

Draft Environmental Impact Report
Solano County 2008 Draft General Plan



SCH # 2007122069

Volume I: DEIR Text

Prepared by:
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Sacramento, CA 95811

April 18, 2008

EDAW | **AECOM**

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Solano County 2008 Draft General Plan



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Volume I: DEIR Text

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COUNTY OF SOLANO GENERAL PLAN UPDATE

Department of Resource Management
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April 18, 2008

RE: Draft EIR - 2008 Draft Solano County General Plan

A comprehensive update of Solano County's General Plan was initiated in 2006. After months of meetings by the Citizens Advisory Committee, Planning Commission and Board of Supervisors, the 2008 Draft General Plan was released for public review earlier this month. A copy was previously sent to your agency.

The Draft Environmental Impact Report (DEIR) for the 2008 Draft General Plan is enclosed with this transmittal. The formal public review period for the DEIR has been initiated and will conclude on June 2, 2008. Please submit your comments on the DEIR by June 2, 2008 to:

Jim Louie, Senior Planner
County of Solano County
Resource Management Department
675 Texas Street, Suite 5500
Fairfield, CA 94533

The Solano County Planning Commission will begin public hearings in May 2008. The Solano County Board of Supervisors will follow with public hearings scheduled to begin in July 2008. Additional information and supporting documents for the comprehensive update of the County's General Plan are online at: www.solanocountygeneralplan.net.

If you have any further questions regarding the Draft General Plan and the Draft EIR please contact Jim Louie at either 707.784.3173 or Email - jalouie@solanocounty.com.

Jim Louie, Sr Planner

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Resource Management**
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**NOTICE OF COMPLETION, AVAILABILITY & PUBLIC HEARING
DRAFT ENVIRONMENTAL IMPACT REPORT
2008 SOLANO COUNTY GENERAL PLAN**

NOTICE IS HEREBY GIVEN that the County of Solano has prepared a Draft Environmental Impact Report (EIR) for the 2008 Draft Solano County General Plan.

This environmental impact report (EIR) evaluates the broad-scale impacts of the *2008 Solano County General Plan Update* (2008 Draft General Plan). The 2008 Draft General Plan EIR is a program EIR under the California Environmental Quality Act Guidelines (State CEQA Guidelines) (California Code of Regulations, Title 14, Sections 15000 et seq. [14 CCR 15000 et seq.]). A program EIR "may be prepared on a series of actions that can be characterized as one large project and are related in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program" (State CEQA Guidelines Section 15168[a][3]). In this case, the program EIR will address the 2008 Draft General Plan, which is the proposed project. This program EIR considers a series of actions needed to achieve the implementation of the 2008 Draft General Plan.

Environmental review in compliance with CEQA (Public Resources Code Sections 21000 et seq.) is required as part of the County's consideration of the 2008 Draft General Plan. This DEIR includes an evaluation of 15 primary environmental resource areas, as well as other CEQA-mandated sections, as presented below:

Land use, Air quality, Noise, Transportation and circulation, Hydrology and water resources, Biological resources, Geology and soils, Agricultural resources, Public services and utilities, Cultural and paleontological resources, Aesthetic resources, Energy, Hazards and hazardous materials, Recreation, Climate change.

The County of Solano is the Lead Agency in the preparation of the EIR. The EIR examines all of the potentially significant environmental effects of the project, and alternatives and/or mitigation measures to reduce or avoid those significant impacts. The Draft EIR concludes that there could be significant adverse environmental effects for the 2008 Draft Solano County General Plan. Mitigation measures are identified to reduce some of these impacts to a less-than-significant levels; exceptions are identifying in the report.

The Draft EIR is being published for a 45-day public review and comment period that begins on April 18, 2008 and ends on June 2, 2008. A Final EIR will be prepared to respond to comments received during the review period and will be presented for public comment at a future date. The Board of Supervisors must certify the EIR as a complete, accurate, and objective analysis prior to taking action on the 2008 Solano County General Plan at a date to be specified. We welcome your views on the adequacy and completeness of the Draft EIR. If you represent a public agency, please provide information that is germane to your statutory responsibilities as they may be affected by this project. Responsible and trustee agencies will need to use the EIR prepared by the County when considering adoption of the 2008 Solano County General Plan. If you decide to challenge the action of the County in court, you may be limited to raising only those issues you or someone else raised at or prior to the final public hearing on the 2008 Solano County General Plan.

Due to the time limits mandated by State law, your comments must be received by the County prior to the close of the 45 day review period, which is 5:00 p.m. on June 2, 2008. The Solano County Planning Commission will conduct a public hearing to review the Draft EIR and receive public comments at 7:00 p.m. on Thursday, May 15, 2008, at the Solano County Board of Supervisors Board Room, 675 Texas Street, 1st Floor, Fairfield, California. Please submit any requests for a CD disk copy of the Draft EIR, your written comments, including the name, address and telephone number of a contact person to: Jim Louie, Sr. Planner, Solano County Department of Resource Management, 675 Texas Street, Suite 5500, Fairfield, CA 94533 (707) 784-6765.

Copies of the Draft EIR can be reviewed at the Department of Resource Management at the above address beginning on April 18, 2008. Additional copies can be reviewed at all public libraries in Dixon, Rio Vista, Vacaville, Fairfield, Suisun City, Benicia and Vallejo and on the internet website at www.solanocountygeneralplan.net.

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ACRONYMS AND ABBREVIATIONS

°C	Celsius
°F	Fahrenheit
µg/m ³	micrograms per cubic meter
2008 Draft General Plan	<i>2008 Solano County General Plan Update</i>
A	Exclusive Agricultural
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ADA	Americans with Disabilities Act
ADT	average daily traffic
AFB	Air Force Base
afy	acre-feet per year
A-L	Limited Agricultural
ALUC	Airport Land Use Commission
ALUCP	airport land use compatibility plan
AQAP	Air Quality Attainment Plan
ARB	California Air Resources Board
ATCM	Airborne Toxic Control Measure
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
Bay-Delta	San Francisco Bay/Sacramento–San Joaquin Delta
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice
BNHM	Berkeley Natural History Museums
BO	biological opinion
BP	Before Present
BSC	Building Standards Commission
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAAQS	California ambient air quality standards
CAC	Citizens’ Advisory Committee
Cal/EPA	California Environmental Protection Agency
CALFED	California Bay-Delta Authority
Caltrans	California Department of Transportation
CALUP	Comprehensive Airport Land Use Plan
CALVIN	California Value Integrated Network
CAP	climate action plan
CARE	Community Air Risk Evaluation
CBC	California Building Code
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCCC	California Climate Change Center
CCR	California Code of Regulations
CDE	California Department of Education
CDF	California Department of Forestry and Fire Protection

ACRONYMS AND ABBREVIATIONS

CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CGS	California Department of Conservation, Geologic Survey
CH ₄	methane
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon monoxide
Cortese-Knox-Hertzberg Act	Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000
County	Solano County
County OES	County Office of Emergency Services
CPA	California Power Authority
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CTC	California Transportation Commission
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CVP	Central Valley Project
CWA	Clean Water Act of 1972
dBA	A-weighted decibels
DEIR	draft environmental impact report
Delta	Sacramento–San Joaquin Delta
DFG	California Department of Fish and Game
DHS	California Department of Health Services
diesel PM	diesel particulate matter
District	Fairfield-Suisun Sewer District
DOC	California Department of Conservation
DPC	Delta Protection Commission
DPC Plan	<i>Land Use and Resource Management Plan for the Primary Zone of the Delta</i>
DPH	California Department of Public Health
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EAP	Energy Action Plan
EFH	essential fish habitat
EIR	environmental impact report
EMS	emergency medical service
EMT	emergency medical technician
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FD	Fire Department
FEIR	final environmental impact report
FEMA	Federal Emergency Management Agency

ACRONYMS AND ABBREVIATIONS

FEMP	Federal Energy Management Program
FERC	Federal Energy Regulatory Commission
FIP	Federal Implementation Plan
FIRM	flood insurance rate map
FMMP	Farmland Mapping and Monitoring Program
FPD	Fire Protection District
FPP	Farmland Protection Program
FPPA	Farmland Protection Policy Act
FSSD	Fairfield-Suisun Sewer District
GCM	general circulation model
General Plan	<i>Solano County General Plan</i>
GHG	greenhouse gas
GIS	information system
gpd	gallons per day
gpm	gallons per minute
GVW	gross vehicle weight
GVWR	Gross Vehicle Weight Rating
GWh	gigawatt-hours
GWP	global warming potential
H.R.	House of Representatives
HAPs	hazardous air pollutants
HOV	high-occupancy vehicle
I-	interstate highway
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
ISO	Insurance Services Office
IWMP	Integrated Waste Management Plan
JPA	joint powers authority
kW	kilowatts
kWh	kilowatt-hours
LAFCO	Local Agency Formation Commission
L _{dn}	day/night average sound level
LEED	Leadership in Energy Efficient Design
LEV	Low Emission Vehicle
LOS	level of service
LVW	loaded vehicle weight
MACT	maximum available control technology
maf	million acre-feet
MCL	maximum contaminant level
M-G	General Manufacturing
mgd	million gallons per day
M-L	Limited Manufacturing

ACRONYMS AND ABBREVIATIONS

Mojave	Mojave Water Agency
mph	miles per hour
MPO	metropolitan planning organization
MPWD	Maine Prairie Water District
MSA	municipal service area
MTC	Metropolitan Transportation Commission
MTP	Metropolitan Transportation Plan
MW	megawatts
MWh	megawatt-hours
N ₂ O	ozone, nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NBA	North Bay Aqueduct
NBR	North Bay Regional
NECPA	National Energy Conservation Policy Act
NESHAP	national emissions standards for hazardous air pollutants
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NMHC	nonmethane hydrocarbon
NMWD	North Marin Water District
NO	nitric oxide
NOP	notice of preparation
NOX	nitrogen
NO _x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTR	National Toxics Rule
NWIC	Northwest Information Center
OAP	Ozone Attainment Plan
OES	Governor's Office of Emergency Services
OGI	Orderly Growth Initiative
OMR	Office of Mine Reclamation
OSHA	Occupational Safety and Health Administration
OWTS	on-site wastewater treatment systems
PAH	polycyclic aromatic hydrocarbons
pCi/L	picocuries per liter
PCM	parallel climate model
PG&E	Pacific Gas and Electric Company
PGT	Pacific Gas Transmission
PIER	Public Interest Energy Research
PM ₁₀	particulate matter less than or equal to 10 microns in diameter
PM _{2.5}	particulate matter less than or equal to 2.5 microns in diameter
ppm	parts per million
PRC	Public Resources Code
PTC	Production Tax Credit

ACRONYMS AND ABBREVIATIONS

PURPA	Public Utility Regulatory Policies Act
RCRA	Resource Conservation and Recovery Act
RD	reclamation district
RDA	redevelopment agency
Reclamation	U.S. Bureau of Reclamation
RHNA	Regional Housing Need Allocation
RNVWD	Rural North Vacaville Water District
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
RTIP	regional transportation improvement program
RTP	regional transportation plan
r-WD	Water-Dependent Industrial
RWQCB	regional water quality control board
SACOG	Sacramento Area Council of Governments
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SB	Senate Bill
SCFCWCD	Solano County Flood Control and Water Conservation District
SCFD	Solano County Fire Department
SCWA	Solano County Water Agency
SEMSC	Solano Emergency Medical Services Cooperative
SFBAAB	San Francisco Bay Area Air Basin
SHMA	Seismic Hazards Mapping Act
SHMP	Seismic Hazard Mapping Program
SID	Solano Irrigation District
SIP	State Implementation Plan
SLR	sea level rise
SLRSP	Sea Level Rise Strategic Program
SMARA	Surface Mining and Reclamation Act of 1975
SMGB	State Mining and Geology Board
SMUD	Sacramento Municipal Utility District
SO ₂	Sulfur dioxide
Society	Solano County Historical Society
Solano HCP	<i>Solano Multi-Species Habitat Conservation Plan</i>
SP	Solano Project
SR	State Route
SRCD	Suisun Resource Conservation District
SRRE	Source Reduction and Recycling Element and Household Hazardous Waste Element
SSWA	Suisun-Solano Water Authority
STA	Solano Transportation Authority
STAR	Standardized Testing and Reporting
State CEQA Guidelines	California Environmental Quality Act Guidelines
STIP	State Transportation Improvement Program
SVAB	Sacramento Valley Air Basin
SWMP	stormwater management plan
SWP	State Water Project

ACRONYMS AND ABBREVIATIONS

SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCCP	<i>Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation</i>
TCM	Transportation Control Measure
TCP	Traditional Cultural Property
TDR	transfer of development rights
TDS	total dissolved solids
TIP	Transportation Improvement Program
TMDL	total maximum daily load
tpy	tons per year
TRU	transportation refrigeration unit
UBC	Uniform Building Code
UCMP	University of California Museum of Paleontology
UNFCCC	United Nations Framework Convention on Climate Change
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USW	U.S. Windpower
UWMP	<i>Urban Water Management Plan</i>
Vallejo Museum	Vallejo Naval and Historical Museum
VMT	vehicle miles traveled
VPW	Vallejo permit water
VSFCD	Vallejo Sanitation and Flood Control District
W	Watershed and Conservation
WDRs	waste discharge requirements
WPD	Water Permits Division
WSA	water supply assessment
WTGs	wind turbine generators
WTPs	water treatment plants
WWTP	wastewater treatment plant
YSAQMD	Yolo/Solano Air Quality Management District

1 INTRODUCTION

1.1 TYPE OF EIR

This environmental impact report (EIR) evaluates the broad-scale impacts of the *2008 Solano County General Plan Update* (2008 Draft General Plan). The 2008 Draft General Plan EIR is a program EIR under the California Environmental Quality Act Guidelines (State CEQA Guidelines) (California Code of Regulations, Title 14, Sections 15000 et seq. [14 CCR 15000 et seq.]).

According to the State CEQA Guidelines (Section 15168[a]), a state or local agency should prepare a program EIR, rather than a project EIR, when the lead agency proposes the following:

- ▶ a series of related actions that are linked geographically;
- ▶ logical parts of a chain of contemplated events, rules, regulations, or plans that govern the conduct of a continuing program; or
- ▶ individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways.

A program EIR “may be prepared on a series of actions that can be characterized as one large project and are related...in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program” (State CEQA Guidelines Section 15168[a][3]). In this case, the program EIR will address the 2008 Draft General Plan, which is the proposed project. This program EIR considers a series of actions needed to achieve the implementation of the 2008 Draft General Plan.

As a program EIR, this document focuses on the overall effect of the 2008 Draft General Plan. This analysis does not examine the effects of site-specific projects that may occur within the overall umbrella of this program in the future. The nature of general plans is such that many proposed policies are intended to be general, with details to be worked out during implementation. As a result, many of the impacts and mitigation measures in this EIR can be described only in general or qualitative terms.

With respect to the processing of subsequent site-specific projects, the County intends to avail itself of two separate, but complementary processes authorized by CEQA that are intended to streamline the review of projects consistent with approved general plans and to allow the County to make optimal use of this EIR once it is certified. These two processes are described below to put the public on notice of how, specifically, the County intends to use this EIR in the future.

First, the analysis in this program EIR, which addresses the impacts of Solano County (County) and local policy decisions, is considered the first tier of environmental review and creates the foundation upon which future, project-specific CEQA documents can build. Tiering refers to the concept of a multilevel approach to preparing environmental documents set forth in State CEQA Guidelines Section 15152. Section 15152 provides that where a first-tier EIR has “adequately addressed” the subject of cumulative impacts, such impacts need not be revisited in second- and/or third-tier documents. According to Section 15152(f)(3), significant effects identified in a first-tier EIR are adequately addressed, for purposes of later approvals, if the lead agency determines that such effects have been either:

- ▶ “mitigated or avoided as a result of the prior [EIR] and findings adopted in connection with that prior [EIR]”;
or

- ▶ “examined at a sufficient level of detail in the prior [EIR] to enable those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.”

This program EIR evaluates the large-scale impacts on the environment that can be expected to result from the adoption of the 2008 Draft General Plan, but it does not necessarily address the site-specific impacts that each individual development project following and implementing the 2008 Draft General Plan may have. CEQA requires that each of those subsequent development projects be evaluated for its particular site-specific impacts. These site-specific analyses are typically encompassed in second-tier documents, such as project EIRs, focused EIRs, or negative declarations on individual development projects subject to the 2008 Draft General Plan. A program EIR can be incorporated by reference into subsequently prepared environmental documents to address issues such as cumulative impacts and growth-inducing impacts, allowing the subsequent documents to focus on new or site-specific impacts (State CEQA Guidelines Section 15168[d]). Although the legally required contents of a program EIR are the same as those of a project EIR, in practice there are considerable differences in level of detail. Program EIRs are typically conceptual and abstract; they contain a more general discussion of impacts, alternatives, and mitigation measures than project-level EIRs.

Second, future environmental review can also be streamlined pursuant to Public Resources Code Section 21083.3 and State CEQA Guidelines Section 15183. These provisions generally limit the scope of necessary environmental review for site-specific approvals following the preparation of an EIR for a general plan. For such site-specific approvals, CEQA generally applies only to impacts that are “peculiar to the parcel or to the project” and that have not been disclosed in the general plan EIR, except where “substantial new information” shows that previously identified impacts will be more significant than previously assumed. Impacts are considered *not* to be “peculiar to the parcel or to the project” if they can be substantially mitigated pursuant to previously adopted “uniformly applied development policies or standards.”

Therefore, the program EIR will help determine the need for subsequent environmental documentation. Parameters by which a lead agency can determine the need for additional environmental documentation are contained in the State CEQA Guidelines (Sections 15160–15170 and Section 15183).

1.2 PURPOSE AND INTENDED USES OF THE EIR

This programmatic draft environmental impact report (DEIR) evaluates the environmental impacts that could result from implementation of the proposed 2008 Draft General Plan, which provides policy guidelines for the unincorporated portions of Solano County to direct growth and development.

The State CEQA Guidelines charge public agencies with the responsibility of avoiding or minimizing environmental damage where feasible. As part of this responsibility, public agencies are required to balance various public objectives including economic, environmental, and social issues. As part of that process, the EIR is intended to inform decision-makers and the public what significant environmental effects could result from a proposed project. In addition, an EIR identifies potential ways of mitigating significant effects and presents reasonable alternatives to the project. Solano County, as the lead agency, has prepared this EIR on the proposed project. In making its decision about the proposed project, the County will consider the information in this EIR along with any other available information.

The EIR was prepared under the direction of the County and is provided for review by both the public and public agencies, as required by CEQA. The County Board of Supervisors must certify the final EIR (FEIR) before adopting the 2008 Draft General Plan.

1.3 SCOPE OF THE EIR

1.3.1 GEOGRAPHIC SCOPE

To keep the analysis of impacts in this program EIR in perspective, Solano County contains an area of 910 square miles. It includes well-established urban, suburban, and rural communities. Agricultural lands are a dominant feature within the county's landscape. The county also contains coastal mountains, rolling hills, flat valley areas, and expansive marshland areas. The variety of geographic zones has an influence on climate, which in turn affects biodiversity, energy usage (for air conditioning and heating), water usage (for agriculture and landscaping), wildland fire hazards, flood hazards, air quality (heat, wind patterns, topography), water quality (natural salinity), and soil types (Prime Farmland) within the county. In addition, the county contains vast expanses of federal and state lands and seven incorporated cities that are not under the land use control of the County. The analysis in a program EIR for a county this size is not intended to be site-specific (e.g., determining the traffic level of service for intersections within the county), but is instead a more broad analysis. For example, the traffic analysis determines whether the roadway widths proposed in the 2008 Draft General Plan's Circulation Element will accommodate the planned land uses. The program EIR does not, however, determine fair-share roadway improvements for individual future development projects.

1.3.2 ENVIRONMENTAL ISSUES ADDRESSED

Environmental review in compliance with CEQA (Public Resources Code Sections 21000 et seq.) is required as part of the County's consideration of the 2008 Draft General Plan. This DEIR includes an evaluation of 15 primary environmental resource areas, as well as other CEQA-mandated sections, as presented below:

- ▶ Land use
- ▶ Air quality
- ▶ Noise
- ▶ Transportation and circulation
- ▶ Hydrology and water resources
- ▶ Biological resources
- ▶ Geology and soils
- ▶ Agricultural resources
- ▶ Public services and utilities
- ▶ Cultural and paleontological resources
- ▶ Aesthetic resources
- ▶ Energy
- ▶ Hazards and hazardous materials
- ▶ Recreation
- ▶ Climate change

Chapter 5 includes an analysis of alternatives to the proposed project (which is also referred to as the "Preferred Plan"), as required by Section 15126.6 of the State CEQA Guidelines. Other CEQA-mandated issues discussed within the context of this DEIR are cumulative impacts, growth-inducing impacts, and significant and unavoidable adverse impacts (Chapter 6). Included as Volume II of this DEIR are the technical appendices that accompany the text of the DEIR (Volume I). Volume II of the DEIR includes technical planning documents and other studies prepared to support development and implementation of the 2008 Draft General Plan and the DEIR.

In compliance with CEQA, the County sent a Notice of Preparation (NOP) on December 27, 2007, to government agencies, special service districts, organizations, and individuals with an interest in or jurisdiction over the project. This step ensured early consultation on the scope of the EIR. The comment period ended on February 4, 2008. The County held a public scoping meeting for the project on January 23, 2008.

The DEIR has been prepared in accordance with CEQA, including the CEQA statutes (Public Resources Code Sections 21000–21178.1), State CEQA Guidelines (14 CCR Sections 15000–15387), and relevant court decisions.

1.4 ENVIRONMENTAL REVIEW PROCESS

The State CEQA Guidelines require that each DEIR contain areas of description and analysis. Table 1-1 identifies the required elements of a DEIR (with State CEQA Guidelines sections referenced) and the corresponding chapters or sections in which each element is discussed in this document.

Table 1-1 Analyses Required by the State CEQA Guidelines	
Required Description and Analysis	EIR Chapter or Section
Summary (Section 15123)	2
Description of the Project (Section 15124)	3
Description of the Existing Setting (Section 15125)	4
Environmental Impacts (Sections 15126 and 15143)	4
Alternatives to the Proposed Project (Section 15126.6)	5
Cumulative Impacts (Section 15355)	6.1
Growth-Inducing Impacts (Section 15126[d])	6.2
Irreversible Environmental Effects (Section 15126.2[c])	6.3
Significant Environmental Effects Which Cannot be Avoided (Section 15126.2[b])	6.4
Source: Data provided by EDAW in 2008	

1.5 ORGANIZATION OF THE EIR

This DEIR is organized as follows:

- ▶ **Chapter 1, “Introduction,”** describes the type of EIR prepared for the 2008 Draft General Plan; the purpose, intended uses, and geographic and environmental scope of the EIR; the environmental review process; the relationship of the EIR to other County plans and zoning; subsequent actions required; the type of mitigation proposed in this EIR; the EIR comment process; and other agencies expected to use this EIR.
- ▶ **Chapter 2, “Executive Summary,”** provides an overview of the findings and conclusions of this EIR.
- ▶ **Chapter 3, “Project Description,”** describes the project’s location, purpose, and history; the framework of the 2008 Draft General Plan; and the relationship of the 2008 Draft General Plan to area and regional plans.
- ▶ **Chapter 4, “Environmental Impact Analysis,”** evaluates the topics listed above (except climate change) in Section 1.3.2, “Environmental Issues Addressed,” and includes a discussion of the existing conditions; regulatory framework; less-than-significant, potentially significant, and significant environmental effects; mitigation for potentially significant and significant effects; and any effects remaining significant after mitigation. For each impact, two scenarios are analyzed: the “Preferred Plan” scenario, which examines the impacts of buildout of the 2008 Draft General Plan under the assumption that each land use designation would be developed at the midpoint of the designation’s permitted densities/intensities, and the “Maximum Development Scenario,” which examines the impacts if development occurred at the theoretical maximum allowed in the draft plan.

- ▶ **Chapter 5, “Alternatives Analysis,”** provides a comparative analysis between the 2008 Draft General Plan as described in Chapter 2, “Project Description,” and two alternatives. This chapter also describes alternatives that were considered but eliminated from detailed consideration in the EIR; describes the alternatives that were carried forward for evaluation; and identifies the “environmentally superior” alternative. In this EIR the alternatives used for comparison are the No-Project Alternative and the Maximum Environmental Sustainability Alternative.
- ▶ **Chapter 6, “Other CEQA Considerations,”** describes the impacts of implementing the 2008 Draft General Plan in combination with the impacts of related past, present, and reasonably foreseeable projects. This chapter also includes a description of effects related to climate change. It also discusses the growth inducement potential of the 2008 Draft General Plan, significant irreversible environmental changes associated with the plan, and significant and unavoidable effects of the plan.
- ▶ **Chapter 7, “Report Preparation,”** lists the individuals who contributed to preparation of the DEIR.
- ▶ **Chapter 8, “References,”** lists the sources of information cited throughout the DEIR.
- ▶ **Appendices** provide background and technical information.

1.6 RELATIONSHIP TO OTHER COUNTY PLANS AND ZONING

Both the existing General Plan and the 2008 Draft General Plan have been coordinated with the general plans of the seven incorporated cities within Solano County. Areas for future expansion of the cities have been coordinated with the cities. Although the 2008 Draft General Plan does not regulate development within the cities, it is applicable to lands within the unincorporated parts of the various city spheres of influence.

The County’s adoption of the 2008 Draft General Plan may lead to revisions to the County’s Development Code, including the Zoning Ordinance. It is possible that changes could be made to other existing County plans and programs as well, depending on the final adopted provisions of the 2008 Draft General Plan. A number of future actions may be based, in whole or in part, on the environmental evaluation undertaken as part of the 2008 Draft General Plan and this EIR. Review and approval of subsequent development projects may require review and approval by agencies including but not limited to:

- ▶ the County, which has jurisdiction over amendments to the *Solano County General Plan*, zone changes, subdivisions, conditional use permits, and other discretionary development approvals;
- ▶ the U.S. Army Corps of Engineers, which issues federal Section 404 permits for individual development projects and public works projects;
- ▶ the regional water quality control boards, which issue state National Pollutant Discharge Elimination System permits for individual private development projects and public projects; and
- ▶ the California Department of Fish and Game, which issues state Section 1600 et seq. permits for individual private development projects and public works projects.

Various other federal, state, regional, and local plans and other laws will affect the land use and development consistent with the 2008 Draft General Plan. In some cases, compliance with these plans and/or laws will provide additional reduction of the impacts of future land uses and development. In other cases, these plans and/or laws may preempt County jurisdiction, resulting in environmental impacts that may not occur in their absence.

FEDERAL GOVERNMENT

There are no federal plans that directly affect local land use decisions, but federal laws such as the Endangered Species Act can affect individual land uses in a significant way. Whenever federal funding is involved regarding road and highway projects or other public infrastructure, the projects must comply with the National Environmental Policy Act as well as the federal Endangered Species Act. The U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the U.S. Department of Housing and Urban Development are examples of federal agencies that exercise jurisdiction over many such projects.

STATE AND REGIONAL GOVERNMENT

State and regional agencies also exert strong influence on local land use and development decisions. In some cases, these agencies have adopted plans. The state's influence is accomplished primarily through funding of public infrastructure. In some matters, however, the state exercises direct control. An example is the requirement for certification of housing elements by the California Department of Housing and Community Development. State law also dictates much of the content of general plans and related zoning regulations.

In addition, state requirements are often implemented through regional planning and regulatory agencies. Examples include:

- ▶ the regional water quality control boards' Basin Plans and point- and nonpoint-source water quality regulations;
- ▶ the Metropolitan Transportation Commission's Regional Transportation Plans;
- ▶ the Association of Bay Area Governments' distribution of regional housing needs allocations; and
- ▶ the air quality management districts' Clean Air Plans and permit regulations.

Four other quasi-regional agencies that influence local land use decisions and decisions on development project applications are the Solano County Airport Land Use Commission, the Solano County Local Agency Formation Commission, the Solano Transportation Authority, and the San Francisco Bay Conservation and Development Commission (BCDC). These are state-mandated bodies that exercise independent authority over particular types of projects or projects in particular locations. In these cases, though, the County is a nonmajority participant in the decision making of the agency.

- ▶ The Solano County Airport Land Use Commission is required to adopt a comprehensive airport land use plan that affects projects in the vicinity of the two public-use airports in the county. The Solano County Local Agency Formation Commission is responsible for decisions regarding the formation and organization of special districts that provide public services to county residents and regarding the geographical area served by special districts and cities through spheres of influence and annexation. The Solano Transportation Authority is a regional transportation planning agency that is influential in obtaining funding and prioritizing circulation projects. BCDC, in partnership with coastal cities and counties, plans and regulates the use of land and water in San Francisco Bay. Specifically, BCDC's regulatory jurisdiction includes the following:
 - the open water, marshes, and mudflats of greater San Francisco Bay, including Suisun, San Pablo, Honker, Richardson, San Rafael, San Leandro, and Grizzly Bays and Carquinez Strait;
 - the first 100 feet inland from the shoreline around San Francisco Bay;
 - the portion of Suisun Marsh—including levees, waterways, marshes, and grasslands—below the 10-foot contour line;

- portions of most creeks, rivers, sloughs, and other tributaries that flow into San Francisco Bay; and
- salt ponds, duck hunting preserves, game refuges, and other managed wetlands that have been diked off from San Francisco Bay.

CITY PLANS

Each city in Solano County exercises complete authority over land use and development within its city limits. Cities occasionally exercise authority over sewer, water, and other services outside of the city limits. The 2008 Draft General Plan has established municipal service areas (MSAs) around each incorporated city. MSAs generally correspond to cities' existing spheres of influence and define each city's area of current and/or future jurisdictional responsibility. Land uses depicted on the land use diagram within MSAs generally are consistent with the planned land uses described within a city's general plan. Within MSAs, future development of urban land uses is to be facilitated and served through city annexation. Current land uses within MSAs may continue under County jurisdiction until the land is annexed to the city for conversion to urban uses.

1.7 SUBSEQUENT ACTIONS REQUIRED

Further actions or procedures required to allow implementation of the 2008 Draft General Plan would include the processing of zoning ordinances, specific plans, tentative maps, site design plans, building permits, and/or grading permits. These actions would occur as part of future development project proposals, which would also be subject to CEQA requirements. The only discretionary action anticipated to be taken by the County involves adoption of the 2008 Draft General Plan itself.

1.8 MITIGATION MEASURES

The State CEQA Guidelines define mitigation to include:

- ▶ avoiding the impact altogether by not taking a certain action or parts of an action;
- ▶ minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- ▶ rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- ▶ reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- ▶ compensating for the impact by replacing or providing substitute resources or environments.

In this case, because the proposed project is the County's general plan, mitigation to accomplish the above outcomes is in the form of:

- ▶ modified goals, policies, or implementing programs proposed in the 2008 Draft General Plan;
- ▶ new goals, policies, or implementing programs not currently proposed in the 2008 Draft General Plan;
- ▶ modified land uses (locations, type, and/or amount) capable of reducing or eliminating a potentially significant impact; and
- ▶ other actions (e.g., actions performed by another agency).

The 2008 Draft General Plan's policies take into account many of the impacts and mitigation measures discussed in this EIR, and many of these mitigation measures are included as part of the proposed project itself, with the intention that the proposed project would be self-mitigating for many impacts.

CEQA requires the adoption of a mitigation monitoring program for all adopted mitigation measures. The mitigation monitoring plan must be designed to ensure compliance during project implementation (Public Resources Code Section 21081.6, State CEQA Guidelines Section 15097). The mitigation measures identified for the 2008 Draft General Plan take the form of new or modified goals, policies, implementation measures, and actions that can be added directly to the final plan. Mitigation measures that are adopted by the County will thus be implemented and enforced through the application of the 2008 Draft General Plan to land use and planning decisions and the implementation of actions directed by the plan. As provided by Section 21081.6(b) of the Public Resources Code and Section 15097(b) of the State CEQA Guidelines, the mitigation monitoring plan for the 2008 Draft General Plan will consist of the incorporation of adopted mitigation measures into the 2008 Draft General Plan, the monitoring and implementation policies that are included in the plan, and the annual report on general plan status required by the California Government Code.

1.9 AVAILABILITY OF THE DRAFT EIR

Copies of the 2008 Draft General Plan and this DEIR are available through the Solano County Department of Resource Management and online at www.solanocountygeneralplan.net. The County will also circulate the document to public agencies, relevant organizations, and interested individuals.

Comments may be submitted in writing or orally at a public hearing to be held by the County Planning Commission. Comments should be focused on the adequacy and completeness of the EIR or should address questions about the environmental consequences of project implementation. In this case, "adequacy" is defined as the thoroughness of the EIR in addressing significant environmental effects, identifying mitigation measures for those impacts, and supplying enough information for public officials to make decisions about the merits of the project. To keep the document succinct and useful as a decision-making tool, the State CEQA Guidelines charge that an EIR focus on a project's significant environmental impacts and not address every imaginable less-than-significant effect.

Comments on the DEIR must be made before the close of the public review period on June 2, 2008, and sent or delivered to:

Solano County Department of Resource Management—Planning Services
Attn: Jim Louie
675 Texas Street, Suite 5500
Fairfield, CA 94533

Comments can also be sent by e-mail to: <JALouie@SolanoCounty.com>

After the close of the public review period, an FEIR will be prepared that contains all the comments received by the County during the public review period and responses to those comments. This document will be made available to public agencies and the general public so those parties can review the FEIR before the County certifies it as complete.

No action can be taken on the 2008 Draft General Plan until the FEIR is certified; however, County acceptance of the EIR upon certification does not signal or require approval of the 2008 Draft General Plan.

1.10 AGENCIES EXPECTED TO USE THIS EIR

As the lead agency for this “project,” Solano County will be responsible for considering certification of the EIR and adoption of the 2008 Draft General Plan. The County may utilize this EIR as a program EIR, tiered EIR, or project EIR in subsequent actions on 2008 Draft General Plan implementing programs, general plan amendments or elements, the Development Code, community plans, other County plans, or other relevant County planning actions.

Solano County is the CEQA lead agency for the proposed project. In conformance with Sections 15050 and 15367 of the State CEQA Guidelines, the lead agency is the “public agency which has the principal responsibility for carrying out or disapproving a project.” The County is responsible for approving the 2008 Draft General Plan.

In addition to the lead agency, State CEQA Guidelines Section 15124 states that an EIR should contain a statement briefly describing the intended uses of the EIR and, to the extent that it is known to the lead agency, a list of agencies expected to use the EIR in their decision making, permits or other approvals implementing the project, and related environmental review and consultation required by law or regulation.

A wide variety of federal, state, regional, and local agencies may use this EIR in their planning process, issuance of their permits, or exercise of their regulatory authority over resources or jurisdictional actions within Solano County. Agencies may use the EIR as a program EIR for subsequent parts of their program actions subject to CEQA, tiering their project CEQA studies to the EIR, or utilizing the EIR in whole or part to apply to a required CEQA study in conjunction with specific agencies’ project approval actions.

Cities in Solano County will also need to consider the County General Plan aspects of this EIR, as well as impact analysis and mitigation measures as they pertain to consistency with adopted city general plans and other planning actions. In addition to the County and each of the cities, a number of other jurisdictional and permit-granting agencies have control over specific environmental concerns in the planning area. The following is a listing of agencies that may utilize this EIR. Because it is not practical or possible for the County to know or ascertain all of the possible specific uses for which other agencies may subsequently utilize this EIR, the listing attempts to provide a brief summary disclosure of the applicable types of actions or authorities for which the cited agency may use this EIR as follows:

- ▶ Bay Area Air Quality Management District (monitors air quality and has permit authority over certain types of facilities in a portion of Solano County)
- ▶ San Francisco Bay Conservation and Development Commission (plans and regulates the use of land and water in the San Francisco Bay)
- ▶ California Department of Conservation, Division of Mines and Geology (expertise in evaluating geologic and seismic hazards as well as mineral resource issues)
- ▶ California Department of Fish and Game (streambed alteration agreement pursuant to Section 1600 of the California Fish and Game Code)
- ▶ California Department of Transportation (encroachment permit)
- ▶ California Department of Housing and Community Development (reviews the adequacy of housing elements and funding for affordable housing programs)
- ▶ California Public Utilities Commission (certificate of public convenience and necessity)

- ▶ Central Valley and San Francisco Bay Regional Water Quality Control Boards (water quality certification pursuant to Section 401 of the Clean Water Act; National Pollutant Discharge Elimination System permit)
- ▶ Metropolitan Transportation Commission (directs transportation planning and financing in the nine-county San Francisco Bay Area)
- ▶ Native American Heritage Commission (mandated to preserve and protect places of special religious or cultural significance pursuant to Section 5097 et seq. of the Public Resources Code)
- ▶ Solano County Fire Districts (delisting of proposed fire stations)
- ▶ Solano County Water Agency (responsible for the operation and maintenance of various water conveyance and flood control facilities in Solano County)
- ▶ Yolo-Solano Air Quality Management District (monitors air quality and has permit authority over certain types of facilities in a portion of Solano County)

In addition to these agencies, the following federal agencies may use environmental information in this DEIR for permitting decisions:

- ▶ U.S. Army Corps of Engineers (Section 404 of the Clean Water Act permit)
- ▶ U.S. Fish and Wildlife Service (Section 7 consultation or Section 10a habitat conservation plan/Section 9 incidental take permit pursuant to the federal Endangered Species Act)

2 EXECUTIVE SUMMARY

2.1 INTRODUCTION

This draft environmental impact report (DEIR) evaluates the broad-scale impacts of the *2008 Solano County General Plan Update* (2008 Draft General Plan). The 2008 Draft General Plan proposes a comprehensive update to the current *Solano County General Plan* (General Plan) and includes sections addressing issues not previously covered by the current General Plan. The DEIR has been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000–21178.1), the State CEQA Guidelines (14 California Code of Regulations, Title 14, Sections 1500–15387), and relevant court decisions.

As stated in Section 15123(a) of the State CEQA Guidelines, “[a]n EIR shall contain a brief summary of the proposed action and its consequences. The language of the summary should be as clear and simple as reasonably practical.” This executive summary of the DEIR includes (1) a summary description of the proposed project (i.e., the 2008 Draft General Plan), (2) a synopsis of environmental impacts and recommended mitigation measures (see Table 2-1 at the end of this chapter), (3) identification of the alternatives evaluated, and (4) a discussion of the areas of controversy associated with the 2008 Draft General Plan.

2.2 TYPE OF EIR

The 2008 Draft General Plan EIR is a program EIR under the State CEQA Guidelines. A program EIR “may be prepared on a series of actions that can be characterized as one large project and are related...in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program” (State CEQA Guidelines Section 15168[a][3]). This program EIR considers a series of actions needed to achieve the implementation of the 2008 Draft General Plan and focuses on the plan’s overall effect. The nature of general plans is such that many proposed policies are intended to be general, with details to be worked out during implementation. As a result, many of the impacts and mitigation measures in this EIR can be described only in general or qualitative terms.

This program EIR evaluates the large-scale impacts on the environment that can be expected to result from the adoption by Solano County (County) of the 2008 Draft General Plan, but it does not necessarily address the potential site-specific impacts of each individual development project following and implementing the 2008 Draft General Plan. The program EIR will help determine the need for subsequent environmental documentation for such projects. For example, the traffic analysis determines whether the roadway widths proposed in the 2008 Draft General Plan’s Transportation and Circulation chapter will accommodate the planned land uses. The program EIR does not, however, determine fair-share roadway improvements for individual future development projects.

2.3 PROJECT OBJECTIVES

The primary objective of the 2008 Draft General Plan is to provide policy guidelines for future development and conservation in the unincorporated portions of Solano County and to adapt the document to pertinent issues that have emerged since the preparation of the previous elements. The objectives of the proposed project are as follows:

- ▶ Maintain the current development strategy of city-centered growth, where most urban growth is located within the incorporated cities through city annexation where urban services are provided.
- ▶ Retain the overall function of the County’s Orderly Growth Initiative, while refining the policies and land use designations.

- ▶ Protect and support agriculture as an important component of the county’s economy and quality of life.
- ▶ Encourage the location of needed new industrial and agricultural processing facilities through appropriate land use designations on parcels of sufficient size and location in relation to existing agriculture, industry, and infrastructure to support such development.
- ▶ Sustain and enhance the county’s natural environment, including its diverse species, watersheds, natural communities, and wildlife corridors.
- ▶ Continue the existing development pattern of distinct and identifiable cities and communities.
- ▶ Encourage economic development within the unincorporated county.
- ▶ Ensure sufficient residential, commercial, and industrial development within areas serviced by cities to support a vibrant economy and provide affordable housing options.

2.4 PROJECT CHARACTERISTICS

2.4.1 TOPICS DISCUSSED IN THE 2008 DRAFT GENERAL PLAN

Protection of agricultural lands and the county’s rural character has been an overarching theme of the County’s planning efforts for many decades. The 2008 Draft General Plan would continue this tradition and broaden the General Plan’s scope to encompass sustainability as it relates to the environment, the economy, and social equity.

To address these themes, the 2008 Draft General Plan is organized as topical chapters. The current Housing and Parks and Recreation Elements were recently updated and adopted before this comprehensive update, and are therefore not a part of the proposed project. The seven topical chapters address the general plan issues required by the California Government Code and usually found within the required elements; however, the County has chosen to group topics differently, as permitted by the California Government Code, to resolve potential internal consistency issues and avoid duplication of plan content. Chapter 3, “Project Description,” of this EIR describes the 2008 Draft General Plan in detail. A general description of each chapter of the plan is provided below.

LAND USE CHAPTER

The 2008 Draft General Plan continues the current General Plan’s policies to focus most development within the existing urban centers. The municipal service area (MSA) is used to define the areas of current and future city jurisdictional responsibility for public services and infrastructure necessary to support planned urban land uses. Existing land uses within MSAs would continue under the County’s jurisdiction until the land is annexed to the city for conversion to urban uses. (It should be noted that most of the changes that would occur under the 2008 Draft General Plan relative to the current General Plan are intended to conform to the city general plans’ land uses within their MSAs.) In areas outside MSAs, planned land uses would be maintained or developed under County jurisdiction. Exhibit 3-2 in Chapter 3, “Project Description,” of this DEIR depicts the land use diagram for the 2008 Draft General Plan. The Land Use chapter of the 2008 Draft General Plan also includes policies that would guide future development in four special study areas: Middle Green Valley, Suisun Valley, Collinsville, and Old Town Cordelia.

AGRICULTURE CHAPTER

The 2008 Draft General Plan marks the first time the County has chosen to separate agricultural policies into a separate chapter. New policies direct the County to consider agricultural land uses within 10 distinct regions in order to promote focused marketing and economic development. The 2008 Draft General Plan would enable agricultural processing to occur on land designated for agriculture within several regions and would allow more

agricultural areas to provide “value-added” services such as sales and agritourism, particularly within the Suisun Valley. Policies in this chapter would establish a farmland mitigation program for all agricultural land converted as a result of nonagricultural development. A County ordinance is required for this program. Additionally, an Agricultural Resource Overlay is proposed. The overlay would indicate the areas along the Interstate 80 corridor between Vacaville and Dixon and between Dixon and Davis, where the County would encourage private landowners to voluntarily participate in agricultural conservation easements as one method of implementing the farmland mitigation program. The Agriculture chapter also includes policies to reduce conflicts between residential and agricultural uses through the use of agricultural-urban buffers. The cost to create and maintain these buffers would be paid by new development through development impact fees or ongoing maintenance fees. Further, proposed policies direct the County to streamline the permitting process for agriculture-related buildings on agricultural land, and guide future development in the Suisun Valley special study area.

RESOURCES CHAPTER

The Resources chapter contains several sections, as described below.

- ▶ **Biological Resources.** The 210,576-acre Resource Conservation Overlay is proposed to identify portions of the county with high-priority resource management needs and provide in-situ protection of several target biological resources. The overlay would be compatible with the Agriculture, Water Bodies and Courses, Watershed, and Marsh land use designations. If a development proposal requires a change to the designation, the County would require resource conservation strategies tailored to the resource(s) of concern. The 2008 Draft General Plan also would require the creation of an ordinance that protects oak woodlands and another ordinance requiring a permit and mitigation for the removal or significant disturbance of a heritage oak tree.
- ▶ **Marsh and Delta Areas.** This section emphasizes the importance of the county’s extensive marshland environment and the San Francisco Bay/Sacramento–San Joaquin Delta area. Policies and programs support implementation of the Suisun Marsh Protection Act, Delta Protection Act, *White Slough Specific Plan*, and Napa Sonoma Marsh Restoration Project.
- ▶ **Mineral Resources.** This section contains policies and implementation programs that facilitate the extraction of known mineral deposits, prevent encroachment of incompatible uses adjacent to such deposits, and require mines to conduct their operations in a manner compatible with surrounding land uses.
- ▶ **Scenic Resources.** Policies and programs in this section are intended to protect valued landscape features and ensure that new development within scenic roadway corridors respects and maintains the integrity of viewsheds. Policies would strengthen the protection of the *Tri-City and County Cooperative Plan* area (also see “Community Separators” below), protect ridgelines, reduce light pollution, and encourage provision of scenic open spaces.
- ▶ **Cultural Resources.** Three policy directions are identified in this section: preserving cultural and historic resources, continued and improved consultation with Native American tribes, and using historic and cultural resources to create opportunities for tourism.
- ▶ **Recreational Resources.** Policies in this section would expand recreational resources by creating a connected trail network, improving bicycle routes, and establishing additional parks and fishing access points.
- ▶ **Energy Resources.** Policies and programs in this section would strive to make the county a model of energy efficiency and green building, with specific requirements for both new residential developments of six or more units and new commercial buildings larger than 10,000 square feet. Policies would also encourage the development of renewable energy sources (e.g., solar, water, wind, biofuels) and emphasize proper siting of wind resources to avoid conflict with biological and scenic resources. A 31,737-acre Wind Resources Overlay

area in the Montezuma Hills is identified as the county's primary wind resource area. Additional wind resource verification would not be required for wind energy permit applications in this area.

- ▶ **Community Separators.** Policies in this section direct the County to work with the cities, the state, and other agencies to maintain open-space separators around cities to preserve their identity and character. The Tri-City and County Planning Area Overlay is included to preserve a physical and visual separation between Benicia, Fairfield, and Vallejo in response to concerns of encroaching development and the loss of agricultural lands.
- ▶ **Water Resources.** This section contains policies addressing water quality, groundwater, the conservation and reuse of water, importing and exporting of water, and watershed management. It calls for an ordinance that establishes a riparian buffer to protect water quality and ecosystem function. Policies would limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks as well as natural drainage features that would filter and absorb stormwater. The plan would also propose watershed protection policies, application of best management practices in agricultural operations, and the improvement of water use efficiency.

PUBLIC HEALTH AND SAFETY CHAPTER

Sections within the Public Health and Safety chapter are described below.

- ▶ **Flooding.** This section contains policy direction beyond that of the current General Plan to consolidate flood control responsibilities. It also contains a discussion of the flood potential resulting from climate change and sea level rise and a new program, the Sea Level Strategic Program, to address this flood threat.
- ▶ **Seismic Safety and Land Stability.** This section emphasizes current policies to limit development within fault zones, near creek banks, and areas susceptible to landslides; enforce existing building codes for new construction and rehabilitation of existing at-risk buildings; and stabilize public facilities that cross fault zones.
- ▶ **Fire.** Policies in this section limit development expansion into high-fire-hazard areas and require new development to incorporate construction standards and materials that provide increased levels of fire protection. They also require certain rural residential properties in high-fire-hazard areas to provide adequate water supplies for fire suppression.
- ▶ **Hazardous Materials.** This section establishes policies and programs (e.g., supporting implementation of the County's Hazardous Waste Management Plan) to minimize residents' and the environment's exposure to hazardous materials. Such materials are most commonly associated with certain industrial operations, hazardous waste shipping, agricultural sprays, and leaking underground storage tanks.
- ▶ **Disaster Preparedness.** The Governor's Office of Emergency Services is the lead agency for disaster response operations, but coordination with other agencies, cities, other jurisdictions, and the general public is essential. This new section includes policies to ensure the adequacy of disaster response in coordination with other jurisdictions; plan for and designate evacuation and aid routes; and educate the public on disaster preparedness.
- ▶ **Public Health.** This section proposes policies and implementation programs for public health issues that are not addressed in other portions of the plan. Proposed policies include working to provide outreach and services for special needs populations, increasing access to healthy foods, encouraging the provision of health care, and encouraging the provision of childcare facilities located close to other uses.
- ▶ **Air Quality.** This section provides policies and programs designed to protect human and environmental health by reducing the generation of air pollutants and buffering sensitive uses or user groups from high

concentrations of air pollutants. Policies and programs would reduce vehicle emissions, minimize health impacts from sources of toxic air contaminants, promote consistency and cooperation in air quality planning efforts, and provide incentives to agricultural producers to minimize the impacts of operations on air quality.

- ▶ **Climate Change.** This new section summarizes proposed policies and programs found throughout the 2008 Draft General Plan related to climate change to reduce vehicle emissions (air quality section), provide for natural carbon sequestration to offset carbon emissions (air quality section and Agriculture chapter), enable renewable-energy production and increased energy efficiency (energy resources and conservation section), and direct city-centered development (Land Use chapter). The section calls for the implementation of a climate action plan with two primary objectives: reduce total greenhouse gas emissions in the county to 20% below 1990 levels by 2020 (20% below state law requirements); and create adaptation strategies to address the impacts of climate change on the county.
- ▶ **Noise.** The noise section emphasizes separation of noise-sensitive land uses (housing, schools, and parks) from noise-producing land uses (highways, airports, and industry). When such separation is not feasible, proposed policies recognize and direct the use of other noise attenuation strategies such as sound barriers.

ECONOMIC DEVELOPMENT CHAPTER

This chapter promotes land use decisions that ensure that an adequate amount of land is available for commercial and industrial uses; an efficient regulatory environment with a predictable development process; incentives and activities to attract or retain businesses; social policies designed to benefit the economic environment of the county; and policies and efforts to maintain or increase the quality of life in Solano County.

TRANSPORTATION AND CIRCULATION CHAPTER

This chapter contains policies regarding the maintenance and improvement of current transportation systems, collaboration with other agencies and cities to continue to plan land uses to reduce vehicle miles traveled, and evaluation of new development for their compatibility with and potential effects on transportation systems.

PUBLIC FACILITIES AND SERVICES CHAPTER

This chapter addresses numerous topics, as described below.

- ▶ **Water Facilities and Service.** Policies in this section would allow for on-site wells or for public water service where it is available.
- ▶ **Sewer and Wastewater.** Policies in this section would allow for individual on-site systems or centralized sewage treatment systems utilizing the best system available that meets tertiary treatment or higher standards. Service may be provided to either developed or planned areas, with oversight by a public agency.
- ▶ **Solid Waste.** In addition to policies directing the provision of disposal sites and reducing waste, this section includes policies regarding composting and making compost available to farmers, allowing use of solid waste for alternative energy production, and minimizing negative effects of disposal operations on the environment.
- ▶ **Drainage.** Policies in this section direct the County to control runoff through site design, landscaping, and stormwater facilities and to work with Solano County Water Agency to improve drainage facilities. Low-impact development techniques are emphasized; development projects would be required to minimize stormwater pollution and runoff and to maximize the potential for groundwater recharge.
- ▶ **Fire Protection and Emergency Services.** Policies address proposed response times, training, and equipment; public education regarding fire safety; and including review within the development process.

- ▶ **Law Enforcement.** Policies in this section address police protection, the inclusion of law enforcement review in the County’s development review process, and law enforcement needs throughout the county.
- ▶ **Public Education.** Policies include coordinating with school districts, ensuring sufficient funding for school facilities through development impact fees, and pursuing joint use of school and park sites.
- ▶ **Community Facilities.** This section addresses those facilities not addressed separately in other sections, including health clinics, libraries, and community centers. Policies direct improved access to and continued development of new facilities.
- ▶ **Utilities.** Policies in this section call for minimizing disruption caused by transmission lines and encourage undergrounding of utility lines.

2.4.2 POPULATION, HOUSING, AND DEVELOPMENT PROJECTIONS

Implementation of the 2008 Draft General Plan would result in increased population, housing units, and commercial and industrial floor space within the county compared to existing conditions. Chapter 3, “Project Description,” and the analyses in Chapter 4, “Environmental Impact Analysis,” of this DEIR evaluate two distinct land use scenarios for the 2008 Draft General Plan: the Preferred Plan and the Maximum Development Scenario. The “Preferred Plan” scenario is based on two assumptions: (1) Future development will occur at the same densities and intensities at which current land uses have developed; and (2) all developable property will be developed by 2030. Under the Maximum Development Scenario, by contrast, (1) development would occur at the highest density and intensity allowed by the 2008 Draft General Plan, taking into account conditions that would prevent 100% of all lands designated for development from being built to 100% of the maximum density or intensity permitted under the 2008 Draft General Plan; and (2) all developable property will be developed by 2030. As a result, this scenario would generate substantially more dwelling units, commercial square footage, and population growth than the Preferred Plan. Although it is extremely unlikely that maximum buildout could occur, such a scenario must be analyzed to demonstrate the highest possible level of environmental impact that could result from the project.

2.5 ALTERNATIVES

An EIR is required to contain a discussion of a reasonable range of alternatives to the project, or to the location of the project, that could feasibly attain the basic objectives of the project (State CEQA Guidelines Section 15126.6[a]). The comparative merits of the alternatives should also be presented. Chapter 5, “Alternatives to the Proposed Project,” of this DEIR provides a comparative analysis between the 2008 Draft General Plan and four alternatives. One of these alternatives, as required under CEQA, is a no project alternative. The text below provides a brief summary of the alternatives to the 2008 Draft General Plan.

2.5.1 ALTERNATIVE 1. NO PROJECT: BUILDOUT OF THE EXISTING GENERAL PLAN

This alternative assumes that the 2008 Draft General Plan would not be implemented and that the County would build out as indicated by the existing (pre-update) General Plan. The No Project Alternative would contain less land designated as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan. The alternative contains 1,778 fewer acres of residential land, 349 fewer acres of commercial land, and 891 fewer acres of industrial land. A total of 15,072 fewer acres of agricultural lands would be converted to nonagricultural uses under the No Project Alternative than under the 2008 Draft General Plan. The No Project Alternative would not have the Resource Conservation Overlay or Agricultural Reserve Overlay designations contained in the 2008 Draft General Plan.

2.5.2 ALTERNATIVE 2. IMPROVED ENVIRONMENTAL SUSTAINABILITY

This alternative seeks to improve environmental sustainability by modifying the land use diagram, certain land use designations, and certain policies and programs proposed within the 2008 Draft General Plan that are designed to achieve primarily economic or social-equity objectives. This alternative assumes reduced amounts of development of land designated Rural Residential, Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs, and increased amounts of land within the proposed Agricultural Reserve Overlay and Resource Conservation Overlay.

Under Alternative 2, a Limited Industrial area would be reduced from 689 acres to 240 acres. This area and 266 acres proposed for Limited Industrial use would be designated Agriculture—Dixon Ridge Region. The Agricultural Reserve Overlay would be extended westward to add 7,338 acres; 6,652 acres of Resource Conservation Overlay would be added. In addition, areas proposed for Rural Residential use would be designated Agriculture—Western Hills Region (300 acres) and Agriculture—Pleasants, Vaca, and Lagoon Valleys Region (190 acres). Approximately 30 acres proposed for Highway Commercial use would be placed within the City of Vacaville’s MSA and designated Urban Commercial. Land proposed for Neighborhood Agricultural/Tourist Centers would be reduced from 75 acres (among eight centers) to 40 acres; the remaining 35 acres would be designated Agriculture—Suisun Valley Region. Lastly, under Alternative 2, approximately 4,190 acres proposed for Water Dependent Industrial use east of Collinsville would be designated Agriculture—Montezuma Hills Region.

These assumptions are presented in the land use diagram for Alternative 2 (see Exhibit 5-2 in Chapter 5, “Alternatives to the Proposed Project”). This alternative further assumes certain limits on agricultural processing on lands designated Agriculture, and would place limitations on proposed policies enabling centralized sewer treatment facilities.

2.5.3 ALTERNATIVE 3. REDUCED COMMERCIAL AND INDUSTRIAL DEVELOPMENT

This alternative modifies the land use diagram, land use designations, and certain policies and programs proposed within the 2008 Draft General Plan that would expand areas designated for commercial and industrial uses relative to the current General Plan. This alternative assumes designation of less land as Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs.

Under Alternative 2, a Limited Industrial area would be reduced from 689 acres to 240 acres; 266 acres proposed for Limited Industrial use would be designated Agriculture—Dixon Ridge Region. Areas proposed for Highway Commercial use would be designated Agriculture—Pleasants, Vaca, and Lagoon Valleys Region (30 acres) and Agriculture—Dixon Region (45 acres). In addition, land proposed for Neighborhood Agricultural/Tourist Centers would be reduced from 75 acres (among eight centers) to 40 acres; remaining 35 acres would be designated Agriculture—Suisun Valley Region. Finally, under Alternative 2, approximately 8,996 acres proposed for Water Dependent Industrial use east of Collinsville would be designated Agriculture—Montezuma Hills Region.

These assumptions are presented in the land use diagram for Alternative 3 (see Exhibit 5-3 in Chapter 5). This alternative also places limitations on the policies enabling centralized sewer treatment facilities.

2.5.4 ALTERNATIVE 4. REDUCED RURAL RESIDENTIAL DEVELOPMENT

This alternative modifies the land use diagram, land use designations, and certain policies and programs proposed within the 2008 Draft General Plan that would expand areas designated for rural residential use relative to the current General Plan. This alternative assumes designation of less land as Rural Residential. Under Alternative 4, approximately 1,830 acres proposed for Rural Residential use within the unincorporated county area would be

designated Agriculture. This assumption is presented in the land use diagram for Alternative 4 (see Exhibit 5-4 in Chapter 5). This alternative also places limitations on the policies enabling centralized sewer treatment facilities.

2.5.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

In addition to the discussion and comparison of impacts of the alternatives to the 2008 Draft General Plan, CEQA requires that an “environmentally superior” alternative among the alternatives considered be selected and that the reasons for such selection be disclosed. In general, the environmentally superior alternative is the alternative that would generate the fewest or least severe adverse impacts. If the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives (State CEQA Guidelines Section 15126.6[e]). For the purposes of this EIR, Alternative 2 is environmentally superior because it would reduce impacts in the greatest number of topic areas compared to the 2008 Draft General Plan. It is assumed that any of the alternatives described in this chapter could be designed to achieve the majority of the community’s goals, as expressed throughout the 2008 Draft General Plan.

2.6 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Chapter 4 of this EIR evaluates in detail the environmental impacts that would result from implementation of the 2008 Draft General Plan and sets forth mitigation measures required to avoid or reduce environmental impacts, where feasible. Chapter 6 evaluates potential cumulative impacts associated with the 2008 Draft General Plan. Table 2-1 (at the end of this chapter) lists each of the environmental impacts of the 2008 Draft General Plan under both the Preferred Plan and the Maximum Development Scenario, then presents the level of significance of each impact before mitigation, mitigation measures for significant and potentially significant impacts, and the level of significance of each impact after mitigation. It also lists the significant cumulative effects to which the 2008 Draft General Plan would contribute. As shown in Table 2-1, implementation of the 2008 Draft General Plan could significantly affect a number of environmental resources and issue areas, but mitigation is included to reduce these impacts to a less-than-significant level, where feasible. A discussion of significant and unavoidable impacts is provided in Chapter 6 of this DEIR.

2.7 AREAS OF CONTROVERSY AND SUBSEQUENT ACTIONS REQUIRED

Section 15123 of the State CEQA Guidelines requires that a summary of an EIR identify areas of controversy known to the lead agency, including issues raised by agencies and the public. During the public comment period for the notice of preparation, various comment letters were received regarding the 2008 Draft General Plan. Appendix A of this DEIR includes the notice of preparation and comments received in writing. In general, areas of potential controversy known to the County include aesthetics (effects of proposed urban development on ridgeline views, tree protection, bay and marsh views, and greenbelt areas), agriculture (effects of proposed MSAs, agricultural subregions, and decrease in minimum agricultural parcel size on agricultural resources), biological resources (potential for impacts on oak woodlands, effects of the Wind Resources Overlay on protected species), hydrology (effects on water supply, groundwater, and drainage and flooding), land use (growth-inducing impacts of land use changes), public services (ability of the County to provide services to new development within unincorporated areas), and transportation (traffic impacts of increased commercial, industrial, and rural residential development in the unincorporated county). These issues were considered in the preparation of this DEIR and, where appropriate, are addressed in the environmental impact analyses presented in Chapter 4.

The only discretionary action anticipated to be taken by the County involves adoption of the 2008 Draft General Plan itself. However, adoption of the plan may lead to revisions to the County’s Development Code, including the Zoning Ordinance. It is possible that changes could be made to other existing County plans and programs as well, depending on the final adopted provisions of the 2008 Draft General Plan. Further actions or procedures required to allow implementation of the 2008 Draft General Plan would include the processing of zoning ordinances,

specific plans, tentative maps, site design plans, building permits, and/or grading permits. These actions would occur as part of future development project proposals, which would also be subject to CEQA requirements.

Various other federal, state, regional, and local plans and other laws will affect the land use and development consistent with the 2008 Draft General Plan. In some cases, compliance with these plans and/or laws will provide additional reduction of the impacts of future land uses and development. In other cases, these plans and/or laws may preempt County jurisdiction, resulting in environmental impacts that may not occur in their absence.

2.8 AVAILABILITY OF THE DRAFT EIR

Copies of the 2008 Draft General Plan and this DEIR are available through the Solano County Department of Resource Management, at all public libraries in the county, and online at <www.solanocountygeneralplan.net>. Copies of the background documents and references in the EIR are available for review at the Solano County Department of Resource Management.

The County will also circulate the document to public agencies, relevant organizations, and interested individuals. Comments may be submitted in writing or orally at a public hearing to be held by the County Planning Commission. Comments should be focused on the adequacy and completeness of the EIR or should address questions about the environmental consequences of project implementation. In this case, “adequacy” is defined as the thoroughness of the EIR in addressing significant environmental effects, identifying mitigation measures for those impacts, and supplying enough information for public officials to make decisions about the merits of the project. To keep the document succinct and useful as a decision-making tool, the State CEQA Guidelines charge that an EIR focus on a project’s significant environmental impacts and not address every imaginable less-than-significant effect.

Comments on the DEIR must be made before the close of the public review period on June 2, 2008, and sent or delivered to:

Solano County Department of Resource Management—Planning Services
Attn: Jim Louie
675 Texas Street, Suite 5500
Fairfield, CA 94533

Comments can also be sent by e-mail to: <JALouie@SolanoCounty.com>

After the close of the public review period, a final environmental impact report (FEIR) will be prepared that contains all the comments received by the County during the public review period and responses to those comments. This document will be made available to public agencies and the general public so those parties can review the FEIR before the County certifies it as complete.

No action can be taken on the 2008 Draft General Plan until the FEIR is certified; however, County acceptance of the EIR upon certification does not signal or require approval of the 2008 Draft General Plan.

Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
4.1 Land Use			
4.1-1a (Preferred Plan) and 4.1-1b (Maximum Development Scenario): Division of Established Communities. Buildout of the 2008 Draft General Plan could result in the division of established communities. However, implementation of policies and programs contained in the 2008 Draft General Plan would ensure that potential divisions do not occur or are minimized. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.1-2a (Preferred Plan) and 4.1-2b (Maximum Development Scenario): Conflict with Other Plans. Goals, policies, and programs of the 2008 Draft General Plan would not conflict with other adopted plans. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.1-3a (Preferred Plan) and 4.1-3b (Maximum Development Scenario): Conflict with Adopted Habitat Conservation Plans. Buildout of the 2008 Draft General Plan would not conflict with an adopted habitat conservation plan or natural community conservation plan. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.1-4a (Preferred Plan) and 4.1-4b (Maximum Development Scenario): Incompatibility with Established Land Uses. Implementation of the 2008 Draft General Plan would result in changes in land use type, density, and scale in existing agricultural areas and in areas adjacent to incorporated cities and unincorporated communities. These changes would result in land use conflicts and incompatibilities. Although the 2008 Draft General Plan contains policies and programs to reduce incompatibilities, the impacts would not be fully mitigated. This impact would be significant .	S	Mitigation Measures 4.1-4a (Preferred Plan) and 4.1-1b (Maximum Development Scenario): Require Minimum Mitigation Ratio of 1.5:1 or Higher for Farmland Conversion. Program AG.I-1 of the 2008 Draft General Plan shall be amended to have a minimum mitigation ratio of 1.5:1 or higher for farmland conversion to mitigate the impacts of new nonagricultural uses on adjacent and neighboring agricultural operations. Program AG.I-1 shall be amended to read as follows. AG.I-1: Create and adopt a farmland conversion mitigation program and ordinance. Require compensation for loss of agricultural land. Establish appropriate mitigation ratios for the program or utilize a graduated mitigation mechanism. The mitigation ratio shall be a minimum of 1.5:1 (1.5 acres of	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		farmland protected through mitigation for each acre of farmland converted). The program shall not present regulatory barriers to agritourism, agricultural services, and agricultural processing in regions and within land use designations where such uses are permitted and encouraged. The program shall also establish mitigation within the same agricultural region as the proposed development project, or within the Agricultural Reserve Overlay district, as a preferred strategy. The program shall incorporate a fee option, and shall provide an exemption for farmworker housing. Mitigation lands shall be of similar agricultural quality to the lands being converted.	
<p>4.1-5a (Preferred Plan) and 4.1-5b (Maximum Development Scenario): Inducement of Population Growth. Implementation of the 2008 Draft General Plan would induce population growth in unincorporated portions of Solano County. This impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact. This impact would remain significant and unavoidable without a reduction in acreage devoted to residential use, a decrease in residential densities to reduce the projected number of dwelling units, or the regulation of the number of residential building permits that may be issued annually. These potential mitigation measures could increase the cost of housing in Solano County, thereby conflicting with Objective C.1 and Policy C.1 of the 2008 Draft General Plan Housing Element, which promote the production of housing for all segments of the population at all income levels.	SU
<p>4.1-6a (Preferred Plan) and 4.1-6b (Maximum Development Scenario): Displacement of Substantial Existing Housing. Buildout of the 2008 Draft General Plan would not result in the displacement of substantial existing housing units; therefore, it would not necessitate the construction of housing units elsewhere. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.1-7a (Preferred Plan) and 4.1-7b (Maximum Development Scenario): Displacement of Substantial Numbers of People. Buildout of the 2008 Draft General Plan would not result in the displacement of substantial numbers of people and therefore would not necessitate the construction of housing units elsewhere. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
4.2 Air Quality			
<p>4.2-1a (Preferred Plan) and 4.2-1b (Maximum Development Scenario): Generation of Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors. Emissions of ROG and NO_x during construction consistent with the 2008 Draft General Plan would exceed BAAQMD's significance threshold of 80 lb/day and YSAQMD's significance threshold of 10 TPY for ROG and NO_x and 80 lb/day for PM₁₀. In addition, control measures recommended by BAAQMD and YSAQMD for construction-related emissions of PM₁₀ are not currently required, nor are they projected to be required. Thus, construction-related emissions of criteria air pollutants and precursors could violate an ambient air quality standard, contribute substantially to an existing or predicted air quality violation, and/or expose sensitive receptors to substantial pollutants. As a result, this impact would be significant.</p>	S	<p>Mitigation Measures 4.2-1a(1) (Preferred Plan) and 4.2-1b(1) (Maximum Development Scenario): Require Implementation of Supplemental Measures to Reduce Construction-Related Exhaust Emissions. In addition to the measures recommended by BAAQMD and YSAQMD for construction emissions of PM₁₀ and incorporated into the 2008 Draft General Plan under Program HS.I-60, the County shall require each project applicant, as a condition of project approval, to implement the following measures to further reduce exhaust emissions from construction-related equipment:</p> <ul style="list-style-type: none"> ▶ Commercial electric power shall be provided to the project site in adequate capacity to avoid or minimize the use of portable gas-powered electric generators and equipment. ▶ Where feasible, equipment requiring the use of fossil fuels (e.g., diesel) shall be replaced or substituted with electrically driven equivalents (provided that they are not run via a portable generator set). ▶ To the extent feasible, alternative fuels and emission controls shall be used to further reduce NO_x and PM₁₀ exhaust emissions. ▶ On-site equipment shall not be left idling when not in use. ▶ The hours of operation of heavy-duty equipment and/or the amount of equipment in use at any one time shall be limited. ▶ Construction shall be curtailed during periods of high ambient pollutant concentrations; this may involve ceasing construction activity during the peak hour of vehicular traffic on adjacent roadways or on Spare the Air Days. ▶ Staging areas for heavy-duty construction equipment shall be located as far as possible from sensitive receptors. ▶ Before construction contracts are issued, the project applicants shall perform a review of new technology, in 	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>consultation with BAAQMD and YSAQMD, as it relates to heavy-duty equipment, to determine what (if any) advances in emissions reductions are available for use and are economically feasible. Construction contract and bid specifications shall require contractors to utilize the available and economically feasible technology on an established percentage of the equipment fleet. It is anticipated that in the near future, both NO_x and PM₁₀ control equipment will be available.</p> <p>Mitigation Measures 4.2-1a(2) (Preferred Plan) and 4.2-1a(2) (Maximum Development Scenario): Require Implementation of Supplemental Measures to Reduce Fugitive PM₁₀ Dust Emissions. In addition to the required basic control measures, the County shall require each project applicant, as a condition of project approval, to implement the following enhanced and additional control measures recommended by BAAQMD and YSAQMD to further reduce fugitive PM₁₀ dust emissions:</p> <ul style="list-style-type: none"> ▶ Hydroseeding shall be used or nontoxic soil stabilizers shall be applied to inactive construction areas (previously graded areas inactive for 10 days or more). ▶ Exposed stockpiles (e.g., dirt, sand) shall be enclosed, covered, or watered twice daily, or nontoxic soil binders shall be applied to such stockpiles. ▶ Traffic speeds on unpaved roads shall be limited to 15 mph. ▶ Sandbags or other erosion control measures shall be installed to prevent runoff of silt to public roadways. ▶ Vegetation shall be replanted in disturbed areas as quickly as possible. ▶ Wheel washers shall be installed on all exiting trucks, or the tires or tracks of all trucks and equipment leaving the site shall be washed off. ▶ Windbreaks shall be installed or trees/vegetative windbreaks shall be planted at windward side(s) of construction areas. 	

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> ▶ Excavation and grading activity shall be suspended when winds (instantaneous gusts) exceed 25 mph. ▶ The area subject to excavation, grading, and other construction activity at any one time shall be limited, as necessary. 	
<p>4.2-2a (Preferred Plan) and 4.2-2b (Maximum Development Scenario): Consistency with Air Quality Planning Efforts. Future development in Solano County would generate emissions of criteria air pollutants (PM₁₀) and ozone precursors, both of which affect regional air quality. Anticipated population and development consistent with the 2008 Draft General Plan could lead to operational (mobile-source and area-source) emissions that exceed thresholds. This impact would be significant.</p>	S	<p>Mitigation Measures 4.2-2a (Preferred Plan) and 4.2-2b (Maximum Development Scenario): Coordinate with Air Districts on Assumptions from Air Quality Plan Updates. The County shall coordinate with BAAQMD and YSAQMD at the earliest opportunity to ensure that all new assumptions from new air quality plan updates are implemented as part of the 2008 Draft General Plan.</p>	SU
<p>4.2-3a (Preferred Plan) and 4.2-3b (Maximum Development Scenario): Generation of Long-Term Operational, Regional Emissions of Criteria Air Pollutants and Precursors. Long-term operational activities consistent with the 2008 Draft General Plan would result in emissions of ROG, NO_x, and PM₁₀ that exceed BAAQMD's and YSAQMD's significance thresholds of 80 lb/day and 10 TPY. Thus, operational emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be significant.</p>	S	<p>Mitigation Measures 4.2-3a (Preferred Plan) and 4.2-3b (Maximum Development Scenario): Require Implementation of YSAQMD Design Recommendations for Development Projects. The County shall require each project applicant, as a condition of project approval, to implement the following mitigation measure recommended by YSAQMD.</p> <p>Design of all development projects shall include all of the following elements, as applicable:</p> <ul style="list-style-type: none"> ▶ A duct system within the building thermal envelope, or insulated to R-83 standards ▶ Passive cooling strategies, including passive or fan-aided cooling planned for or designed into the structure, a cupola or roof opening for hot-air venting, or underground cooling tubes ▶ High-efficiency outdoor lighting utilizing solar power or controlled by motion detectors ▶ Natural lighting in buildings ▶ Building siting and orientation designed to reduce energy use 	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> ▶ Summer shading and wind protection measures to increase energy efficiency ▶ Use of concrete or other nonpolluting materials for parking lots instead of asphalt ▶ Use of landscaping to shade buildings and parking lots ▶ Photovoltaic and wind generators ▶ Installation of energy efficient appliances and lighting ▶ Installation of mechanical air conditioners and refrigeration units that use non-ozone-depleting chemicals 	
<p>4.2-4a (Preferred Plan) and 4.2-4b (Maximum Development Scenario): Generation of Long-Term, Operational, Local Mobile-Source Emissions of CO. Based on BAAQMD’s and YSAQMD’s screening criteria, implementation of the 2008 Draft General Plan could result in LOS levels being lowered to LOS E or LOS F at some county intersections resulting in long-term operational, local mobile-source emissions of CO that substantially contribute to emissions concentrations or exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact would be significant.</p>	S	<p>Mitigation Measures 4.2-4a (Preferred Plan) and 4.2-4b (Maximum Development Scenario): Require Implementation of Measures to Reduce Operational Emissions from Mobile Sources. The County shall require each project applicant, as a condition of project approval, to implement the following mitigation measures, as appropriate:</p> <ul style="list-style-type: none"> ▶ Intersections affected by individual projects shall be evaluated for violations of CO concentration thresholds. ▶ Development review shall focus on upgrading roads in Solano County to County design standards if the new development significantly contributes to the need to upgrade these roads, regardless of whether the new development occurs inside a city or within the unincorporated county. <p>The County shall support regular monitoring of the transportation system by the California Department of Transportation and the Solano Transportation Authority, with emphasis on studying congested areas to identify the cause, duration, and severity of the congestion.</p>	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.2-5a (Preferred Plan) and 4.2-5b (Maximum Development Scenario): Exposure of Sensitive Receptors to Emissions of Toxic Air Contaminants. With implementation of the 2008 Draft General Plan, new or modified sources of TACs could be placed near existing sensitive receptors, and new sensitive receptors could be developed near existing sources of TACs. As a result, sensitive receptors could be exposed to substantial concentrations of TACs. This impact would be less than significant for construction-related emissions, but significant for some types of operational emissions.</p>	<p>S/LTS</p>	<p>Mitigation Measures 4.2-5a (Preferred Plan) and 4.2-5b (Maximum Development Scenario): Require Implementation of Measures to Reduce the Potential for Exposure to TACs from Mobile Sources. The County shall require each project applicant to implement the following measures as a condition of project approval:</p> <ul style="list-style-type: none"> ▶ Activities involving idling trucks shall be oriented as far away from and downwind of existing or proposed sensitive receptors as feasible. ▶ Strategies shall be incorporated to reduce the idling time of main propulsion engines through alternative technologies such as IdleAire, electrification of truck parking, and alternative energy sources for TRUs to allow diesel engines to be completely turned off. ▶ Proposed developments shall incorporate site plans that move sensitive receptors as far as feasibly possible from major roadways (100,000+ average daily trips) 	<p>SU</p>
<p>4.2-6a (Preferred Plan) and 4.2-6b (Maximum Development Scenario): Exposure of Sensitive Receptors to Emissions of Odors. Implementation of the 2008 Draft General Plan could result in the exposure of sensitive receptors to emissions of objectionable odors. As a result, this impact would be significant.</p>	<p>S</p>	<p>Mitigation Measures 4.2-6a (Preferred Plan) and 4.2-6b (Maximum Development Scenario): Require Implementation of Measures to Reduce Exposure of Sensitive Receptors to Odorous Emissions. The County shall require each project applicant to implement the following mitigation measures as a condition of project approval:</p> <ul style="list-style-type: none"> ▶ The deeds to all properties of proposed sensitive uses located within 2 miles of the major odor sources identified by BAAQMD and YSAQMD shall include a disclosure clause (odor easement), prepared by an attorney with expertise in the field, and approved by the County, advising buyers and tenants of the potential adverse odor impacts from major sources of odors. ▶ Odor control devices shall be installed at the emitter to reduce the exposure of receptors to objectionable odorous 	<p>SU</p>

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>emissions if an odor-emitting facility is to occupy space in a proposed commercial land use area.</p> <ul style="list-style-type: none"> ▶ The odor-producing potential of land uses shall be considered when the exact type of facility that would occupy commercial areas is determined. 	
4.3 Noise			
<p>4.3-1a (Preferred Plan) and 4.3-1b (Maximum Development Scenario): Development of Noise-Sensitive Land Uses within Areas Subject to Noise Impacts. Future development of new noise-sensitive land uses would occur within areas that either are currently affected by noise from both transportation and nontransportation noise sources, or will be in the future. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.3-2a (Preferred Plan) and 4.3-2b (Maximum Development Scenario): Development of Noise-Producing Uses near Existing Noise-Sensitive Land Uses. Future development of new noise-generating land uses could occur within areas containing noise-sensitive land uses. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.3-3a (Preferred Plan) and 4.3-3b (Maximum Development Scenario): Traffic Noise Level Increases Caused by Development Consistent with the 2008 Draft General Plan. Implementation of the 2008 Draft General Plan would result in greater traffic volumes on county roadways than currently exists. The greater traffic volumes would result in increased traffic noise on county roadways. This impact would be significant.</p>	S	<p>Mitigation Measures 4.3-3a (Preferred Plan) and 4.3-3b (Maximum Development Scenario): Adopt Countywide Noise Reduction Program. The County shall adopt a countywide noise reduction program to reduce traffic and other noise levels countywide. The program shall include, but shall not be limited to, the following specific elements for noise abatement consideration where reasonable and feasible:</p> <ul style="list-style-type: none"> ▶ Noise barrier retrofits 	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> ▶ Truck usage restrictions ▶ Reduction of speed limits ▶ Use of quieter paving materials ▶ Building façade sound insulation ▶ Traffic calming ▶ Additional enforcement of speed limits and exhaust noise laws ▶ Signal timing 	
<p>4.3-4a (Preferred Plan) and 4.3-4b (Maximum Development Scenario): Possible Temporary, Short-Term Exposure of Sensitive Receptors to Vibration. Construction of projects under the 2008 Draft General Plan could cause a temporary, short-term disruptive vibration if it were to occur near sensitive receptors. This impact would be potentially significant.</p>	<p>PS</p>	<p>Mitigation Measures 4.3-4a (Preferred Plan) and 4.3-4b (Maximum Development Scenario): Require Implementation of Measures to Reduce Temporary, Short-Term Project-Generated Vibration Levels from Construction. To reduce impacts associated with vibration generated during construction/demolition activities, the County shall require future project applicants to conform to the following requirements:</p> <ul style="list-style-type: none"> ▶ All construction activities shall be limited to the hours of 7 a.m.–6 p.m. Painting, interior finish work, and other generally quiet activities may be allowed outside of these hours provided that construction noise does not exceed ambient noise levels by 10 dBA at nearby sensitive receptors. ▶ All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers’ specifications. ▶ Construction equipment shall be staged and construction employee parking shall be located as far as possible from any sensitive receptors. For the purposes of this project, sensitive receptors are residential dwellings and the community park. ▶ Stationary equipment with substantial potential to result in vibration (e.g., pile drivers) shall be placed away from existing vibration-sensitive receptors and/or acoustical shielding shall be provided. 	<p>LTS</p>

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> ▶ A disturbance coordinator shall be designated and the name and phone number of this person shall be posted conspicuously at the site. The disturbance coordinator shall respond to complaints about vibration and shall take the steps necessary to mitigate the problem in a timely fashion. ▶ Access to the site by construction-related truck traffic shall be limited to the hours of 7 a.m.–6 p.m., Monday–Sunday, unless a special permit is issued to the project applicant by the County. 	
4.4 Transportation and Circulation			
4.4-1a (Preferred Plan) and 4.4-1b (Maximum Development Scenario): Degradation of Roadway Levels of Service. With implementation of the 2008 Draft General Plan, operation of numerous roadways currently operating at LOS C or better would degrade to LOS D, LOS E, or LOS F. Additionally, numerous roadways currently operating at LOS D, LOS E, and LOS F would degrade further. This impact would be significant .	S	No feasible mitigation is available to fully mitigate this impact to a less-than-significant level.	SU
4.4-2a (Preferred Plan) and 4.4-2b (Maximum Development Scenario): Adverse Effects on Emergency Access. Implementation of the 2008 Draft General Plan could create an increase in conditions that could adversely affect emergency access. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.4-3a (Preferred Plan) and 4.4-3b (Maximum Development Scenario): Potential for Inadequate Parking Capacity. Implementation of the 2008 Draft General Plan would result in additional parking demand for new activities that are allowed. Depending on the nature of the new activities, the potential exists for inadequate parking capacity. However, with application of parking standards in the County Zoning Ordinance, this impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.4-4a (Preferred Plan) and 4.4-4b (Maximum Development Scenario): Potential for Conflict with Adopted Plans, Policies, or Programs Supporting Alternative Transportation. Implementation of the 2008 Draft General Plan could result in plans, policies, or programs that could conflict with support of alternative transportation. However, with implementation of the 2008 Draft General Plan’s policy supporting alternative transportation, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.4-5a (Preferred Plan) and 4.5-5b (Maximum Development Scenario): Potential for Air Traffic Safety Risks. Implementation of the 2008 Draft General Plan could result in increased air traffic safety risks or changed air traffic patterns at the county’s two general-aviation airports and one military airport. However, with implementation of existing airport land use compatibility plans, development regulations, and policies contained in the 2008 Draft General Plan, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.5 Hydrology and Water Resources</p>			
<p>4.5-1a (Preferred Plan) and 4.5-1b (Maximum Development Scenario): Violation of Water Quality Standards. The changes in Public, Residential, Commercial, and Industrial land use designations consistent with the 2008 Draft General Plan would result in additional discharges of pollutants to receiving water bodies from nonpoint sources. Such pollutants would result in adverse changes to the water quality of Solano County. However, with adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.5-2a (Preferred Plan) and 4.5-2b (Maximum Development Scenario): On-Site and Downstream Erosion and Sedimentation. Development and land use changes consistent with the 2008 Draft General Plan would increase the amount of impervious surfaces, thereby increasing the total volume and peak discharge rate of stormwater runoff. This could alter local drainage patterns, increasing watershed flow rates above the natural background level (i.e., peak flow rates). Increased peak flow rates may exceed drainage system capacities, exacerbate erosion in overland flow and drainage swales and creeks, and result in downstream sedimentation. Sedimentation, in turn, could increase the rate of deposition in natural receiving waters and reduce conveyance capacities, resulting in an increased risk of flooding. Erosion of upstream areas and related downstream sedimentation typically leads to adverse changes to water quality and hydrology. However, with adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.5-3a (Preferred Plan) and 4.5-3b (Maximum Development Scenario): Construction-Related Water Quality Impacts. Construction and grading activities during development consistent with the 2008 Draft General Plan could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms. However, with implementation of existing regulations and water quality policies and programs contained in the 2008 Draft General Plan, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.5-4a (Preferred Plan) and 4.5-4b (Maximum Development Scenario): Interference with Groundwater Recharge. Development and land use changes consistent with the 2008 Draft General Plan would result in additional impervious surfaces, the diversion of groundwater to surface water, and a potential increase of private wells. Resulting reductions in groundwater recharge in Solano County groundwater basins could affect the yield of hydrologically connected wells and have adverse effects on sensitive plant communities in Jepson Prairie and other areas. However, with implementation of the proposed goal, policies, and programs in the 2008 Draft General Plan, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.5-5a (Preferred Plan) and 4.5-4b (Maximum Development Scenario): Exposure of People or Structures to Flood Hazards. Development and land use changes consistent with the 2008 Draft General Plan would result in the development of residential or commercial structures in floodplains, thereby exposing people and structures to flood hazards. Similar exposure could occur in shoreline areas that would be subject to flooding because of extreme high tides or concurrent high tides and watershed flooding. Sea level rise associated with global climate change would exacerbate these risks. However, with implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with flood control regulations, this impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.5-6a (Preferred Plan) and 4.5-6b (Maximum Development Scenario): Potential for Failure of a Levee. When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property could result. The aging, fragile levee system in the Delta, which includes much of southeastern Solano County, protects farmland, highways, a railroad, natural gas and electric transmission facilities, and aqueducts. The Delta's levees also protect the residents of Rio Vista and multiple communities and rural areas in unincorporated Solano County. Such a levee could fail because of earthquake-induced</p>	S	No feasible mitigation is available to reduce this impact.	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
slumping, landslides, and liquefaction. Implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with other relevant state and local regulations, would reduce the potential for effects on the county from levee failure. However, this impact would still be significant .			
4.5-7a (Preferred Plan) and 4.5-7b (Maximum Development Scenario): Potential for Failure of a Dam. Of the 18 dams in Solano County, the state OES has identified 10 where dam inundation has the potential to cause human injury or loss of life. In the unlikely event of dam failure, people and structures are exposed to inundation, and death, injury, or loss of property could result. Implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with other relevant state and local regulations, would minimize the potential for effects on the county from dam failure. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.6 Biological Resources			
4.6-1a (Preferred Plan) and 4.6-1b (Maximum Development Scenario): Loss of Habitat for Swainson’s Hawk, Other Raptors, and Burrowing Owl. Buildout of the 2008 Draft General Plan could result in the conversion of 5,697 acres of agricultural habitat, resulting in the loss of habitat for Swainson’s hawk and other raptors, as well as burrowing owl and other resident and migratory wildlife species. This impact would be significant .	S	Mitigation Measures 4.6-1a (Preferred Plan) and 4.6-1b (Maximum Development Scenario): Preserve Agricultural Foraging Habitat. The County shall implement the following measures to mitigate permanent impacts of future projects consistent with the 2008 Draft General Plan on Swainson’s hawk and burrowing owl foraging habitat in agricultural areas of Solano County: (1) Preservation of Foraging Habitat. Agricultural foraging habitat shall be preserved and managed at a 1:1 ratio (mitigation impact acreage), where the foraging habitat preserved is of equal or better quality than the foraging habitat affected. Habitat preservation may be achieved through the purchase of credits at an authorized mitigation bank, fee title (with an applicable conservation easement dedicated to an approved organization), or purchase of suitable conservation easements directly from landowners. All habitat preserves established shall have a	LTS

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>resource management plan prepared by one or more qualified persons experienced in the development and implementation of restoration, mitigation, and management plans for the Swainson’s hawk and burrowing owl. At a minimum, the resource management plan shall do the following:</p> <ul style="list-style-type: none"> ▶ specify control measures and programs for invasive exotic and noxious weeds, to be implemented in perpetuity and include annual surveys to visually assess and identify weed infestations and identify annual control measures; ▶ specify control measures for invasive and destructive nonnative animal species, to be implemented in perpetuity and include annual surveys to visually assess and identify new infestations and appropriate control measures; ▶ create a management endowment or other permanent funding mechanism that is acceptable to the long-term management entity and sufficient to manage the property in perpetuity, consistent with the approved management plan; ▶ provide for replacement of nesting habitat for the Swainson’s hawk distributed throughout the agricultural areas of Solano County; ▶ specify maintenance requirements and responsibilities for implementation, long-term ownership and/or management responsibility, annual reporting requirements, and a funding mechanism; and ▶ provide for permanent preservation under a conservation easement that prohibits all of the following: <ul style="list-style-type: none"> • plantings of orchards and/or vineyards, except in designed farmstead areas; • cultivation of perennial vegetable crops and annual crops; • commercial feedlots (defined as any open or enclosed areas where domestic livestock owned by other than the grantor are grouped together for intensive feeding purposes); 	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> • horticultural specialties, including sod, nursery stock, ornamental shrubs, ornamental trees, and flowers; • commercial greenhouses or plant nurseries; and • commercial aquaculture of aquatic plants and animals and their byproducts. <p>(2) Additional Measures for Protection of Burrowing Owl Habitat. Agricultural habitat preserves shall meet the following additional criteria to mitigate the loss of burrowing owl foraging habitat:</p> <ul style="list-style-type: none"> ▶ <i>Suitable Burrow and Cover Habitat.</i> A minimum of 1 acre of habitat per 80 acres of preserve land shall be permanently taken out of production to provide suitable nesting and cover habitat for burrowing owls. This 1 acre shall consist of one continuous block of habitat and shall not be adjacent to a County road or highway. ▶ <i>Artificial Burrows.</i> A minimum of two burrow complexes (three burrows per complex) shall be installed and maintained in perpetuity within the 1 acre of habitat set aside for burrowing owls. ▶ <i>Vegetation Height:</i> Within the 1 acre of habitat set aside from agricultural production for burrowing owls, management measures shall be implemented and adequately funded to maintain average effective vegetation height at 6 inches or less from February 1 through April 15, when owls typically select mates and nest burrows. In addition, the set-aside area must be kept free of tree and shrub canopy cover in perpetuity. 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.6-2a (Preferred Plan) and 4.6-2b (Maximum Development Scenario): Loss of Value of Upland Grassland, Oak Woodland, Oak Savanna, and Scrub/Chaparral Habitats. Buildout of the 2008 Draft General Plan would result in the loss or reduced habitat value of 2,272 acres of upland grassland, 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be significant.</p>	<p>S</p>	<p>Mitigation Measures 4.6-2a (Preferred Plan) and 4.6-2b (Maximum Development Scenario): Require a Habitat Inventory and Mitigation and Management Plans, and Specify a Replacement Ratio for Native Trees and Shrubs. The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on upland grassland, oak woodland, oak savanna, and scrub/chaparral habitats:</p> <p>(1) Habitat Inventory and Assessment. The County shall require all future projects to conduct, as a condition of project approval, appropriately timed biological resources inventories designed to assess the presence of wetlands, rock outcrops, serpentine or other unique edaphic substrates, and special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.</p> <p>(2) Habitat Mitigation. Where conversion of upland grasslands, oak woodland, oak savanna, and scrub/chaparral is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans. The County shall develop minimum standards that address management and restoration requirements based on subdivision size, affected communities, presence of other valuable habitats and special-status species, and development in accordance with preserved-area edge ratios.</p> <p>Where clustering of development results in a contiguous block of habitat greater than 40 acres with no more than a 1.25:1 development-to-preserve edge, affected acreage shall be calculated only for the development area and individual lots. Developments with higher development-to-preserve edge ratios and preserved areas less than 40 acres shall be required to implement additional habitat preservation and management activities based on the types and values of the habitats at the project site.</p>	<p>LTS</p>

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		<p>Preserved habitats shall also be subject to the following conditions:</p> <ul style="list-style-type: none"> ▶ Preserved mitigation sites shall have equivalent woodland resources. Total area, canopy cover, woodland type, and habitat value shall be considered when determining whether off-site resources are equivalent to those of the project site. ▶ Preserved areas shall contain similar topographic and elevational gradients. ▶ All preserves established shall have a resource management plan that includes the minimum applicable requirements to this habitat associated species identified in Mitigation Measure 4.6-1a. <p>(3) Tree Replacement. In addition to the other requirements outlined in the oak woodland protection ordinance (Program RS.I-3), the ordinance shall specify a replacement ratio for all native trees and shrubs. The ratio shall be sufficient to restore canopy cover and stand characteristics similar to what was removed within a specified time frame. If mitigation of native tree removal is required, planting plans shall be included as part of the resource management plan for oak woodland prepared by one or more qualified persons experienced in the development and implementation of oak woodland and savanna restoration, mitigation, and management plans. Plans shall also include minimum survival standards, monitoring and maintenance requirements for a minimum of 10 years, and provisions for guaranteed replacement of trees, should survival fall below performance standards.</p>	
<p>4.6-3a (Preferred Plan) and 4.6-3b (Maximum Development Scenario): Loss or Reduction in Habitat Values of Valley Floor Grassland and Vernal Pool Grassland Habitats. Buildout of the 2008 Draft General Plan would result in the loss or reduced habitat value of 8,389 acres of valley floor grassland</p>	S	<p>Mitigation Measures 4.6-3a (Preferred Plan) and 4.6-3b (Maximum Development Scenario): Require a Habitat Inventory, Buffer Zones, and Appropriate Avoidance and Compensatory Measures to Mitigate Habitat Loss. The County shall implement the following measures to mitigate</p>	LTS

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<p>habitat and 2,375 acres of vernal pool grassland habitat. This impact would be significant.</p>		<p>impacts of future projects consistent with the 2008 Draft General Plan on valley floor grassland and vernal pool habitats:</p> <p>(1) Habitat Inventory and Assessment. The County shall require all future projects to conduct, as a condition of project approval, appropriately timed biological resources inventories designed to assess the presence of wetlands, other unique edaphic substrates, and special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.</p> <p>(2) Buffer Zones for Extremely Rare and/or Range-Limited Species. If Colusa grass, Solano grass, San Joaquin Valley orcutt grass, Ferris’s milkvetch, Conservancy fairy shrimp, Ricksecker’s water scavenger beetle, or Delta green ground beetle are found to be present, populations of these species shall be protected. The County shall require projects to develop site-specific buffer zones that shall include, at a minimum, the immediate watershed for the occupied vernal pools and a minimum 500-foot buffer beyond the boundary of this immediate watershed.</p> <p>(3) Habitat Mitigation. Compensatory mitigation for the conversion and loss of vernal pool and valley floor grassland habitats shall be provided at a 1:1 ratio through a combination of preservation of high-quality vernal pool and grassland habitat and the construction and restoration of vernal pool habitat. Where conversion of these communities is unavoidable as part of a project’s development, the County shall require the project applicant to prepare and implement mitigation and management plans consistent with policies and implementation programs of the 2008 Draft General Plan. The County shall establish standards for preservation and restoration of uplands and wetlands (including vernal pool and swale habitats and seasonal wetlands) that are based on, but not limited to, the standards in USFWS’s <i>Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon</i> (USFWS 2005) and the Solano HCP, and that take into</p>	

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		<p>account the needs of grassland-dependent special-species animals as well as more common species.</p> <p>Preserved habitats shall also be subject to the following conditions:</p> <ul style="list-style-type: none"> ▶ Preserved mitigation sites shall have equivalent or higher quality resources. All preserves established shall have a resource management plan that includes the minimum applicable requirements to this habitat associated species identified in Mitigation Measure 4.6-1a. ▶ All project applicants shall be required to provide proof to the County Department of Resource Management that they have obtained all necessary state and federal authorizations (e.g., USACE Section 404 permit, RWQCB Section 401 certification or waste discharge requirements, and compliance with ESA and CESA) before the issuance of any grading permits or other actions that could result in ground-disturbing activities. ▶ Preserves shall contain a large core area where ground-squirrel control is prohibited and shall maintain artificial burrow complexes until suitable, natural burrow densities can be reached. <p>(4) Habitat Mitigation for Special-Status Plant Species. Avoidance measures shall be used when feasible and compensatory mitigation shall be used when avoidance is not possible. Avoidance measures shall include establishing buffer zones to avoid effects on special-status plants; installing exclusion fencing around the existing plant populations before and during construction; and training construction personnel on the identification and location of special-status plants on the project site. Compensatory mitigation shall include replanting on-site or propagating plants at a nearby conservation site through seeding or translocation. Mitigation ratios shall be sufficient to achieve performance criteria of no net loss of either contiguous</p>	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>occupied habitat or the number of individual plants. This may require planting or restoration ratios higher than 1:1 to guarantee long-term success. Postproject monitoring shall verify that avoidance and mitigation measures are successful.</p> <p>(5) Habitat Mitigation for Vernal Pool Invertebrates. Compensatory mitigation for vernal pool invertebrate species shall include the following additional requirements:</p> <ul style="list-style-type: none"> ▶ The preservation component shall include habitat occupied by the affected species. ▶ The constructed/restored habitats shall incorporate a variety of pool conditions that include dense complexes of small and medium-sized pools with minimal spacing interspersed among widely spaced larger pools. Larger, turbid-water, playa-type pools shall also be incorporated where appropriate soil conditions are present. The appropriate species associations for these vernal pool types are as follows: <ul style="list-style-type: none"> • Dense complexes of small and medium pools with minimal spacing: Vernal pool fairy shrimp and midvalley fairy shrimp • Larger, deeper pools: Vernal pool tadpole shrimp and California linderiella (as well as Conservancy fairy shrimp addressed below) • Playa pools with turbid water: Conservancy, vernal pool and tadpole shrimp <p>(6) Habitat Mitigation for California Tiger Salamanders. Mitigation shall be required for any activities that result in the conversion of upland habitat within 2,100 feet of California tiger salamander breeding habitat (excluding lands separated from breeding sites by incompatible land uses) that result in the conversion of upland and/or aquatic breeding habitats for California tiger salamander to incompatible land uses (e.g., development, intensive recreation). Mitigation shall consist of</p>	

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		two components: preservation and enhancement of suitable upland habitat, and preservation and construction of new breeding habitat consistent with the mitigation standards specified above.	
4.6-4a (Preferred Plan) and 4.6-4b (Maximum Development Scenario): Potential for Direct and Indirect Impacts on Riparian, Stream, and Open-Water Habitats. Buildout of the 2008 Draft General Plan could result in direct and indirect impacts on riparian, stream, and open-water habitats. This impact would be significant .	S	<p>Mitigation Measures 4.6-4a (Preferred Plan) and 4.6-4b (Maximum Development Scenario): Require an Inventory for Special-Status Species and Uncommon Habitats, and Appropriate Mitigation of Impacts on Valley Elderberry Longhorn Beetle, Salmonid, and Other Habitats. The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on riparian, stream, and open-water habitats:</p> <p>(1) Habitat Inventory and Assessment. The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to assess the presence of special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.</p> <p>(2) Habitat Mitigation. Where conversion of riparian and channel habitats is unavoidable as part of a project’s development, the County shall require the project applicant to prepare and implement mitigation and management plans. The County shall develop minimum standards that address management and restoration requirements based on subdivision size, affected communities, presence of other valuable habitats and special-status species, and development in accordance with preserved-area edge ratios.</p> <p>Preserved habitats shall also be subject to the following conditions:</p> <ul style="list-style-type: none"> ▶ Preserved mitigation sites shall have equivalent riparian woodland resources. Total area, canopy cover, woodland type, and habitat value shall be considered when determining whether 	LTS

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>off-site resources are equivalent to those of the project site.</p> <ul style="list-style-type: none"> ▶ Preserved areas shall contain similar topographic and elevational gradients. ▶ All preserves established shall have a resource management plan that includes the minimum applicable requirements for this habitat associated species identified in Mitigation Measure 4.6-1a. Compensatory mitigation requirements for removal of native trees and shrubs shall be met through tree replacement as specified in Mitigation Measure 4.6-2a. ▶ All project applicants shall be required to provide proof to the County Department of Resource Management that they have obtained all necessary state and federal authorizations (e.g., USACE Section 404 permit, RWQCB Section 401 certification or waste discharge requirements, DFG Section 1602 agreement, and compliance with ESA and CESA) before issuance of any grading permits or other actions that could result in ground-disturbing activities. <p>(3) Valley Elderberry Longhorn Beetle and Elderberry Shrub Mitigation. The following mitigation measures shall be implemented to avoid, minimize, and mitigate impacts on valley elderberry longhorn beetle:</p> <p>(a) Any ground-disturbing activities within 100 feet of elderberry plants containing stems measuring 1 inch or greater in diameter at ground level shall conform to the following minimum avoidance measures:</p> <ul style="list-style-type: none"> ▶ A setback shall be established measuring at least 20 feet from the dripline of each elderberry plant containing stems measuring 1 inch or greater in diameter at ground level from the edge of an established road, intensively farmed field, or facility (whichever is closer). The setbacks shall be fenced and flagged to identify the setback zone (i.e., areas into which equipment and materials shall not encroach). Fire fuel breaks 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>(disked land) may not be included within the 20-foot setback; however, vegetation may be cleared by mowing (e.g., mower, mechanical trimmers, hand tools) to less than 2 inches in height. Where encroachment resulting in new soil disturbance (e.g., disking, trenching, grading) within the 20-foot setback zone is unavoidable, the project applicant shall provide compensatory mitigation at a 50% (1:2) ratio of the standard requirements identified below for habitat mitigation.</p> <ul style="list-style-type: none"> ▶ Construction contractors shall be briefed on the need to avoid damaging elderberry plants and the possible penalties for not complying with these requirements. ▶ Work crews shall be instructed about the status of the beetle and the need to protect its elderberry host plant. ▶ No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant shall be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1 inch or greater in diameter at ground level. ▶ Mowing of grasses or ground cover shall occur only from July through April to reduce fire hazard. Mowing shall be done in a manner that avoids damaging plants (e.g., bark shall not be stripped away through careless use of mowing or trimming equipment). ▶ Trimming of elderberry stems less than 1 inch in diameter shall occur between September 1 and March 14. The recommended period for trimming is between November and the first 2 weeks in February, when the plants are dormant and after they have lost their leaves. <p>(b) In cases where removal of elderberry shrubs or their stems measuring 1 inch or greater (removal or trimming) is unavoidable, the affected elderberry shrubs shall be salvaged and replanted and additional elderberry shrubs and associated native riparian plants shall be planted according to the ratios specified in the following criteria:</p>	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> ▶ All elderberry shrubs scheduled for removal shall be transplanted to an approved, secure site (an approved mitigation bank location within Solano County or nonbank site approved by the County and USFWS). All nonbank relocation sites shall be protected by a conservation easement or other applicable protection measure, and funding shall provided for long-term monitoring and maintenance. Transplanting shall occur between June 15 and March 15. No elderberry shrub may be transplanted between March 16 and June 14, except where isolated bushes are more than 0.5 mile away from other suitable valley elderberry longhorn beetle habitat and there is no sign of use (exit holes). ▶ A minimum of five elderberry seedlings or rooted cuttings and five associated native, woody riparian plants per removed elderberry bush shall be planted within the mitigation area, or applicable credits shall be purchased from a mitigation bank in Solano County approved to sell valley elderberry longhorn beetle credits. ▶ Transplanted elderberry and planted elderberry and associated native riparian plants shall be managed and monitored for a minimum of 5 years. A minimum of 80% of the transplanted elderberry and planted elderberry and associated species shall be alive and in good health at the end of the 5-year period. If survivorship rates drop below 80%, additional planting of applicable species (elderberry or associated native riparian species) shall occur and additional monitoring shall occur until the initial 80% survival rate is achieved for a minimum of 3 consecutive years. Monitoring reports shall be submitted to USFWS annually for review, approval, and compliance reporting. ▶ Mitigation planting shall occur, to the maximum extent practicable, in areas adjacent to the impact area and/or located to fill in existing gaps in riparian corridors. These requirements may be deleted once the species is delisted. 	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>(4) Mitigation of Impacts on Salmonids. The following measures shall be implemented to avoid, minimize, and mitigate impacts on steelhead and chinook salmon, including those impacts that may result from new instream crossings:</p> <p>(a) For projects that would result in impacts on streams that are known to support or have the potential to support salmonids—Green Valley, Suisun, American Canyon, and Putah Creeks, and to a lesser extent Ulatis, Alamo, Jameson Canyon, and Ledge wood Creeks and their tributaries—the following avoidance and minimization measures apply:</p> <ul style="list-style-type: none"> ▶ Instream work shall be allowed only during specified work windows from June 1 to October 15 during low-flow conditions. ▶ No fill material, including concrete, shall be allowed to enter any waterways. Any concrete piers, footings, or other structures shall be poured in tightly sealed forms and shall not be allowed contact with surface waters until the cement has fully cured. This process takes a minimum of 14–28 days. ▶ Channel disturbance shall be kept to a minimum, no material shall be left in the channel, and if bridge footings are to be protected by riprap, the channel bottom elevation shall not be elevated above the natural channel bottom. ▶ For bridge removal, no portions of the old structure shall be left in the channel, and where abutments are removed, no depressions shall be left; they shall be filled in with clean river rock or gravel of an appropriate size (approximately 2–4 inches). ▶ Where practicable, bridge design shall be full span and avoid adversely affecting channel hydraulics. Bridge and road design shall prevent direct discharge (such as culverts or bridge drains) of any untreated stormwater runoff directly into any waterways. ▶ Construction BMPs and erosion control methods shall be utilized during construction. Such methods shall include 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>revegetation of all bare soil before the rainy season and any other measures necessary to ensure that there is no increase in sediment entering waterways.</p> <ul style="list-style-type: none"> ▶ If cofferdams are to be used, turbid water pumped out of the dam shall not be allowed to reenter the channel unless sediment has settled out so that there is no increase in turbidity in downstream waters. ▶ Construction sites shall be monitored to ensure that no salmonids are present that may be harmed. If salmonids are present, a qualified fishery biologist shall be required to capture and relocate the fish. Where column repairs are to be done, materials used shall be nontoxic to aquatic life. ▶ All equipment refueling and maintenance shall occur outside the creek channel and appropriate measures shall be taken to prevent the discharge of fuels or other contaminants to the stream in the event of spills. ▶ Water that contacts wet concrete and has a pH greater than 9 shall be pumped out and disposed of outside the creek channel. <p>(b) All new stream crossings in streams that are known to, or that have the potential to, support salmonids shall follow the guidelines developed by NMFS to allow for safe passage of salmonids. For new instream crossings, the following alternatives and structure types shall be considered in order of preference:</p> <ol style="list-style-type: none"> 1. Nothing—Road realignment to avoid crossing the stream 2. Bridge—Spanning the stream to allow for long-term dynamic channel stability 3. Streambed simulation strategies—Bottomless arch, embedded culvert design, or ford 4. Nonembedded culvert—Often referred to as a hydraulic design; associated with more traditional culvert design approaches, and limited to low slopes for fish passage 5. Baffled culver or structure designed with a fishway—For 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p align="center">steeper slopes</p> <p>If a segment of stream channel where a crossing is proposed is in an active salmonid spawning area, then only full-span bridges or streambed simulations are acceptable.</p>	
<p>4.6-5a (Preferred Plan) and 4.6-5b (Maximum Development Scenario): Potential for Direct and Indirect Impacts on Seasonal Wetlands. Buildout of the 2008 Draft General Plan could result in direct and indirect impacts on seasonal wetlands. This impact would be significant.</p>	<p align="center">S</p>	<p>Mitigation Measures 4.6-5a (Preferred Plan) and 4.6-5b (Maximum Development Scenario): Require Surveys for Seasonal Wetlands and Replacement at a Minimum 2:1 Ratio. The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to determine the presence of seasonal wetlands. The surveys shall be completed as part of a complete application for a project.</p> <p>In addition, where conversion of seasonal wetlands is unavoidable as part of a project’s development, the County shall require the project applicant to prepare and implement mitigation and management plans. Seasonal wetlands shall be replaced at a minimum 2:1 ratio.</p>	<p align="center">LTS</p>
<p>4.6-6a (Preferred Plan) and 4.6-6b (Maximum Development Scenario): Potential Direct and Indirect Impacts on Marsh and Tidal Flat Habitat. Buildout of the 2008 Draft General Plan could result in direct and indirect impacts on marsh and tidal flat habitat. This impact would be significant.</p>	<p align="center">S</p>	<p>Mitigation Measures 4.6-6a (Preferred Plan) and 4.6-6b (Maximum Development Scenario): Require Surveys for Wetlands and Special-Status Species, Develop an Avoidance and Mitigation Plan, and Replace Affected Habitats at a 2:1 Ratio. The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to determine the presence of wetlands (marsh, tidal flat, and channel) and associated special-status species. Such a survey shall be completed as part of a complete application for a project.</p> <p>For projects that may have potential impacts on special-status plant and animal species within marsh habitat, the project applicants shall develop a site-specific resource avoidance and minimization plan for approval by the County, DFG, and USFWS.</p> <p>Where conversion of marsh, channel, and tidal flat habitats is</p>	<p align="center">LTS</p>

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		unavoidable as part of a project’s development, the County shall require the project applicant to prepare and implement mitigation and management plans. At a minimum, affected habitats shall be replaced at a 2:1 ratio.	
<p>4.6-7a (Preferred Plan) and 4.6-7b (Maximum Development Scenario): Loss or Disturbance of Raptor and Loggerhead Shrike Nests. Buildout of the 2008 Draft General Plan could result in the loss or disturbance of raptor and loggerhead shrike nests from removal of trees and shrubs associated with the loss of 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be significant.</p>	S	<p>Mitigation Measures 4.6-7a (Preferred Plan) and 4.6-7b (Maximum Development Scenario): Require Nest Surveys and Buffers and Implement Mitigation Measures 4.6-1a, 4.6-2a, 4.6-3a, 4.6-4a, and 4.6-6a. The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on raptor and loggerhead shrike nests:</p> <p>(1) A qualified biologist shall conduct surveys for raptor and loggerhead shrike nests before pruning or removal of trees, ground-disturbing activities, or construction activities to locate any active nests on or immediately adjacent to the site. The surveys shall be designed and of sufficient intensity to document raptor nesting activity within 500 feet of planned work activities. Preconstruction surveys shall be conducted at 21-day intervals unless construction activities have been initiated in an area. Preconstruction surveys shall be conducted between February 1 and August 31. Locations of active nests shall be described and protective measures implemented. Protective measures shall include establishment of avoidance areas around each nest site. Avoidance areas shall be clearly delineated (i.e., by orange construction fencing) and shall be a minimum of 300 feet from the dripline of the nest tree or nest for raptors and 100 feet for shrikes. The active nest sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify any signs of disturbance. These protection measures shall remain in effect until the young have left the nest and are foraging independently or the nest is no longer active. A report shall be prepared at the end of each construction season detailing the results of the preconstruction surveys. The report shall be submitted to DFG by November 30 of each year.</p>	LTS

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		(2) The County shall implement Mitigation Measures 4.6-1a, 4.6-2a, 4.6-3a, 4.6-4a, and 4.6-6a to reduce impacts on potential nesting habitat for raptors and loggerhead shrike.	
4.6-8a (Preferred Plan) and 4.6-8b (Maximum Development Scenario): Loss or Disturbance of Bat Roost Sites and Loss of Foraging Habitat. Buildout of the 2008 Draft General Plan could result in the disturbance of bat roost sites and loss of foraging habitat. This impact would be significant.	S	<p>Mitigation Measures 4.6-8a (Preferred Plan) and 4.6-8b (Maximum Development Scenario): Require Surveys for Bat Roosting Habitat and Development of Roost Replacements, and Implement Mitigation Measures 4.6-1a through 4.6-4a.</p> <p>The County shall require project applicants, as a condition of project approval, to implement the following measures to mitigate impacts on bat roost sites and foraging habitat:</p> <p>(1) A qualified biologist shall be retained to conduct surveys to identify and assess bat roosting habitat on or immediately adjacent to the project site. The surveys shall be designed and of sufficient intensity to document bat roosting within 500 feet of planned work activities. Locations of active roosts shall be described and protective measures implemented. Protective measures shall include establishment of avoidance areas around each roost site. Avoidance areas shall be clearly delineated (i.e., by orange construction fencing) and shall be a minimum of 100 feet from each roost site. The active roost sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify any signs of disturbance. These protection measures shall remain in effect until the young have left the roost and are foraging independently or until the roost is no longer active. A report shall be prepared at the end of each construction season detailing the results of the preconstruction surveys.</p> <p>(2) Site- and species-specific roost replacements shall be developed for roost sites lost or disturbed as a result of project construction. A roost replacement plan shall be prepared by a qualified biologist and shall be subject to review and approval by the County, in consultation with DFG.</p> <p>(3) Mitigation Measures 4.6-1a through 4.6-4a shall be</p>	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		implemented to reduce impacts on bat foraging habitat.	
<p>4.6-9a (Preferred Plan) and 4.6-9b (Maximum Development Scenario): Direct Mortality of Bats and Birds from Expansion of Wind Energy Resources. Development and establishment of wind turbines within the Wind Energy Resource Overlay proposed in the 2008 Draft General Plan could cause significant mortality of special-status bats and raptors as well as other migratory and resident birds. This impact would be significant.</p>	S	<p>Mitigation Measures 4.6-9a (Preferred Plan) and 4.6-9b (Maximum Development Scenario): Require Project-Specific Collision Risk Assessments, Enhanced Avoidance and Minimization Measures, Appropriate Compensatory Habitat Mitigation, and Contingency Plans. The County shall implement the following measures to reduce the risk of direct mortality of bats and birds from the expansion of wind energy resources in Solano County:</p> <p>(a) Collision Risk Assessment. Consistent with Policy RS.I-48, the County shall require project applicants for wind turbine generator proposals to include a collision risk assessment or a “Pre-permitting Assessment” as outlined in <i>California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development</i> as part of the application for project entitlement (CEC and DFG 2007). The risk assessment shall determine whether projected overall avian and bat fatality rates are low, moderate, or high relative to other projects and shall provide measures to avoid overall avian and bat casualties attributable to collisions with wind turbines.</p> <p>(b) Avoidance and Minimization. Policy RS.P-56 encourages the use of technology or siting to minimize adverse impacts from energy production facilities on the environment, including wildlife. This policy shall be expanded to require all project proposals for the development of wind energy to implement the following measures when selecting a project site and turbine layout and developing the facility’s infrastructure:</p> <ul style="list-style-type: none"> ▶ Fragmentation and habitat disturbance shall be minimized. ▶ Buffer zones shall be established to minimize collision hazards (for example, placement of turbines within 100 meters of a riparian area shall be avoided). ▶ Impacts shall be reduced with appropriate turbine design and 	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>layout.</p> <ul style="list-style-type: none"> ▶ Artificial habitat for prey at the turbine base area shall be reduced. ▶ Lighting that attracts birds and bats shall be avoided. ▶ Power line impacts shall be minimized by placing lines under ground whenever possible. ▶ Use of structures with guy wires shall be avoided. ▶ Nonoperational turbines shall be decommissioned. <p>(c) Habitat Mitigation. The County shall require project applicants for new wind turbine generator proposals, before and as a condition of project approval, to consult with DFG, USFWS, and species experts in the development of site-specific ratios and fees to use in establishing compensation formulae. The compensation formulae shall be biologically based and reasonable, shall provide certainty about the availability and sufficiency of funds to be expended, and shall assure that the mitigation will continue to provide biological resource value over the life of the project. At a minimum, the following list of potential options shall be considered in developing compensatory mitigation:</p> <ul style="list-style-type: none"> ▶ Off-site conservation and protection of essential habitat: <ul style="list-style-type: none"> • Nesting and breeding areas • Foraging habitat • Roosting or wintering areas • Migratory rest areas • Habitat corridors and linkages ▶ Off-site conservation and habitat restoration: <ul style="list-style-type: none"> • Restored habitat function • Increased carrying capacity ▶ Off-site habitat enhancement: <ul style="list-style-type: none"> • Predator control programs • Removal of exotic/invasive species 	

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		<p>(d) Postconstruction Monitoring and Contingency Plans. Accurately assessing the potential for bat and bird mortality from wind resource projects is difficult, and once completed, such a project could have unanticipated fatalities. Therefore, before issuing a permit, the County shall require project applicants for any new wind turbine generator proposals to include a contingency plan to mitigate high levels of unanticipated fatalities. Permit conditions shall explicitly establish a range of compensatory mitigation options to offset unexpected fatalities and the thresholds that will trigger implementation. The need for compensatory mitigation for unexpected impacts shall be determined by postconstruction monitoring. Postconstruction monitoring shall conform to the guidelines outlined in <i>California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development</i> (CEC and DFG 2007).</p>	
<p>4.6-10a (Preferred Plan) and 4.6-10b (Maximum Development Scenario): Loss of Habitat and Mortality of California Red-Legged Frogs. Buildout of the 2008 Draft General Plan could result in the loss of habitat and direct mortality of California red-legged frogs. This impact would be significant.</p>	<p>S</p>	<p>Mitigation Measures 4.6-10a (Preferred Plan) and 4.6-10b (Maximum Development Scenario): Require Implementation of Specified Mitigation for California Red-Legged Frog Habitat Loss, as well as Management Plans and Applicable Funding Mechanisms. For all proposed development sites in the western foothills in Solano County outside of the Jameson Canyon–Lower Napa River Core Recovery Area (where the presence of California red-legged frog is assumed), the County shall require project applicants to retain a qualified biologist. The biologist shall conduct surveys following standard USFWS protocols to identify and assess California red-legged frog habitat. If California red-legged frogs are present or the proposed project is located within the Jameson Canyon–Lower Napa River Core Recovery Area, the County shall require the project applicant to implement the following habitat mitigation measures as a condition of project approval:</p> <ul style="list-style-type: none"> ▶ All projects involving development or a change of land use that would convert upland habitats to incompatible uses (certain agricultural uses may not impede frog movement in 	<p>LTS</p>

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		upland areas) shall mitigate impacts on specific habitat components at the following ratios: <ul style="list-style-type: none"> • 3:1 ratio for upland and seasonal wetland movement habitats • 4:1 for aquatic breeding and summer hydration habitats and adjacent uplands with 200 feet of the aquatic habitat ▶ Management plans and applicable funding mechanisms consistent with the guidance specified in Mitigation Measures 4.6-2a and 4.6-4a shall also be implemented.	
<p>4.6-11a (Preferred Plan) and 4.6-11b (Maximum Development Scenario): Potential for Direct and Indirect Effects on Callippe Silverspot Butterfly and Its Habitat. Buildout of the 2008 Draft General Plan could result in direct loss of potential upland dispersal and breeding habitat for the Callippe silverspot butterfly, as well as indirect effects. This impact would be significant.</p>	<p>S</p>	<p>Mitigation Measures 4.6-11a (Preferred Plan) and 4.6-11b (Maximum Development Scenario): Require Implementation of Specified Avoidance and Minimization Measures and Habitat Mitigation Measures for Impacts on Callippe Silverspot Butterfly. The County shall require project applicants, as a condition of project approval, to implement the following measures to mitigate impacts on callippe silverspot butterfly and their habitat:</p> <p>(a) Avoidance and Minimization. The project applicant shall implement the following measures to avoid and minimize impacts on callippe silverspot butterfly:</p> <ul style="list-style-type: none"> ▶ <i>Survey.</i> A qualified biologist shall conduct appropriately timed surveys, consistent with the habitat inventory requirements outlined in Mitigation Measures 4.6-2a and 4.6-2b, to determine the presence of adult butterflies or any of the following habitat requirements: larval food plants (violet or Johnny jump-up), adult nectar plants, and hilltops. ▶ <i>Core Breeding Areas.</i> If core stands of larval viola (<i>Viola pedunculata</i>) host plants and adult nectar sources are present, these stands shall be preserved by establishing appropriate open-space buffers (minimum 300-foot buffer from incompatible uses), land dedications (including management endowment funding), and other incentives for maintaining 	<p>LTS</p>

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		<p>compatible land uses. Permanent loss of core breeding habitat shall be limited to no more than 20% of any breeding habitat. Core breeding habitat is defined as, at minimum, a 1-acre block of habitat with viola density of at least 10%. The core breeding area also includes the outer edge of the viola stands where the viola density is at least one plant per square meter or 1% of the total cover.</p> <ul style="list-style-type: none"> ▶ <i>Corridors.</i> Natural open-space corridors with a minimum width of 300 feet, oriented along hilltops and ridgelines, shall be provided to connect core stands of larval viola host plants and adult nectar sources and allow for dispersal of adults between core breeding areas. ▶ <i>Construction Windows in Buffer Zones.</i> Short-term construction or other incompatible land use activities within 300 feet of core stands of larval viola larval host plants or adult nectar sources and in corridor areas shall be limited to the period between August–April, when the callippe silverspot butterfly is not active (flying, feeding, mating, laying eggs). <p>(b) Habitat Mitigation. If callippe silverspot butterflies are present or the project would be located within areas of suitable butterfly habitat, the project applicant shall implement the following habitat mitigation:</p> <ul style="list-style-type: none"> ▶ If the project involves development or a change of land use that would result in the conversion of upland habitats to incompatible uses, the project shall mitigate impacts on specific habitat components at a 3:1 ratio. ▶ The following measures shall be implemented to reduce impacts on core stands of larval viola larval host plants, adult nectar sources, and associated buffer habitats within the callippe silverspot butterfly habitat areas: <ul style="list-style-type: none"> • Additional compensatory mitigation for the conversion or loss of known or potential breeding habitat (i.e., a core breeding area) shall be provided at a 3:1 ratio, with 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>preservation of known occupied habitat areas. Permanent loss of core breeding habitat shall be limited to no more than 20% of any breeding habitat.</p> <ul style="list-style-type: none"> • Additional compensatory mitigation for indirect impacts from new development within 300 feet of known or potential breeding habitat shall be provided at a 1.5:1 ratio, with preservation of known occupied habitat. <p>► Management plans and applicable funding mechanisms consistent with the guidance specified in Mitigation Measures 4.6-2a and 4.6-4a shall also be implemented.</p>	
<p>4.6-12a (Preferred Plan) and 4.6-12b (Maximum Development Scenario): Potential Spread of or Increase in Populations of Invasive Exotic Species. Buildout of the 2008 Draft General Plan could result in the spread of or increases in populations of invasive exotic species. This impact would be significant.</p>	S	<p>Mitigation Measures 4.6-12a (Preferred Plan) and 4.6-12b (Maximum Development Scenario): Require Avoidance and Minimization Measures and Implementation of Invasive Exotic Species Management Plans. The County shall require project applicants, as a condition of project approval, to implement the following measures to avoid the spread of or increase in populations of invasive exotic species:</p> <p>(a) Avoidance and Minimization. Project applicants in areas of potential noxious weed infestations shall hire a qualified botanist to identify and map infestation areas before commencement of construction. Construction activities shall avoid infestation areas, if feasible. If avoidance is infeasible, construction supervisors shall be educated regarding weed identification and the importance of controlling and preventing the spread of noxious weed infestations. Construction equipment that comes into contact with a noxious-weed infestation area shall be cleaned at a designated wash station after leaving the infestation area. The location of the wash station shall be designated by the qualified botanist in coordination with the construction supervisor.</p> <p>(b) Invasive Exotic Species Management Plans. Development projects that require habitat mitigation shall implement control programs for invasive exotic species as part of restoration and</p>	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		management plans. These plans shall include a monitoring and maintenance component that details the procedures for preventing recurrence and spread of invasive exotic species such as yellow star thistle, purple star thistle, Medusa-head, goatgrass, perennial pepperweed, Russian thistle, and any other noxious weed species.	
4.7 Geology and Soils			
4.7-1a (Preferred Plan) and 4.7-1b (Maximum Development Scenario): Potential for Fault Rupture. Buildout of the 2008 Draft General Plan would result in development of areas subject to potential substantial adverse effects from the rupture of a known earthquake fault. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to fault rupture. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.7-2a (Preferred Plan) and 4.7-2b (Maximum Development Scenario): Potential for Exposure to Seismic Ground Shaking. Buildout of the 2008 Draft General Plan would result in development of areas prone to seismic ground shaking. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground shaking. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.7-3a (Preferred Plan) and 4.7-3b (Maximum Development Scenario): Potential for Seismic Ground Failure. Buildout of the 2008 Draft General Plan would result in development of areas prone to seismic-related ground failure, including liquefaction. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground failure. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-4a (Preferred Plan) and 4.7-4b (Maximum Development Scenario): Potential for Exposure to Landslides. Buildout of the 2008 Draft General Plan would result in development of areas prone to landslides. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to landslides. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-5a (Preferred Plan) and 4.7-5b (Maximum Development Scenario): Soil Erosion or Loss of Topsoil. Buildout of the 2008 Draft General Plan would result in substantial soil erosion or the loss of topsoil. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-6a (Preferred Plan) and 4.7-6b (Maximum Development Scenario): Potential for Unstable Soils. Buildout of the 2008 Draft General Plan would result in construction of occupied structures in areas located on a geologic unit or soil that is unstable or that would become unstable, potentially resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.7-7a (Preferred Plan) and 4.7-7b (Maximum Development Scenario): Construction in Areas with Expansive Soils. Buildout of the 2008 Draft General Plan would result in construction of occupied structures in areas with expansive soils. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-8a (Preferred Plan) and 4.7-8b (Maximum Development Scenario): Construction in Areas with Soils with Poor Septic Suitability. Buildout of the 2008 Draft General Plan would result in construction of occupied structures in areas with soils poorly suited to septic systems. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-9a (Preferred Plan) and 4.7-9b (Maximum Development Scenario): Loss of Availability of Known Mineral Resources. Buildout of the 2008 Draft General Plan would result in urban development in areas known to contain mineral resources, causing a loss of availability of a known mineral resource of value to the region and residents of the state. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.7-10a (Preferred Plan) and 4.7-10b (Maximum Development Scenario): Potential for Loss of Availability of Locally Important Mineral Resource Recovery Sites. Buildout of the 2008 Draft General Plan would not result in the loss of availability of any locally important mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.8 Agricultural Resources			
<p>4.8-1a (Preferred Plan): Loss of Important Farmland. Buildout of the 2008 Draft General Plan would result in the conversion of Important Farmland to nonagricultural uses. Approximately 21,971 acres of existing agricultural land uses in Solano County, including approximately 4,131 acres of Important Farmland, would be converted to urban uses. This impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.8-1b (Maximum Development Scenario): Loss of Important Farmland. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the conversion of Important Farmland to nonagricultural uses. Approximately 32,727 acres of existing agricultural land uses in Solano County, including approximately 4,131 acres of Important Farmland, would be converted to urban uses. This impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact	SU
<p>4.8-2a (Preferred Plan) and 4.8-2b (Maximum Development Scenario): Conflict with Williamson Act Contracts. Buildout of the 2008 Draft General Plan would result in the development of urban land uses on lands under a Williamson Act contract. Approximately 1,682 acres of land in Solano County are under a Williamson Act contract and would be converted to urban uses as envisioned in the 2008 Draft General Plan. To allow for urban development, these agricultural land uses would be removed from protection under the Williamson Act. This impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact	SU
<p>4.9 Public Services and Utilities</p>			
<p>4.9-1a (Preferred Plan) and 4.9-1b (Maximum Development Scenario): Insufficient Water Supplies to Meet the Future Water Demand in Unincorporated Areas Served by the County. Land uses and development consistent with the 2008 Draft General Plan would increase the demand for water. Available water sources would be insufficient to serve some of the unincorporated areas of the county with buildout of the 2008 Draft General Plan. New methods to obtain water and additional sources of supply would be required. This impact would be significant.</p>	S	<p>Mitigation Measures 4.9-1a(1) (Preferred Plan) and 4.9-1b(1) (Maximum Development Scenario): Implement Measures to Ensure Sufficient Water Supplies for Development Projects. The County shall implement the following measures to ensure sufficient water supplies for land development projects in the unincorporated county under the 2008 Draft General Plan:</p> <ul style="list-style-type: none"> ▶ Before approval of any tentative small-lot subdivision map for a proposed residential project of more than 500 dwelling units, the County shall comply with SB 221 requirements for verification of sufficient subdivision water supplies, as specified in Section 66473.7 of the Government Code. ▶ Before approval of any tentative small-lot subdivision map for a proposed residential project of 500 or fewer units, the County need not comply with Section 66473.7 or formally 	SU

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>consult with the public water system that would provide water to a proposed subdivision, but shall nevertheless make a factual showing or impose conditions similar to those required by Section 66473.7 to ensure an adequate water supply for development authorized by the map.</p> <ul style="list-style-type: none"> ▶ Before recordation of any final small-lot subdivision map, or before County approval of any project-specific discretionary approval or entitlement required for nonresidential land uses, the County or the project applicant shall demonstrate, based on substantial evidence, the availability of a long-term, reliable water supply from a public water system for the amount of development that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of a written verification that existing sources are or will be available and that needed physical improvements for treating and delivering water to the project site will be in place before occupancy. <p>Mitigation Measures 4.9-1a(2) (Preferred Plan) and 4.9-1b(2) (Maximum Development Scenario): Implement a Countywide Groundwater Balance Budget and Monitoring Program. Ongoing groundwater monitoring is critical for evaluating existing conditions and comparing groundwater extractions against projected sustainable yields on a countywide basis. To achieve this, a countywide groundwater balance budget shall be developed that incorporates the provisions of Policy RS.P-65, which calls for coordination with SCWA to monitor and manage the county’s groundwater supplies, and Program RS.I-70, which requires the County Department of Resource Management, together with SCWA and the cities, to create and maintain a comprehensive database of information about groundwater supply and quality, and to complete a countywide groundwater study that fills the gaps among disparate aquifer-specific studies in the county. This groundwater balance budget and monitoring</p>	

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		program shall be implemented to facilitate evaluation of current groundwater conditions. It shall also provide evaluation of the effectiveness of the 2008 Draft General Plan goal, policies, and programs associated with Impact 4.5-4a in Section 4.5, "Hydrology and Water Resources," that pertain to groundwater-recharge efforts and sustainable groundwater levels.	
<p>4.9-2a (Preferred Plan) and 4.9-2b (Maximum Development Scenario): New or Expanded Water Supply Facilities. Expansion and extension of water supply and distribution facilities is required for buildout of the 2008 Draft General Plan. Although goals and policies have been identified to reduce impacts, construction of these facilities could result in significant effects on the environment. This impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact.	SU
<p>4.9-3a (Preferred Plan) and 4.9-3b (Maximum Development Scenario): Increased Wastewater Treatment Demand. Land uses and development consistent with the 2008 Draft General Plan would generate additional wastewater flows that would be served by city municipal treatment facilities and individual sewer systems, and larger development would be permitted for the construction of small-scale treatment facilities. The County is responsible for permitting and managing wastewater treatment outside of MSAs, in which individual sewer systems and small centralized treatment facilities are used on a case-by-case basis. The County does not have quantifiable data available showing total demand and capacity of these individual systems; therefore, the ability to serve the buildout of the 2008 Draft General Plan is unknown. Although some uncertainty exists about the long-term ability to serve the county's future wastewater needs, current regulations and policies would provide a mechanism to provide wastewater services to areas where future development is expected. This impact would be significant.</p>	S	<p>Mitigation Measures 4.9-3a (Preferred Plan) and 4.9-3b (Maximum Development Scenario): Implement Measures to Ensure Sufficient Wastewater Collection and Removal Systems for Development Projects. The County shall implement the following measures to ensure the availability of adequate wastewater collection and removal systems for land development projects in the unincorporated county under the 2008 Draft General Plan:</p> <ul style="list-style-type: none"> ▶ Before approval of any tentative subdivision map for a proposed residential project, the County shall formally consult with the wastewater system provider that would serve the proposed subdivision to make a factual showing or impose conditions to ensure the availability of an adequate wastewater removal system for the proposed development. ▶ Before recordation of any final small-lot subdivision map, or before County approval of any project-specific discretionary approval or entitlement for nonresidential land uses, the County or the project applicant shall demonstrate, based on substantial evidence, the availability of a long-term, reliable wastewater collection system for the amount of development 	SU

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of a written verification that existing treatment capacity is or will be available and that needed physical improvements for treating wastewater from the project site will be in place before occupancy.	
4.9-4a (Preferred Plan) and 4.9-4b (Maximum Development Scenario): New or Expanded Wastewater Facilities. Land uses and development consistent with the 2008 Draft General Plan would result in an increased need for wastewater facilities. Construction of these facilities could result in site-specific impacts. This impact would be significant .	S	No feasible mitigation is available to reduce this impact	SU
4.9-5a (Preferred Plan) and 4.9-5b (Maximum Development Scenario): Increased Demand for Solid Waste Disposal. Future population growth through buildout of the 2008 Draft General Plan would result in an increase of generated solid waste that could exceed existing capacity. Implementation of proposed policies in the 2008 Draft General Plan, in combination with existing state regulations, would reduce the potential impacts from increased demand for solid waste disposal. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.9-6a (Preferred Plan) and 4.9-6b (Maximum Development Scenario): Demand for Public Education Services. Buildout of the 2008 Draft General Plan would result in increased demand for public education services. Implementation of policies in the 2008 Draft General Plan would substantially reduce construction-related impacts of development of new facilities. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.9-7a (Preferred Plan) and 4.9-7b (Maximum Development Scenario): Demand for Additional Fire Protection and Emergency Services Facilities. Development and operation of fire protection and emergency services are addressed by a goal	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS

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Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
and various policies in the 2008 Draft General Plan. Adherence to the goal and policies would reduce impacts related to projected population growth for Solano County. This impact would be less than significant .			
4.9-8a (Preferred Plan) and 4.9-8b (Maximum Development Scenario): Demand for Additional Law Enforcement Facilities. Implementation of the 2008 Draft General Plan would increase the demand for a new or expanded Sheriff’s Office substation and detention facilities. Policies from the 2008 Draft General Plan would apply to potential impacts associated with the construction and operation of law enforcement facilities. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.9-9a (Preferred Plan) and 4.9-9b (Maximum Development Scenario): Increased Demand for Library Facilities. Solano County’s library facilities are not currently meeting any of the existing service standards. Implementation of the 2008 Draft General Plan would result in the demand for new or expanded County Library facilities to maintain acceptable service levels. Current policies and plans included in the 2008 Draft General Plan would address the provision of library services. However, because the County already does not meet any of the existing service standards, this impact would be significant .	S	No feasible mitigation is available to reduce this impact	SU
4.10 Cultural and Paleontological Resources			
4.10-1a (Preferred Plan) and 4.10-1b (Maximum Development Scenario): Removal of Historical Built-Environment Resources. Development within Solano County in accordance with the 2008 Draft General Plan may result in the removal of historical built-environment resources. This impact would be significant .	S	Mitigation Measures 4.10-1a (Preferred Plan) and 4.10-1b (Maximum Development Scenario): Determine Historical Significance of Built-Environment Resources Subject to Removal and Require Implementation of Recommended Feasible Mitigation. California case law, as well as 14 CCR Section 15126.4(b)(2), state that generally no amount of mitigation is sufficient to reduce the impact of completely removing a built-environment historical resource to a less-than-significant level (League for the Protection of Oakland’s Architectural and Historic Resources v. City of Oakland, 55	SU

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>Cal.App.4th 896; 60 Cal.Rptr.2nd 821 [1991]). However, PRC Section 21002.1(b) states that each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so. Under CEQA, one type of mitigation involves minimizing the severity of the impact, but not necessarily reducing it to a less-than-significant level.</p> <p>Therefore, until historic preservation review guidelines have been developed pursuant to Program RS.I-29 of the 2008 Draft General Plan and are in place, if a building or structure more than 45 years of age will be removed in conjunction with a County permitting process, the County shall determine whether that building or structure meets the definition of a historical resource under 14 CCR Section 15064.5(a). As a basis for making this determination, the following steps shall be taken:</p> <ul style="list-style-type: none"> ▶ The project applicant shall conduct a records search at the NWIC to access the existing archival database for historical built-environment resources, and to obtain recommendations for additional study, if appropriate. ▶ The project applicant shall implement the recommendations of the NWIC as pertains to additional study. If an architectural study is recommended, the County shall require that the work be conducted for the project applicant by a qualified architectural historian. (A qualified architectural historian is defined as an individual who meets the Secretary of the Interior’s Professional Qualifications Standards in architectural history [36 Code of Federal Regulations 61].) At a minimum, the study shall enable the County to determine: <ul style="list-style-type: none"> • whether the building or structure qualifies as a historical resource (as defined at 14 CCR Section 15064.5); • whether there would be a substantial adverse change in the significance of the resource (if it does so qualify); 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<ul style="list-style-type: none"> and <ul style="list-style-type: none"> • if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts. ▶ If the building or structure qualifies as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the project applicant to implement feasible mitigation as recommended by the architectural historian. 	
<p>4.10-2a (Preferred Plan) and 4.10-2b (Maximum Development Scenario): Alteration of Historical Built-Environment Resources. Development within Solano County in accordance with the 2008 Draft General Plan may result in the alteration of historical resources. This impact would be significant.</p>	S	<p>Mitigation Measures 4.10-2a (Preferred Plan) and 4.10-2b (Maximum Development Scenario): Determine Historical Significance of Built-Environment Resources Subject to Building Alteration or Alteration of Setting, and Require Implementation of Recommended Feasible Mitigation. If development actions would alter buildings or structures more than 45 years of age, or would alter the settings of such buildings or structures, the County shall determine whether these proposed actions would result in a substantial adverse change in the significance of a historical resource. As described below, the approach for determining impacts from the structural alteration of a building or structure shall differ from the approach for determining impacts from the alteration of setting.</p> <p>Determining Potential Impacts from Building Alteration</p> <p>Until review guidelines providing for the identification, evaluation, and protection of historical built-environment resources have been developed pursuant to Program RS.I-29 of the 2008 Draft General Plan and are in place, if a building or structure more 45 years of age would be altered in conjunction with a County permitting process, the County shall determine whether the building or structure meets the definition of a historical resource under 14 CCR Section 15064.5(a). As a basis for making this determination, the following steps shall be taken:</p> <ul style="list-style-type: none"> ▶ The project applicant shall conduct a records search at the 	SU (building alteration)/ LTS (alteration of setting)

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>NWIC to determine whether the subject building or structure qualifies as a historical resource through previous listing or identification, and to obtain recommendations for additional study, if appropriate.</p> <ul style="list-style-type: none"> ▶ The project applicant shall implement the recommendations of the NWIC. If additional architectural study is recommended (either to evaluate the significance of an unevaluated building or structure, or to develop mitigation recommendations for a previously identified historical resource), the County shall require that the work be conducted for the project applicant by a qualified architectural historian. At a minimum, the evaluation study shall enable the County to determine: <ul style="list-style-type: none"> • whether the building or structure qualifies as a historical resource (as defined at 14 CCR Section 15064.5); • whether there would be a substantial adverse change in the significance of the resource (if it does so qualify); and • if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts. ▶ If the building or structure qualifies as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the project applicant to implement feasible mitigation as recommended by the architectural historian. <p>Determining Potential Impacts from the Alteration of Setting</p> <p>This determination shall be made for new development that would occur adjacent to buildings or structures that are 45 years of age or older. The County shall determine whether the development has a reasonable possibility of resulting in impacts on adjacent historical resources, should they be present, by altering the resources setting. This determination shall be based on the nature and scale of the development, the existing</p>	

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>architectural context of the development location, the age of the adjacent buildings or structures, and the level of community concern about the proposed project.</p> <p>If the County finds that a reasonable possibility of an impact on the setting of adjacent historical resources exists, the following steps shall be taken:</p> <ul style="list-style-type: none"> ▶ The project applicant shall conduct a records search at the NWIC to determine whether buildings or structures adjacent to the project site qualify as historical resources through previous listing or identification, and to obtain recommendations for additional study, if appropriate. ▶ The project applicant shall implement the recommendations of the NWIC. If additional architectural study is recommended (either to evaluate the significance of an unevaluated adjacent building or structure, or to develop mitigation recommendations), the County shall require that the work be conducted for the project applicant by a qualified architectural historian. At a minimum, the evaluation study shall enable the County to determine: <ul style="list-style-type: none"> • whether the buildings or structures adjacent to the project site qualify as a historical resource (as defined at 14 CCR Section 15064.5); • whether there would be a substantial adverse change in the significance of those resources (if they do so qualify); and • if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts. ▶ If the buildings or structures adjacent to the project site qualify as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the implementation of feasible mitigation as recommended by the architectural historian. 	
4.10-3a (Preferred Plan) and 4.10-3b (Maximum)	S	Mitigation Measures 4.10-3a (Preferred Plan) and 4.10-3b	LTS

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>Development Scenario): Destruction of Prehistoric and Historical Archaeological Deposits. Development within Solano County in accordance with the 2008 Draft General Plan may result in the destruction of prehistoric and/or historical archaeological deposits. This impact would be significant.</p>		<p>(Maximum Development Scenario): Require Preparation of a Cultural Resources Study and Implementation of Recommended Feasible Mitigation for Destruction of Prehistoric and Historical Archaeological Deposits. The County shall include the following requirements in addition to those contained in Program RS.I-25 of the 2008 Draft General Plan:</p> <ul style="list-style-type: none"> ▶ Project applicants shall conduct, at a minimum, a records search at the NWIC to access the existing archival database for cultural resources in a subject project area, as well as to receive an assessment of the project area’s cultural resource sensitivity and recommendations for additional study, if appropriate. ▶ Project applicants shall prepare cultural resources studies for all development projects requiring discretionary County approval, based on the recommendations made by the NWIC as part of the records search. Each cultural resources study shall be conducted by an individual listed on the consultant list maintained by the NWIC. The scope of the study shall be tailored to the nature of the project, the sensitivity of the project area, and community concern about potential project effects (e.g., Native American community concerns about human remains and prehistoric archaeological deposits). The professional judgment of the NWIC staff, cultural resources consultant and County planning staff shall be the primary basis for determining the level of effort for the study. Not every development review for cultural resources will require the same level of effort. At a minimum, the study shall provide the technical basis for the County to make the following determinations: <ul style="list-style-type: none"> • whether there are any historical resources (as defined at 14 CCR Section 15064.5) or unique archaeological resources (as defined at PRC Section 21083.2[g]) in the project area; • whether there would be a substantial adverse change in 	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>the significance of such resources as a result of the project;</p> <ul style="list-style-type: none"> • if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts; and • whether Native American tribal and historical organizations were provided an opportunity to comment on the adequacy of the cultural resources study, or about the conclusions and recommendations therein. <ul style="list-style-type: none"> ▶ The County shall, at its discretion and based on tribal inquiries, refer the study’s conclusions and recommendations to the tribal organization in whose traditional territory the study was conducted for the purposes of garnering input on the potential for impacts and the means to alleviate such impacts. ▶ Upon completion of the cultural resources study (and tribal review of the study, if undertaken), the County shall require the project applicant to implement the feasible recommendations of the cultural resources professional (and tribe, if applicable) as a condition of project approval. ▶ If archaeological monitoring or excavation relating to prehistoric archaeological sites or areas of prehistoric archaeological sensitivity is required by the County, the County shall provide an opportunity for Native American monitors from culturally affiliated descendant groups to participate in the monitoring or excavation at tribal expense. <p>This mitigation measure would provide the basis for the County to make a finding, supported by substantial evidence, on the likelihood of potentially significant impacts to archaeological deposits under CEQA. In accordance with 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.</p>	

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>4.10-4a (Preferred Plan) and 4.10-4b (Maximum Development Scenario): Loss of Integrity of Rural Historic Landscapes. Development within Solano County in accordance with the 2008 Draft General Plan may result in new buildings, roadways, or related facilities that would diminish the integrity of rural historic landscapes. This impact would be less than significant.</p>	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
<p>4.10-5a (Preferred Plan) and 4.10-5b (Maximum Development Scenario): Adverse Effects on Montezuma Hills and Suisun Marsh Area Cultural Resources. Development within Solano County in accordance with the 2008 Draft General Plan may result in new buildings, roadways, or related facilities that would adversely affect cultural resources in the Montezuma Hills and Suisun Marsh area. This impact would be significant.</p>	S	<p>Mitigation Measures 4.10-5a (Preferred Plan) and 4.10-5b (Maximum Development Scenario): Conduct Viewshed Analysis and Install Buffers or Consider Alternate Siting Locations for Wind-Generating Structures to Reduce Impacts on Montezuma Hills Cultural Resources. The County shall consider potential impacts on historical resources that may occur from the installation of wind-generating structures in the Montezuma Hills, and shall conduct a viewshed analysis. If the analysis indicates that an impact on historical resources is likely, the County shall implement feasible mitigation measures, such as installing visual buffers and/or considering alternate siting locations that would reduce the severity of such impacts. In accordance with 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.</p>	LTS
<p>4.10-6a (Preferred Plan) and 4.10-6b (Maximum Development Scenario): Loss of Integrity of Traditional Cultural Properties. Development within Solano County in accordance with the 2008 Draft General Plan may result in new buildings, roadways, or related facilities that would diminish the integrity of TCPs. This impact would be significant.</p>	S	<p>Mitigation Measures 4.10-6a (Preferred Plan) and 4.10-6b (Maximum Development Scenario): Require Consultation with Native Americans and Consideration of Non-Native American TCPs. The County shall make the conditional consultation expressed in Program RS.I-27 mandatory as part of the 2008 Draft General Plan, as well as a component of any area plans developed pursuant to the 2008 Draft General Plan. Additionally, the County shall require that any cultural resources studies undertaken for permitting under the 2008 Draft General Plan shall address the possibility that TCPs may include those important to non-Native American community groups. If such non-Native American TCPs are identified, impact mitigation recommendations of the consulting cultural resource professional shall be implemented by the County. In accordance with 14 CCR</p>	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.	
<p>4.10-7a (Preferred Plan) and 4.10-7b (Maximum Development Scenario): Destruction of Paleontological Resources. Development within Solano County in accordance with the 2008 Draft General Plan may result in the destruction of paleontological resources. This impact would be potentially significant.</p>	PS	<p>Mitigation Measures 4.10-7a (Preferred Plan) and 4.10-7b (Maximum Development Scenario): Determine the Need for a Paleontological Resources Analysis and Implement Recommended Mitigation. The County shall implement the following measures:</p> <p>(a) Actions that do not meet the CEQA definition of a “project” and therefore do not require an environmental analysis under the CEQA process shall not be required to perform a paleontological resources analysis.</p> <p>(b) All projects in Solano County that are subject to a CEQA evaluation shall include a site-specific analysis of paleontological resources. At a minimum, the site-specific analysis shall include a review of the types of the geologic formation(s) present at the project site and a determination of the likelihood that those formation(s) would contain a “unique paleontological resource” as stated in Title 14, California Code of Regulations, Appendix G (the CEQA checklist). If the site-specific analysis determines that a project may have an adverse effect on a “unique paleontological resource,” the County shall require that project-specific mitigation measures be implemented to address the following:</p> <ul style="list-style-type: none"> ▶ cessation of work in the vicinity of the find and notification of the County Planning Department and the lead agency for the project; ▶ retention by the project applicant of a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan, which may include some or all of the following elements: a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen 	LTS

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>recovered, and a report of findings; and</p> <ul style="list-style-type: none"> ▶ implementation of recommendations made by the paleontologist, where the lead agency for the project determines that said recommendations are necessary and feasible. 	
<p>4.10-8a (Preferred Plan) and 4.10-8b (Maximum Development Scenario): Disturbance of Human Remains. Development within Solano County in accordance with the 2008 Draft General Plan may result in the disturbance of human remains, including those interred outside of formal cemeteries. This impact would be significant.</p>	<p>S</p>	<p>Mitigation Measures 4.10-8a (Preferred Plan) and 4.10-8b (Maximum Development Scenario): Require Pre-Project Consideration of the Possibility of Human Remains Discoveries, and Require Appropriate Consultation with Descendant Communities. Based on the requirements of Mitigation Measure 4.10-3a (Require Preparation of a Cultural Resources Study and Implementation of Recommended Feasible Mitigation for Destruction of Prehistoric and Historical Archaeological Deposits), the County shall require project applicants to address the possibility of human remains occurring in given project sites in pre-project planning, based on the results of project-specific archival research and/or field study.</p> <p>However, the possibility that human remains will be encountered in unexpected locations cannot be discounted. If a project undertaken pursuant to the 2008 Draft General Plan encounters human remains, the procedures set forth in PRC Section 5097.98 (the procedures governing the accidental discovery of human remains) shall be followed. (Note that the requirements of PRC Section 5097.98 were amended by statute in September 2006, and modify the requirements for human remains discovery as described in 14 CCR Section 15064.5[e].) If, in following the requirements of PRC Section 5097.98, the human remains are determined to not be of Native American origin (and are not the remains of a recent decedent subject to the coroner’s authority), then the County shall require the project applicant to consult with the appropriate descendant community regarding means for treating or disposing of the human remains, and any associated items, with appropriate dignity. Pursuant to 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008</p>	<p>LTS</p>

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		Draft General Plan.	
4.11 Aesthetic Resources			
<p>4.11-1a (Preferred Plan) and 4.11-1b (Maximum Development Scenario): Adverse Impacts on Scenic Vistas. Prominent views in Solano County include marshlands and Delta waters, the Coast Range, meandering hills, and expanses of agricultural lands. Views of the Coast Range and nearby hills are considered a scenic vista in Solano County. Views of the Coast Range could be partially or totally blocked by future urban land uses in Solano County. Further, urban development in Solano County would permanently alter the foreground and middle ground views from vehicles traveling along Interstate 80 (I-80), I-505, SR 37, and I-680. The 2008 Draft General Plan identifies areas that would be converted from existing open spaces to urban land uses. Because the 2008 Draft General Plan envisions development of urban land uses that could partially or wholly block views of the Coast Range (a countywide scenic vista), this impact would be significant.</p>	S	No feasible mitigation is available to reduce this impact	SU
<p>4.11-2a (Preferred Plan) and 4.11-2b (Maximum Development Scenario): Damage to Scenic Resources within a State Scenic Highway. Development of urban land uses in Solano County, specifically the area surrounding the city of Rio Vista, would be visible from SR 160, which is a state-designated scenic highway in Sacramento County. The 2008 Draft General Plan identifies extensive agricultural land uses surrounding the existing urban development in Rio Vista. Caltrans has identified agricultural areas and small towns viewable from SR 160 as scenic resources. The 2008 Draft General Plan identifies continuation of existing agricultural land uses surrounding existing urban development in Rio Vista. However, the 2008 Draft General Plan also promotes development of electricity-generating wind-powered facilities that would be viewable from SR 160. This impact would be significant.</p>	S	<p>Mitigation Measures 4.11-2a(1) (Preferred Plan) and 4.11-2b(1) (Maximum Development Scenario): Require Consultation with Caltrans before Approval of Individual Development Projects near Rio Vista. The County shall require that project applicants for development projects within 1 mile of SR 160, or otherwise having the potential to be visible from SR 160 as determined by the County based on information provided by the applicant, consult with Caltrans, and that Caltrans review proposed land use plans before project approval. The applicants shall implement design measures recommended by Caltrans to minimize impacts on scenic resources from SR 160 to the maximum extent practical. Recommended design measures could include the use of setbacks, nonreflective building materials, and specific design features (e.g., overhang, finishes, paint) that create a pleasing aesthetic. If the project applicant can demonstrate that the development is not visible from SR 160, then design measures</p>	SU

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>shall not be required.</p> <p>Mitigation Measures 4.11-2a(2) (Preferred Plan) and 4.11-2b(2) (Maximum Development Scenario): Require Project Applicants to Submit Tentative Maps and Landscaping, Lighting, and Design Plans to the County before Approval of Individual Development Projects near Rio Vista. The County shall require project applicants for development projects within 1 mile of the city of Rio Vista, or otherwise having the potential to be visible from the city as determined by the County based on information provided by the applicant, to submit tentative maps and landscaping, lighting, and design plans to the County for review and approval before approval of the development projects. The plans shall demonstrate that all feasible and practical design measures (e.g., landscaping, open space buffers, use of neutral colors) have been incorporated into the project to achieve or exceed all requirements of 2008 Draft General Plan policies and minimize the project’s impacts on scenic resources, consistent with County standards. If the project applicant can demonstrate that the development is not visible from SR 160, then design measures shall not be required.</p>	
<p>4.11-3a (Preferred Plan) and 4.11-3b (Maximum Development Scenario): Degradation of Visual Character. Implementation of the 2008 Draft General Plan would substantially alter the visual character of Solano County through conversion of agricultural and open space lands to developed urban uses. Assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether such an alteration would also be considered a substantial degradation of the visual character. For this analysis, a conservative approach was taken to analyzing the potential for degradation of the visual character in Solano County. This impact would be significant.</p>	S	<p>Mitigation Measures 4.11-3a (Preferred Plan) and 4.11-3b (Maximum Development Scenario): Require Preparation of Design Guidelines and Landscaping Standards. The County shall require project applicants to prepare comprehensive design guidelines and landscaping standards as conditions of approval of development projects to address impacts on aesthetic resources associated with the conversion of agricultural and open space land uses to urban and wind energy development.</p>	SU
<p>4.11-4a (Preferred Plan) and 4.11-4b (Maximum Development Scenario): Increase in Nighttime Lighting and</p>	S	<p>Mitigation Measures 4.11-4a(1) (Preferred Plan) and 4.11-4b(1) (Maximum Development Scenario): Require Lighting and</p>	SU

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Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<p>Daytime Glare. Urban development projects within Solano County would require nighttime lighting and could construct facilities with reflective surfaces that could inadvertently cast light and glare toward motorists on area highways and roadways under day and nighttime conditions. However, the degree of darkness experienced in the eastern portion of Solano County would not substantially diminish as a result of implementing the 2008 Draft General Plan and would effectively retain views of stars and other features of the night sky. Although urban development envisioned in the 2008 Draft General Plan would increase the amount of nighttime light and daytime glare primarily adjacent to existing urban communities in Solano County, a Specific Project Area would introduce a new source of nighttime lighting in a rural portion of the county. This impact would be significant.</p>		<p>Building Materials that Minimize Glare and Reflectance. The County shall require project applicants to implement the following measures as conditions of approval of development projects:</p> <ol style="list-style-type: none"> (1) Light fixtures shall be installed that have light sources aimed downward and shielded to prevent glare or reflection or any nuisance, inconvenience, and hazardous interference of any kind on adjoining streets or property. (2) Exterior building materials on nonresidential structures shall be composed of a minimum 50% low-reflectance, nonpolished finishes. (3) Bare metallic surfaces (e.g., pipes, vents, light fixtures) shall be painted to minimize reflectance. <p>Mitigation Measures 4.11-4a(2) (Preferred Plan) and 4.11-4b(2) (Maximum Development Scenario): Require Preparation of Design Guidelines with Appropriate Lighting and Signage Standards. The County shall require project applicants to prepare comprehensive design guidelines as conditions of approval of development projects. The design guidelines shall include lighting standards that are structured to balance the safety of residents with the value of darkness. At a minimum, the lighting standards shall prohibit the use of harsh mercury vapor, low-pressure sodium, or fluorescent bulbs for public lighting or residential neighborhoods. Guidelines shall also be provided regarding appropriate lighting and signage in office and/or commercial areas to prevent light and glare from adversely affecting motorists and adjacent land uses. The design guidelines shall be submitted to the County for review and approval.</p>	

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
4.12 Energy			
4.12-1a (Preferred Plan) and 4.12-1b (Maximum Development Scenario): Effects on Energy Consumption from Land Use Locations and Patterns. Buildout of the 2008 Draft General Plan could affect energy usage through inefficient land use patterns that increase dependency on single-occupant vehicles; however, the proposed land use patterns and goals and policies would promote compact, cluster developments in the vicinity of existing infrastructure and developed areas, which would reduce transportation-related energy usage and the need for expanded infrastructure. Therefore, this impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.12-2a (Preferred Plan) and 4.12-2b (Maximum Development Scenario): Increased Energy Demand and Need for Additional Energy Infrastructure. Future population growth through buildout of the 2008 Draft General Plan would increase the demand for energy and the need for additional energy resources to meet this demand; however, the proposed regulations and policies included in the 2008 Draft General Plan would ensure that sufficient energy supplies would be available. This impact would be less than significant .	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required.	LTS
4.13 Hazards and Hazardous Materials			
4.13-1a (Preferred Plan) and 4.13-1b (Maximum Development Scenario): Release of Hazardous Materials. Future population growth through buildout of the 2008 Draft General Plan would result in an increase in the routine transport, use, and/or disposal of hazardous materials, which could result in exposure of such materials to the public through either routine use or accidental release. Implementation of proposed 2008 Draft General Plan policies, in combination with existing federal and state regulations, would reduce the potential impacts related to the routine transportation of hazardous materials. This impact would be less than	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
significant.			
4.13-2a (Preferred Plan) and 4.13-2b (Maximum Development Scenario): Safety Hazards Associated with Public and Private Airports. Implementation of the proposed 2008 Draft General Plan could locate development within the vicinity of a public-use or private airstrip, potentially resulting in a safety hazard for people residing or working in the area. Policies and plans included in the 2008 Draft General Plan would address these hazards. This impact would be less than significant.	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required	LTS
4.13-3a (Preferred Plan) and 4.13-3b (Maximum Development Scenario): Interference with an Adopted Emergency-Response Plan. Implementation of the proposed 2008 Draft General Plan would add additional traffic and residences requiring evacuation in case of an emergency. Implementation of proposed policies would ensure conformance with local emergency-response programs and continued cooperation with emergency-response service providers. This impact would be less than significant.	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required	LTS
4.13-4a (Preferred Plan) and 4.13-4b (Maximum Development Scenario): Exposure of Structures to Urban and Wildland Fires. Implementation of the 2008 Draft General Plan would expose unincorporated areas of the county to risks related to both urban and wildland fires. Compliance with California Building Code regulations, city Fire Code requirements, and other state and local fire safety requirements would minimize wildland fire risks. In addition, proposed 2008 Draft General Plan policies would ensure that people and structures would not be exposed to significant risk of loss of injury involving wildland fires. This impact would be less than significant.	LTS	No mitigation beyond the 2008 Draft General Plan policies and programs is required	LTS

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
4.14 Recreation			
<p>4.14-1a (Preferred Plan): Need for New or Expanded Parks or Recreational Facilities. Buildout of the 2008 Draft General Plan would result in a need for new or expanded parks and recreation facilities. Buildout at average densities would result in a condition where demand for parks outstrips the existing supply. The County would have only 5.4 acres of parkland per 1,000 residents. This would be substantially lower than the County’s adopted parkland provision standard of 10 acres per 1,000 residents. This impact would be significant.</p>	S	<p>Mitigation Measure 4.14-1a (Preferred Plan): Require Developers to Pay Fair-Share Park and Recreation Impact Fees. As a condition of approval of all residential development, the County shall require project developers to mitigate any adverse impacts on park and recreational facilities through the payment of a fair-share impact fee. The park mitigation impact fees shall be designed to mitigate impacts reasonably related to a proposed residential development and must be used to acquire or develop park and recreational facilities. “Development,” for the purposes of this measure, shall mean all single-family structures requiring a building permit, condominium and multifamily residential units, planned residential development, and all multifamily structures that require building permits, but shall exclude remodel or renovation permits that do not result in additional dwelling units. Impact fees shall be based on a fee formula developed by the County. Payment of the required impact fee shall occur before the issuance of any building permit.</p>	LTS
<p>4.14-1b (Maximum Development Scenario): Need for New or Expanded Parks or Recreational Facilities. Buildout of the 2008 Draft General Plan would result in a need for new or expanded parks and recreation facilities. Buildout at maximum densities would result in a condition where demand for parks outstrips the existing supply. In 2008 the County has 213 acres of parkland. The County would have only 3.4 acres of parkland per 1,000 residents. This would be substantially lower than the County’s adopted parkland provision standard of 10 acres per 1,000 residents. This impact would be significant.</p>	S	<p>Mitigation Measure 4.14-1b (Maximum Development Scenario): Require Developers to Pay Fair-Share Park and Recreation Impact Fees. As a condition of approval of all residential development, the County shall require project developers to mitigate any adverse impacts on park and recreational facilities through the payment of a fair-share impact fee. The park mitigation impact fees shall be designed to mitigate impacts reasonably related to a proposed residential development and must be used to acquire or develop park and recreational facilities. “Development,” for the purposes of this measure, shall mean all single-family structures requiring a building permit, condominium and multifamily residential units, planned residential development, and all multifamily structures that require building permits, but shall exclude remodel or renovation permits that do not result in additional dwelling units. Impact fees shall be based on a fee formula developed by the County. Payment of the required impact fee shall occur before the</p>	LTS

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Table 2-1 Summary of Project Impacts and Mitigation Measures			
Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		issuance of any building permit.	
6.2 Climate Change			
6.2-1a (Preferred Plan) and 6.2-1b (Maximum Development Scenario): Increases in Greenhouse Gas Emissions. Per-capita rates of CO ₂ emissions would not meet the levels required to meet the goals of AB 32 (9 TPY per capita). Emissions would increase considerably compared with existing levels. This impact would be significant .	S	Implementation of the 2008 Draft General Plan goals, policies, and implementation programs would reduce emissions of GHGs, but the degree of future impacts and applicability, feasibility, and success of future mitigation measures cannot be adequately known for each specific future project at this program level of analysis. Therefore, it cannot be determined whether these measures would reduce GHG levels to a less-than-significant level.	SU
6.2-2a (Preferred Plan) and 6.2-2b (Maximum Development Scenario): Effects of Climate Change on Solano County. Climate change is expected to result in a variety of effects on Solano County: reduced agricultural production, changes to terrestrial and aquatic ecosystems, reduced hydroelectric energy production, increased energy demand, decreased water supply, increased risk of flooding and landslide, increased frequency and intensity of wildfire, and the inundation of low-lying areas caused by rising sea levels. Substantial negative effects on the county's residents, resources, structures, and the economy could result. This impact would be significant .	S	Implementation of the 2008 Draft General Plan policies and implementation programs would serve to reduce the impacts of climate change on Solano County. However, the efficacy of such policies and programs is uncertain. No other feasible mitigation measures exist to reduce the impact to a less-than-significant level.	SU
Cumulative Impacts			
<p>The 2008 Draft General Plan would make a cumulatively considerable contribution to significant cumulative impacts related to:</p> <ul style="list-style-type: none"> ▶ land use conflicts between urban, rural residential, commercial, industrial, and agricultural uses ▶ population increase ▶ emissions of ozone and particulate matter (both PM10 and PM2.5) ▶ exposure to TAC emissions from mobile sources ▶ carbon monoxide emissions from local mobile sources ▶ traffic noise level increases ▶ degradation of roadway levels of service ▶ demand for and resulting effects on groundwater and surface-water supplies 			

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**Table 2-1
Summary of Project Impacts and Mitigation Measures**

Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
<ul style="list-style-type: none"> ▶ loss of sensitive wildlife habitat (grassland, vernal pool, oak woodland and savanna, marsh, and riparian woodland) ▶ foraging habitat for Swainson’s hawk and burrowing owl from loss of agricultural land ▶ conversion of Important Farmland ▶ insufficiency of available water supplies to incorporated areas and portions of unincorporated areas to accommodate projected future growth ▶ historical built-environment resources ▶ conversion of local viewsheds from agricultural land uses and open spaces to urban development ▶ increases in demand for energy ▶ County parks and recreation programs, from increased growth in the unincorporated county ▶ climate change 			

3 PROJECT DESCRIPTION

The following describes the proposed project to be analyzed within the EIR, the 2008 update to the *Solano County General Plan* (2008 Draft General Plan), including the location, history, and objectives of the proposed project and the relationship of the proposed project to related plans and regulations.

3.1 PROJECT LOCATION

Solano County extends from the shores of San Pablo Bay in the west to the heart of the Central Valley in the east and is located between the San Francisco and Sacramento metropolitan regions. The county encompasses approximately 910 square miles—830 square miles of land and 80 square miles of water. Approximately 130 square miles of the county, or 14% of the total land area, lie within one of seven incorporated cities. All lands outside of the jurisdictional boundaries of the seven incorporated cities compose unincorporated Solano County, and constitute the geography to which the 2008 Draft General Plan would apply (Exhibit 3-1).

3.2 PROJECT HISTORY

The current *Solano County General Plan* (General Plan) comprises several stand-alone documents:

- ▶ Resource Conservation and Open Space Element (1972)
- ▶ Health and Safety Element (1977)
- ▶ Scenic Highways Element (1977)
- ▶ *Collinsville–Montezuma Hills Area Plan* (1979)
- ▶ Land Use and Circulation Element (1980)
- ▶ Energy Element (1982)
- ▶ *Tri-City and County Cooperative Plan* (1994)
- ▶ Park and Recreation Element (2003)
- ▶ Housing Element (2005)

Many of the elements in the current General Plan are outdated and need extensive revision. In the years since the elements were adopted, the county has experienced significant changes that have affected and will continue to influence local planning considerations. In response to such changes and state requirements, the County initiated the proposed project.

Of particular relevance to the General Plan Update process is the county's Orderly Growth Initiative, adopted in 1994. The purpose of the initiative is to continue to assure protection of Solano County's agricultural and open space resources by extending the following provisions:

- ▶ amending the General Plan to restrict redesignation of lands identified as Agriculture or Open Space on the land use and circulation map through December 31, 2010; and
- ▶ amending the General Plan to restrict the density of residential and other development of lands designated Agriculture or Open Space through the year 2010, preventing large-scale residential or mixed-use developments outside of municipal areas.

In 2005, the County Board of Supervisors adopted the *Solano County General Plan Update Guiding Principles*. The guiding principles include the following:

1. The General Plan update will be conducted within the framework of the Orderly Growth Initiative.



Sources: CaSIL, data provided by Solano County in 2006

Regional Map

Exhibit 3-1

2. The County's current development strategy of city centered growth and "what is urban shall be municipal" as set forth in the current Land Use and Circulation Element shall continue as an overall goal of the General Plan.
3. It is anticipated that there shall be some refinement to the Orderly Growth Initiative policies and agricultural and open space land use designations, but that the basic concepts within the initiative shall be retained.
4. It is anticipated that portions of the new General Plan which affect any provisions of the Orderly Growth Initiative will be placed on the Ballot for approval by the voters of the County.

These principles have helped guide development of the 2008 Draft General Plan.

3.3 PROJECT OBJECTIVES

The project proposes a comprehensive update to the County's current General Plan. The 2008 Draft General Plan has been significantly revised and reorganized. The primary objective of the updated plan is to provide policy guidelines for future development and conservation in the unincorporated portions of Solano County and to adapt the document to pertinent issues that have emerged since the preparation of the previous elements. The 2008 Draft General Plan contains nine chapters, and includes sections addressing issues not previously covered by the current plan.

The objectives of the proposed project are as follows:

- ▶ Maintain the current development strategy of city-centered growth, where most urban growth is located within the incorporated cities through city annexations, where urban services are provided.
- ▶ Retain the overall function of the County's Orderly Growth Initiative, while refining the policies and land use designations.
- ▶ Protect and support agriculture as an important component of the county's economy and quality of life.
- ▶ Encourage the location of needed new industrial and agricultural processing facilities through appropriate land use designations on parcels of sufficient size and location in relation to existing agriculture, industry, and infrastructure to support such development.
- ▶ Sustain and enhance the county's natural environment, including its diverse species, watersheds, natural communities, and wildlife corridors.
- ▶ Continue the existing development pattern of distinct and identifiable cities and communities.
- ▶ Encourage economic development within the unincorporated county.
- ▶ Ensure sufficient residential, commercial, and industrial development within areas serviced by cities to support a vibrant economy and provide affordable housing options.

3.4 FRAMEWORK OF THE 2008 DRAFT GENERAL PLAN

Protection of agricultural lands and the county's rural character has been an overarching theme of the County's planning efforts for many decades. The 2008 Draft General Plan would continue this tradition as well as broaden the General Plan's scope to encompass sustainability as it relates to the environment, the economy, and social equity.

To address these themes, the 2008 Draft General Plan is organized as topical chapters: Land Use, Agriculture, Resources, Public Health and Safety, Economic Development, Circulation, and Public Facilities and Services. The current Housing and Parks and Recreation Elements were recently updated and adopted before this comprehensive update, and are therefore not a part of the proposed project. The seven topical chapters address the general plan issues required by the state and usually found within the required elements; however, the County has chosen to group topics differently, as permitted by the California Government Code. The County chose the selected format to resolve potential internal consistency issues and avoid duplication of plan content. Each chapter includes sections presenting pertinent goals, policies, and implementation programs. A brief discussion of the policy content and direction provided by each chapter follows.

3.4.1 LAND USE CHAPTER

The Land Use chapter addresses the physical distribution of land uses within Solano County. The chapter describes the general development strategy within the county and continues the current general plan's policies to focus most development within the existing urban centers. The proposed policy that would accomplish this is the municipal service area (MSA).

An MSA defines the area of current and/or future city jurisdictional responsibility to provide public services and infrastructure necessary to support planned urban land uses. Within MSAs, future development of urban land uses would be facilitated and served through city annexation. Existing land uses within MSAs would continue under the County's jurisdiction until the land is annexed to the city for conversion to urban uses. In areas outside MSAs, planned land uses would be maintained or developed under County jurisdiction. Services to support existing and future development outside MSAs would be provided by the County and special districts consistent with General Plan servicing policies, as described within the Public Facilities and Services chapter.

Determining the future location, type, and intensity of new development and reuse projects, and establishing the desired mix and relationship between such projects are key objectives of this chapter. Exhibit 3-2 depicts the proposed land use diagram. The 2008 Draft General Plan establishes land use designations to identify the types and nature of development permitted throughout the county, providing a mix of land uses that provides for a thriving agricultural economy, a suitable inventory of housing for a range of income groups, a robust commercial and employment base for residents and surrounding communities, sufficient open space and recreational opportunities, adequate public facilities and services, and high-quality rural lifestyles for both residents and visitors to enjoy.

The plan establishes the following residential land use designations:

- ▶ RR—Rural Residential: 2.5- to 10-acre lots
- ▶ UR—Urban Residential:
 - UR-L (Low): 2–7 dwelling units per acre (du/acre)
 - UR-M (Medium): 8–15 du/acre
 - UR-H (High): 16–25 du/acre
- ▶ TC—Traditional Community:
 - TC-R (Residential): 1–4 du/acre
 - TC-M (Mixed-use): 1–4 du/acre

Proposed commercial and industrial designations include:

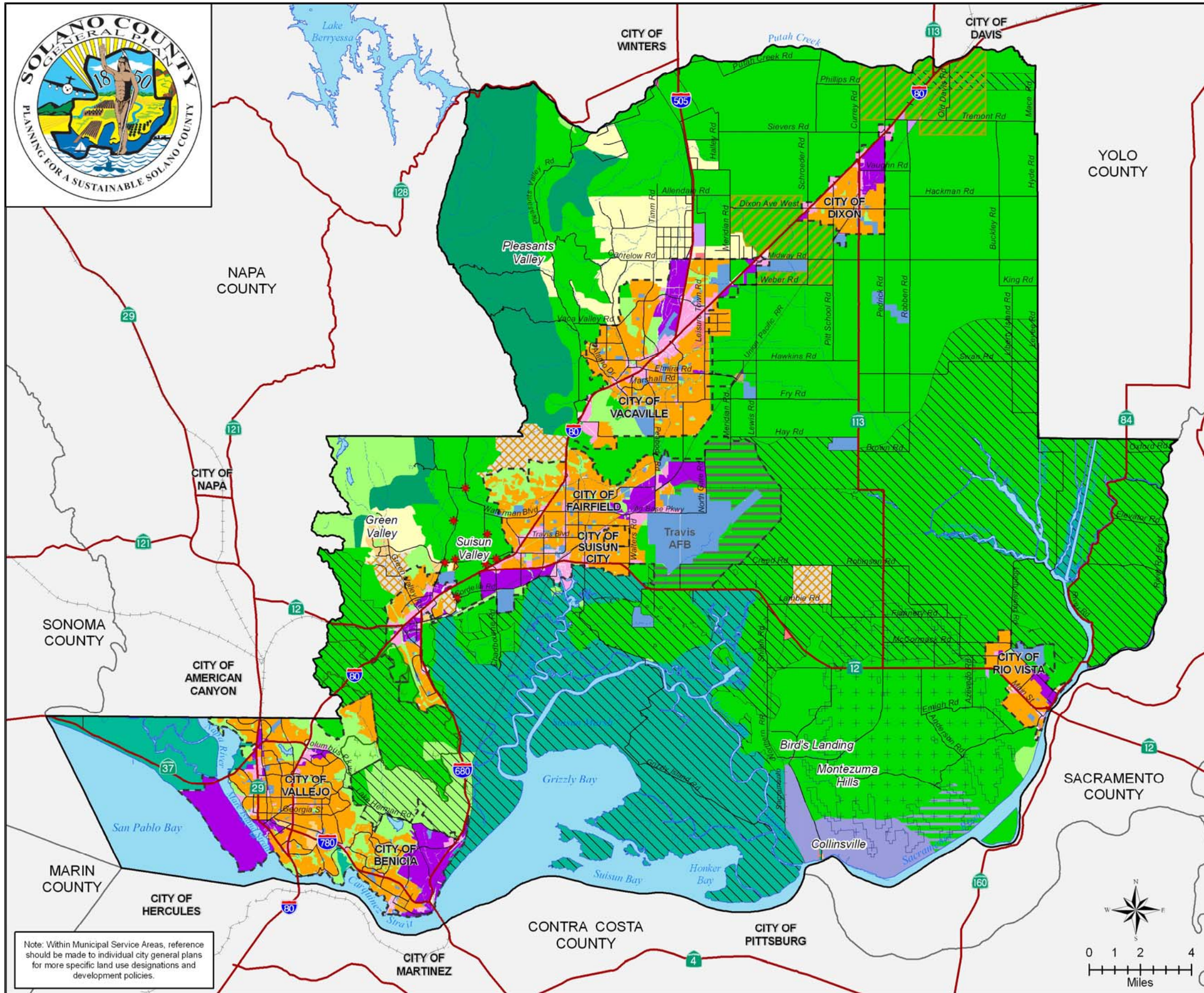
- ▶ NC—Neighborhood Commercial
- ▶ HC—Highway Commercial
- ▶ SC—Service Commercial
- ▶ NAC—Neighborhood Agricultural/Tourist Center
- ▶ UC—Urban Commercial



Solano County General Plan EIR

Exhibit 3-2

Land Use Map



Legend

General Plan Land Use Designations

Natural Resource Designations

- Water Bodies and Courses
- Park and Recreation
- Marsh

Agricultural Designations

- Watershed
- Agriculture

Public Designations

- Public/Quasi-Public

Residential Designations

- Rural Residential
- Traditional Community - Residential
- Traditional Community - Mixed Use
- Urban Residential

Commercial Designations

- Neighborhood Commercial
- Neighborhood Agricultural/Tourist Center
- Commercial Recreation
- Service Commercial
- Highway Commercial
- Urban Commercial

Industrial Designations

- General Industrial
- Limited Industrial
- Water Dependant Industrial
- Urban Industrial

Special Purpose Areas

- Specific Project Areas
- Water Dependant Industrial - Reserve
- Travis Reserve Area
- Wind Energy Resource Overlay
- Agricultural Reserve Overlay
- Tri-City/County Cooperative Planning Area
- Resource Conservation Overlay

Note: Within Municipal Service Areas, reference should be made to individual city general plans for more specific land use designations and development policies.



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- ▶ CR—Commercial Recreation
- ▶ UI—Urban Industrial
- ▶ LI—Limited Industrial
- ▶ GI—General Industrial
- ▶ WDI—Water Dependent Industrial
- ▶ WDI-R—Water Dependent Industrial Reserve

Designations to accommodate agriculture, open space, public, and institutional uses include the following:

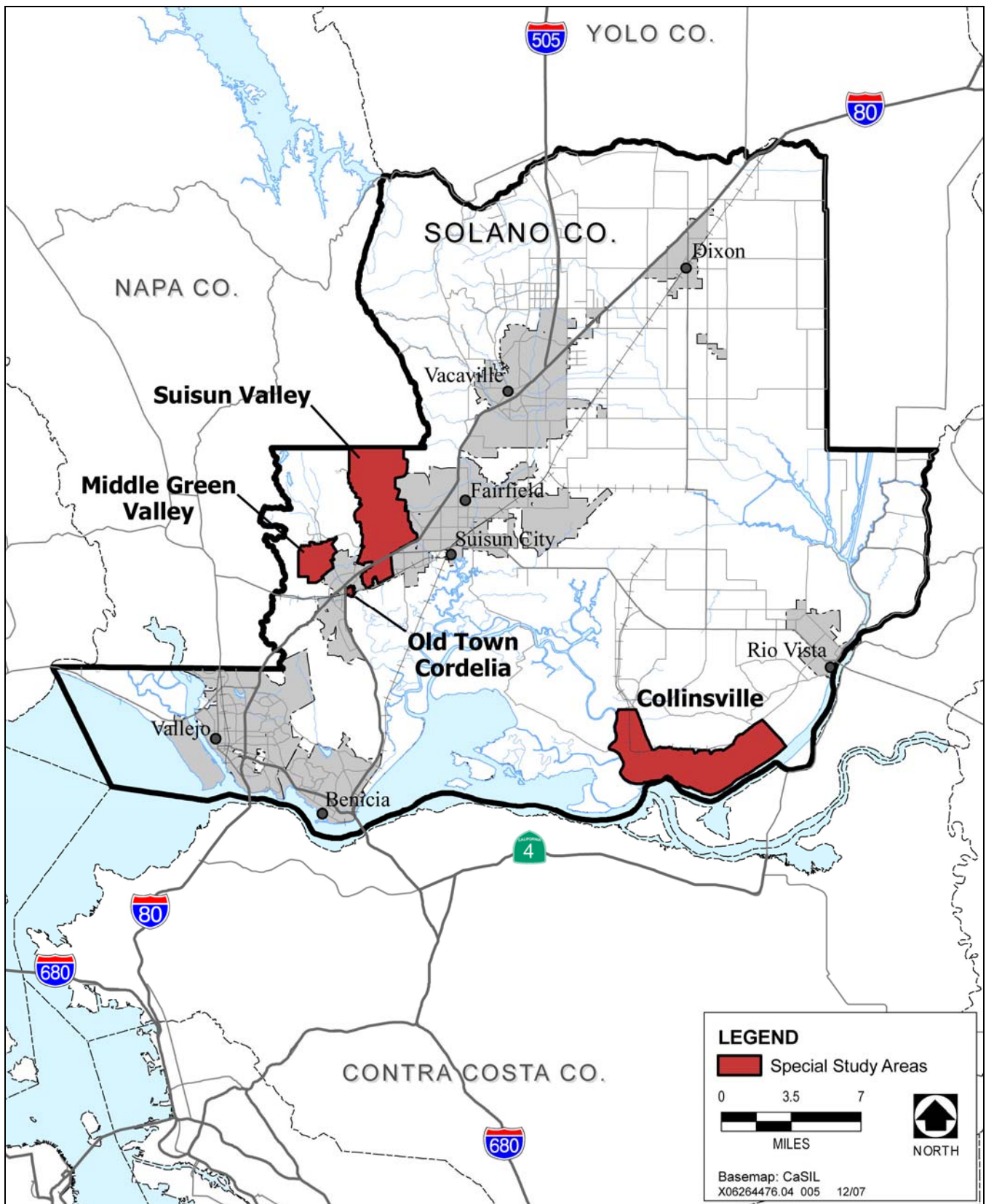
- ▶ AG—Agriculture: Minimum lot size and desired uses vary by region
- ▶ WS—Watershed: One dwelling per 160 acres
- ▶ WB—Water Bodies & Courses
- ▶ M—Marsh
- ▶ PR—Park & Recreation
- ▶ PQP—Public/Quasi-Public

Special-purpose areas and overlays include:

- ▶ ARO—Agricultural Reserve Overlay
- ▶ RCO—Resource Conservation Overlay
- ▶ SP—Specific Project Area
- ▶ TCO—Tri-City Cooperative Planning Area
- ▶ TRA—Travis Reserve Area
- ▶ WRO—Wind Energy Resource Overlay

This chapter also includes policies that would guide future development in four special study areas: Middle Green Valley, Suisun Valley, Collinsville, and Old Town Cordelia (Exhibit 3-3).

- ▶ **Middle Green Valley**—The Middle Green Valley area comprises roughly 1,930 acres and is located north and west of the Fairfield city limits along Green Valley Road. It is nestled on the edge of the western hills with a mixture of cultivated agricultural land and single-family residential on the valley floor and grazing land in the hills. The area is valued for its rural character and scenic qualities. The goal of the special study area is to maintain the rural character of Middle Green Valley while allowing some opportunities for compatible residential development. Land use tools such as clustering and transfer of development rights would be used to limit the effects of residential development on the rural character of the valley, including viewsheds, wildlife habitat and corridors, and agricultural activities. A future specific plan would be developed to refine the preferred plan for the area.
- ▶ **Suisun Valley**—Suisun Valley includes about 9,760 acres and is located northwest of Fairfield, east of the Napa Hills, and south of the Napa County border. Most land in this area is in agricultural use, producing wine grapes, small grains, and fruit crops. Two intersections in this area contain commercial establishments: Mankas Corners and Rockville Corners. The primary goal of the special study area is to allow the Suisun Valley to serve as a destination for those visitors interested in local wine production and local produce. Commercial land use designations would be expanded in eight Neighborhood Agricultural/Tourist Centers in Suisun Valley comprising 75 acres among the centers. These Neighborhood Agricultural/Tourist Centers would allow additional commercial uses in Mankas Corner, Rockville Corner, Morrison Road, Gomer School, Rockville Road east of Abernathy Road, North Connector at Abernathy Road, Iwama Market, and Cordelia Road at Thomasson Lane. Even with these changes in designation, additional commercial development would be limited based on the number of parcels with Williamson Act contracts. Outside of the Neighborhood Agricultural/Tourist Centers, the Suisun Valley would be designated for agricultural use, pursuant to standards established in the Agriculture chapter.



Sources: CaSIL, data provided by Solano County in 2006

Special Study Areas

Exhibit 3-3

- ▶ **Collinsville**—The Collinsville Special Study Area includes about 11,240 acres located in the extreme southeastern portion of Solano County. Located south of State Route 12 approximately 10 miles southwest of Rio Vista and 15 miles southeast of Travis Air Force Base and Fairfield, Collinsville is bordered on the south and southwest by the Sacramento River and on the west by Montezuma Slough and Suisun Marsh. The land use plan for Collinsville would maintain the residential character of Collinsville and Birds Landing, retain the possibility for future industrial development outside of the existing Collinsville community, and protect the condition of Suisun Marsh and other natural resource areas. Limited changes were made to the land use designations found in the 1979 *Collinsville–Montezuma Hills Area Plan and Program*.
- ▶ **Old Town Cordelia**—Old Town Cordelia contains about 110 acres and is located in central Solano County in an unincorporated area of the county, located just outside and north of Suisun Marsh. The town’s western boundary is clearly defined by Interstate 680. The goal of the special study area would be to protect and maintain the historic community of Cordelia while providing opportunities for appropriate future development. Preservation of the community’s historic structures and context, reduced traffic impacts, improved infrastructure and flood prevention were identified as core components of the special study area.

Other policies within this chapter are generally consistent with those of the current General Plan. Most of the requirements of a land use element are fulfilled through this chapter. The balance of land use element requirements are addressed within the Agriculture, Economic Development, and Public Facilities and Services chapters.

For more information on the proposed land use goals, policies, and programs and the proposed General Plan land use map, please refer to the 2008 Draft General Plan, available from the following Web site: <www.solanocountygeneralplan.net>.

3.4.2 AGRICULTURE CHAPTER

Farming and ranching play a vital role in Solano County’s economy and provide rural identity and a high quality of life for its residents. The Agriculture chapter identifies the location of the county’s agricultural resources and the goals, policies, and the implementation programs that would be used to protect them. Although agricultural policies were included in the last update, this update marks the first time the County has chosen to separate agricultural policies into a separate chapter. Goals and policies in this chapter are designed to protect agricultural land, support the economic viability of farmers and agricultural practices, and protect agricultural land and practices from encroachment by sensitive uses.

The 2008 Draft General Plan includes the following new agricultural policies and programs:

- ▶ **Agricultural Regions**—New policies direct the County to consider agricultural land uses within 10 distinct regions to promote focused marketing and economic development (Exhibit 3-4). Various studies have identified the unique characteristics of the agricultural practices and marketing needs for each region. These characteristics make the regions valuable planning units for creating targeted agricultural policies, programs, and requirements and are recommended as the basis for region-based agricultural policies. Marketing efforts would also be targeted for each region. County planning and ombudsman positions could assist regions in creating strategic plans or helping with other economic or marketing needs.
- ▶ **Agricultural Processing/Value-Added Agriculture**—The 2008 Draft General Plan would enable agricultural processing to occur on land designated for agriculture within several regions and would allow more agricultural areas to provide “value-added” services such as sales and agritourism, particularly within the Suisun Valley (Table 3-1). This would be implemented through the revision of the County Zoning Ordinance and other relevant sections of the county. Allowing additional agricultural processing and agriculture-related services in these regions would increase the land use intensity above what is allowed under current General Plan policies.

Table 3-1 Agricultural Regions		
Agricultural Region	Minimum Lot Size	General Uses
Winters	40 acres	Provides for agricultural production, agricultural processing facilities, facilities to support the sale of produce, and tourist services that are ancillary to agricultural production.
Dixon Ridge	40 acres	Provides for agricultural production, agricultural processing facilities, and agricultural services.
Elmira and Maine Prairie	40 acres—northwest portion (Elmira) 80 acres—southeast portion (Maine Prairie) See General Plan Figure AG-5	Provides for agricultural production, agricultural processing facilities, and agricultural services.
Montezuma Hills	160 acres	Provides for agricultural and energy production.
Ryer Island	80 acres	Provides for agricultural production.
Suisun Valley	20 acres	Provides for agricultural production, agricultural processing facilities, facilities to support the sale of produce, and tourist services that are ancillary to agricultural production.
Green Valley	20 acres	Provides for agricultural production. A future specific plan required for Middle Green Valley will further detail desired agricultural uses and lot sizes.
Pleasants, Vaca, and Lagoon Valleys	40 acres—Parcels with current A-40 zoning 20 acres—Parcels with current A-20 zoning See General Plan Figure AG-6	Provides for agricultural production and facilities to support the sale of produce.
Jepson Prairie	160 acres	Provides for agricultural production.
Western Hills	160 acres—West of Pleasants Valley Road 20 acres—East of Pleasants Valley Road and in the Tri-City and County area See General Plan Figure AG-7	Provides for agricultural production.

Source: Solano County 2008

- ▶ **Agricultural Reserve Overlay**—The 2008 Draft General Plan proposes an overlay land use designation to distinguish the preferred area for a future agricultural preserve. The preserve would be used to focus mitigation efforts for both farmland conversions occurring both within the unincorporated county and within cities. The Agricultural Reserve Overlay indicates that area in which the County will encourage private landowners within the overlay to voluntarily participate in agricultural conservation easements. This overlay will incorporate existing agricultural conservation easements and establish new land easement acquisition methods (such as transfers of development rights) that encourage landowner cooperation.

Projects having a significant impact on valued agricultural resources in other areas of the county or participating cities would be able to mitigate this impact by paying in-lieu fees used to purchase agricultural easements from landowners in the overlay area. Easements would be held by the County or relevant land trusts, and the landowner would maintain ownership and management control. As proposed, the overlay would be applied to 14,418 acres of farmland in the county.

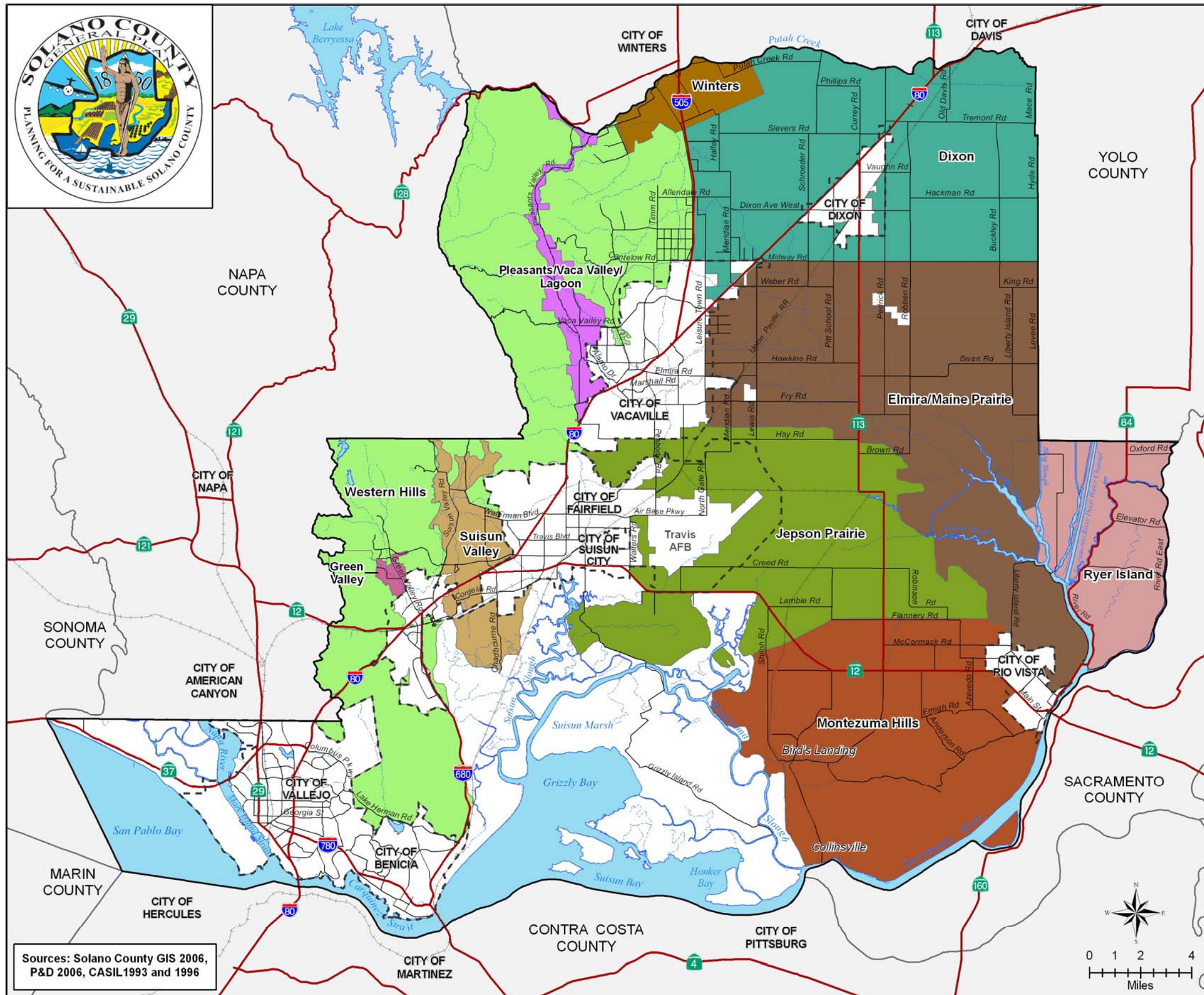
- ▶ **Farmland Mitigation**—Policies contained within the 2008 Draft General Plan would establish a farmland mitigation program for agricultural land converted as a result of nonagricultural development. Mitigation may



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Exhibit 3-4

Agricultural Regions



- Legend**
- Agricultural Region**
- Dixon
 - Elmira/Maine Prairie
 - Green Valley
 - Jepson Prairie
 - Montezuma Hills
 - Pleasants/Vaca Valley/Lagoon
 - Ryer Island
 - Suisun Valley
 - Western Hills
 - Winters
- Basemap Layers**
- Roadways
 - Highways
 - Railroads
 - Streams and Creeks
 - Major Water Features
 - Municipal Service Areas
 - Adjacent Counties

Sources: Solano County GIS 2006, P&D 2006, CASIL1993 and 1996



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be in the form of conservation easements, outright purchase of other agricultural properties for protection, or in-lieu fees paid to the County. The farmland conservation mitigation would be directed toward lands within the Agricultural Resource Overlay areas. A County ordinance is required for this program. The ordinance would determine the extent of mitigation necessary, although many jurisdictions use a ratio of 1:1. Farmland that is used to support agritourism and agricultural processing would be exempted from this ordinance because the intent is to prevent agricultural land conversion, not to present barriers to development of agriculture-supporting industries.

- ▶ **Agricultural-Urban Buffers**—The 2008 Draft General Plan would include policies to reduce conflicts between residential and agricultural uses. Agricultural-Urban buffers are strips of vegetated land (typically ranging from 300 feet to 500 feet) located within city MSAs that are used to help reduce complaints due to normal agricultural operations near residential areas. With appropriate vegetation management, the buffer can also prevent pesticide drift resulting from agricultural spraying. The cost to maintain these buffers is typically borne by the proposed development project rather than the agricultural landowner/farmer, and managed or maintained by the adjacent city, a homeowners association, or a special district. The cost to create and maintain these buffers would be paid by the new development through development impact fees or ongoing maintenance fees.
- ▶ **Streamlined Permitting**—Proposed policies direct the County to streamline the permitting process for agriculture-related buildings on agricultural land. This would include but not be limited to barns, farm stands, and agricultural processing plants. The policies also call for the creation of a separate permitting fee structure for such projects to promote investment in agricultural improvements.

The Agriculture chapter also includes policies that would guide future development in the Suisun Valley special study area as described above in the discussion of the Land Use chapter (Exhibit 3-3). This chapter partially satisfies state requirements for the Conservation Element. Additional Conservation Element requirements are met within the Resources chapter.

For more information on the proposed goals, policies, and programs related to agriculture, please refer to the 2008 Draft General Plan, available from the following Web site: <www.solanocountygeneralplan.net>.

3.4.3 RESOURCES CHAPTER

The purpose of the Resources chapter is to identify goals, policies, and implementation programs that would be used to protect the County's natural, cultural, and open space resources. The chapter focuses on the conservation, preservation, and enhancement of these resources to ensure a high quality of life for the county's residents. This chapter satisfies most state requirements for the Conservation Element and all state requirements for the Open Space Element. Additional Conservation Element requirements are met within the Agriculture chapter.

Sections within the Resources chapter are described below.

BIOLOGICAL RESOURCES

The biological resources section provides policies and programs directed toward conservation of special-status species and sensitive natural communities, including vernal pools, wetlands, riparian habitat, and wildlife movement corridors.

The 2008 Draft General Plan places increased emphasis on the protection of the county's biological resources. Understanding the role that agricultural and open space lands have played in maintaining the county's biological assets to date, emphasis is placed on working collaboratively with property owners and state and federal agencies to find feasible and economically viable species and habitat protection methods.

- ▶ **Resource Conservation Overlay**—The primary policy to achieve this objective is the proposed Resource Conservation Overlay. This overlay is proposed to identify portions of the county with high-priority resource

management needs and provide in-situ protection of the target biological resources. The overlay district would include 210,576 acres as identified in Exhibit 3-5. The overlay would contain the following resources:

- California red-legged frog critical habitat and core recovery areas
- Callippe butterfly priority conservation areas
- Giant garter snake priority conservation areas
- Priority habitat corridors
- Vernal pool conservation areas
- *Suisun Marsh Protection Plan* Management Zones

The overlay would be compatible with each of the following land use designations: Agriculture, Water Bodies and Courses, Watershed, and Marsh. If a development proposal requires a change to the designation, the County would require resource conservation strategies tailored to the resource(s) of concern. Such strategies would include site assessment of potential project-related impacts, implementation of best management practices to eliminate impacts on the resource(s), and the voluntary transfer of development rights from the resource area to another designated site. The Resource Conservation Overlay also encourages mitigation banks to be located within the overlay district. Projects having a significant impact on valued biological resources in other areas of the county or participating cities would be able to mitigate this impact by paying in-lieu fees used to purchase easements from landowners in the overlay area.

- ▶ **Oak Woodland and Heritage Oak Tree Protection**—Another important new policy direction of this section is the protection of oak woodlands and heritage oak trees. The 2008 Draft General Plan would require the creation of an ordinance that protects oak woodlands as required and defined in Senate Bill 1334 (Chapter 732, Statutes of 2004), and an additional ordinance that would require a permit and mitigation for the removal or significant disturbance of a heritage oak tree. The 2008 Draft General Plan suggests that oak woodland management plans would be required for all development, agricultural uses (including grazing), and timber/firewood collection within the county's oak woodlands.

MARSH AND DELTA AREAS

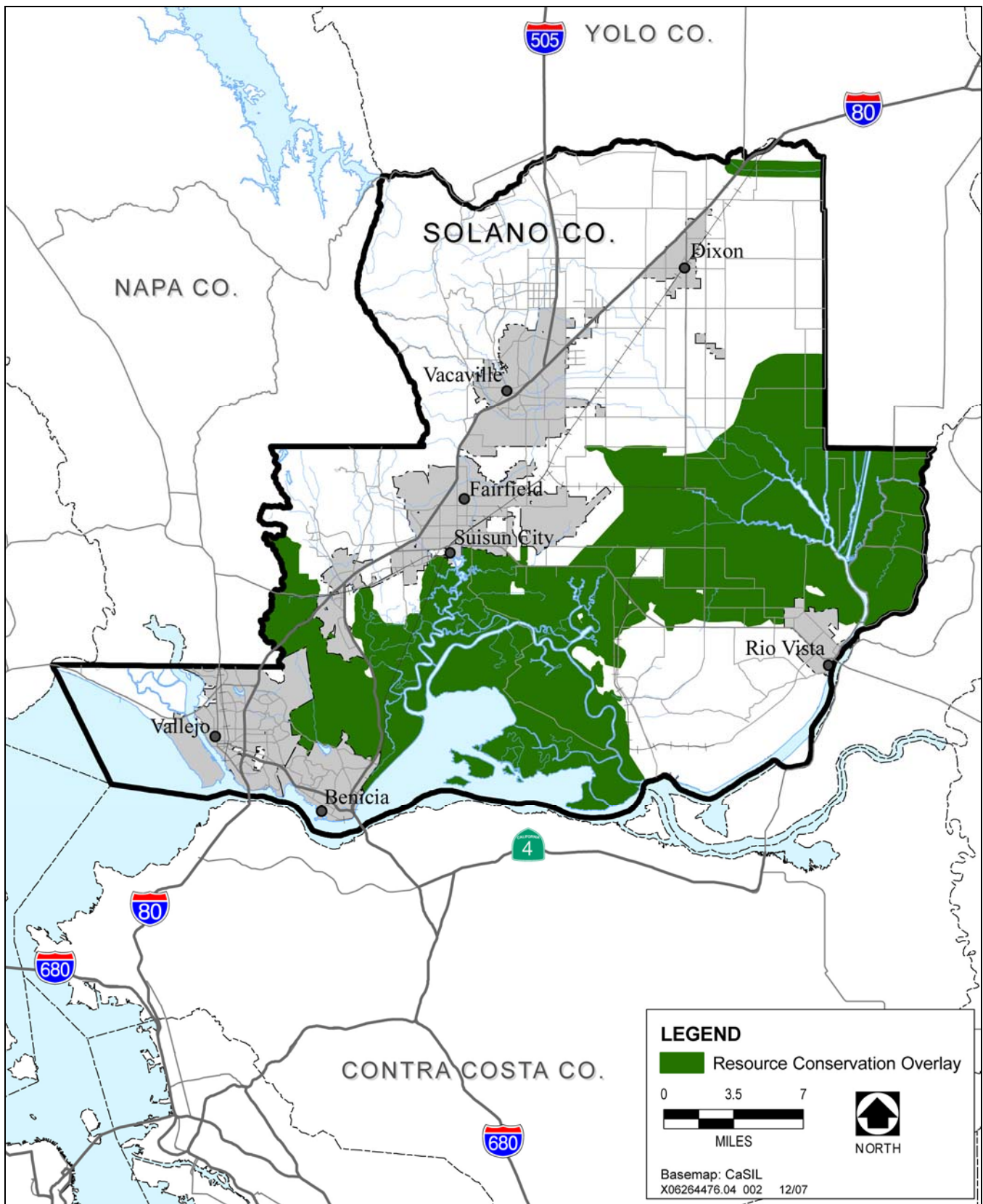
The marsh and delta areas section of the plan emphasizes the importance of the county's extensive marshland environment and the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) area. This section contains policies and implementation programs that comply with and enhance the requirements of state and federal regulations controlling development within and use of these sensitive resource areas.

The 2008 Draft General Plan facilitates state and federal efforts to protect the marshland and Delta areas within the county. Proposed policies and programs support implementation of the following existing programs and projects:

- ▶ Suisun Marsh Protection Act
- ▶ Delta Protection Act
- ▶ *White Slough Specific Plan*
- ▶ Napa Sonoma Marsh Restoration Project

MINERAL RESOURCES

The mineral resources section contains policies and implementation programs that facilitate the extraction of known mineral deposits, prevent encroachment of incompatible uses adjacent to such deposits, and require mines to conduct their operations in a manner compatible with the health, safety, and welfare of county residents and surrounding land uses.



Sources: CaSIL, data provided by Solano County in 2006

Proposed Resource Conservation Overlay

Exhibit 3-5

Proposed policies are similar to those within the current General Plan. These policies include maintaining land use compatibility, remaining aware of new information, and ensuring compliance with Surface Mining and Reclamation Act regulations.

SCENIC RESOURCES

The scenic resources section focuses on protecting the aesthetic qualities of the county's landscape. Policies and programs contained in the section attempt to protect valued landscape features and ensure that new urban or rural development within scenic roadway corridors respects and maintains the integrity of the viewsheds.

The 2008 Draft General Plan includes policies to strengthen the protection of the *Tri-City and County Cooperative Plan* area, protect ridgelines, reduce light pollution, and encourage the provision of scenic open spaces.

The current General Plan does not specifically address ridgeline protection or light pollution. The 2008 Draft General Plan condenses policies from the 1977 Scenic Highways Element and includes them within this section. The general direction of the new policies are similar, but the 2008 Draft General Plan places greater emphasis on the protection of scenic and natural resources, whether or not they are within view of a designated scenic highway.

CULTURAL RESOURCES

The cultural resources section describes the County's efforts to protect archaeological and historic sites from diverse threats: development, infrastructure extensions, modernization, and the more subtle but persistent effects of time and erosion.

Three policy directions are identified in this section: preserving cultural and historic resources, continued and improved consultation with Native American tribes, and using historic and cultural resources to create opportunities for tourism.

RECREATIONAL RESOURCES

It is the County's objective to expand recreational resources by creating a connected trail network, improving bicycle routes, and establishing additional parks and fishing access points. The County also aims to work with city, state, and federal agencies and land trusts to coordinate efforts to implement recommendations and programs in the existing Park and Recreation Element. Such coordination is expected to result in greater recreation opportunities for the region's residents. The 2008 Draft General Plan also includes policies directing the completion of a regional trail system.

ENERGY RESOURCES

The 2008 Draft General Plan identifies the energy sources occurring within the county and places expanded emphasis on the production of renewable energy and energy efficiency. Proposed policies and programs would strive to make the county a model of energy efficiency and green building. New residential and commercial buildings would be required to exceed state energy requirements by 20%. New residential developments of six or more units would be required to participate in the state's New Solar Homes Partnership, and new commercial buildings larger than 10,000 square feet would have to incorporate green building techniques and to meet standards for Leadership in Energy Efficient Design (LEED) certification established by the U.S. Green Building Council. Policies would also encourage the development of renewable energy sources from sources such as solar, water, wind, and biofuels.

The energy section of the 2008 Draft General Plan would incorporate and update the policies and standards of the *1982 Wind Turbine Siting Plan*. Policies contained in the section emphasize the importance of wind resources, but also emphasize proper siting to avoid conflict with biological and scenic resources. To ensure this, the plan contains a Wind Resources Overlay.

The Wind Resources Overlay identifies a 31,737-acre area in the Montezuma Hills as the primary wind resource area in the county. Throughout the county wind energy development, depending on size and location of the project, may require both wind resource verification and an EIR to meet CEQA requirements. Within the Wind Resource Overlay, additional wind resource verification would not be required for wind energy permit applications.

COMMUNITY SEPARATORS

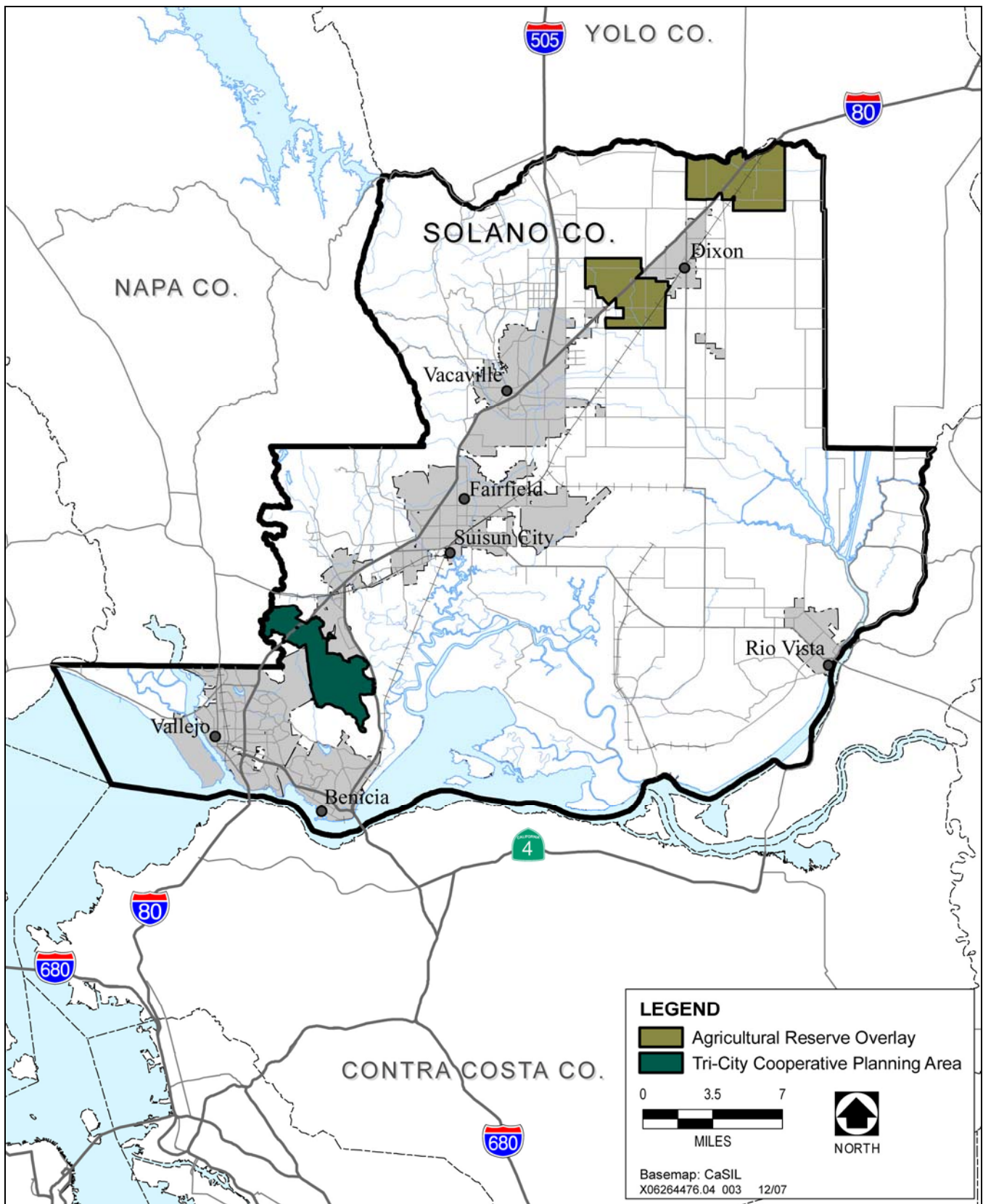
The community separators section presents policies and programs to facilitate existing city and County efforts to establish areas that physically separate the incorporated cities within the county. Proposed policies direct the County to work with the cities, the state, and other agencies to maintain open-space separators around cities to preserve their identity and character. Policies also focus on the continuance of agricultural uses in these areas. This section also describes the proposed Agricultural Reserve Overlay, which aims to preserve the agricultural landscape within the overlay area by encouraging private landowners to voluntarily participate in land conservation programs. The proposed Agricultural Reserve Overlay would include areas identified in Exhibit 3-6 and is described in more detail above.

In addition to the Agricultural Resource Overlay, the 2008 Draft General Plan contains the Tri-City and County Planning Area Overlay. The overlay identifies the area covered under the *Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation*. This plan aims to create a physical and visual separation between Benicia, Fairfield, and Vallejo. The plan was created in response to concerns of encroaching development, the loss of agricultural lands, and the diminishing separation between communities. The cities and County created policies and implementation programs that address these issues and support the protection of the planning area's agricultural, biological, and scenic resources.

WATER RESOURCES

The 2008 Draft General Plan addresses county water resource issues in a comprehensive manner. The Water Resources section contains policies addressing water quality, groundwater, the conservation and reuse of water, importing and exporting of water, and watershed management. The 2008 Draft General Plan includes the following new water resource policies and programs:

- ▶ **Protection of Riparian Vegetation**—The 2008 Draft General Plan would establish an ordinance that establishes a riparian buffer to protect water quality and ecosystem function. For parcels more than 2 acres in size, a minimum 150-foot development setback would be provided. For parcels of 0.5–2.0 acres, a minimum 50-foot setback would be provided. For parcels less than 0.5 acre a minimum 20-foot setback would be provided. Exceptions would exist when a parcel is entirely within the riparian buffer setback or development on the parcel entirely outside of the setback is infeasible or would have greater impacts on water quality and wildlife habitat.
- ▶ **Stormwater Pollution Prevention**—The 2008 Draft General Plan proposes policies and programs that would require site plan elements to limit runoff from new development. The policies would limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks as well as natural drainage features that would filter and absorb stormwater.



Sources: CaSIL, data provided by Solano County in 2006

Agricultural Reserve Map

Exhibit 3-6

- ▶ The plan would also propose watershed protection policies that attempt to safeguard the recharge and filtering capacities of undisturbed natural areas, application of best management practices in agricultural operations, and the improvement of water use efficiency in the residential, commercial, and municipal sectors.

For more information on the proposed goals, policies, and programs related to resources, please refer to the 2008 Draft General Plan, available from the following Web site: <www.solanocountygeneralplan.net>.

3.4.4 PUBLIC HEALTH AND SAFETY CHAPTER

The Public Health and Safety chapter addresses the County's desire to protect its residents, their property, and the environment from natural and human-caused hazards. This chapter describes these hazards and their potential impacts and identifies proposed goals, policies, and implementation programs that would be used to minimize such risks. The chapter meets the guidelines and requirements as described by the Governor's Office of Planning and Research for safety and noise elements. Sections within the Public Health and Safety chapter are described below.

FLOODING

The 2008 Draft General Plan and the current General Plan are similar in their discussion of flooding, although organization of this topic has changed. Both plans contain policies that restrict the type and design of buildings in flood zones. They also both require project proponents in inundation risk areas to assess their risk and take appropriate steps to mitigate it. The 2008 Draft General Plan contains additional policy direction to consolidate flood control responsibilities. An additional difference is that the proposed plan contains a discussion of the flood potential resulting from climate change and sea level rise. The chapter contains a new program that is aimed at addressing this flood threat. The Sea Level Rise Strategic Program will have three primary objectives: investigate the potential effects of sea level rise on Solano County, identify properties and resources susceptible to sea level rise in order to prioritize management strategies, and develop protection and adaptation strategies to meet the County's and region's goals. The program will encompass all areas identified within a Sea Level Rise Planning Area.

SEISMIC SAFETY AND LAND STABILITY

The 2008 Draft General Plan and the current General Plan are very similar in their treatment of seismic safety and land stability. The seismic safety and land stability section provides descriptions and approximate locations of various geologic hazards in the county and proposes policies and implementation programs that would reduce the risks associated with such features. Information provided in this section can inform and direct human activity away from high-risk areas. No new policy directions are proposed by the 2008 Draft General Plan. Rather, continued emphasis is placed on current policies to limit development within fault zones, near creek banks, and areas susceptible to landslides; enforce existing building codes for new construction and rehabilitation of existing at-risk buildings; and stabilize public facilities that cross fault zones.

FIRE

Throughout the American West, wildfire suppression techniques implemented for the last century have led to heavy fire fuel loads in the forested lands. These heavy fuel loads and the associated fire risk pose a threat to human life and property and, in some cases, even jeopardize natural ecosystems. Solano County aims to reduce the dangers associated with wildfire by limiting development expansion into high-fire-hazard areas and by requiring new development to incorporate construction standards and materials that provide increased levels of fire protection. Additionally, the County proposes to require certain rural residential properties in high-fire-hazard areas to provide adequate water supplies for fire suppression purposes.

This direction is generally consistent with the current General Plan. The 2008 Draft General Plan also recommends residential clustering, buffering, creating fuel breaks, and other measures to minimize fire dangers.

HAZARDOUS MATERIALS

The hazardous materials section provides policies and implementing programs created to protect Solano County from the dangers associated with the use, storage, and transportation of hazardous materials. Such waste materials can be toxic, carcinogenic, mutagenic, reactive, ignitable, and/or corrosive and are most commonly associated with certain industrial operations, hazardous waste shipping, agricultural sprays, and leaking underground storage tanks or otherwise contaminated properties.

The 2008 Draft General Plan would establish policies and programs to minimize residents' and the environment's exposure to such hazards. Proposed policies in the 2008 Draft General Plan include supporting implementation of the County's Hazardous Waste Management Plan, reducing hazardous wastes, and monitoring producers.

DISASTER PREPAREDNESS

Disaster preparedness refers to efforts to respond to various emergencies. Earthquakes and wildfires pose specific threats to the county based on its natural characteristics, thus requiring carefully planned responses to minimize personal injuries and property damage as well as harm to the environment. Other disasters such as aircraft accidents, hazardous material incidents, and flooding necessitate further preparation. This section proposes policies and implementation programs to facilitate a coordinated disaster response system. The Governor's Office of Emergency Services is the lead agency in such situations, but coordination with other agencies, cities, other jurisdictions, and the general public is essential to the success of their operations.

Through the Governor's Office of Emergency Services, the County has already been planning for disasters. This new section of the 2008 Draft General Plan includes policies to ensure the adequacy of disaster response in coordination with other communities, agencies, and the region; plan for and designate evacuation and aid routes; and educate the public on disaster preparedness.

PUBLIC HEALTH

This new section of the 2008 Draft General Plan proposes policies to create a healthy physical and social environment for county residents. Public health is addressed throughout every chapter of the 2008 Draft General Plan and each chapter's policies and implementation strategies strive to encourage active, healthy lifestyles. This section proposes policies and implementation programs for issues that are not addressed in other portions of the plan. Proposed policies include working to provide outreach and services for special needs populations, increasing access to healthy foods, encouraging the provision of health care, and encouraging the provision of childcare facilities located close to other uses.

AIR QUALITY

The air quality section provides policies and programs designed to protect human and environmental health based on two primary strategies: reducing the generation of air pollutants, and buffering sensitive uses or user groups from high concentrations of air pollutants. Vehicle and industrial emissions are the major sources of the air pollutants affecting Solano County. Natural factors in the county such as terrain, wind, and sunlight can worsen air quality. Other factors, like the presence of certain industries and high volume transportation corridors, can produce localized "hot spots" of poor air quality.

This is a new section within the 2008 Draft General Plan. The proposed plan includes policies and programs to reduce vehicle emissions, minimize health impacts from sources of toxic air contaminants, promote consistency

and cooperation in air quality planning efforts, and provide incentives to agricultural producers to minimize the impacts of operations on air quality.

CLIMATE CHANGE

This section summarizes proposed policies and programs found throughout the 2008 Draft General Plan related to climate change. The 2008 Draft General Plan would establish a greenhouse gas (GHG) emissions reduction goal of 20% below 1990 levels by 2020. To achieve this goal, the plan would contain a broad spectrum of policies and implementation programs. These policies and programs have been integrated throughout the relevant General Plan chapters. These include reducing vehicle emissions (air quality section); providing for natural carbon sequestration to offset carbon emissions (air quality section and Agriculture chapter), enabling renewable-energy production and increased energy efficiency (energy resources and conservation section), and directing city-centered development (land use section). In addition, the section calls for the development and implementation of a climate action plan (CAP).

The CAP will have two primary objectives: reduce total GHG emissions in the county to 20% below 1990 levels by 2020; and create adaptation strategies to address the impacts of climate change on the county such as sea level rise, increased risk of flooding, and diminished water supplies. The CAP will contain five chapters. The first chapter of the CAP will outline the County's rationale and motivation for taking a leadership role in addressing climate change and developing and implementing the CAP. In the second chapter the County will calculate GHG emissions for the base year 1990, forecast emissions in 2020 under a business-as-usual scenario, and describe the GHG reductions necessary to achieve the County's adopted target. The third chapter will describe the policies and measures necessary to reduce GHG emissions in the county and achieve the reduction target. The fourth chapter of the CAP will describe strategies, policies, and measures that will be used to protect Solano County from and facilitate adaptation to the potential effects of climate change. In conclusion, the CAP will identify benchmarks, monitoring procedures, and other steps needed to ensure that the County achieves its GHG reduction, protection, and adaptation goals.

This is a new section of the 2008 Draft General Plan.

NOISE

The noise section emphasizes separation of noise-sensitive land uses (housing, schools, and parks) from noise-producing land uses (highways, airports, and industry). When such separation is not feasible, proposed policies recognize and direct the use of other noise attenuation strategies such as sound barriers.

The policies and implementing programs in the noise section are intended to prevent excessive noise impacts while still allowing adequate opportunities for development of commercial and industrial uses and transportation infrastructure.

Policies in the current General Plan and 2008 Draft General Plan are similar. Both propose noise standards and strive for land use compatibility.

For more information on the proposed goals, policies, and programs related to public health and safety, please refer to the 2008 Draft General Plan, available from the following Web site:

<www.solanocountygeneralplan.net>.

3.4.5 ECONOMIC DEVELOPMENT CHAPTER

The Economic Development chapter identifies actions the County could take to improve the viability of the local economy. These include:

- ▶ land use decisions that ensure that an adequate amount of land is available for commercial and industrial uses;
- ▶ an efficient and consistent regulatory environment with a predictable development process to encourage growth of existing businesses and attract new businesses to locate within Solano County;
- ▶ incentives and activities to attract or retain businesses, including financial incentives or technical assistance;
- ▶ social policies designed to affect the economic environment of the county, including support for education and job training; and
- ▶ policies and efforts to maintain or increase the quality of life in Solano County, which have the effect of increasing the county's desirability for businesses and residents.

The 2008 Draft General Plan represents the first time the County has placed economic development into the General Plan on an equal footing with other required topics.

For more information on the proposed goals, policies, and programs related to economic development, please refer to the 2008 Draft General Plan, available from the following Web site:
<www.solanocountygeneralplan.net>.

3.4.6 TRANSPORTATION AND CIRCULATION CHAPTER

The Transportation and Circulation chapter sets forth the policy framework to shape circulation within Solano County. The policy direction provided by the 2008 Draft General Plan is similar to that within the current General Plan. Proposed policies and programs would guide new investment choices within the county and assist in determining the role of new development in addressing future circulation issues. The chapter contains policies regarding the maintenance and improvement of current transportation systems, collaboration with other agencies and cities to continue to plan land uses to reduce vehicle miles traveled, and evaluation of new development for their compatibility with and potential effects on transportation systems.

For more information on the proposed goals, policies, and programs related to transportation and circulation, please refer to the 2008 Draft General Plan, available from the following Web site:
<www.solanocountygeneralplan.net>.

3.4.7 PUBLIC FACILITIES AND SERVICES CHAPTER

The Public Facilities and Services chapter addresses a wide range of topics: water facilities and service, sewer and wastewater, solid waste, drainage, fire protection and emergency services, law enforcement, public education, and community facilities and utilities.

WATER FACILITIES AND SERVICE

The water facilities and service section directs how water will be provided to residents and businesses throughout the county. The current General Plan requires that water for rural development be provided by on-site wells. It allows for public water service where individual wells are marginal or inadequate and where water service is necessary for maintenance of public health and safety. Proposed policies within the 2008 Draft General Plan would allow for on-site wells or for public water service where it is available.

Aside from this difference, policies within the 2008 Draft General Plan are very similar to those within the existing General Plan. Additional proposed policies address promoting efficient use of water, designing public water facilities to avoid growth-inducing impacts on agricultural lands, and continuing to set minimum parcel sizes for on-site wells or public water service.

SEWER AND WASTEWATER

This section provides servicing policies for sewer and wastewater. These policies represent a change in policy direction for the County. The current General Plan requires on-site individual septic systems to support rural development. The exception is where public sewer is necessary for maintenance of public health and safety. The policy direction of the 2008 Draft General Plan would allow for individual on-site systems or centralized sewage treatment systems utilizing the best system available that meets tertiary treatment or higher standards. It allows for service to be provided to either developed or planned areas, and requires that oversight of such systems be provided by a public agency. The proposed sewer and wastewater section of the 2008 Draft General Plan would require the county to update the County Code and ensure the incorporation of best practices to minimize impacts of on-site septic systems and sewage treatment systems and to continue to enforce the abatement of ailing septic systems that have been demonstrated to be a health and safety hazard.

SOLID WASTE

The solid-waste section includes policies directing the provision of solid-waste disposal and recycling services, and directing the use of solid waste in energy production. The 2008 Draft General Plan has expanded the current General Plan's discussion of solid waste to address a wider range of topics. The current General Plan included policies directing the provision of disposal sites and reducing waste. In addition to these topics, the 2008 Draft General Plan includes policies regarding composting and making compost available to farmers, allowing the use of solid waste for alternative energy production, and minimizing the negative effects that disposal operations may have on the environment.

DRAINAGE

The drainage section addresses physical facilities related to minimizing the risk of flooding. Proposed policies direct the County to control runoff through site design, landscaping, and stormwater facilities and to work with Solano County Water Agency (SCWA) to improve drainage facilities. The 2008 Draft General Plan places emphasis on low-impact development techniques and would require development projects to minimize stormwater pollution and runoff and to maximize the potential for groundwater recharge. "Infiltration" style technologies that mimic the natural hydrologic regime are encouraged. The policies emphasize the importance of such drainage systems to meeting relevant state-required stormwater permit criteria.

FIRE PROTECTION AND EMERGENCY SERVICES

Proposed policies in this section address provision of fire and emergency services, training, and equipment. Proposed policies also address public education regarding fire safety and including review within the development process. Proposed policies in this section are consistent with those of the current General Plan.

LAW ENFORCEMENT

This section addresses provision of police protection, the inclusion of law enforcement review in the County's development review process, and law enforcement needs throughout the county. Proposed policies in this section are consistent with those of the current General Plan.

PUBLIC EDUCATION

Policies in this section address the provision of education services and facilities within the county and are consistent with those of the current General Plan. Proposed policies include coordinating with school districts, ensuring sufficient funding for school facilities through development impact fees, and pursuing joint use of school and park sites.

COMMUNITY FACILITIES

The community facilities section addresses those facilities not addressed separately in other sections, including health clinics, libraries, and community centers. Proposed policies in this section direct improved access to and continued development of new facilities.

UTILITIES

This section contains policies addressing the desired placement of utilities. Proposed policies call for minimizing disruption caused by transmission lines and encourage undergrounding of utility lines.

For more information on the proposed goals, policies, and programs related to public facilities and services, please refer the 2008 Draft General Plan, available from the following Web site:
<www.solanocountygeneralplan.net>.

3.5 POPULATION, HOUSING, AND DEVELOPMENT PROJECTIONS

Implementation of the 2008 Draft General Plan would result in increased population, housing units, and commercial and industrial floor space within the county. The plan's population and land use projections are presented in Table 3-2. The table illustrates three land use scenarios: existing land use conditions, estimated buildout of the 2008 Draft General Plan (referred to subsequent sections of this EIR as the "Preferred Plan"), and maximum buildout of the 2008 Draft General Plan (referred to in subsequent sections of this EIR as the "Maximum Development Scenario").

Existing land use conditions represent on-the-ground uses in 2006 as reported in Solano County assessor's data. This EIR uses the existing land use conditions data as a baseline from which to determine environmental impacts of the 2008 Draft General Plan and its alternatives.

The Preferred Plan has been used to project the density and intensity of the 2008 Draft General Plan. The scenario is based on two assumptions: (1) Future development will occur at the same densities and intensities at which current land uses have developed; and (2) all developable property will be developed by 2030.

To estimate population, dwelling units, and commercial space at buildout of the 2008 Draft General Plan, the County used the midpoint of the permitted density/intensity range for each land use category based on the estimated net acreage for that category (after subtracting for roads and other rights-of-way). The use of the midpoint was based on an analysis of past developed patterns. Development in unincorporated Solano County tends to be at the midpoint or less of the permitted General Plan density/intensity ranges. Values generated in the Preferred Plan are used to describe the density and intensity of the Preferred Plan in the environmental impact analysis described in Chapter 4.

The Maximum Development Scenario represents the highest theoretical amount of development that would be possible under the 2008 Draft General Plan. In this scenario the development properties would occur at the highest density and intensity allowed by the plan. The Maximum Development Scenario would generate substantially more dwelling units, commercial square footage, and population growth than the Preferred Plan. Although it is extremely unlikely that maximum buildout could occur, such a scenario must be analyzed to demonstrate the highest possible level of environmental impact that could result from the project. For this reason, the Maximum Development Scenario is also utilized in analyses contained in Chapter 4 of this EIR.

**Table 3-2
Land Use Projections of the 2008 Draft General Plan**

Land Use Categories/General Plan Designations	Existing Land Use (2006)				2008 Draft General Plan— Preferred Plan in Year 2030				2008 Draft General Plan— Maximum Development Scenario in Year 2030			
	Acres	Dwelling Units	Population	Nonresidential Square Feet	Acres	Dwelling Units	Population	Nonresidential Square Feet	Acres	Dwelling Units	Population	Nonresidential Square Feet
UNINCORPORATED AREA												
Water Bodies and Courses	51,092				51,092	–	–	–	51,092	–	–	–
Park and Recreation	791				2,132	–	–	–	2,132	–	–	–
Marsh	64,731				64,723	–	–	–	64,723	–	–	–
Subtotal, Natural Resource Designations	116,615	–	–	–	117,948	–	–	–	117,948	–	–	–
Watershed	36,575				36,575	80	210	–	36,575	160	420	–
Agriculture	329,076				307,105	1,800	4,729	–	307,105	3,600	9,459	–
Subtotal, Agricultural Designations	365,651	812	2,269	–	343,680	1,880	4,940	1,190,818	343,680	3,760	9,879	1,984,697
Public/Quasi-Public	1,517				1,871	–	–	–	1,871	–	–	–
Subtotal, Public Designations	1,517	–	–	–	1,871	–	–	–	1,871	–	–	–
Rural Residential	5,864				13,721	2,744	7,210	–	13,721	4,391	11,535	–
Traditional Community—Residential	–				980	1,960	5,148	–	980	3,135	8,237	–
Traditional Community—Mixed Use	–				108	65	170	393,548	108	103	271	734,623
Urban Residential	286				1,890	5,674	14,908	–	1,890	8,720	22,909	–
Subtotal, Residential Designations	6,878	6,568	17,719	–	16,698	10,442	27,435	393,548	16,698	16,349	42,953	734,623
Neighborhood Commercial	–				6	–	–	32,943	6	–	–	65,887
Neighborhood Agricultural/Tourist Center	–				75	–	–	392,040	75	–	–	784,080
Commercial Recreation	–				155	–	–	54,142	155	–	–	270,710
Service Commercial	–				75	–	–	394,221	75	–	–	788,443
Highway Commercial	–				136	–	–	712,251	136	–	–	1,424,502
Urban Commercial	–				588	–	–	3,072,180	588	–	–	6,144,361
Subtotal, Commercial Designations	640	–	–	99,976	1,036	–	–	4,657,777	1,036	–	–	9,477,983
General Industrial	–				8	–	–	11,584	8	–	–	23,169
Limited Industrial	–				969	–	–	1,476,760	969	–	–	2,953,520
Water Dependent Industrial	–				6,766	–	–	2,947,362	6,766	–	–	5,894,724
Urban Industrial	–				1,254	–	–	1,911,425	1,254	–	–	3,822,851
Subtotal, Industrial Designations	2,125	–	–	345,201	8,996	–	–	6,347,131	8,996	–	–	12,694,264
Specific Project Areas	–				4,208	2,600	7,081	1,787,579	4,208	3,400	9,273	3,384,628
Subtotal, Special Purpose Areas	–	–	–	–	4,208	2,600	7,081	1,787,579	4,208	3,400	9,273	3,384,628
Vacant Land (Existing Use Only)	1,011	–	–	–	–	–	–	–	–	–	–	–
TOTAL, Unincorporated Area	494,437	7,380	19,988	445,177	494,437	14,923	39,455	14,376,853	494,437	23,509	62,105	28,276,195
Overlays (Not Counted in Total)												
Water Dependent Industrial—Reserve					2,870				2,870	0	0	0
Travis Reserve Area					7,890				7,890	0	0	0
Wind Energy Resource Overlay	–				31,737	–	–	–	31,737	0	0	0
Agricultural Reserve Overlay	–				14,428	–	–	–	14,428	0	0	0
Tri-City Cooperative Planning Area	–				9,968	–	–	–	9,968	0	0	0
Resource Conservation Overlay	–				210,576	–	–	–	210,576	0	0	0

Source: Solano County 2008

3.6 RELATIONSHIP TO AREA AND REGIONAL PLANS

The 2008 Draft General Plan has been coordinated with the general plans of the seven incorporated cities within Solano County. Land use designations within city spheres of influence have in most cases deferred to the applicable city designations.

A wide range of federal, state, regional, and local plans have been adopted that have a bearing on the County's land use and other policies. These plans can work in tandem with County plans or they may override County policies.

3.6.1 FEDERAL GOVERNMENT

Although no federal plans directly control local land use policies, a number of federal laws have significant impacts on land use decisions at the municipal and private levels. Examples of such regulations include the Endangered Species Act, Section 404 of the Clean Water Act, and in the case of federally funded transportation and infrastructure projects, the National Environmental Policy Act. Numerous agencies have jurisdiction and exert influence on local land use processes.

3.6.2 STATE GOVERNMENT

The State of California wields significant influence on local land use and related policy decisions. The Governor's Office of Planning and Research dictates the requirements for the content of general plans. The California Department of Housing and Community Development must certify the County's housing element. The state also has significant influence through the funding of public infrastructure.

The San Francisco Bay Conservation and Development Commission has jurisdiction over the bay areas. The commission has created management plans and land use policies for a variety of subareas of the bay, including Suisun Marsh and the Napa-Solano Marsh. The California Department of Conservation and California Department of Fish and Game also have jurisdiction and directly regulate certain land use decisions in the county.

3.6.3 REGIONAL GOVERNMENT

A variety of state regulations are implemented through regional planning and regulatory bodies. These include clean-air plans coordinated and enforced by the Bay Area and Yolo/Solano Air Quality Management Districts, water quality regulations enforced by the San Francisco Bay and Central Valley Regional Water Quality Control Boards, and regional transportation plans managed by the Bay Area Metropolitan Transportation Commission and Solano Transportation Authority. The Association of Bay Area Governments has authority with regard to the distribution of regional housing needs; it also uses its influence to address other regional planning issues including transportation, housing, equity, environment, and earthquake safety.

Three additional quasi-regional agencies have influence on the county's land use decisions: the Solano County Airport Land Use Commission, the Solano County Local Agency Formation Commission, and the Solano Transportation Authority. The Solano Airport Land Use Commission prepares a comprehensive airport land use plan that controls land use and development standards adjacent to airports. The Solano County Local Agency Formation Commission reviews and evaluates all proposals for the formation of special districts, incorporation of cities, annexation to special districts or cities, and consolidation or merger of districts with cities. The Solano Transportation Authority is responsible for countywide transportation planning, programming transportation funds, delivering transportation projects, and setting transportation priorities.

CITY PLANS

Each city in Solano County has control over land use and development within its city limits. All cities have adopted general plans that describe land use designations within their jurisdictions. In most cases, the County has deferred to city designations within established city spheres of influence as reflected within the MSAs.

SOLANO COUNTY MULTI SPECIES HABITAT CONSERVATION PLAN

The *Solano County Multi Species Habitat Conservation Plan* process was coordinated by SCWA. The habitat conservation plan was initiated to promote the conservation of biological diversity and to establish a framework for complying with state and federal endangered species regulations while accommodating future urban growth, development of infrastructure, and ongoing operations activities undertaken by or under the permitting authority of plan participants within Solano County over the next 50 years. Plan participants include SCWA, Solano Irrigation District, Dixon Resource Conservation District, Dixon Regional Watershed Joint Powers Authority, Vallejo Sanitation and Flood Control District, Fairfield-Suisun Sewer District, and the cities of Dixon, Fairfield, Suisun City, Rio Vista, Vacaville, and Vallejo. The County has chosen not to participate in this habitat conservation plan. The plan had not been adopted at the time of writing.

4 ENVIRONMENTAL IMPACT ANALYSIS

4.0 APPROACH TO THE ENVIRONMENTAL IMPACT ANALYSIS

4.0.1 SCOPE

Sections 4.1 through 4.14 of this DEIR present the environmental impact analysis for the anticipated effects of the adoption of the 2008 Draft General Plan. Topics evaluated in these sections consist of a full range of environmental issues identified for review in the notice of preparation (NOP) (Appendix A). The environmental topics are:

- ▶ Land use (Section 4.1)
- ▶ Air quality (Section 4.2)
- ▶ Noise (Section 4.3)
- ▶ Transportation and circulation (Section 4.4)
- ▶ Hydrology and water resources (Section 4.5)
- ▶ Biological resources (Section 4.6)
- ▶ Geology and soils (Section 4.7)
- ▶ Agricultural resources (Section 4.8)
- ▶ Public services and utilities (Section 4.9)
- ▶ Cultural and paleontological resources (Section 4.10)
- ▶ Aesthetic resources (Section 4.11)
- ▶ Energy (Section 4.12)
- ▶ Hazards and hazardous materials (Section 4.13)
- ▶ Recreation (Section 4.14)

In addition to the topics listed above, this DEIR presents a discussion of anticipated effects of the adoption of the 2008 Draft General Plan related to climate change. The analysis of these effects is presented in Section 6.2 in Chapter 6, “Other CEQA Considerations,” of this DEIR.

4.0.2 STRUCTURE

Each section in this chapter presents a detailed evaluation of a particular resource area and includes a description of existing conditions (both physical and regulatory), potential environmental impacts associated with the 2008 Draft General Plan, mitigation measures proposed to reduce significant environmental impacts, and a determination of the level of significance after mitigation measures are implemented.

EXISTING CONDITIONS

This subsection provides relevant information about the physical environment of Solano County with regard to the particular resource area. In accordance with Section 15125 of the State CEQA Guidelines, the discussion of the physical environment describes existing conditions within Solano County at the time the NOP was filed—December 27, 2007—unless otherwise noted.

REGULATORY FRAMEWORK

This subsection describes federal, state, and regional and local plans, policies, regulations, and laws that may apply to the resource area being evaluated with implementation of the 2008 Draft General Plan.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This subsection focuses on an analysis of the potential environmental impacts of the project described in Chapter 3, “Project Description,” of this DEIR. First, where applicable, the subsection describes the methods, process, procedures, and/or assumptions used to formulate and conduct the impact analysis. Next, it presents the thresholds of significance used to identify the potential environmental impacts of the 2008 Draft General Plan. Following this is an analysis of the potential environmental impacts themselves. Specifically, this analysis utilizes the following format:

- ▶ An impact statement at the beginning of each impact discussion summarizes the potential impact of the 2008 Draft General Plan and its level of significance under CEQA, based on the identified thresholds of significance.
- ▶ The potential impact is explained in greater detail, using sufficient technical information to further characterize the impact as previously summarized and to formulate a conclusion about its level of significance.
- ▶ When necessary and feasible, the analysis of the impact is followed by a description of one or more proposed mitigation measures. Mitigation measures are required by the State CEQA Guidelines when a significant impact is identified. All mitigation measures must be enforceable through legally binding instruments. Section 15370 of the State CEQA Guidelines defines mitigation as:
 - avoiding the impact altogether by not taking a certain action or parts of an action;
 - minimizing impacts by limiting the degree of magnitude of the action and its implementation;
 - rectifying the impact by repairing, rehabilitating, or restoring the impacted environment;
 - reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
 - compensating for the impact over time by replacing or providing substitute resources or environments.

RESIDUAL SIGNIFICANT IMPACTS

This subsection describes the significance of the potential impact after the relevant 2008 Draft General Plan goals, policies, and implementation programs and any necessary mitigation measures are applied. Impacts are described as either less than significant or significant and unavoidable. Significant and unavoidable impacts are identified here and summarized in Section 6.5 in Chapter 6, “Other CEQA Considerations.”

4.0.3 DETERMINING LEVEL OF SIGNIFICANCE

For each potential environmental impact identified in this EIR, a statement of the level of significance of the impact is provided. Impacts are assessed as one of the following categories:

- ▶ The term “no impact” is used when the environmental resource being discussed would or may not be adversely affected by implementation of the 2008 Draft General Plan. It means no change from existing conditions. This impact level does not need mitigation.
- ▶ A “less-than-significant impact” would or may cause a minor, but acceptable adverse change in the physical environment. This impact level does not require mitigation, even if feasible, under CEQA.

- ▶ A “significant impact” would or may have a substantial adverse effect on the physical environment but could be reduced to a less-than-significant level with mitigation. Impacts may also be considered “potentially significant” if the analysis cannot definitively conclude that an impact would occur as a result of the implementation of the 2008 Draft General Plan. Under CEQA, mitigation measures must be provided, where feasible, to reduce the magnitude of significant or potentially significant impacts.
- ▶ A “significant and unavoidable impact” would or may cause a substantial adverse effect on the environment, and no known feasible mitigation measures are available to reduce the impact to a less-than-significant level. Under CEQA, a project with significant and unavoidable impacts could proceed, but the lead agency (in the case of the 2008 Draft General Plan, the County) would be required to prepare a “statement of overriding considerations” in accordance with Section 15093 of the State CEQA Guidelines, explaining why the lead agency would proceed with the project in spite of the potential for significant impacts.

4.0.4 FORMAT OF IMPACTS AND MITIGATION MEASURES

Throughout the discussion, impacts are identified numerically and sequentially. For example, impacts discussed in Section 4.1 are identified as 4.1-1, 4.1-2, and so on. Mitigation measures, where needed, are identified numerically to correspond with the number of the impact being reduced by the measure. For example, Mitigation Measure 4.1-1 would mitigate Impact 4.1-1.

For each impact, two buildout scenarios are examined: estimated buildout (referred to as the “Preferred Plan”) and maximum buildout (referred to as the “Maximum Development Scenario”). Impact discussions related to the Preferred Plan are labeled with an “a” after each impact number (e.g., 4.1-1a, 4.1-2a) and impact discussions related to the Maximum Development Scenario are labeled with a “b” after each impact number (e.g., 4.1-1b, 4.1-2b).

The format used to present the evaluation of impacts and mitigation measures is as follows:

IMPACT **Impact Title – Preferred Plan.** *An impact summary heading appears before the impact discussion. The heading contains the impact number and title, then indicates that the Preferred Plan is being discussed. The impact statement briefly summarizes the findings of the impact discussion below. The level of significance is included at the end of the summary heading. Levels of significance listed in this EIR (as described above) are no impact, less than significant, potentially significant, and significant.*

4.0-1a

The impact discussion for the Preferred Plan is contained in the paragraphs following the impact statement and describes the impact in detail. The analysis compares the 2008 Draft General Plan, under the Preferred Plan, to existing conditions. The discussion does the following:

- ▶ identifies federal, state, and regional and local regulations that would fully or partially mitigate the impact;
- ▶ identifies 2008 Draft General Plan goals, policies, and implementation programs that would partially or fully mitigate the impact;
- ▶ describes the potential impact after the various regulations and goals, policies, and programs are taken into account; and
- ▶ reiterates the level of significance of the impact.

Mitigation Measure

After the impact discussion, mitigation measures are identified that would reduce the impact of the project to the lowest level feasible. If no mitigation is necessary or feasible, this is stated. If mitigation measures are identified,

then the measure provides direction on how to modify the 2008 Draft General Plan to reduce its potential impacts. Upon certification of the Final EIR, these mitigation measures will be used to amend the 2008 Draft General Plan and will be incorporated as the final adopted version. In this way, the adopted 2008 Draft General Plan will serve as the mitigation monitoring program required under the Public Resources Code (Section 21081.6) and the State CEQA Guidelines (Section 15097).

IMPACT **Impact Title – *Maximum Development Scenario*.** *The impact summary heading is repeated for the*
4.0-1b *Maximum Development Scenario and contains an impact number, title, statement, and the appropriate level*
 *of significance—either **no impact, less than significant, potentially significant, or significant.***

In the Maximum Development Scenario the impact discussion compares the level of impact of this scenario to the impact level generated under the Preferred Plan. If the Maximum Development Scenario would have the same level of impact as the Preferred Plan, the discussion simply states this and reiterates the same conclusion as used above. If it would create a higher level of impact, then analysis of these impacts is provided.

Mitigation Measure

Mitigation measures for the Maximum Development Scenario are also identified. A mitigation measure applied to the Preferred Plan can be repeated, or if necessary, a new mitigation measure is proposed.

4.1 LAND USE

This section contains an analysis of the impacts the 2008 Draft General Plan may have on land use, population, and housing in Solano County. The section provides a description of existing land use patterns, population trends, and housing conditions as well as a brief analysis of regulations and plans pertinent to the implementation of the 2008 Draft General Plan. Certain topics discussed in this section—agriculture, biological resources, transportation, and recreation—overlap with topics discussed in other sections of the EIR. Information utilized in the writing of this section was obtained in part from the Land Use and Population and Housing Background Reports prepared for the 2008 Draft General Plan (Solano County 2006a, 2006b).

4.1.1 EXISTING CONDITIONS

LAND USE PATTERNS

Solano County encompasses 830 square miles of land and 80 square miles of water. Approximately 85% (773 square miles) of the land area is located within unincorporated portions of the county. The county's incorporated cities—Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo—together encompass 128 square miles. The county contains a diversity of physical settings. The western quarter extends into the foothills of the Coast Range. This area is characterized by steep slopes that become more gently rolling as one moves east. The remainder of the county is part of the Sacramento Valley, which consists primarily of level topography, with some isolated areas of low hills. Other significant features include the Suisun Marsh in the southern portion of Solano County and the Napa-Sonoma Marsh area in the southwest.

History of Land Use

Native Americans inhabited what is now Solano County for millennia before European missionaries and settlers arrived in the early 19th century. When the Spanish arrived, the Patwin people lived in the majority of the county, while the Plains Miwok may have inhabited a smaller area in the eastern portion of the county. The Patwin settlement pattern consisted of a primary village surrounded by smaller associated villages. Seasonal camps were established as well. The group subsisted through hunting and gathering of the area's diverse natural resources.

Spanish explorers arrived in the region around 1800, and by 1835 the Mexican government began to colonize the Fairfield/Suisun area to protect its interior interests from the Russians at Fort Ross. This initiated the Rancho Period, when the lower part of the Sacramento Valley and Sacramento–San Joaquin Delta (Delta) areas were settled rapidly as the Mexican government granted large tracts of land and access to the region's natural resources. The primary economy during this period was the hide and tallow trade. Large herds of cattle were raised and slaughtered for their hides, which were traded for goods and services. The hides were shipped to New England and used in the shoe and boot industry.

In the late 1840s and 1850s, former gold seekers and pioneers began settling in Solano County, where they raised livestock and cultivated fruit orchards, vineyards, wheat, barley, and oats. Produce and livestock were transported overland by wagons to the many sloughs throughout the county, and then were shipped by water to waiting markets.

In 1851 Solano County was established as one of the 27 original counties in California, which received statehood in 1850. Twelve townships were established in Solano County between 1850 and 1871. Although the largest towns were adjacent to San Pablo and Suisun Bays, smaller settlements were situated at the ends of sloughs or channels that ran primarily through the eastern portion of the county.

In 1854, the U.S. government established Mare Island as a naval shipyard and the first permanent U.S. naval installation on the West Coast. In 1868, the completion of the California Pacific Railroad through Solano County allowed the shipment of goods to East Coast markets, significantly bolstering economic development, agricultural production, and population growth. By the 1880s, the western edge of the county had become an urban

community focused on ship construction and other industry, and the eastern county was an established agricultural area.

Between the turn of the 20th century and World War II Solano County experienced sustained growth, which was focused mostly in the Vallejo and Benicia areas because of the industry and easy access to San Francisco by ferry and Napa by electric rail. In 1942 Travis Air Force Base was established adjacent to Fairfield. The air base quickly became the largest employer in the county and led to demand for housing and services in the central area of the county.

Today, Solano County’s most prevalent economic activities continue to be agriculture and industry. A wide variety of vegetables, fruit, and nuts are grown, with walnuts being the most recent crop that has gained favor. The county is in the top five California producers of corn, lamb, sheep, and Sudan grass hay. Although the county has increasingly become a bedroom community for Sacramento and the San Francisco Bay Area, major companies such as Anheuser-Busch, BIOSOURCE Technologies, Chiron, Costco, Genentech, and AT&T are located in Solano County. Travis Air Force Base also continues to be an asset to the local economy.

The unincorporated area of Solano County has been rural since the county was established, with most land in use for either agricultural purposes (crop cultivation and grazing) or natural resources. The County has historically required areas that receive water and sewer service to be incorporated within one of the county’s cities. The establishment of the orderly growth initiative in 1994 furthered the direction of growth into the cities. Because of the robust agricultural economy and these growth management policies, 95% of the county’s population lives within the cities. In 2000, only 19,322 of Solano County’s 394,542 residents lived in the unincorporated area.

Existing Land Use Patterns

Table 4.1-1 indicates the acreage of existing uses in Solano County. In accordance with CEQA requirements, the County has used the existing land use conditions as a baseline from which it determines the potential environmental impacts of the proposed land use amendments.

Table 4.1-1 Existing Land Uses (2006)		
Land Use Categories	Total	Percentage of Total
Water	51,094	8.78
Park and Recreation	791	0.14
Marsh	64,731	11.12
Watershed	36,576	6.28
Agriculture	344,107	56.52
Public/Quasi-Public	1,517	0.26
Residential	6,878	1.18
Commercial	641	0.11
Industrial	2,125	0.37
Vacant Land	1,011	0.17
Total Unincorporated Area	494,384	84.92
Total Incorporated Area	81,678	14.03
Existing Roadway/Railroad Rights-of-Way	6,105	1.05
Total County	582,168	100.00
Source: Solano County 2006a		

Agriculture and Other Undeveloped Areas

The vast majority of the county's unincorporated land area is undeveloped. Watershed uses encompass 36,576 acres (6%), agricultural uses make up 344,107 acres (57%) and marshlands make up 64,731 acres (11%).

The California Department of Conservation identifies 139,539 acres within the county as Prime Farmland, 7,164 acres as Farmland of Statewide Importance, and 11,036 acres as Farmland of Local Importance. The majority of this farmland is located in the northeast portion of the county in the Ryers Island, Maine Prairie, Winters, and Dixon Ridge areas. Other high-quality farmlands occur in the Suisun Valley, Green Valley, and Pleasants Valley.

Residential Land Uses

Single-family residences exist on approximately 6,700 acres (1%) in unincorporated areas of Solano County. Very-low-density, rural residential development on properties of 2.5–5 acres makes up the majority of these residences. Such development has occurred in the Olive School Lane area, English Hills area, Allendale area, Gibson Canyon area, Wolfskill and Midway Road areas, Maple Street area, Tolenas area, and Green Valley area, among other locations.

Some suburban-density development has occurred in Rockville Corners, Cordelia, Willotta Oaks, and Elmira, and portions of Green Valley on parcels varying in size from one-quarter acre to 1 acre. Additionally, approximately 75 acres of land in Solano County is used for multifamily residential development, which includes apartment buildings, duplexes, triplexes, and similar housing types.

Urban development in Solano County is normally concentrated within the incorporated boundaries of the cities; however, the cities of Vallejo, Fairfield, and to a lesser extent Vacaville have “islands” of county land surrounded by incorporated land where urban development has occurred without annexation. The largest county “islands” are located in Vallejo. The Starr Subdivision area is located roughly north of Interstate 780 (I-780), south of Benicia Road, east of Beach Street, and west of I-80. Land uses in this area include single-family residences at approximately five to 10 units per acre, multifamily residences, retail and service commercial areas, and vacant commercial and residential land. The Homeacres area in Vallejo is located approximately three-quarters mile to the east and is bisected by I-780. This area is generally south of Hazelwood Street, west of Glen Cove Road, east of Home Acres Avenue, and north of Pueblo Way. Existing land uses include single-family residential development at approximately 0.3–7 units per acre, multifamily uses, churches, vacant single-family land, and limited commercial and industrial operations. The Sandy Beach area is located on Mare Island Strait and is developed with single-family residential development.

Commercial and Industrial Land Uses

Commercial and industrial uses are located primarily within the incorporated cities. Approximately 900 acres in the unincorporated areas of the county are classified as commercial land and include retail, commercial services, and service stations. The predominant type of commercial development in the unincorporated county area is highway oriented, with the majority of such land located along I-80. Other smaller areas of commercial development are located in the unincorporated county and serve the needs of local residents and visitors.

Almost 2,700 acres of land used for industrial purposes exists in the unincorporated county. Notable areas of industrial uses are located northeast of Dixon along I-80, at Lambie Road, at multiple sites directly east of Vacaville, east of Fairfield near Peabody Road, and at multiple sites north of Portrero Hills. Other industrial areas are spread throughout the unincorporated county, many of which are agriculturally related.

Public and Quasi-Public Land Use

The Public and Quasi-Public land use category includes sites that serve the community or public need and are owned or operated by government agencies, public utilities, or nonprofit organizations. This method of classification, though logical for the purposes of assessing property taxes, does not work as well for land use planning purposes. Large tracts of land in the Suisun Marsh area owned by the state and managed by the California Department of Fish and Game are characterized by the County Assessor as government-owned land, instead of being categorized as marshland. For the purposes of this report, 1,517 acres, 0.62% of the total land area of the unincorporated county, is considered civic.

POPULATION

Population Growth

Solano County's total population grew by 7% between 2000 and 2006. Population growth has occurred largely within the incorporated cities. As can be seen in Table 4.1-2, the cities of Rio Vista, Fairfield, Vacaville, and Dixon experienced significantly higher rates of growth than the 2% rate of growth experienced in the unincorporated portions of the county. Although growth has been slow in recent years, it should be noted that between 1980 and 1990 the unincorporated portions of the county experienced a 33% increase in population. The growth that occurred during this time period occurred primarily as rural residential development within Rural Residential-designated areas.

Geographic Area	1980	1990	2000	2006	% Growth 1980–1990	% Growth 1990–2000	% Growth 2000–2006
Solano Co. Unincorporated	16,288	21,692	19,322	19,736	33%	-11%*	2%
Benicia	15,376	24,437	26,865	27,319	59%	10%	2%
Dixon	7,541	10,401	16,103	17,574	38%	55%	9%
Fairfield	58,099	77,211	96,178	105,601	33%	25%	10%
Rio Vista	3,142	3,316	4,571	7,376	6%	38%	61%
Suisun City	11,087	22,686	26,118	27,748	5%	15%	6%
Vacaville	43,367	71,479	88,625	96,395	65%	24%	9%
Vallejo	80,303	109,199	116,760	121,099	36%	7%	4%
Solano County Total	235,203	340,421	394,542	422,848	45%	16%	7%

* The unincorporated county's declines between 1990 and 2000 may be due in part to cities annexing land that had previously been part of the unincorporated county.
Sources: U.S. Census 1990, 2000; California Department of Finance 2006

Population Densities

Solano County contains a wide spectrum of population densities. As shown in Table 4.1-3, the unincorporated portions of the county contain low or very low densities associated with rural residential and agricultural uses. The incorporated cities contain substantially higher density suburban uses.

**Table 4.1-3
Population and Density of Solano County and Solano Cities and Unincorporated Area, 1980–2006**

Jurisdiction	Population (2006)	Acres	Average Density (persons per acre)
Solano Co. Unincorporated	19,736	435,947	0.05
Benicia	27,319	10,091	2.71
Dixon	17,574	4,268	4.12
Fairfield	105,601	24,100	4.38
Rio Vista	7,376	4,365	1.69
Suisun City	27,748	2,591	10.71
Vacaville	96,395	17,419	5.53
Vallejo	121,099	31,780	3.81

Source: Solano County 2006b

HOUSING

Table 4.1-4 shows the housing unit estimates from 1990 and 2005. Solano County’s housing stock increased by 22.8% in that 15-year period. The vast majority of the housing stock was developed in the incorporated cities. Housing stock grew by only 2.6% in the unincorporated areas of the county.

**Table 4.1-4
Population, Housing, and Employment in Solano County**

Jurisdiction	Housing Units		Percent Change
	1990	2005	
Benicia	9,587	10,810	12.8
Dixon	3,564	5,561	56.0
Fairfield	27,030	36,248	34.1
Rio Vista	1,406	3,007	113.9
Suisun City	7,035	8,713	23.9
Vacaville	23,656	31,805	34.4
Vallejo 2005	39,902	42,973	7.7
Incorporated Cities Subtotal	112,180	139,117	24.0
Unincorporated Solano County	6,956	7,134	2.6
Total	119,136	146,251	22.8

Sources: California Department of Finance 2000, 2005

ABAG Regional Housing Need Allocation

The Association of Bay Area Governments (ABAG) is the agency that develops the regional housing strategy for Solano County and the incorporated cities. The Regional Housing Need Allocation (RHNA) determines potential

locations for future housing stock based on projected population growth, employment trends, and development suitability. The 2007 RHNA allocated 99 units in the unincorporated areas of the county (Table 4.1-5).

Table 4.1-5 Housing Unit Allocation for Unincorporated Solano County	
Household Income Level	Housing Units
Very Low	26
Low	16
Moderate	18
Above Moderate	39
Total	99
Source: ABAG 2007	

Existing Housing Element

In 2005 the County Board of Supervisors adopted the General Plan Housing Element. There are no proposed changes to the Housing Element. The entire Housing Element would be incorporated into the 2008 Draft General Plan upon adoption. Because the County’s Housing Element has already been adopted by the County Board of Supervisors, it will not be analyzed in this EIR. The goal of the Housing Element is to promote and ensure adequate housing in a satisfying environment for all residents of Solano County. The specific objectives that the element addresses are as follows:

- ▶ Conserve existing affordable housing units and rehabilitate existing housing stock.
- ▶ In concert with the cities, provide sufficient land to accommodate the county’s projected housing needs.
- ▶ Provide housing to meet the needs of all economic segments of the community.
- ▶ Ensure that adequate housing is available for all the citizens of the county.
- ▶ Minimize constraints to the production of housing within the unincorporated areas of the county where limited residential development is appropriate and consistent with the Orderly Growth Initiative.
- ▶ Provide properly timed residential development in a pattern that is consistent with county economic, social, and environmental needs.
- ▶ Provide for residential development that is generally self-sufficient in regard to water supply and sewage disposal.
- ▶ Enhance and preserve the environmental quality of residential areas.
- ▶ Promote energy conservation in new and existing residential units.

2008 DRAFT GENERAL PLAN LAND USE DESIGNATIONS

The proposed land use designations contained in the 2008 Draft General Plan differ in many areas of the county from the existing on-the-ground land use conditions. Land use amendments included in the 2008 Draft General Plan were proposed for the following reasons:

- ▶ To reflect existing uses
- ▶ To correspond with state or federal policy areas (i.e., Suisun Marsh)
- ▶ To reflect policies of a specific plan area (i.e., *White Slough Specific Plan*)
- ▶ To encourage the establishment of land uses deemed to be beneficial to the public
- ▶ To accommodate city general plan designations within the city’s sphere of influence
- ▶ To reflect underlying zoning and remove inconsistencies
- ▶ To create additional residential housing opportunities within the county
- ▶ To accommodate property owner proposals
- ▶ To reflect resource conservation goals of the County

Table 4.1-6 describes the change in acreage between the existing land uses and the proposed amendments contained in the 2008 Draft General Plan Update.

Table 4.1-6 Existing and General Plan Land Use Designations			
Land Use Categories/General Plan Designations	Existing Land Use (acres)	2008 Draft General Plan (acres)	Net Change (acres)
Water Bodies and Courses	51,092	51,092	–
Park and Recreation	791	2,132	1,341
Marsh	64,731	64,723	(8)
Subtotal Natural Resource Designations	116,615	117,948	1,333
Watershed	36,575	36,575	–
Agriculture	329,076	307,105	(21,971)
Subtotal Agricultural Designations	365,651	343,680	(21,971)
Public/Quasi-Public	1,517	1,871	–
Subtotal Public Designations	1,517	1,871	354
Rural Residential	5,864	13,721	7,856
Traditional Community—Residential	–	980	–
Traditional Community—Mixed Use	–	108	–
Urban Residential	286	1,890	1,604
Subtotal Residential Designations	6,878	16,698	9,820
Neighborhood Commercial	–	6	–
Neighborhood Agricultural/Tourist Center	–	75	–
Commercial Recreation	–	155	–
Service Commercial	–	75	–
Highway Commercial	–	136	–
Urban Commercial	–	588	–
Subtotal Commercial Designations	640	1,036	396
General Industrial	–	8	–
Limited Industrial	–	969	–
Water Dependent Industrial	–	6,766	–

**Table 4.1-6
Existing and General Plan Land Use Designations**

Land Use Categories/General Plan Designations	Existing Land Use (acres)	2008 Draft General Plan (acres)	Net Change (acres)
Urban Industrial	–	1,254	–
Subtotal Industrial Designations	2,125	8,996	6,871
Specific Project Areas	–	4,208	4,208
Subtotal Special Purpose Areas	–	4,208	4,208
Vacant Land (Existing Use Only)	1,011	–	(1,011)
TOTAL Unincorporated Area	494,437	494,437	0
<i>Overlays (Not Counted in Total)</i>			
Water Dependent Industrial—Reserve	–	2,870	2,870
Travis Reserve Area	–	7,890	7,890
Wind Energy Resource Overlay	–	31,737	31,737
Agricultural Reserve Overlay	–	14,428	14,428
Tri-City Cooperative Planning Area	–	9,968	9,968
Resource Conservation Overlay	–	210,576	210,576
Source: Data provided by Solano County in 2008			

Exhibit 3-2 in Chapter 3, “Project Description,” presents the proposed land use map.

4.1.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws pertaining to land use are applicable.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

State Housing Element Requirements

Article 10.6 of the California Government Code outlines the contents that are required in general plan housing elements. The element must analyze existing and projected housing needs, examine special housing needs within the population, evaluate the effectiveness of current goals and policies, identify governmental and other constraints, determine compliance with other housing laws, and identify opportunities to incorporate energy conservation into the housing stock. The element must also establish goals, policies and programs to maintain, enhance, and develop housing and create, at minimum, a 5-year plan to implement these objectives.

California Relocation Law

The California Relocation Law, California Public Resources Code Section 7260(b), requires the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a public entity. The law requires agencies to prepare a relocation plan, provide relocation payments, and identify substitute housing opportunities for any resident that is to be displaced by a public project.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Solano County General Plan

The existing *Solano County General Plan* (General Plan) contains goals and policies that guide and direct both the location and extent of land uses, population growth, and housing. It also contains policies that direct the services and infrastructure required to accommodate such growth. The existing General Plan includes a land use map and a Housing Element that contains housing policies and programs that are aimed at providing housing opportunities for residents of all income levels and abilities.

County Zoning Ordinance

The Solano County Zoning Ordinance provides a precise plan for land use and development standards within Solano County. General plan land use designations are associated with zoning districts, which include specific requirements, including setbacks, height limits, and development standards. The zoning ordinance must be consistent with the General Plan, and so amendments and updates to the General Plan require corresponding zoning ordinance changes.

Orderly Growth Initiative

The Orderly Growth Initiative was adopted in 1994. The purpose of the initiative is to ensure protection of Solano County's agricultural and open space resources through the following provisions:

- ▶ amending the General Plan to restrict redesignation of lands identified as Agriculture or Open Space on the land use and circulation map through December 31, 2010; and
- ▶ amending the General Plan to restrict the density of residential and other development of lands designated Agriculture or Open Space through the year 2010, preventing large-scale residential or mixed-use developments outside of municipal areas.

Under the provisions of the Orderly Growth Initiative, a popular vote is required to redesignate Agriculture or Open Space lands into some other use, or to increase the density of development on designated Agriculture or Open Space lands.

Collinsville–Montezuma Hills Area Plan and Program

This plan addresses the area around the historic community of Collinsville in the extreme southern portion of the county bordered generally by Montezuma Slough on the west, Rio Vista on the east, the Sacramento River on the south, and State Route (SR) 12 on the north. This plan was drafted to analyze the economic, planning, and environmental conditions related to providing for water-dependent industrial development, although this has not occurred to date in this part of the county, despite some development proposals.

White Slough Specific Area Plan

This plan was required by the White Slough Protection and Development Act of 1990 to address habitat preservation, transportation improvements, flood protection, public access, land use change, and sewer line relocation. The planning area is bisected by SR 37 and located adjacent and east of the Napa River/Mare Island area. The plan was jointly adopted by the City of Vallejo and Solano County.

Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation

The Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation was adopted by the County and the cities of Vallejo, Benicia, and Fairfield in 1994. The plan is intended to guide future land use and

park planning for the protection of open space and agricultural resources in an area located south of SR 12 and west of I-680.

Solano County Local Agency Formation Commission

The Solano County Local Agency Formation Commission (LAFCO) is responsible for coordinating changes in local governmental boundaries, including city, agency, and special district boundaries and spheres of influence. This includes establishing boundaries and spheres of influence for each city and special district within Solano County. The LAFCO’s efforts are directed toward seeing that services are provided efficiently and economically while agricultural and open-space lands are protected.

City General Plans

Each of Solano County’s seven cities has its own general plan regulating land use and development within the city’s boundaries. These general plans, and the associated land use diagrams, are particularly relevant to areas of the unincorporated county that are adjacent to or near city boundaries. During the preparation of the 2008 Draft General Plan, and as both the County and city general plans undergo amendments during the life cycle of the plans, coordination and compatibility between the County’s plan and the individual city plans remains an important goal. In most cases, the County has deferred to city designations within established city spheres of influence.

Association of Bay Area Governments

ABAG is the regional land use planning agency for the Bay Area, including Napa, Sonoma, Marin, San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, and Solano Counties. ABAG is responsible for preparing the Regional Housing Needs Plan allocating regional housing needs through this nine-county area. In addition, as the regional land use planning agency for the Bay Area, ABAG is responsible for describing existing conditions, forecasting changes to the population and economy, and assisting local governments in identifying policies that address a changing environment. ABAG prepares demographic and economic projections for the Bay Area on a biennial basis, and supports regional cooperation on issues of development, sustainability, and the environment.

The Smart Growth Strategy is a five-agency planning effort coordinated by ABAG that seeks to foster “smart growth” land use patterns throughout the Bay Area’s nine counties and 101 cities. The project works to advance regulatory changes and incentives that are needed to advance smart-growth planning objectives. The project’s vision for Solano County includes the preservation of agricultural industry and character by focusing new development within the incorporated cities. The project encourages the strengthening of employment centers, slight increases in residential densities, and the development of mixed-use centers located adjacent to Amtrak Capitol Corridor rail stations. Municipal participation in the plan is currently voluntary.

4.1.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact on land use is considered significant if the proposed project would:

- ▶ physically disrupt or divide an established community;
- ▶ conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect;

- ▶ conflict with any applicable habitat conservation plan or natural community conservation plan; or
- ▶ introduce new land uses or alter the intensity of existing land uses, potentially resulting in incompatibility with established land uses within Solano County's unincorporated area.

IMPACT ANALYSIS

IMPACT 4.1-1a **Division of Established Communities – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the division of established communities. However, implementation of policies and programs contained in the 2008 Draft General Plan would ensure that potential divisions do not occur or are minimized. This impact would be less than significant.*

The 2008 Draft General Plan proposes numerous changes to land use designations throughout the county. It is possible that some of these changes and the accompanying increases in land use intensity and infrastructure could result in the division of existing communities. However, the 2008 Draft General Plan proposes the following policies to ensure that land use and development patterns are compatible with the surrounding land uses:

- ▶ **Policy LU.P-5** requires the County to coordinate land development use within municipal service areas with the relevant city.
- ▶ **Policy LU.P-16** calls on development to preserve the character and quality of Traditional Community areas.
- ▶ **Policy LU.P-20** encourages the development of commercial uses to use architecture and site design compatible with the rural character of the surrounding community.
- ▶ **Policy LU.P-21** demands that commercial and industrial development be located, designed, and sited in a manner that minimizes negative impacts on surrounding residential and agricultural uses.
- ▶ **Policy LU.P-22** ensures that commercial and industrial development that occurs adjacent to a city is developed consistently with the standards of the adjacent city.

As part of the General Plan update process, goals, policies, and programs were established for four special study areas in the county: Middle Green Valley, Suisun Valley, Old Town Cordelia, and Collinsville. The specific needs and contexts of the areas were determined through extensive community outreach.

- ▶ **Goal SS.G-1** encourages the County to maintain the rural character of Middle Green Valley by ensuring that compatible residential development will occur.
- ▶ **Program SS.I-1** directs the County to adopt a specific plan or master plan that establishes techniques to ensure that development is compatible with the rural character of Middle Green Valley and surrounding areas. Such techniques should include design guidelines and development standards.
- ▶ **Goal SS.G-3** calls on the County to maintain the historic communities of Birds Landing and Collinsville while providing opportunities for industrial development compatible with the Collinsville area.
- ▶ **Goal SS.G-4** states that the County should protect the community of Old Town Cordelia while providing opportunities for appropriate future development.
- ▶ **Program SS.I-16** requires the County to work with the community to study the potential for new infill standards, design guidelines, and economic incentives to ensure that any future development is appropriately designed and scaled to fit in with the community's historic context.

As described above, the 2008 Draft General Plan would incorporate numerous goals, policies, and programs aimed at preventing or minimizing the division of existing communities. Buildout of the 2008 Draft General Plan under the Preferred Plan would result in the development of new residential, commercial, and industrial uses and would extend infrastructure in portions of the county. This type of development could divide existing communities; however, the implementation of the goals, policies, and programs contained within the plan update, as described above, would assure that divisions with adverse effects on the physical environment would either not occur or be minimized.

The implementation of the 2008 Draft General Plan under the Preferred Plan would not result in significant division of existing communities. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-1b **Division of Established Communities – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the division of established communities. However, implementation of policies and programs contained in the 2008 Draft General Plan would ensure that potential divisions do not occur or are minimized. This impact would be less than significant.*

This impact is the same as Impact 4.1-1a for the Preferred Plan. Maximum buildout of the 2008 Draft General Plan would result in the development of new residential, commercial, and industrial uses and would extend infrastructure in portions of the county. This type of development could divide existing communities; however, implementation of the goals, policies, and programs contained within the plan update would assure that divisions with adverse effects on the physical environment would either not occur or be minimized. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-2a **Conflict with Other Plans – Preferred Plan.** *Goals, policies, and programs of the 2008 Draft General Plan under the Preferred Plan would not conflict with other adopted plans. This impact would be less than significant.*

In compliance with State CEQA Guidelines Section 15125(d), an analysis of potential inconsistencies between the 2008 Draft General Plan and other relevant County, regional, and state plans, programs, and regulations is provided below. The consistency analysis has not encountered any significant or substantive inconsistencies between the plan and other applicable plans, policies, and regulations.

A variety of specific plans and other land use plans have been established within Solano County. Additionally, regional, state, and federal agencies have established plans, programs, and regulations that have jurisdiction within the planning area. During the update process the County has attempted to make the 2008 Draft General Plan internally and externally consistent. To achieve this, the 2008 Draft General Plan contains policies and programs that conform to the requirements of the external plans, programs, and regulations. Where possible, the 2008 Draft General Plan has adopted relevant plans by reference.

Land use and other plans, programs, and regulations that apply to unincorporated areas of Solano County include the following:

- ▶ Orderly Growth Initiative
- ▶ Solano County LAFCO regulations
- ▶ Airport land use compatibility plans
- ▶ *Travis Air Force Base Land Use Compatibility Plan*
- ▶ *Regional Transportation Plan*
- ▶ *Solano Comprehensive Transportation Plan*
- ▶ Solano County Zoning Code
- ▶ *Suisun Marsh Protection Plan*—Suisun March Protection Act
- ▶ *Delta Protection Plan*
- ▶ *White Slough Specific Plan*
- ▶ Napa Sonoma Marsh Restoration Project
- ▶ *Collinsville–Montezuma Hills Area Plan*
- ▶ *Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation*
- ▶ *San Francisco Bay Trail Plan*
- ▶ *Bay Area Ridge Trail Plan*
- ▶ *Carquinez Trust Trail Plan*

Relevant Policies and Programs of the 2008 Draft General Plan

To ensure external consistency, the 2008 Draft General Plan contains the following policies and programs. The policies and programs are organized with regard to the plan, program, or regulation they address.

Orderly Growth Initiative

The 1994 Orderly Growth Initiative restricts the redesignation of and density of development on agricultural and open space land through 2010. Policies LU.P-2 and LU.P-3 ensure that the 2008 Draft General Plan is consistent with the Orderly Growth Initiative.

Solano County LAFCO

Program LU.I-9 directs the County to work with the Solano County LAFCO and cities to ensure that municipal service areas conform to cities' spheres of influence and clearly define those lands that are expected to be urbanized through annexation.

Airport Land Use Compatibility Plans

Airport land use compatibility plans help to reduce the potential for land use conflicts between the airports and surrounding uses. State law requires future land use development near airports to be consistent with compatibility criteria included in such a plan. Policy LU.P-29 reiterates this law and requires that all development within the airport land use compatibility areas/safety zones of the airports complies with Airport Land Use Commission height, noise, and safety policies as set forth in the airports' comprehensive land use plans.

Transportation Plans

The *Regional Transportation Plan* and the *Solano Comprehensive Transportation Plan* are long-range planning documents prepared by the Metropolitan Transportation Commission and the Solano Transportation Authority, respectively.

- ▶ **Program LU.I-15** directs the County to coordinate with the Metropolitan Transportation Commission, the Solano Transportation Authority, and the California Department of Transportation to ensure consistency between transportation plans and programs and the 2008 Draft General Plan.
- ▶ **Policy LU.P-31** requires the County circulation plan to be compatible with the 2008 land use plan.

- ▶ **Policy TC.P-8** requires the County to actively participate with the California Department of Transportation, Solano Transportation Authority, cities, and other agencies to plan for any proposed future realignments of current interregional routes.

Solano County Zoning Ordinance

The zoning ordinance describes the permitted land uses and development standards within each zoning district in the county. The County’s zoning ordinance is subordinate to the General Plan. Policy LU.P-30 and Program LU.I-1 require the zoning ordinance to be consistent with changes in land use designations.

Marsh and Delta Plans and Programs

Solano County contains extensive marshlands critical to the health and vitality of the San Francisco Bay/Sacramento–San Joaquin Delta estuary ecosystem. Many of these marshlands are protected under regional, state, or federal plans and programs.

- ▶ **Policies RS.P-10 to RS.P-19** and the policies in the *Suisun Marsh Policy Addendum*, Appendix C of the 2008 Draft General Plan, address the requirements of and ensure consistency with the Suisun Marsh Protection Act. Specifically, Policies RS.P-13 and RS.P-14 limit land uses to those allowed within the Primary and Secondary Management Areas as defined by the Suisun Marsh Protection Act.
- ▶ **Policy RS.P-20** states that the goals, policies, and provisions of the Delta Protection Commission’s *Land Use and Resource Management Plan for the Primary Zone of the Delta* are incorporated by reference into the 2008 Draft General Plan.
- ▶ **Policies RS.P-20 through RS.P-28** incorporate goals and policies from the Delta Protection Commission’s *Delta Protection Plan*.
- ▶ **Policies RS.P-29 and RS.P-30** relate to the *White Slough Specific Plan* and address the requirements of that plan.
- ▶ **Policy RS.P-31** restricts land uses with the Napa Sonoma Marsh Restoration Project area to be consistent with the provisions of the project.

Area Plans

Prior to the 2008 Draft General Plan, Solano County had adopted two area plans—the *Collinsville–Montezuma Hills Area Plan* and the *White Slough Specific Plan*—to address the areas’ individual needs. These area plans are subservient to, and must be consistent with, the 2008 Draft General Plan.

- ▶ **Program SS.I-6** requires the County to review and update the *Collinsville–Montezuma Hills Area Plan* and Program consistent with the Collinsville Special Study Area’s land uses, policies, and programs.
- ▶ **Program SS.I-7** directs the County to evaluate the circulation system within the Collinsville Water Dependent Industrial area and ensure that industrial and nonindustrial uses can coexist in the area. If a new industrial roadway is developed, the program requires the County to consider an alternative to the alignment shown in the 1979 *Collinsville–Montezuma Hills Area Plan*.

Policies that discuss the *White Slough Specific Plan* have been addressed above in the context of the County’s marsh areas.

Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation

The County and the cities of Vallejo, Benicia, and Fairfield adopted the *Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation* in 1994. The plan is intended to direct land use and park planning and protect open space and agricultural resources within the plan area.

- ▶ **Program RS.I-20** requires the County to amend the zoning ordinance to include the area, policies, and programs of the *Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation*.
- ▶ **Program RS.I-24** encourages continued interjurisdictional cooperation and coordination of resource and land use planning in the Cooperative Planning Area through the continued operation of the Tri-City and County Cooperative Planning Group.

Trail Plans

A number of plans exist to establish regional trail systems in the Bay Area. Three trail plans—the *San Francisco Bay Trail Plan*, the *Bay Area Ridge Trail Plan*, and the *Carquinez Trust Trail Plan*—are relevant to Solano County.

- ▶ **Policy RS.P-40** directs the County to provide trail links and an integrated trail system to connect people to accessible open spaces and to regional trail routes.
- ▶ **Policy RS.P-43** calls on the County to support the provision of public lands for use in a trail network and work collaboratively with property owners to secure easements across private lands.
- ▶ **Policy RS.P-44** encourages the County to support the completion of regional trails that link destinations within Solano County and beyond, including the San Francisco Bay Trail, the Bay Area Ridge Trail, and Carquinez Trust Trail.
- ▶ **Program RS.I-36** directs the County to coordinate with cities, regional organizations, and neighboring counties to complete countywide and regional trail systems.

Conclusion

The plan consistency analysis described above did not identify any inconsistencies between the 2008 Draft General Plan and other relevant plans, programs, and regulations that would result in adverse physical effects under CEQA. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-2b **Conflict with Other Plans – Maximum Development Scenario.** *Goals, policies, and programs of the 2008 Draft General Plan under the Maximum Development Scenario would not conflict with other adopted plans. This impact would be less than significant.*

This impact is the same as Impact 4.1-2a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would not change the results of the plan consistency analysis described above. The analysis did not identify any inconsistencies between the 2008 Draft General Plan and other relevant plans, programs, and regulations that would result in adverse physical effects under CEQA. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-3a **Conflict with an Adopted Habitat Conservation Plan – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would not conflict with an adopted habitat conservation plan or natural community conservation plan. This impact would be less than significant.*

The U.S. Bureau of Reclamation, Solano County Water Agency, and its eight member agency contracts (the City of Vacaville, the City of Fairfield, Suisun City, the City of Vallejo, Solano Irrigation District, and the Maine Prairie Water District) have prepared a draft habitat conservation plan to ensure the protection of threatened and endangered species and their habitat within the water agency’s contract service area, as described in Section 4.6, “Biological Resources.” The plan, however, has not been adopted. No other natural community conservation plan exists for areas within the county. Therefore, the impact of the 2008 Draft General Plan would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-3b **Conflict with Adopted Habitat Conservation Plan – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would not conflict with an adopted habitat conservation plan or natural community conservation plan. This impact would be less than significant.*

This impact is the same as Impact 4.1-3a for the Preferred Plan and would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-4a **Incompatibility with Established Land Uses – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan would result in changes in land use type, density, and scale in existing agricultural areas and in areas adjacent to incorporated cities and unincorporated communities. These changes would result in land use conflicts and incompatibilities. Although the 2008 Draft General Plan contains policies and programs to reduce incompatibilities, the impacts would not be fully mitigated. This impact would be significant.*

Rural Residential

The 2008 Draft General Plan proposes to increase the quantity of rural residential designated lands by 7,856 acres and to increase urban residential designated lands by 1,604 acres. Converting existing agricultural lands to residential uses would increase the likelihood of residential/agricultural use conflicts. Incompatible uses could occur as a result. Conversion of agricultural lands and mitigation is discussed in Section 4.8, “Agricultural Resources.”

The following goals, policies, and programs in the 2008 Draft General Plan seek to minimize the impacts of land use changes and development on adjacent agricultural operations:

- ▶ **Goal LU.G-4** encourages land use development patterns and circulation systems that minimize adverse effects on agriculture.

- ▶ **Policies LU.P-11 and AG.P-16** call on the County to work with cities to protect and maintain community buffers within city jurisdiction that are compatible with adjoining agricultural uses.
- ▶ **Program AG.I-5** requires that buffers be an appropriate size to reduce potential conflicts, but in no case less than 300 feet in width.
- ▶ **Policy LU.P-14** requires rural residential development to be established in a manner that preserves rural character and protects agricultural resources.
- ▶ **Policy AG.P-2** stipulates that suburban and rural residential development must be compatible with surrounding agricultural activities.
- ▶ **Policy LU.P-17** encourages clustering of residential development when necessary to preserve agricultural lands.

Although the above policies would help to reduce use incompatibilities, they would not mitigate all residential/agricultural conflicts. Rural residential land uses create numerous hardships for agricultural operations. Increased traffic on rural roads makes moving agricultural equipment more challenging. New rural residents can complain about odors, noises, spraying, and other practices and make it hard for farmers and ranchers to run their operations efficiently. Parcelization of agricultural lands into rural residential often results in parcels that are too small to farm. Clustering of rural residential units can help protect useable areas for agriculture, but does not reduce the risk of use conflicts between the two uses.

Agricultural Processing/Agricultural Tourism

To strengthen Solano County’s agricultural economy, the 2008 Draft General Plan has enabled the development of agricultural processing facilities on farmland. Although the agricultural processing and agritourism-oriented facilities would have the potential to improve the county’s economy, this development may produce a variety of land use conflicts. Agricultural processing could directly conflict with agricultural production by transforming areas of arable land into facilities and parking lots. Additionally, increased truck and tourist traffic could result and adversely affect agricultural operations in the area.

The following goal and policy attempt to lessen the extent of land use conflicts between agricultural and nonagricultural uses:

- ▶ **Goal AR.G-5** emphasizes the reduction of conflicts between agricultural and nonagricultural uses in Agriculture-designated areas.
- ▶ **Policy AG.P-17** requires potential conflicts between automobile and bicycle traffic and agricultural operations to be minimized through transportation planning and capital improvement efforts.

Although these would reduce some of the potential impacts, they would not fully mitigate the impacts that could result from the increased intensity of uses permitted in agricultural designation in the 2008 Draft General Plan.

Industrial and Commercial

The 2008 Draft General Plan proposes to locate industrial and commercial uses adjacent to incorporated cities and the unincorporated communities in a variety of locations. Much of the land where development would occur is on and adjacent to land with existing agricultural uses. These land uses may create conflicts and be incompatible with both adjacent agricultural operations and urban uses.

The urbanization of parcels adjacent to farmland can create numerous negative impacts on agriculture. In addition to the direct impacts discussed above, urbanization can result in land values that discourage agricultural

investment. Additionally, the direct impacts (e.g., traffic, emissions) can be much more severe because of the intensity of uses permitted on industrial and commercial lands. Inversely, industrial uses are less likely to complain about agricultural dust, noise, and smells. Commercial uses may be adversely affected by adjacent agricultural uses, depending on the type of business.

The proposed industrial and commercial land uses could generate substantial impacts on adjacent urban land uses. Increased traffic, large volumes of storm drainage, emissions, noise, and other impacts could result from the development and operation of proposed industrial and commercial uses. Notably, large areas of industrial uses are proposed adjacent to residential uses in western Suisun City, eastern Dixon and northeast of Vacaville and in the area surrounding the community of Collinsville. These designations may create substantial land use conflicts and be incompatible with the existing land use patterns. In-depth analysis of the compatibility of proposed land uses and existing land uses within incorporated cities was not feasible because of a lack of existing use data for the cities.

Relevant Policies and Programs of the 2008 Draft General Plan

The 2008 Draft General Plan contains the following policies and implementation program to reduce such impacts:

- ▶ **Program AG.I-1** calls on the County to create and adopt a farmland conversion mitigation program and ordinance. The ordinance would require projects that result in the conversion of agricultural lands to mitigate the impacts through the purchase of agricultural easements or through the payment of an in-lieu fee to the county. The mitigation ratio shall be a minimum of 1:1 (1 acre of farmland protected through mitigation for each acre of farmland converted) and the easement shall protect land of equal or greater quality in the same agricultural region or within the Agricultural Reserve Overlay.
- ▶ **Policy LU.P-21** requires commercial and industrial development to be located, designed, and sited in a manner that minimizes traffic congestion and other negative effects on surrounding residential and agricultural uses.
- ▶ **Policy LU.P-26** requires industrial uses to be located and developed in a manner that does not conflict with adjacent and surrounding agricultural activities and protects water quality and marshland and wetland habitats.
- ▶ **Policy LU.P-20** encourages development of commercial uses to use architecture and site design compatible with the rural character of the surrounding community, the county, and adopted County policies.
- ▶ **Policy LU.P-22** requires that commercial and industrial development occurring adjacent to a city be consistent with the development design standards of the adjacent city.
- ▶ **Policy AG.P-15** stipulates that agricultural service uses located in Limited Industrial– and Agriculture–designated areas must support local agricultural activities and not harm long-term agricultural uses in the surrounding area.
- ▶ **Policy LU.P-27** establishes the requirement that only agriculture-supporting industrial uses are allowed in Limited Industrial–designated areas located northeast of Dixon.

The above policies seek to mitigate negative impacts associated with the industrial and commercial land uses proposed in the 2008 Draft General Plan. Although such policies may minimize conflicts and incompatibility, they would not fully prevent all significant impacts on adjacent urban and agricultural uses.

Conclusion

The impacts of increased rural residential, agricultural processing facilities, and industrial and commercial land uses proposed in the 2008 Draft General Plan would create conflicts with established land uses. The resulting incompatibilities could create a variety of environmental impacts. Therefore, this impact would be significant.

Mitigation Measure 4.1-4a: Require Minimum Mitigation Ratio of 1.5:1 or Higher for Farmland Conversion.

Program AG.I-1 of the 2008 Draft General Plan shall be amended to have a minimum mitigation ratio of 1.5:1 or higher for farmland conversion to mitigate the impacts of new nonagricultural uses on adjacent and neighboring agricultural operations. Program AG.I-1 shall be amended to read as follows.

AG.I-1: Create and adopt a farmland conversion mitigation program and ordinance. Require compensation for loss of agricultural land. Establish appropriate mitigation ratios for the program or utilize a graduated mitigation mechanism. The mitigation ratio shall be a minimum of 1.5:1 (1.5 acres of farmland protected through mitigation for each acre of farmland converted). The program shall not present regulatory barriers to agritourism, agricultural services, and agricultural processing in regions and within land use designations where such uses are permitted and encouraged. The program shall also establish mitigation within the same agricultural region as the proposed development project, or within the Agricultural Reserve Overlay district, as a preferred strategy. The program shall incorporate a fee option, and shall provide an exemption for farmworker housing. Mitigation lands shall be of similar agricultural quality to the lands being converted.

Although Mitigation Measure 4.1-4a may work to reduce some portion of the impact associated with agricultural and nonagricultural use conflicts, it would not reduce these impacts to below a level of significance. For this reason, the impact would remain **significant and unavoidable**.

IMPACT 4.1-4b **Incompatibility with Established Land Uses – Maximum Development Scenario.** *Implementation of the 2008 Draft General Plan would result in changes in land use type, density, and scale in existing agricultural areas and in areas adjacent to incorporated cities and unincorporated communities. These changes would result in land use conflicts and incompatibilities. Although the 2008 Draft General Plan contains policies and programs to reduce incompatibilities, the impacts would not be fully mitigated. This impact would be significant.*

This impact is similar to Impact 4.1-4a for the Preferred Plan. Table 4.1-7 compares the buildout intensity of the 2008 Draft General Plan under the Preferred Plan and the Maximum Development Scenario. The Maximum Development Scenario would result in substantially greater population, housing units, and commercial/industrial area than the Preferred Plan.

Table 4.1-7 Comparison of Buildout of the 2008 Draft General Plan under the Preferred Plan and Maximum Development Scenario				
	Acres	Housing Units	Population	Nonresidential Square Feet
Preferred Plan	494,437	14,923	39,455	14,376,853
Maximum Development Scenario	494,437	23,509	62,105	28,276,195
Source: Solano County 2006a				

The increased population, density, and intensities associated with the Maximum Development Scenario are likely to exacerbate land use conflicts and incompatibilities. Increased traffic would have a negative impact on agricultural operations. Increased population in residential areas adjacent to agriculture would expose additional people to odors, noises, and chemical associated with farm operations. This impact would be significant.

Mitigation Measure 4.1-4b: Require Minimum Mitigation Ratio of 1.5:1 or Higher for Farmland Conversion.

This measure is the same as Mitigation Measure 4.1-4a above. For the same reasons as described above, the impact would remain **significant and unavoidable**.

IMPACT **Inducement of Population Growth – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan would induce population growth in unincorporated portions of Solano County. This impact would be **significant**.*

Implementation of the 2008 Draft General Plan under the Preferred Plan would increase the acreages of both rural and urban residential land use designations in the unincorporated portions of Solano County. Increases in land availability for residential development could directly induce population growth. Additionally, increases in land designated for industrial and commercial uses could indirectly induce population growth by increasing the number of jobs in the county. Similarly, the 2008 Draft General Plan would permit increased agricultural processing, agritourism, and agriculture-related services on agricultural lands. This, too, could lead to increased employment, which could in turn induce population growth.

Association of Bay Area Governments’ Forecast

Implementation of a general plan is considered growth inducing if the plan’s projected population growth exceeds the jurisdiction’s share of the regional population forecast. ABAG’s regional population forecast projects that the population of unincorporated Solano County will be 26,000 by 2030 (Table 4.1-8). Implementation of the 2008 Draft General Plan under the Preferred Plan could result in an estimated population of 39,455 by 2030 if buildout of all residential designated land were to occur at the midpoint of the permitted density range. The 2008 Draft General Plan population, under the Preferred Plan, would be significantly larger than the population forecasted by ABAG and would therefore be considered growth inducing.

Table 4.1-8 Comparison of Population under the 2008 Draft General Plan Preferred Plan at Buildout with ABAG’s 2030 Population Forecast				
	Existing (2000)	2008 General Plan Growth	Total General Plan Buildout Potential	ABAG Projections for Unincorporated Solano County 2030
Population	19,988	39,455	59,443	26,000
Housing	7,380	14,923	22,303	8,740
Note: ABAG = Association of Bay Area Governments Source: Solano County 2006b				

2005 Housing Element

In 2005, the Solano County Housing Element was adopted by the County Board of Supervisors. The element was intended to address the county’s housing needs through June 30, 2007, but will remain in effect until the County updates the element. The Regional Housing Needs Allocation (RHNA) used during the 2005 Housing Element’s planning period was for 2,719 dwelling units. As part of the 2005 Housing Element, the County negotiated housing transfer agreements with the cities of Benicia, Fairfield, Vacaville, and Rio Vista, leaving a remaining

allocation of 434 units. Based on the transfer of regional housing need to the cities and construction of housing units within the unincorporated county during this time period, the County has no remaining unmet housing need under 2005 Housing Element. ABAG provided a new RHNA in 2007 for the next Housing Element update in 2009. This allocation calls for only 99 additional units during the 2007–2014 RHNA planning period.

The 2008 Draft General Plan has a buildout potential of more than 7,543 additional housing units under the assumption that average densities will persist into the future. This is considerably more than required by the RHNA. However, the RHNA allocation only covers the period through 2014, whereas the 2008 Draft General Plan is intended to address housing needs through 2030.

Additionally, the plan provides diverse rural and suburban sites for the development of these units. The 2008 Draft General Plan presents sufficient area for the development called for in the 2007 ABAG allocations. Therefore, the plan is consistent with the element and ABAG requirements.

Conclusion

The 2008 Draft General Plan would accommodate a substantially higher population than is projected in the ABAG regional population forecast. If implemented, the plan update would be considered growth inducing. Therefore, this impact would be significant.

Mitigation Measure

No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable** without a reduction in acreage devoted to residential use, a decrease in residential densities to reduce the projected number of dwelling units, or the regulation of the number of residential building permits that may be issued annually. These potential mitigation measures could increase the cost of housing in Solano County, thereby conflicting with Objective C.1 and Policy C.1 of the 2008 Draft General Plan Housing Element, which promote the production of housing for all segments of the population at all income levels.

IMPACT 4.1-5b **Inducement of Population Growth – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario is estimated to generate a population of 62,105 in 2030. ABAG projections expect the unincorporated population to be 26,000 in the same year. The Maximum Development Scenario would induce population growth in unincorporated portions of Solano County. This impact would be **significant**.*

This impact is similar to Impact 4.1-5a for the Preferred Plan, except that, as demonstrated above in Table 4.1-7, maximum buildout of the 2008 Draft General Plan would generate substantially more population growth than the in the Preferred Plan. ABAG projections expect the unincorporated population to be 26,000 in 2030. The Preferred Plan would generate a population of 39,455 and the Maximum Development Scenario would generate a population of 62,105. Maximum buildout of the 2008 Draft General Plan would accommodate more than twice the population that is projected in the ABAG regional population forecast. If implemented, the plan update would be considered growth inducing. Therefore, this impact would be significant.

Mitigation Measure

For the same reasons as described for Impact 4.1-5a, no feasible mitigation is available to reduce this growth-inducing impact. This impact would remain **significant and unavoidable**.

IMPACT 4.1-6a **Displacement of Substantial Existing Housing – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would not result in the displacement of substantial existing housing units; therefore, it would not necessitate the construction of housing units elsewhere. This impact would be **less than significant**.*

The 2008 Draft General Plan does not include any redevelopment areas and does not explicitly convert developed residential areas to nonresidential designations; however, it is possible that existing dwelling units in Agriculture-designated areas could be displaced through proposed conversions of agricultural lands to other uses and buildout of the plan. It is also possible that the establishment of Neighborhood Agricultural Tourism Centers in Suisun Valley could cause the displacement of existing dwelling units.

The 2005 Housing Element contains policies that seek to prevent the displacement of dwelling units. Housing Element Policy A.1 directs the County to conserve its affordable housing stock and reduce substandard housing through ongoing rehabilitation programs. Policy A.2 states that the County will coordinate housing conservation and rehabilitation plans and programs with other public and private agencies. General Plan Goal LU.G-2 encourages the County to maintain existing communities.

California Public Resources Code Section 7260(b), the California Relocation Law, establishes “a uniform policy for the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a public entity.” The law would require the County to prepare a relocation plan, provide relocation payments, and identify substitute housing opportunities for any resident that is to be displaced by a public project.

Although it is possible that buildout of the 2008 Draft General Plan would result in the displacement of existing dwelling units, the occurrence of such displacement would be rare. As stated previously, the 2008 Draft General Plan does not include any redevelopment areas and does not explicitly convert designated residential areas to nonresidential designations. Incidents of displacement would occur primarily as existing dwellings on agricultural land are displaced as the land is converted to a nonagricultural use. The number of dwelling units displaced by such conversions would be limited. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-6b **Displacement of Substantial Existing Housing – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would not result in the displacement of substantial existing housing units; therefore, it would not necessitate the construction of housing units elsewhere. This impact would be **less than significant**.*

This impact is similar to Impact 4.1-6a for the Preferred Plan. Although maximum buildout of the 2008 Draft General Plan may result in the displacement of existing dwelling units, the occurrence of such displacement would be rare. The 2008 Draft General Plan does not include any redevelopment areas and would not explicitly convert designated residential areas to nonresidential designations. Incidents of displacement would occur primarily as existing dwellings on agricultural land are displaced as the land is converted to a nonagricultural use. The number of dwelling units displaced by such conversions would be limited. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-7a **Displacement of Substantial Numbers of People – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would not result in the displacement of substantial numbers of people and therefore would not necessitate the construction of housing units elsewhere. This impact would be **less than significant**.*

As discussed in Impact 4.1-6a, it is possible that people would be displaced through implementation of the 2008 Draft General Plan. Conversion of Agriculture-designated land to other uses could result in the removal of existing dwelling units and thus result in the displacement of inhabitants. Although such displacement could occur, the number of dwelling units that would be removed would be quite low. Additionally, development that would result in the displacement of people or dwelling units would be subject to the California Relocation Law, and the County would be required to prepare a relocation plan, provide relocation payments, and identify substitute housing opportunities. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.1-7b **Displacement of Substantial Numbers of People – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would not result in the displacement of substantial numbers of people and therefore would not necessitate the construction of housing units elsewhere. This impact would be **less than significant**.*

Although it is possible that people would be displaced through implementation of the 2008 Draft General Plan, the number of dwelling units that would be removed would be low. Additionally, all development that results in the displacement of people or dwelling units would be subject to the California Relocation Law, and the County would be required to prepare a relocation plan, provide relocation payments, and identify substitute housing opportunities. For these reasons, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

4.1.4 RESIDUAL SIGNIFICANT IMPACTS

As described in Impacts 4.1-4a and 4.1-4b, implementation of the 2008 Draft General Plan would result in changes in land use type, density, and scale in existing agricultural areas and in areas adjacent to incorporated cities and unincorporated communities. The changes are likely to result in land use conflicts and incompatibilities. The 2008 Draft General Plan contains policies and programs to reduce incompatibilities, but the plan would not fully mitigate these impacts. Mitigation Measures 4.1-4a and 4.1-4b attempt to further minimize these impacts by amending Program AG.I-1 to have a farmland conversion mitigation ratio of 1.5:1 or greater. The increased ratio would help compensate for the adjacency impacts of the proposed nonagricultural uses. Although the mitigation measures would help reduce such impacts to an extent, the mitigation would not reduce the impacts to a less-than-significant level. For this reason, Impacts 4.1-4a and 4.1-4b would remain **significant and unavoidable**.

No feasible mitigation is available to reduce Impacts 4.1-5a and 4.1-5b. These impacts would remain **significant and unavoidable** without a reduction in acreage devoted to residential use, a decrease in residential densities to reduce the projected number of dwelling units, or the regulation of the number of residential building permits that may be issued annually. These potential mitigation measures could increase the cost of housing in Solano County, thereby conflicting with Objective C.1 and Policy C.1 of the 2008 Draft General Plan Housing Element, which promote the production of housing for all segments of the population at all income levels.

4.2 AIR QUALITY

This section includes a description of existing air quality conditions in Solano County, a summary of applicable regulations, and an analysis of potential air quality impacts of the 2008 Draft General Plan.

4.2.1 EXISTING CONDITIONS

Solano County is in a geographically unique situation because of its orientation across two air basins. Two air quality management agencies have purview over air quality considerations for these two portions of the county. The northeastern portion of Solano County lies within the Sacramento Valley Air Basin (SVAB). The SVAB also comprises all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties and the western portion of Placer County. The southwestern portion of Solano County is located in the San Francisco Bay Area Air Basin (SFBAAB), which also comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties and the southern portion of Sonoma County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

Sacramento Valley Air Basin

The SVAB is relatively flat, bordered by the north Coast Range to the west and the northern Sierra Nevada to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin Delta (Delta) from the SFBAAB.

The Mediterranean climate type of the SVAB is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50 degrees Fahrenheit (°F) to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November–February); the average winter temperature is a moderate 49°F. Characteristic of SVAB winters are periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dryland flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. The highest frequency of poor air movement occurs in the fall and winter when high-pressure cells are present over the SVAB. The lack of surface wind during these periods, combined with the reduced vertical flow because of less surface heating, reduces the influx of air and leads to the concentration of air pollutants under stable meteorological conditions. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

May–October is ozone season in the SVAB. This period is characterized by poor air movement in the mornings and the arrival of the Delta sea breeze from the southwest in the afternoons. Longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic gases (ROG) and oxides of

nitrogen (NO_x), which result in ozone formation. Typically, the Delta breeze transports air pollutants northward out of the SVAB; however, during about half of the days from July to September, a phenomenon known as the Schultz Eddy prevents this from occurring. Instead of allowing the prevailing wind patterns to move north, carrying pollutants out of the valley, the Schultz Eddy causes the wind pattern to shift southward and blow air pollutants back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the area and contributes to violations of the ambient air quality standards. The eddy normally dissipates around noon when the Delta sea breeze arrives.

Local meteorology of the eastern portion of Solano County is represented by measurements recorded at the Davis station. The normal annual precipitation is approximately 18 inches. January temperatures range from a normal minimum of 36°F to a normal maximum of 53°F. July temperatures range from a normal minimum of 55°F to a normal maximum of 93°F (NOAA 1992). The predominant wind direction and speed, measured at the Woodland station, is from the north-northwest at around 7 miles per hour (mph) (ARB 1994).

San Francisco Bay Area Air Basin

The SFBAAB is characterized by complex terrain consisting of the Coast Range, inland valleys, and bays, which distorts normal wind flow patterns. In this area the Coast Range splits, resulting in the western (Golden Gate) coast gap and the eastern (Carquinez Strait) coast gap. These gaps allow air to flow out of the SFBAAB. Air flows into Solano County through the Carquinez Strait, moving across the Delta and transporting pollution from the Bay Area. Regional flow patterns affect air quality patterns by moving pollutants downwind of sources. Localized meteorological conditions, such as moderate winds, disperse pollutants and reduce pollutant concentrations. An inversion layer develops when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground. During summer mornings and afternoons, these inversions are present over much of Solano County. During summer's longer daylight hours, plentiful sunshine provides the energy needed to fuel photochemical reactions between ROG and NO_x, resulting in ozone formation.

Local meteorology of the western portion of Solano County is represented by measurements recorded at the Fairfield station. The normal annual precipitation, which occurs primarily from November through March, is approximately 21 inches. January temperatures range from a normal minimum of 36°F to a normal maximum of 55°F. July temperatures range from a normal minimum of 55°F to a normal maximum of 88°F (NOAA 1992). The predominant wind direction and speed, measured at the Vallejo station, is from the southwest at around 7 mph (ARB 1994).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

Concentrations of criteria air-pollutant emissions are used as indicators of ambient air quality conditions. A brief description of each criteria air pollutant (source types, health effects, and future trends) is provided below along with the most current attainment area designations and monitoring data for Solano County.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not emitted directly into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_x in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_x are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere

(troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 part per million (ppm) for 1 or 2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in the respiratory system's responsiveness to challenges and the interference or inhibition of the immune system's ability to defend against infection (Godish 2004).

Emissions of ozone precursors ROG and NO_x have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SVAB and SFBAAB have declined overall by about 14% and 26%, respectively, during the last 20 years. Peak ozone values in the SVAB have not declined as rapidly over the last several years as they have in other urban areas. This can be attributed to the influx of pollutants into the SVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (ARB 2007).

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77% of the nationwide CO emissions are from mobile sources. The other 23% consist of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2008).

The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO tends to cause localized problems.

Nitrogen Dioxide

Nitrogen dioxide (NO₂) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO₂ are combustion devices, such as boilers, gas turbines, and mobile, and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO₂ (EPA 2008). The combined emissions of NO and NO₂ are referred to as NO_x, which are reported as equivalent NO₂. Because NO₂ is formed and depleted by reactions associated with photochemical smog (ozone), the NO₂ concentration in a particular geographical area may not be representative of the local NO_x emission sources.

Inhalation is the most common route of exposure to NO₂. Because NO₂ has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends

primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation, during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO₂ intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

Sulfur dioxide (SO₂) is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO₂ exposure pertain to the upper respiratory tract. SO₂ is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO₂ at 5 ppm or more. On contact with the moist mucous membranes, SO₂ produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO₂ concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM₁₀. PM₁₀ consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires, and natural windblown dust; and particulate matter formed in the atmosphere by condensation and/or transformation of SO₂ and ROG (EPA 2008). PM_{2.5} includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 microns or less (ARB 2007).

The adverse health effects associated with PM₁₀ depend on the specific composition of the particulate matter. For example, health effects may be associated with adsorption of metals, polycyclic aromatic hydrocarbons, and other toxic substances onto fine particulate matter (which is referred to as the “piggybacking effect”), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM₁₀ may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2008). PM_{2.5} poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health.

Direct emissions of both PM₁₀ and PM_{2.5} increased slightly in the SVAB and SFBAAB between 1975 and 2005 and are projected to increase through 2020. These emissions are dominated by areawide sources, primarily because of development. Direct emissions of particulate matter from mobile and stationary sources have remained relatively steady (ARB 2007).

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. Environmental Protection Agency (EPA) set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2008).

As a result of EPA’s regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector declined dramatically (95% between 1980 and 1999), and levels of lead in the air decreased by 94%

between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA 2008).

Lead emissions and ambient lead concentrations have decreased dramatically in California over the past 25 years. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent California Air Resources Board (ARB) regulations have eliminated virtually all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB has identified lead as a toxic air contaminant (TAC).

Monitoring-Station Data and Attainment-Area Designations

Concentrations of criteria air pollutants are measured at several monitoring stations in the SVAB and SFBAAB. The Vallejo–304 Tuolumne Street station is the only station within Solano County with recent data for ozone, CO, PM₁₀, and PM_{2.5}. In general, the ambient air quality measurements from this station are representative of the air quality in the vicinity of the county. Table 4.2-1 summarizes the air quality data from the most recent 3 years.

Table 4.2-1 Summary of Annual Ambient Air Quality Data (2004–2006)^a			
	2004	2005	2006
Ozone			
Maximum concentration (1-hour/8-hour average, ppm)	0.104/0.069	0.087/0.070	0.080/0.069
Number of days state standard exceeded (1-hour)	1	0	0
Number of days national 1-hour/8-hour standard exceeded	0/0	0/0	0/0
Carbon Monoxide			
Maximum concentration (8-hour average, ppm)	3.39	3.09	2.94
Number of days state standard exceeded	0	0	0
Number of days national standard exceeded	0	0	0
Fine Particulate Matter (PM_{2.5})			
Maximum concentration (µg/m ³)	39.7	43.8	44.0
Number of days national standard exceeded (measured ^b)	0	0	0
Respirable Particulate Matter (PM₁₀)			
Maximum concentration (µg/m ³)	51.4	52.3	50.1
Number of days state standard exceeded (measured ^b)	1	1	0
Number of days national standard exceeded (measured ^b)	0	0	0
Notes: µg/m ³ = micrograms per cubic meter; PM _{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM ₁₀ = particulate matter less than or equal to 10 microns in diameter; ppm = parts per million ^a Measurements from the Vallejo–304 Tuolumne Street station. 2007 data were not yet available at the time this EIR analysis was written. ^b Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year. Sources: ARB 2008a, 2008b			

Both ARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are “nonattainment,” “attainment,” and “unclassified.” The unclassified designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called “nonattainment-transitional.” The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. State attainment designations for the year 2004 and national attainment designations for the year 2006 for both the eastern and western portions of Solano County are shown in Table 4.2-2 for each criteria air pollutant. If the designation for each jurisdiction is the same for a given pollutant, the designation is listed once.

Emission Sources

Sources of criteria air pollutant emissions in Solano County include stationary, area, and mobile sources. According to the 2006 emissions inventory (Exhibit 4.2-1) for the county, the majority of ROG and NO_x emissions are attributable to mobile sources, while areawide sources are the greatest contributor of particulate-matter emissions (ARB 2008c).

Stationary Sources

Major stationary sources of air pollutant emissions within the county include industrial processes, fuel combustion from electric utilities and other processes, waste disposal, surface coating and cleaning, petroleum production, and other sources. Local air districts issue permits to various types of stationary sources, which must demonstrate implementation of best available control technologies (BACT).

Areawide Sources

Areawide sources of emissions include consumer products, application of architectural coatings, residential fuel combustion, farming operations, construction and demolition, road dust, fugitive dust, landscaping, fires, and other miscellaneous sources. Paved road dust is the largest contributor to particulate matter emissions within the county.

Mobile Sources

On-road and other mobile sources are the largest contributors of ozone precursor emissions within the county. On-road sources consist of passenger vehicles, trucks, buses, and motorcycles, while off-road vehicles and other mobile sources comprise heavy-duty equipment, boats, aircraft, trains, recreational vehicles, and farm equipment. Major roadways in Solano County include Interstate 80 (I-80), I-680, I-780, and I-505. Major state routes include State Route (SR) 12, SR 113, SR 29, and SR 37.

EXISTING AIR QUALITY—TOXIC AIR CONTAMINANTS

TACs are air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at low concentrations. According to the *2007 California Almanac of Emissions and Air Quality* (ARB 2007), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal-combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, no

Table 4.2-2 Ambient Air Quality Standards and Designations						
Pollutant	Averaging Time	California		National Standards ^a		
		Standards ^{b, c}	Attainment Status (YSAQMD / BAAQMD)	Primary ^{c, e}	Secondary ^{c, f}	Attainment Status (YSAQMD/BAAQMD) ^g
Ozone	1-hour	0.09 ppm (180 µg/m ³)	N (Serious)/N (Serious)	– ^h	Same as Primary Standard	– ^h
	8-hour	0.070 ppm (137 µg/m ³)	–	0.08 ppm (157 µg/m ³)		N/N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	A/A	35 ppm (40 mg/m ³)	–	U/A
	8-hour	9 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (56 µg/m ³)	–	0.053 ppm (100 µg/m ³)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (338 µg/m ³)	A/A	–		–
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m ³)	–	U/A
	24-hour	0.04 ppm (105 µg/m ³)	A/A	0.14 ppm (365 µg/m ³)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m ³)	
	1-hour	0.25 ppm (655 µg/m ³)	A/A	–	–	–
Respirable Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	20 µg/m ³	N/N	– ^h	Same as Primary Standard	U/U
	24-hour	50 µg/m ³		150 µg/m ³		
Fine Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	12 µg/m ³	U/N	15 µg/m ³	Same as Primary Standard	U/A
	24-hour	–	–	35 µg/m ³		
Lead ⁱ	30-day Average	1.5 µg/m ³	A/A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m ³	Same as Primary Standard	–
Sulfates	24-hour	25 µg/m ³	A/A	No National Standards		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)	U/U			
Vinyl Chloride ⁱ	24-hour	0.01 ppm (26 µg/m ³)	–			

**Table 4.2-2
Ambient Air Quality Standards and Designations**

Pollutant	Averaging Time	California		National Standards ^a		
		Standards ^{b,c}	Attainment Status (YSAQMD / BAAQMD)	Primary ^{c,e}	Secondary ^{c,f}	Attainment Status (YSAQMD/BAAQMD) ^g
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U/U			

Notes:

BAAQMD = Bay Area Air Quality Management District; $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; ppm = parts per million; YSAQMD = Yolo/Solano Air Quality Management District

^a National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $\text{PM}_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

^b California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2 , particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^c Concentration expressed first in units in which it was promulgated (i.e., parts per million [ppm] or micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]). Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d Unclassified (U): A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment (A): A pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment (N): A pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.

Nonattainment/Transitional (NT): A subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

^e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

^f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^g Nonattainment (N): Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

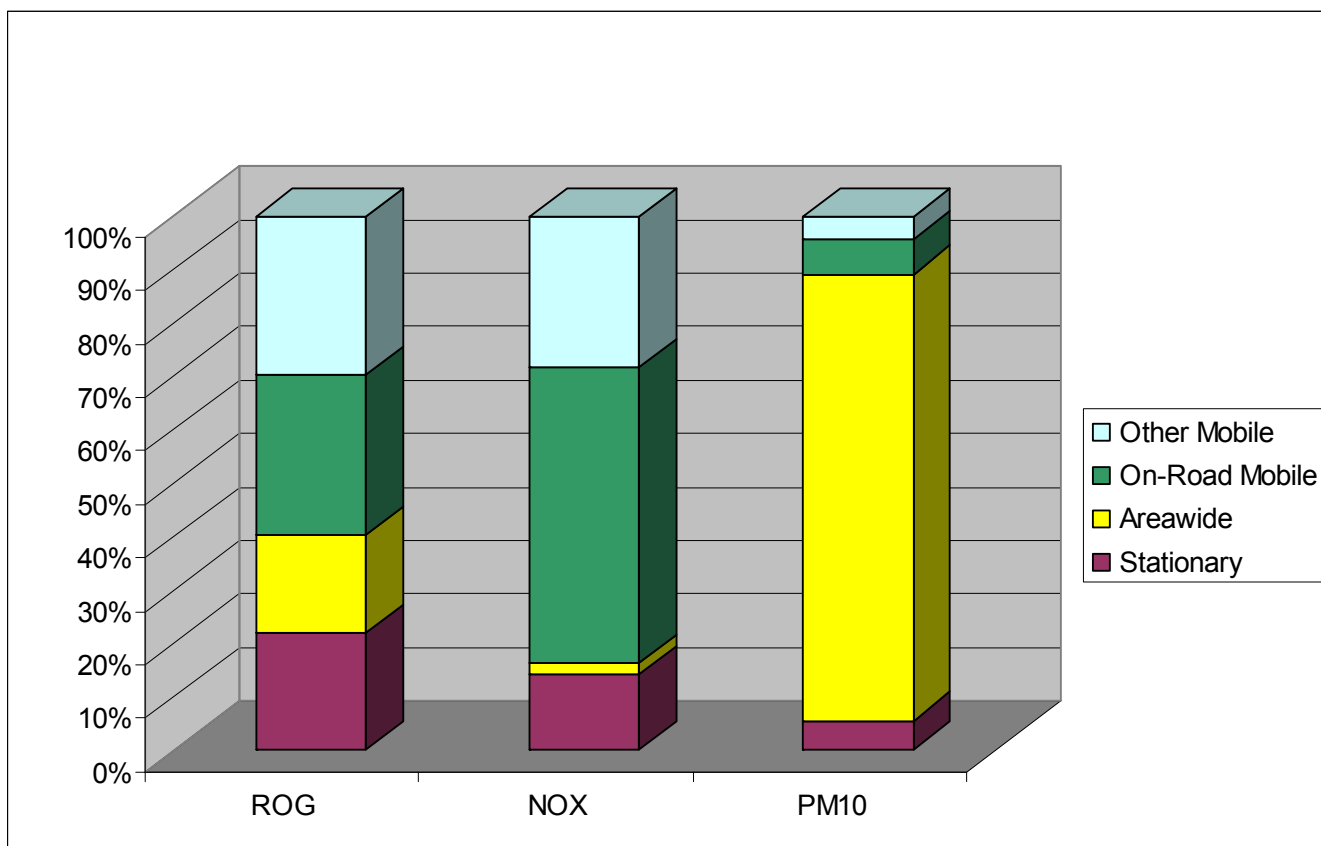
Attainment (A): Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

^h The 1-hour ozone national ambient air quality standard (NAAQS) was revoked on June 15, 2005, and the annual PM_{10} NAAQS was revoked in 2006.

ⁱ The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for this pollutant.

Sources: ARB 2008a, 2008b



¹ On-road sources include automobiles, motorcycles, and trucks; other mobile sources (off-road mobile sources) include small off-road engines and equipment, off-road recreational vehicles, farm and construction equipment, forklifts, locomotives, commercial marine vessels, and marine pleasure craft. Stationary sources include nonmobile sources such as power plants, refineries, and manufacturing facilities. Areawide sources of pollution are those where the emissions are spread over a wide area, such as consumer products, fireplaces, road dust, and farming operations. Natural sources are nonhuman-made emission sources, which include biological and geological sources, wildfires, windblown dust, and biogenic emissions from plants and trees.

Source: ARB 2008c

Solano County 2006 Emissions Inventory— Relative Contributions from Emission Sources¹

Exhibit 4.2-1

ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM₁₀ database, ambient PM₁₀ monitoring data, and the results from several studies on chemical speciation to estimate concentrations of diesel PM. Of the TACs for which data are available in California, diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risks.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Based on receptor modeling techniques, ARB estimated its health risk to be 360 excess cancer cases per million people in the SVAB and 480 excess cases in the SFBAAB. Since 1990, the health risk associated with diesel PM has been reduced by 52% in the SVAB and by 36% in the SFBAAB. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (ARB 2007).

Area sources of TAC emissions in Solano County include Travis Air Force Base (associated with jet fuel) and the Western Electric railyard located along the Sacramento Northern Rail Road line between Rio Vista and Fairfield.

In addition, please refer to the existing *Solano County General Plan's* (General Plan's) land use diagram (Exhibit 5-1 in Chapter 5, "Alternatives to the Proposed Project") for areas currently designated as industrial (i.e., areas most likely to be stationary sources of emissions).

Sensitive Land Uses

Sensitive land uses or sensitive receptors are people or facilities that generally house people (e.g., schools, hospitals, residences) that may experience adverse effects from unhealthful concentrations of air pollutants. There are numerous types of these receptors throughout Solano County, particularly concentrated near populated areas. Please refer to the existing General Plan's land use diagram (Exhibit 5-1 in Chapter 5 of this EIR) for areas currently designated as residential and public (i.e., areas most likely to be sensitive land uses).

EXISTING AIR QUALITY—ODORS

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast food restaurant) may be perfectly acceptable to another. Unfamiliar odors are more easily detected than familiar odors and are more likely to cause complaints. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition occurs only with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the intensity of the odor weakens and eventually becomes so low that detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Land uses in Solano County that constitute odor sources include agricultural land uses, confined animal facilities, wastewater treatment facilities, landfills, and composting facilities. Wastewater treatment facilities and landfills are described in Section 4.9, "Public Services and Utilities," of this EIR. There are three commercial composting facilities in Solano County. These are regulated by the California Integrated Waste Management Board. More information is available at www.ciwmb.ca.gov/Foodwaste/Compost/Facility.htm.

4.2.2 REGULATORY FRAMEWORK

Air quality in Solano County is regulated by EPA, ARB, the Yolo/Solano Air Quality Management District (YSAQMD), and the Bay Area Air Quality Management District (BAAQMD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

CRITERIA AIR POLLUTANTS

Air quality regulations focus on ozone, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead. Because these are the most prevalent air pollutants known to be deleterious to human health, and extensive health-effects criteria documents are available, these pollutants are commonly referred to as “criteria air pollutants.”

Federal Plans, Policies, Regulations, and Laws

At the federal level, EPA has been charged with implementing national air quality programs. EPA’s air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments to the CAA were made by Congress in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 4.2-2, EPA has established primary and secondary NAAQS for ozone, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead. The primary standards protect the public health, while the secondary standards protect the public welfare. The CAA also required each state to prepare an air quality control plan, referred to as a state implementation plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and to determine whether implementing the SIPs will achieve air quality goals. If EPA determines a SIP to be inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary sources of air pollution in the air basin.

State Plans, Policies, Regulations, and Laws

ARB is responsible for coordination and oversight of state and local air pollution control programs in California and for implementation of the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 4.2-2). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained through interpretation of the health-effects studies considered during the standard-setting process. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires all local air districts in the state to endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts shall focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Among ARB’s other responsibilities are overseeing compliance by local air districts with California and federal laws; approving local air quality plans, submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Regional and Local Plans, Policies, Regulations, and Ordinances

YSAQMD attains and maintains air quality conditions in the northeastern portion of Solano County and BAAQMD does so in the southwestern portion of Solano County, through comprehensive programs of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of YSAQMD and BAAQMD involves the preparation of plans and programs for the attainment of ambient-air-quality standards, adoption and enforcement of rules and regulations, and issuance of permits for

stationary sources. The districts also inspect stationary sources, respond to citizen complaints, monitor ambient air quality and meteorological conditions, and implement other programs and regulations required by the CAA, CAAA, and CCAA. (See Exhibit 4.2-2.)

Yolo/Solano Air Quality Management District

In 2007, YSAQMD released a revision to the previously adopted guidelines document for assessment and mitigation of air quality impacts under CEQA. This revised handbook (YSAQMD 2007) is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains the following applicable components:

- ▶ criteria and thresholds for determining whether a project may have a significant adverse impact on air quality,
- ▶ specific procedures and modeling protocols for quantifying and analyzing impacts on air quality,
- ▶ methods available to mitigate impacts on air quality, and
- ▶ information for use in air quality assessments that will be updated more frequently, such as air quality data, regulatory setting, climate, and topography.

All projects in the northeastern portion of Solano County are subject to YSAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the 2008 Draft General Plan may include but are not limited to the following:

- ▶ Rule 2-5: Nuisance
- ▶ Rule 2-9: Open Burning
- ▶ Rule 2-11: Particulate Matter
- ▶ Rule 2-14: Architectural Coatings
- ▶ Rule 2-28: Cutback and Emulsified Asphalt
- ▶ Rule 2-40: Wood Burning Appliances
- ▶ Rule 3-1: General Permit Requirements
- ▶ Rule 9-9: Asbestos

Air Quality Plans

YSAQMD in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Sacramento, and Sutter Counties prepared and submitted the 1991 *Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM₁₀. The CCAA also requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved through the use of control measures. As part of the assessment, the AQAP must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections.

The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 *Ozone Attainment Plan* (OAP). The OAP stresses attainment of ozone standards and focuses on strategies for reducing emissions of the ozone precursors ROG and NO_x. It promotes active public involvement, enforcement of compliance with YSAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of control measures for stationary and mobile sources. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time, the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of “severe



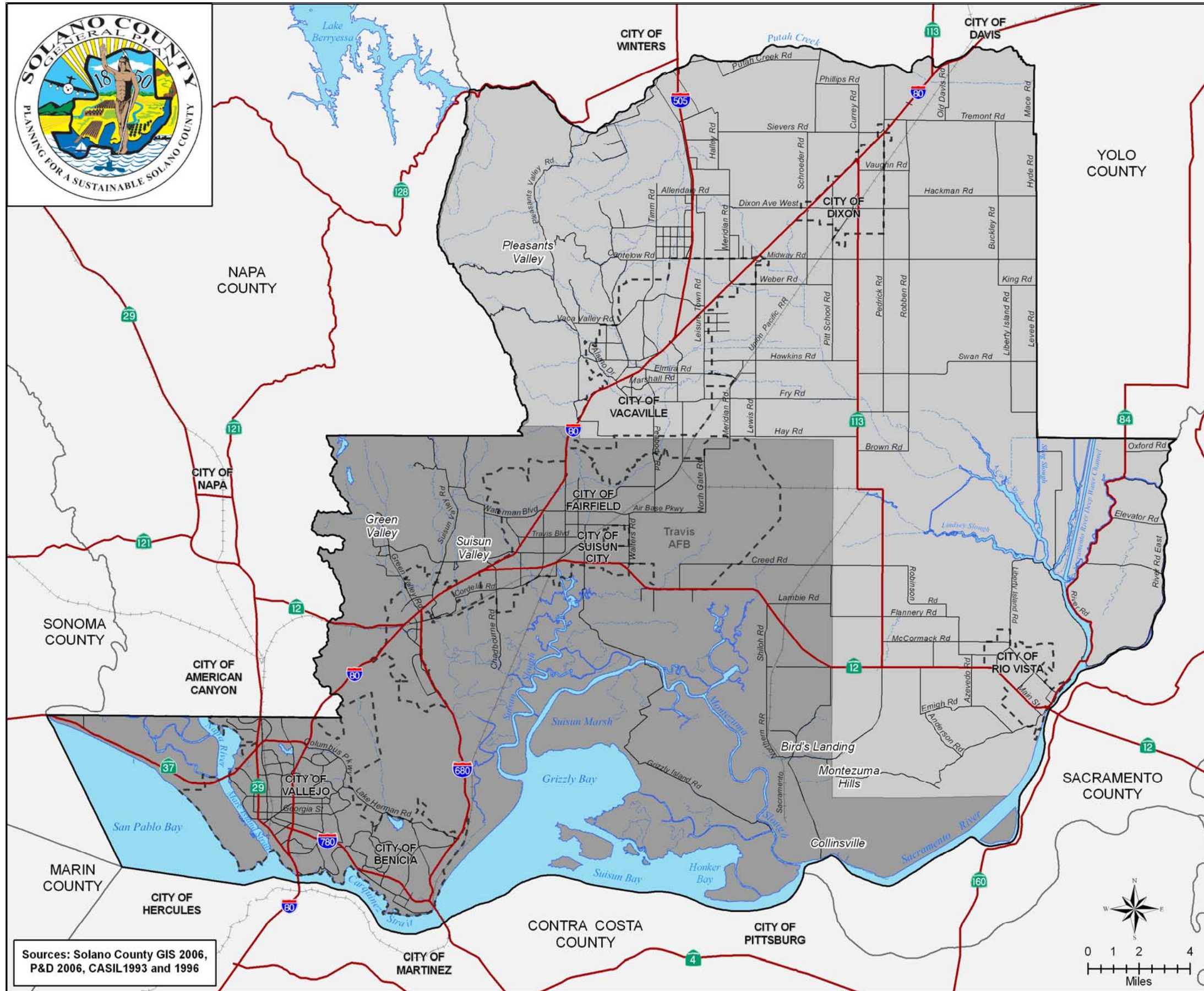
Solano County General Plan EIR

Exhibit 4.2-2

Air Quality Management District Jurisdictions

Legend

- Bay Area Air Quality Management District
- Yolo-Solano Air Quality Management District
- Basemap Layers**
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties



Sources: Solano County GIS 2006, P&D 2006, CASIL 1993 and 1996

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nonattainment” coupled with additional emissions requirements for stationary sources. Additional triennial reports that act as incremental updates were also prepared in 1997, 2000, and 2003 in compliance with the CCAA.

As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, 2002, and 2006. These milestone reports include compliance demonstrations that the requirements have been met for the Sacramento nonattainment area. The AQAPs and reports present comprehensive strategies to reduce ROG, NO_x, and PM₁₀ emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect-source review program; adoption of local air quality plans; and control measures for stationary, mobile, and indirect sources.

In July 1997, EPA promulgated a new 8-hour ozone standard. This change lowered the standard for ambient ozone from 0.12 ppm averaged over 1 hour to 0.08 ppm averaged over 8 hours. In general, the 8-hour standard is more protective of public health and more stringent than the 1-hour standard. The promulgation of this standard prompted new designations and nonattainment classifications in June 2004 and resulted in the revocation of the 1-hour standard in June 2005. The region has been designated as a nonattainment (serious) area for the national (8-hour) ozone standard with an attainment deadline of June 2013.

Transportation Conformity

Transportation conformity is the federal regulatory procedure for linking and coordinating the transportation and air quality planning processes. Conformity provisions require that federal funding and approvals be given only to those transportation plans and projects that are consistent with air quality goals specified in the SIP. Conformity with the SIP means that emissions from transportation activities are at or below the motor vehicle emission budgets established in the SIP.

The region’s transportation plan must conform with the SIP and show that implementation will not harm the region’s chances of attaining the ozone standard. Transportation conformity budgets were included in the Sacramento region’s 8-hour ozone rate-of-progress plan for 2008. These motor vehicle emissions were based on ARB’s improved emission factors and the travel activity projections prepared by the Sacramento Area Council of Governments.

In the March 14, 2006, *Federal Register*, EPA found that the motor vehicle emissions budgets for 2008 were determined to be adequate for transportation conformity purposes by EPA. The Sacramento Area Council of Governments was able to demonstrate that the 2006 *Metropolitan Transportation Plan (MTP)* and the 2006/08 Metropolitan Transportation Improvement Program for the Sacramento region were below the 2008 budgets. (SMAQMD 2008.) Thus, emissions associated with activity assumptions contained in the applicable transportation plan to eastern Solano County were found to conform to those in the SIP.

Bay Area Air Quality Management District

In December 1999, BAAQMD released a revision to the previously adopted guidelines document, which serves the same function and contains similar components as the YSAQMD guidance document discussed above.

All projects in the southwestern portion of Solano County are subject to BAAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the 2008 Draft General Plan may include but are not limited to the following:

- ▶ Regulation 2, Rule 1: General Permit Requirements
- ▶ Regulation 6: Particulate Matter and Visible Emissions
- ▶ Regulation 7: Odorous Substances
- ▶ Regulation 8, Rule 3: Architectural Coatings
- ▶ Regulation 8, Rule 15: Emulsified Asphalt

- ▶ Regulation 11, Rule 2: Asbestos
- ▶ Regulation 13: Trip Reduction Requirements for Large Employers

BAAQMD prepares OAPs for the national ozone standard and clean air plans (CAPs) for the California standard both in coordination with the Metropolitan Transportation Commission and the Association of Bay Area Governments. Past plans include the 2001 OAP and the 2000 CAP. The 2001 OAP is a revision to the Bay Area part of the SIP and was prepared in response to EPA's partial disapproval of the 1999 OAP. The 2001 OAP for the national 1-hour ozone standard includes two commitments for further planning: (1) Conduct a midcourse review of progress toward attaining the national 1-hour ozone standard by December 2003; and (2) provide a revised ozone attainment strategy to EPA by April 2004.

The 2000 CAP was adopted by BAAQMD on December 20, 2000, and was then submitted to ARB. The CCAA requires BAAQMD to update the CAP for attaining the state 1-hour ozone standard every 3 years. The 2000 CAP is the third triennial update of BAAQMD's original 1991 CAP. The 2000 CAP includes a control strategy review to ensure that the CAP includes all feasible measures to reduce ozone, updates to the emissions inventory, estimates of emission reductions, and assessments of air quality trends.

In July 2003, EPA proposed an interim final determination that the 2001 OAP corrected the deficiencies of the 1999 plan and proposed approval of the 2001 OAP. After 3 years of low ozone levels (2001, 2002, and 2003), in October 2003, EPA proposed a finding that the SFBAAB had attained the national 1-hour standard and that certain elements of the 2001 OAP (attainment demonstration, contingency measures, and reasonable further progress) were no longer required. In April 2004, EPA made final the finding that the SFBAAB had attained the 1-hour standard and approved the remaining applicable elements of the 2001 OAP: emission inventory, control measure commitments, motor vehicle emission budgets, reasonably available control measures, and commitments to further study measures. However, as part of a transition from the national 1-hour standard to an 8-hour standard, the 1-hour standard was revoked on June 15, 2005, and is no longer applicable (BAAQMD 2008).

The 8-hour standard took effect in June 2004. In April 2004, EPA designated regions for the new national 8-hour standard and these designations took effect on June 15, 2004. EPA formally designated the SFBAAB as a nonattainment area for the national 8-hour ozone standard and classified the region as "marginal" according to five classes of nonattainment areas for ozone ranging from marginal to extreme. Compliance with the standard is determined at each monitoring station using an average of the fourth highest ozone reading for 3 years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. Monitoring data for the San Martin station for the years 2001, 2002, and 2003 show an average of the fourth highest ozone values of 86 parts per billion (1 part per billion above the standard), hence the Bay Area's "marginal" nonattainment classification. Marginal nonattainment areas were required to attain the national 8-hour ozone standard by June 15, 2007. The results have not yet been released.

Although certain elements of Phase 1 of the 8-hour implementation rule are still undergoing legal challenge, EPA signed Phase 2 of the 8-hour implementation rule on November 9, 2005. It is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the 8-hour standard (BAAQMD 2008).

However, there is still a need for continued improvement to meet the state 1-hour ozone standard. Accordingly, BAAQMD prepared the *Bay Area 2005 Ozone Strategy*, which is a road map showing how the SFBAAB will achieve compliance with the state 1-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The strategy, which was adopted by BAAQMD's board of directors on January 4, 2006, describes how the SFBAAB will fulfill the CCAA planning requirements for the state 1-hour ozone standard and transport mitigation requirements through the proposed control strategy. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the Metropolitan Transportation Commission, local governments, transit agencies, and others.

BAAQMD will continue to adopt regulations, implement programs, and work cooperatively with other agencies, organizations, and the public on a wide variety of strategies to improve air quality in the region and reduce transport to neighboring air basins.

The *Bay Area 2005 Ozone Strategy* explains how the SFBAAB plans to achieve these goals with respect to ozone. It also discusses related air quality issues of interest: the public involvement process, climate change, fine particulate matter, BAAQMD's Community Air Risk Evaluation program, local benefits of ozone control measures, the environmental review process, national ozone standards, and photochemical modeling.

Overall, the *Bay Area 2005 Ozone Strategy* is a comprehensive document that describes the SFBAAB's strategy for compliance with planning requirements associated with the state 1-hour ozone standard, and is a significant component of the region's commitment to achieving clean air to protect the public's health and the environment (BAAQMD 2008).

TOXIC AIR CONTAMINANTS

Air quality regulations also focus on TACs, or in federal parlance hazardous air pollutants (HAPs). Examples of TACs are discussed in detail in Section 4.2.1, "Existing conditions," under "Existing Air Quality—Toxic Air Contaminants." In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no safe level of exposure. This contrasts with the criteria air pollutants, for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 4.2-2). Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by the districts, establish the regulatory framework for TACs.

Federal Programs for Hazardous Air Pollutants

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAAA also required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State and Local Programs for Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Chapter 1047, Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a

substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Once a TAC is identified, ARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions.

The Air Toxics Hot Spots Information and Assessment Act requires existing facilities emitting toxic substances above a specified level to prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel-exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public-transit bus fleet rule and emissions standards for new urban buses. These new rules and standards provide (1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines, (2) zero-emission bus demonstration and purchase requirements applicable to transit agencies, and (3) reporting requirements under which transit agencies must demonstrate compliance with the public-transit bus fleet rule. New milestones include the low-sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than current vehicles. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade, and they will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's risk reduction plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

ARB published the *Air Quality and Land Use Handbook: A Community Health Perspective*, which provides guidance concerning land use compatibility with TAC sources (ARB 2005). Although it is not a law or adopted policy, the handbook offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help keep children and other sensitive populations out of harm's way. A number of comments on the handbook were provided to ARB by air districts, other agencies, real estate representatives, and others. The comments included concern about whether ARB was playing a role in local land use planning, the validity of relying on static air quality conditions over the next several decades in light of technological improvements, and support for providing information that can be used in local decision making.

At the local level, air pollution control or air quality management districts may adopt and enforce ARB control measures. Under YSAQMD Rule 3-1 ("General Permit Requirements"), Rule 3-4 ("New Source Review"), and Rule 3-8 ("Federal Operating Permit"), all sources that possess the potential to emit TACs are required to obtain permits from the district. Similarly, permits under BAAQMD Regulation 2 ("Permits") may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source-review standards and air toxics control measures. YSAQMD and BAAQMD limit emissions and public exposure to TACs through a number of programs and prioritize TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

ODORS

BAAQMD and YSAQMD have identified some common types of facilities that have been known to produce odors: wastewater treatment facilities, chemical manufacturing plants, painting/coating operations, feed lots/dairies, composting facilities, landfills, and transfer stations. Because offensive odors rarely cause any physical harm and no requirements for their control are included in federal or state air quality regulations, neither BAAQMD nor YSAQMD has rules or standards related to odor emissions other than the respective nuisance rules (Regulation 7 and Rule 2-5). Any actions related to odors are based on citizen complaints to local governments and the respective AQMD.

Two situations increase the potential for odor problems. The first occurs when a new odor source is located near existing sensitive receptors. The second occurs when new sensitive receptors are developed near existing sources of odor. In the first situation, YSAQMD and BAAQMD recommend operational changes, add-on controls, process changes, or buffer zones where feasible to address odor complaints. In the second situation, the potential conflict is considered significant if the project site is at least as close as any other site that has already experienced significant odor problems related to the odor source. For projects locating near a source of odors where there is no nearby development that may have filed complaints, and for odor sources locating near existing sensitive receptors, YSAQMD and BAAQMD recommend that the determination of potential conflict be based on the distance and frequency at which odor complaints from the public have occurred in the vicinity of a similar facility (YSAQMD 2007, BAAQMD 1999).

YSAQMD's and BAAQMD's nuisance rules (Rule 2-5 and Regulation 7, respectively) address odor exposure in their respective jurisdictions. Both rules similarly state that no person shall discharge from any source whatsoever such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons, or to the public; that endanger the comfort, repose, health, or safety of any such persons, or the public; or that cause or have a natural tendency to cause injury or damage to business or property.

4.2.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Regional and local emissions of criteria air pollutants and precursors, odors, and TACs during project construction and operations consistent with the 2008 Draft General Plan were assessed in accordance with the methodologies described below.

Construction-related emissions of criteria air pollutants (e.g., PM₁₀) and ozone precursors (ROG and NO_x) were assessed in accordance with methodologies recommended by ARB, BAAQMD, and YSAQMD. Where quantification was required, emissions were modeled using the URBEMIS 2007 Version 9.2.4 computer model (ARB 2008d). Project-specific data (e.g., construction equipment types and number requirements, and maximum daily acreage disturbed) were not available at the level of the 2008 Draft General Plan for modeling purposes. Modeled construction-related emissions were compared with applicable BAAQMD and YSAQMD thresholds to determine significance.

Regional operational emissions of criteria air pollutants and precursors (e.g., mobile and area sources) were also quantified using the URBEMIS 2007 Version 9.2.4 computer model (ARB 2008d). Modeling was based on buildout assumptions in the 2008 Draft General Plan and information about vehicle trip generation from the traffic analysis prepared for this project (see Section 4.4, "Transportation and Circulation," in this EIR).

Other air quality impacts (i.e., local emissions of CO, odors, and operation-related TACs) were assessed in accordance with methodologies recommended by ARB, BAAQMD, and YSAQMD.

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, the following thresholds of significance, as identified by the State CEQA Guidelines (Appendix G), BAAQMD, and YSAQMD have been used to determine whether implementation of the 2008 Draft General Plan would result in significant air quality impacts.

Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if the proposed project would:

- ▶ conflict with or obstruct implementation of the applicable air quality plan,
- ▶ violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- ▶ result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions that exceed quantitative thresholds for ozone precursors),
- ▶ expose sensitive receptors to substantial pollutant concentrations, or
- ▶ create objectionable odors affecting a substantial number of people.

As stated in Appendix G, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. Thus, according to BAAQMD, an air quality impact is considered significant if the proposed project would:

- ▶ violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations (80 lb/day of ROG, NO_x, or PM₁₀);
- ▶ conflict with adopted environmental plans or goals of the community where it is located;
- ▶ create a potential public health hazard or involve the use, production, or disposal of materials that pose a hazard to people or animal or plant populations in the area affected;
- ▶ have a substantial, demonstrable negative aesthetic effect.
- ▶ create objectionable odors:or
- ▶ alter air movement, moisture, or temperature, or change in climate, either locally or regionally.

BAAQMD has developed guidelines and thresholds of significance for local plans. Inconsistency with the most recently adopted CAP is considered a significant impact. According to BAAQMD, all of the following criteria must be satisfied for a local plan to be found consistent with the CAP and thus not result in a significant air quality impact:

- ▶ The local plan is consistent with the CAP's assumptions about population and VMT. This is demonstrated if the population growth over the planning period would not exceed the values included in the current CAP and the rate of increase in VMT is equal to or lower than the rate of increase in population.
- ▶ The local plan demonstrates reasonable efforts to implement the transportation control measures included in the CAP that identify cities (local agencies) as implementing agencies.

- ▶ Buffer zones are established around existing and proposed land uses that would emit odors or TACs. Establishment of buffer zones to avoid odor and TAC impacts must be reflected in the local plan's policies, land use maps, and implementing ordinances.

YSAQMD's significance criteria for air quality impacts are identical to those of Appendix G of the State CEQA Guidelines, as listed above. An air quality impact is considered significant if it would:

- ▶ conflict with or obstruct implementation of the applicable air quality plan;
- ▶ violate any air quality standard or contribute substantially to an existing or projected air quality violation (10 TPY of ROG, NO_x, 80 lb/day of PM₁₀);
- ▶ result in a cumulatively considerable net increase of any criteria pollutant for which the project is nonattainment under applicable federal or state ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- ▶ expose sensitive receptors to substantial pollutant concentrations; or
- ▶ create objectionable odors affecting a substantial number of people.

YSAQMD has developed guidelines and thresholds of significance for local plans. Among these criteria, inconsistency with the most recently adopted CAP is considered a significant impact. According to YSAQMD, a local plan must satisfy all of the following criteria to be found consistent with the CAP and thus not result in a significant air quality impact:

- ▶ The local plan is consistent with AQAP and SIP population and vehicle use projections.
- ▶ AQAP and SIP transportation control measures are implemented in the plan.
- ▶ Buffer zones are established around sources of odors and TACs.

IMPACT ANALYSIS

IMPACT 4.2-1a **Generation of Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors – Preferred Plan.** *Emissions of ROG and NO_x during construction consistent with the 2008 Draft General Plan under the Preferred Plan would exceed BAAQMD's significance threshold of 80 lb/day and YSAQMD's significance threshold of 10 TPY for ROG and NO_x and 80 lb/day for PM₁₀. In addition, control measures recommended by BAAQMD and YSAQMD for construction-related emissions of PM₁₀ are not currently required, nor are they projected to be required. Thus, under the Preferred Plan, construction-related emissions of criteria air pollutants and precursors could violate an ambient air quality standard, contribute substantially to an existing or predicted air quality violation, and/or expose sensitive receptors to substantial pollutants. As a result, this impact would be **significant**.*

Construction-related emissions are described as short term or temporary in duration and have the potential to represent a significant impact with respect to air quality. Buildout of the 2008 Draft General Plan is dependent on individual household decisions, employment opportunities, provision of services for housing and supporting commercial uses, land use decisions of the County and other public agencies, regional transportation planning decisions, the decisions of financial institutions related to development projects, and many other factors that are often grouped together under the moniker "the market."

Planned phasing of buildout of the 2008 Draft General Plan will be reviewed in relation to residential uses, revenue-generating employment uses, housing affordability, provision and financing of infrastructure and public facilities, mechanisms for funding of ongoing service needs, and overall coordination of phase improvements with previous and subsequent phases. Subsequent implementation projects and plans would continue to define phasing

at a detailed level and be reviewed by the County to ensure that development occurs in a logical manner consistent with policies in the 2008 Draft General Plan, and that additional environmental review is conducted under CEQA, as needed.

Construction-related activities would result in emissions of criteria air pollutants (e.g., PM₁₀) and precursors (e.g., ROG and NO_x) from site preparation (e.g., excavation, grading, and clearing); exhaust from off-road equipment, material delivery vehicles, and worker commute vehicles; vehicle travel on paved and unpaved roads; and other miscellaneous activities (e.g., building construction, asphalt paving, application of architectural coatings, and trenching for utility installation).

Emissions of Ozone Precursors

Emissions of ozone precursors are associated primarily with exhaust from off-road construction equipment. Worker commute trips and other construction-related activities also contribute to short-term increases in such emissions.

Construction-related emissions of ROG and NO_x were modeled using the ARB-approved URBEMIS 2007 Version 9.2.4 computer program (ARB 2008d). URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Detailed phasing and construction information (e.g., construction equipment type and number requirements, maximum daily acreage disturbed, number of workers, hours of operation) is not possible to determine at the level of the 2008 Draft General Plan.

Modeling was performed assuming a 20-year planning horizon. It is assumed that 1/20 or roughly 5% of the proposed uses would be constructed during any given year over a 20-year time frame. Modeling was conducted for the year 2010 because this is assumed to be the earliest possible year during which construction could occur. If construction would not occur until future years, emission factors associated with off-road construction equipment would be lower because of the regulatory trend of stricter equipment emissions by the state and the implementation of more stringent emissions standards. As older models of equipment are replaced by newer models with cleaner engines, fleetwide emission factors decrease.

Table 4.2-3 summarizes the estimated construction-related emissions of criteria air pollutants and ozone precursors from site preparation (e.g., grading) and building construction activities for buildout of the 2008 Draft General Plan. Construction-related air quality effects were determined by comparing these modeling results with applicable BAAQMD and YSAQMD significance thresholds. Refer to Appendix B for detailed modeling input parameters and results.

As depicted in Table 4.2-3, construction-related activities associated with the buildout of the worst-reasonable-case year (2010) would result in annual unmitigated emissions of approximately 92 TPY (1,165 lb/day) of ROG, 133 TPY (1,018 lb/day) of NO_x, and 36 TPY (2,712 lb/day) of PM₁₀.

Based on the modeling conducted, construction-related activities would result in emissions of ROG, NO_x, and PM₁₀ that exceed BAAQMD's and YSAQMD's significance thresholds. Thus, construction-related emissions of ozone precursors could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

**Table 4.2-3
Summary of Modeled Construction-Related Annual Exhaust Emissions
of Criteria Air Pollutants and Precursors—5% of Buildout of the 2008 Draft General Plan
under the Preferred Plan in the Worst-Case Year (2010)**

	Emissions (lb/day / TPY)		
	ROG	NO _x	PM ₁₀
Phase 1—Site Preparation¹			
Grading	14.5/0.2	127.9/1.3	2,711.9
Phase 2—Building Construction			
Building Construction	103.3/14.8	957.5/124.8	47.2
Asphalt Paving	5.0/0.6	24.0/2.9	1.9
Architectural Coatings	1,052.7/75.8	0.8/0.1	0.1
Trenching	4.2/0.5	35.5/4.3	1.8
Total Unmitigated Maximum Emissions per Phase	1,165.2 lb/day/ 91.7 TPY	1,017.8 lb/day/ 132.1 TPY	2,711.9 lb/day
BAAQMD Significance Threshold	80 lb/day	80 lb/day	80 lb/day
YSAQMD Significance Threshold	10 TPY	10 TPY	80 lb/day
Notes: lb/day = pounds per day; NO _x = oxides of nitrogen; PM ₁₀ = particulate matter less than or equal to 10 microns in diameter; ROG = reactive organic gases; TPY = tons per year; YSAQMD = Yolo/Solano Air Quality Management District ¹ No emissions were modeled for demolition activities. Existing land uses to be demolished are unknown at this time. Refer to Appendix B for detailed input parameters and modeling results. Source: Modeling performed by EDAW in 2008			

Emissions of Fugitive PM₁₀ Dust

Emissions of fugitive PM dust (e.g., PM₁₀ and PM_{2.5}) are associated primarily with ground disturbance activities during site preparation (e.g., grading) and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT on- and off-site. Exhaust emissions from diesel equipment and worker commute trips also contribute to short-term increases in PM₁₀ emissions, but to a much lesser extent (see Table 4.2-3).

Construction-related activities would result primarily in project-generated emissions of fugitive PM₁₀ dust from site preparation (e.g., excavation, grading, and clearing). BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions (BAAQMD 1999). YSAQMD's approach is to quantify actual pounds per day of dust generated by project construction with URBEMIS. YSAQMD also recommends that projects not exceeding district PM thresholds implement best management practices to reduce dust emissions and avoid localized health impacts (YSAQMD 2007).

BAAQMD- and YSAQMD-recommended control measures beyond threshold evaluations are incorporated into the 2008 Draft General Plan under Program HS.I-60. However, the control measures are not a requirement of approval. As a result, construction-related emissions of fugitive dust could violate an air quality standard, contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

Because of the large amount of development and potential for simultaneous construction of multiple sites, the nonattainment status of Solano County, and modeled emissions that exceed applicable thresholds (Table 4.2-3), implementation of the 2008 Draft General Plan under the Preferred Plan could result in or substantially contribute to an air quality violation. As a result, this impact would be significant.

Mitigation Measure 4.2-1a(1): Require Implementation of Supplemental Measures to Reduce Construction-Related Exhaust Emissions.

In addition to the measures recommended by BAAQMD and YSAQMD for construction emissions of PM₁₀ and incorporated into the 2008 Draft General Plan under Program HS.I-60, the County shall require each project applicant, as a condition of project approval, to implement the following measures to further reduce exhaust emissions from construction-related equipment:

- ▶ Commercial electric power shall be provided to the project site in adequate capacity to avoid or minimize the use of portable gas-powered electric generators and equipment.
- ▶ Where feasible, equipment requiring the use of fossil fuels (e.g., diesel) shall be replaced or substituted with electrically driven equivalents (provided that they are not run via a portable generator set).
- ▶ To the extent feasible, alternative fuels and emission controls shall be used to further reduce NO_x and PM₁₀ exhaust emissions.
- ▶ On-site equipment shall not be left idling when not in use.
- ▶ The hours of operation of heavy-duty equipment and/or the amount of equipment in use at any one time shall be limited.
- ▶ Construction shall be curtailed during periods of high ambient pollutant concentrations; this may involve ceasing construction activity during the peak hour of vehicular traffic on adjacent roadways or on Spare the Air Days.
- ▶ Staging areas for heavy-duty construction equipment shall be located as far as possible from sensitive receptors.
- ▶ Before construction contracts are issued, the project applicants shall perform a review of new technology, in consultation with BAAQMD and YSAQMD, as it relates to heavy-duty equipment, to determine what (if any) advances in emissions reductions are available for use and are economically feasible. Construction contract and bid specifications shall require contractors to utilize the available and economically feasible technology on an established percentage of the equipment fleet. It is anticipated that in the near future, both NO_x and PM₁₀ control equipment will be available.

Mitigation Measure 4.2-1a(2): Require Implementation of Supplemental Measures to Reduce Fugitive PM₁₀ Dust Emissions.

In addition to the required basic control measures, the County shall require each project applicant, as a condition of project approval, to implement the following enhanced and additional control measures recommended by BAAQMD and YSAQMD to further reduce fugitive PM₁₀ dust emissions:

- ▶ Hydroseeding shall be used or nontoxic soil stabilizers shall be applied to inactive construction areas (previously graded areas inactive for 10 days or more).
- ▶ Exposed stockpiles (e.g., dirt, sand) shall be enclosed, covered, or watered twice daily, or nontoxic soil binders shall be applied to such stockpiles.

- ▶ Traffic speeds on unpaved roads shall be limited to 15 mph.
- ▶ Sandbags or other erosion control measures shall be installed to prevent runoff of silt to public roadways.
- ▶ Vegetation shall be replanted in disturbed areas as quickly as possible.
- ▶ Wheel washers shall be installed on all exiting trucks, or the tires or tracks of all trucks and equipment leaving the site shall be washed off.
- ▶ Windbreaks shall be installed or trees/vegetative windbreaks shall be planted at windward side(s) of construction areas.
- ▶ Excavation and grading activity shall be suspended when winds (instantaneous gusts) exceed 25 mph.
- ▶ The area subject to excavation, grading, and other construction activity at any one time shall be limited, as necessary.

Implementation of Mitigation Measures 4.2-1a(1) and 4.2-1a(2) would further reduce short-term, construction-related emissions, but not to a less-than-significant level. Construction-related emissions of criteria air pollutants and precursors would still exceed significance thresholds; for this reason, and because of the large size of Solano County, such emissions could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.2-1b **Generation of Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors – Maximum Development Scenario.** *Emissions of ROG and NO_x during construction consistent with the 2008 Draft General Plan under the Maximum Development Scenario would exceed BAAQMD's significance threshold of 80 lb/day and YSAQMD's significance threshold of 10 TPY for ROG and NO_x and 80 lb/day for PM₁₀. In addition, control measures recommended by BAAQMD and YSAQMD for construction-related emissions of PM₁₀ are not currently required, nor are they projected to be required. Thus, under the Maximum Development Scenario, construction-related emissions of criteria air pollutants and precursors could violate an ambient air quality standard, contribute substantially to an existing or predicted air quality violation, and/or expose sensitive receptors to substantial pollutants. As a result, this impact would be **significant**.*

This impact is similar to Impact 4.2-1a for the Preferred Plan, except that emissions of criteria pollutants may increase from those modeled in 4.2-1a. Acreages developed are the same for both scenarios; therefore, only density would increase under the Maximum Development Scenario. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.2-1b(1): Require Implementation of Supplemental Measures to Reduce Construction-Related Exhaust Emissions.

This mitigation measure is the same as Mitigation Measure 4.2-1a(1) for the Preferred Plan.

Mitigation Measure 4.2-1b(2): Require Implementation of Supplemental Measures to Reduce Fugitive PM₁₀ Dust Emissions.

This mitigation measure is the same as Mitigation Measure 4.2-1a(2) for the Preferred Plan.

Implementation of Mitigation Measures 4.2-2a(1) and 4.2-2a(2) would further reduce short-term, construction-related emissions, but not to a less-than-significant level. Construction-related emissions of criteria air pollutants and precursors would still exceed significance thresholds; for this reason, and because of the large size of Solano

County, such emissions could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.2-2a Consistency with Air Quality Planning Efforts – Preferred Plan. *Future development in Solano County would generate emissions of criteria air pollutants (PM₁₀) and ozone precursors, both of which affect regional air quality. Anticipated population and development consistent with the 2008 Draft General Plan under the Preferred Plan could lead to operational (mobile-source and area-source) emissions that exceed thresholds. This impact would be **significant**.*

Future changes to air pollutant emissions in Solano County were computed based on VMT estimates because most air pollutant emissions associated with land use development occur from vehicle use.

The ARB motor vehicle emissions model (EMFAC2007) emission factors, as contained in the ARB-approved URBEMIS 2007 (Version 9.2.4) computer model, were used along with VMT estimates from the traffic analysis prepared for this project (see Section 4.4, “Transportation and Circulation,” of this EIR) to calculate emissions in units of TPY and lb/day for future (2030) conditions upon buildout of the 2008 Draft General Plan under the Preferred Plan. Daily air pollutant emissions are shown in Table 4.2-4.

Table 4.2-4 Summary of Modeled Operational Emissions of Criteria Air Pollutants and Precursors— 2030 Conditions upon Buildout of the 2008 Draft General Plan (Preferred Plan)			
Source	Emissions (lb/day / TPY) ¹		
	ROG	NO _x	PM ₁₀
Area Sources ²	812.4/156.2	198.9/42.4	1.5
Mobile Sources ³	1,599.6/356.6	1,722.8/506.8	2,642.9
Total Unmitigated Emissions	2,412.0 lb/day/ 512.8 TPY	1,921.7 lb/day/ 549.2 TPY	2,644.5 lb/day
BAAQMD Significance Threshold	80 lb/day	80 lb/day	80 lb/day
YSAQMD Significance Threshold	10 TPY	10 TPY	80 lb/day
Notes: BAAQMD = Bay Area Air Quality Management District; lb/day = pounds per day; NO _x = oxides of nitrogen; PM ₁₀ = particulate matter less than or equal to 10 microns in diameter; ROG = reactive organic gases; TPY = tons per year; YSAQMD = Yolo/Solano Air Quality Management District ¹ Emissions modeled using the URBEMIS 2007 (Version 9.2.4) computer model, based on trip generation rates obtained from the analysis prepared for this project and proposed land uses identified in Chapter 3, “Project Description,” and Section 4.4, “Transportation and Circulation,” of this EIR. ² For this estimate, default model assumptions were used for the number of residences that would contain hearth features. ³ Trip generation rates were obtained from the traffic analysis for the respective land uses (see Section 4.4, “Transportation and Circulation”). Refer to Appendix B for detailed assumptions and modeling output files. Source: Data modeled by EDAW in 2008			

Emissions of PM₁₀ and ozone precursors (ROG and NO_x) associated with new growth under the 2008 Draft General Plan are treated as new to the region. (This is a conservative [worst-case] assumption because many “new vehicle trips” may actually be moved from one part of the region to another partly as a result of the 2008 Draft General Plan.)

Because the 2008 Draft General Plan would result in emissions in excess of thresholds for criteria air pollutants and precursors for which the region is in nonattainment, and would increase population (and thus VMT) beyond

those anticipated by the Association of Bay Area Governments (see Section 4.1, “Land Use”) (ABAG 2005), this would conflict with BAAQMD and YSAQMD air quality planning efforts.

Relevant Goals, Policies, and Programs of the 2008 Draft General Plan

Health and Safety Chapter

The Health and Safety Chapter of the 2008 Draft General Plan includes an air quality section with numerous policies and programs that seek to reduce air pollution and minimize the air quality impacts of new development:

- ▶ **Policy HS.P-43:** Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.
- ▶ **Policy HS.P-45:** Promote consistency and cooperation in air quality planning efforts.
- ▶ **Policy HS.P-46:** Coordinate with and provide incentives to agricultural producers to minimize the impacts of operations on air quality.
- ▶ **Program HS.I-54:** Consider a trip reduction ordinance and incentives to encourage employers to increase telecommuting, provide bicycle facilities, and access to public transit for employees, including County employees.
- ▶ **Program HS.I-60:** Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.
- ▶ **Program HS.I-61:** Comply with the California Air Resources Board and Bay Area or Yolo/Solano Air Quality Management District rules, regulations, and recommendations for Solano County facilities and operations. Such operations shall comply with mandated measures to reduce emissions from fuel consumption, energy consumption, surface coating operations, and solvent usage.
- ▶ **Program HS.I-62:** Encourage coordination between the Bay Area and Yolo/Solano Air Quality Management Districts for consistency in air quality planning efforts.
- ▶ **Program HS.I-64:** Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.

Transportation and Circulation Chapter

The Transportation and Circulation Chapter of the 2008 Draft General Plan contains goals and policies that intend to reduce per-capita VMT and accommodate more sustainable travel options:

- ▶ **Goal CI.G-3:** Encourage land use patterns which maximize mobility options for commuting and other types of trips, and minimize traffic congestion and carbon footprints.
- ▶ **Goal CI.G-4:** Promote alternative forms of transportation such as walking and bicycling to encourage these modes when making short-distance trips, and when pursuing recreational opportunities.
- ▶ **Policy CIP-2:** Together with other agencies and cities, continue to plan land uses and transportation systems that concentrate major employment and activity centers near major circulation systems and in proximity to residential areas.
- ▶ **Policy CIP-3:** Establish land use patterns to facilitate shorter travel distances and non-auto modes of travel.

- ▶ **Policy CLP-6:** Participate in transportation programs that promote technological solutions resulting in more efficient use of energy resources, reduced greenhouse gas emissions and noise, and improved air quality.
- ▶ **Policy CLP-14:** Encourage the development of transit facilities and operations along major corridors to connect the county with surrounding activity centers and regional destinations.
- ▶ **Policy CLP-18:** Encourage the expansion of Capitol Corridor passenger rail service through additional trains, new stations, and faster speeds to connect the county with other Bay Area and Sacramento area communities.

Additionally, please refer to the 2008 Draft General Plan, under separate cover, for the wide range of land use, community design, transportation, conservation, and other policies that would directly or indirectly address air quality.

Conclusion

Future development in Solano County would generate emissions of PM10 and ozone precursors. The 2008 Draft General Plan contains numerous goals, policies, and implementation programs intended to reduce per-capita VMT and resulting air pollution; however, even with implementation of these goals, policies, and programs, anticipated population and development consistent with the 2008 Draft General Plan under the Preferred Plan could lead to operational (mobile-source and area-source) emissions that exceed thresholds. Therefore, this impact would be significant.

Mitigation Measure 4.2-2a: Coordinate with Air Districts on Assumptions from Air Quality Plan Updates.

The County shall coordinate with BAAQMD and YSAQMD at the earliest opportunity to ensure that all new assumptions from new air quality plan updates are implemented as part of the 2008 Draft General Plan.

Mitigation Measure 4.2-2a and the various 2008 Draft General Plan goals, policies, and programs outlined above would reduce air pollutant emissions that affect both Solano County and the region. However, the 2008 Draft General Plan would still result in operational emissions in excess of threshold assumptions used by BAAQMD and YSAQMD for relevant clean air plans. Buildout of the 2008 Draft General Plan would continue to conflict with current air quality planning efforts. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.2-2b *Consistency with Air Quality Planning Efforts – Maximum Development Scenario. Future development in Solano County would generate emissions of criteria air pollutants (PM₁₀) and ozone precursors, both of which affect regional air quality. Anticipated population and development consistent with the 2008 Draft General Plan under the Maximum Development Scenario could lead to operational (mobile-source and area-source) emissions that exceed thresholds. This impact would be **significant**.*

This impact is similar to Impact 4.2-2a for the Preferred Plan, except that anticipated population and development under the Maximum Development Scenario would be greater than that under the Preferred Plan and therefore, emissions would be equivalent or higher. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.2-2b: Coordinate with Air Districts on Assumptions from Air Quality Plan Updates.

This mitigation measure is the same as Mitigation Measure 4.2-2a for the Preferred Plan. For the same reasons as described above, this impact would remain **significant and unavoidable**.

IMPACT 4.2-3a **Generation of Long-Term Operational, Regional Emissions of Criteria Air Pollutants and Precursors – Preferred Plan.** *Long-term operational activities consistent with the 2008 Draft General Plan under the Preferred Plan would result in emissions of ROG, NO_x, and PM₁₀ that exceed BAAQMD's and YSAQMD's significance thresholds of 80 lb/day and 10 TPY. Thus, operational emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be significant.*

Area- and Mobile-Source Emissions

Regional area- and mobile-source emissions of ROG, NO_x, and PM₁₀ were modeled using the URBEMIS 2007 Version 9.2.4 computer program, which is designed to estimate emissions for land use development projects (ARB 2008d). URBEMIS allows land use data entries that include project location specifics and trip generation rates. URBEMIS accounts for area-source emissions from the use of natural gas, wood stoves, fireplaces, landscape maintenance equipment, and consumer products; and mobile-source emissions associated with vehicle trip generation. Regional area- and mobile-source emissions were modeled based on proposed land use types and sizes (see Chapter 3, “Project Description”), the increase in trip generation from the traffic analysis prepared for this project (see Section 4.4, “Transportation and Circulation”), and default settings and parameters attributable to construction period and site location.

Modeled operational emissions are summarized in Table 4.2-4 for 2030 full-buildout conditions, assuming that the entire 2008 Draft General Plan would be constructed over a 20-year planning horizon. As shown in Table 4.2-4, operational activities would result in annual unmitigated emissions of approximately 512 TPY (2,412 lb/day) of ROG, 549 TPY (1,922 lb/day) of NO_x, and (2,645 lb/day) of PM₁₀, under full buildout conditions.

Based on the modeling conducted, operational activities would result in emissions of ROG, NO_x, and PM₁₀ that exceed BAAQMD's and YSAQMD's applicable thresholds of 80 lb/day and 10 TPY, respectively. Thus, operational emissions of these ozone precursors and PM₁₀ could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations.

Stationary-Source Emissions

The 2008 Draft General Plan could accommodate stationary sources of pollutants that would be required to obtain permits to operate in compliance with BAAQMD and YSAQMD rules. These sources could include but not be limited to diesel-engine or gas turbine generators for emergency power generation; central-heating boilers for commercial, industrial, or large residential buildings; process equipment for light-industrial uses; kitchen equipment at restaurants and schools; service-station equipment; and dry-cleaning equipment. The permit process would assure that these sources would be equipped with the required emission controls, and that individually, these sources would not cause a significant environmental impact. There is no available methodology to reliably estimate these emissions; nonetheless, the emissions from these sources would be additive to the estimated area-source and mobile-source emissions described above.

Relevant Policies and Programs of the 2008 Draft General Plan

As noted previously, the Air Quality section of the Public Health and Safety chapter of the 2008 Draft General Plan (in addition to other chapters) includes several goals and policies designed to minimize adverse effects related to long-term operational emissions that would be implemented as specific development projects and plans are proposed and considered by the County. Relevant goals and policies are outlined below. Implementation measures throughout the Air Quality section and balance of the 2008 Draft General Plan also address air quality. Please refer to the 2008 Draft General Plan, under separate cover, for more information.

- ▶ **Policy HS.P-43:** Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.
- ▶ **Policy HS.P-45:** Promote consistency and cooperation in air quality planning efforts.
- ▶ **Policy HS.P-46:** Coordinate with and provide incentives to agricultural producers to minimize the impacts of operations on air quality.
- ▶ **Program HS.I-54:** Consider a trip reduction ordinance and incentives to encourage employers to increase telecommuting, provide bicycle facilities, and access to public transit for employees, including County employees.
- ▶ **Program HS.I-60:** Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.
- ▶ **Program HS.I-61:** Comply with the California Air Resources Board and Bay Area or Yolo/Solano Air Quality Management District rules, regulations, and recommendations for Solano County facilities and operations. Such operations shall comply with mandated measures to reduce emissions from fuel consumption, energy consumption, surface coating operations, and solvent usage.
- ▶ **Program HS.I-62:** Encourage coordination between the Bay Area and Yolo/Solano Air Quality Management Districts for consistency in air quality planning efforts.
- ▶ **Program HS.I-64:** Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.

Conclusion

Even with the implementation of relevant policies and implementation programs from the 2008 Draft General Plan, operational emissions from the proposed new growth under the plan would still exceed the 80 lb/day and 10 TPY significance thresholds for ROG, NO_x, and PM₁₀ (see Table 4.2-4). As a result, this impact would be significant.

Mitigation Measure 4.2-3a: Require Implementation of YSAQMD Design Recommendations for Development Projects.

The County shall require each project applicant, as a condition of project approval, to implement the following mitigation measure recommended by YSAQMD.

Design of all development projects shall include all of the following elements, as applicable:

- ▶ A duct system within the building thermal envelope, or insulated to R-83 standards
- ▶ Passive cooling strategies, including passive or fan-aided cooling planned for or designed into the structure, a cupola or roof opening for hot-air venting, or underground cooling tubes
- ▶ High-efficiency outdoor lighting utilizing solar power or controlled by motion detectors
- ▶ Natural lighting in buildings
- ▶ Building siting and orientation designed to reduce energy use
- ▶ Summer shading and wind protection measures to increase energy efficiency

- ▶ Use of concrete or other nonpolluting materials for parking lots instead of asphalt
- ▶ Use of landscaping to shade buildings and parking lots
- ▶ Photovoltaic and wind generators
- ▶ Installation of energy efficient appliances and lighting
- ▶ Installation of mechanical air conditioners and refrigeration units that use non-ozone-depleting chemicals

Implementation of the above mitigation measure, in addition to compliance with the above 2008 Draft General Plan policies and implementation programs and existing regulations, would reduce operational emissions of ROG, NO_x, and PM₁₀, but not to a less-than-significant level. This impact would remain **significant and unavoidable**.

IMPACT 4.2-3b **Generation of Long-Term Operational, Regional Emissions of Criteria Air Pollutants and Precursors – Maximum Development Scenario.** *Long-term operational activities consistent with the 2008 Draft General Plan under the Maximum Development Scenario would result in emissions of ROG and NO_x that exceed BAAQMD's and YSAQMD's significance thresholds of 80 lb/day and 10 TPY. Thus, operational emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be significant.*

This impact is similar to Impact 4.2-3a for the Preferred Plan, except that anticipated population and development under the Maximum Development Scenario would be greater than that under the Preferred Plan, and thus would result in greater operational emissions. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.2-3b: Require Implementation of YSAQMD Design Recommendations for Development Projects.

This mitigation measure is the same as Mitigation Measure 4.2-3a for the Preferred Plan. For the same reasons as described above, this impact would remain **significant and unavoidable**.

IMPACT 4.2-4a **Generation of Long-Term, Operational, Local Mobile-Source Emissions of CO – Preferred Plan.** *Based on BAAQMD's and YSAQMD's screening criteria, implementation of the 2008 Draft General Plan under the Preferred Plan could result in LOS levels being lowered to LOS E or LOS F at some county intersections resulting in long-term operational, local mobile-source emissions of CO that substantially contribute to emissions concentrations or exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact would be significant.*

The concentration of CO is a direct function of motor vehicle activity, particularly during peak commute hours, and of meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land uses (e.g., residential areas, schools, and hospitals). BAAQMD and YSAQMD have established preliminary screening criteria for long-term, local mobile-source emissions of CO. If these criteria are not violated with implementation of the 2008 Draft General Plan under the Preferred Plan, it is fairly certain that such CO emissions would not result in or substantially contribute to emissions concentrations exceeding the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. YSAQMD's preliminary screening criteria for significance are as follows (YSAQMD 2007):

- ▶ a traffic study for the project indicates that the level of service (LOS) on one or more streets or at one or more intersections in the project vicinity would be reduced to LOS E or LOS F; or
- ▶ a traffic study for the project indicates that implementation would substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity.

BAAQMD's preliminary screening criteria for significance are as follows:

- ▶ vehicle emissions of CO would exceed 550 lb/day;
- ▶ project traffic would adversely affect intersections or roadway links operating at LOS D, E, or F or would cause LOS to decline to LOS D, E, or F; or
- ▶ project traffic would increase traffic volumes on nearby roadways by 10% or more.

Policy CI.P-1 in the Transportation and Circulation chapter of the 2008 Draft General Plan calls on the County to monitor and maintain the existing transportation system to remedy safety and congestion issues and establish specific actions to address these issues when they occur. However, according to the traffic analysis prepared for the 2008 Draft General Plan (see Section 4.4, "Transportation and Circulation"), roadway segments and intersections could be reduced to LOS E or LOS F from LOS A–D under plan buildout (2030) conditions for both a.m. and p.m. peak hours, despite improvements included in the 2008 Draft General Plan and traffic calming mitigation in place. Thus, based on the screening criteria above, long-term operational local mobile-source emissions of CO could result in or substantially contribute to emissions concentrations exceeding the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm; they could also result in exposure of sensitive receptors to levels of CO higher than recommended levels. As a result, this impact would be significant.

Mitigation Measure 4.2-4a: Require Implementation of Measures to Reduce Operational Emissions from Mobile Sources.

The County shall require each project applicant, as a condition of project approval, to implement the following mitigation measures, as appropriate:

- ▶ Intersections affected by individual projects shall be evaluated for violations of CO concentration thresholds.
- ▶ Development review shall focus on upgrading roads in Solano County to County design standards if the new development significantly contributes to the need to upgrade these roads, regardless of whether the new development occurs inside a city or within the unincorporated county.

The County shall support regular monitoring of the transportation system by the California Department of Transportation and the Solano Transportation Authority, with emphasis on studying congested areas to identify the cause, duration, and severity of the congestion.

Implementation of this mitigation measure would reduce operational emissions of CO. However, because the extent and locations of CO emissions are unknown at this time, this impact would remain **significant and unavoidable**.

IMPACT 4.2-4b **Generation of Long-Term, Operational, Local Mobile-Source Emissions of CO – Maximum Development Scenario.** *Based on BAAQMD's and YSAQMD's screening criteria, implementation of the 2008 Draft General Plan under the Maximum Development Scenario could result in LOS levels being lowered to LOS E or LOS F at some county intersections resulting in long-term operational, local mobile-source emissions of CO that substantially contribute to emissions concentrations or exceed the 1-hour ambient air quality standard of 20 ppm or the 8-hour standard of 9 ppm. As a result, this impact would be **significant**.*

This impact is similar to Impact 4.2-4a for the Preferred Plan, except that anticipated population and development under the Maximum Development Scenario would be greater than that under the Preferred Plan, and thus would result in greater mobile-source emissions. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.2-4b: Require Implementation of Measures to Reduce Operational Emissions from Mobile Sources.

This mitigation measure is the same as Mitigation Measure 4.2-4a for the Preferred Plan. For the same reasons as described above, this impact would remain **significant and unavoidable**.

IMPACT 4.2-5a *Exposure of Sensitive Receptors to Emissions of Toxic Air Contaminants – Preferred Plan. With implementation of the 2008 Draft General Plan under the Preferred Plan, new or modified sources of TACs could be placed near existing sensitive receptors, and new sensitive receptors could be developed near existing sources of TACs. As a result, sensitive receptors could be exposed to substantial concentrations of TACs. This impact would be less than significant for construction-related emissions, but significant for some types of operational emissions.*

Emissions of TACs during project construction consistent with the 2008 Draft General Plan (e.g., emissions from on-site heavy-duty diesel equipment) and from project operation under the plan (e.g., emissions from both on-site and off-site area, stationary, and mobile sources) are discussed and their resulting levels of TAC exposure of sensitive receptors are analyzed separately below.

Construction-Related Emissions

Construction-related activities would result in short-term emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment for site preparation (e.g., excavation, grading, and clearing); paving; application of architectural coatings; and other miscellaneous activities. Diesel PM was identified as a TAC by ARB in 1998. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential for all other health impacts (ARB 2003).

It is important to note that emissions from construction equipment would be reduced over the period of buildout of the 2008 Draft General Plan. In January 2001, EPA promulgated a final rule to reduce emissions standards for heavy-duty diesel engines in 2007 and subsequent model years. These emissions standards represent a 90% reduction in NO_x emissions, 72% reduction of nonmethane hydrocarbon emissions, and 90% reduction of PM emissions in comparison to the emissions standards for the 2004 model year. In December 2004, ARB adopted a fourth phase of emission standards (Tier 4) in the Clean Air Non-road Diesel Rule that are nearly identical to those finalized by EPA on May 11, 2004. As such, engine manufacturers are now required to meet after-treatment-based exhaust standards for NO_x and PM starting in 2011 that are more than 90% lower than current levels, putting emissions from off-road engines virtually on par with those from on-road heavy-duty diesel engines.

More specifically, the dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the California Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period and duration of activities associated with the project, in this case the 2008 Draft General Plan (Salinas, pers. comm., 2004). Thus, because the use of off-road heavy-duty diesel equipment would be temporary and would combine with the highly dispersive properties of diesel PM (Zhu et al. 2002), further reductions in exhaust emissions would occur, and construction-related activities would be typical to similar development-type projects, construction-related TAC emissions would not expose sensitive receptors to substantial emissions of TACs. It is also important to note that compliance with the construction dust mitigation requirements would also reduce PM exhaust emissions. As a result, this impact would be less than significant.

Operational Emissions

Stationary Sources

The 2008 Draft General Plan anticipates construction of commercial land uses, which may potentially include stationary sources of TACs, such as dry-cleaning establishments, gasoline-dispensing facilities, and diesel-fueled backup generators. These types of stationary sources, in addition to any other stationary sources that may emit TACs, would be subject to BAAQMD's and YSAQMD's rules and regulations. Thus, as discussed above, BAAQMD and YSAQMD would analyze such sources (e.g., health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of BAAQMD's and YSAQMD's applicable significance threshold, MACT or BACT would be implemented to reduce emissions. If the implementation of MACT or BACT would not reduce the risk below the applicable threshold, BAAQMD and YSAQMD would deny the required permit. As a result, given compliance with applicable rules and regulations, operation of stationary sources would not result in the exposure of sensitive receptors to TACs at levels exceeding BAAQMD's and YSAQMD's significance thresholds, and this impact would be less than significant.

Furthermore, only two major stationary sources of TACs currently exist in Solano County (ARB 2008e). These stationary sources would be required to be permitted and regulated to prevent new land use compatibility conflicts. Therefore, there would be no incompatibility of proposed land uses with major existing sources of TAC emissions. This impact would also be less than significant.

On-Site, On-Road Mobile Sources

On-site mobile sources of TACs would be associated primarily with the operation of on-road heavy-duty diesel trucks used for proposed on-site commercial/industrial activities (e.g., unloading/loading). According to the ARB guidance document *Air Quality and Land Use Handbook: A Community Health Perspective*, ARB recommends avoiding the siting of new commercial trucking facilities that accommodate more than 100 trucks per day, or 40 trucks equipped with transportation refrigeration units (TRUs), within 1,000 feet of sensitive receptors (e.g., residences) (ARB 2005). The ARB guidance document is advisory, not regulatory. Operational activities that require the use of diesel-fueled vehicles for extended periods, such as commercial trucking facilities or delivery/distribution areas, may generate diesel PM emissions that could expose sensitive receptors to diesel PM emissions. Although commercial and industrial uses that would be developed under the 2008 Draft General Plan have not been identified, some of the tenants would require large delivery and shipping trucks that use diesel fuel. The diesel exhaust PM emissions generated by these uses would be produced primarily at single locations on a regular basis (e.g., loading dock areas). Idling trucks, including TRUs, increase diesel PM levels at these locations. Occupants of nearby existing and proposed residences may be exposed to diesel exhaust PM emissions on a reoccurring basis.

ARB has adopted an idling restriction ATCM for large commercial diesel-powered vehicles, which became effective February 1, 2005. In accordance with this measure, affected vehicles are required to limit idling to no longer than 5 minutes under most circumstances. ARB is currently evaluating additional ATCMs intended to further reduce TACs associated with commercial operations, including a similar requirement to limit idling of smaller diesel-powered commercial vehicles.

It is unknown at this time whether the concentration of diesel PM at any sensitive receptor locations might exceed the threshold for acceptable cancer risk for the maximally exposed individual. It is also unclear what effect ARB's new diesel-engine emission standards and diesel PM regulations would have on the level of emissions from any one facility. Therefore, because of uncertainty with respect to determination of tenants, frequency of diesel-fueled trucks visiting the proposed land uses, and distances between trucking activities and sensitive receptors at final buildout of the 2008 Draft General Plan and associated mobile emissions of diesel exhaust, this impact would be significant.

Off-Site, On-Road Mobile Sources

The 2008 Draft General Plan includes a mix of land uses, including commercial, industrial, and residential uses. The ARB guidance document *Air Quality and Land Use Handbook: A Community Health Perspective* recommends avoiding the placement of new sensitive land uses (e.g., residences and schools) within 500 feet of major freeways (those with 100,000+ vehicles per day, such as I-80, I-680, I-780, I-505, SR 12, SR 37, and SR 113). The 2008 Draft General Plan contains goals, policies, and implementation strategies (see below) designed to reduce exposure of sensitive receptors to concentrations of TACs from mobile sources. However, because it is not specified under law that sensitive receptors are to be placed a minimum of 500 feet from major roadways, the maximum net change of 9,820 residential acres of land use proposed in the 2008 Draft General Plan under the Preferred Plan could result in the location of sensitive receptors adjacent to major roadways.

Sensitive receptors could be sited within 500 feet of a major freeway, and risk associated with implementation of the 2008 Draft General Plan under the Preferred Plan would exceed ARB's (and subsequently BAAQMD's and YSAQMD's) recommendation. Thus, this impact would be significant.

Long-Term Off-Site Rail Traffic Sources

Solano County has two major rail lines, each with several spurs that run through the major population centers of the county. The Union Pacific Railroad (UPRR) operates the rail lines, one that originates in the southwest corner of the city of Vallejo and one that crosses into the county over the George Miller Jr. Memorial Bridge in Benicia. These two lines meet in Suisun City and continue to Sacramento as one. The rail lines are used for both passenger trains and freight service. The rail traffic is variable and information concerning schedules is not available at this time.

In October 2004, ARB released a study that provided a health risk characterization and assessment of the diesel PM from locomotives at the J. R. Davis Rail Yard in Roseville, California (ARB 2004). The study indicated that locomotive-related activities at the rail yard would result in the exposure of sensitive receptors near the yard to a cancer risk level of in excess of the applicable threshold. However, the UPRR rail lines in Solano County are used specifically for passenger and freight service and experience extremely light daily rail traffic relative to the traffic occurring at the rail yard in Roseville. In addition, unlike the locomotives in Solano County, the locomotives at the Roseville rail yard undergo engine testing, and they idle for extended periods of time, so emissions are higher and persist in one localized area for greater amounts of time. The rail yard study describes conditions that are unlike those associated with the rail line through Solano County, which would not expose sensitive receptors to diesel PM concentrations that would result in a health risk in excess of the threshold. Additionally, the Western Electric rail line is electric and therefore does not emit TACs. This impact would be less than significant.

Relevant Policies and Programs of the 2008 Draft General Plan

The 2008 Draft General Plan contains the following policies and implementation programs designed to reduce exposure of sensitive receptors to concentrations of TACs and help reduce future land use incompatibilities of sources that could potentially emit TACs and exposure of sensitive uses to harmful air pollutants:

- ▶ **Policy HS.P-44:** Minimize health impacts from sources of toxic air contaminants, both stationary (e.g., refineries, manufacturing plants) as well as mobile sources (e.g., freeways, rail yards, commercial trucking operations).
- ▶ **Policy HS.P-46:** Coordinate with and provide incentives to agricultural producers to minimize the impacts of operations on air quality.
- ▶ **Program HS.I-55:** Require development proposals that introduce new sources of toxic air pollutants to prepare a health risk assessment as required under the Air Toxics "Hot Spots" Act (AB 2588 [1987]) and,

based on the results of the assessment, establish appropriate land use buffer zones around those areas posing substantial health risks.

- ▶ **Program HS.I-59:** Encourage agricultural best management practices regarding herbicide and pesticide use, odor control, fugitive dust control, and agricultural equipment emissions to minimize air quality impacts.

Conclusion

For the reasons described above, and with implementation of the above 2008 Draft General Plan policies and implementation programs, this impact would be less than significant for construction-related emissions, as well as for operational emissions from stationary sources and long-term off-site rail traffic sources. However, with respect to both on-site and off-site, on-road mobile sources, even with implementation of the above 2008 Draft General Plan policies and programs, this impact would be significant.

Mitigation Measure 4.2-5a: Require Implementation of Measures to Reduce the Potential for Exposure to TACs from Mobile Sources.

The County shall require each project applicant to implement the following measures as a condition of project approval:

- ▶ Activities involving idling trucks shall be oriented as far away from and downwind of existing or proposed sensitive receptors as feasible.
- ▶ Strategies shall be incorporated to reduce the idling time of main propulsion engines through alternative technologies such as IdleAire, electrification of truck parking, and alternative energy sources for TRUs to allow diesel engines to be completely turned off.
- ▶ Proposed developments shall incorporate site plans that move sensitive receptors as far as feasibly possible from major roadways (100,000+ average daily trips).

Implementation of these measures would reduce the potential for exposure to TACs. However, the only measure available to completely mitigate Impact 4.2-5a—completely separating emissions sources (diesel vehicles associated with commercial trucking activities at commercial and industrial land uses, rail operations, stationary sources) by 1–2 miles from all sensitive receptors—is not feasible; therefore, no feasible mitigation is available to reduce the impact to a less-than-significant level. The County will coordinate with BAAQMD and YSAQMD as implementation of the 2008 Draft General Plan occurs to assess situations in which toxic risk from diesel PM may occur and to review methodologies that may become available to estimate the risk. However, this impact would remain **significant and unavoidable**.

IMPACT 4.2-5b Exposure of Sensitive Receptors to Emissions of Toxic Air Contaminants – Maximum Development Scenario. *With implementation of the 2008 Draft General Plan under the Maximum Development Scenario, new or modified sources of TACs could be placed near existing sensitive receptors, and new sensitive receptors could be developed near existing sources of TACs. As a result, sensitive receptors could be exposed to substantial concentrations of TACs. This impact would be less than significant for construction-related emissions, but significant for some types of operational emissions.*

This impact is similar to Impact 4.2-5a for the Preferred Plan, except that anticipated population and development under the Maximum Development Scenario would be greater than that under the Preferred Plan, and thus would result in greater emissions of TACs. For the same reasons as described above, this impact would be less than significant for construction-related emissions, as well as for operational emissions from stationary sources and long-term off-site rail traffic sources. However, as under the Preferred Plan, with respect to both on-site and off-

site, on-road mobile sources, even with implementation of the above 2008 Draft General Plan policies and programs, this impact would be significant under the Maximum Development Scenario.

Mitigation Measure 4.2-5b: Require Implementation of Measures to Reduce the Potential for Exposure to TACs from Mobile Sources.

This mitigation measure is the same as Mitigation Measure 4.2-5a. For the same reasons as described above, this impact would remain **significant and unavoidable**.

IMPACT 4.2-6a Exposure of Sensitive Receptors to Emissions of Odors – Preferred Plan. *Implementation of the 2008 Draft General Plan under the Preferred Plan could result in the exposure of sensitive receptors to emissions of objectionable odors. As a result, this impact would be significant.*

As discussed previously, the human response to odors is extremely subjective, and sensitivity to odors varies greatly among the public. The screening-level distance identified by BAAQMD and YSAQMD for major sources of odors is 1 mile from sensitive receptors (2 miles for petroleum refineries). Minor sources of odors, such as exhaust from mobile sources, garbage collection areas, and charbroilers associated with commercial uses, are not typically associated with numerous odor complaints, but are known to have some temporary, less concentrated odorous emissions. Major and minor sources of odors are discussed separately below.

Major Sources of Odors

BAAQMD and YSAQMD have identified the following as potential major sources of odors: wastewater treatment facilities, chemical manufacturing facilities, sanitary landfills, fiberglass manufacturing facilities, transfer stations, painting/coating operations (e.g., auto body shops), composting facilities, food processing facilities, feed lots/dairies, asphalt batch plants, rendering plants, coffee roasters, and petroleum refineries (BAAQMD 1999, YSAQMD 2007). This list is meant not to be entirely inclusive, but to act as general guidance. A list of existing major odor facilities is not currently available for Solano County, nor is a list of potential new major odor sources projected for the duration of the 2008 Draft General Plan. Therefore, land use conflicts between major odor sources and sensitive receptors could occur. As a result, this impact would be significant.

Minor Sources of Odors

Minor sources of odors associated with the 2008 Draft General Plan would be associated with the construction of the proposed land uses. The predominant source of power for construction equipment is diesel engines. Exhaust odors from diesel engines, as well as emissions associated with asphalt paving and the application of architectural coatings may be considered offensive to some individuals. Similarly, diesel-fueled locomotives traveling along the UPRR and diesel-fueled trucks traveling on local roadways would produce associated diesel exhaust fumes. However, because odors associated with diesel fumes would be temporary and would disperse rapidly with distance from the source, construction-generated and mobile-source odors would not result in the frequent exposure of on-site receptors to objectionable odor emissions. As a result, short-term construction-related odors would be less than significant.

Conclusion

Commercial uses may include sources of odors (e.g., charbroiling restaurants, dry cleaners) near existing or proposed sensitive receptors. The operation of such sources could result in the frequent exposure of on-site receptors to substantial emissions of objectionable odors. As a result, this impact would be significant.

Mitigation Measure 4.2-6a: Require Implementation of Measures to Reduce Exposure of Sensitive Receptors to Odorous Emissions.

The County shall require each project applicant to implement the following mitigation measures as a condition of project approval:

- ▶ The deeds to all properties of proposed sensitive uses located within 2 miles of the major odor sources identified by BAAQMD and YSAQMD shall include a disclosure clause (odor easement), prepared by an attorney with expertise in the field, and approved by the County, advising buyers and tenants of the potential adverse odor impacts from major sources of odors.
- ▶ Odor control devices shall be installed at the emitter to reduce the exposure of receptors to objectionable odorous emissions if an odor-emitting facility is to occupy space in a proposed commercial land use area.
- ▶ The odor-producing potential of land uses shall be considered when the exact type of facility that would occupy commercial areas is determined.

Implementation of Mitigation Measure 4.2-6a would reduce the exposure of sensitive receptors to odorous emissions, but not to a less-than-significant level. Because the sources of the odors cannot be eliminated, the potential exposure may not completely mitigate odor impacts and may not completely protect the odor-producing sources against potential future nuisance complaints. Full physical mitigation of potential odor impacts would require the implementation of odor control measures, and neither the County nor future project applicants have the direct ability to impose such controls. Whether BAAQMD, YSAQMD, or the County, reacting to complaints, sees fit in the future to order modifications to operation of major odor sources is uncertain. Any predictions about future enforcement actions are beyond the scope of this EIR. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.2-6b Exposure of Sensitive Receptors to Emissions of Odors – Maximum Development Scenario.
Implementation of the 2008 Draft General Plan under the Maximum Development Scenario could result in the exposure of sensitive receptors to emissions of objectionable odors. As a result, this impact would be significant.

This impact is similar to Impact 4.2-6a for the Preferred Plan, except that anticipated population and development under the Maximum Development Scenario would be greater than that under the Preferred Plan, and thus has the potential to result in greater exposure of sensitive receptors to emissions of odors. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.2-6b: Require Implementation of Measures to Reduce Exposure of Sensitive Receptors to Odorous Emissions.

This mitigation measure is the same as Mitigation Measure 4.2-6a. For the same reasons as described above, this impact would remain **significant and unavoidable**.

4.2.4 RESIDUAL SIGNIFICANT IMPACTS

Implementation of Mitigation Measures 4.2-1a(1) and 4.2-1a(2) for the Preferred Plan and Mitigation Measures 4.2-1a(1) and 4.2-1a(2) for the Maximum Development Scenario would further reduce short-term, construction-related emissions, but not to a less-than-significant level. Construction-related emissions of criteria air pollutants and precursors would still exceed significance thresholds; for this reason, and because of the large size of Solano County, such emissions could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. As a result, Impacts 4.2-1a and 4.2-1b would remain **significant and unavoidable**.

Mitigation Measures 4.2-2a and 4.2-2b and the various 2008 Draft General Plan policies and programs outlined under Impact 4.2-2a would reduce air pollutant emissions that affect both Solano County and the region under the Preferred Plan and the Maximum Development Scenario. However, the 2008 Draft General Plan would still result in higher operational emissions than the current General Plan and assumptions used by BAAQMD and YSAQMD used for relevant clean air plans. Buildout of the 2008 Draft General Plan would continue to conflict with current air quality planning efforts under both the Preferred Plan and the Maximum Development Scenario. Therefore, Impacts 4.2-2a and 4.2-2b would remain **significant and unavoidable**.

Implementation of Mitigation Measures 4.2-3a and 4.2-3b, in addition to compliance with the 2008 Draft General Plan policies and implementation programs outlined under Impact 4.2-3a as well as existing regulations, would reduce operational emissions of ROG, NO_x, and PM₁₀ under the Preferred Plan and the Maximum Development Scenario, but not to a less-than-significant level. Therefore, Impacts 4.2-3a and 4.2-3b would remain **significant and unavoidable**.

Implementation of Mitigation Measures 4.2-4a and 4.2-4b would reduce operational emissions of CO under the Preferred Plan and the Maximum Development Scenario. However, because the extent and locations of CO emissions are unknown at this time, Impacts 4.2-4a and 4.2-4b would remain **significant and unavoidable**.

Implementation of Mitigation Measures 4.2-5a and 4.2-5b would reduce the potential for exposure to TACs under the Preferred Plan and the Maximum Development Scenario. However, the only measure available to completely mitigate Impact 4.2-5a and Impact 4.2-5b—completely separating emission sources (diesel vehicles associated with commercial trucking activities at commercial and industrial land uses, rail operations, stationary sources) from all sensitive receptors—is not feasible; therefore, no feasible mitigation is available to reduce these impact to a less-than-significant level. The County will coordinate with BAAQMD and YSAQMD as implementation of the 2008 Draft General Plan occurs to assess situations in which toxic risk from diesel PM may occur and to review methodologies that may become available to estimate the risk. However, Impacts 4.2-5a and 4.2-5b would remain **significant and unavoidable**.

Implementation of Mitigation Measure 4.2-6a and 4.2-6b would reduce the exposure of sensitive receptors to odorous emissions under the Preferred Plan and the Maximum Development Scenario, but not to a less-than-significant level. Because the sources of the odors cannot be eliminated, the potential exposure of sensitive receptors to odorous emissions near the sources would remain. The odor easement would not result in any reduction in odor impacts, nor would it protect the odor-producing sources against potential future nuisance complaints. Full physical mitigation of potential odor impacts would require the implementation of odor control measures, and neither the County nor future project applicants have the direct ability to impose such controls. Whether BAAQMD, YSAQMD, or the County, reacting to complaints, sees fit in the future to order modifications to operation of major odor sources is uncertain. Any predictions about future enforcement actions are beyond the scope of the administrative proceedings. As a result, Impacts 4.2-6a and 4.2-6b would remain **significant and unavoidable**.

4.3 NOISE

4.3.1 ENVIRONMENTAL SETTING

BACKGROUND AND TERMINOLOGY

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard; hence they are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, called Hertz (Hz). Table 4.3-1 provides definitions of acoustic terminology used in this section.

Table 4.3-1 Acoustical Terminology	
Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space, consisting of all noise sources audible at that location. In many cases, the term “ambient” is used to describe an existing or preproject condition, such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound-level meter that conditions the output signal to approximate human response. (A-weighted decibels are referred to in this EIR as “dBA.”)
Community Noise Equivalent Level (CNEL)	The 24-hour average noise level with noise occurring during evening hours (7–10 p.m.) weighted by a factor of 3 and noise occurring during nighttime hours (10 p.m.–7 a.m.) weighted by a factor of 10 before averaging.
Decibel (dB)	A fundamental unit of sound. A bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A decibel is one-tenth of a bell.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
L_{dn}	Day/night average sound level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square sound level measured over a given period of time
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Sound Exposure Level (SEL)	A rating, in decibels, of a discrete event, such as an aircraft flyover or train pass-by, that compresses the total sound energy of the event into a 1-second time period.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Source: Solano County 2007	

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold (20 micropascals of pressure), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Table 4.3-2 shows examples of noise levels for several common noise sources and environments.

**Table 4.3-2
Typical A-Weighted Sound Levels of Common Noise Sources**

Decibels	Description
130	Threshold of pain
120	Jet aircraft takeoff at 100 feet
110	Riveting machine at operator's position
100	Shotgun at 200 feet
90	Bulldozer at 50 feet
80	Diesel locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversation speech at 5–10 feet
50	Open office background level
40	Background level within a residence
30	Soft whisper at 2 feet
20	Interior of recording studio

Source: Solano County 2007; data provided by Bollard Acoustical Consultants in 2007 based in part on Egan 1972

EFFECTS OF NOISE ON PEOPLE

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and it can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels (i.e., dBA).

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually 1 hour). The L_{eq} is the foundation of the day-night average level noise descriptor, L_{dn} , and shows very good correlation with community response to noise.

The day-night average level (L_{dn}) is based on the average noise level over a 24-hour day, with a +10-dBA weighting applied to noise occurring during nighttime (10 p.m.–7 a.m.) hours. The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Noise in the community has been cited as being a health problem, not in terms of actual physiological damage such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities such as sleep, speech, recreation, and tasks demanding concentration or coordination. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases, and the acceptability of the environment for people decreases. This decrease in acceptability and the threat to public well-being are the bases for policies preventing exposures to excessive community noise levels.

To control noise from fixed sources that have developed from processes other than zoning or land use planning, many jurisdictions have adopted community noise control ordinances. Such ordinances are intended to abate noise nuisances and to control noise from existing sources. They may also be used as performance standards to judge the creation of a potential nuisance, or potential encroachment of sensitive uses upon noise-producing facilities. Community noise control ordinances are generally designed to resolve noise problems on a short-term basis (usually by means of hourly noise level criteria), rather than on the basis of 24-hour or annual cumulative noise exposures.

In addition to the A-weighted noise level, other factors should be considered in establishing criteria for noise-sensitive land uses. For example, sounds with noticeable tonal content such as whistles, horns, droning, or high-pitched sounds may be more annoying than A-weighted sound levels alone suggest. Many noise standards apply a penalty, or correction, of 5 dBA to such sounds. The effects of unusual tonal content are generally more of a concern at nighttime, when residents may notice the sound in contrast to low levels of background noise.

Because many rural residential areas experience very low noise levels, residents may express concern about the loss of peace and quiet caused by the introduction of a sound that was not audible previously. In very quiet environments, the introduction of virtually any change in local activities will cause an increase in noise levels. A change in noise level and the loss of peace and quiet is the inevitable result of land use or activity changes in such areas. Audibility of a new noise source and/or increases in noise levels within recognized acceptable limits are not usually considered to be significant noise impacts, but these concerns should be addressed and considered in the planning and environmental review processes.

EXISTING NOISE CONDITIONS IN SOLANO COUNTY

Overview

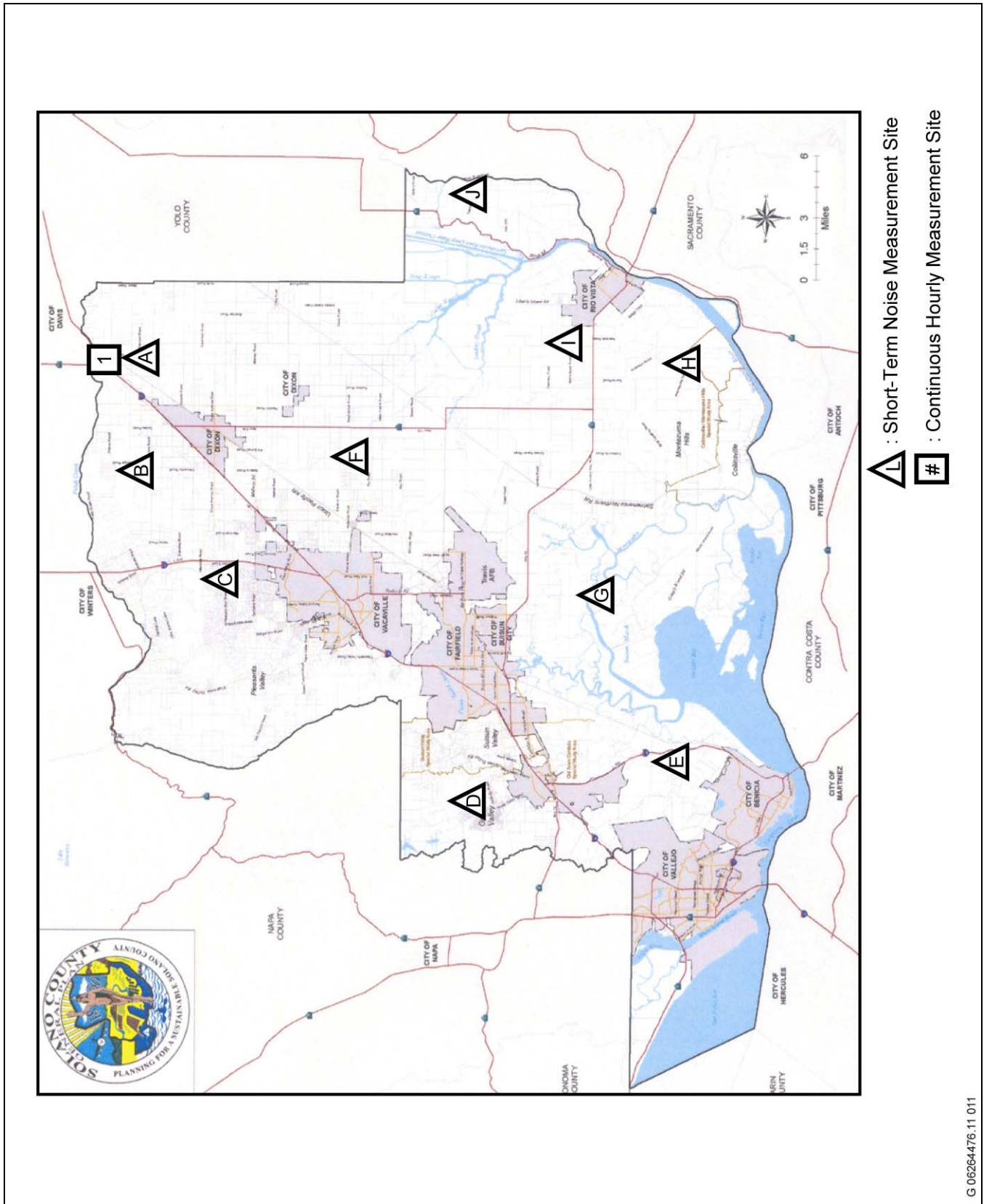
The 2008 Draft General Plan noise study area is shown in Exhibit 4.3-1. The major noise sources in Solano County consist of highway traffic and local traffic on city streets, commercial and industrial uses, active recreation areas of parks, outdoor play areas of schools, railroad operations, and aircraft overflights. Each of these noise sources is discussed individually below.

Roadways

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108), with California Vehicle Noise (CALVENO) emission levels, was used to predict traffic noise levels within the Solano County Limits. The use of the FHWA model is considered acceptable for the development of traffic noise predictions for the 2008 Draft General Plan.

Interstate 80 (I-80) and I-680 are the two most heavily traveled roadways in Solano County. The FHWA model was used with existing traffic data to develop L_{dn} contours for the highways and major roadways within Solano County. The existing traffic noise levels as determined by the FHWA model and noise contours for those roadways are provided in Table 4.3-3. The distances from the centerlines of the major roadways to the 60-dB L_{dn} contours are also summarized in that table. The 60-dB L_{dn} contour locations for existing conditions on I-80 are shown in Exhibit 4.3-2. FHWA model inputs are provided in Appendix C.

Topography in Solano County varies, sometimes alternating from flat to moderately hilly along relatively short roadway segments. Because of the topographic complexity of Solano County, it is not possible to evaluate the effects of topography on traffic noise within the framework of the Noise section of the 2008 Draft General Plan. Therefore, the contour distances presented in Table 4.3-3 and the I-80 noise exposure contours shown in Exhibit 4.3-2 should be considered conservative estimates of traffic noise exposure, to be supplemented by a detailed and project-specific study as needed.

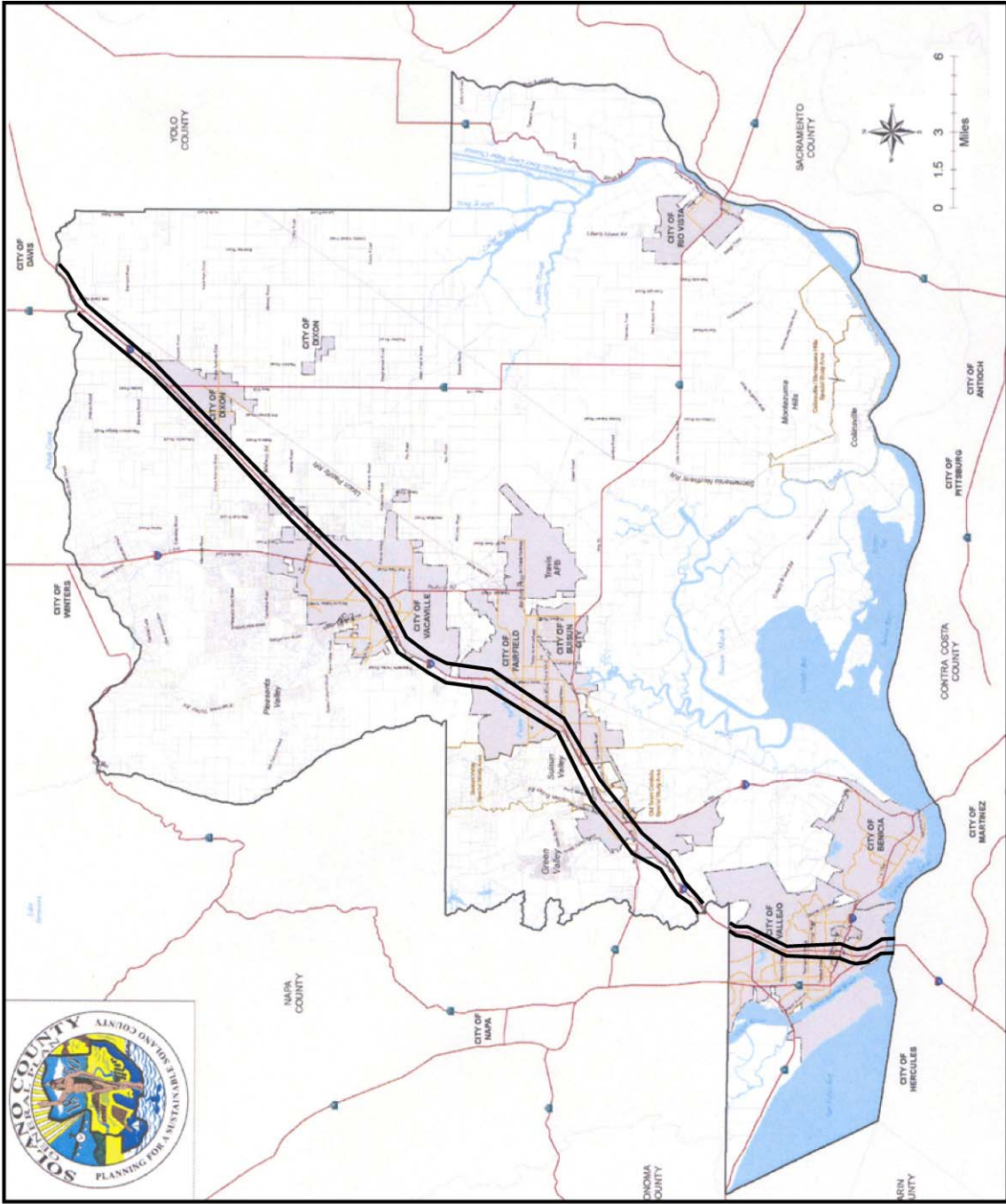


G 06264476.11.011

Source: Bollard Acoustical Consultants 2006

Noise Measurement Locations

Exhibit 4.3-1



— 60 Ldn Noise Contour

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Source: Bollard Acoustical Consultants 2006

60-dB L_{dn} Noise Contours for Interstate 80

Exhibit 4.3-2

**Table 4.3-3
Predicted Existing Traffic Noise Levels and Approximate Distances to
Existing Traffic Noise Contours in Solano County**

Segment	Roadway	Segment Description	dBA L _{dn} at 100 feet	Distance to 60-dBA L _{dn} Contour (feet)
1	I-80	Solano-Yolo County Line	79	1,921
2		North of SR 37	79	1,766
3		East of American Canyon Road	79	1,797
4		At Carquinez Bridge	79	1,946
5		North of Tennessee Street	79	1,977
6		East of Suisun Valley Road	83	3,169
7		East of Pleasants Valley Road	80	2,227
8		East of Leisure Town Road	79	1,740
9	I-780	West of Military West (Benicia)	78	1,491
10	I-680	At Benicia Bridge	79	1,908
11		North of Marshview Road	76	1,202
12	I-505	North of Allendale Road	71	583
13		South of Midway Road	74	846
14	SR 84	At Solano-Yolo County Line	61	122
15	SR 37	East of Walnut Avenue	75	986
16		West of I-80	77	1,449
17	SR 29	South of Lake-Napa County Line	64	184
18		Solano-Napa County Line	75	1,077
19	SR 128	East of Junction with SR 121 South	66	244
20		East of Franz Valley Road	67	305
21	SR 12/121	West of Old Sonoma Road	74	799
22	SR 12	East of Junction with SR 84 North	72	618
23		West of Solano-Napa County Line	75	931
24		West of Beck Avenue (Leg A)	76	1,102
25		East of Pennsylvania Avenue	76	1,100
26		East of Scandia Road	71	537
27	SR 113	North of I-80 (near Davis)	75	1075
28		North of SR 12	66	243
29		South of Dixon City Limits	64	197
30		South of I-80	70	458
31	Air Base Parkway	East of I-80 (#53)	71	568
32		West of Railroad Tracks (#8)	69	409
33	Alamo Drive	South of Marshall Road	67	303
34		East of I-80	66	238
35	American Canyon	At American Canyon City Limits	62	137
36	Batavia Road	South of Dixon City Limits	57	59
37	Benicia Road	East of Lemon Street	62	137
38	Broadway	North of Tennessee Street	66	238

**Table 4.3-3
Predicted Existing Traffic Noise Levels and Approximate Distances to
Existing Traffic Noise Contours in Solano County**

Segment	Roadway	Segment Description	dBA L _{dn} at 100 feet	Distance to 60-dBA L _{dn} Contour (feet)
39	Collinsville Road		57	59
40	Columbus Parkway	North of Tennessee Street	65	218
41	Cordelia Road	West of Hale Ranch Road	63	162
42		East of Pennsylvania Avenue	57	59
43	Curtola Parkway	West of Lemon Street	69	416
44	Davis Street	South of Bella Vista Road	61	124
45	Dixon Avenue	East of Gateway Drive	64	196
46	East Tabor Avenue	East of Tolenas Avenue (#7)	63	150
47	Georgia Street	West of 14th Street	64	174
48	Lake Herman Road	East of Columbus Parkway	61	110
49	Leisure Town Road	North of Orange Drive	66	248
50	Magazine Street	West of Sixth Street	62	137
51	Mason Street–Elmira Road	East of Peabody Road	69	378
52	North Texas Street	East of I-80 (#40)	67	312
53	North Connector	East of Suisun Valley Road	57	59
54	Nut Tree Road	South of Burtoin Drive	66	257
55	Oakwood Avenue	North of Tennessee Street	63	162
56	Peabody Road	North of Cement Hill Road	68	320
57	Pedrick Road–Road 98		57	59
58	Petrified Forest Road	At Sonoma-Napa County Line	64	185
59	Pitt School Road	South of Dixon City Limits	57	59
60		North of Market Street	61	124
61	Pleasants Valley Road	North of Vaca Valley Parkway	57	59
62		South of Vaca Valley Parkway	57	59
63	Redwood Parkway	West of Fairgrounds Dr	70	438
64	Road 89/Winters Road		57	59
65	Rockville Road	East of Suisun Valley Road	64	174
66	Sacramento Street	North of Tennessee Street	63	150
67	Solano Avenue	West of Phelan Avenue	63	150
68	Sonoma Boulevard (SR 29)	North of Tennessee Street	70	431
69		North of I-80	67	312
70	Stevenson Bridge		57	59
71	Suisun Valley Road	Solano-Napa County Line	61	110
72	Sunset Avenue	South of Travis Boulevard (#16)	67	312
73	Tennessee Street	West of Mariposa Street	68	320
74	Travis Boulevard	East of I-80 (#84)	69	386
75	Tuolumne Street	North of Tennessee Street	64	185
76	Vanden Road	South of Leisure Town Road	61	124
77	West Texas Street	East of I-80 (#101)	66	238

**Table 4.3-3
Predicted Existing Traffic Noise Levels and Approximate Distances to
Existing Traffic Noise Contours in Solano County**

Segment	Roadway	Segment Description	dBA L _{dn} at 100 feet	Distance to 60-dBA L _{dn} Contour (feet)
78	Wilson Avenue	North of Tennessee Street	65	228

Notes:

dBA = A-weighted decibels; I-80 = Interstate 80; I-505 = Interstate 505; I-680 = Interstate 680; I-780 = Interstate 780; L_{dn} = day/night average sound level; SR = State Route

Sources: Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108); data provided by Bollard Acoustical Consultants in 2008

Railroads

Railroad activity in Solano County consists of freight and passenger operations on the Union Pacific Railroad (UPRR) tracks. The UPRR tracks extend from the southwest portion to the northern portion of Solano County. Passenger train activity on this line consists of three Capitol Corridor/Amtrak routes between the Bay Area and Sacramento, with one route stopping at the Suisun Station. At least 20 Capitol Corridor/Amtrak trains pass through Solano County Monday through Friday. In addition to the passenger services, freight services use the UPRR tracks to transport goods into and through Solano County. It is recognized, however, that the use of the railroad warning horns at the roadway crossings results in brief periods of elevated noise levels near the tracks.

It is difficult to predict future railroad noise exposure in Solano County without knowing whether, or to what degree, railroad activity will change in the future. Table 4.3-4 was developed to estimate the distances to the 65-dB and 60-dB L_{dn} railroad noise contours for various numbers of future daily trains in Solano County. Those data assume that railroad operations in Solano County would occur uniformly throughout the daytime and nighttime hours, and is based on a mean railroad sound exposure level (SEL) of 103 dB at a distance of 100 feet.

**Table 4.3-4
Railroad Noise Exposure as a Function of the Number of Daily Trains in Solano County**

Number of Daily Trains	L _{dn} at 100 feet (dBA)	Distance to L _{dn} Noise Contours (feet)	
		65 dBA	60 dBA
45	76	518	1,202
50	77	593	1,278
55	77	631	1,359
60	77	671	1,445
65	78	713	1,537

Notes:

dBA = A-weighted decibels; L_{dn} = day/night average sound level

The predicted distances to the L_{dn} contours assume a mean railroad sound exposure level of 103 dBA (with horn usage) at a reference distance of 100 feet from the tracks and uniform distribution of train operations across daytime and nighttime hours.

Sources: Solano County 2007, data provided by Bollard Acoustical Consultants in 2007

Nontransportation Noise Sources

The production of noise is a result of many processes and activities, even when the best available noise control technology is applied. Noise exposure within industrial facilities is controlled by federal and state employee health and safety regulations, but exterior noise levels may exceed locally acceptable standards. Activities at commercial, recreational, and public services facilities can also produce noise that affects adjacent sensitive land uses.

From a land use planning perspective, issues related to controlling noise from fixed sources focus on two goals: preventing the introduction of new noise-producing uses in noise-sensitive areas, and preventing encroachment of noise-sensitive uses on existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses near noise-producing facilities include mitigation measures to ensure compliance with those noise performance standards. Site-specific noise analyses should be performed where noise-sensitive land uses are proposed near noise sources, or where similar sources are proposed to be located near noise-sensitive land uses.

General Service Commercial and Light Industrial Uses

Noise sources associated with service commercial uses such as automotive and truck repair facilities, wrecking yards, tire installation centers, car washes, loading docks, transfer stations, corporation yards, recycling centers, and concrete ready-mix facilities are found at various locations within Solano County. Many of these sources are located in the cities of Benicia, Dixon, Fairfield, Vacaville, and Vallejo. The noise emissions of these types of uses are dependent on many factors and are therefore difficult to quantify precisely. Nonetheless, noise generated by these uses contributes to the ambient noise environment in the immediate vicinity; therefore, such noise should be considered where either new noise-sensitive uses are proposed nearby or similar uses are proposed in existing residential areas.

Parks and School Playing Fields

Numerous parks and schools are spread throughout Solano County. Noise generated by these uses depends on the age and number of people using the respective facility at a given time and the types of activities in which they are engaged. Activities at school playing fields tend to generate more noise than those at neighborhood parks because the intensity of school playground usage tends to be much higher. At 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 dB and 75 dB, respectively, can be expected. At organized events such as high-school football games with large crowds and public-address systems, the noise generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

Noise Associated with Construction Activities

During construction and demolition associated with projects in Solano County, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels typically ranging from 85 dB to 90 dB at a distance of 50 feet. Impulsive construction activities such as pile driving would generate even higher noise levels. Although construction activities can vary in duration, they are nonetheless temporary in nature and typically occur during normal daytime working hours.

Airports

Travis Air Force Base

Travis Air Force Base is located in central Solano County just east of the city of Fairfield. The base is home to three U.S. Air Force command units and occupies approximately 7,100 acres of land with two 11,000-foot runways oriented along the northeast-southwest diagonal away from existing housing developments. The County Department of Resource Management has estimated that 40,000 residents are exposed to noise levels from Travis Air Force Base of 60 dBA CNEL periodically on a daily basis. Approximately 10,000 Solano County residents currently are exposed to noise levels of 80 dBA CNEL from Travis. The noise contours for Travis Air Force Base are shown in Exhibit 4.3-3.

Rio Vista Municipal Airport

Rio Vista Municipal Airport (Baumann Field) is located in the southwest corner of Solano County 3 miles northwest of the city of Rio Vista. This airport is home to approximately 56 aircraft: 51 single-engine and five multiengine aircraft. The airport's daily aviation operations are approximately 94 aircraft per day. Air traffic is divided equally between local and transient general-aviation flights. The noise contours for Rio Vista Municipal Airport are shown in Exhibit 4.3-4.

Nut Tree Airport

Nut Tree Airport is located in central Solano County within the city limits of Vacaville. This airport is home to approximately 244 aircraft: 204 single-engine and 40 multiengine aircraft. The airport's daily aviation operations are approximately 277 aircraft per day. Air traffic consists of general-aviation local flights, with a higher number of transient flights than local flights or flights originating at the airport. The noise contours for Nut Tree Airport are shown in Exhibit 4.3-5.

General Noise Environment Away From Major Noise Sources—Community Noise Survey

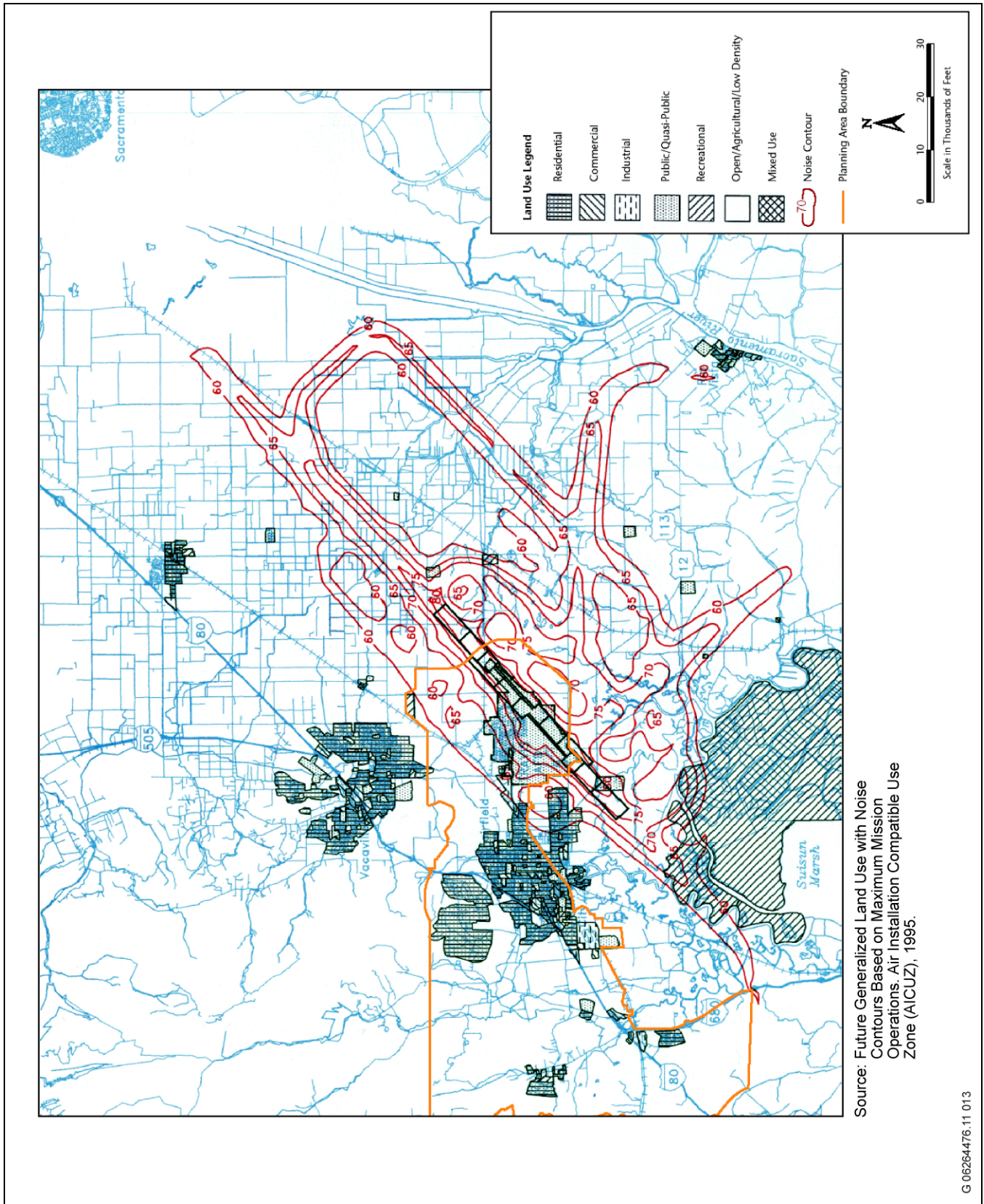
To quantify existing noise levels in the quieter parts of Solano County, a community noise survey was performed September 13–27, 2006, at 10 locations in Solano County that are removed from major noise sources. The 10 locations were each monitored for two 15-minute periods during daytime hours and one 5-minute period during nighttime hours. The locations of the noise measurements for the community noise survey are shown in Exhibit 4.3-1. The results of the community noise survey are provided in Table 4.3-5 on page 4.3-14.

4.3.2 REGULATORY SETTING

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

To address the human response to groundborne vibration, the Federal Transit Administration of the U.S. Department of Transportation has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 65 vibration decibels (VdB), referenced to 1 microinch per second and based on the root-mean-square velocity amplitude, for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities); 80 VdB for residential uses and buildings where people normally sleep; and 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2006).

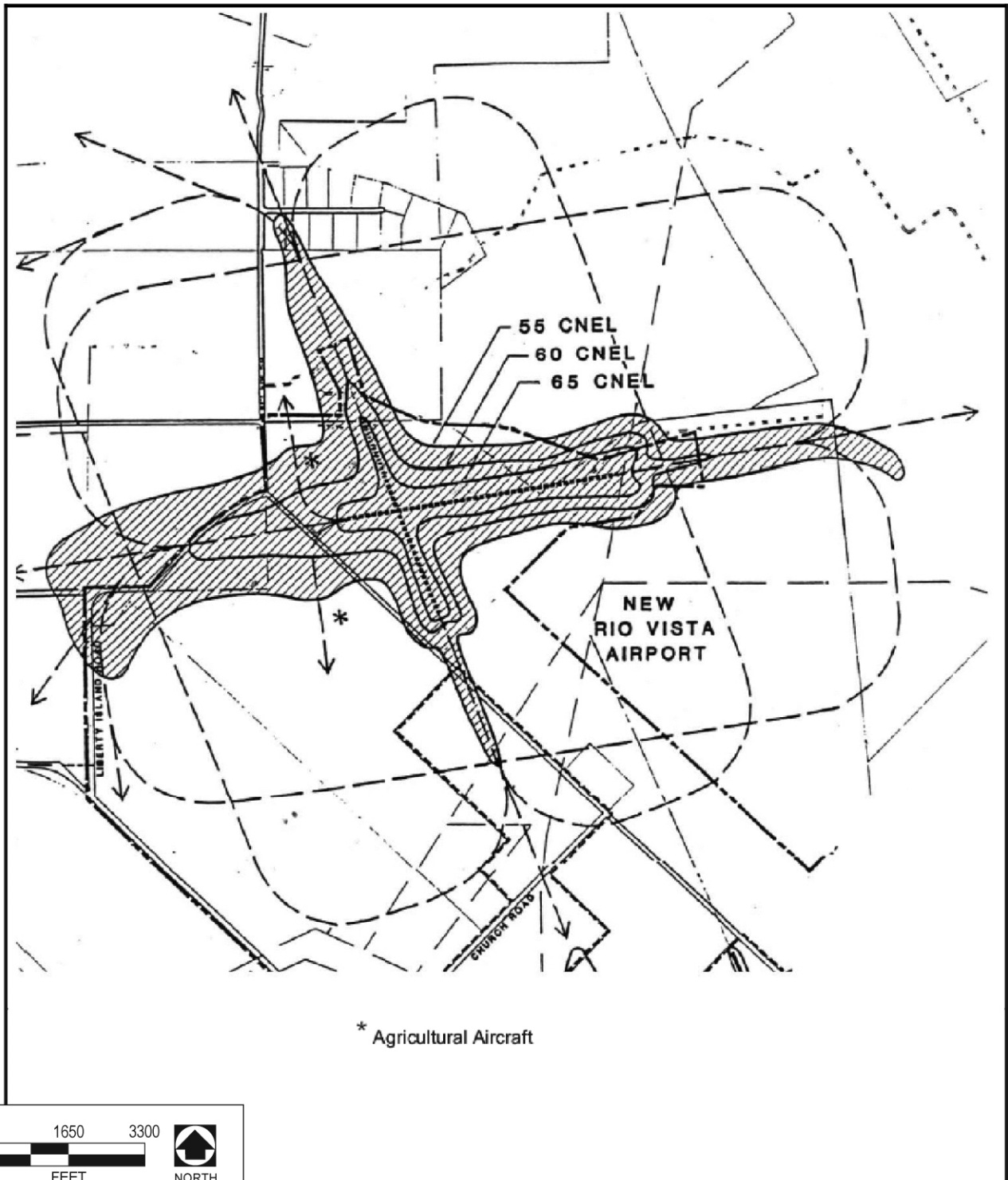
Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of the U.S. Environmental Protection Agency (FTA 2006). For fragile structures, CHABA recommends a maximum limit of 0.25 inch per second (in/sec) peak particle velocity (PPV) (FTA 2006).



Source: Bollard Acoustical Consultants, Inc. 2006

Travis Air Force Base Noise Contours

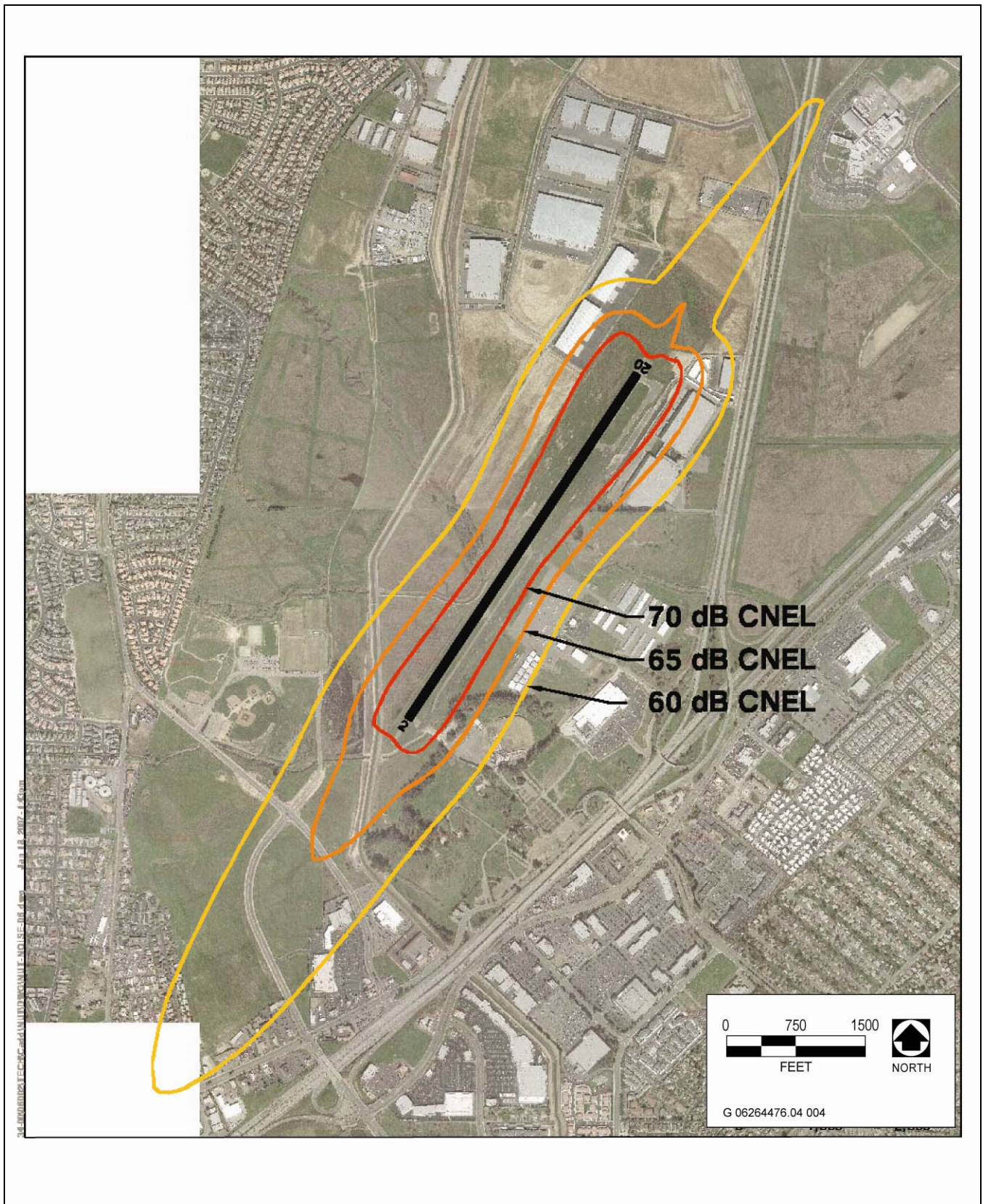
Exhibit 4.3-3



Source: Mead & Hunt, Inc. 2005

Rio Vista Airport Noise Contours

Exhibit 4.3-4



Nut Tree Airport Noise Contours

Exhibit 4.3-5

Table 4.3-5 Results of Solano County Community Noise Measurement Survey							
Site	Location	Dates	Time Period	L _{eq} (dBA)	L _{max} (dBA)	Estimated L _{dn} (dBA)	Sources
A	Old Davis Road, North of Tremont Road	9/13/06	Morning	45	60	56	Traffic, wind, industrial noise
		9/14/06	Afternoon	55	67		
		9/26/06	Night	48	53		
B	Campbell Road, West of Stevenson Bridge Road	9/13/06	Morning	37	45	47	Flyovers by small aircraft, tractor, distant natural sounds
		9/14/06	Afternoon	39	47		
		9/26/06	Night	41	55		
C	Udell Road, West of Timm Road	9/13/06	Morning	44	63	50	Traffic on Timm Road, flyovers by small aircraft, traffic on Interstate 505
		9/15/06	Afternoon	36	51		
		9/26/06	Night	44	51		
D	Rockville Road, West of Sidney Jones Lane	9/13/06	Morning	45	60	45	Traffic on Rockville Road, yard equipment, flyover by small aircraft
		9/15/06	Afternoon	42	57		
		9/27/06	Night	37	48		
E	Oakridge Lane, off of Lopes Road	9/13/06	Morning	49	58	57	High winds, flyover by small aircraft, traffic from Interstate 680
		9/15/06	Afternoon	49	59		
		9/27/06	Night	51	60		
F	Clark Road, South of Hawkins Road	9/13/06	Morning	36	43	51	Traffic on Clark Road, light winds, flyover by small aircraft
		9/15/06	Afternoon	38	53		
		9/26/06	Night	48	51		
G	Grizzly Island Road, South of Rio Vista Road	9/15/06	Morning	43	54	54	Traffic on Grizzly Road, flyovers by large aircraft, natural sounds
		9/15/06	Afternoon	55	71		
		9/27/06	Night	44	56		
H	Stewart Lane, East of Montezuma Hills Road	9/13/06	Morning	51	60	55	High winds, flyovers by small aircraft, natural sounds
		9/15/06	Afternoon	41	51		
		9/27/06	Night	49	60		
I	McCormack Road, East of Canright Road	9/13/06	Morning	40	54	55	High winds, flyovers by small aircraft, natural sounds
		9/15/06	Afternoon	43	56		
		9/27/06	Night	50	60		
J	South of Elevator Road, West of Ryer Road	9/13/06	Morning	41	58	46	High winds, flyovers by small aircraft, natural sounds
		9/15/06	Afternoon	44	59		
		9/27/06	Night	39	51		
<p>Notes: dBA = A-weighted decibels; L_{dn} = day/night average sound level; L_{eq} = equivalent or energy-averaged sound level; L_{max} = Highest root-mean-square sound level measured over a given period of time Source: Data provided by Bollard Acoustical Consultants in 2006</p>							

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Governor's Office of Planning and Research

The *State of California General Plan Guidelines* (OPR 2003), published by the Governor's Office of Planning and Research, provides guidance for the acceptability of projects within specific L_{dn} contours. This document does not represent an adopted standard; rather, it provides guidelines for each city and county to use in the development of its own standards. Table 4.3-6 summarizes the recommended range of acceptable and unacceptable community noise exposure limits for various land use categories. Generally, residential uses (e.g., mobile homes) are considered to be acceptable in areas where exterior noise levels do not exceed 60 dBA L_{dn} . Residential uses are normally unacceptable in areas exceeding 70 dBA L_{dn} and conditionally acceptable within 55–70 dBA L_{dn} . Schools are normally acceptable in areas up to 70 dBA L_{dn} and normally unacceptable in areas exceeding 70 dBA L_{dn} .

Commercial uses are normally acceptable in areas up to 70 dBA CNEL. Levels between 67.5 and 77.5 dBA L_{dn} for commercial uses are conditionally acceptable, depending on the noise insulation features and the noise reduction requirements. The guidelines also present adjustment factors that may be used to determine noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

**Table 4.3-6
Summary of Land Use Noise Compatibility Guidelines**

Land Use Category	Community Noise Exposure (dBA L_{dn} or CNEL)			
	Normally Acceptable ¹	Conditionally Acceptable ²	Normally Unacceptable ³	Clearly Unacceptable ⁴
Residential—Low Density Single Family, Duplex, Mobile Home	<60	55–70	70–75	75+
Residential—Multifamily	<65	60–70	70–75	75+
Transient Lodging—Motel, Hotel	<65	60–70	70–80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	<70	60–70	70–80	80+
Auditoriums, Concert Halls, Amphitheaters		<70	65+	
Sports Arena, Outdoor Spectator Sports		<75	70+	
Playgrounds, Neighborhood Parks	<70		67.5–75	72.5+
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<75		70–80	80+
Office Building, Business Commercial, and Professional	<70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70–80	75+	

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; L_{dn} = day-night average noise level

¹ Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

² New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and after needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice.

³ New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

⁴ New construction or development should generally not be undertaken.

Source: OPR 2003; also cited in Solano County 2008 (Table HS-2)

Title 24, Part 2, of the California Building Code establishes noise standards for all new multifamily residential units. Where exterior noise levels exceed 60 dBA CNEL/L_{dn}, the code stipulates that an acoustical analysis shall be performed and submitted before construction. The acoustical analysis must establish mitigation measures that will limit maximum CNEL/L_{dn} levels to 45 dBA in any inhabitable room. Although there are not generally applicable interior noise standards pertinent to all uses, California communities typically adopt a CNEL/L_{dn} standard of 45 dBA as a maximum limit on interior noise in all residential units.

California Department of Transportation

For the protection of fragile, historic, and residential structures, the California Department of Transportation recommends a more conservative threshold of 0.2 in/sec PPV for normal residential buildings and 0.08 in/sec PPV for old or historically significant structures (Caltrans 2002). These standards are more stringent than the federal standard established by CHABA, presented above.

California Noise Insulation Standards

The state has also established noise insulation standards for new multifamily residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24 of the California Code of Regulations). The noise insulation standards set forth an interior standard of 45 dBA L_{dn} in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than 60 dBA L_{dn}. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Noise Limits in the California Motor Vehicle Code

The State of California also establishes noise limits for vehicles licensed to operate on public roads, with those limits contained in Division 12, Chapter 5, Article 2.5 (Noise Limits) of the Motor Vehicle Code. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials. This article establishes limits for cars, motorcycles, and trucks (of various weight categories), and includes different noise level limits for these vehicle types depending on the age of the vehicle. The specific noise level limits can be found at http://www.dmv.ca.gov/pubs/vctop/vc/tocd12c5a2_5.htm.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Airport Land Use Compatibility Plans

Airport land use compatibility plans were adopted by the Solano County Airport Land Use Commission for the Nut Tree Airport and Rio Vista Municipal Airport in May 1998 and for Travis Air Force Base in June 2002. These documents establish various land use compatibility criteria for new developments affected by aircraft noise. The supporting policies within the plans for the Nut Tree Airport and Rio Vista Municipal Airport are identical with respect to noise, with both establishing 60 dBA CNEL as the normally acceptable noise exposure for new residential developments affected by aircraft noise. These documents also contain noise level criteria for public, commercial, industrial, agricultural, and recreational land uses.

The plan for Travis Air Force Base's supporting criteria for noise similarly considers new residential development incompatible with the base where aircraft noise exposure exceeds 60 dBA CNEL. In addition, *the Travis Airport Land Use Plan* establishes 45 dBA CNEL as the maximum acceptable aircraft-related interior noise level for residential and other noise-sensitive land uses, including hotels, hospitals, churches, schools, etc. The exterior noise exposure criteria for public, commercial, industrial, agricultural, and recreational land uses are generally

consistent with those adopted for Rio Vista Municipal Airport and the Nut Tree Airport. These plans are incorporated into this document by reference.

Solano County Code

The County Code contains 60 references to noise under various sections: Agriculture (Section 2.2), Animals (Section 4), Miscellaneous Offences (Section 18), Parks and Recreation (Section 19), and Zoning (Section 28). Most of the references to noise are contained in the Zoning section, and all but two are nuisance-based (e.g., disturbing the peace, barking dogs) and without numerical standards to support the code provisions. The two code provisions that do contain numerical standards restrict noise generated by wind turbine generators and wireless communication sites to 50 dB L_{dn} at the property line of a noise-sensitive land use.

Health and Safety Element of the Existing Solano County General Plan

For the purposes of evaluating noise impacts from new projects in Solano County, the criteria contained within the Health and Safety Element of the existing *Solano County General Plan* (General Plan) are used. That document establishes acceptable noise level criteria for transportation and nontransportation (fixed) noise sources, and includes the following noise level performance criteria for new projects that are affected by or include nontransportation noise sources:

The introduction of any fixed point, permanent, non-residential, noise-emitting land use (industrial, commercial, public utility, etc.) shall be prohibited if the projected noise emission level will exceed one or more of the following:

- a. 50 dBA CNEL as measured at the boundary of a nearby residential zone.
- b. 60 dBA CNEL as measured at the boundary of a nearby commercial zone, business zone. (personal service, offices), or noise-sensitive industrial or manufacturing zone (research, communications, etc.)

For transportation noise sources, such as roadway traffic, the General Plan establishes an exterior noise level criterion of 60 dBA CNEL and an interior noise level standard of 45 dBA CNEL.

4.3.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Approach

Because this DEIR considers the impacts associated with adoption of the 2008 Draft General Plan, including new noise policies and the development of both noise-sensitive and noise-generating land uses, the following methodology was employed for the impact analysis. Noise impacts were identified for new noise-sensitive developments located within areas affected by substantial existing or future noise sources (e.g., aircraft, automobile or truck traffic, railroad lines, and industrial uses). Noise impacts were also identified for noise-producing projects proposed near existing or proposed noise-sensitive areas. Noise impacts were also identified where implementation of 2008 Draft General Plan policies pertaining to noise would themselves result in the exposure of people to excessive noise levels. Finally, noise impacts were evaluated by comparing traffic noise generation associated with implementation of the 2008 Draft General Plan relative to existing conditions.

Assumptions

The analysis assumes that businesses, industries, and residents would comply with County noise standards identified in the 2008 Draft General Plan.

Analysis of Future Traffic Noise Levels

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108), with CALVENO noise emission levels, was used to predict traffic noise levels within the Solano County limits for two future development scenarios: the Preferred Plan and the Maximum Development Scenario.

Table 4.3-7 lists the projected distances to the projected future 60-dB L_{dn} traffic noise contours for the scenarios described above. These contour distances are used to identify areas within the county that would be considered potentially subject to noise impacts from traffic.

Table 4.3-8 compares projected future traffic noise levels under the Preferred Plan and the Maximum Development Scenario to those under existing conditions (2007). This table provides an evaluation of the cumulative changes in traffic noise levels that would result from development under the Preferred Plan or the Maximum Development Scenario.

Segment	Roadway	Segment Description	Distance to 60-dBA L_{dn} Contour (feet)	
			Preferred Plan	Maximum Development Scenario
1	I-80	Solano-Yolo County Line	2,221	2,221
2		North of SR 37	2,223	2,223
3		East of American Canyon Road	2,232	2,232
4		At Carquinez Bridge	2,364	2,364
5		North of Tennessee Street	2,175	2,165
6		East of Suisun Valley Road	3,234	3,234
7		East of Pleasants Valley Road	2,557	2,566
8	I-80	East of Leisure Town Road	2,088	2,118
9	I-780	West of Military West (Benicia)	1,710	1,710
10	I-680	At Benicia Bridge	2,350	2,377
11		North of Marshview Road	1,463	1,463
12	I-505	North of Allendale Road	1,037	1,055
13		South of Midway Road	1,245	1,262
14	SR 84	At Solano-Yolo County Line	254	254
15	SR 37	East of Walnut Avenue	1,200	1,200
16		West of I-80	1,632	1,632

**Table 4.3-7
Distances to Future 60-dB L_{dn} Traffic Noise Contours for Major Solano County Roadways**

Segment	Roadway	Segment Description	Distance to 60-dBA L _{dn} Contour (feet)	
			Preferred Plan	Maximum Development Scenario
17	SR 29	South of Lake-Napa County Line	1,84	184
18		Solano-Napa County Line	1,216	1,216
19	SR 128	East of Junction with SR 121 South	462	485
20	SR 128	East of Franz Valley Road	562	562
21	SR 12/121	West of Old Sonoma Road	963	963
22	SR 12	East of Junction with SR 84 North	907	907
23		West of Solano-Napa County Line	1,248	1,248
24		West of Beck Avenue (Leg A)	1,570	1,570
25		East of Pennsylvania Avenue	1,394	1,394
26		East of Scandia Road	833	871
27	SR 113	North of I-80 (near Davis)	1,328	1,353
28		North of SR 12	359	386
29		South of Dixon City Limits	363	387
30		South of I-80	489	489
31	Air Base Parkway	East of I-80 (#53)	606	606
32		West of Railroad Tracks (#8)	522	529
33	Alamo Drive	South of Marshall Road	303	285
34		East of I-80	276	276
35	American Canyon Road	American Canyon City Limits	207	218
36	Batavia Road	South of Dixon City Limits	94	110
37	Benicia Road	East of Lemon Street	267	248
38	Broadway	North of Tennessee Street	354	354
39	Collinsville Road	Entire Segment	59	59
40	Columbus Parkway	North of Tennessee Street	337	329
41	Cordelia Road	West of Hale Ranch Road	137	124
42		East of Pennsylvania Avenue	78	78
43	Curtola Parkway	West of Lemon Street	495	495
44	Davis Street	South of Bella Vista Road	162	162
45	Dixon Avenue	East of Gateway Drive	320	329
46	East Tabor Avenue	East of Tolenas Avenue (#7)	196	196
47	Georgia Street	West of 14th Street	196	196

**Table 4.3-7
Distances to Future 60-dB L_{dn} Traffic Noise Contours for Major Solano County Roadways**

Segment	Roadway	Segment Description	Distance to 60-dBA L _{dn} Contour (feet)	
			Preferred Plan	Maximum Development Scenario
48	Lake Herman Road	East of Columbus Parkway	185	196
49	Leisure Town Road	North of Orange Drive	416	431
50	Magazine Street	West of Sixth Street	150	137
51	Mason Street–Elmira	East of Peabody Road	393	393
52	North Texas Street	East of I-80 (#40)	370	370
53	North Connector	East of Suisun Valley Road	370	370
54	Nut Tree Road	South of Burtoin Drive	337	346
55	Oakwood Avenue	North of Tennessee Street	228	228
56	Peabody Road	North of Cement Hill Road	431	431
57	Pedrick Road–Road 98	Entire Segment	59	59
58	Petrified Forest Road	At Sonoma-Napa County Line	257	257
59	Pitt School Road	South of Dixon City Limits	59	59
60		North of Market Street	150	150
61	Pleasants Valley Road	North of Vaca Valley Parkway	59	59
62		South of Vaca Valley Parkway	59	59
63	Redwood Parkway	West of Fairgrounds Drive	488	488
64	Road 89/Winters Road		137	137
65	Rockville Road	east of Suisun Valley Road	174	174
66	Sacramento Street	north of Tennessee Street	238	218
67	Solano Avenue	West of Phelan Avenue	207	196
68	Sonoma Boulevard	North of Tennessee Street	481	481
69		North of I-80	409	416
70	Stevenson Bridge		59	59
71	Suisun Valley Road	Solano-Napa County Line	137	137
72	Sunset Avenue	South of Travis Boulevard (#16)	346	346
73	Tennessee Street	West of Mariposa Street	378	370
74	Travis Boulevard	East of I-80 (#84)	453	446
75	Tuolumne Street	North of Tennessee Street	257	257
76	Vanden Road	South of Leisure Town Road	238	238
77	W Texas Street	East of I-80 (#101)	320	312
78	Wilson Avenue	North of Tennessee Street	285	285

**Table 4.3-7
Distances to Future 60-dB L_{dn} Traffic Noise Contours for Major Solano County Roadways**

Segment	Roadway	Segment Description	Distance to 60-dBA L _{dn} Contour (feet)	
			Preferred Plan	Maximum Development Scenario
Notes: dBA = A-weighted decibels; I-80 = Interstate 80; I-505 = Interstate 505; I-680 = Interstate 680; I-780 = Interstate 780; L _{dn} = day-night average noise level; SR = State Route Sources: Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108); data provided by Bollard Acoustical Consultants in 2008				

**Table 4.3-8
Project-Related Increases in Traffic Noise on Major Solano County Roadways
under the 2008 Draft General Plan Relative to Existing (2007) Conditions¹**

Segment	Roadway	Segment Description	Existing Condition (dBA L _{dn})	2008 Draft General Plan (dBA L _{dn})			
				Preferred Plan	Change	Max. Dev't. Scenario	Change
1	I-80	Solano-Yolo County Line	79	80	1	80	1
2		North of SR 37	79	80	1	80	1
3		East of American Canyon Road	79	80	1	80	1
4		At Carquinez Bridge	79	81	2	81	2
5		North of Tennessee Street	79	80	1	80	1
6		East of Suisun Valley Road	83	83	0	83	0
7		East of Pleasants Valley Road	80	81	1	81	1
8		East of Leisure Town Road	79	80	1	80	1
9	I-780	West of Military West (Benicia)	78	78	1	78	1
10	I-680	At Benicia Bridge	79	81	2	81	2
11		North of Marshview Road	76	77	1	77	1
12	I-505	North of Allendale Road	71	75	4	75	4
13		South of Midway Road	74	76	2	77	3
14	SR 84	At Solano-Yolo County Line	61	66	5	66	5
15	SR 37	East of Walnut Avenue	75	76	1	76	1
16		West of I-80	77	78	1	78	1
17	SR 29	South of Lake-Napa County Line	64	64	0	64	0
18		Solano-Napa County Line	75	76	1	76	1
19	SR 128	East of Junction with SR 121 South	66	70	4	70	4
20		East of Franz Valley Road	67	71	4	71	4

**Table 4.3-8
Project-Related Increases in Traffic Noise on Major Solano County Roadways
under the 2008 Draft General Plan Relative to Existing (2007) Conditions¹**

Segment	Roadway	Segment Description	Existing Condition (dBA L _{dn})	2008 Draft General Plan (dBA L _{dn})			
				Preferred Plan	Change	Max. Dev't. Scenario	Change
21	SR 12/121	West of Old Sonoma Road	74	75	1	75	1
22	SR 12	East of Junction with SR 84 North	72	74	2	74	2
23		West of Solano-Napa County Line	75	77	2	77	2
24		West of Beck Avenue (Leg A)	76	78	2	78	2
25		East of Pennsylvania Avenue	76	77	1	77	1
26		East of Scandia Road	71	74	3	74	3
27		SR 113	North of I-80 (near Davis)	75	77	2	77
28	North of SR 12		66	68	2	69	3
29	South of Dixon City Limits		64	68	4	69	5
30	South of I-80		70	70	0	70	0
31	Air Base Parkway	East of I-80 (#53)	71	72	1	72	1
32		West of Railroad Tracks (#8)	69	71	2	71	2
33	Alamo Drive	South of Marshall Road	67	67	0	67	0
34		East of I-80	66	67	1	67	1
35	American Canyon Road	American Canyon City Limits	62	65	3	65	3
36	Batavia Road	South of Dixon City Limits	57	60	3	61	4
37	Benicia Road	East of Lemon Street	62	66	4	66	4
38	Broadway	North of Tennessee Street	66	68	2	68	2
39	Collinsville Road	Entire Segment	57	57	0	57	0
40	Columbus Parkway	North of Tennessee Street	65	68	3	68	3
41	Cordelia Road	West of Hale Ranch Road	63	62	-2	61	-2
42		East of Pennsylvania Avenue	57	58	1	58	1
43	Curtola Parkway	West of Lemon Street	69	70	1	70	1
44	Davis Street	South of Bella Vista Road	61	63	2	63	2
45	Dixon Avenue	East of Gateway Drive	64	68	4	68	4
46	East Tabor Avenue	East of Tolenas Avenue (#7)	63	64	1	64	1
47	Georgia Street	West of 14th Street	64	64	0	64	0
48	Lake Herman Road	East of Columbus Parkway	61	64	3	64	3
49	Leisure Town Road	North of Orange Drive	66	69	3	70	4

**Table 4.3-8
Project-Related Increases in Traffic Noise on Major Solano County Roadways
under the 2008 Draft General Plan Relative to Existing (2007) Conditions¹**

Segment	Roadway	Segment Description	Existing Condition (dBA L _{dn})	2008 Draft General Plan (dBA L _{dn})			
				Preferred Plan	Change	Max. Dev't. Scenario	Change
50	Magazine Street	West of Sixth Street	62	63	1	62	0
51	Mason Street–Elmira	East of Peabody Road	69	69	0	69	0
52	North Texas Street	East of I-80 (#40)	67	69	2	69	2
53	North Connector	East of Suisun Valley Road	57	69	12	69	12
54	Nut Tree Road	South of Burtoin Drive	66	68	2	68	2
55	Oakwood Avenue	North of Tennessee Street	63	65	2	65	2
56	Peabody Road	North of Cement Hill Road	68	70	2	70	2
57	Pedrick Road–Road 98	Entire Segment	57	57	0	57	0
58	Petrified Forest Road	At Sonoma-Napa County Line	64	66	2	66	2
59	Pitt School Road	South of Dixon City Limits	57	57	0	57	0
60		North of Market Street	61	63	2	63	2
61	Pleasants Valley Road	North of Vaca Valley Parkway	57	57	0	57	0
62		South of Vaca Valley Parkway	57	57	0	57	0
63	Redwood Parkway	West of Fairgrounds Drive	70	70	0	70	0
64	Road 89/Winters Road	Entire Segment	57	62	5	62	5
65	Rockville Road	East of Suisun Valley Road	64	64	0	64	0
66	Sacramento Street	North of Tennessee Street	63	66	3	65	2
67	Solano Avenue	West of Phelan Avenue	63	65	2	64	1
68	Sonoma Boulevard	North of Tennessee Street	70	70	1	70	1
69		North of I-80	67	69	2	69	2
70	Stevenson Bridge	Entire Segment	57	57	0	57	0
71	Suisun Valley Road	Solano-Napa County Line	61	62	1	62	1
72	Sunset Avenue	South of Travis Boulevard (#16)	67	68	1	68	1
73	Tennessee Street	West of Mariposa Street	68	69	1	69	1
74	Travis Boulevard	East of I-80 (#84)	69	70	1	70	1
75	Tuolumne Street	North of Tennessee Street	64	66	2	66	2
76	Vanden Road	South of Leisure Town Road	61	66	5	66	5
77	West Texas Street	East of I-80 (#101)	66	68	2	67	1
78	Wilson Avenue	North of Tennessee Street	65	67	2	67	2

¹ Traffic noise level at 100 feet from roadway centerline in terms of day/night average levels

**Table 4.3-8
Project-Related Increases in Traffic Noise on Major Solano County Roadways
under the 2008 Draft General Plan Relative to Existing (2007) Conditions¹**

Segment	Roadway	Segment Description	Existing Condition (dBA L _{dn})	2008 Draft General Plan (dBA L _{dn})			
				Preferred Plan	Change	Max. Dev't. Scenario	Change
Notes: dBA = A-weighted decibels; I-80 = Interstate 80; I-505 = Interstate 505; I-680 = Interstate 680; I-780 = Interstate 780; L _{dn} = day-night average noise level; SR = State Route Sources: Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108); data provided by Bollard Acoustical Consultants in 2008							

NOISE STANDARDS AND IMPLEMENTATION PROGRAMS IN THE 2008 DRAFT GENERAL PLAN

The goal of the Public Health and Safety chapter of the 2008 Draft General Plan is to prevent noise conflicts between adjoining land uses. The County's noise reduction and abatement strategy focuses on preventative techniques that protect noise-sensitive land uses from noise-producing sources. The following policies are applicable:

- ▶ **Policy HS.P-48:** Consider and promote land use compatibility between noise-sensitive and noise-generating land uses when reviewing new development proposals. (For the purposes of the Health and Safety chapter, noise-sensitive land uses include schools, hospitals, rest homes, long-term care, mental care facilities, and residences. Outdoor activity areas are considered to be the portion of a noise-sensitive property where outdoor activities would normally be expected (i.e., patios of residences and outdoor instructional areas of schools). Outdoor activity areas for the purposes of this section do not include gathering spaces alongside transportation corridors or associated public rights-of-way.
- ▶ **Policy HS.P-49:** Encourage design that minimizes negative effects of noise without compromising aesthetic values and pedestrian and auto connectivity.
- ▶ **Policy HS.P-50:** Ensure that development in the vicinity of the Travis Air Force Base or the Rio Vista or Nut Tree airports is compatible with existing and projected airport noise levels.
- ▶ **Policy HS.P-51:** Develop strategies with residents and businesses to reduce noise conflicts.
- ▶ **Policy HS.P-52:** Minimize noise conflicts between current and proposed land uses and transportation networks by encouraging compatible land uses around critical areas with higher noise potential.

These policies are intended to do all of the following:

- ▶ develop strategies to reduce excessive noise exposure through cost-effective measures and appropriate zoning that avoids placing incompatible land uses near each other;
- ▶ protect existing regions of the county where noise levels are currently acceptable, as well as locations that are deemed noise-sensitive;
- ▶ protect existing noise-generating commercial and industrial uses from encroachment of new noise-sensitive developments;

- ▶ prevent new noise-generating commercial and industrial uses in Solano County from encroaching on noise-sensitive land uses; and
- ▶ provide sufficient information about existing and future community noise levels so that noise may be effectively considered in land use planning.

The County’s noise policies and implementation programs were created to support the County’s vision of creating a place where people can live, work, and play in close proximity. To successfully integrate these lifestyle needs, noise sources need to be designed, developed, and maintained in a way that does not affect residential neighborhoods, schools, hospitals, places of worship, and other noise-sensitive land uses. Industrial and commercial noise sources are essential for economic growth and, through careful planning, can continue to operate and grow to support the economy of Solano County.

Noise Performance Standards

Daytime noise standards are typically set at noise levels that would not cause annoyance or impede human interaction or function in outdoor activity areas. Nighttime noise standards are typically set to result in acceptable noise levels that would not interfere with sleep for most people inside a building with windows closed. In general, noise standards are designed to prevent annoyance or sleep disruption in sensitive members of the public.

Table 4.3-9 shows the acceptable noise levels for various land use categories affected by traffic and railroad noise sources, as indicated in the Health and Safety chapter of the 2008 Draft General Plan. The noise levels shown in this table would be used when determining a proposed project’s noise impact.

Table 4.3-10 defines noise performance standards for nontransportation noise sources. In addition, properties located within an influence area surrounding Travis Air Force Base, Rio Vista Municipal Airport, or Nut Tree Airport are also subject to the more stringent noise/land use compatibility standards of the applicable airport land use compatibility plan.

New Land Use	Sensitive Outdoor Area (dBA L _{dn})	Sensitive Interior ¹ Area (dBA L _{dn})	Notes
All Residential	65	45	2
Transient Lodging	65	45	2, 3
Hospitals and Nursing Homes	65	45	2, 3, 4
Theaters and Auditoriums	–	35	3
Churches, Meeting Halls, Schools, Libraries, etc.	65	40	3
Office Buildings	65	45	3
Commercial Buildings	–	50	3
Playgrounds, Parks, etc.	70	–	
Industry	65	50	3

**Table 4.3-9
Noise Standards in the 2008 Draft General Plan for New Uses Affected by Traffic and Railroad Noise**

New Land Use	Sensitive Outdoor Area (dBA L _{dn})	Sensitive Interior ¹ Area (dBA L _{dn})	Notes
<p>Notes:</p> <p>dBA = A-weighted decibels; L_{dn} = day-night average noise level</p> <p>¹ Interior-noise-level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.</p> <p>² If these uses are affected by nighttime railroad passages, the potential for sleep disturbance shall be addressed</p> <p>³ Where there are no sensitive exterior spaces proposed for these uses, only the interior-noise-level standard shall apply.</p> <p>⁴ Hospitals are often noise-generating uses. The exterior-noise-level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.</p> <p>Source: Solano County 2008</p>			

**Table 4.3-10
Nontransportation Noise Standards in the 2008 Draft General Plan—
Average (dBA L_{eq})/Maximum (dBA L_{max})¹**

Receiving Land Use	Outdoor Area		Interior ²	Notes
	Daytime	Nighttime	Day and Night	
All Residential	55/70	50/65	35/55	
Transient Lodging	55/75	—	35/55	³
Hospitals and Nursing Homes	55/75	—	35/55	^{4,5}
Theaters and Auditoriums	—	—	30/50	⁵
Churches, Meeting Halls, Schools, Libraries, etc.	55/75	—	35/60	⁵
Office Buildings	60/75	—	45/65	⁵
Commercial Buildings	55/75	—	45/65	⁵
Playgrounds, Parks, etc.	65/75	—	—	⁵
Industry	60/80	—	50/70	⁵
<p>Notes:</p> <p>L_{eq} = equivalent or energy-averaged sound level; L_{max} = Highest root-mean-square sound level measured over a given period of time</p> <p>¹ The standards shall be reduced by 5 dBA for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards, then the noise level standards shall be increased at 5-dBA increments to encompass the ambient.</p> <p>² Interior-noise-level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.</p> <p>³ Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.</p> <p>⁴ Hospitals are often noise-generating uses. The exterior-noise-level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.</p> <p>⁵ The outdoor activity areas of these uses (if any), are not typically utilized during nighttime hours.</p> <p>Source: Solano County 2008</p>				

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact related to noise is considered significant if the proposed project would do any of the following:

- ▶ expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- ▶ result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- ▶ result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- ▶ expose persons to or generate excessive groundborne vibration or noise levels;
- ▶ for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public-use airport, expose people residing or working in the project area to excessive noise levels; or
- ▶ for a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

IMPACT ANALYSIS

IMPACT 4.3-1a Development of Noise-Sensitive Land Uses within Areas Subject to Noise Impacts – Preferred Plan.

*Future development of new noise-sensitive land uses would occur under the Preferred Plan within areas that either are currently affected by noise from both transportation and nontransportation noise sources, or will be in the future. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be **less than significant**.*

Under the Preferred Plan, future development of noise-sensitive uses (e.g., residential dwellings, schools, hospitals, parks, hotels, places of worship, libraries) would occur in areas that either are currently exposed to or will be exposed to future traffic, railroad, or aircraft noise levels exceeding 35 dBA L_{dn} for sensitive interior areas and 64 dBA L_{dn} for sensitive outdoor areas. Development would also occur within areas exposed to noise from nontransportation noise sources exceeding 55 dBA L_{eq} and 70 dBA L_{max} during the daytime and 50 dBA L_{eq} and 65 dBA L_{max} at night in outdoor areas; and 35 dBA L_{eq} and 50 dBA L_{max} at night for day and night for interior areas. Noise levels exceeding these standards (listed in Tables 4.3-9 and 4.3-10) would represent a significant impact.

Relevant Programs of the 2008 Draft General Plan

The Public Health and Safety chapter of the 2008 Draft General Plan includes the following implementation programs related to noise:

- ▶ **Program HS.I-65:** Develop, adopt, and implement a County noise ordinance that includes:
 - performance standards and exemptions;
 - restrictions on noise-emitting construction activities based on standards for construction equipment;

- regulations for mobile or single event types of noise emissions or noise generated by added equipment including truck loading and unloading, operation of construction equipment, and amplified music;
 - standards to ensure that the County personnel charged with enforcing such an ordinance are properly trained and equipped for on-site measurement techniques and other necessary tasks; and
 - standardized, broadly accepted documented procedures for noise measurement collection to ensure that field measurements are conducted in a consistent manner.
- ▶ **Program HS.I-66:** Trucks tend to generate noise in excess of applicable standards, but goods movement by truck is necessary to support the area's economy. Thus, continue to designate and maintain established truck routes where noise conflicts with land uses are least likely to occur.
 - ▶ **Program HS.I-67:** When reviewing new development proposals,
 - Require noise abatement measures to ensure that noise levels will not exceed those indicated in Tables HS-3 and HS-4 [of the 2008 Draft General Plan; see Tables 4.3-9 and 4.3-10].
 - Require buffering between noise-sensitive land uses and noise sources unless a detailed noise analysis is conducted and noise abatement measures can be taken to reduce noise to acceptable levels as shown on Tables HS-3 and HS-4 [of the 2008 Draft General Plan; see Tables 4.3-9 and 4.3-10].
 - Where development projects produce, or are affected by, nontransportation-related noise, require the inclusion of project features that will enable the project to achieve acceptable levels specified in Table HS-4 [of the 2008 Draft General Plan; see Table 4.3-10], as measured at outdoor activity areas of existing and planned noise-sensitive land uses.
 - Require noise mitigation to reduce construction and other short-term noise impacts as a condition of approval for development projects by applying the performance standards outlined in Table HS-5 [of the 2008 Draft General Plan; see Table 4.3-10]. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table HS-5 [see Table 4.3-10], as measured at outdoor activity areas of any affected noise sensitive land use except:
 - If the ambient noise level exceeds the standard in Table HS-5 [of the 2008 Draft General Plan; see Table 4.3-10], the standard becomes the ambient level plus 5 dB.
 - Reduce the applicable standards in Table HS-5 [of the 2008 Draft General Plan; see Table 4.3-10] by 5 dB if they exceed the ambient level by 10 or more dB.
 - Under the conditions outlined below, require acoustical studies to be prepared as part of the development review process to ensure adequate analysis of proposed development and incorporation of noise-reducing features in project designs. Acoustical studies with appropriate noise abatement measures will be required for all discretionary projects where any of the following conditions apply:
 - The project is located within the existing or future 60 dB CNEL transportation noise contours as measured at outdoor activity areas of noise-sensitive land uses.
 - The project will cause future traffic volumes to exceed 5,000 average daily trips on any roadway that fronts residential, institutional, and open space land uses or will cause traffic volume to increase by 25 percent or more, on any of these roadways.

- The project will introduce noise or vibration sources associated with mechanical equipment operations, entertainment, maintenance, and facility operations.
 - The project is a proposed residential use in the vicinity of existing and proposed commercial and industrial areas.
 - The project is proposed in an area where existing noise levels exceed acceptable levels in Table HS-4 as measured at outdoor activity areas of noise sensitive land uses.
- Where it is not possible to reduce noise levels in outdoor activity areas to 60 dB or less using practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB may be allowed, provided that all available exterior noise level reduction measures have been implemented.
- ▶ **Program HS.I-68:** Refer proposed development projects within areas requiring airport land use compatibility review to the Airport Land Use Commission. Ensure that new development complies with the noise standards contained within the Airport Land Use Compatibility Plans. Maintain buffers between the airports and incompatible land uses.
 - ▶ **Program HS.I-69:** Promote the use of berms, landscaping, setbacks, or architectural design for noise abatement, in addition to conventional wall barriers, to enhance aesthetics and minimize pedestrian barriers. Development of noise-sensitive land uses in areas exposed to existing or projected levels of noise from transportation, stationary sources, or agricultural operations exceeding, or estimated to exceed, levels specified in Table HS-2 [see Table 4.3-6] shall require transportation planning, traffic calming, site planning, buffering, sound insulation, or other methods to reduce noise exposure in outdoor activity areas and interior spaces to the levels specified in Table HS-2 [Table 4.3-6].
 - ▶ **Program HS.I-70:** Make public information readily available on noise abatement measures, the physical and psychological effects of noise on public health and welfare, and the meaning of noise levels and standards. Consider specific mailings to properties located in existing or projected 60 dB contours.
 - ▶ **Program HS.I-71:** Locate industrial and other noise-generating land uses away from noise-sensitive land uses and/or require substantial noise sources to be completely enclosed within buildings or structures.
 - ▶ **Program HS.I-72:** Identify locations and work with the California Department of Transportation to mitigate freeway noise in those locations where such noise adversely affects unincorporated residential land uses.

Conclusion

As described above, Program HS.I-67 in the 2008 Draft General Plan requires use of project-specific noise mitigation measures (completion of acoustical studies, use of buffering, and implementation of other noise abatement measures, as necessary) to mitigate this impact. Implementation of this program and others in the 2008 Draft General Plan, as described above, would reduce the potential for noise levels in areas of new noise-sensitive land uses to exceed the standards contained in Tables 4.3-9 and 4.3-10. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.3-1b **Development of Noise-Sensitive Land Uses within Areas Subject to Noise Impacts – Maximum Development Scenario.** *Future development of new noise-sensitive land uses would occur under the Maximum Development Scenario within areas that either are currently affected by noise from both transportation and nontransportation noise sources, or that will be in the future. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be less than significant.*

This impact is the same as Impact 4.3-1a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.3-2a **Development of Noise-Producing Uses near Existing Noise-Sensitive Land Uses – Preferred Plan.** *Under the Preferred Plan, future development of new noise-generating land uses could occur within areas containing noise-sensitive land uses. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be less than significant.*

Under the Preferred Plan, future development of noise-generating uses (e.g., industries, commercial loading docks, automotive maintenance facilities, recreational areas) in areas containing noise-sensitive land uses (e.g., residential dwellings, schools, hospitals, parks, hotels, places of worship, libraries) could cause noise levels to exceed acceptable limits as defined in Tables 4.3-9 and 4.3-10 and described in Impact 4.3-1a above.

However, as described in Impact 4.3-1a, programs in the 2008 Draft General Plan requires use of project-specific noise mitigation measures to mitigate this impact. Implementation of this program and others in the 2008 Draft General Plan would reduce the potential for noise levels from new noise-generating land uses to exceed the noise standards contained in Tables 4.3-9 and 4.3-10. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.3-2b **Development of Noise-Producing Uses near Existing Noise-Sensitive Land Uses – Maximum Development Scenario.** *Under the Maximum Development Scenario, future development of new noise-generating land uses could occur within areas containing noise-sensitive land uses. However, the 2008 Draft General Plan would also include implementation programs to reduce the potential for noise levels to exceed established standards. This impact would be less than significant.*

This impact is the same as Impact 4.3-2a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.3-3a Traffic Noise Level Increases Caused by Development Consistent with the 2008 Draft General Plan – Preferred Plan. *Implementation of the 2008 Draft General Plan under the Preferred Plan would result in greater traffic volumes on county roadways than currently exists. The greater traffic volumes would result in increased traffic noise on county roadways. This impact would be significant.*

Implementation of the Preferred Plan, along with regional growth and traffic conditions, would cause changes in traffic noise levels generally ranging from a decrease of 2 dBA to an increase of 5 dBA relative to existing traffic noise levels, with a 12-dBA increase projected on one roadway segment, as indicated in Table 4.3-8. Because a traffic noise level increase of 1.5 dBA to 5 dBA L_{dn} is commonly considered the threshold of significance, depending on existing levels without the project, the project thresholds of significance would be exceeded. As a result, this impact would be significant.

Mitigation Measure 4.3-3a: Adopt Countywide Noise Reduction Program.

The County shall adopt a countywide noise reduction program to reduce traffic and other noise levels countywide. The program shall include, but shall not be limited to, the following specific elements for noise abatement consideration where reasonable and feasible:

- ▶ Noise barrier retrofits
- ▶ Truck usage restrictions
- ▶ Reduction of speed limits
- ▶ Use of quieter paving materials
- ▶ Building façade sound insulation
- ▶ Traffic calming
- ▶ Additional enforcement of speed limits and exhaust noise laws
- ▶ Signal timing

It is recognized that the above 2008 Draft General Plan policies and Mitigation Measure 4.3-4a, used individually or collectively, can result in a reduction of traffic noise levels at affected sensitive receptor locations. Nonetheless, despite the implementation of such a noise abatement program, it is infeasible to ensure that existing residential uses will not be exposed to future traffic noise levels exceeding the County's noise standards or significantly exceeding levels they are exposed to today. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.3-3b Noise Impacts Associated with Caused by Development Consistent with the 2008 Draft General Plan – Maximum Development Scenario. *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario would result in greater traffic volumes on County roadways than exist today. The greater traffic volumes would result in increased traffic noise on county roadways. This impact would be significant.*

This impact is the same as Impact 4.3-3a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.3-3b: Adopt Countywide Noise Reduction Program.

This mitigation measure is the same as Mitigation Measure 4.3-3a for the Preferred Plan. For the same reasons as described above, with implementation of this mitigation measure, the impact would be reduced, but the impact would remain **significant and unavoidable**.

IMPACT 4.3-4a Possible Temporary, Short-Term Exposure of Sensitive Receptors to Vibration. *Construction of projects under the 2008 Draft General Plan could cause a temporary, short-term disruptive vibration if it were to occur*

near sensitive receptors. This impact would be *potentially significant*.

Construction and demolition activities associated with future projects implemented under the 2008 Draft General Plan have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used, the location of construction activities relative to receptors, and the operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Also, the type and density of soil can affect the transmission of energy. Table 4.3-11 displays vibration levels for typical construction equipment.

The required construction equipment for future projects is not known at this time, but it could include maximum generation of vibration from trucks and bulldozers. According to the Federal Transit Administration, vibration levels associated with the use of such equipment would be approximately 0.089 in/sec PPV and 87 VdB (referenced to 1 μ in/sec and based on the root mean square velocity amplitude) at 25 feet, as shown in Table 4.3-11. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels would not exceed 0.2 in/sec PPV (Caltrans's recommended standard with respect to the prevention of structural damage for normal buildings), but would exceed 80 VdB (FTA's maximum-acceptable vibration standard with respect to human annoyance for residential uses) within 60 feet of vibration-sensitive receptors.

Table 4.3-11 Typical Vibration Levels for Construction Equipment			
Equipment		PPV at 25 Feet (in/sec)	Approximate L _v at 25 Feet
Pile Driver (Impact)	Upper Range	1.518	112
	Typical	0.644	104
Pile Driver (Sonic)	Upper Range	0.734	105
	Typical	0.170	93
Large Bulldozer		0.089	87
Drill		0.089	87
Truck		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58
Significance Threshold		0.2/0.08 ¹	80
Notes: in/sec = inches per second; L _v = the velocity level in decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude; PPV = peak particle velocity ¹ For normal residential buildings and for buildings more susceptible to structural damage, respectively. Sources: Caltrans 2002, FTA 2006			

Depending on the nature of the future projects, existing vibration-sensitive receptors could be within 60 feet of proposed construction sites. Temporary, short-term vibration levels from project construction sources could exceed FTA's maximum-acceptable vibration standard of 80 VdB with respect to human response for residential uses (i.e., annoyance) at vibration-sensitive land uses. More importantly, if construction activities were to occur during the more noise-sensitive hours, vibration from construction sources could annoy and/or disrupt the sleep of occupants of existing and proposed residences and expose persons to excessive groundborne vibration or groundborne noise levels. No policies or implementation programs of the 2008 Draft General Plan are available to reduce this impact. Therefore, this impact would be potentially significant.

Mitigation Measure 4.3-4a: Require Implementation of Measures to Reduce Temporary, Short-Term Project-Generated Vibration Levels from Construction.

To reduce impacts associated with vibration generated during construction/demolition activities, the County shall require future project applicants to conform to the following requirements:

- ▶ All construction activities shall be limited to the hours of 7 a.m.–6 p.m. Painting, interior finish work, and other generally quiet activities may be allowed outside of these hours provided that construction noise does not exceed ambient noise levels by 10 dBA at nearby sensitive receptors.
- ▶ All construction equipment shall be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications.
- ▶ Construction equipment shall be staged and construction employee parking shall be located as far as possible from any sensitive receptors. For the purposes of this project, sensitive receptors are residential dwellings and the community park.
- ▶ Stationary equipment with substantial potential to result in vibration (e.g., pile drivers) shall be placed away from existing vibration-sensitive receptors (including residences constructed during earlier phases) and/or acoustical shielding shall be provided.
- ▶ A disturbance coordinator shall be designated and the name and phone number of this person shall be posted conspicuously at the site. The disturbance coordinator shall respond to complaints about vibration and shall take the steps necessary to mitigate the problem in a timely fashion.
- ▶ Access to the site by construction-related truck traffic shall be limited to the hours of 7 a.m.–6 p.m., Monday–Sunday, unless a special permit is issued to the project applicant by the County.

Implementation of this mitigation measure would reduce the impact to a **less-than-significant** level.

IMPACT 4.3-4b Possible Temporary, Short-Term Exposure of Sensitive Receptors to Vibration. *Construction of projects under the 2008 Draft General Plan could cause a temporary, short-term disruptive vibration if it were to occur near sensitive receptors. This impact would be **potentially significant**.*

This impact is the same as Impact 4.3-4a for the Preferred Plan. For the same reasons as described above, this impact would be potentially significant.

Mitigation Measure 4.3-4b: Require Implementation of Measures to Reduce Temporary, Short-Term Project-Generated Vibration Levels from Construction.

This mitigation measure is the same as Mitigation Measure 4.3-4a for the Preferred Plan. Implementation of this mitigation measure would reduce the impact to a **less-than-significant** level.

4.3.4 RESIDUAL SIGNIFICANT IMPACTS

Despite the implementation of the noise abatement program described in Mitigation Measure 4.3-3a for the Preferred Plan and Mitigation Measure 4.3-3b for the Maximum Development Scenario, it is infeasible to ensure that existing residential uses will not be exposed to future traffic noise levels exceeding the County's noise standards or significantly exceeding levels they are exposed to today. As a result, Impacts 4.3-3a and 4.3-3b would remain **significant and unavoidable**.

4.4 TRANSPORTATION AND CIRCULATION

This section describes the existing transportation systems in Solano County, characterizes the different modes of transportation, discusses the adopted transportation plans and policies pertinent to transportation in the area, and effects on transportation and circulation associated with the 2008 Draft General Plan. This analysis addresses countywide and regional transportation impacts and identifies mitigation measures to lessen those impacts. A more detailed technical analysis is also provided in Appendix D.

4.4.1 EXISTING CONDITIONS

MODES OF TRANSPORTATION

Transportation in Solano County is provided through many different transportation modes. The modes present various mobility choices for county residents, employees, and visitors, depending on their destinations and reasons for their trips. Existing transportation opportunities offer different travel times.

The longest trips on the transportation network are taken by persons commuting to work. Commuters often utilize the transportation network during the mornings and afternoons, creating the most congestion on a regional basis. Table 4.4-1 summarizes the modes used by county residents when they commuted to work during 2000, when the last large survey was taken. These data show that the largest percentage of Solano County residents commute in single-occupant vehicles, and that carpoolers are another significant share of Solano County commuters. Other modes represent small shares of commuters.

Place of Work	Total No. of Persons	Percentage Using Each Commuting Mode						
		Drive Alone	Carpool 2	Carpool 3+	Transit	Bicycle/ Walk	Other	Work at Home
San Francisco	10,385	40%	15%	26%	18%	0%	1%	0%
San Mateo County	2,880	59%	14%	25%	1%	1%	0%	0%
Santa Clara County	1,605	77%	15%	6%	0%	2%	1%	0%
Alameda County	12,590	69%	15%	10%	6%	0%	1%	0%
Contra Costa County	22,020	80%	12%	7%	1%	0%	0%	0%
Solano County	93,790	80%	11%	3%	1%	3%	1%	6%
Napa County	8,255	78%	14%	7%	1%	0%	0%	0%
Sonoma County	2,335	70%	15%	13%	1%	1%	1%	0%
Marin County	4,420	74%	15%	9%	1%	0%	0%	0%
San Joaquin County	330	88%	5%	7%	0%	1%	0%	0%
Sacramento Region	8,440	82%	9%	7%	1%	0%	0%	0%
Lake County	10	0%	0%	0%	0%	0%	0%	0%
Other	21,368	37%	10%	17%	9%	0%	1%	0%
Total	173,558	74%	11%	6%	3%	2%	1%	3%

Source: U.S. Census Bureau 2000

Roadway System and Classification

The county's roadway network comprises a hierarchy of roads with different classifications and characteristics. The normal hierarchy of roadways includes freeway, major highways, arterial roadways, collector roadways, and local streets. A map of this classification is shown in Exhibit 4.4-1.

The Solano County roadway system is dominated by Interstate 80 (I-80), which runs southwest to northeast, connecting the three largest cities in the county—Vallejo, Fairfield, and Vacaville—as well as Dixon. This freeway facility carries a sizeable amount of through traffic between the core of the San Francisco Bay Area and the Sacramento region. This facility has six to 10 lanes at various points within Solano County and is accessed by a series of freeway interchanges.

Solano County's roadway system consists of several types of roadways: freeways, arterial roads, collector roads, and local roads. Typically, these roadways are defined according to use, and the appropriate geometric features of the roadways will vary based on a variety of conditions. The respective categories of roadways are described below.

The Solano County roadway system is constrained and influenced by prominent geographic features in the county such as water bodies and the Coast Range. These barriers restrict the route options that drivers have when entering or exiting the county. Routes that are not restricted serve as gateways to the county. The “screenlines” (geographic delineations between areas that encompass several roadways) described in this section include those gateway points.

Freeways

The facilities, also known as “Super-highways” in the *Solano County Road Improvement Standards and Land Development Requirements* (County Road Improvement Standards) (Solano County 2006), are designed to have limited-access operation without any signalized control. Instead, all roadway access is limited to ramps.

The County uses the American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004) to define freeways and design considerations. Solano County has four designated freeways, which are maintained by the California Department of Transportation (Caltrans): *I-80* from the Contra Costa County line to Yolo County line. This freeway, the major trunk route for Solano County, varies between three and four lanes for traffic in each direction.

- ▶ *I-505* from I-80 to the Yolo County line. This facility, which connects Solano County with the northern Sacramento Valley and I-5, has two lanes in each direction.
- ▶ *I-680* from I-80 to the Contra Costa County line. This roadway, which connects Solano County with central Contra Costa County and points south, has two lanes in each direction between I-780 and I-80. The southernmost segment of I-680 in Solano County is the Benicia-Martinez Bridge, which has three to four lanes in each direction.
- ▶ *I-780* from I-80 to I-680. This freeway segment between Vallejo and Benicia has two lanes in each direction.

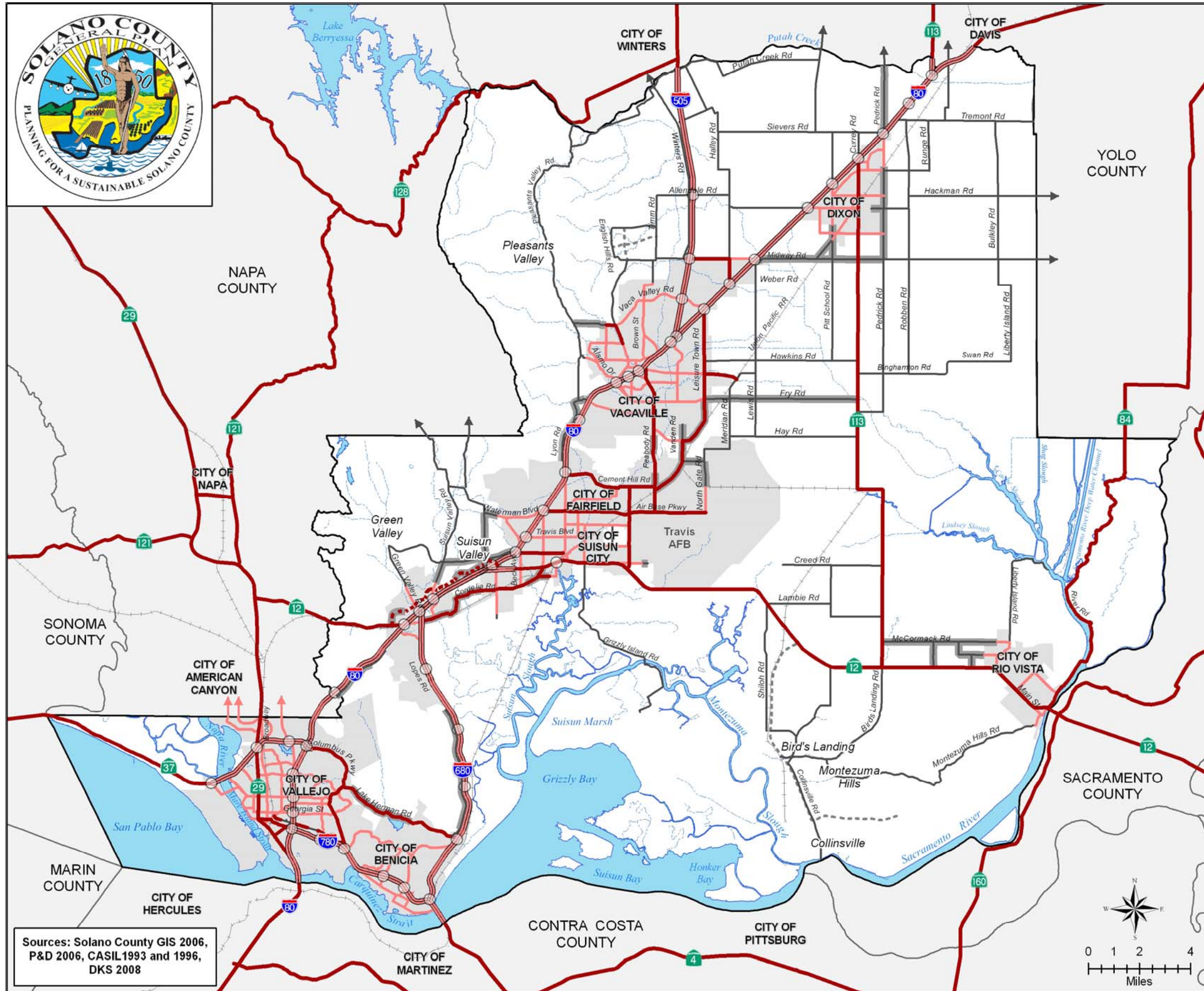
In addition, portions of State Route (SR) 37 and SR 12 in Solano County currently are designed to freeway standards; however, these sections are not within the unincorporated area of the county.



Solano County General Plan EIR

Exhibit 4.4-1

Proposed Roadway Classification Map



Legend

- County Routes of Regional Significance
- Intersections
- Existing Roadways
 - Freeway
 - Major Arterial
 - Minor Arterial
 - Collector
- Planned Roadways
 - Planned Major Arterial
 - Planned Collector
- Basemap Layers
 - Railroads
 - Streams and Creeks
 - Major Water Features
 - Municipal Service Areas
 - Adjacent Counties

Sources: Solano County GIS 2006, P&D 2006, CASIL1993 and 1996, DKS 2008



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Arterial Roadways

A number of additional arterial roadways connect various activity centers in Solano County through unincorporated portions of the county. There are two-lane or four-lane facilities that are controlled by signalized or unsignalized intersections. The following roadways are classified as major arterial roadways:

- ▶ *Curtola Parkway*—Portions in unincorporated Solano County near Vallejo
- ▶ *SR 113*—From west of Rio Vista to I-80, and a short segment of interchange adjacent to the Yolo County line near Davis
- ▶ *SR 12*—Between Rio Vista and Suisun City, and between Fairfield and the Napa County line
- ▶ *SR 29*—Portions in unincorporated Solano County near Vallejo
- ▶ *SR 37*—Portions in unincorporated Solano County west of Vallejo
- ▶ *Peabody Road*—A small portion between Vacaville and Fairfield
- ▶ *River Road (SR 84)*—From north of Rio Vista to Yolo County line

Within this classification, there are both urban and rural categories, which govern the speed, cross section, and other geometric treatments, although the functions of these remain the same.

A secondary class of roadways, called other principal arterial roadways, is also found in Solano County. These facilities generally serve to connect destinations inside the incorporated areas.

Collector and Local Roadways

Collector roadways serve as key connecting facilities to the freeway, highway, and arterial roadway system. In the unincorporated areas, these provide access between rural districts and the overall roadway network. Some collector roadways in rural areas are considered major, while others are considered minor, based on the importance of the roadway segment. A master list of collector roads is provided in Appendix D.

Finally, local roads provide access to the various parcels of property in Solano County. Local traffic on these roads are low, as they are used primarily to serve local portions of trips that otherwise would travel on the other higher-speed roadways. Many of these streets are designed and maintained for only low volumes of traffic.

Level of Service Methodology and Existing Roadway Capacity

Traffic conditions on roadways and at intersections are generally characterized by the “level of service” (LOS). LOS is a term commonly used to quantify the experience of using roadways when the amount of additional traffic is considered and is therefore a relative measure of traffic congestion. An examination of roadway segment volumes provides an indication of the overall usage. When compared to the capacity of the facility, a relative level of congestion can be determined. LOS is also used as a planning tool used to determine highway deficiencies.

According to the County Road Improvement Standards (Solano County 2006) and the Caltrans *Highway Design Manual* (Caltrans 2006), methods of determining LOS are guided by the *Highway Capacity Manual* published by the Transportation Research Board. The *Highway Capacity Manual* (TRB 2000) establishes six levels of service to cover the entire range of traffic operations on highway facilities, designated “A” through “F” from best to worst. Each LOS includes a range of operating conditions bounded by values of travel speed and by the ratio of volume to capacity. Table 4.4-2 provides definitions of LOS provided by the Transportation Research Board.

Table 4.4-2 Definitions of Levels of Service	
Level of Service	Definition
LOS A	Free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.
LOS B	In the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desire speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.
LOS C	In the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.
LOS D	High-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
LOS E	Operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to “give way” to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because even small increases in flow or minor perturbations within the traffic stream will cause breakdowns.
LOS F	Forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse it and queues begin to form. Operations within the queue are characterized by stopping and starting. Over and over, vehicles may progress at reasonable speeds for several hundred feet or more, and then be required to stop. LOS F is used to describe operating conditions within the queue especially at the point of the breakdown, although it is noted that traffic may resume to normal conditions quite rapidly once free of the queue.
Note: LOS = level of service Sources: TRB 1980, 2000	

The County Road Improvement Standards define LOS C as the design standard for the county. Based on this, a generalized LOS based on the volume/capacity ratio has been developed using a model created by the Florida Department of Transportation. This model has been used by a variety of local jurisdictions such as Napa County and the City of Fairfield; it provides a generalized LOS designation for illustrative purposes, and is the standard approach in the profession for determining roadway capacity and function. Table 4.4-3 describes methods used to calculate LOS in the most recent *Highway Capacity Manual* as well as the generalized LOS measure.

Solano County’s roadway system was assessed according to a number of roadway segments considered representative of the county’s overall roadway network. Counts or volumes on these roadways were obtained through several different sources. The preferred counts used were weekday average daily traffic (ADT) LOS. This approach was used because the County Road Improvement Standards are based on ADT.

As summarized in Table 4.4-3, the analysis focused on road segments because of the nature of the general plan process, as opposed to a site-specific development proposal. For each of the roadway segments selected for analysis, an existing and future roadway classification was assigned as a freeway, an urban roadway, or a rural

roadway. The methodology used for the LOS analysis was developed to be consistent with the *Highway Capacity Manual*, 2000 edition (TRB 2000).

Table 4.4-3 Level of Service Criteria and Description				
No. of Lanes	Annual Average Daily Volume			
	LOS A-C	LOS D	LOS E	LOS F
Freeways				
4	≤ 52,000	≤ 67,200	≤ 76,500	> 76,500
6	≤ 81,700	≤ 105,800	≤ 120,200	> 120,200
8	≤ 111,400	≤ 144,300	≤ 163,900	> 163,900
10	≤ 41,200	≤ 182,600	≤ 207,600	> 207,600
12	≤ 170,900	≤ 221,100	≤ 251,200	> 251,200
Urban Roadway Segments				
2	≤ 11,200	≤ 15,400	≤ 16,300	> 16,300
4	≤ 26,000	≤ 32,700	≤ 34,500	> 34,500
6	≤ 40,300	≤ 49,200	≤ 51,800	> 51,800
8	≤ 53,300	≤ 63,800	≤ 67,000	> 67,000
Rural Roadway Segments				
2	≤ 15,000	≤ 21,300	≤ 27,100	> 27,100
4	≤ 47,800	≤ 61,800	≤ 70,200	> 70,200
6	≤ 71,600	≤ 92,700	≤ 105,400	> 105,400
Note: LOS = Level of service				
Source: Florida Department of Transportation 2008				

Weekday Traffic Conditions for 2007

The Solano/Napa regional travel demand model was developed by examining recent traffic counts for a.m. and p.m. peak hours. Using existing ratios for peak-hour to daily traffic, an approximation of the various ADT volumes has been developed along key roadway segments. Table 4.4-4 summarizes these draft findings for roadways and “screenlines” that provide geographic delineations between areas that encompass several roadways.

Using the generalized LOS methodology described in Table 4.4-3, recent daily traffic estimates suggest that traffic congestion occurs on various key roadways across the county. Estimates of daily level of service are also shown in Table 4.4-4. Congestion has been estimated to exceed LOS C in one direction at the following locations:

- ▶ SR 12 (Rio Vista Bridge) (LOS F)
- ▶ SR 37 between Vallejo and the Sonoma County line (LOS F)
- ▶ I-80 at the Carquinez Bridge (LOS F)
- ▶ SR 29 at the Napa County line (LOS F)
- ▶ SR 12 at the Napa County line (LOS F)
- ▶ SR 29 north of Tennessee Street (LOS F)

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
South Gateway	Eastbound	I-80	East of Carquinez Bridge	55,000	A-C
	Northbound	I-680	At Benicia Bridge	62,000	A-C
	Westbound	SR 12	East of Junction with SR 84 North	10,000	F
	Eastbound	SR 37	East of Walnut Avenue (Mare Island)	19,000	F
	Westbound	I-80	East of Carquinez Bridge	72,000	F
	Southbound	I-680	At Benicia Bridge	66,000	A-C
	Eastbound	SR 12	East of Junction with SR 84 North	8,000	F
	Westbound	SR 37	East of Walnut Avenue (Mare Island)	16,000	E
South Gateway	Out	Subtotal		162,000	
North Gateway	Westbound	SR 128	East of Junction with SR 121 South	2,000	A-C
	Southbound	Pleasants Valley Road	At Yolo County Line	<1000	A-C
	Southbound	Road 89/Winters Road	At Yolo County Line	1,000	A-C
	Southbound	I-505	North of Allendale Road Interchange	8,000	A-C
	Southbound	Stevenson Bridge Road	At Yolo County Line	<1000	A-C
	Southbound	Pedrick Road-Road 98	At Yolo County Line	1,000	A-C
	Southbound	SR 113	North of I-80 (near Davis)	25,000	A-C
	Westbound	I-80	At Yolo County Line	57,000	A-C
	Southbound	SR 84	At Yolo County Line	1,000	A-C
North Gateway	In	Subtotal		95,000	
North Gateway	Eastbound	SR 128	East of Junction with SR 121 South	3,000	A-C
	Northbound	Pleasants Valley Road		<1000	A-C
	Northbound	Road 89/Winters Road		1,000	A-C
	Northbound	I-505	North of Allendale Road Interchange	8,000	A-C
	Southbound	Stevenson Bridge Road		<1000	A-C
	Northbound	Pedrick Road-Road 98		1,000	A-C
	Northbound	SR 113	North of I-80 (near Davis)	26,000	A-C
	Eastbound	I-80	Solano-Yolo County Line	58,000	A-C
Northbound	SR 84	At Solano-Yolo County Line	1,000	A-C	
North Gateway	Out	Subtotal		98,000	

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
Napa-Solano County Line	Northbound	SR 29	At Napa County Line	23,000	F
	Westbound	SR 12	At Napa County Line	18,000	F
	Northbound	Suisun Valley Road	At Napa County Line	2,000	A-C
Napa-Solano County Line	Out	Subtotal		43,000	
Napa-Solano County Line	Southbound	SR 29	At Napa County Line	27,000	F
	Eastbound	SR 12	At Napa County Line	20,000	F
	Southbound	Suisun Valley Road	At Napa County Line	3,000	A-C
Napa-Solano County Line	In	Subtotal		49,000	
Vallejo East-West	Northbound	Wilson Avenue	North of Tennessee Street	7,000	D
	Northbound	Sacramento Street	North of Tennessee Street	4,000	A-C
	Northbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	18,000	F
	Northbound	Broadway	North of Tennessee Street	8,000	A-C
	Northbound	Tuolumne Street	North of Tennessee Street	6,000	D
	Eastbound	I-80	North of Tennessee Street	60,000	F
	Northbound	Oakwood Avenue	North of Tennessee Street	4,000	A-C
	Northbound	Columbus Parkway	North of Tennessee Street	7,000	D
Vallejo East-West	Northbound	Subtotal		114,000	
Vallejo East-West	Southbound	Wilson Avenue	North of Tennessee Street	8,000	F
	Southbound	Sacramento Street	North of Tennessee Street	4,000	A-C
	Southbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	21,000	F
	Southbound	Broadway	North of Tennessee Street	8,000	A-C
	Southbound	Tuolumne Street	North of Tennessee Street	5,000	A-C
	Westbound	I-80	North of Tennessee Street	70,000	F
	Southbound	Oakwood Avenue	North of Tennessee Street	5,000	A-C
	Southbound	Columbus Parkway	North of Tennessee Street	7,000	D
Vallejo East-West	Southbound	Subtotal		128,000	
Vallejo I-80	Southbound	Sonoma Boulevard (SR 29)	North of I-80	13,000	A-C
	Eastbound	Magazine Street	West of Sixth Street	3,000	A-C
	Eastbound	Curtola Parkway	West of Lemon Street	21,000	D
	Eastbound	Benicia Road	East of Lemon Street	3,000	A-C
	Eastbound	Georgia Street	West of 14th Street	6,000	A-C

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
Vallejo I-80	Eastbound	Solano Avenue	West of Phelan Avenue	3,000	A-C
	Eastbound	Tennessee Street	West of Mariposa Street	13,000	A-C
	Eastbound	Redwood Parkway	West of Fairgrounds Drive	19,000	F
	Eastbound	SR 37	West of I-80	42,000	D
Vallejo I-80	Eastbound	Subtotal		123,000	
Vallejo I-80	Northbound	Sonoma Boulevard (SR 29)	North of I-80	11,000	A-C
	Westbound	Magazine Street	West of Sixth Street	4,000	A-C
	Westbound	Curtola Parkway	West of Lemon Street	16,000	A-C
	Westbound	Benicia Road	East of Lemon Street	4,000	A-C
	Westbound	Georgia Street	West of 14th Street	4,000	A-C
	Westbound	Solano Avenue	West of Phelan Avenue	5,000	A-C
	Westbound	Tennessee Street	West of Mariposa Street	12,000	A-C
	Westbound	Redwood Parkway	West of Fairgrounds Drive	21,000	F
	Westbound	SR 37	West of I-80	35,000	A-C
Vallejo I-80	Westbound	Subtotal		112,000	
Napa-Solano Ridge	Eastbound	I-780	West of Military West (Benicia)	46,000	F
	Eastbound	Lake Herman Road	East of Columbus Parkway	3,000	A-C
	Eastbound	I-80 (north)	East of American Canyon Road	55,000	A-C
	Eastbound	SR 12	At Napa County Line	20,000	F
Napa-Solano Ridge	Eastbound	Subtotal		123,000	
Napa-Solano Ridge	Westbound	I-780	West of Military West (Benicia)	46,000	F
	Westbound	Lake Herman Road	East of Columbus Parkway	2,000	A-C
	Westbound	I-80 (north)	East of American Canyon Road	62,000	D
	Westbound	SR 12	At Napa County Line	18,000	F
Napa-Solano Ridge	Westbound	Subtotal		128,000	
South of American Canyon– Cordelia	Northbound	SR 29	Solano-Napa Co Line	23,000	F
	Eastbound	I-80 (south)	North of SR 37	53,000	A-C
	Northbound	I-680	North of Marshview Road	32,000	D
South of American Canyon– Cordelia	Eastbound	Subtotal		108,000	

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
South of American Canyon–Cordelia	Southbound	SR 29	Solano-Napa County Line	27,000	F
	Westbound	I-80 (south)	North of SR 37	61,000	D
	Southbound	I-680	North of Marshview Road	32,000	D
South of American Canyon–Cordelia	Westbound	Subtotal		120,000	
Fairfield-Cordelia	Eastbound	Rockville Road	East of Suisun Valley Road	5,000	A–C
	Eastbound	I-80	East of Suisun Valley Road	97,000	F
Fairfield-Cordelia	Eastbound	Cordelia Road	West of Hale Ranch Road	4,000	A–C
	Eastbound	North Connector	East of Suisun Valley Road	NA	NA
Fairfield-Cordelia	Eastbound	Subtotal		106,000	
Fairfield-Cordelia	Westbound	Rockville Road	East of Suisun Valley Road	5,000	A–C
	Westbound	I-80	East of Suisun Valley Road	161,000	F
	Westbound	Cordelia Road	West of Hale Ranch Road	5,000	A–C
	Westbound	North Connector	East of Suisun Valley Road	NA	NA
Fairfield-Cordelia	Westbound	Subtotal		171,000	
Fairfield I-80	Eastbound	SR 12	West of Beck Avenue (Leg A)	22,000	F
	Eastbound	W Texas Street	East of I-80 (#101)	11,000	A–C
	Eastbound	Travis Boulevard	East of I-80 (#84)	16,000	A–C
	Eastbound	Air Base Parkway	East of I-80 (#53)	32,000	F
	Southbound	N Texas Street	East of I-80 (#40)	12,000	A–C
Fairfield I-80	Eastbound	Subtotal		93,000	
Fairfield I-80	Westbound	SR 12	West of Beck Avenue (Leg A)	28,000	F
	Westbound	W Texas Street	East of I-80 (#101)	5,000	A–C
	Westbound	Travis Boulevard	East of I-80 (#84)	17,000	A–C
	Westbound	Air Base Parkway	East of I-80 (#53)	27,000	F
	Northbound	N Texas Street	East of I-80 (#40)	12,000	A–C
Fairfield I-80	Westbound	Subtotal		89,000	
Fairfield–Suisun City	Eastbound	Cordelia Street	East of Pennsylvania Avenue	1,000	A–C
	Eastbound	SR 12	East of Pennsylvania Avenue	26,000	A–C
	Southbound	Sunset Avenue	South of Travis Boulevard (#16)	12,000	F
	Eastbound	E Tabor Avenue	East of Tolenas Avenue (#7)	4,000	A–C

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
Fairfield–Suisun City	Eastbound	Air Base Parkway	West of railroad tracks (#8)	18,000	F
	Southbound	Peabody Road	North of Cement Hill Road	12,000	E
Fairfield–Suisun City	Eastbound	Subtotal		73,000	
Fairfield–Suisun City	Westbound	Cordelia Street	East of Pennsylvania Avenue	1,000	A–C
	Westbound	SR 12	East of Pennsylvania Avenue	28,000	D
	Northbound	Sunset Avenue	South of Travis Boulevard (#16)	12,000	F
	Westbound	E Tabor Avenue	East of Tolenas Avenue (#7)	4,000	A–C
	Westbound	Air Base Parkway	West of railroad tracks (#8)	18,000	F
	Northbound	Peabody Road	North of Cement Hill Road	13,000	E
Fairfield–Suisun City	Westbound	Subtotal		77,000	
Suisun City West	Eastbound	SR 12	East of Scandia Road	7,000	A–C
	Southbound	Collinsville Road	South of SR 12	<1000	A–C
Suisun City West	Eastbound	Subtotal		7,000	
Suisun City West	Westbound	SR 12	East of Scandia Road	8,000	D
	Northbound	Collinsville Road	South of SR 12	<1000	A–C
Suisun City West	Westbound	Subtotal		8,000	
Fairfield-Vacaville	Eastbound	I-80	East of Pleasants Valley	73,000	E
	Northbound	Peabody Road	North of Cement Hill Road	13,000	E
	Northbound	Vanden Road	South of Leisure Town Road	3,000	A–C
	Northbound	SR 113	North of SR 12	2,000	A–C
Fairfield-Vacaville	Northbound	Subtotal		91,000	
Fairfield-Vacaville	Westbound	I-80	East of Pleasants Valley	79,000	E
	Southbound	Peabody Road	North of Cement Hill Road	12,000	E
	Southbound	Vanden Road	South of Leisure Town Road	3,000	A–C
	Southbound	SR 113	North of SR 12	3,000	A–C
Fairfield-Vacaville	Southbound	Subtotal		96,000	

**Table 4.4-4
Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
Vacaville I-80	Southbound	Alamo Drive	North of Marshall Road	7,000	A-C
	Southbound	Davis Street	South of Bella Vista Road	3,000	A-C
	Eastbound	Mason Street-Elmira Road	West of Peabody Road	17,000	E
	Southbound	Allison Drive	East of I-80	9,000	A-C
	Southbound	Nut Tree Road	North of Burton Drive	8,000	A-C
	Southbound	Leisure Town Road	North of Orange Drive	10,000	F
Vacaville I-80	Southbound	Subtotal		52,000	
Vacaville I-80	Northbound	Alamo Drive	South of Marshall Road	16,000	D
	Northbound	Davis Street	South of Bella Vista Road	3,000	A-C
	Westbound	Mason Street-Elmira Road	East of Peabody Road	15,000	D
	Northbound	Allison Drive	East of I-80	7,000	A-C
	Northbound	Nut Tree Road	South of Burton Drive	10,000	A-C
	Northbound	Leisure Town Road	South of Orange Drive	7,000	D
Vacaville I-80	Northbound	Subtotal		58,000	
Vacaville-Dixon	Northbound	Pleasants Valley Road	North of Vaca Valley Parkway	<1000	A-C
	Northbound	I-505	South of Midway Road	14,000	A-C
	Eastbound	I-80	East of Leisure Town Road	53,000	A-C
	Northbound	Batavia Road	South of Dixon City Limits	<1000	A-C
	Northbound	Pitt School Road	South of Dixon City Limits	<1000	A-C
	Northbound	SR 113	South of Dixon City Limits	2,000	A-C
Vacaville-Dixon	Northbound	Subtotal		70,000	
Vacaville-Dixon	Southbound	Pleasants Valley Road	North of Vaca Valley Parkway	<1000	A-C
	Southbound	I-505	South of Midway Road	14,000	A-C
	Westbound	I-80	East of Leisure Town Road	52,000	A-C
	Southbound	Batavia Road	South of Dixon City Limits	<1000	A-C
	Southbound	Pitt School Road	South of Dixon City Limits	<1000	A-C
	Southbound	SR 113	South of Dixon City Limits	2,000	A-C
Vacaville-Dixon	Southbound	Subtotal		68,000	

**Table 4.4-4
 Estimated Roadway Daily Volumes and Levels of Service—Existing Conditions (2007)**

Screenline	Direction	Street	Location	Daily Traffic	Level of Service
Dixon I-80	Eastbound	Dixon Avenue	East of Gateway Drive	6,000	A-C
	Southbound	Pitt School Road	North of Market Lane	3,000	A-C
	Southbound	SR 113	South of I-80	6,000	D
Dixon I-80	Southbound	Subtotal		15,000	
Dixon I-80	Westbound	Dixon Avenue	East of Gateway Drive	6,000	D
	Northbound	Pitt School Road	North of Market Lane	3,000	A-C
	Northbound	SR 113	South of I-80	4,000	D
Dixon I-80	Northbound	Subtotal		14,000	
Notes:					
I-80 = Interstate 80; I-505 = Interstate 505; SR = State Route					
Source: Data provided by DKS Associates in 2008					

- ▶ I-80 between Benicia Road and Redwood Street (LOS F)
- ▶ I-80 at Cordelia (LOS F)
- ▶ SR 12 west of Beck Avenue (LOS F)
- ▶ I-780 between I-80 and I-680 (LOS F)
- ▶ Air Base Parkway (LOS F)
- ▶ Peabody Road north of Vanden Road (LOS E)
- ▶ Peabody Road south of Vanden Road (LOS F)
- ▶ I-80 east of Pleasants Valley Road (LOS E)
- ▶ Rockville Road east of Suisun Valley Road (LOS F)
- ▶ Sunset Boulevard south of Travis Boulevard (LOS F)

Roadway Projects to be Completed by 2030

An examination of traffic changes anticipated during the study year informs the 2008 Draft General Plan by identifying what major concerns are likely to develop. Because most travel in the county occurs using private, single-occupant vehicles, the impact of traffic growth combined with the construction of related roadway improvement projects influences how traffic concerns will materialize in the next several years.

The development of background traffic forecasts provided by the Solano/Napa Travel Model assumes local land use growth as well as new background highway projects. This model contains local and out-of-county growth assumptions for households and employment (as defined in regional transportation planning processes in the Bay Area and the Sacramento region), and applies this to the roadway network, consisting of today's network plus major roadway widening projects that have been identified in various plans.

Highway Projects

In the Arterials, Highways, and Freeways Element of the *Solano Comprehensive Transportation Plan* (Solano Transportation Authority 2005a), a compendium of needs by jurisdictions was assembled. The following projects have already been identified as major needs on Routes of Regional Significance in the unincorporated portions of Solano County:

- ▶ I-80 project: Widen from Leisure Town Road to Kidwell Road
- ▶ I-80 project: Widen from Vallejo to SR 37
- ▶ I-80/I-680/SR 12 interchange project
- ▶ SR 12 project: Widen from I-80 to SR 29 (i.e., on Jamieson Canyon Road)
- ▶ SR 12 project: Improve from I-80 to Rio Vista (specific improvements not determined at this point)
- ▶ Jepson Parkway project
- ▶ North Connector project
- ▶ Peabody Road widening

The Solano Transportation Authority has determined that a number of major highway projects will be completed by 2030. The future year of the Solano/Napa Travel Model reflects these projects, as listed in Appendix D. Some key projects included in this list are:

- ▶ Addition of high-occupancy vehicle (HOV) lanes on I-80 between Red Top Road and Air Base Parkway
- ▶ Addition of two lanes on SR 12 (Jamieson Canyon Road) between SR 29 in Napa County and Red Top Road
- ▶ Construction of the North Connector between SR 12 and Abernathy Road
- ▶ Widening of Columbus Parkway between I-80 and I-780
- ▶ New Benicia Bridge
- ▶ Jepson Parkway projects (widening of Leisure Town Road and Vanden Road)
- ▶ South Parkway Boulevard Project in southern Dixon
- ▶ Vaca Valley Parkway connections in northern Vacaville

Traffic volumes by 2030 are shown in Table 4.4-5 (which begins on page 4.4-17). The significant addition of trips would result in additional traffic on Solano County roadways in 2030. In particular, sizeable traffic growth is expected on the freeways that run through Solano County.

Transportation Safety

Several facilities in Solano County have been identified as high-accident locations. These locations and their relative rank of accidents on a yearly basis are shown in Table 4.4-6 on page 4.4-25.

The *Solano Travel Safety Plan* (Solano Transportation Authority 2005b) identifies a number of safety projects that should be undertaken. These projects, listed in Table 4.4-7 on page 4.4-25, may or may not be satisfactorily funded by the horizon year of the 2008 Draft General Plan. A dedicated local-funding source will need to be found to successfully provide the resources to construct these facilities.

Transit Service

A number of transit services are provided for Solano County residents. Most of these are oriented to serving residents within particular jurisdictions, although unincorporated Solano County residents also have access to these services.

Regional transit services include express bus, rail, and ferry. Each type of service features park-and-ride lots to accommodate riders from a nearby catchment area, and unincorporated Solano County residents may use them. These services and major park-and-ride lots are as follows:

- ▶ *Ferry*: Vallejo Baylink Ferry—Vallejo Terminal
- ▶ *Rail*: Capitol Corridor (Amtrak)—Fairfield/Suisun City station
- ▶ *Express Bus*: Vallejo Transit Routes 80, 85, and 90—Curtola park-and-ride lot; Fairfield Transportation Center; Fairfield/Suisun City station—Davis Street park-and-ride lot; Fairfield Suisun Transit Routes 20, 30 and 40—Fairfield Transportation Center, Davis Street park-and-ride lot, Market Lane park-and-ride lot

Services are provided 7 days a week, although not all routes operate on Saturdays or Sundays. Hours of service and scheduled headways vary according to route and operator. Appendix D provides a list of all local transit service, headways, fares, and other information.

For every fixed-route daylong transit service, complementary Americans with Disabilities Act (ADA) paratransit service must also be provided. The Solano Transportation Authority contracts with the Fairfield/Suisun Transit System to operate Solano Paratransit, a door-to-door intercity paratransit service that provides ADA paratransit service on behalf of the County. Fares range from \$4 to \$6, depending on trip length and destination. Ticket books are available for \$15. Solano Paratransit has transfer arrangements with Vacaville City Coach Special Services, Dixon Redit-Ride, Fairfield/Suisun DART, Benicia Transit Dial-A-Ride, Vallejo Runabout, and VINE Go for travel to other areas outside of Solano Paratransit's service area.

To use Solano Paratransit, a person must be unable to access a local bus stop or board a local bus because of a disability. An application must be filled out and submitted for review and approval. Once approved, a rider must make reservations for Solano Paratransit service 1–7 days in advance.

Solano Paratransit operates Monday–Friday from 7:00 a.m. to 7:00 p.m. and Saturday from 8:00 a.m. to 5:00 p.m. No service is provided on Sundays, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, or Christmas Day.

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
South Gateway	Eastbound	I-80	East of Carquinez Bridge	55,000	75,000	20,000	36%	75,000	20,000	35%
	Northbound	I-680	At Benicia Bridge	62,000	85,000	23,000	37%	86,000	24,000	39%
	Westbound	SR 12	East of Junction with SR 84 North	10,000	16,000	6,000	65%	16,000	7,000	68%
	Eastbound	SR 37	East of Walnut Avenue (Mare Island)	19,000	26,000	7,000	34%	26,000	7,000	34%
South Gateway	In	Subtotal		146,000	202,000	56,000	38%	203,000	57,000	39%
South Gateway	Westbound	I-80	East of Carquinez Bridge	72,000	95,000	23,000	33%	95,000	23,000	32%
	Southbound	I-680	At Benicia Bridge	66,000	90,000	25,000	37%	92,000	26,000	40%
	Eastbound	SR 12	East of Junction with SR 84 North	8,000	16,000	7,000	86%	16,000	7,000	89%
	Westbound	SR 37	East of Walnut Avenue (Mare Island)	16,000	21,000	5,000	30%	21,000	5,000	29%
South Gateway	Out	Subtotal		162,000	223,000	60,000	37%	224,000	61,000	38%
North Gateway	Westbound	SR 128	East of Junction with SR 121 South	2,000	5,000	3,000	170%	5,000	3,000	185%
	Southbound	Pleasants Valley Road	At Yolo County Line	<1000	<1000	<1000	0%	1,000	1,000	4978%
	Southbound	Road 89/Winters Road	At Yolo County Line	1,000	2,000	2,000	210%	3,000	2,000	223%
	Southbound	I-505	North of Allendale Road Interchange	8,000	21,000	12,000	144%	21,000	12,000	147%
	Southbound	Stevenson Bridge Road	At Yolo County Line	<1000	<1000	<1000	32%	<1000	<1000	35%
	Southbound	Pedrick Road–Road 98	At Yolo County Line	1,000	1,000	<1000	12%	1,000	<1000	21%
	Southbound	SR 113	North of I-80 (near Davis)	25,000	35,000	10,000	39%	36,000	10,000	41%
	Westbound	I-80	At Yolo County Line	57,000	68,000	10,000	18%	68,000	11,000	19%
	Southbound	SR 84	At Yolo County Line	1,000	3,000	2,000	293%	3,000	2,000	303%
North Gateway	In	Subtotal		95,000	135,000	40,000	42%	138,000	42,000	45%
North Gateway	Eastbound	SR 128	East of Junction of SR 121 South	3,000	8,000	6,000	196%	9,000	6,000	199%
	Northbound	Pleasants Valley Road		<1000	1,000	<1000	100%	1,000	<1000	108%
	Northbound	Road 89/Winters Road		1,000	5,000	3,000	235%	4,000	3,000	213%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
North Gateway	Northbound	I-505	North of Allendale Road Interchange	8,000	17,000	10,000	131%	18,000	11,000	141%
	Southbound	Stevenson Bridge Road		<1000	<1000	<1,000	29%	<1,000	<1,000	45%
	Northbound	Pedrick Road–Road 98		1,000	1,000	1,000	73%	1,000	1,000	73%
	Northbound	SR 113	North of I-80 (near Davis)	26,000	35,000	9,000	37%	36,000	10,000	41%
	Eastbound	I-80	Solano-Yolo County Line	58,000	75,000	16,000	28%	75,000	17,000	29%
	Northbound	SR 84	At Solano-Yolo County Line	1,000	3,000	3,000	307%	3,000	3,000	300%
North Gateway	Out	Subtotal		98,000	146,000	48,000	49%	148,000	50,000	51%
Napa-Solano County Line	Northbound	SR 29	At Napa County Line	23,000	29,000	5,000	24%	29,000	6,000	26%
	Westbound	SR 12	At Napa County Line	18,000	28,000	10,000	53%	27,000	9,000	51%
	Northbound	Suisun Valley Road	At Napa County Line	2,000	3,000	2,000	89%	3,000	2,000	91%
Napa-Solano County Line	Out	Subtotal		43,000	59,000	17,000	39%	60,000	17,000	39%
Napa-Solano County Line	Southbound	SR 29	At Napa County Line	27,000	31,000	4,000	16%	31,000	5,000	18%
	Eastbound	SR 12	At Napa County Line	20,000	31,000	12,000	61%	32,000	12,000	62%
	Southbound	Suisun Valley Road	At Napa County Line	3,000	4,000	1,000	47%	4,000	1,000	48%
Napa-Solano County Line	In	Subtotal		50,000	67,000	18,000	36%	67,000	18,000	37%
Vallejo East-West	Northbound	Wilson Avenue	North of Tennessee Street	7,000	10,000	3,000	42%	10,000	3,000	42%
	Northbound	Sacramento Street	North of Tennessee Street	4,000	8,000	4,000	89%	7,000	3,000	87%
	Northbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	18,000	22,000	4,000	24%	22,000	4,000	25%
	Northbound	Broadway	North of Tennessee Street	8,000	14,000	6,000	71%	14,000	5,000	66%
	Northbound	Tuolumne Street	North of Tennessee Street	6,000	9,000	3,000	56%	9,000	3,000	54%
	Eastbound	I-80	North of Tennessee Street	60,000	72,000	12,000	19%	72,000	12,000	20%
	Northbound	Oakwood Avenue	North of Tennessee Street	4,000	6,000	2,000	57%	6,000	2,000	52%
	Northbound	Columbus Parkway	North of Tennessee Street	7,000	12,000	6,000	81%	12,000	5,000	78%
Vallejo East-West	Northbound	Subtotal		114,000	153,000	39,000	34%	153,000	39,000	34%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Vallejo East-West	Southbound	Wilson Avenue	North of Tennessee Street	8,000	11,000	3,000	31%	11,000	3,000	32%
	Southbound	Sacramento Street	North of Tennessee Street	4,000	8,000	4,000	89%	7,000	3,000	87%
	Southbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	21,000	24,000	3,000	14%	24,000	3,000	13%
	Southbound	Broadway	North of Tennessee Street	8,000	15,000	7,000	95%	15,000	7,000	97%
	Southbound	Tuolumne Street	North of Tennessee Street	5,000	9,000	4,000	81%	9,000	4,000	82%
	Westbound	I-80	North of Tennessee Street	70,000	78,000	8,000	11%	77,000	8,000	11%
	Southbound	Oakwood Avenue	North of Tennessee Street	5,000	9,000	4,000	82%	9,000	4,000	80%
	Southbound	Columbus Parkway	North of Tennessee Street	7,000	15,000	7,000	100%	14,000	7,000	94%
Vallejo East-West	Southbound	Subtotal		128,000	168,000	40,000	31%	168,000	39,000	30%
Vallejo I-80	Southbound	Sonoma Boulevard (SR 29)	North of I-80	13,000	20,000	7,000	57%	21,000	8,000	59%
	Eastbound	Magazine Street	West of Sixth Street	3,000	3,000	<1000	12%	3,000	<1000	10%
	Eastbound	Curtola Parkway	West of Lemon Street	21,000	25,000	4,000	21%	25,000	4,000	20%
	Eastbound	Benicia Road	East of Lemon Street	3,000	8,000	5,000	156%	7,000	4,000	135%
	Eastbound	Georgia Street	West of 14th Street	6,000	7,000	2,000	28%	7,000	1,000	21%
	Eastbound	Solano Avenue	West of Phelan Avenue	3,000	6,000	3,000	82%	5,000	1,000	44%
	Eastbound	Tennessee Street	West of Mariposa Street	13,000	17,000	4,000	29%	16,000	4,000	28%
	Eastbound	Redwood Parkway	West of Fairgrounds Drive	19,000	24,000	5,000	24%	24,000	5,000	24%
	Eastbound	SR 37	West of I-80	42,000	50,000	8,000	18%	50,000	7,000	18%
Vallejo I-80	Eastbound	Subtotal		123,000	160,000	37,000	30%	158,000	35,000	28%
Vallejo I-80	Northbound	Sonoma Boulevard (SR 29)	North of I-80	11,000	16,000	5,000	48%	16,000	5,000	48%
	Westbound	Magazine Street	West of Sixth Street	4,000	5,000	1,000	33%	4,000	1,000	26%
	Westbound	Curtola Parkway	West of Lemon Street	16,000	23,000	6,000	39%	23,000	6,000	39%
	Westbound	Benicia Road	East of Lemon Street	4,000	11,000	6,000	154%	10,000	5,000	131%
	Westbound	Georgia Street	West of 14th Street	4,000	5,000	1,000	39%	5,000	2,000	45%
	Westbound	Solano Avenue	West of Phelan Avenue	5,000	7,000	1,000	27%	7,000	1,000	24%
	Westbound	Tennessee Street	West of Mariposa Street	12,000	15,000	2,000	19%	15,000	2,000	20%
	Westbound	Redwood Parkway	West of Fairgrounds Drive	21,000	23,000	2,000	10%	23,000	2,000	10%
	Westbound	SR 37	West of I-80	35,000	42,000	8,000	22%	42,000	7,000	21%
Vallejo I-80	Westbound	Subtotal		112,000	147,000	34,000	31%	146,000	33,000	29%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Napa-Solano Ridge	Eastbound	I-780	West of Military West (Benicia)	46,000	56,000	10,000	22%	56,000	11,000	23%
	Eastbound	Lake Herman Road	East of Columbus Parkway	3,000	6,000	3,000	116%	7,000	4,000	133%
	Eastbound	I-80 (north)	East of American Canyon Road	55,000	78,000	23,000	42%	78,000	23,000	41%
	Eastbound	SR 12	At Napa County Line	20,000	31,000	12,000	61%	32,000	12,000	62%
Napa-Solano Ridge	Eastbound	Subtotal		123,000	172,000	49,000	39%	173,000	49,000	40%
Napa-Solano Ridge	Westbound	I-780	West of Military West (Benicia)	46,000	57,000	11,000	25%	57,000	11,000	25%
	Westbound	Lake Herman Road	East of Columbus Parkway	2,000	5,000	3,000	143%	5,000	3,000	154%
	Westbound	I-80 (north)	East of American Canyon Road	62,000	84,000	22,000	36%	84,000	22,000	35%
	Westbound	SR 12	At Napa County Line	18,000	28,000	10,000	53%	27,000	9,000	51%
Napa-Solano Ridge	Westbound	Subtotal		128,000	174,000	46,000	36%	174,000	46,000	36%
South of American Canyon-Cordelia	Northbound	SR 29	Solano-Napa County Line	23,000	29,000	5,000	24%	29,000	6,000	26%
	Eastbound	I-80 (south)	North of SR 37	53,000	77,000	24,000	46%	77,000	24,000	46%
	Northbound	I-680	North of Marshview Road	32,000	42,000	11,000	34%	42,000	11,000	33%
South of American Canyon-Cordelia	Eastbound	Subtotal		108,000	148,000	40,000	37%	149,000	41,000	38%
South of American Canyon-Cordelia	Southbound	SR 29	Solano-Napa County Line	27,000	31,000	4,000	16%	31,000	5,000	18%
	Westbound	I-80 (south)	North of SR 37	61,000	84,000	23,000	37%	84,000	22,000	36%
	Southbound	I-680	North of Marshview Road	32,000	44,000	12,000	38%	44,000	12,000	39%
South of American Canyon-Cordelia	Westbound	Subtotal		120,000	159,000	39,000	33%	159,000	39,000	33%
Fairfield-Cordelia	Eastbound	Rockville Road	East of Suisun Valley Road	5,000	6,000	1,000	20%	6,000	1,000	15%
	Eastbound	I-80	East of Suisun Valley Road	97,000	127,000	30,000	31%	127,000	30,000	31%
	Eastbound	Cordelia Road	West of Hale Ranch Road	4,000	3,000	-1,000	-20%	3,000	-1,000	-34%
	Eastbound	North Connector	East of Suisun Valley Road	NA	17,000	-1,000	-20%	17,000	NA	NA
Fairfield-Cordelia	Eastbound	Subtotal		106,000	153,000	47,000	45%	152,000	47,000	44%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Fairfield-Cordelia	Westbound	Rockville Road	East of Suisun Valley Road	5,000	4,000	-1,000	-25%	4,000	-1,000	-26%
	Westbound	I-80	East of Suisun Valley Road	161,000	139,000	-22,000	-14%	139,000	-22,000	-13%
	Westbound	Cordelia Road	West of Hale Ranch Road	5,000	4,000	-1,000	-23%	3,000	-2,000	-34%
	Westbound	North Connector	East of Suisun Valley Road	NA	14,000	NA	NA	14,000	NA	NA
Fairfield-Cordelia	Westbound	Subtotal		171,000	161,000	-10,000	-6%	160,000	-11,000	-6%
Fairfield I-80	Eastbound	SR 12	West of Beck Avenue (Leg A)	22,000	39,000	16,000	73%	39,000	17,000	74%
	Eastbound	W Texas Street	East of I-80 (#101)	11,000	17,000	6,000	53%	17,000	6,000	53%
	Eastbound	Travis Boulevard	East of I-80 (#84)	16,000	19,000	4,000	23%	19,000	3,000	22%
	Eastbound	Air Base Parkway	East of I-80 (#53)	32,000	36,000	4,000	14%	36,000	4,000	14%
	Southbound	N Texas Street	East of I-80 (#40)	12,000	15,000	3,000	25%	15,000	3,000	27%
Fairfield I-80	Eastbound	Subtotal		93,000	126,000	33,000	36%	126,000	34,000	36%
Fairfield I-80	Westbound	SR 12	West of Beck Avenue (Leg A)	28,000	46,000	18,000	63%	46,000	18,000	64%
	Westbound	W Texas Street	East of I-80 (#101)	5,000	8,000	2,000	43%	7,000	2,000	38%
	Westbound	Travis Boulevard	East of I-80 (#84)	17,000	23,000	6,000	36%	22,000	5,000	31%
	Westbound	Air Base Parkway	East of I-80 (#53)	27,000	29,000	2,000	6%	29,000	2,000	8%
	Northbound	N Texas Street	East of I-80 (#40)	12,000	16,000	4,000	37%	16,000	5,000	41%
Fairfield I-80	Westbound	Subtotal		89,000	121,000	32,000	36%	121,000	32,000	36%
Fairfield-Suisun City	Eastbound	Cordelia Street	East of Pennsylvania Avenue	1,000	1,000	1,000	80%	1,000	<1000	57%
	Eastbound	SR 12	East of Pennsylvania Avenue	26,000	37,000	12,000	45%	37,000	12,000	46%
	Southbound	Sunset Avenue	South of Travis Boulevard (#16)	12,000	14,000	2,000	18%	14,000	2,000	18%
	Eastbound	E Tabor Avenue	East of Tolenas Avenue (#7)	4,000	6,000	2,000	50%	6,000	2,000	49%
	Eastbound	Air Base Parkway	West of railroad tracks (#8)	18,000	26,000	7,000	41%	26,000	8,000	42%
	Southbound	Peabody Road	North of Cement Hill Road	12,000	19,000	7,000	59%	19,000	7,000	59%
Fairfield-Suisun City	Eastbound	Subtotal		73,000	104,000	31,000	42%	104,000	31,000	43%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Fairfield-Suisun City	Westbound	Cordelia Street	East of Pennsylvania Avenue	1,000	2,000	1,000	82%	2,000	1,000	100%
	Westbound	SR 12	East of Pennsylvania Avenue	28,000	40,000	12,000	43%	40,000	12,000	44%
	Northbound	Sunset Avenue	South of Travis Boulevard (#16)	12,000	14,000	2,000	13%	14,000	2,000	13%
	Westbound	E Tabor Avenue	East of Tolenas Avenue (#7)	4,000	6,000	2,000	47%	6,000	2,000	48%
	Westbound	Air Base Parkway	West of railroad tracks (#8)	18,000	26,000	8,000	44%	27,000	8,000	45%
	Northbound	Peabody Road	North of Cement Hill Road	13,000	20,000	7,000	54%	20,000	7,000	55%
Fairfield-Suisun City	Westbound	Subtotal		77,000	109,000	32,000	41%	110,000	33,000	42%
Suisun City west	Eastbound	SR 12	East of Scandia Road	7,000	15,000	8,000	120%	15,000	9,000	131%
	Southbound	Collinsville Road	South of SR 12	<1000	<1000	<1000	67%	<1000	<1000	
Suisun City west	Eastbound	Subtotal		7,000	15,000	8,000	119%	15,000	9,000	133%
Suisun City west	Westbound	SR 12	East of Scandia Road	8,000	14,000	7,000	91%	16,000	8,000	105%
	Northbound	Collinsville Road	South of SR 12	<1000	<1000	<1000	67%	<1000	<1000	
Suisun City west	Westbound	Subtotal		8,000	15,000	7,000	90%	16,000	8,000	107%
Fairfield-Vacaville	Eastbound	I-80	East of Pleasants Valley	73,000	92,000	19,000	25%	93,000	19,000	26%
	Northbound	Peabody Road	North of Cement Hill Road	13,000	20,000	7,000	54%	20,000	7,000	55%
	Northbound	Vanden Road	South of Leisure Town Road	3,000	8,000	5,000	208%	8,000	5,000	205%
	Northbound	SR 113	North of SR 12	2,000	5,000	2,000	116%	5,000	3,000	119%
Fairfield-Vacaville	Northbound	Subtotal		91,000	125,000	33,000	37%	126,000	34,000	38%
Fairfield-Vacaville	Westbound	I-80	East of Pleasants Valley	79,000	95,000	17,000	21%	95,000	16,000	21%
	Southbound	Peabody Road	North of Cement Hill Road	12,000	19,000	7,000	59%	19,000	7,000	59%
	Southbound	Vanden Road	South of Leisure Town Road	3,000	8,000	5,000	211%	8,000	6,000	230%
	Southbound	SR 113	North of SR 12	3,000	4,000	2,000	66%	5,000	2,000	75%
Fairfield-Vacaville	Southbound	Subtotal		96,000	127,000	31,000	32%	127,000	31,000	32%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Vacaville I-80	Southbound	Alamo Drive	North of Marshall Road	7,000	6,000	<0	-4%	6,000	<0	-4%
	Southbound	Davis Street	South of Bella Vista Road	3,000	4,000	1,000	42%	4,000	1,000	40%
	Eastbound	Mason Street–Elmira Road	West of Peabody Road	17,000	20,000	3,000	17%	20,000	3,000	17%
	Southbound	Allison Drive	East of I-80	9,000	11,000	3,000	33%	11,000	3,000	33%
	Southbound	Nut Tree Road	North of Burton Drive	8,000	12,000	4,000	57%	12,000	5,000	63%
	Southbound	Leisure Town Road	North of Orange Drive	10,000	20,000	10,000	107%	21,000	11,000	112%
Vacaville I-80	Southbound	Subtotal		52,000	74,000	21,000	41%	75,000	22,000	43%
Vacaville I-80	Northbound	Alamo Drive	South of Marshall Road	16,000	17,000	1,000	7%	15,000	<0	-2%
	Northbound	Davis Street	South of Bella Vista Road	3,000	5,000	2,000	50%	5,000	2,000	52%
	Westbound	Mason Street–Elmira Road	East of Peabody Road	15,000	14,000	<0	-3%	14,000	<0	-2%
	Northbound	Allison Drive	East of I-80	7,000	9,000	2,000	27%	9,000	2,000	28%
	Northbound	Nut Tree Road	South of Burton Drive	10,000	15,000	6,000	57%	16,000	6,000	60%
	Northbound	Leisure Town Road	South of Orange Drive	7,000	17,000	10,000	132%	18,000	11,000	147%
Vacaville I-80	Northbound	Subtotal		58,000	78,000	20,000	34%	78,000	20,000	34%
Vacaville-Dixon	Northbound	Pleasants Valley Road	North of Vaca Valley Parkway	<1000	<1000	<1000	102%	<1000	<1000	113%
	Northbound	I-505	South of Midway Road	14,000	26,000	11,000	81%	26,000	12,000	87%
	Eastbound	I-80	East of Leisure Town Road	53,000	72,000	19,000	37%	75,000	22,000	41%
	Northbound	Batavia Road	South of Dixon City Limits	<1000	2,000	2,000	1093%	2,000	2,000	1136%
	Northbound	Pitt School Road	South of Dixon City Limits	<1000	<1000	<0	-38%	<1000	<0	-37%
	Northbound	SR 113	South of Dixon City Limits	2,000	5,000	3,000	157%	5,000	3,000	168%
Vacaville-Dixon	Northbound	Subtotal		70,000	105,000	36,000	51%	109,000	39,000	57%
Vacaville-Dixon	Southbound	Pleasants Valley Road	North of Vaca Valley Parkway	<1000	1,000	<1000	129%	1,000	<1000	173%
	Southbound	I-505	South of Midway Road	14,000	24,000	10,000	73%	25,000	11,000	79%
	Westbound	I-80	East of Leisure Town Road	52,000	66,000	14,000	27%	66,000	14,000	28%
	Southbound	Batavia Road	South of Dixon City Limits	<1000	2,000	2,000	1353%	3,000	3,000	2309%
	Southbound	Pitt School Road	South of Dixon City Limits	<1000	<1000	<0	-43%	<1000	<0	-34%
	Southbound	SR 113	South of Dixon City Limits	2,000	5,000	3,000	179%	6,000	4,000	208%
Vacaville-Dixon	Southbound	Subtotal		68,000	97,000	29,000	43%	100,000	33,000	48%

**Table 4.4-5
Forecasts of 2030 Average Daily Traffic Volumes**

Screenline	Direction	Street	Location	Existing Conditions (2007)	Preferred Plan			Maximum Development Scenario		
				Daily Traffic	Daily Traffic	Change from Existing	Percent Change from Existing	Daily Traffic	Change from Existing	Percent Change from Existing
Dixon I-80	Eastbound	Dixon Avenue	East of Gateway Drive	6,000	12,000	6,000	114%	13,000	7,000	131%
	Southbound	Pitt School Road	North of Market Lane	3,000	4,000	1,000	37%	4,000	1,000	45%
	Southbound	SR 113	South of I-80	6,000	10,000	4,000	55%	10,000	3,000	51%
Dixon I-80	Southbound	Subtotal		15,000	26,000	11,000	73%	27,000	12,000	79%
Dixon I-80	Westbound	Dixon Avenue	East of Gateway Drive	6,000	13,000	7,000	117%	13,000	7,000	124%
	Northbound	Pitt School Road	North of Market Lane	3,000	4,000	1,000	16%	4,000	1,000	22%
	Northbound	SR 113	South of I-80	4,000	<1000	-4,000	-99%	<1000	-4,000	-99%
Dixon I-80	Northbound	Subtotal		14,000	17,000	3,000	21%	17,000	4,000	26%

Notes: I-80 = Interstate 80; I-505 = Interstate 505; SR = State Route

Source: Data provided by DKS Associates in 2008

**Table 4.4-6
High-Accident Locations**

Category	Location			Average Number	Average Rate
Intersection ¹	Suisun Valley Road and Rockville Road			4.8	0.97
Intersection ¹	Vanden Road and Canon Road			1.4	0.34
Intersection ¹	Rockville Road and Abernathy Road			1.6	0.31
Intersection ¹	N. Gate Road and Canon Road			0.8	0.26
Pedestrian ²	Solano County Areas			1.8	0.09
Category	Route	From	To	Average Number	Average Rate
Freeway ³	SR 12	I-80	Walters Road	97.5	1.45
Freeway ³	SR 12	Napa County Line	I-80	41	1.33
Freeway ³	I-80	Carquinez Bridge	SR 37	314.7	1.28
Freeway ³	SR 37	Sonoma County Line	I-80	137.7	0.93
Freeway ³	SR 12	Walters Road	Rio Vista	75.3	0.86
Freeway ³	I-80	Red Top Road	N. Texas Street	434.8	0.86
Freeway ³	SR 113	I-80	SR 12	37.7	0.75
Freeway ³	I-780	I-80	I-680	90.5	0.74
Freeway ³	I-80	SR 37	Red Top Road	146.5	0.65
Freeway ³	I-80	N. Texas Street	Alamo Street	136.5	0.58
Freeway ³	I-680	Benicia Bridge	I-80	142.3	0.56
Freeway ³	I-80	Alamo Street	SR 113	348.5	0.48
Freeway ³	I-505	Yolo County Line	I-80	29.3	0.38

Notes:

I-80 = Interstate 80; I-505 = Interstate 505; I-680 = Interstate 780; SR = State Route

¹ Intersection—Accidents per million entering vehicles

² Pedestrian—Yearly average per 1,000 population

³ Freeway—Accidents per million vehicle miles

Source: Solano Transportation Authority 2005b

**Table 4.4-7
Safety Projects**

Category	Location	Description
Safety Projects at Local Intersections	Rockville Road and Abernathy Road	Construction of a roundabout
Safety-Related Projects on Highways and Freeways	SR 12	Installation of a soft median barrier and upgraded shoulder between Drouin Drive and Currie Drive (Rio Vista)
	SR 12	Shoulder widening throughout Rio Vista
	SR 12	Installation of a new median barrier between I-80 and Pennsylvania Avenue
	I-80	Reconstruction of the westbound off-ramp at Oliver Road
	I-80	Installation of an upgraded median barrier from West Texas Street to Yolo County and from American Canyon Road to I-680
State Highway Operations and Protection Program	SR 12	Construction of a truck climbing lane west of I-80
	I-80	Upgrading of cable median barrier from West Texas Street in Fairfield to the Yolo County line (installation of temporary K-rail on each side of oleanders)
	I-80	Modification of ramp and exit traffic signals at Rockville Road and West Texas Street

Notes: I-80 = Interstate 80; SR = State Route

Source: Solano Transportation Authority 2005b

Rail Operations

Solano County is along the main line of the Union Pacific Railroad, which carries substantial amounts of freight traffic through Solano County to connect West Coast ports and inland markets. This requires the operation of frequent and long freight trains.

In addition, the Amtrak Capitol Corridor service runs through Solano County. Currently, this service stops only at the Fairfield/Suisun City station. New stations at Fairfield/Vacaville and Dixon are in various stages of planning and design.

Industrial and warehousing functions occasionally use several spur railroad tracks, as well as a track that runs between Suisun City and the Napa County line east of Cordelia.

Area Airports

Three airports operate in Solano County. The Nut Tree Airport and the Rio Vista Municipal Airport are public-use facilities and Travis Air Force Base (AFB) is a military airfield.

The Nut Tree Airport is located in Vacaville and provides a facility for both general and business aviation use. The County owns and operates this airport, currently overseen by the General Services Department.

The Rio Vista Municipal Airport (Baumann Field) is located 3 miles northwest of Rio Vista in the unincorporated county. This general-aviation airport covers 273 acres and has two runways and one helipad.

Travis AFB is adjacent to the city of Fairfield and encompasses an area of about 5,025 acres. Travis AFB is a part of the Air Mobility Command and is host to the 60th Air Mobility Wing. The primary mission of the base is airlift of troops and freight. Some discussions have occurred regarding making Travis AFB a joint-use facility for military and civilian operations, but there are no adopted plans to enable this, nor are any proposed plans under active consideration by any of the local jurisdictions, including the County.

Waterway Transportation

Along the southern and eastern borders of Solano County, a major waterway, the San Joaquin–Sacramento Ship Channel, carries ship-based traffic through the Carquinez Strait from major inland ports to the Pacific Ocean. This ship channel is used for recreational purposes and serves local and regional industries.

Solano County has three marinas, all privately owned: Arrowhead Harbor (Prospect Island), Snug Harbor Resort (Ryer Island), and the Delta Marina (Rio Vista). These marinas serve as the key access points for most water-based recreation users in the county.

Pedestrian Network

Generally, roadways in unincorporated Solano County are not designed with sidewalks, because these roadways generally are located in areas with low population or employment density. The county's pedestrian connectivity consists primarily of short sidewalks and multiuse trails. Class I bicycle trails are usually designed as multiuse trails that can be shared with pedestrians. Pedestrian facilities also include crosswalks and pedestrian-actuated signals at major intersections near developed areas.

Bicycle Network

Extensive efforts have been made in Solano County to identify bicycle and pedestrian projects and conditions. A summary of these represent the most effective way to recognize their relevance in the 2008 Draft General Plan.

Bicycle facilities are generally classified as Class I, II, or III according to the Caltrans *Highway Design Manual* (Caltrans 2006) and referenced in the County Road Improvement Standards (Solano County 2006). The definitions of each class are as follows:

- ▶ *Class I facilities (bike path)*—A completely separated facility and right-of-way (shared with pedestrians) that excludes general motor vehicle traffic.
- ▶ *Class II facilities (bike lane)*—A striped lane for one-way bike travel on a roadway.
- ▶ *Class III facilities (bike route)*—A facility that has shared use with pedestrian or motor vehicle traffic. It is typically a street with low traffic volumes and speeds, with measures or preferential bike treatment.

4.4.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The U.S. government participates in transportation through the regulation of airspace and water space, funding and oversight of transit service, and funding and oversight of the roadway system. Oversight of roadways includes regulation of allowable vehicles on public roadways based on type, fuel emission targets, and air quality performance. The most recent authorization was in July 2005, when the U.S. Congress passed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

SAFETEA-LU represents the most recent in a long-established system of transportation oversight efforts involving funding and authorization by Congress. As an example, federal funding was involved in the creation of U.S. Highway 40 in Solano County in the 1920s.

Federal requirements are also relevant when applying for funds to construct projects. Planning, forecasting, and project funding have been governed by planning requirements assigned to the regional metropolitan planning organizations (MPOs), which are discussed below.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Transportation Commission

The State of California collects and distributes funds for the construction of highway, passenger rail, and transit services through the California Transportation Commission (CTC). CTC also works with the secretary of the Business, Transportation, and Housing Agency and the California Legislature to formulate and evaluate state policies and plans for California's many transportation programs.

CTC is most notably responsible for approving the State Transportation Improvement Program (STIP), a multiyear capital improvement program of transportation projects. The STIP is updated every 2 years, with occasional interim amendments.

California Department of Transportation

Caltrans is responsible for the construction and maintenance of state-owned facilities. These include interstate highways and other state routes that run through Solano County, as described in Section 4.4.1, "Existing Conditions," above.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Regional Transportation Plan

State and federal laws require that regional planning agencies develop and submit a regional transportation improvement program to CTC and Caltrans every 3 years. The primary agency with the responsibility is the MPO. In the Bay Area, the MPO is the Metropolitan Transportation Commission (MTC). The MTC coordinates a number of federal and state programs and grants for the region. This agency also is responsible for producing travel forecasts for the region.

The MTC is responsible for producing an adopted regional transportation plan (RTP) every 3 years. The RTP sets for the vision for Bay Area transportation, and it must have an investment plan that is financially constrained to anticipated revenue sources. The current plan, known as *Transportation 2030*, was adopted by the MTC on February 23, 2005 (MTC 2005). This plan is a long-range transportation plan for the nine-county San Francisco Bay Area (San Francisco, Alameda, Contra Costa, San Mateo, Santa Clara, Napa, Solano, Marin, and Sonoma Counties). The plan sets priority for funding and implementation of transportation-related projects in the Bay Area. Projects cannot use federal, or in many cases, state funds unless it is specifically listed or is consistent with the RTP. The RTP must be checked for conformance with the region's air quality plan to ensure that the projects and programs in the RTP meet the air quality improvement and maintenance goals and policies required by the federal government.

The RTP is implemented through the Regional Transportation Improvement Program (RTIP) (MTC 2006). The RTIP describes the projects and programs in the RTP, their funding sources, and the year of funding for the next 5 years.

2007 Transportation Improvement Program

The 2007 Transportation Improvement Program (TIP) is a list of transportation projects and programs to be funded and implemented over a minimum of the next 3 years. TIPs are required to be updated every 2 years. By law, the TIP must be financially constrained so that the amount of programmed expenditures does not exceed the amount of funding expected to be available. All transportation projects that use federal funds, in whole or in part, must be listed in the TIP. Also, projects that touch the state or federal roadway system or projects that require certain types of federal permits, regardless of their funding source, must also be in the TIP.

Solano Transportation Authority

The creation of congestion management agencies in 1990 began a new era of localized, interjurisdictional planning at the countywide level. Within Solano County, all jurisdictions, including the County, participate in a singular agency for transportation planning and funding, known as the Solano Transportation Authority. This agency is responsible for overseeing a number of programs and funds. A key directive of this agency is to prepare a congestion management program document every 2 years, which in turn requires preparation of a forecast travel demand model that is consistent with the MTC's regional travel demand model. This model is known as the Solano-Napa Model because it was jointly developed with participation from both counties.

County Roadway Standards

As a rural area, Solano County has several roadways that are designed to carry low volumes. There is typically no congestion associated with these roadways. Still, the County has established minimum roadway standards to ensure that roads are built or eventually upgraded to a sufficient width and pavement surface to carry the demands placed on them. The current County Road Improvement Standards were published in February 2006 by the County Department of Resource Management (Solano County 2006).

Short-Range Transit Plans

Each local transit operator in Solano County must prepare a short-range transit plan every 3 years to be eligible for state operating subsidies for transit funding. These subsidies, provided through the Transportation Development Act and the State Transit Assistance programs, provide the bulk of the revenue shortfall that transit operations experience after fares and other funds are provided for the system's operation. These must be prepared in a manner set forth by the MTC.

Airport Land Use Compatibility Plans

State law requires local agencies to modify their general plans and any affected specific plans to be consistent with airport land use compatibility plans (ALUCPs). A general plan must address compatibility planning issues and avoid direct conflicts with compatibility planning criteria. County zoning regulations restrict heights within defined airport flight obstruction areas, which are defined more broadly for military airports than commercial airports in recognition of the mission of Travis AFB.

The Solano County Airport Land Use Commission (ALUC) has adopted the ALUCPs. Plans address the Nut Tree Airport, the Rio Vista Municipal Airport, and Travis AFB. In June 2002, the County ALUC adopted an updated ALUCP, now called the *Travis Air Force Base Land Use Compatibility Plan* (Travis LUCP). The Travis LUCP addresses restrictions on residential development within the different compatibility zones. Nonresidential development is also restricted by the Travis LUCP according to the number of people per acre and established noise sensitivity of different land uses and activities. Please see the Travis LUCP for additional information governing actions in the compatibility zones.

The 1988 ALUCP defines compatibility zones in the area around the Nut Tree Airport. Potentially incompatible land uses and land use policies are confined to the jurisdictional area of the City of Vacaville. The *Nut Tree Airport Land Use Compatibility Plan* contains additional information governing allowable land use and development standards in this area. Similarly, the ALUCP for the Rio Vista Municipal Airport also restricts land uses near that facility. The *Rio Vista Municipal Airport Land Use Compatibility Plan* contains additional information governing allowable land use and development standards in this area.

4.4.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Forecasting Tool

The traffic forecasts used for this EIR are based on the Napa/Solano Phase 2 Traffic Model prepared under the sponsorship of the Solano Transportation Authority. County staff members and staff members from other local jurisdictions participated in the development of this forecasting tool.

The forecasting tool provides a reasonable estimate of future traffic forecasts. This is accomplished by examining land use forecasts for surrounding jurisdictions according to *Projections 2005*, published by the Association of Bay Area Governments (ABAG), and anticipated roadway projects as defined by the MTC, the Solano Transportation Authority, and local jurisdictions. Growth in employment and the number of residents in 15 counties around Solano County (the remainder of the Bay Area, the Sacramento region, and San Joaquin and Lake Counties) is also assumed. The projections are for 2030, which represents the furthest horizon year for which such projections have been developed. *Projections 2005* is used because this is the series used in the Solano Transportation Authority's travel model, and because the more recent *Projections 2007* forecasts less growth in 2030 than *Projections 2005* does, enabling the *Projections 2005* scenario to show more traffic and thus more likely to show project impacts.

The Solano-Napa model produces travel forecasts for a.m. and p.m. peak hours. Because the County standard applies to daily volumes, the forecasts were modified to project what ADT should be.

Scenarios Evaluated

Existing Conditions

The evaluation of existing traffic conditions was made by examining the traffic counts at key facilities for the a.m. and p.m. peak hours and daily conditions. Existing ADT volumes can be found in the “Existing Conditions (2007)” column in Table 4.4-5 above.

2030 Growth

The projected growth in housing, employment, and other trip creators in and around Solano County is required to be consistent with ABAG’s projections in the base forecasting model developed by the Solano Transportation Authority. For 2030, ABAG’s Projections 2007 has fewer households and jobs than Projections 2005, and therefore, Projections 2005 was used to develop the most current version of the Phase 2 Solano-Napa Model, so these demographic projections were used to evaluate all horizon-year scenarios as a slightly more conservative analysis of anticipated traffic congestion.

Preferred Plan

This alternative was analyzed for traffic volumes according to the anticipated changes resulting from the land uses in the 2008 Draft General Plan. In some cases, these land uses were already modified to reflect city general plans in areas expected to be annexed to those cities. In these cases, most of the growth was also anticipated in the No-Project Alternative. Each acreage was assigned a land use, converted to an estimated number of units or square footage on a small-area basis (called a traffic analysis zone), and then converted to estimates in households, employed residents, types of jobs, student totals, and a number of other demographic attributes. These changes were then assigned to the anticipated 2030 roadway network to determine the anticipated impacts of adoption of the 2008 Draft General Plan.

Maximum Development Scenario

To project a possible reality of intensely developed land uses, the Maximum Development Scenario was also analyzed. This scenario assumes a more-fully-built-out 2008 Draft General Plan scenario. This scenario is unlikely in the aggregate, given economic and site plan requirements that govern development proposals. Still, the scenario is analyzed to demonstrate a possible outcome of more intense development.

Model Limitations

Travel models are representations of realities based on a wide range of assumptions about land uses, transportation systems, and travel behavior. Different travel demands may result from changes in these assumptions (such as unanticipated, significant increases or decreases in gasoline prices or unforeseen, significant development proposals within a local jurisdiction or in an adjacent county). The assumptions used in this model are always subject to continuing development trends, travel trends, and other external forces.

Travel models are also mathematical processes with multiple steps. For example, mathematical calculations of which street paths a driver would use when estimating travel volumes assigned to a roadway network are recalculated 35 times, with different paths each time. As a result, changes sometimes occur between traffic assignments.

In cases where the estimated LOS is F on a daily basis, peak-hour traffic congestion will likely spread to other hours. The daily LOS is intended to be an aggregate indication of congestion, rather than an analysis of the specific duration and speeds anticipated during congestion periods.

THRESHOLDS OF SIGNIFICANCE

The County Road Improvement Standards (Solano County 2006) state the following:

[T]he goal of Solano County is to maintain a Level of Service C on all roads and intersections. In addition to meeting the design widths and standards contained in this document, all projects shall be designed to maintain a Level of Service C, except where the existing level of service is already below C, the project shall be designed such that there will be no decrease in the existing level of service. Levels of Service shall be calculated using the Transportation Research Board's most recent Highway Capacity Manual.

Based on this guidance and on Appendix G of the State CEQA Guidelines, an impact on transportation and circulation is considered significant if the proposed project would:

- ▶ cause roadways that presently operate at LOS C or better to degrade to LOS D, E or F, or cause a decrease in LOS for those roadways that presently operate at LOS D, E, or F, regardless of whether the traffic is from new development within incorporated or incorporated portions of Solano County;
- ▶ result in inadequate emergency access;
- ▶ substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- ▶ result in inadequate parking capacity;
- ▶ conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks); or
- ▶ result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

The thresholds used in this document are intended to be applied to roadway segments. Analysis of specific intersections was not performed because of the programmatic level of analysis in this EIR and because no specific development project is proposed under the 2008 Draft General Plan. When specific development projects are proposed, the County will require analysis of intersection LOS, regardless of 2008 Draft General Plan consistency status.

IMPACT ANALYSIS

IMPACT 4.4-1a **Degradation of Roadway Levels of Service – Preferred Plan.** *With implementation of the 2008 Draft General Plan under the Preferred Plan, operation of numerous roadways currently operating at LOS C or better would degrade to LOS D, LOS E, or LOS F. Additionally, numerous roadways currently operating at LOS D, LOS E, and LOS F would degrade further. This impact would be **significant**.*

Total Number of Trips

The anticipated change in the daily number of trip ends within Solano County was examined. These are shown to illustrate how trip totals in Solano County are slated to increase by 2030 in all alternatives. The aggregate trip

growth under the Preferred Plan as well as anticipated growth inside the various jurisdictions is anticipated to result in a 43.8% increase in total daily trips (Table 4.4-8).

Table 4.4-8 Total Daily Trips in Solano County (Preferred Plan)			
Scenarios	Total Daily Trips	Change from Existing Conditions	
		Total Trips	Percent
Existing Conditions (2007)	2,094,228	–	–
Preferred Plan	3,012,014	917,786	43.8%

Source: Solano-Napa Phase 2 Model

Vehicle Miles Traveled and Vehicle Hours Traveled

The increase in total trips would result in an increase in both vehicle miles traveled (VMT) and vehicle hours traveled for roadways that are in Solano County. The results are shown in Table 4.4-9. These results are reported for a combined a.m. and p.m. peak hour, as the times when congestion is the heaviest and impacts on air quality would be most likely to occur.

Table 4.4-9 Vehicle Miles Traveled and Vehicle Hours Traveled (Preferred Plan)				
Scenario	Combined a.m. and p.m. Peak Hour			
	Vehicle Miles Traveled		Vehicle Hours Traveled	
	Whole County	Congested Area	Whole County	Congested Area
Existing Conditions	2,022,198	206,343	56,364	11,990
Preferred Plan	2,914,306	463,573	97,533	32,423
Change from Existing Conditions to Preferred Plan	892,108	257,231	41,168	20,433
	44%	125%	73%	170%

Source: Modeling conducted by DKS Associates in 2008

Table 4.4-9 indicates that the Preferred Plan and associated growth inside jurisdictions would result in a 44% increase in VMT. The increase in VMT on congested facilities is expected to be much greater at 125%. This results because there are expected to be more congested roadways in general across Solano County by 2030.

The increased congestion is also a significant factor in the 73% of increased vehicle hours of travel by 2030 under the Preferred Plan. Similarly, the vehicle hours of travel on congested facilities would grow to 170% beyond the current vehicle hours of travel on congested facilities estimated today.

Forecasted Levels of Service

Traffic volumes by 2030 are shown in Table 4.4-5. Based on these, Table 4.4-10 summarizes what the anticipated LOS would be on these facilities. According to County policy, significance occurs only when the level of service would worsen from the current level of service to LOS D, E, or F. This would occur at the following locations under the Preferred Plan:

- *I-80 (Carquinez Bridge):* LOS C to LOS E in the eastbound direction

- ▶ *I-680 (Benicia Bridge):* LOS C to LOS D in both directions
- ▶ *SR 37 at Mare Island:* LOS E to LOS F in the westbound direction
- ▶ *SR 128 at the Yolo County line:* LOS C to LOS D in the eastbound direction
- ▶ *I-80 at the Yolo County line:* LOS C to LOS D in the eastbound direction
- ▶ *Wilson Avenue north of Tennessee Street:* LOS D to LOS F in the northbound direction
- ▶ *Broadway north of Tennessee Street:* LOS C to LOS D in both directions
- ▶ *Tuolumne Street north of Tennessee Street:* LOS D to LOS F in the northbound direction and LOS C to LOS F in the southbound direction
- ▶ *Curtola Parkway west of Lemon Street:* LOS D to LOS E in the eastbound direction and LOS C to LOS D in westbound direction
- ▶ *Tennessee Street west of Mariposa Street:* LOS C to LOS E in the eastbound direction and LOS C to LOS D in the westbound direction
- ▶ *SR 37 west of I-80:* LOS C to LOS D in the westbound direction
- ▶ *Lake Herman Road east of Columbus Parkway:* LOS C to LOS D in the eastbound direction
- ▶ *I-80 east of American Canyon Road:* LOS C to LOS E in the eastbound direction and LOS D to LOS F in the westbound direction
- ▶ *I-80 east of SR 37:* LOS C to D in the eastbound direction and LOS D to LOS F in the westbound direction
- ▶ *I-680 north of Marshview Road:* LOS D to LOS F in both directions
- ▶ *North Connector:* To be LOS E in the eastbound direction and LOS F in the westbound direction
- ▶ *West Texas Street east of I-80:* LOS C to LOS E in the eastbound direction
- ▶ *North Texas Street south of I-80:* LOS C to LOS D in both directions
- ▶ *SR 12 east of Pennsylvania Avenue:* LOS C to LOS E in the eastbound direction and LOS D to LOS F in the westbound direction
- ▶ *East Tabor Avenue east of Tolenas Avenue:* LOS C to LOS D in both directions
- ▶ *Peabody Road north of Cement Hill Road:* LOS E to LOS F in both directions (two-lane portion)
- ▶ *SR 12 east of Scandia Road:* LOS C to LOS F in the eastbound direction, and LOS D to LOS F in the westbound direction
- ▶ *I-80 east of Pleasants Valley Road:* LOS E to LOS F in both directions
- ▶ *Peabody Road east of Pleasants Valley Road:* LOS E to LOS F in both directions
- ▶ *Alamo Drive south of Marshall Drive:* LOS D to LOS E in the northbound direction

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
South Gateway	Eastbound	I-80	East of Carquinez Bridge	A-C	E
	Northbound	I-680	At Benicia Bridge	A-C	D
	Westbound	SR 12	East of Junction of SR 84 North	F	F
	Eastbound	SR 37	East of Walnut Avenue (Mare Island)	F	F
	Westbound	I-80	At Carquinez Bridge	F	F
	Southbound	I-680	At Benicia Bridge	A-C	D
	Eastbound	SR 12	East of Junction of SR 84 North	F	F
	Westbound	SR 37	East of Walnut Avenue (Mare Island)	E	F
North Gateway	Westbound	SR 128	East of Junction of SR 121 South	A-C	A-C
	Southbound	Pleasants Valley Road	At Yolo County Line	A-C	A-C
	Southbound	Road 89/Winters Road	At Yolo County Line	A-C	A-C
	Southbound	I-505	North of Allendale Road Interchange	A-C	A-C
	Southbound	Stevenson Bridge Road	At Yolo County Line	A-C	A-C
	Southbound	Pedrick Road-Road 98	At Yolo County Line	A-C	A-C
	Southbound	SR 113	North of I-80 (near Davis)	A-C	A-C
	Westbound	I-80	At Yolo County Line	A-C	A-C
	Southbound	SR 84	At Yolo County Line	A-C	A-C
	Eastbound	SR 128	East of Junction of SR 121 South	A-C	D
	Northbound	Pleasants Valley Road	At Yolo County Line	A-C	A-C
	Northbound	Road 89/Winters Road	At Yolo County Line	A-C	A-C
	Northbound	I-505	North of Allendale Road Interchange	A-C	A-C
	Southbound	Stevenson Bridge Road	At Yolo County Line	A-C	A-C
	Northbound	Pedrick Road-Road 98	At Yolo County Line	A-C	A-C
	Northbound	SR 113	North of I-80 (near Davis)	A-C	A-C
Eastbound	I-80	At Yolo County Line	A-C	D	

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
North Gateway	Northbound	SR 84	At Yolo County Line	A-C	A-C
Napa-Solano County Line	Northbound	SR 29	At Napa County Line	F	F
	Westbound	SR 12	At Napa County Line	F	D
	Northbound	Suisun Valley Road	At Napa County Line	A-C	A-C
	Southbound	SR 29	At Napa County Line	F	F
	Eastbound	SR 12	At Napa County Line	F	E
	Southbound	Suisun Valley Road	At Napa County Line	A-C	A-C
Vallejo East-West	Northbound	Wilson Avenue	North of Tennessee Street	D	F
	Northbound	Sacramento Street	North of Tennessee Street	A-C	A-C
	Northbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	F	F
	Northbound	Broadway	North of Tennessee Street	A-C	D
	Northbound	Tuolumne Street	North of Tennessee Street	D	F
	Eastbound	I-80	North of Tennessee Street	F	F
	Northbound	Oakwood Avenue	North of Tennessee Street	A-C	A-C
	Northbound	Columbus Parkway	North of Tennessee Street	D	A-C
	Southbound	Wilson Avenue	North of Tennessee Street	F	F
	Southbound	Sacramento Street	North of Tennessee Street	A-C	A-C
	Southbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	F	F
	Southbound	Broadway	North of Tennessee Street	A-C	D
	Southbound	Tuolumne Street	North of Tennessee Street	A-C	F
	Westbound	I-80	North of Tennessee Street	F	F
	Southbound	Oakwood Avenue	North of Tennessee Street	A-C	A-C
Southbound	Columbus Parkway	North of Tennessee Street	D	D	
Vallejo I-80	Southbound	Sonoma Boulevard (SR 29)	North of I-80	A-C	F
	Eastbound	Magazine Street	West of Sixth Street	A-C	A-C

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
Vallejo I-80	Eastbound	Curtola Parkway	West of Lemon Street	D	E
	Eastbound	Benicia Road	East of Lemon Street	A-C	A-C
	Eastbound	Georgia Street	West of 14th Street	A-C	A-C
	Eastbound	Solano Avenue	West of Phelan Avenue	A-C	A-C
	Eastbound	Tennessee Street	West of Mariposa Street	A-C	E
	Eastbound	Redwood Parkway	West of Fairgrounds Drive	F	F
	Eastbound	SR 37	West of I-80	D	D
	Northbound	Sonoma Boulevard (SR 29)	North of I-80	A-C	D
	Westbound	Magazine Street	West of Sixth Street	A-C	A-C
	Westbound	Curtola Parkway	West of Lemon Street	A-C	D
	Westbound	Benicia Road	East of Lemon Street	A-C	A-C
	Westbound	Georgia Street	West of 14th Street	A-C	A-C
	Westbound	Solano Avenue	West of Phelan Avenue	A-C	A-C
	Westbound	Tennessee Street	West of Mariposa Street	A-C	D
	Westbound	Redwood Parkway	West of Fairgrounds Drive	F	F
Westbound	SR 37	West of I-80	A-C	D	
Napa-Solano Ridge	Eastbound	I-780	West of Military West (Benicia)	F	F
	Eastbound	Lake Herman Road	East of Columbus Parkway	A-C	D
	Eastbound	I-80 (north)	East of American Canyon Road	A-C	E
	Eastbound	SR 12	At Napa County Line	F	E
	Westbound	I-780	West of Military West (Benicia)	F	F
	Westbound	Lake Herman Road	East of Columbus Parkway	A-C	A-C
	Westbound	I-80 (north)	East of American Canyon Road	D	F
	Westbound	SR 12	At Napa County Line	F	D

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
South of American Canyon–Cordelia	Northbound	SR 29	At Napa County Line	F	F
	Eastbound	I-80 (south)	North of SR 37	A–C	D
	Northbound	I-680	North of Marshview Road	D	F
	Southbound	SR 29	At Napa County Line	F	F
	Westbound	I-80 (south)	North of SR 37	D	F
	Southbound	I-680	North of Marshview Road	D	F
Fairfield-Cordelia	Eastbound	Rockville Road	East of Suisun Valley Road	A–C	A–C
	Eastbound	I-80	East of Suisun Valley Road	F	A–C
	Eastbound	Cordelia Road	West of Hale Ranch Road	A–C	A–C
	Eastbound	North Connector	East of Suisun Valley Road	-	E
	Westbound	Rockville Road	East of Suisun Valley Road	A–C	A–C
	Westbound	I-80	East of Suisun Valley Road	F	E
	Westbound	Cordelia Road	West of Hale Ranch Road	A–C	A–C
	Westbound	North Connector	East of Suisun Valley Road	-	D
Fairfield I-80	Eastbound	SR 12	West of Beck Avenue (Leg A)	F	F
	Eastbound	W Texas Street	East of I-80 (#101)	A–C	E
	Eastbound	Travis Boulevard	East of I-80 (#84)	A–C	A–C
	Eastbound	Air Base Parkway	East of I-80 (#53)	F	F
	Southbound	N Texas Street	East of I-80 (#40)	A–C	D
	Westbound	SR 12	West of Beck Avenue (Leg A)	F	F
	Westbound	W Texas Street	East of I-80 (#101)	A–C	A–C
	Westbound	Travis Boulevard	East of I-80 (#84)	A–C	D
	Westbound	Air Base Parkway	East of I-80 (#53)	F	F
Northbound	N Texas Street	East of I-80 (#40)	A–C	D	

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
Fairfield–Suisun City	Eastbound	Cordelia Street	East of Pennsylvania Avenue	A–C	A–C
	Eastbound	SR 12	East of Pennsylvania Avenue	A–C	E
	Southbound	Sunset Avenue	South of Travis Boulevard (#16)	F	F
	Eastbound	E Tabor Avenue	East of Tolenas Avenue (#7)	A–C	D
	Eastbound	Air Base Parkway	West of railroad tracks (#8)	F	F
	Southbound	Peabody Road	North of Cement Hill Road	E	F
	Westbound	Cordelia Street	East of Pennsylvania Avenue	A–C	A–C
	Westbound	SR 12	East of Pennsylvania Avenue	D	F
	Northbound	Sunset Avenue	South of Travis Boulevard (#16)	F	F
	Westbound	E Tabor Avenue	East of Tolenas Avenue (#7)	A–C	D
Suisun City West	Westbound	Air Base Parkway	West of railroad tracks (#8)	F	F
	Northbound	Peabody Road	North of Cement Hill Road	E	F
	Eastbound	SR 12	East of Scandia Road	A–C	F
	Southbound	Collinsville Road	South of SR 12	A–C	A–C
Fairfield-Vacaville	Westbound	SR 12	East of Scandia Road	D	F
	Northbound	Collinsville Road	South of SR 12	A–C	A–C
	Eastbound	I-80	East of Pleasants Valley	E	F
	Northbound	Peabody Road	North of Cement Hill Road	E	F
	Northbound	Vanden Road	South of Leisure Town Road	A–C	A–C
	Northbound	SR 113	North of SR 12	A–C	A–C
	Westbound	I-80	East of Pleasants Valley	E	F
	Southbound	Peabody Road	North of Cement Hill Road	E	F
Southbound	Vanden Road	South of Leisure Town Road	A–C	A–C	
Southbound	SR 113	North of SR 12	A–C	A–C	

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
Vacaville I-80	Southbound	Alamo Drive	North of Marshall Road	A-C	A-C
	Southbound	Davis Street	South of Bella Vista Road	A-C	A-C
	Eastbound	Mason Street-Elmira Road	West of Peabody Road	E	A-C
	Southbound	Allison Drive	East of I-80	A-C	A-C
	Southbound	Nut Tree Road	North of Burton Drive	A-C	A-C
	Southbound	Leisure Town Road	North of Orange Drive	F	D
	Northbound	Alamo Drive	South of Marshall Road	D	E
	Northbound	Davis Street	South of Bella Vista Road	A-C	A-C
	Westbound	Mason Street-Elmira Road	East of Peabody Road	D	A-C
	Northbound	Allison Drive	East of I-80	A-C	A-C
	Northbound	Nut Tree Road	South of Burton Drive	A-C	D
	Northbound	Leisure Town Road	South of Orange Drive	D	A-C
Vacaville-Dixon	Northbound	Pleasants Valley Road	North of Vaca Valley Parkway	A-C	A-C
	Northbound	I-505	South of Midway Road	A-C	A-C
	Eastbound	I-80	East of Leisure Town Road	A-C	E
	Northbound	Batavia Road	South of Dixon City Limits	A-C	A-C
	Northbound	Pitt School Road	South of Dixon City Limits	A-C	A-C
	Northbound	SR 113	South of Dixon City Limits	A-C	A-C
	Southbound	Pleasants Valley Road	North of Vaca Valley Parkway	A-C	A-C
	Southbound	I-505	South of Midway Road	A-C	A-C
	Westbound	I-80	East of Leisure Town Road	A-C	D
	Southbound	Batavia Road	South of Dixon City Limits	A-C	A-C
	Southbound	Pitt School Road	South of Dixon City Limits	A-C	A-C
	Southbound	SR 113	South of Dixon City Limits	A-C	A-C

**Table 4.4-10
Forecasts of Roadway Levels of Service in 2030 (Preferred Plan)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Preferred Plan ¹
Dixon I-80	Eastbound	Dixon Avenue	East of Gateway Drive	A-C	A-C
	Southbound	Pitt School Road	North of Market Lane	A-C	A-C
	Southbound	SR 113	South of I-80	D	A-C
	Westbound	Dixon Avenue	East of Gateway Drive	D	A-C
	Northbound	Pitt School Road	North of Market Lane	A-C	A-C
	Northbound	SR 113	South of I-80	D	A-C

Notes:

I-80 = Interstate 80; I-680 = Interstate 680; I-780 = Interstate 780; SR = State Route

¹ **Bold text and shading** of an LOS listed in the "Preferred Plan" column indicate a significant impact at that roadway location.

Source: Data provided by DKS Associates in 2008

- ▶ *Nut Tree Road south of Burton Drive*: LOS C to LOS D in the northbound direction
- ▶ *I-80 east of Leisure Town Road*: LOS C to LOS E in the eastbound direction and LOS C to LOS D in the westbound direction

Relevant Policies of the 2008 Draft General Plan

The Transportation and Circulation chapter of the 2008 Draft General Plan contains the following policies regarding traffic operations, including traffic LOS:

- ▶ **Policy TC.P-3**: Facilitate shorter travel distances and modes of travel other than the automobile, and limit the extent of additional transportation improvements and maintenance that may be needed with a more dispersed land use pattern.
- ▶ **Policy TC.P-4**: Evaluate proposals for new development for their compatibility with and potential effects on transportation systems.
- ▶ **Policy TC.P-5**: Fairly attribute to each development the cost of on- and off-site improvements needed for county roads and other transportation systems to accommodate that development, including the potential use of development impact fees for to generate revenue.

Other Projects that Could Mitigate Congestion

Mitigating traffic impacts to the level of performance under existing (2007) conditions would require substantial investment in new bridges, freeway lanes, and arterial roadway lanes across Solano County and/or substantial reductions in VMT through general plan policies for bus, rail, and nonmotorized travel. Although implementation of Policy TC.P-3 could reduce vehicle travel, it would be speculative to conclude that implementing this policy would reduce VMT, and thus LOS, to acceptable levels. The estimated costs of these projects would be in the billions of dollars.

Some projects have been identified in other studies and would mitigate the congestion if funding is available:

- ▶ Widening of Lake Herman Road to four lanes total
- ▶ Addition of HOV lanes to I-80 between the Carquinez Bridge and Red Top Road
- ▶ Addition of HOV lanes to I-80 between Air Base Parkway and Vacaville
- ▶ Widening of I-680 to six lanes total
- ▶ Widening of SR 12 between Suisun City and the Sacramento County line (including a new Rio Vista Bridge) to four lanes total
- ▶ Upgrading of SR 12 to freeway standards and/or widening from four lanes to six lanes between Suisun City and I-80

Other deficiencies would require significant neighborhood disruption and substantial additional cost to mitigate. Some mitigation may be possible through the use of freeway management techniques (such as ramp metering) or arterial management techniques (such as signal system coordination).

Conclusion

With adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with implementation of some or all of the roadway improvement projects listed above, impacts on roadway LOS in Solano County would be reduced. However, implementation of the 2008 Draft General Plan policies alone would not be sufficient to reduce the impact to a less-than-significant level. Furthermore, many of the proposed roadway projects listed above are under the jurisdiction of Caltrans and others are sponsored by local cities and funded substantially with project development fees in those cities, so the County cannot guarantee their implementation, nor can funding for those projects be guaranteed. Therefore, this impact would be significant.

Mitigation Measure

No feasible mitigation is available to fully mitigate this impact to a less-than-significant level. This impact would remain **significant and unavoidable**.

IMPACT 4.4-1b **Degradation of Roadway Levels of Service – Maximum Development Scenario.** *With implementation of the 2008 Draft General Plan under the Maximum Development Scenario, operation of numerous roadways currently operating at LOS C or better would degrade to LOS D, LOS E, or LOS F. Additionally, numerous roadways currently operating at LOS D, LOS E, and LOS F would degrade further. This impact would be **significant**.*

This impact is similar to Impact 4.4-1a for the Preferred Plan. Specific effects under the Maximum Development Scenario are described below.

Total Number of Trips

Under the Maximum Development Scenario, the growth in total trips is anticipated to be 46.5% countywide (Table 4.4-11).

Scenarios	Total Daily Trips	Change from Existing Condition	
		Total Trips	Percent
Existing Conditions (2007)	2,094,228	–	–
Maximum Development Scenario	3,068,800	974,572	46.5%

Source: Solano-Napa Phase 2 Model

Vehicle Miles Traveled and Vehicle Hours Traveled

As expected, the increase in total trips would result in an increase in both VMT and vehicle hours traveled for roadways that are in Solano County. The results are shown in Table 4.4-12. These results are reported for a combined a.m. and p.m. peak hour, as the times when congestion is the heaviest and impacts on air quality would be most likely to occur.

Table 4.4-12 Vehicle Miles Traveled and Vehicle Hours Traveled (Maximum Development Scenario)				
Scenario	Combined a.m. and p.m. Peak Hour			
	Vehicle Miles Traveled		Vehicle Hours Traveled	
	Whole County	Congested Area	Whole County	Congested Area
Existing Conditions	2,022,198	206,343	56,364	11,990
Maximum Development Scenario	2,952,845	426,172	99,316	32,034
Change from Existing Conditions to Maximum Development Scenario	930,647	219,830	42,952	20,044
	46%	107%	76%	167%
Source: Modeling conducted by DKS Associates in 2008				

As indicated in Table 4.4-12 above, the Maximum Development Scenario and associated growth inside jurisdictions would result in a 46% increase in VMT. The increase in VMT on congested facilities is expected to be much greater at 107%. This results because there are expected to be more congested roadways in general across Solano County by 2030.

The increased congestion is also a significant factor in the 76% of increased vehicle hours of travel by 2030 in the Preferred Plan. Similarly, the vehicle hours of travel on congested facilities would grow to 167% beyond the current vehicle hours of travel on congested facilities estimated today.

Forecasted Levels of Service

Traffic volumes by 2030 are shown in Table 4.4-5. Based on these, Table 4.4-13 summarizes what the anticipated LOS would be on these facilities. According to County policy, significance occurs only when the level of service would worsen to LOS D, E, or F. Under the Maximum Development Scenario, this would occur at the same locations as listed under Impact 4.4-1 for the Preferred Plan, as well as at the following additional locations:

- ▶ *I-680 at the Benicia Bridge*: LOS C to LOS E in the southbound direction
- ▶ *I-505 at the Yolo County line*: LOS C to LOS D in the northbound direction

Conclusion

The same 2008 Draft General Plan policies as described under Impact 4.4-1a for the Preferred Plan would be implemented under the Maximum Development Scenario, and the same other roadway projects as listed above could also mitigate congestion. However, for the same reasons as described above for the Preferred Plan, this impact would be significant.

Mitigation Measure

No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.4-2a **Adverse Effects on Emergency Access – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan could create an increase in conditions that could adversely affect emergency access. This impact would be less than significant.*

Implementation of the 2008 Draft General Plan under the Preferred Plan could create an increase in conditions that could negatively affect emergency access. The project could result in higher levels of traffic congestion or dangerous design treatments that are incompatible with adjacent uses. The 2008 Draft General Plan, however, includes the following policies to develop transportation facilities that are safe and maintain these facilities in a manner that would provide for safe travel, including travel by emergency vehicles:

- ▶ **Policy TC.P-1:** Maintain and improve current transportation systems to remedy safety and congestion issues, and establish specific actions to address these issues when they occur.
- ▶ **Policy TC.P-11:** Maintain and improve the current roadways and highway system to meet recommended design standards set forth by the County, including streets that also carry transit and nonmotorized traffic.

With implementation of these 2008 Draft General Plan policies, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-2b **Adverse Effects on Emergency Access – Maximum Development Scenario.** *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario could create an increase in conditions that could adversely affect emergency access. This impact would be **less than significant**.*

This impact is the same as Impact 4.4-2a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-3a **Potential for Inadequate Parking Capacity – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan would result in additional parking demand for new activities that are allowed. Depending on the nature of the new activities, the potential exists for inadequate parking capacity. However, with application of parking standards in the County Zoning Ordinance, this impact would be **less than significant**.*

Parking capacity is a consideration of development projects. Parking needs are a function of overall vehicle activity in a development. Parking is not only limited to automobiles; consideration of parking for trucks, construction vehicles, and other heavy vehicles may be required. Implementation of the 2008 Draft General Plan would result in additional parking demand for new activities that are allowed. Depending on the nature of the new activities allowed, there is the potential for inadequate parking capacity to occur, particularly if parking facilities are not constructed and maintained.

The County Zoning Ordinance includes parking standards. Application of these standards would reduce the potential impact associated with parking demand. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-3b **Potential for Inadequate Parking Capacity – Maximum Development Scenario.** *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario would result in additional parking demand for new activities that are allowed. Depending on the nature of the new activities, the potential exists for inadequate parking capacity. However, with application of parking standards in the County Zoning Ordinance, this impact would be **less than significant**.*

This impact is the same as Impact 4.4-3a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
South Gateway	Eastbound	I-80	East of Carquinez Bridge	A-C	E
	Northbound	I-680	At Benicia Bridge	A-C	D
	Westbound	SR 12	East of Junction of SR 84 North	F	F
	Eastbound	SR 37	East of Walnut Avenue (Mare Island)	F	F
	Westbound	I-80	At Carquinez Bridge	F	F
	Southbound	I-680	At Benicia Bridge	A-C	E
	Eastbound	SR 12	East of Junction of SR 84 North	F	F
	Westbound	SR 37	East of Walnut Avenue (Mare Island)	E	F
North Gateway	Westbound	SR 128	East of Junction of SR 121 South	A-C	A-C
	Southbound	Pleasants Valley Road	At Yolo County Line	A-C	A-C
	Southbound	Road 89/Winters Road	At Yolo County Line	A-C	A-C
	Southbound	I-505	North of Allendale Road Interchange	A-C	A-C
	Southbound	Stevenson Bridge Road	At Yolo County Line	A-C	A-C
	Southbound	Pedrick Road-Road 98	At Yolo County Line	A-C	A-C
	Southbound	SR 113	North of I-80 (near Davis)	A-C	A-C
	Westbound	I-80	At Yolo County Line	A-C	A-C
	Southbound	SR 84	At Yolo County Line	A-C	A-C
	Eastbound	SR 128	East of Junction of SR 121 South	A-C	D
	Northbound	Pleasants Valley Road	At Yolo County Line	A-C	A-C
	Northbound	Road 89/Winters Road	At Yolo County Line	A-C	A-C
	Northbound	I-505	North of Allendale Road Interchange	A-C	A-C
	Southbound	Stevenson Bridge Road	At Yolo County Line	A-C	A-C
	Northbound	Pedrick Road-Road 98	At Yolo County Line	A-C	A-C
	Northbound	SR 113	North of I-80 (near Davis)	A-C	A-C
	Eastbound	I-80	At Yolo County Line	A-C	D
	Northbound	SR 84	At Yolo County Line	A-C	A-C

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
Napa-Solano County Line	Northbound	SR 29	At Napa County Line	F	F
	Westbound	SR 12	At Napa County Line	F	D
	Northbound	Suisun Valley Road	At Napa County Line	A-C	A-C
	Southbound	SR 29	At Napa County Line	F	F
	Eastbound	SR 12	At Napa County Line	F	E
	Southbound	Suisun Valley Road	At Napa County Line	A-C	A-C
Vallejo East-West	Northbound	Wilson Avenue	North of Tennessee Street	D	F
	Northbound	Sacramento Street	North of Tennessee Street	A-C	A-C
	Northbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	F	F
	Northbound	Broadway	North of Tennessee Street	A-C	D
	Northbound	Tuolumne Street	North of Tennessee Street	D	F
	Eastbound	I-80	North of Tennessee Street	F	F
	Northbound	Oakwood Avenue	North of Tennessee Street	A-C	A-C
	Northbound	Columbus Parkway	North of Tennessee Street	D	A-C
	Southbound	Wilson Avenue	North of Tennessee Street	F	F
	Southbound	Sacramento Street	North of Tennessee Street	A-C	A-C
	Southbound	Sonoma Boulevard (SR 29)	North of Tennessee Street	F	F
	Southbound	Broadway	North of Tennessee Street	A-C	D
	Southbound	Tuolumne Street	North of Tennessee Street	A-C	F
	Westbound	I-80	North of Tennessee Street	F	F
	Southbound	Oakwood Avenue	North of Tennessee Street	A-C	A-C
Southbound	Columbus Parkway	North of Tennessee Street	D	D	
Vallejo I-80	Southbound	Sonoma Boulevard (SR 29)	North of I-80	A-C	F
	Eastbound	Magazine Street	West of Sixth Street	A-C	A-C
	Eastbound	Curtola Parkway	West of Lemon Street	D	E
	Eastbound	Benicia Road	East of Lemon Street	A-C	A-C
	Eastbound	Georgia Street	West of 14th Street	A-C	A-C
	Eastbound	Solano Avenue	West of Phelan Avenue	A-C	A-C

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
Vallejo I-80	Eastbound	Tennessee Street	West of Mariposa Street	A-C	E
	Eastbound	Redwood Parkway	West of Fairgrounds Drive	F	F
	Eastbound	SR 37	West of I-80	D	D
	Northbound	Sonoma Boulevard (SR 29)	North of I-80	A-C	D
	Westbound	Magazine Street	West of Sixth Street	A-C	A-C
	Westbound	Curtola Parkway	West of Lemon Street	A-C	D
	Westbound	Benicia Road	East of Lemon Street	A-C	A-C
	Westbound	Georgia Street	West of 14th Street	A-C	A-C
	Westbound	Solano Avenue	West of Phelan Avenue	A-C	A-C
	Westbound	Tennessee Street	West of Mariposa Street	A-C	D
	Westbound	Redwood Parkway	West of Fairgrounds Drive	F	F
Westbound	SR 37	West of I-80	A-C	D	
Napa-Solano Ridge	Eastbound	I-780	West of Military West (Benicia)	F	F
	Eastbound	Lake Herman Road	East of Columbus Parkway	A-C	D
	Eastbound	I-80 (north)	East of American Canyon Road	A-C	E
	Eastbound	SR 12	At Napa County Line	F	E
	Westbound	I-780	West of Military West (Benicia)	F	F
	Westbound	Lake Herman Road	East of Columbus Parkway	A-C	A-C
	Westbound	I-80 (north)	East of American Canyon Road	D	F
	Westbound	SR 12	At Napa County Line	F	D
South of American Canyon-Cordelia	Northbound	SR 29	At Napa County Line	F	F
	Eastbound	I-80 (south)	North of SR 37	A-C	D
	Northbound	I-680	North of Marshview Road	D	F
	Southbound	SR 29	At Napa County Line	F	F
	Westbound	I-80 (south)	North of SR 37	D	F
	Southbound	I-680	North of Marshview Road	D	F

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
Fairfield-Cordelia	Eastbound	Rockville Road	East of Suisun Valley Road	A-C	A-C
	Eastbound	I-80	East of Suisun Valley Road	F	A-C
	Eastbound	Cordelia Road	West of Hale Ranch Road	A-C	A-C
	Eastbound	North Connector	East of Suisun Valley Road	F	E
	Westbound	Rockville Road	East of Suisun Valley Road	A-C	A-C
	Westbound	I-80	East of Suisun Valley Road	F	E
	Westbound	Cordelia Road	West of Hale Ranch Road	A-C	A-C
	Westbound	North Connector	East of Suisun Valley Road	F	D
Fairfield I-80	Eastbound	SR 12	West of Beck Avenue (Leg A)	F	F
	Eastbound	W Texas Street	East of I-80 (#101)	A-C	E
	Eastbound	Travis Boulevard	East of I-80 (#84)	A-C	A-C
	Eastbound	Air Base Parkway	East of I-80 (#53)	F	F
	Southbound	N Texas Street	East of I-80 (#40)	A-C	D
	Westbound	SR 12	West of Beck Avenue (Leg A)	F	F
	Westbound	W Texas Street	East of I-80 (#101)	A-C	A-C
	Westbound	Travis Boulevard	East of I-80 (#84)	A-C	D
	Westbound	Air Base Parkway	East of I-80 (#53)	F	F
Northbound	N Texas Street	East of I-80 (#40)	A-C	D	
Fairfield-Suisun City	Eastbound	Cordelia Street	East of Pennsylvania Avenue	A-C	A-C
	Eastbound	SR 12	East of Pennsylvania Avenue	A-C	E
	Southbound	Sunset Avenue	South of Travis Boulevard (#16)	F	F
	Eastbound	E Tabor Avenue	East of Tolenas Avenue (#7)	A-C	D
	Eastbound	Air Base Parkway	West of railroad tracks (#8)	F	F
	Southbound	Peabody Road	North of Cement Hill Road	E	F
	Westbound	Cordelia Street	East of Pennsylvania Avenue	A-C	A-C
	Westbound	SR 12	East of Pennsylvania Avenue	D	F
	Northbound	Sunset Avenue	South of Travis Boulevard (#16)	F	F
Westbound	E Tabor Avenue	East of Tolenas Avenue (#7)	A-C	D	

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
Fairfield–Suisun City	Westbound	Air Base Parkway	West of railroad tracks (#8)	F	F
	Northbound	Peabody Road	North of Cement Hill Road	E	F
Suisun City West	Eastbound	SR 12	East of Scandia Road	A–C	F
	Southbound	Collinsville Road	South of SR 12	A–C	A–C
	Westbound	SR 12	East of Scandia Road	D	F
	Northbound	Collinsville Road	South of SR 12	A–C	A–C
Fairfield-Vacaville	Eastbound	I-80	East of Pleasants Valley	E	F
	Northbound	Peabody Road	North of Cement Hill Road	E	F
	Northbound	Vanden Road	South of Leisure Town Road	A–C	A–C
	Northbound	SR 113	North of SR 12	A–C	A–C
	Westbound	I-80	East of Pleasants Valley	E	F
	Southbound	Peabody Road	North of Cement Hill Road	E	F
	Southbound	Vanden Road	South of Leisure Town Road	A–C	A–C
	Southbound	SR 113	North of SR 12	A–C	A–C
Vacaville I-80	Southbound	Alamo Drive	North of Marshall Road	A–C	A–C
	Southbound	Davis Street	South of Bella Vista Road	A–C	A–C
	Eastbound	Mason Street–Elmira Road	West of Peabody Road	E	A–C
	Southbound	Allison Drive	East of I-80	A–C	A–C
	Southbound	Nut Tree Road	North of Burton Drive	A–C	A–C
	Southbound	Leisure Town Road	North of Orange Drive	F	D
	Northbound	Alamo Drive	South of Marshall Road	D	E
	Northbound	Davis Street	South of Bella Vista Road	A–C	A–C
	Westbound	Mason Street–Elmira Road	East of Peabody Road	D	A–C
	Northbound	Allison Drive	East of I-80	A–C	A–C
	Northbound	Nut Tree Road	South of Burton Drive	A–C	D
	Northbound	Leisure Town Road	South of Orange Drive	D	A–C

**Table 4.4-13
Forecasts of Roadway Levels of Service in 2030 (Maximum Development Scenario)**

Screenline	Direction	Roadway	Location	Levels of Service	
				Existing Conditions	Maximum Development Scenario ¹
Vacaville-Dixon	Northbound	Pleasants Valley Road	North of Vaca Valley Parkway	A-C	A-C
	Northbound	I-505	South of Midway Road	A-C	D
	Eastbound	I-80	East of Leisure Town Road	A-C	E
	Northbound	Batavia Road	South of Dixon City Limits	A-C	A-C
	Northbound	Pitt School Road	South of Dixon City Limits	A-C	A-C
	Northbound	SR 113	South of Dixon City Limits	A-C	A-C
	Southbound	Pleasants Valley Road	North of Vaca Valley Parkway	A-C	A-C
	Southbound	I-505	South of Midway Road	A-C	A-C
	Westbound	I-80	East of Leisure Town Road	A-C	D
	Southbound	Batavia Road	South of Dixon City Limits	A-C	A-C
	Southbound	Pitt School Road	South of Dixon City Limits	A-C	A-C
	Southbound	SR 113	South of Dixon City Limits	A-C	D
Dixon I-80	Eastbound	Dixon Avenue	East of Gateway Drive	A-C	A-C
	Southbound	Pitt School Road	North of Market Lane	A-C	A-C
	Southbound	SR 113	South of I-80	D	A-C
	Westbound	Dixon Avenue	East of Gateway Drive	D	D
	Northbound	Pitt School Road	North of Market Lane	A-C	A-C
	Northbound	SR 113	South of I-80	D	A-C

Notes:

I-80 = Interstate 80; I-680 = Interstate 680; I-780 = Interstate 780; SR = State Route

¹ **Bold text and shading** of an LOS listed in the "Maximum Development Scenario" column indicate a significant impact at that roadway location.

Source: Data provided by DKS Associates in 2008

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-4a Potential for Conflict with Adopted Plans, Policies, or Programs Supporting Alternative Transportation – Preferred Plan. *Implementation of the 2008 Draft General Plan under the Preferred Plan could result in plans, policies, or programs that could conflict with support of alternative transportation. However, with implementation of the 2008 Draft General Plan's policy supporting alternative transportation, this impact would be less than significant.*

Sometimes transportation-related actions may create conflicts with adopted plans, policies, or programs that support alternative transportation. Many of these are not a result of deliberate choices, but of unintended consequences made in the design development process. However, the Transportation and Circulation chapter of the 2008 Draft General Plan provides the following policy regarding alternative modes:

- ▶ **Policy TC.P-3:** Facilitate shorter travel distances and modes of travel other than the automobile, and limit the extent of additional transportation improvements and maintenance that may be needed with a more dispersed land use pattern.

Although the analysis does not identify any policies within the 2008 Draft General Plan that explicitly conflict with the support of alternative transportation, policies may inadvertently lead to such conflicts. Policy TC.P-3 provides alternative transportation equivalent standing to travel by automobile within the 2008 Draft General Plan. In the future, if a proposed project conflicts with the support of alternative transportation, Policy TC.P-3 would ensure that the viability of alternative modes of transportation is upheld. For this reason, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-4b Potential for Conflict with Adopted Plans, Policies, or Programs Supporting Alternative Transportation – Maximum Development Scenario. *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario could result in plans, policies, or programs that could conflict with support of alternative transportation. However, with implementation of the 2008 Draft General Plan's policy supporting alternative transportation, this impact would be less than significant.*

This impact is the same as Impact 4.4-4a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-5a Potential for Air Traffic Safety Risks – Preferred Plan. *Implementation of the 2008 Draft General Plan under the Preferred Plan could result in increased air traffic safety risks or changed air traffic patterns at the county's two general-aviation airports and one military airport. However, with implementation of existing airport land use compatibility plans, development regulations, and policies contained in the 2008 Draft General Plan, this impact would be less than significant.*

Solano County contains two general-aviation airports, and one military air base. The County ALUC has established airport land use compatibility plans for each airport. The plans describe the allowable land uses and

development standards for each compatibility zone. The following policy and implementation programs contained in the 2008 Draft General Plan would also help reduce the associated safety risks:

- ▶ **Policy TC.P-20:** Support the continued safe operation of current general-aviation airports and heliports and encourage complementary land uses near such facilities.
- ▶ **Program TC.I-14:** Apply appropriate site planning practices and development standards in areas near general-aviation airports and heliports so that aircraft are not disturbed by nearby buildings, overhead wires, cell phone towers, or other possible obstructions.
- ▶ **Program TC.I-15:** Discourage residential land uses near general-aviation airports and heliports so that residents will not be disturbed by aircraft noise.

These policies and the established land use compatibility plans would protect future operations of the airports and provide for the safety and compatibility of adjacent land uses. Because future land uses and development would continue to be subject to these regulations and policies, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.4-5b **Potential for Air Traffic Safety Risks – Maximum Development Scenario.** *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario could result in increased air traffic safety risks or changed air traffic patterns at the county's two general-aviation airports and one military airport. However, with implementation of existing airport land use compatibility plans, development regulations, and policies contained in the 2008 Draft General Plan, this impact would be **less than significant**.*

This impact is the same as Impact 4.4-3a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

4.4.4 RESIDUAL SIGNIFICANT IMPACTS

No feasible mitigation is available to reduce the impact of the 2008 Draft General Plan on roadway LOS under either the Preferred Plan or the Maximum Development Scenario. Therefore, Impacts 4.4-1a and 4.4-1b would remain **significant and unavoidable**.

4.5 HYDROLOGY AND WATER RESOURCES

This section presents the existing conditions with regard to surface water and groundwater resources in Solano County, summarizes the regulatory and planning framework, and analyzes the impacts on surface water and groundwater resources associated with the 2008 Draft General Plan. Impacts on water supply and wastewater treatment are discussed in Section 4.9, “Public Services and Utilities.”

4.5.1 EXISTING CONDITIONS

CLIMATE AND TOPOGRAPHY

Solano County is located within the southern portion of the Sacramento Valley and is one of the nine counties that constitute the San Francisco Bay Area. The climate of Solano County varies spatially depending mainly on the effects of topography on rainfall distribution. The eastern parts of the county (the Sacramento Valley and Sacramento and Suisun Bay watersheds) are classified as having a Mediterranean/hot summer climate while the western portions (the Napa River and San Pablo Bay watersheds) have a Mediterranean/cool summer climate. The average annual precipitation in the Central Valley lowland areas of the county is typically between 15 and 25 inches, with higher rainfall amounts reaching 25–40 inches in the western portion. Runoff characteristics closely follow rainfall patterns, with the majority of the streamflow and runoff occurring during the winter rainy season (SCWA 2005a).

The most prominent topographic features of Solano County are the mountains and hills that form the western boundary of the county: the Vaca Mountains, the West Hills, and the Sulphur Spring Mountain range. The Vaca Mountains and other hills are part of the Coast Range and form a strip of extremely steep slopes along the western border of the county that possesses a wide range in elevation, bedrock composition, and climate. Mt. Vaca is the highest point in the range at an elevation of 2,819 feet. Precipitation increases with elevation from 20 inches to 40 inches per year. The Montezuma Hills and Potrero Hills region dominates the southeastern portion of the county. The elevation of this area ranges from approximately 25 feet to 350 feet, and annual precipitation is between 15 and 23 inches.

SURFACE-WATER RESOURCES

Surface-water resources within Solano County are diverse and include many creeks, drainages, sloughs, marshes, and bays. Exhibits 4.5-1 and 4.5-2 show the water service areas and major water resources, watersheds, and water bodies in Solano County. As shown in Exhibit 4.5-2, Solano County has two major drainage provinces, the Sacramento River/Delta Drainage Province and the San Francisco Bay Drainage Province. As a result, Solano County falls within the jurisdiction of two regional water quality control boards (RWQCBs), the San Francisco Bay RWQCB and the Central Valley RWQCB. Each of the major water resources in Solano County is described in more detail below. Water quality characteristics of significant water bodies are discussed in additional detail in the “Water Supply and Water Demand” section of the Water Resources Background Report prepared for the 2008 Draft General Plan (Solano County 2006).

Sacramento–San Joaquin Delta

A few miles south of Sacramento, two of California’s major rivers converge to form one of the most important features of California’s water system, the Sacramento–San Joaquin Delta (Delta). More than 23 million Californians and millions of acres of farmland rely on the Delta for all or part of their water supply, and countless species depend on it for their habitat. Covering more than 700 square miles, the Delta is a patchwork of nearly 60 islands and tracts surrounded by natural and human-made channels and sloughs. It is a popular destination for boaters and other recreational users, and home to more than 750 distinct species of plants and wildlife. Salmon, striped bass, and other key species such as Delta smelt depend on the Delta and its many marshes and waterways for their food and habitat. The Delta boundary was legally defined in 1959 with the passage of the Delta

Protection Act (Section 12220 of the California Water Code). The primary zone is defined as “the delta land and water area of primary state concern and statewide significance” and includes Delta protection zones. The legal and primary-zone Delta boundary in Solano County is shown in Exhibit 4.5-3.

Because about two-thirds of the islands and tracts are located below sea level, the Delta relies on a maze of levees to protect land and key infrastructure from floods and daily high tides. In all, more than 1,100 miles of levees are located in the Delta, including many built more than a century ago to protect farmland. Were it not for these levees, the Delta would be a 740,000-acre brackish inland sea. Today, the Delta’s aging and increasingly fragile levee system is being asked to protect much more than farmland. Three state highways, a railroad, natural gas and electric transmission facilities, and aqueducts serving water to parts of the Bay Area also depend on Delta levees. In addition, more than 400,000 people live in Delta towns and communities, some of which rank among the fastest-growing jurisdictions in California.

The Delta is also the single most important link in California’s water supply system. Two of the state’s biggest water projects, the State Water Project (SWP) and the federal Central Valley Project (CVP), depend on Delta waterways to convey water from Northern California rivers to pumping facilities in the southern Delta. Delta levees play a critical role in preventing salty water from San Francisco Bay from intruding into critical parts of the Delta and contaminating the freshwater that supplies communities and farms (ACWA 2006).

Approximately 150 miles of navigable rivers, sloughs, channels, and bays composing the western portion of the Delta lie within the jurisdiction of Solano County. This area is commonly known as the “gateway to the Delta,” and serves as an entry point for thousands of recreational boaters and commercial vessels, many transitioning from the San Francisco Bay area to the Delta each year (Solano County 2006).

Suisun Bay

Suisun Bay is a shallow tidal estuary that lies at the confluence of the Sacramento and San Joaquin Rivers and forms the entrance to the Delta. Estuaries are water bodies located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Estuaries extend from a bay or the open ocean to a point upstream where there is no significant mixing of freshwater and seawater. On its western end, Suisun Bay is drained by the Carquinez Strait, which connects to San Pablo Bay, a northern extension of San Francisco Bay. In addition to the Carquinez Bridge at the Carquinez Strait, Suisun Bay is spanned in its center by the Benicia-Martinez Bridge and at its eastern end by the State Route 160 crossing (also known as the Antioch Bridge) between Antioch and Oakley.

Suisun Marsh

Suisun Marsh is the largest contiguous brackish-water marsh remaining on the west coast of North America. It is a critical part of the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) estuary ecosystem. Encompassing 116,000 acres, Suisun Marsh includes 52,000 acres of managed wetlands, 27,700 acres of upland grasses, 6,300 acres of tidal wetlands, and 30,000 acres of bays and sloughs. Suisun Marsh is home to public waterfowl hunting areas and 158 private duck clubs. The marsh encompasses more than 10% of California’s remaining natural wetlands and serves as a resting and feeding ground for thousands of waterfowl migrating on the Pacific Flyway. In addition, Suisun Marsh provides essential habitat for more than 221 bird species, 45 animal species, 16 different reptilian and amphibian species, and more than 40 fish species. The marsh’s vast open-space resources and proximity to large urban areas makes it ideally suited for wildlife viewing, hiking, canoeing, and other recreation opportunities. Suisun Marsh is located in southern Solano County about 35 miles northeast of San Francisco. The marsh is bordered on the east by the Delta, on the south by Suisun Bay, on the west by Interstate 680, and on the north by State Route 12 and the cities of Suisun and Fairfield.



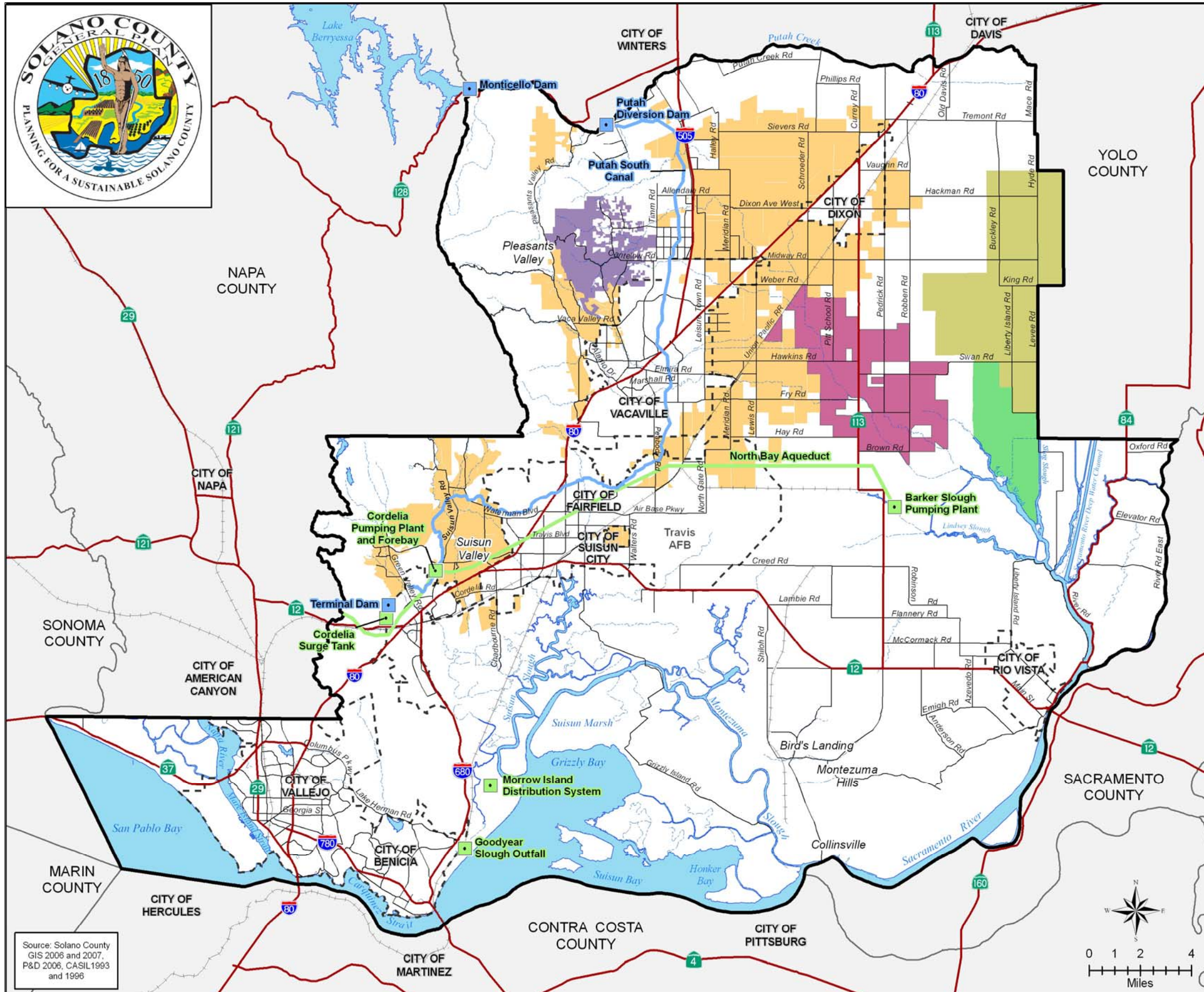
Solano County General Plan EIR

Exhibit 4.5-1

Water Service Areas and Facilities

Legend

- SCWA Service Area
- Solano Project Facilities**
- Facility Location
- Putah South Canal
- State Water Project Facilities**
- Facility Location
- North Bay Aqueduct
- Water Districts**
- Rural North Vacaville Water District
- Solano Irrigation District
- Reclamation District 2098
- Reclamation District 2068
- Maine Prairie Water District
- Basemap Layers**
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL 1993 and 1996



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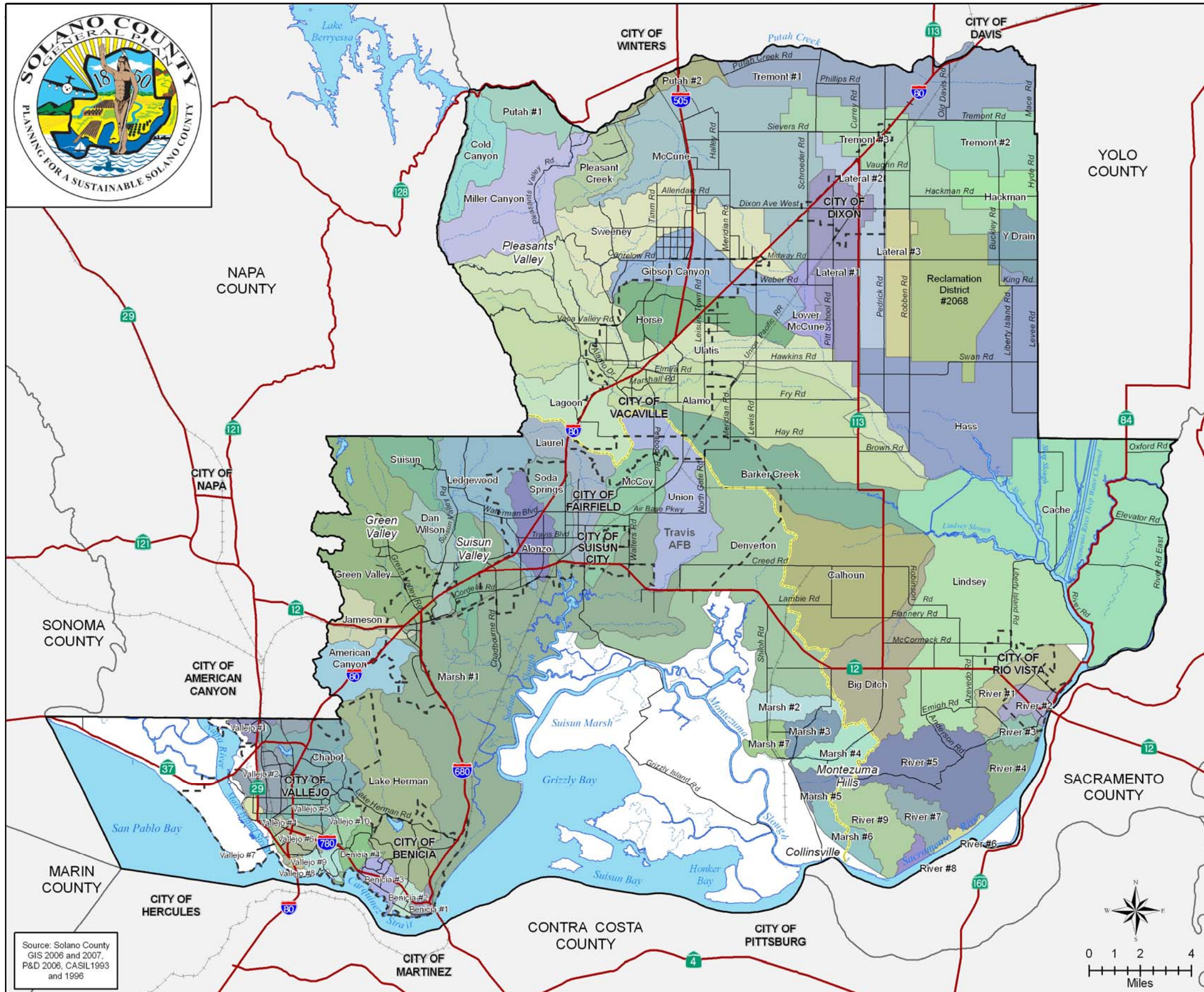
"Planning for a Sustainable Solano County"



Solano County General Plan EIR

Exhibit 4.5-2

Water Resources



Legend

- Watershed Divide Between Sacramento River/Delta and San Francisco Bay Drainage Province
- Watersheds
- Basemap Layers**
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL1993 and 1996

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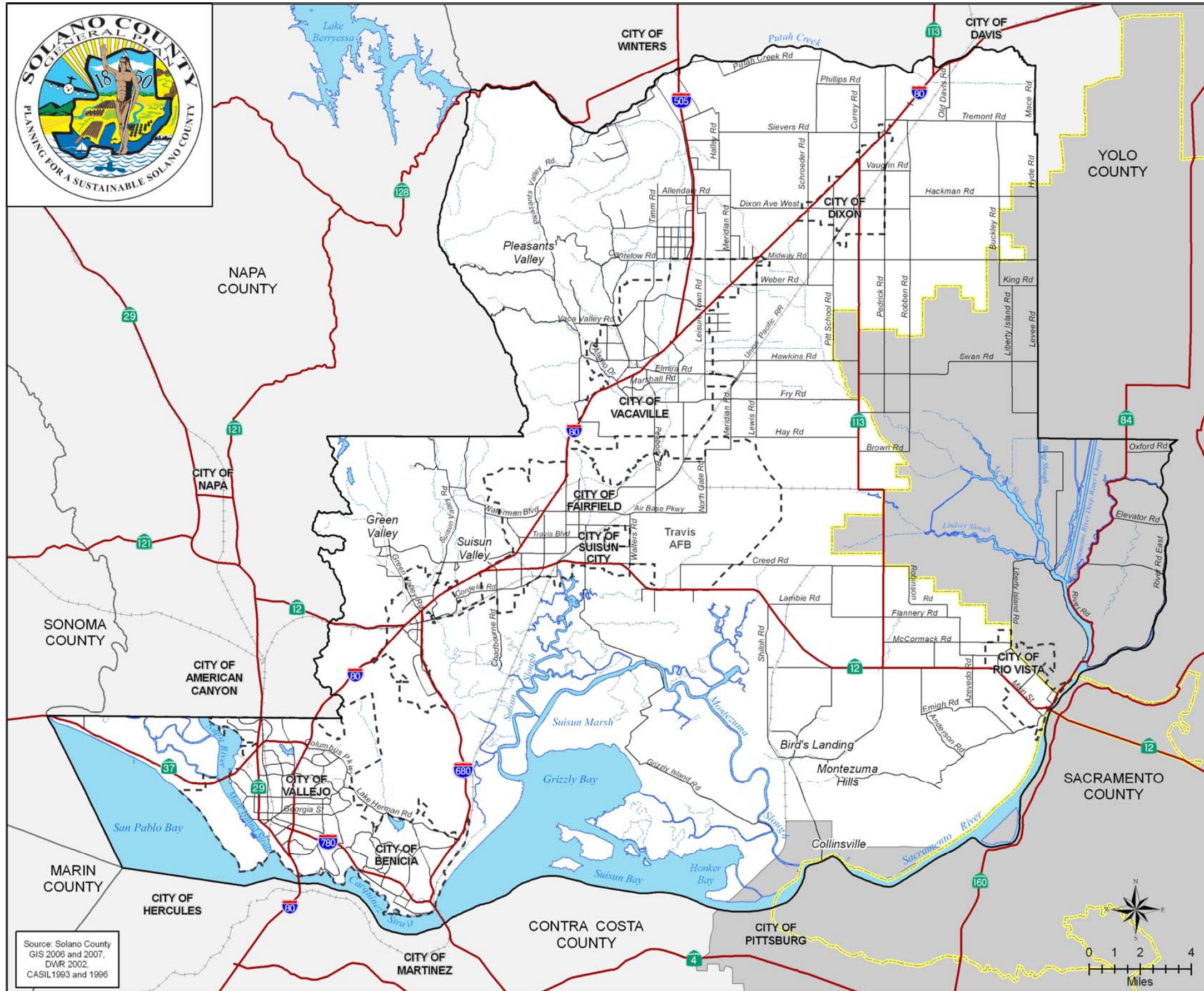
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Solano County General Plan EIR

Exhibit 4.5-3

Delta Boundaries



Legend

- Legal Delta
- Delta Primary Zone
- Basemap Layers
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006 and 2007, DWR 2002, CASIL1993 and 1996



"Planning for a Sustainable Solano County"

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Suisun Marsh is a mosaic of seasonally managed wetlands, unmanaged tidal wetlands, bays, and sloughs bordered by upland grasslands. As in much of California, the history of Suisun Marsh has been shaped by water. This brackish marsh was originally formed by erosion, sedimentation, and the dynamics of a tidal system where fresh river water and saline ocean water meet. In 1987, the California Department of Water Resources (DWR), California Department of Fish and Game (DFG), U.S. Bureau of Reclamation (Reclamation), and Suisun Resource Conservation District (SRCD) signed the Suisun Marsh Preservation Agreement, which includes the following provisions:

- ▶ construction of facilities to deliver lower-salinity water to portions of Suisun Marsh and meet water quality standards;
- ▶ a monitoring program to collect data on surface water and soil water quality, water elevations, vegetation, and wildlife species;
- ▶ wetlands mitigation for effects of facilities construction and upstream water diversions; and
- ▶ wetland improvements through use of management plans and a cost-share program for installation and improvement of water conveyance facilities.

Suisun Marsh monitoring requirements are described in detail in the Suisun Marsh Monitoring Agreement, also signed by all Suisun Marsh Protection Agreement signatories except SRCD in 1987 (DWR 2000).

On April 27, 2004, a corroded underground fuel pipeline running through Suisun Marsh ruptured and spilled more than 103,000 gallons of diesel fuel into the marsh. The U.S. Coast Guard and the pipeline owner, Kinder Morgan Energy Partners, took initial measures to recover the fuel and prevent it from spreading, but called on the U.S. Environmental Protection Agency (EPA) to clean up and restore the marsh. By September 2004, after the work was done, 616 tons of contaminated soil had been removed. Tests showed that the mud remaining in the marsh no longer posed a threat to the environment.

In January 2006, more than a half-dozen levees around Suisun Marsh were breached because of storms and high tides that overwhelmed the marsh's levee system and flooded more than 3,500 acres of wetlands. Maintenance of Suisun Marsh levees falls under the jurisdiction or management of several agencies at the federal, state, and local levels: the U.S. Army Corps of Engineers (USACE), Reclamation, and the State Water Resources Control Board (SWRCB). A Levee Systems Integrity Program is proposed for the Suisun Marsh levee system through a cooperative effort among DWR, DFG, USACE, participating local reclamation districts, and SRCD. Components of the program are included in the *Habitat Management, Preservation and Restoration Plan for the Suisun Marsh* (CALFED 2006).

San Pablo Bay

The San Pablo Bay watershed drains into the northern reaches of San Francisco Bay. The San Pablo Bay watershed is a major drainage basin for Marin, Sonoma, Napa, Solano, and Contra Costa Counties. The catchment area of San Pablo Bay is approximately 810 square miles (520,000 acres), and the surface area of the bay is approximately 90 square miles (60,000 acres). The western portion of Solano County is characterized by large expanses of diked baylands that border San Pablo Bay and the eastern edge of Mare Island. The city of Vallejo borders the Napa River on the west and San Pablo Bay on the south.

The northern reaches of San Pablo Bay are characterized by large expanses of diked former and current tidal baylands. San Pablo Bay's watershed has experienced increased soil erosion, stream channel degradation, loss of riparian and oak woodland habitat, and declining groundwater values. Many researchers have concluded that the ecological resources remaining in this area are declining in quantity and quality because of waterway modification, development of rural lands, and increased pollution (USACE 1999).

GROUNDWATER RESOURCES

There are four groundwater basins within Solano County as defined by DWR (2006): the Napa-Sonoma Lowlands subbasin within the Napa-Sonoma Valley basin, the Suisun-Fairfield Valley basin, and the Solano and Yolo Valley subbasins within the Sacramento Valley Basin. Other groundwater areas are not well defined (Exhibit 4.5-2).

The cities of Rio Vista and Dixon are served exclusively by groundwater from the Solano Subbasin underlying the cities. Vacaville gets approximately one-third of its municipal water supply from this basin, which underlies the eastern portion of the city. Most of the growers within the Solano Irrigation District (SID) use surface water supplied by SID, but SID also has its own wells to supplement its surface-water supply from the Solano Project. Maine Prairie Water District (MPWD) and Reclamation District (RD) 2068 provide surface water to their growers and do not currently use groundwater underlying their districts. Growers outside of districts that provide surface water rely entirely on groundwater unless they have an individual right to a surface-water supply. SID also provides domestic-water service to several areas of the unincorporated county along with the cities of Vallejo, Suisun City, and Vacaville.

Most rural residential landowners have individual shallow groundwater wells that serve their domestic needs. Some small rural residential water systems also distribute groundwater to their customers. The Solano Subbasin, which underlies the northeastern portion of the county, is the largest groundwater basin in the county. This basin starts from the foothills above Vacaville and extends to the Sacramento River and from Putah Creek to the north to the boundaries of Fairfield to the south. Two basic levels exist within the groundwater basin. The Putah Fan is a shallower aquifer providing agricultural water and local domestic supplies. The Putah Fan starts near Winters and extends south and east through Vacaville and Dixon. The Tehama Formation is underneath the Putah Fan in some areas and is underlain by the English Hills area north and west of Vacaville. Vacaville's wells draw from the Tehama Formation for groundwater supply. The Suisun-Fairfield Valley Basin is the second largest groundwater basin in Solano County. It lies southwest of English Hills beneath the cities of Fairfield and Suisun City. This basin is not used in a significant capacity because of low yields and poor water quality (SCWA 2005b).

Groundwater levels drop in dry years, but rebound in wet years. Before development of the Solano Project, groundwater was used extensively in Solano County, both for municipal supplies and for agriculture. One of the main reasons the Solano Project (see below for further description) was developed was to rectify groundwater overdraft in some agricultural areas. Once the Solano Project started making agricultural water deliveries, groundwater levels rebounded.

Public agencies that overlie the Solano Subbasin have developed groundwater management plans as specified in Assembly Bill (AB) 3030 (Chapter 947, Statutes of 1992), a state law that authorizes local agencies to prepare groundwater management plans. Solano County Water Agency (SCWA) prepares biannual reports on groundwater levels for the groundwater basin. Groundwater level data come from DWR and local public agencies that utilize the groundwater basin. These reports show no trend of groundwater overdraft with current levels of groundwater use (SCWA 2005b).

The Rural North Vacaville Water District (RNVWD) was formed in 1996 to address groundwater problems in the rural north Vacaville area, which included a drop in groundwater levels and failing wells. The Tehama Formation is the thickest water-bearing unit underlying the Solano Subbasin, ranging in thickness from 1,500 feet to 2,500 feet (DWR 2004). Two wells that draw from the Tehama Formation provide the source of RNVWD's water supply. This supply is limited to a total capacity of approximately 522 connections, and includes drilling two deep wells (1,500 feet) with pumps that pump 500 gallons per minute. To date there have been no groundwater storage calculations for the Solano Subbasin in the vicinity of Pleasants Valley/Vaca Valley, and the area to the west of this basin is not defined (DWR 2004).

Groundwater within the Solano Subbasin is considered to be of generally good quality. Total dissolved solids (TDS) range from 250 parts per million (ppm) to 500 ppm in the northwest and eastern portion of the basin, and are found at levels higher than the 500-ppm secondary maximum contaminant level (MCL) in the central and southern areas. In general, most of the water within the subbasin is classified as hard to very hard. Boron concentrations are less than 0.75 ppm, except in the southern and southeastern portion of the basin, where concentrations average between 0.75 ppm and 2.0 ppm (more than 1.0 ppm will affect sensitive tree crops). Arsenic concentrations are typically between 0.02 ppm and 0.05 ppm, with the highest concentrations found along the southeastern margin of the basin. The current primary MCL for arsenic is 0.05 ppm. Also, manganese is found at concentrations above the secondary MCL of 0.05 ppm along the Sacramento River along the eastern portion of the subbasin (DWR 2004).

WATER SUPPLY

This subsection describes the water supply projects in Solano County and provides a summary of existing water supply and water demand within the county. This subsection also describes projected water demands in the county. This description focuses on water supply projects and supplies of SCWA and the demands of member agencies who receive water supply from SCWA, as well as areas within the county outside of the service area of SCWA (SCWA 2005b, 2005c). Please also refer to the discussion of water supply in Section 4.9, “Public Services and Utilities.”

Solano County Water Agency Water Supplies

Solano Project

The Solano Project was conceived in the 1940s and 1950s to meet the water demands of agriculture, municipalities, and military facilities in Solano County. As agriculture developed throughout the county, groundwater use increased substantially. Groundwater overdraft persisted in several parts of the county, providing an impetus for a surface-water supply to offset the overdraft. The population of Solano County in the 1940s and 1950s was also expected to grow; however, planners at that time had no way of knowing that the urban population growth in Solano County would increase as dramatically as it has in recent decades. During the planning of the Solano Project, Napa County and Yolo County chose not to participate in a larger Solano Project. The Solano Project was sized to meet only the projected water needs of Solano County.

Congressional authorization was granted for the construction of the Solano Project and the first water was delivered in 1959. The total construction cost for the Solano Project was \$38 million.

The physical facilities of the Solano Project are Monticello Dam, Putah Diversion Dam, and the Putah South Canal (Exhibit 4.5-1). SCWA is responsible for operations and maintenance of the Solano Project and has an agreement with SID to operate and maintain Solano Project facilities on SCWA’s behalf. SID also owns and operates a hydroelectric power plant at Monticello Dam.

Table 4.5-1 Solano Project Facilities			
	Monticello Dam— Lake Berryessa	Putah Diversion Dam— Lake Solano	Putah South Canal
Storage Capacity (af)	1,602,000	750	956 cfs (maximum)
Dam Height (feet)	304	29	NA
Dam Crest	1,023	910	NA
Length (miles)	NA	NA	33
Note: af = acre-feet; cfs = cubic feet per second; NA = not applicable Sources: SCWA 2004, 2005b			

The amount of water contracted (207,350 acre-feet per year [afy]) is approximately the firm yield of the Solano Project. The firm yield is an engineering calculation based on a specified water amount every year during the driest hydrologic period on record. For the Solano Project, the driest hydrologic record was from 1916 to 1934. This is a conservative method of determining water supply from a reservoir, and results in a very dependable water supply.

Water Supply Contracts

SCWA uses property taxes to pay for the operations and maintenance of the Solano Project. SCWA has entered into agreements with cities, water districts, and state agencies to provide water from the Solano Project. The contracts with the Solano Project member units are for the full supply available from the Solano Project. The Solano Project’s contracting agencies are the Cities of Fairfield, Suisun City, Vacaville, and Vallejo; SID; MPWD; the University of California, Davis; and California State Prison, Solano.

Contract entitlements for each agency are listed in Table 4.5-2. Reclamation is contractually committed to deliver the full contract amount of water from the Solano Project unless the supply does not physically exist (e.g., the reservoir is empty). All Solano Project contractors, municipal or agricultural, are on an equal basis for Solano Project water supply.

Table 4.5-2 Solano Project Water Contracts	
Agency	Annual Entitlement (acre-feet)
City of Fairfield	9,200
City of Suisun City	1,600
City of Vacaville	5,750
City of Vallejo	14,600
Solano Irrigation District	141,000
Maine Prairie Water District	15,000
University of California, Davis	4,000
California State Prison, Solano	1,200
Project Operating Loss (average estimated)	15,000
Total Project	207,350

Source: SCWA 2005b

Solano Project Water Quality

Water quality from the Solano Project is excellent for both municipal and agricultural uses.

The watershed of the Lake Berryessa reservoir spans 576 square miles in Lake and Napa Counties. Much of this area is in a natural state, but urban and agricultural development is also located within the watershed. In the Lake County portion of the watershed, the communities of Middletown, Anderson Springs, and Hidden Valley have a collective population of about 13,000. Several small subdivisions and the town of Pope Valley are located near Lake Berryessa in Napa County, with an estimated population of less than 5,000. Recreational visitors seasonally increase the number of people temporarily in the watershed. An estimated 2 million recreational visitors come to the Lake Berryessa area each year.

The primary agricultural land use in the watershed is vineyard production of wine grapes. Cattle graze along the eastern shore of Lake Berryessa. SCWA works with groups in the Lake Berryessa watershed to promote activities

that protect water quality. For example, SCWA leads the Lake Berryessa Watershed Partnership, which consists of organizations and public agencies that monitor and improve water quality in the reservoir. The partnership supports projects such as household hazardous waste collection sites, signage to prevent water pollution, and sharing of water quality data.

The large volume of Lake Berryessa provides dilution for any contaminants that may reach the reservoir. Additionally, the Solano Project draws its water supply from the bottom of the reservoir, providing additional decomposition and dilution of contaminants before Solano Project water is released to Putah Creek for delivery to the Putah South Canal.

In compliance with state law, a sanitary survey has been prepared for the Solano Project that analyzes all potential contamination sources and recommends measures to protect water quality. The sanitary survey covers Putah Creek (between Monticello Dam and the Putah Diversion Dam) and the Putah South Canal, in addition to the Lake Berryessa watershed. City water treatment plants (WTPs) regularly test Solano Project water and find it to be of high quality.

North Bay Aqueduct

The North Bay Aqueduct (NBA) is part of the SWP. The SWP exports water from Northern California to parts of the San Francisco Bay Area, San Joaquin Valley, and Southern California. Along with the CVP, the SWP is a major water supplier in the state of California. The SWP contracts with 29 public agencies, including SCWA, for water supplies.

SWP water comes from Lake Oroville and water rights to flows in the Sacramento and San Joaquin River systems. Major facilities of the SWP include the Banks Pumping Plant in the south Delta, the California Aqueduct, Lake Oroville on the Feather River, and San Luis Reservoir located south of the Delta. The NBA is an underground pipeline that runs from Barker Slough in the Delta to Cordelia Forebay, located near Fairfield. From Cordelia Forebay, water is pumped to Napa County, Vallejo, and Benicia. Travis Air Force Base is also served by the NBA. The size of the underground pipeline varies from 72 inches at Barker Slough to 54 inches at Cordelia Forebay.

NBA facilities are shown in Exhibit 4.5-1. The NBA is operated remotely by DWR at the Delta Field Division office near Tracy. DWR has recently found that the NBA cannot deliver 154 cubic feet per second (cfs), the flow for which it was designed. An additional pump, not presently installed, is required to reach the full contract amount of 175 cfs. Pumping tests have shown that the NBA can deliver a maximum of 142 cfs. DWR, SCWA, and Napa County are investigating methods to increase the capacity of the NBA to design levels, and are considering increasing the capacity to as much as 248 cfs.

North Bay Aqueduct Water Supply Contracts

SCWA has a contract with DWR for water supply from the SWP. All the water from the NBA supply is currently used for municipal and industrial purposes. The SWP contract runs to the year 2035 and is renewable. SCWA has contracted for 47,756 afy of water from the SWP. The amount of contract water increases each year until it reaches this ultimate entitlement.

Table 4.5-3 shows the annual increases in supply from 2004 to 2015. From 2015 through 2030, the annual supply remains 47,756 afy.

**Table 4.5-3
SCWA North Bay Aqueduct Water Supply**

Year	Total Annual Amount (Acre-Feet per Year)
2004	47,206
2005	47,256
2006	47,306
2007	47,356
2008	47,406
2009	47,456
2010	47,506
2011	47,556
2012	47,606
2013	47,656
2014	47,706
2015 and each succeeding year thereafter	47,756

Source: SCWA 2005b

State Water Project Reliability

The issue of greatest concern regarding the NBA’s water supply is its reliability. When the SWP was first envisioned, water supply was assumed to be very reliable. Additional dams and reservoirs were planned to meet the ultimate contractual demands of SWP contractors of 4.2 million acre-feet (maf) per year. Under current conditions, in dry years and even many normal years, the SWP will not be able to deliver its full contractual amount. Future SWP facilities are not expected to raise the yield of the SWP to 4.2 maf. SWP export pumping is limited by fishery and water quality constraints in the Delta.

The NBA was subject to pumping restrictions because of the Delta smelt, a threatened species listed under the federal Endangered Species Act. This fish resides in sloughs and channels of the Delta. Delta smelt spawn in the slough where the NBA intake is located. In several years since Delta smelt monitoring started in 1993, a temporary pumping restriction of 65 cfs was placed on the NBA to protect young Delta smelt from being entrained (sucked up) by the NBA pumping plants. In 2005, the U.S. Fish and Wildlife Service discontinued Delta smelt monitoring at the NBA intake. Through grant funding, SCWA has also investigated the feasibility of an alternate intake to the NBA located away from Delta smelt habitat and on or near the Sacramento River, which has better water quality. Such a project is feasible from an engineering perspective, but is very expensive.

Non-State Water Project Water

Two other important water sources use the NBA: Vallejo permit water (VPW) and settlement agreement water.

VPW is derived from a water rights license held by the City of Vallejo. The license allows pumping of 31.52 cfs from the Delta. The service area allowed to use VPW comprises the cities of Vallejo and Benicia, parts of the city of Fairfield, and the American Canyon area of Napa County. In 1990 the three cities filed for SWRCB water rights permits for an appropriation of water under the state’s watershed of origin statutes. The permit application was withdrawn after a settlement was reached with DWR that provided an essentially equivalent water supply from the SWP. A settlement agreement and a conveyance agreement with DWR specify the details of the settlement water supply.

Settlement agreement water is available up to the following amounts: Benicia, 10,500 afy; Fairfield, 11,800 afy; Vacaville, 9,320 afy. Settlement agreement water is a major new water source to meet these cities' long-term needs. The amount of water requested was based on projected water needs to meet each city's general plan demands. The settlement agreement allows the three cities to apply in the future to the SWRCB for watershed of origin appropriations above settlement agreement amounts, if their demands exceed those upon which the settlement agreement was based. The settlement agreement runs through 2035 and is renewable under the same terms as the DWR/SCWA SWP contract. Settlement agreement water can be considered a permanent supply.

NBA Water Quality

Another major NBA issue is water quality. Delta water from the NBA is generally of poorer quality and requires more treatment than water from the Solano Project. Statewide water quality studies show that the NBA has the poorest water quality of all SWP contractors for some constituents such as turbidity and organic carbon. City WTPs have been designed to take into consideration the poorer quality and are able to meet current drinking-water standards. However, as drinking-water standards become more stringent, it will be both more difficult and more expensive to treat water from the NBA. Some city WTPs will switch from NBA water to other sources of water when NBA water quality is poor, but this may be less of an available option as the cities build out. Poor NBA water quality occurs particularly in the winter when runoff from the Barker Slough watershed is pumped into the NBA.

SCWA conducted studies to determine the source of contaminants to the NBA water supply. Studies have shown that winter runoff from the local watershed is the primary source of elevated levels of turbidity and total organic carbon. No point sources were identified. The local watershed is used mostly for livestock grazing.

The organic carbon in NBA water is coming from natural sources, such as soil and decaying plant matter. Studies have shown that it is not possible to effectively control organic carbon in the NBA watershed. Turbidity comes from soil particles that are not settling. Soil types in the Barker Slough watershed do not settle well, and remain in suspension for very long periods. Traditional best management practices (BMPs), such as vegetative buffers and settling ponds, do not reduce turbidity for these types of soils. Studies have determined that eliminating livestock from areas near channels and controlling erosion are the BMPs to reduce turbidity. SCWA has installed fencing and alternate water supplies to prohibit livestock access to many of the waterways in the watershed. Ongoing water quality testing and monitoring is testing the effectiveness of these source-control measures. Through grant funding, SCWA is evaluating water treatment technologies to reduce organic carbon in the NBA water.

Other Water Purveyors

SID has entitlements for 141,000 afy of Solano Project water for service to areas in Solano County, including the Dixon Solano Municipal Water Service and Suisun-Solano Water Authority (SSWA). SID is also the operator of the Solano Project, which delivers Lake Berryessa water to four cities, and MPWD as well as SID customers. RD 2068 is an agricultural water supplier in Solano and Yolo Counties. California Water Service Company delivers 1 million gallons per day (mgd) of local groundwater to 2,900 customer connections in the city of Dixon, and has a contract to operate the RNVWD water system as well. In addition, an exchange agreement with the Maine Prairie Water District allows SID to exchange irrigation tailwater for 10,000 af of Solano Project water.

Cities

City of Benicia

The City of Benicia's water supply contracts are an SWP contract, a 1962 agreement with the City of Vallejo, and a settlement agreement with the State of California as a result of an application for area-of-origin water rights. Benicia's WTP has a treatment capacity of 12 mgd. The transmission system consists of two pump stations and approximately 18 miles of pipeline. The distribution system consists of three pump stations, eight pressure-reducing stations, and approximately 150 miles of pipelines. The storage system consists of five treated-water

reservoirs and Lake Herman, with a capacity of 1,800 af. The City of Benicia’s Water Operations Division provides for the negotiation and management of Benicia’s water supply contracts and for the operation, maintenance, repair, and capital improvements of the water treatment plant and transmission, distribution, and storage systems (City of Benicia 2008).

The City of Benicia also has a water exchange and banking arrangement with the Mojave Water Agency (Mojave), another SWP contractor, to exchange wet-year SWP water for dry-year SWP water. In years when SCWA has extra SWP supplies, it can exchange two units of SWP water for a future return of one unit of water to be provided (at the Delta) by Mojave, most likely in a dry year when there are SWP shortages. As of 2004, the City of Benicia had the right to 5,500 af of return water from Mojave, which stores its excess water supply in its groundwater basin (SCWA 2004).

City of Dixon

Water is supplied within the Dixon planning area by two water purveyors. A joint agreement between the City of Dixon and SID created the Dixon-Solano Municipal Water Service, which currently supplies water within the Dixon planning area. It will eventually supply water to all newly annexing and developing portions of the Dixon planning area. California Water Service Company serves the older central, developed land within the core of the city, including its downtown area. Future water service by this company is limited to current service boundaries. Irrigation water in the Dixon planning area is supplied by SID. Both suppliers deliver groundwater from naturally occurring aquifers; therefore, neither supplier needs to contract with other water agencies for entitlements. Groundwater quality in the area is very good (City of Dixon 2005).

City of Fairfield

Water for the city of Fairfield is supplied by the SWP, the Solano Project, VPW, settlement agreement water, SID agreements, and recycled water (Table 4.5-4). SWP water is taken from the Delta at the Barker Slough Pumping Plant and conveyed through the NBA to the North Bay Regional (NBR) WTP, which is jointly owned by the Cities of Fairfield and Vacaville. Solano Project water is diverted through the Putah South Canal to Fairfield’s Waterman and NBR treatment plants. The “area of origin” water rights settlement with DWR provides Fairfield with 11,800 afy of nonproject (i.e., not SWP) water. Settlement water is available when the Delta is in excess or balanced conditions and Term 91 is not in effect. Term 91 is declared by the SWRCB when it is determined that the SWP and the CVP are releasing stored water in excess of natural flow (natural flow is the flow that would have been in existence if the dam were not there) to meet in-Delta demands and Delta water standards. Term 91 is declared in the summer of all but very wet years, and is essentially a permanent allocation of water supply. The water is conveyed through the NBA when capacity is available and delivered to Fairfield in the same manner as SWP water (SCWA 2005b).

City	Water Source	Amount (acre-feet per year)
Benicia	State Water Project	17,200
	Settlement Agreement Water	10,500
	Lake Herman	500
	Vallejo Permit Water	5,500
	Mojave Exchange	5,500 ¹
Dixon	State Water Project	1,500
	Groundwater	variable
Fairfield	State Water Project	14,678
	Solano Project	9,200

Table 4.5-4 Water Supply and Sources by City		
City	Water Source	Amount (acre-feet per year)
Fairfield (continued)	Settlement Agreement Water	11,800
	Vallejo Permit Water	variable
	SID Agreements	16,018
	Recycled Water	3,000
Rio Vista	State Water Project ²	1,500
	Groundwater	variable
Suisun City	State Water Project	1,300
	Solano Project	1,600
	Suisun-Solano Water Authority ³	variable
Vacaville	State Water Project	8,978
	Solano Project	5,750
	Settlement Agreement Water	9,320
	SID Agreement	3,000
	Groundwater	8,000
	Recycled Water	880
Vallejo	State Water Project	5,600
	Solano Project	14,600
	Vallejo Permit Water	17,287
	Lakes System	400
Notes:		
SID = Solano Irrigation District		
¹ Amount currently available, not annually.		
² State Water Project contract will begin with 300 acre-feet in 2016 and increase by 300 acre-feet annually, reaching a maximum of 1,500 acre-feet by 2020.		
³ Suisun-Solano Water Authority fulfills total demand as needed.		
Source: SCWA 2005c		

Fairfield has an ongoing water exchange agreement with Vallejo that stipulates that the parties can exchange portions of VPW for Fairfield Solano Project water on a 2:1 basis, respectively, with mutual willingness. The agreement also allows Fairfield to purchase Vallejo's VPW at a mutually agreeable rate. The agreement can be terminated by either party with a 30-day written notice. Several agreements between SID and the City of Fairfield since 1974 have provided "common boundary" Solano Project water to Fairfield. Amendment No. 2 (2002) to an 1974 agreement between SID and Fairfield adds Fairfield-Suisun Sewer District (FSSD) as a party and retitles the agreement the "second amended agreement." The total amount of Solano Project water available to Fairfield from the second amended agreement is 16,018 afy. Under the second amended agreement, SID and FSSD agree to provide Fairfield with the first 12 mgd (or 13,447 afy) of recycled water from the FSSD Wastewater Treatment Plant (WWTP). If Fairfield is not using the recycled water, the SID may use or sell it (SCWA 2005b).

City of Rio Vista

Rio Vista currently uses groundwater to meet its water demands (SCWA 2005b). The supply system consists of six wells (four of which are currently producing) ranging in depth from 500 feet to 1,000 feet below ground

surface. Rio Vista's SWP surface-water contract will begin with 300 af in the year 2016 and gradually increase by 300 af annually, reaching a maximum of 1,500 af by 2020 and remaining at that amount thereafter.

Suisun City

Suisun City receives its water from the Solano Project and the SWP. Suisun's SWP contract amount is 750 afy as of 2004 and gradually increases by 150 afy to a maximum of 1,300 afy by 2015, and remains at that level each year thereafter (SCWA 2005b). Suisun City currently has no transmission or treatment facilities to utilize water from the NBA. Suisun City has contract rights to up to 1,600 afy of Solano Project water annually, which it receives via the Putah South Canal to the Cement Hill WTP. Suisun and SID entered into a joint powers authority (JPA) agreement in 1988. The full JPA, called the SSWA, was implemented in 1991. Under the JPA, SID operates the Cement Hill WTP to treat Suisun City's water and delivers it to the city's service area for distribution. A small portion of Suisun Valley is historically part of the service area and still being served. SSWA provides any additional contract water as needed beyond 1,600 af from SID's Solano Project water supply (SCWA 2005b).

City of Vacaville

Water is supplied to Vacaville from the SWP, Solano Project, DWR water rights settlement, an agreement with SID, groundwater, and recycled water. The SWP water is delivered via the NBA. SWP water is taken from the Delta at the Barker Slough Pumping Plant and conveyed through the NBA to the NBR Water Treatment Plant, which as mentioned previously is jointly owned by the Cities of Vacaville and Fairfield. Solano Project water is diverted through the Putah South Canal to Vacaville's diatomaceous earth plant and the NBR Water Treatment Plant. The "area of origin" water rights settlement with DWR provides Vacaville with nonproject (i.e., non-SWP) water. Settlement water is available when the Delta is in excess or balanced conditions and Term 91 is not in effect. The water is conveyed through the NBA when capacity is available and delivered to Vacaville in the same manner as SWP water. Vacaville has a system of 10 deep aquifer wells, most of which are located in the Elmira well field. Currently, approximately 6,000 afy is withdrawn. The estimated safe yield of Vacaville's groundwater system is 8,000 afy. The supply in dry years could be increased to 10,000 afy (SCWA 2005b).

City of Vallejo

SWP water is taken from the Delta at the Barker Slough Pumping Plant and conveyed through the NBA to Cordelia Forebay, where Vallejo then pumps the water to its Fleming Hill Treatment Plant. The current SWP contract amount to Vallejo could ultimately be reduced by 1,125 af beginning in the year 2016 if Dixon and Rio Vista take their full NBA contract amount (SCWA 2005b). Solano Project water is conveyed to the Terminal Reservoir in Cordelia, where it is pumped by Vallejo to the Fleming Hill Treatment Plant. Vallejo holds Appropriative Water Rights License No. 7848 with the SWRCB, issued August 1966; this license is commonly referred to as VPW. VPW is conveyed to Vallejo through the NBA project facilities governed by Amendment No. 10 to the Water Supply Contract between DWR and SCWA.

Vallejo also holds various appropriative rights to store water in three small local reservoirs: Frey, Madigan, and Curry Lakes, commonly known as the Lakes System. The annual safe yield of Lakes Frey and Madigan is 400 af and Lake Curry's is 3,750 af, although Lake Curry water is currently not available because of conveyance issues (SCWA 2005b).

WATER DEMAND

This subsection describes water demands for Solano County. For further information, please also see the discussion of water demand in Section 4.9, "Public Services and Utilities."

Because the SCWA boundary includes all of Solano County, future water-demand projections are based on Solano County population estimates provided by the California Department of Finance (SCWA 2005c). Current

and projected water deliveries and demands within Solano County are listed in Table 4.5-5, based on data provided in the SCWA *Urban Water Management Plan* (UWMP) (SCWA 2005c). It should be noted that some cities within Solano County that purchase water from SCWA may have other water supplies they can use to meet their needs, such as groundwater. Any additional water demands beyond what is supplied by SCWA are not addressed in this report. These additional supplies would be addressed in each city’s individual UWMP.

Table 4.5-5 shows that water supplies are expected to be roughly the same from 2015 to 2030, but population in Solano County is expected to continue to grow. The UWMP indicates that water demands for projected growth within Solano County will be met by individual cities that supplement their water supplies beyond those supplies provided by SCWA (SCWA 2005c). In addition, water conservation measures have the potential to reduce the per-capita water demands (SCWA 2005c).

Table 4.5-5 Past, Current, and Projected Water Deliveries and Demands, and Population Projections							
	2000	2005	2010	2015	2020	2025	2030
Water Use (Acre-feet per year [afy])							
Deliveries	220,376	239,606	239,856	240,106	240,106	240,106	240,106
System Losses	24,472	15,000	15,000	15,000	15,000	15,000	15,000
Total Water Use	244,848	254,606	254,856	255,106	255,106	255,106	255,106
Service Area Population Projections							
Population		421,657	455,647	505,455	555,264	616,446	677,628
Source: SCWA 2005c							

4.5.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Clean Water Act

The Clean Water Act of 1972 (CWA) is the primary federal law that governs and authorizes water quality control activities by EPA, the lead federal agency responsible for water quality management, as well as the states. By employing a variety of regulatory and nonregulatory tools (establishing water quality standards, issuing permits, monitoring discharges, and managing polluted runoff), the CWA seeks to restore and maintain the chemical, physical, and biological integrity of surface waters to support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.” EPA is the federal agency with primary authority for implementing regulations adopted pursuant to the CWA. EPA has delegated the state of California as the authority to implement and oversee most of the programs authorized or adopted for CWA compliance through the Porter-Cologne Water Quality Control Act of 1969, described below.

Water Quality Criteria and Standards

Pursuant to federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations (40 CFR). Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: designated beneficial uses of the water body in question and criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of effects on health and welfare that may be expected from the presence of pollutants in water. Where

multiple uses exist, water quality standards must protect the most sensitive use. Section 303(d) lists the water bodies and associated pollutants that exceed water quality criteria.

National Pollutant Discharge Elimination System Permit Program

A discharge from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. In California, EPA delegates much of the implementation of the CWA to the SWRCB. NPDES permits cover industrial and municipal discharges, discharges from storm sewer systems in larger cities, stormwater associated with numerous kinds of industrial activity, runoff from construction sites disturbing more than 1 acre of soil, mining operations, and animal feedlots and agricultural facilities above certain thresholds.

Stormwater discharges from both large and small construction sites are now subject to NPDES requirements. Large construction sites are those that involve 5 or more acres of soil disturbance. The SWRCB has issued an NPDES general permit for discharges of storm water associated with construction activity (General Construction Permit) under the CWA. The permit requires the preparation of a storm water pollution prevention plan (SWPPP) for proposed construction activities of greater than 5 acres in size. A SWPPP is an operational plan that identifies and describes the BMPs to be implemented at the construction site to control pollution of stormwater runoff. Since March 10, 2003, small construction sites (those involving disturbance of less than 5 acres of soil) have also required an NPDES permit as part of Phase II of EPA's NPDES Storm Water Program. Phase II is intended to further reduce adverse impacts on water quality and aquatic habitat by instituting the use of BMPs on previously unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation (EPA 2000). The Phase II requirements also impose new obligations on municipal separate storm sewer systems (MS4s). Small MS4s (i.e., those located in an incorporated city or a county of less than 100,000 people) that are located within urbanized areas as defined by the U.S. Census must now be covered by a NPDES permit.

The County released its Storm Water Management Plan (SWMP) in February 2003 to be consistent with the NPDES Phase II permit procedures that enable the County to comply with the CWA. The plan comprises six major sections:

- ▶ Section 1, "Background," provides a brief history of water quality regulations.
- ▶ Section 2, "Administration, Planning and Funding," describes the structure, staff involvement, and funding mechanisms of the program.
- ▶ Section 3, "Geography and Land Use," provides demographics, maps, and other physical descriptions of Solano County.
- ▶ Section 4, "Pollutants of Concern," delineates known impaired water bodies and pollutants of concern, as well as actions the program will take to address specific pollutants that are impairing water quality.
- ▶ Section 5, "Minimum Control Measures," describes elements of the County's program for controlling stormwater quality.
- ▶ Section 6, "Monitoring and Evaluation," lists and describes Solano County's measurable goals to bring the program into compliance.

In 2005, the County's SWMP was modified for the 2004–2005 reporting year to address requirements set forth in the Proposed Small MS4 General Permit issued by the SWRCB on January 9, 2003. As described above, construction activities associated with projects 1 acre or larger are regulated by the SWRCB under Construction Activities Storm Water General Permit Order No. 99-08-DWQ (General Construction Permit). The SWMP sets forth a program that the County will implement to ensure compliance with the General Construction Permit for

construction activities carried out by the County, and for construction activities carried out by private interests seeking grading, building, or other development permits from the County. The SWMP is intended to minimize construction impacts.

The SWMP also sets forth a process to be applied to the review of development site plans to address long-term water quality issues and impacts associated with proposed land uses following construction. The SWMP identifies BMPs that are required of all development projects in the Prescribed Base Program of the Design/Construction Storm Water Management Program.

Wastewater discharges from WWTPs are also required to have an NPDES permit. WWTPs are typically required to obtain individual permits from the appropriate RWQCB. The permits include findings, discharge prohibitions, effluent limitations, provisions, and self-monitoring requirements. The findings of the NPDES permit process provide information about treatment plant design and operations, beneficial uses to be protected, and applicable standards.

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirements is delegated by the SWRCB to the nine RWQCBs.

Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses and water quality and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- ▶ Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- ▶ Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- ▶ Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows the linkage between loading reductions and the attainment of water quality objectives. EPA must either approve a TMDL prepared by the state or disapprove the state's TMDL and issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. The goal of the TMDL program is that, after implementation of a TMDL

for a given pollutant on the Section 303(d) list, the causes that led to placement on the pollutant on the list would be reduced or eliminated such that the pollutant would no longer be a significant impact on water quality.

The 303(d) listed segments for Solano County are shown in Table 4.5-6.

National Toxics Rule and California Toxics Rule

The National Toxics Rule (NTR) was issued by EPA on December 22, 1992, and amended on May 4, 1995, and November 9, 1999, to establish numeric criteria for priority toxic pollutants for California. The NTR established water quality criteria for 42 pollutants that were not covered under California's statewide water quality regulations. As a result of a court-ordered revocation of California's statewide water quality control plan for priority pollutants in September 1994, EPA initiated efforts to issue additional numeric water quality criteria for California. On May 18, 2000, EPA issued the California Toxics Rule (CTR), which established numeric criteria for priority pollutants not included in the NTR; the CTR was amended on February 13, 2001. The CTR documentation (*Federal Register*, Volume 65, page 31682) carried forward the previously established criteria of the NTR, thereby providing a single document listing California's fully adopted and applicable water quality criteria for priority pollutants.

Safe Drinking Water Act

The Safe Drinking Water Act was passed in 1974 to regulate the nation's drinking-water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources—rivers, lakes, reservoirs, springs, and groundwater. The Safe Drinking Water Act authorizes EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-made contaminants that may be found in drinking water. EPA sets national standards for drinking water to protect against health risks, considering available technology and costs. These National Primary Drinking Water Regulations set enforceable MCLs for particular contaminants in drinking water or required ways to treat water to remove contaminants.

Section 404 of the Clean Water Act

Section 404 of the CWA establishes a requirement to obtain a permit before conducting any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. This permit is issued by USACE.

Section 401 Water Quality Certification

Section 401 of the CWA states that any person applying for a federal permit or license that may result in the discharge of pollutants into waters of the United States must obtain a state certification that the activity complies with all applicable water quality standards, limitations, and restrictions. This certification is administered in California by the SWRCB, via the RWQCBs. No license or permit may be granted by a federal agency until certification required by Section 401 has been granted. Further, no license or permit may be issued if certification has been denied. Section 401 water quality certifications are typically required to obtain a CWA Section 404 permit from USACE.

Table 4.5-6 Solano County Section 303(d) Water Quality Limited Segments, San Francisco Bay and Central Valley RWQCBs						
Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected ¹	Unit	Proposed TMDL Completion
Suisun Bay	Mercury	Industrial Point Sources	High	23,931	Acres	2003
Suisun Bay	Mercury	Resource Extraction	High	23,931	Acres	2003
Suisun Bay	Mercury	Atmospheric Deposition	High	23,931	Acres	2003
Suisun Bay	Mercury	Natural Sources	High	23,931	Acres	2003
Suisun Bay	Mercury	Nonpoint Source	High	23,931	Acres	2003
Suisun Bay	Nickel	Unknown	Low	23,931	Acres	
Suisun Bay	Selenium	Industrial Point Sources	Low	23,931	Acres	
Suisun Bay	Selenium	Natural Sources	Low	23,931	Acres	
Suisun Bay	Selenium	Exotic Species	Low	23,931	Acres	
Suisun Bay	Exotic Species	Ballast Water	Medium	23,931	Acres	
Suisun Bay	Chlordane	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	DDT	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	Diazinon (recommended delisting)	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	Dieldrin	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	Dioxin Compounds	Atmospheric Deposition	Low	23,931	Acres	
Suisun Bay	Furan Compounds	Atmospheric Deposition	Low	23,931	Acres	
Suisun Bay	PCBs	Unknown Point Source	High	23,931	Acres	2004
Suisun Bay	PCBs (dioxin-like)	Unknown Nonpoint Source	Low	23,931	Acres	
San Pablo Bay	Mercury	Municipal Point Sources	High	13,247	Acres	2003
San Pablo Bay	Mercury	Resource Extraction	High	13,247	Acres	2003
San Pablo Bay	Mercury	Atmospheric Deposition	High	13,247	Acres	2003
San Pablo Bay	Mercury	Natural Sources	High	13,247	Acres	2003
San Pablo Bay	Mercury	Nonpoint Source	High	13,247	Acres	2003
San Pablo Bay	Nickel	Unknown	Low	13,247	Acres	

Table 4.5-6 Solano County Section 303(d) Water Quality Limited Segments, San Francisco Bay and Central Valley RWQCBs						
Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected ¹	Unit	Proposed TMDL Completion
San Pablo Bay	Selenium	Industrial Point Sources	Low	13,247	Acres	
San Pablo Bay	Selenium	Agriculture	Low	13,247	Acres	
San Pablo Bay	Selenium	Natural Sources	Low	13,247	Acres	
San Pablo Bay	Selenium	Exotic Species	Low	13,247	Acres	
San Pablo Bay	Exotic Species	Ballast Water	Medium	13,247	Acres	
San Pablo Bay	Chlordane	Nonpoint Source	Low	13,247	Acres	
San Pablo Bay	DDT	Nonpoint Source	Low	13,247	Acres	
San Pablo Bay	Diazinon (recommended delisting)	Nonpoint Source	Low	13,247	Acres	
San Pablo Bay	Dieldrin	Nonpoint Source	Low	13,247	Acres	
San Pablo Bay	Dioxin Compounds	Atmospheric Deposition	Low	13,247	Acres	
San Pablo Bay	Furan Compounds	Atmospheric Deposition	Low	13,247	Acres	
San Pablo Bay	PCBs	Unknown Nonpoint Source	High	13,247	Acres	2004
San Pablo Bay	PCBs (dioxin-like)	Unknown Nonpoint Source	Low	13,247	Acres	
Lake Herman	Mercury	Surface Mining	Low	108	Acres	
Carquinez Strait	Mercury	Industrial Point Sources	High	3,461	Acres	2003
Carquinez Strait	Mercury	Municipal Point Sources	High	3,461	Acres	2003
Carquinez Strait	Mercury	Resource Extraction	High	3,461	Acres	2003
Carquinez Strait	Mercury	Atmospheric Deposition	High	3,461	Acres	2003
Carquinez Strait	Mercury	Natural Sources	High	3,461	Acres	2003
Carquinez Strait	Mercury	Nonpoint Source	High	3,461	Acres	2003
Carquinez Strait	Selenium	Industrial Point Sources	Low	3,461	Acres	
Carquinez Strait	Selenium	Agriculture	Low	3,461	Acres	
Carquinez Strait	Exotic Species	Ballast Water	Medium	3,461	Acres	
Carquinez Strait	Chlordane	Nonpoint Source	Low	3,461	Acres	

Table 4.5-6 Solano County Section 303(d) Water Quality Limited Segments, San Francisco Bay and Central Valley RWQCBs						
Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected ¹	Unit	Proposed TMDL Completion
Carquinez Strait	DDT	Nonpoint Source	Low	3,461	Acres	
Carquinez Strait	Diazinon (recommended delisting)	Nonpoint Source	Low	3,461	Acres	
Carquinez Strait	Dieldrin	Nonpoint Source	Low	3,461	Acres	
Carquinez Strait	Dioxin Compounds	Atmospheric Deposition	Low	3,461	Acres	
Carquinez Strait	Furan Compounds	Atmospheric Deposition	Low	3,461	Acres	
Carquinez Strait	PCBs	Unknown Nonpoint Source	High	3,461	Acres	2004
Carquinez Strait	PCBs (dioxin-like)	Unknown Nonpoint Source	Low	3,461	Acres	
Sacramento–San Joaquin Delta	Selenium	Exotic Species	Low	883	Acres	
Sacramento–San Joaquin Delta	Exotic Species	Ballast Water	Medium	883	Acres	
Sacramento–San Joaquin Delta	Chlordane	Nonpoint Source	Low	883	Acres	
Sacramento–San Joaquin Delta	DDT	Nonpoint Source	Low	883	Acres	
Sacramento–San Joaquin Delta	Diazinon (recommended delisting)	Nonpoint Source	Low	883	Acres	
Sacramento–San Joaquin Delta	Dieldrin	Nonpoint Source	Low	883	Acres	
Sacramento–San Joaquin Delta	Dioxin Compounds	Atmospheric Deposition	Low	883	Acres	
Sacramento–San Joaquin Delta	Furan Compounds	Atmospheric Deposition	Low	883	Acres	
Sacramento–San Joaquin Delta	PCBs	Unknown Nonpoint Source	High	883	Acres	2004
Sacramento–San Joaquin Delta	PCBs (dioxin-like)	Unknown Nonpoint Source	Low	883	Acres	
Suisun Slough	Diazinon	Urban Runoff/Storm Sewers	High	1,124	Acres	2004
Suisun Marsh Wetlands	Metals	Agriculture	Low	66,345	Acres	
Suisun Marsh Wetlands	Metals	Urban Runoff/Storm Sewers	Low	66,345	Acres	
Suisun Marsh Wetlands	Metals	Flow Regulation/Modification	Low	66,345	Acres	
Suisun Marsh Wetlands	Nutrients	Agriculture	Low	66,345	Acres	
Suisun Marsh Wetlands	Nutrients	Urban Runoff/Storm Sewers	Low	66,345	Acres	

Table 4.5-6 Solano County Section 303(d) Water Quality Limited Segments, San Francisco Bay and Central Valley RWQCBs						
Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected ¹	Unit	Proposed TMDL Completion
Suisun Marsh Wetlands	Nutrients	Flow Regulation/Modification	Low	66,345	Acres	
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	Low	66,345	Acres	
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Urban Runoff/Storm Sewers	Low	66,345	Acres	
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Flow Regulation/Modification	Low	66,345	Acres	
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Agriculture	Low	66,345	Acres	
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Urban Runoff/Storm Sewers	Low	66,345	Acres	
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Flow Regulation/Modification	Low	66,345	Acres	
Napa River	Nutrients	Agriculture	Medium	21.48	Miles	
Napa River	Sedimentation/Siltation	Agriculture	Medium	21.48	Miles	
Napa River	Sedimentation/Siltation	Construction/Land Development	Medium	21.48	Miles	
Napa River	Sedimentation/Siltation	Land Development	Medium	21.48	Miles	
Napa River	Sedimentation/Siltation	Urban Runoff/Storm Sewers	Medium	21.48	Miles	
Napa River	Pathogens	Agriculture	Low	21.48	Miles	
Napa River	Pathogens	Urban Runoff/Storm Sewers	Low	21.48	Miles	
Ledgewood Creek	Diazinon (recommended delisting)	Urban Runoff/Storm Sewers	High	9.32	Miles	2004
Putah Creek, Lower	Mercury	Resource Extraction	Low	16.28	Miles	
Putah Creek, Lower	Mercury	Source Unknown	Low	16.28	Miles	
Delta Waterways (eastern portion)	Unknown Toxicity	Source Unknown	Low	1,754	Acres	
Delta Waterways (eastern portion)	Mercury	Resource Extraction	Medium	1,754	Acres	
Delta Waterways (eastern portion)	Exotic Species (Asian clam and nonnative fish)	Ballast Water		1,754	Acres	
Delta Waterways (eastern portion)	Chlorpyrifos	Agriculture	High	1,754	Acres	2004

**Table 4.5-6
Solano County Section 303(d) Water Quality Limited Segments, San Francisco Bay and Central Valley RWQCBs**

Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected ¹	Unit	Proposed TMDL Completion
Delta Waterways (eastern portion)	Chlorpyrifos	Urban Runoff/Storm Sewers	High	1,754	Acres	2004
Delta Waterways (eastern portion)	DDT	Agriculture	Low	1,754	Acres	
Delta Waterways (eastern portion)	Diazinon	Agriculture	High	1,754	Acres	2004
Delta Waterways (eastern portion)	Diazinon	Urban Runoff/Storm Sewers	High	1,754	Acres	2004
Delta Waterways (eastern portion)	Group A Pesticides	Agriculture	Low	1,754	Acres	
Delta Waterways (western portion)	Unknown Toxicity	Source Unknown	Low	4,429	Acres	
Delta Waterways (western portion)	Mercury	Resource Extraction	Medium	4,429	Acres	
Delta Waterways (western portion)	Electrical Conductivity	Agriculture	Medium	4,429	Acres	
Delta Waterways (western portion)	Chlorpyrifos	Agriculture	High	4,429	Acres	2004
Delta Waterways (western portion)	Chlorpyrifos	Urban Runoff/Storm Sewers	High	4,429	Acres	2004
Delta Waterways (western portion)	DDT	Agriculture	Low	4,429	Acres	
Delta Waterways (western portion)	Diazinon	Agriculture	High	4,429	Acres	2004
Delta Waterways (western portion)	Diazinon	Urban Runoff/Storm Sewers	High	4,429	Acres	2004
Delta Waterways (western portion)	Group A Pesticides	Agriculture	Low	4,429	Acres	

Notes:
 DDT = dichlorodiphenyltrichloroethane; PCB = polychlorinated biphenyl; TDS = total dissolved solids; TMDL = total maximum daily load;
¹ Within Solano County
 Sources: EPA 2003, SWRCB 2006

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains. Solano County is a participant in the NFIP. FEMA also issues flood insurance rate maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA; the minimum level of flood protection for new development is the 1-in-100 Annual Exceedance Probability, defined as a flood that has an average frequency of occurrence on the order of once in 100 years (although such a flood may occur in any given year). Participants in the NFIP must satisfy certain mandated floodplain management criteria. Flood zone areas in Solano County are shown in Exhibit 4.5-4.

Executive Order 11988

Executive Order 11988 (Floodplain Management) addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to do the following:

- ▶ avoid incompatible floodplain development,
- ▶ be consistent with the standards and criteria of the NFIP, and
- ▶ restore and preserve natural and beneficial floodplain values.

Executive Order 11990

Executive Order 11990 requires federal agencies to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands. It generally requires:

- ▶ avoidance of wetlands,
- ▶ minimization of activities in wetlands, and
- ▶ coordination with USACE and CWA Section 404 regarding wetlands mitigation.

U.S. Bureau of Reclamation

Reclamation is part of the U.S. Department of the Interior and is responsible for development and conservation of most water resources in the western United States. Reclamation's original purpose was to provide for the reclamation of arid and semiarid lands in the West; the agency's current mission covers a wider range of interrelated functions, including providing municipal and industrial water supplies through the CVP; generating hydroelectric power; providing irrigation water for agriculture; improving water quality, flood control, and river navigation; providing river regulation and control and fish and wildlife enhancement; offering water-based recreation opportunities; and conducting research on a variety of water-related topics. Reclamation owns the Solano Project facilities.

U.S. Fish and Wildlife Service and National Marine Fisheries Service

The U.S. Fish and Wildlife Service and National Marine Fisheries Service, in cooperation with other federal and state agencies, enforce the federal Endangered Species Act by evaluating the potential for impacts on candidate, threatened, and endangered fish and wildlife resources.

U.S. Army Corps of Engineers

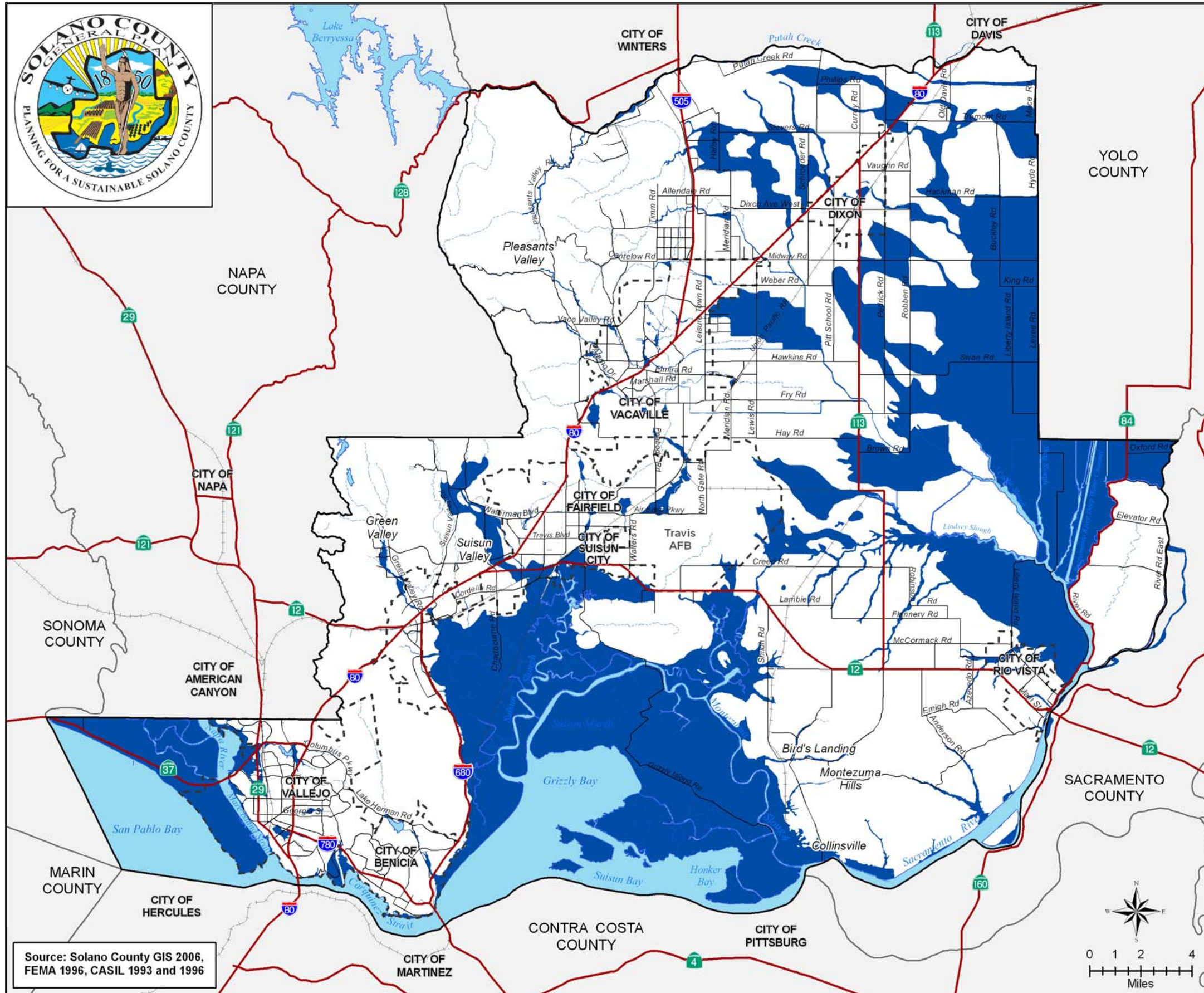
USACE is responsible for issuing permits for the placement of fill or discharge of material into waters of the United States. These permits are required under CWA Sections 401 and 404. Water supply projects that involve instream construction, such as dams or other types of diversion structures, trigger the need for these permits and



Solano County General Plan EIR

Exhibit 4.5-4

100-Year Floodplain Zone



Legend

- 100-Yr Floodplain
- Basemap Layers
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006, FEMA 1996, CASIL 1993 and 1996



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related environmental reviews by USACE. USACE also is responsible for flood control planning and assisting state and local agencies with the design and funding of local flood control projects.

Section 10 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through USACE, for the construction of any structure in or over any navigable water of the United States, or for work outside the limits defined for navigable waters of the United States if the structure or work affects the course, location, or condition of the navigable water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures. It includes any infrastructure, permanent or semipermanent obstacle, or obstruction, including but not limited to wharfs, weirs, jetty, bank protection (e.g., riprap, revetment, bulkheads), mooring structures (e.g., pilings), navigation aids (e.g., buoys, dolphins), aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessels, tunnels, artificial canals, or boat ramps.

Activities regulated under Section 10 of the Rivers and Harbors Act are generally similar to those under Section 404 of the CWA, but the geographic extent of jurisdiction is more restricted and is limited to identified navigable waters of the United States. In Solano County, navigable waters are limited to the current and historic (as of 1899) tidal channels in Suisun Bay, Suisun Marsh, the Delta, and the Sacramento River.

U.S. Geological Survey

The U.S. Geological Survey's National Water Use Information Program is responsible for compiling and disseminating the nation's water-use data. The U.S. Geological Survey works in cooperation with federal, state, and local environmental agencies to collect water-use information at the local level.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is California's statutory authority for the protection of water quality. Under this act, California must adopt water quality policies, plans, and objectives that ensure that beneficial uses of water in the state are reasonably protected. The act requires the nine RWQCBs to adopt water quality control plans and establish water quality objectives, and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs) that contain terms and conditions to regulate the discharge of waste to surface waters and land.

State Water Resources Control Board

The SWRCB was established in 1967 to administer state water rights and water quality functions. The SWRCB and its nine RWQCBs administer water rights and enforce pollution control standards throughout the state. The SWRCB is responsible for granting of water right permits and licenses through an appropriation process following public hearings and appropriate environmental review by applicants and responsible agencies. In granting water right permits and licenses, the SWRCB must consider all beneficial uses, including water for downstream human and environmental needs. In addition to granting the water right permits needed to operate new water supply projects, the SWRCB also issues water quality-related certifications to developers of water projects under Section 401 of the federal CWA.

San Francisco Bay Regional and Central Valley Regional Water Quality Control Boards

The San Francisco Bay and Central Valley RWQCBs are responsible for the preparation and implementation of basin water quality plans consistent with the federal CWA. Enforcement of these plans ensures that local water quality is protected. RWQCBs may become involved in water supply programs as responsible agencies with

respect to project impacts on downstream beneficial uses. Solano County is within the jurisdiction of both the Central Valley RWQCB and the San Francisco Bay RWQCB, as shown in Exhibit 4.5-2.

The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Central Valley RWQCB 2006) defines the beneficial uses, water quality objectives, implementation programs, and surveillance and monitoring programs for waters of the Sacramento River and San Joaquin River Basins. The *Water Quality Control Plan for the San Francisco Bay Basin* (San Francisco Bay RWQCB 2007) does the same for that region. These basin plans contain specific numeric water quality objectives that are applicable to certain water bodies or portions of water bodies. Objectives have been established for bacteria, dissolved oxygen, pH, pesticides, electrical conductivity, total dissolved solids, temperature, turbidity, and trace elements; numerous narrative water quality objectives have also been established.

California Department of Water Resources

DWR is responsible for preparation of the *California Water Plan*, management of the SWP, protection and restoration of the Delta, regulation of dams, provision of flood protection, and other functions related to surface water and groundwater resources. These other functions include helping water agencies prepare their UWMPs and reviewing such plans to ensure that they comply with the related Urban Water Management Planning Act.

Governor's Office of Emergency Services

Dam inundation mapping procedures (Title 19, Section 2575 of the California Code of Regulations [19 CCR Section 2575]) are required by the Governor's Office of Emergency Services (OES) for all dams where human life is potentially endangered by dam flooding inundation. Dam owners are responsible for obtaining recent hydrologic, meteorological, and topological data as well as land surveys denoting the floodplain, to be utilized for the preparation of a dam inundation map. This information is to be submitted to OES 60 days before the filling of any dam. Canal and levee inundation mapping procedures (19 CCR Section 2585) are similar to dam inundation mapping procedures and are required by OES for all canals and levees where human life is potentially endangered by canal or levee flooding inundation. Canal and levee owners are responsible for obtaining recent hydrologic, meteorological, and topological data as well as land surveys denoting the flood plain to be utilized for the preparation of a canal or levee inundation map.

California Department of Fish and Game

DFG is a responsible agency with respect to the review of water right applications and also is responsible for issuing lake and streambed alteration permits for new water supply projects, as appropriate, pursuant to Section 1602 of the California Fish and Game Code. DFG works in coordination with federal and state agencies to mitigate the impacts of projects on fish and wildlife resources, and is responsible for enforcing the California Endangered Species Act. DFG often helps establish instream flows (minimum releases below a dam or diversion structure) to maintain habitat below a project. Such release schedules may be included in water right permits and could affect the yield of a project.

Section 1602 of the California Fish and Game Code requires any person, governmental agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed, to first notify DFG of such proposed activity. This notification requirement generally applies to any work undertaken within the bed and/or bank of a stream, wash, or lake. Usually these features support fish, wildlife, and riparian vegetation, or did in the past.

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (also referred to as the Statewide Implementation Plan) (SWRCB 2005) applies to discharges of toxic

pollutants into inland surface waters, enclosed bays, and estuaries. The policy describes methods for setting effluent limits in NPDES permits based on NTR and CTR criteria and priority pollutant objectives established in basin plans. The policy also establishes certain monitoring requirements and provisions for controlling chronic toxicity, and includes special provisions for certain types of discharges.

SWRCB Resolution No. 68-16

The goal of SWRCB Resolution No. 68-16 (“Statement of Policy with Respect to Maintaining High Quality Waters in California”) (SWRCB 1968) is to maintain high-quality waters where they exist in the state. SWRCB Resolution No. 68-16 states, in part:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.
2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The SWRCB has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy, which is applicable if a discharge that began after November 28, 1975, will lower existing surface water quality.

Urban Water Management Planning Act

Each urban water supplier in California is required to prepare an UWMP and update the plan on or before December 31 in years ending in 5 and 0, pursuant to California Water Code Sections 10610–10657, as last amended by Senate Bill (SB) 318 (Chapter 688, Statutes of 2004), the Urban Water Management Planning Act. SB 318 is the 18th amendment to the original bill requiring a UWMP, which was initially enacted in 1983.

Senate Bill 610

SB 610 (Chapter 643, Statutes of 2001) became effective January 1, 2002. The purpose of SB 610 is to strengthen the process by which local agencies determine whether current and future water supplies are adequate and sufficient to meet current and future demand. SB 610 amended the California Public Resources Code to incorporate California Water Code requirements within the CEQA process for certain types of projects. SB 610 also amended the Water Code to broaden the types of information included in an UWMP (Water Code Section 10610 et seq.).

Water Code Part 2.10

Water Code Part 2.10 clarifies the roles and responsibilities of the lead agency under CEQA and the water supplier (i.e., the public water system) with respect to describing current and future supplies compared to current and future demand. It also defines the projects for which a water supply assessment (WSA) must be prepared as well as the responsibilities of the lead agency related to the WSA. A WSA is required for:

- ▶ proposed residential developments of more than 500 dwelling units;
- ▶ proposed shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space;

- ▶ proposed commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- ▶ proposed hotels or motels, or both, having more than 500 rooms;
- ▶ proposed industrial, manufacturing, or processing plants, or industrial parks planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
- ▶ mixed-use developments that include one or more of the uses described above;
- ▶ developments that would demand an amount of water equivalent to or greater than the amount of water required by a 500-dwelling-unit project; and
- ▶ for lead agencies with fewer than 5,000 water service connections, any new developments that will increase the number of water service connections in the service area by 10% or more.

Under Part 2.10, the lead agency must identify the affected water supplier and ask the supplier whether the new demand associated with the project is included in the supplier's UWMP. If the UWMP includes the demand, it may be incorporated by reference in the WSA (Water Code Section 10910[c][2]). If there is no public water system to serve the project, the lead agency must prepare the WSA itself. (Water Code Section 10910[b].)

Senate Bill 221

SB 221 (Chapter 642, Statutes of 2001) requires a county or city to include as a condition of approval of any tentative map, parcel map, or development agreement for certain residential subdivisions a requirement that a "sufficient water supply" be available. Proof of a sufficient water supply must be based on a written verification from the public water system that would serve the development.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Solano County Water Agency

The boundaries of SCWA include all of Solano County, as well as the property of the University of California, Davis, and the part of RD 2068 in Yolo County. SCWA was formed in 1951 by an act of the California Legislature as the Solano County Flood Control and Water Conservation District (SCFCWCD). Exhibit 4.5-1 shows SCWA's boundary and agencies.

As originally established in 1951, the County Board of Supervisors was the governing board (ex officio) of the SCFCWCD. As with other countywide flood control and water conservation districts established at the time, the SCFCWCD was given both water supply and flood control authorities. The first major action of the SCFCWCD was to contract with Reclamation for water supply from the Solano Project (see "Solano Project" in Section 4.5.1, "Existing Conditions," above for a description of the Solano Project).

In 1988, the legislative act was changed to modify the governing board of the SCFCWCD and to make other minor updates to the act. In 1989 the name of SCFCWCD was changed to "Solano County Water Agency."

The change in the governing board of SCWA was significant. In addition to the five County supervisors, the mayors of all seven cities in the county and a member from each of the three agricultural irrigation districts (SID, MPWD, and RD 2068) were added. The three agricultural districts were added because those districts provide retail water service to their constituents.

The authorities of SCWA still include both water supply and flood control. The water-supply function consists of providing wholesale, untreated water supply to cities, districts, and state agencies. Additionally, SCWA leads

efforts to protect rights to existing sources of water and participates in efforts to secure new sources of water for future use within the county.

Solano County Local Agency Formation Commission

The Solano County Local Agency Formation Commission regulates local agencies' boundary changes, including annexations and changes to spheres of influence for each city and special district within the county. It is also responsible for approving the boundaries and spheres of influence of each water purveyor in the county.

Solano County Environmental Health Services Division

The County Environmental Health Services Division is responsible for a variety of services. The Technical Services Program implements County programs for liquid waste, water systems, solid waste disposal, wells, and land use, and provides assistance to the public in the planning and implementation of small public water systems, wells and on-site sewage disposal, and solid-waste management.

The Environmental Health Services Division conducts or oversees evaluations of the site and soil to determine the best design for a septic system to assure proper disposal of sewage. Site evaluations, plan reviews, permits, and construction and destruction inspections are also conducted for on-site sewage disposal systems and wells pursuant to the California Well Standards and Chapters 6.4 and 13.10 of the County Code.

Local Oversight Program of the Solano County Site Mitigation Program

The County provides regulatory oversight for soil and groundwater cleanup and mitigation under the Site Mitigation Program of its Local Oversight Program through a contract with the SWRCB and voluntary agreements with responsible parties, pursuant to Title 23, Article 11 of the California Code of Regulations and Sections 25297–25299 of the Health and Safety Code.

Solano County Water Agency Integrated Regional Management Plan

An Integrated Regional Water Management Plan (IRWMP) was developed for the SCWA and its member cities and districts (Solano agencies). The IRWMP completes the second phase of a two-phase planning process. For the first phase, SCWA staff identified the major sources of water supply, existing demands, and water resources–related issues. Phase Two of the IRWMP was developed in 2004 by engaging elected officials and a cross-section of technical and policy representatives from agricultural districts and urban agencies. This stakeholder group functioned as the knowledge base for the issues, ideas, and direction developed in the IRWMP.

The IRWMP proposes regionwide policies and projects to meet 10 strategic issues identified by the stakeholder group:

- ▶ Match supply to demand through the long term.
- ▶ Manage the county's groundwater resources.
- ▶ Encourage water of the appropriate quality for the intended use.
- ▶ Improve runoff water quality.
- ▶ Manage flood control services.
- ▶ Participate in multicounty flood control.
- ▶ Manage environmental resources.
- ▶ Leverage state and federal funding opportunities.
- ▶ Address safety and security issues.
- ▶ Prepare for climate change.

These issues represent the fundamental water resource policy questions and critical challenges that affect the Solano agencies' ability to accomplish their missions.

The IRWMP process documents a recommended path for SCWA to use its resources for the betterment of Solano County for programs within the authority of SCWA, including the SCWA-related policies and projects defined in the IRWMP, to be designated the “SCWA Strategic Plan.”

Urban Water Management Plans

UWMPs for 2005 have been prepared by SCWA and the municipal water purveyors within SCWA’s service area, pursuant to the guidelines set forth by the Urban Water Management Act described above. Information contained within SCWA’s UWMP as well as information specific to each of the water purveyors is described in a later section of this report.

SCWA Flood Control Master Plan

SCWA has adopted a master plan governing flood control and flood control improvements within its territory. One of the major recommendations of SCWA’s *Flood Control Master Plan* is to develop watershed studies to address flooding problems on a watershed basis. Several watershed studies have been completed and many projects are being considered for implementation. SCWA also funds small projects that address localized flood control and drainage projects that meet specified criteria.

Suisun Marsh Preservation Act

Suisun Marsh comprises approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County. It is the largest remaining wetland near San Francisco Bay and includes more than 10% of California’s remaining wetland area. The marsh is also a wildlife habitat of nationwide importance. Recognizing the threats to Suisun Marsh from potential residential, commercial, and industrial developments, and the need to preserve this unique wildlife resource for future generations, the California Legislature enacted the Nejedly-Bagley-Z’berg Suisun Marsh Preservation Act of 1974. This act directed the San Francisco Bay Conservation and Development Commission and DFG to prepare a *Suisun Marsh Protection Plan* “to preserve the integrity and assure continued wildlife use” of Suisun Marsh. In December 1976, the commission submitted the *Suisun Marsh Protection Plan* to the governor and the legislature. The Suisun Marsh Preservation Act was amended in 1977 to incorporate the findings and policies contained in the plan into state law.

Solano County Grading and Erosion Control Ordinance

The purpose of the County Grading and Erosion Control Ordinance (Chapter 31 of the County Code) is to provide the means for controlling soil erosion, sedimentation, increased rates of water runoff, and related environmental damage by establishing minimum standards and providing regulations for the construction and maintenance of fills, excavations, cuts and clearing of vegetation, revegetation of cleared areas, drainage control, and protection of exposed soil surfaces to protect downstream waterways and wetlands and to promote the safety, public health, convenience and general welfare of the community.

Solano County Office of Emergency Services

The County Office of Emergency Services (County OES) provides for the development, establishment, and maintenance of programs and procedures to help protect the lives and property of Solano County residents from the effects of natural or human-caused disasters, including floods from dam or levee failures. The County OES works with the County and individual city departments with disaster exercises and evacuation preparations. Additionally, the County OES conducts emergency preparedness training and awareness presentations for citizens and various organizations so that they will better understand what they should do before, during, and after a disaster or major emergency, including flooding from failure of a levee or dam.

4.5.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

The environmental analysis for hydrology and water quality was based largely on the information in SCWA's *Phase I Integrated Regional Water Resources Plan* (SCWA 2004), *Integrated Regional Water Management Plan and Strategic Plan* (SCWA 2005b), and *Urban Water Management Plan* (SCWA 2005c). The Water Resources, Public Facilities and Services, and Health and Safety Background Reports prepared for the 2008 Draft General Plan (Solano County 2006a, 2006b, 2006c) were also consulted, along with the local and regional agency information sources listed in Chapter 8, "References," of this EIR and described more fully in preceding portions of this section. The effects of the 2008 Draft General Plan were compared to environmental baseline conditions (i.e., existing conditions) to determine impacts. There is overlap of some 2008 Draft General Plan policies, regulations, and programs as they pertain to water quality and hydrology. For instance, flooding is addressed in the Land Use, Public Facilities and Services, Transportation and Circulation, and Health and Safety chapters. Where policies, regulations, or programs are utilized for mitigation in more than one impact, their first instance will be described and referred to in subsequent references.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact on hydrology or water resources is considered significant if the proposed project would:

- ▶ violate any water quality standards or waste discharge requirements, including NPDES waste discharge or stormwater runoff requirements, state or federal antidegradation policies, enforceable water quality standards contained in the Central Valley RWQCB's basin plan or statewide water-quality control plans, or federal rule makings to establish water quality standards in California;
- ▶ substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a substantial lowering of the level of the local groundwater table (e.g., the production rate of preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- ▶ substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site;
- ▶ substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site;
- ▶ create or contribute runoff water that would exceed the capacity (peak flow) of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- ▶ substantially degrade surface and groundwater water quality;
- ▶ place within a 100-year flood hazard area, as mapped on a federal flood hazard boundary map or FIRM or other flood hazard delineation map, structures that would impede or redirect flood flows;
- ▶ place housing within a 100-year flood hazard area as mapped on a federal flood hazard boundary or FIRM or other flood hazard delineation map;
- ▶ expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or

- ▶ expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

IMPACT ANALYSIS

IMPACT 4.5-1a **Violation of Water Quality Standards – Preferred Plan.** *The changes in Public, Residential, Commercial, and Industrial land use designations consistent with the 2008 Draft General Plan under the Preferred Plan would result in additional discharges of pollutants to receiving water bodies from nonpoint sources. Such pollutants would result in adverse changes to the water quality of Solano County. However, with adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be **less than significant**.*

An increase in the amount of impervious surfaces (e.g., rooftops, sidewalks, driveways, streets, parking lots) as a result of implementation of the 2008 Draft General Plan under the Preferred Plan would result in higher rates of runoff during rain events, which can be a source of surface-water pollution. Sediment, organic contaminants, nutrients, trace metals, pathogens (e.g., bacteria and viruses), and oil and grease compounds are common urban runoff pollutants. Urban runoff pollutants may stem from erosion of disturbed areas, deposition of atmospheric particles derived from automobiles or industrial sources, corrosion or decay of building materials, rainfall contact with toxic substances, and spills of toxic materials on surfaces that receive rainfall and generate runoff. New urban industrial and commercial development can generate urban runoff from parking areas as well as any areas of hazardous materials storage exposed to rainfall.

Sediment sources include roads and parking lots, as well as destabilized landscape areas, streambanks, unprotected slopes, and denuded or disturbed areas. Sediments, in addition to being contaminants in their own right, transport other contaminants such as trace metals, nutrients, and hydrocarbons that adsorb to suspended sediment particles. Nutrients include nitrogen, phosphorus, and other organic compounds that can be found in organic litter, fertilizers, food waste, sewage, and sediment. Pet or farm animal wastes, sanitary sewer overflow, improperly sited or functioning septic systems, and landfill areas can contribute bacteria and viruses either to surface waters or to groundwater through percolation. Sources of oil and grease compounds include motor vehicles, food service establishments, and fueling stations.

Construction activities would occur over large areas, and substantial construction-related alteration of drainages could result in soil erosion and stormwater discharges of suspended solids, increased turbidity, and potential mobilization of other pollutants from project construction sites, as contaminated runoff to on-site and ultimately off-site drainage channels. This is discussed in Impact 4.5-3a below.

Erosion and Sediment Control Provisions

Chapter 31 of the County Code addresses erosion and sediment control under the County Grading and Erosion Control Ordinance (see Section 4.5.2, “Regulatory Framework,” above). In addition, the County’s SWMP has been prepared, as directed by the Central Valley RWQCB, to be consistent with the NPDES Phase II permit procedures and was designed to enable the County to meet the mandate of the federal CWA to reduce pollutants to the maximum extent practicable. There are six major sections to the plan:

- ▶ **Section 1: Background.** This section provides a regulatory setting.
- ▶ **Section 2: Administration, Planning, and Funding.** This section describes the structure, staff involvement, and funding mechanisms of the SWMP.
- ▶ **Section 3: Geography and Land Use.** This section provides demography, maps, and other physical descriptions of Solano County.

- ▶ **Section 4: Pollutants of Concern.** This section delineates known impaired water bodies and pollutants of concern [i.e., the Section 303(d) list], as well as actions the SWMP will take to address specific pollutants that are impairing water quality.
- ▶ **Section 5: Minimum Control Measures.** This section describes elements of the County’s program for controlling stormwater quality.
- ▶ **Section 6: Monitoring and Evaluation.** This section includes the County’s measurable goals to bring the program into compliance.

On-Site Wastewater Treatment Systems

On-site wastewater treatment systems (OWTS), otherwise known as on-site septic tank and leach field systems, are commonly used in the rural areas of the county not served by municipal wastewater treatment systems. In fact, more than 90% of the properties in the unincorporated county that are not served by the City of Vallejo, the Suisun Fairfield Sewer District, or city municipalities are served by OWTS (Solano County 2006b). With development that would occur in conformance with the 2008 Draft General Plan, the potential exists for contamination of groundwater and surface water resources from several factors: overreliance on OWTS from increased density of OWTS, placement near domestic wells, improperly designed or constructed systems, seasonal or year-round high water tables, or placement in areas with insufficient soil depths or improper soil types.

Existing and new OWTS should conform to standards that protect the underlying groundwater and surface water. New statewide OWTS regulations are currently being promulgated by the state in accordance with AB 885 (Chapter 781, Statutes of 2000). These regulations address concerns about contamination by septic systems of groundwater, which is classified as municipal use (e.g., drinking water) statewide unless otherwise indicated. These regulations are planned to take effect in 2009. AB 885 will set performance standards that must be met by OWTS and supplemental systems, including types of systems permitted, distance between point of OWTS discharge and groundwater and minimum depth of earthen material, and surface application and percolation rates. Local regulatory requirements for OWTS performance standards will not be superseded if these requirements are at least as stringent as those in the proposed AB 885 regulations.

The County’s Environmental Health Services Division conducts or oversees evaluations of the site and soil to determine the best design for a septic system to assure proper disposal of sewage. Site evaluations, plan reviews, permits, and construction and destruction inspections are also conducted for on-site sewage disposal systems and wells pursuant to the California Well Standards and Chapters 13.10 and 6.4 of the County Code.

Relevant Goals, Policies, and Programs of the 2008 Draft General Plan

Water Quality Protection

Land Use Chapter

The Land Use chapter of the 2008 Draft General Plan contains several policies designed to protect water quality in incorporated and unincorporated areas of the county:

- ▶ **Policy LU.P-2:** A cornerstone principle of this General Plan is the direction of new urban development and growth toward municipal areas. In furtherance of this central goal, the people of Solano County, by initiative measure, have adopted and affirmed the following provisions to assure the continued preservation of those lands designated “Intensive Agriculture,” “Extensive Agriculture,” Agriculture, Watershed, Marsh, Park & Recreation, or Water Bodies & Courses—Development Strategy Policy No. 17; Agricultural chapter policies AG.P-31, AG.P-32, AG.P-33, AG.P-34, AG.P-35, and AG.P-36. Agricultural Lands Policies Nos. 9, 10, 11, 12 and 13; and Watershed Lands Policy No. 2. The General Plan may be reorganized, and individual goals

and policies may be renumbered or reordered in the course of ongoing updates of the General Plan in accord with the requirements of state law, but the provisions enumerated in this paragraph shall continue to be included in the General Plan until December 31, 2010, unless earlier repealed or amended by the voters of the County. *[Note to the reader: Policy LU.P-2 was established as part of the Orderly Growth Initiative. Proposed changes to these policies are subject to voter approval and thus are indicated in strikethrough and underline format.]*

- ▶ **Policy LU.P-14:** Establish rural residential development in a manner that preserves rural character and scenic qualities and protects sensitive resources including agricultural lands, creeks, native trees, open spaces, and views.
- ▶ **Policy LU.P-26:** Locate and develop industrial uses in a manner that does not conflict with adjacent and surrounding agricultural activities and protects water quality and marshland and wetland habitats.
- ▶ **Policy LU.P-32:** Promote patterns of development that encourage physical activity to reduce obesity, cardiovascular disease, asthma, diabetes, or injury; and that contribute to a “sense of place” and emotional well-being.

Agriculture Chapter

The Agriculture chapter of the 2008 Draft General Plan contains the following policies and programs that would protect water quality as a result of addressing agricultural goals:

- ▶ **Policy AG.P-8:** Maintain water resource quality and quantity for the irrigation of productive farmland so as to prevent the loss of agriculture related to competition from urban water consumption internal or external to the county.
- ▶ **Policy AG.P-9:** Promote efficient management and use of agricultural water resources.
- ▶ **Program AG.I-21:** Promote and assist farmer and rancher participation in federal and state voluntary incentive programs aimed at improving wildlife habitat, wetlands, and environmental quality (e.g., Natural Resources Conservation Service Wildlife Habitat Incentives Program, Wetlands Reserve Program, Environmental Quality Incentives Program) Concentrate efforts in areas where the Agricultural Reserve Overlay and Resource Conservation Overlay coincide.
- ▶ **Program AG.I-22:** Promote sustainable agricultural activities and practices that support and enhance the natural environment. These activities should minimize impacts on soil quality and erosion potential, water quantity and quality, energy use, air quality, and natural habitats. Sustainable agricultural practices should be addressed in the County’s proposed Climate Action Plan to address climate change effects.

Resources Chapter

The Resources chapter of the 2008 Draft General Plan contains the following goals, policies, and programs designed to protect water quality and hydrology in the county:

- ▶ **Goal RS.G-9:** Protect, monitor, restore and enhance the quality of surface and groundwater resources to meet the needs of all beneficial uses.
- ▶ **Goal RS.G-10:** Foster sound management of the land and water resources in Solano County's watersheds to minimize erosion and protect water quality using best management practices and protect downstream waterways and wetlands.

- ▶ **Policy RS.P-1:** Protect and enhance the County's natural habitats and diverse plant and animal communities, particularly occurrences of special-status species, wetlands, sensitive natural communities, and habitat connections.
- ▶ **Policy RS.P-63:** Identify, promote, and seek funding for the evaluation and remediation of water resource or water quality problems through a watershed management approach. Work with the regional water quality control board, watershed-focused groups, and stakeholders in the collection, evaluation and use of watershed-specific water resource information.
- ▶ **Policy RS.P-64:** Require the protection of natural water courses.
- ▶ **Policy RS.P-65:** Together with the Solano County Water Agency, monitor and manage the County's groundwater supplies.
- ▶ **Policy RS.P-66:** Encourage new groundwater recharge opportunities.
- ▶ **Policy RS.P-67:** Protect existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas.
- ▶ **Policy RS.P-68:** Preserve and maintain watershed areas characterized by slope instability, undevelopable steep slopes, high soil erosion potential, and extreme fire hazards in agricultural use. Watershed areas lacking water and public services should also be kept in agricultural use.
- ▶ **Policy RS.P-69:** Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.
- ▶ **Policy RS.P-71:** Preserve riparian vegetation along County waterways to maintain water quality.
- ▶ **Policy RS.P-72:** Use watershed planning approaches to resolve water quality problems. Use a comprehensive stormwater management program to limit the quantity and increase the water quality of runoff flowing to the county's streams and rivers.
- ▶ **Policy RS.P-73:** Identify naturally occurring and human-caused contaminants in groundwater in new development projects and develop methods to limit and control contaminants. Work with RWQCB to educate the public on evaluating the quality of groundwater.
- ▶ **Policy RS.P-74:** Require and provide incentives for site plan elements (such as permeable pavement, swales, and filter strips) that limit runoff and increase infiltration and groundwater recharge.
- ▶ **Program RS.I-61:** Establish development standards that maximize retention of runoff and regulate development to avoid pollution of storm water, water bodies, and groundwater.
- ▶ **Program RS.I-62:** Develop an ordinance that establishes a riparian buffer to protect water quality and ecosystem function. The minimum buffer width shall be determined according to existing parcel size. For parcels more than 2 acres in size, a minimum 150-foot development setback shall be provided. For parcels of 0.5–2.0 acres, a minimum 50-foot setback shall be provided. For parcels less than 0.5 acre a minimum 20-foot setback shall be provided. Exceptions to these development setbacks apply to parcels where a parcel is entirely within the riparian buffer setback or development on the parcel entirely outside of the setback is infeasible or would have greater impacts on water quality and wildlife habitat.

- ▶ **Program RS.I-63:** Seek funding opportunities for collaborative watershed planning approaches to water quantity and quality enhancement and protection, where such an approach is the desired method of accomplishing the program objectives.
- ▶ **Program RS.I-64:** Protect natural watercourses through acquisition or dedication of adjacent land in fee or less than fee title during the process of reviewing and approving land development proposals.
- ▶ **Program RS.I-65:** Require site plan elements to limit runoff from new development. These measures might include reduced pavement or site coverage, permeable pavement, vegetation that retains and filters stormwater, and/or drainage features. Limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks.
- ▶ **Program RS.I-66:** Require proposed projects located within the Putah Creek and Ulatis Creek watersheds to minimize project-related stormwater runoff and pollution. Stormwater runoff and pollution loads resulting after development of projects shall not exceed predevelopment conditions.
- ▶ **Program RS.I-67:** Seek and secure funding sources for development of countywide water quality assessment, monitoring, remedial and corrective action, awareness/education programs. Provide technical assistance to minimize stormwater pollution, support RWQCB requirements, and manage related County programs. Consider future use of desalinization to supplement water supplies.
- ▶ **Program RS.I-68:** Develop a public education and technical assistance program that provides property owners, applicants, and the general public with information regarding stormwater pollution, efficient water use, public water supplies, water conservation and reuse, and groundwater.
- ▶ **Program RS.I-69:** Continue to require best management land use practices in the Barker Slough watershed.
- ▶ **Program RS.I-71:** Inform the public about practices and programs to minimize water pollution and provide educational and technical assistance to farmers and landowners to reduce sedimentation and increase on-site retention and recharge of storm water.
- ▶ **Program RS.I-72:** Coordinate with federal and state agencies to monitor the extent of endocrine disruptor pollutants (synthetic compounds that mimic certain hormones and effect body functions such as immune and reproductive system) in the County's water supply and water bodies. Create an action plan to reduce such pollutants, if pollutants are found to exist at unacceptable levels.
- ▶ **Program RS.I-73:** Explore a cooperative city/county program to compensate farmers and/or landowners to preserve farmland for watershed preservation and maintenance..

Public Facilities and Services Chapter

The Public Facilities and Services chapter of the 2008 Draft General Plan contains the following policies and programs that aim to protect the county's water quality standards:

- ▶ **Policy PF.P-9:** Actively support efforts of the Solano County Water Agency, water districts, and regional water suppliers and distributors, to ensure that adequate high-quality water supplies are available to support current and future development projects in Solano County.
- ▶ **Policy PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.

- ▶ **Policy PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
- ▶ **Policy PF.P-21:** Sewer services for development within the unincorporated area may be provided through private individual on-site sewage disposal systems, or centralized sewage treatment systems permitted and managed by a public agency utilizing the best systems available that meet tertiary treatment or higher standards.
- ▶ **Policy PF.P-22:** Ensure that new and existing septic systems and sewage treatment systems do not negatively affect groundwater quality.
- ▶ **Policy PF.P-32:** Require development projects to minimize pollution of stormwater, water bodies that receive runoff, and groundwater, and to maximize groundwater recharge potential by:
 - implementing planning and engineering design standards that use low-impact development techniques and approaches to maintain and mimic the natural hydrologic regime;
 - using “infiltration” style low-impact development technologies; and
 - following stormwater BMPs during and after construction, in accordance with relevant state-required stormwater permits.
- ▶ **Program PF.I-19:** Cooperate with the Solano County Water Agency in the implementation of its Integrated Regional Water Management Plan and support the efforts of the Solano County Water Agency to maintain adequate water supply and high water quality. Help the Solano County Water Agency to improve water demand projections and planning. This could include updating the Urban Water Management Plan with population projections as found in the updated general plans of cities and the County.
- ▶ **Program PF.I-20:** Review and revise the County Code to ensure it incorporates current best practices to minimize the impacts of on-site septic systems and sewage treatment systems. This revision should address standards within chapters 6.4, 12.2, 13.10, 26, 28, and 31 of the County code.
- ▶ **Program PF.I-21:** When reviewing development proposals:
 - require septic systems to be located outside of primary groundwater recharge areas, or where that is not possible, require shallow leaching systems for disposal of septic effluent;
 - require new septic systems or leach fields to be installed at least 100 feet away from natural waterways, including perennial or intermittent streams, seasonal water channels, and natural bodies of standing water, but make an exception for the repair of existing systems if the buffer cannot be maintained and if adequate provisions are made for protecting water quality;
 - require the use of alternative wastewater treatment techniques to respond to site characteristics, as determined by the California Department of Public Health (formerly California Department of Health Services) and the RWQCBs; and
 - require new development with septic systems to be designed to prevent nitrates and other pollutants of concern from septic disposal systems from impairing groundwater quality.
- ▶ **Program PF.I-22:** On-site sewage disposal systems for individual lots and subdivisions may be operated by private property owners. A public agency shall permit and manage centralized community sewage disposal systems. If lands proposed for community sewage disposal systems are not within the boundaries of an

existing public sewage treatment agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the sewer service, which may be contracted to a private entity with oversight by the public entity. Sewer treatment facilities shall be designed to provide sewer service to developed areas and areas designated for future development within the General Plan..

- ▶ **Program PF.I-23:** Continue to enforce the abatement of ailing septic systems that have been demonstrated as causing a health and safety hazard.
- ▶ **Program PF.I-24:** Continue inspection of individual sewage facilities to ensure they are not adversely affecting water quality.
- ▶ **Program PF.I-29:** Design, construct, and maintain County buildings, roads, bridges, drainage, and other facilities to minimize sediment and other pollutants in stormwater flows. Develop and implement best management practices for ongoing maintenance and operation.
- ▶ Prepare and implement a BMP manual for minimizing stormwater pollutants associated with construction and maintenance of County buildings, roads, and other facilities..

Public Health and Safety Chapter

The Public Health and Safety chapter of the 2008 Draft General Plan contains the following policies that address water quality as part or all of their focus:

- ▶ **Policy HS.P-2:** Restore and maintain the natural functions of riparian corridors and water channels throughout the county to reduce flooding, convey stormwater flows, and improve water quality.
- ▶ **Policy HS.P-10:** Ensure that flood management policies that minimize loss of life and property also balance environmental health considerations of the floodplain and therefore do not cause further erosion, sedimentation, or water quality problems in the floodplain area.
- ▶ **Policy HS.P-16:** Require minimum setbacks for construction along creeks between the creek bank and structure, except for farm structures that are not dwellings or places of work, based on the susceptibility of the bank to lurching caused by seismic shaking.

Protection and Enhancement of Water Resources

The Resources chapter of the 2008 Draft General Plan contains the following policies and programs to protect and enhance the county's water resources, which would in turn enhance hydrology and water quality:

- ▶ **Policy RS.P-8:** Protect marsh waterways, managed wetlands, tidal marshes, seasonal marshes, and lowland and grasslands because they are critical habitats for marsh-related wildlife and are essential to the integrity of the marshes.
- ▶ **Policy RS.P-27:** Protect long-term water quality in the Delta in coordination with water agencies at local, state, and federal levels for designated beneficial uses, including agriculture, municipal, water-dependent industrial, water-contact recreation, boating and fish and wildlife habitat.
- ▶ **Program RS.I-35:** Monitor levels of use in the Suisun Marsh to ensure that use intensity is compatible with other recreation activities and with protection of the Suisun Marsh environment.

Conclusion

With adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-1b **Violation of Water Quality Standards – Maximum Development Scenario.** *The changes in Public, Residential, Commercial, and Industrial land use designations consistent with the 2008 Draft General Plan under the Maximum Development Scenario would result in additional discharges of pollutants to receiving water bodies from nonpoint sources. Such pollutants would result in adverse changes to the water quality of Solano County. However, with adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be less than significant.*

This impact is similar to Impact 4.5-1a for the Preferred Plan, except that there is the potential for a greater impact because more development would be permitted under the Maximum Development Scenario. With adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, however, combined with current land use, stormwater, grading, and erosion control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-2a **On-Site and Downstream Erosion and Sedimentation – Preferred Plan.** *Development and land use changes consistent with the 2008 Draft General Plan under the Preferred Plan would increase the amount of impervious surfaces, thereby increasing the total volume and peak discharge rate of stormwater runoff. This could alter local drainage patterns, increasing watershed flow rates above the natural background level (i.e., peak flow rates). Increased peak flow rates may exceed drainage system capacities, exacerbate erosion in overland flow and drainage swales and creeks, and result in downstream sedimentation. Sedimentation, in turn, could increase the rate of deposition in natural receiving waters and reduce conveyance capacities, resulting in an increased risk of flooding. Erosion of upstream areas and related downstream sedimentation typically leads to adverse changes to water quality and hydrology. However, with adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.*

Solano County cities are each responsible for their own storm drainage and flood control. Flood control improvements are generally funded by the cities through taxes and/or assessments. SCWA is not responsible for city flood control issues, even though it sometimes assists Solano County's cities in addressing upstream and downstream impacts. SCWA is responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Delta (from precipitation and tides) rely on levees. Levee protection is addressed in Impact 4.5-6a, "Potential for Failure of a Levee," below.

The Ulatis Flood Control Project is located in the Vacaville-Elmira drainage basin. The primary purpose of the Ulatis project is to protect agricultural land downstream of Vacaville. It was designed to control storm drain systems with a capacity to handle a 10-year recurrence level, or a storm that occurs on an average once in every 10 years. About 57 miles of channel in the Ulatis Project is maintained. The Green Valley Flood Control Project is located in the Cordelia area and partially within the city of Fairfield. When the Green Valley Project was first

built, the service area was unincorporated and largely undeveloped. It is designed to control a storm with a 40-year recurrence level. A total of 6 miles of channel is located in the Green Valley Project.

Both projects include unlined earth channels where some vegetation is allowed to grow for slope protection. As development in the watersheds continues, SCWA must ensure adequate capacity for additional runoff. SCWA works with the cities to ensure that development projects adequately mitigate their stormwater runoff impacts. Part of SCWA's long-term maintenance program includes monitoring the channels to ensure that they maintain the ability to carry designated flows.

Erosion and Sediment Control Provisions

In 1998, SCWA approved a flood control master plan. The plan recommended the preparation of flood control watershed studies to address the problem areas in Solano County. Watershed studies analyze potential problem areas from a regional view that all lands drain into a single point and that potential downstream impacts could result if not properly maintained. After the studies are complete, SCWA works to implement solutions to any flood control problems. The Solano County Grading and Erosion Control Ordinance (County Code Chapter 31) establishes standards and provides regulations to minimize or eliminate on-site and downstream erosion and sedimentation.

The Suisun Marsh Policy Addendum certified by the San Francisco Bay Conservation and Development Commission on November 3, 1982, and amended to the *Solano County General Plan* on February 2, 1999, contains principles and standards for all diking, dredging, filling, and other construction to reduce the potential for erosion and sedimentation in the marsh. No development shall be permitted that would interfere with existing channel capacity or that would substantially increase erosion, siltation, or other contributors to the deterioration of any marsh watercourse.

Relevant Policies and Programs of the 2008 Draft General Plan

Land Use Chapter

The Land Use chapter of the 2008 Draft General Plan provides no goals, policies, or programs specifically targeting erosion or sedimentation. However, the Watershed (WS) agricultural designation land use would limit development in watershed areas with steep slopes with high soil erosion potential, thereby reducing the potential for erosion and sedimentation from land use changes under the 2008 Draft General Plan.

Agriculture Chapter

The Agriculture chapter of the 2008 Draft General Plan contains several policies and an implementation program designed to minimize or eliminate on-site and downstream erosion and sedimentation:

- ▶ **Policy RS.P-68:** Preserve and maintain watershed areas characterized by slope instability, undevelopable steep slopes, high soil erosion potential, and extreme fire hazards in agricultural use. Watershed areas lacking water and public services should also be kept in agricultural use.
- ▶ **Policy RS.P-69:** Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.
- ▶ **Policy RS.P-70:** Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.
- ▶ **Program RS.I-48:** During review of wind turbine generator proposals, consider the following:

- Wind turbine generators shall not be located in areas that conflict with the mission of Travis Air Force Base or other air operation facilities.
- Commercial turbines and non-commercial turbines over 100 feet in height or with a total rated power output of more than 100 kilowatts in designated wind resource areas require a public hearing and use permit approval by the Planning Commission.
- Following use permit approval, building permits and grading permits are required. Non-commercial turbines 100 feet or less in height and 100 kilowatts or less in rated power output require only building permits and grading permits.
- Submittal requirements for use permit applications within the wind resource areas include the following:
 - Permit application
 - Project description form (requires information on size and characteristics of project, physical and performance specifications of equipment, transmission system, certification, project schedule and phasing, circulation, and access).
 - Acoustical analysis
 - Archaeological survey
 - Geotechnical report (must correlate to standard county requirements for geotechnical analysis)
 - Site plan
 - Elevation package (elevation drawings to scale of proposed turbines and accessory uses).
 - Notification of the Federal Aviation Administration of any application with wind turbines over 200 feet in height within 20,000 feet of a runway of any airport.
 - Notification of the utility and the California Public Utilities Commission of application filing.
 - Notification of application filing to microwave communications link owners within 2 miles of the proposed installation.
 - Adjacent property owner's notification package.
 - Current aerial photographs or panoramic photographs of the site.
 - Evidence of liability and workers compensation insurance.
 - Map locating all residences within 2 miles of the proposed project.
 - Certification of detailed plans for electrical systems and transmission lines, substation, support towers, generators, and foundations by California licensed professional engineers (electrical, civil, and structural).
 - Performance test documentation by a licensed engineer for all proposed turbine types.

- Contribution to escrow account for removal of inoperable or unsafe wind equipment and associated uses, including foundations.
- Following review of the applicant's site plan by county planning staff, a biological assessment would be required if it is determined that sensitive biological resources identified by the Resource Conservation Overlay (Figure RS-1) [see Exhibit 4.6-2 in Section 4.6, "Biological Resources."] could be affected by the proposed project. If the proposed wind turbine siting would fall within or near areas of sensitivity, additional biological assessment of the probable impacts of the project would be required as part of the permit application. Findings of the biological assessment would determine need for biological resource monitoring and mitigation for protection of biological resources. For projects proposed in areas of low biological sensitivity, no additional biological information would be required.
- Requirements of CEQA shall be met through the public notice and hearing process for negative declarations.
- Submittal requirements for building permit and grading permit applications shall be as follows:
 - Completed permit application.
 - Detailed plans and specifications for structures, foundations, electrical systems, certified by a California licensed professional engineer. Plans will be checked for compliance with such codes as the Uniform Building Code, the National Electrical Code, and applicable ANSI and IEEE standards.
 - Grading and erosion, sediment, and runoff control plans.
 - A standard set of minimum conditions would apply to every permit approval. These conditions could be modified or added to at the discretion of Resource Management Department staff, Planning commission, or Board of Supervisors.
- Additional environmental information beyond that required for permit processing would not be required for projects proposed within the wind resource areas.
- In addition to the required safety setbacks, applicants would be required to demonstrate that the CNEL 50 influence area of proposed wind turbines would not coincide with residential areas or individual dwelling units. No turbines which exhibit high infrasonic noise generation potential would be permitted within one mile of residential uses or land zoned for residential uses.
- The zoning ordinance should require a bond or other guarantee, such as a contribution to an escrow account, for removal of inoperable or unsafe wind equipment and associated uses, including foundations, after use permit approval.

Public Health and Safety Chapter

The Public Health and Safety chapter of the 2008 Draft General Plan contains the following policies and programs designed to minimize or eliminate on-site and downstream erosion and sedimentation:

- ▶ **Policy HS.P-1:** Prevent or correct upstream land use practices that contribute to increased rates of surface-water runoff.
- ▶ **Policy HS.P-2:** Restore and maintain the natural functions of riparian corridors and water channels throughout the county to reduce flooding, convey stormwater flows, and improve water quality.

- ▶ **Policy HS.P-3:** Require new developments to incorporate devices capable of detaining the stormwater runoff caused by a 100-year storm event or to contribute to regional solutions to improve flood control, drainage, and water recharge.
- ▶ **Policy HS.P-4:** Encourage the use of stormwater detention that could also be used for groundwater recharge.
- ▶ **Policy HS.P-5:** Appropriately elevate and flood proof developments for human occupancy within the 100-year floodplain for the profile of a 100-year flood event.
- ▶ **Policy HS.P-6:** Work with federal, state, and local agencies to improve flood control and drainage throughout the county.
- ▶ **Policy HS.P-7:** Require new development proposals in dam, canal, or levee inundation areas to consider risk from failure of these facilities and to include mitigation measures to bring this risk to a reasonable level.
- ▶ **Policy HS.P-9:** Preserve open space and agricultural areas that are subject to natural flooding and are not designated for future urban growth. It prohibits permanent structures in a designated floodway where such structures could increase risks to human life or restrict the carrying capacity of the floodway.
- ▶ **Policy HS.P-10:** Ensure that flood management policies that minimize loss of life and property also balance environmental health considerations of the floodplain and therefore do not cause further erosion, sedimentation, or water quality problems in the floodplain area.
- ▶ **Program HS.I-7:** During project review, encourage the use of stormwater management techniques in developed upstream watershed areas that protect low-lying areas from flooding and incorporate appropriate measures into the development review process to mitigate flooding and prevent erosion in and around County ditches.
- ▶ **Program HS.I-22:** Require geotechnical evaluation and recommendations before new development in moderate or higher-hazard areas. Such geotechnical evaluation shall analyze the potential hazards from:
 - landslides
 - liquefaction
 - expansive soils
 - steep slopes
 - erosion
 - subsidence
 - Alquist-Priolo Earthquake Fault Zones or other identified fault zones
 - tsunamis
 - seiches

Require new development to incorporate project features that avoid or minimize the identified hazards. Costs related to providing or confirming required geotechnical reports will be borne by the applicant.

Public Facilities and Services Chapter

The Public Facilities and Services chapter of the 2008 Draft General Plan contains the following policies and program designed to minimize or eliminate on-site and downstream erosion and sedimentation:

- ▶ **Policy PF.P-32:** Require development projects to minimize pollution of stormwater, water bodies that receive runoff, and groundwater, and to maximize groundwater recharge potential by:

- implementing planning and engineering design standards that use low-impact development techniques and approaches to maintain and mimic the natural hydrologic regime;
 - using “infiltration” style low-impact development technologies; and
 - following stormwater BMPs during and after construction, in accordance with relevant state-required stormwater permits.
- ▶ **Policy PF.P-34:** Provide for the costs of operating and maintaining storm drainage facilities by establishing the appropriate funding entity and fees to ensure that the costs are borne by those receiving benefit.
 - ▶ **Program PF.I-30:** Require new development to provide adequate on-site and offsite stormwater and drainage facilities to control both direct and indirect erosion and discharges of pollutants and/or sediments so that “no net increase in runoff” occurs as a result of the proposed project. To determine the needs for facilities and best management practices, the County would require, when necessary, that a licensed and County-approved civil engineer perform a hydrological/drainage analysis. The project applicant would be responsible for the cost of this analysis. In cases where a local or regional drainage facility may be the best solution to serve multiple properties or an entire drainage basin, the County would work with property owners and public agencies with jurisdiction in the affected area to devise an appropriate funding mechanism (e.g., impact fees, assessment district) for such facilities.

Resources Chapter

The Resources chapter of the 2008 Draft General Plan contains the following goal and policies designed to minimize or eliminate on-site and downstream erosion and sedimentation:

- ▶ **Goal RS.G-10:** Foster sound management of the land and water resources in Solano County’s watersheds to minimize erosion and protect water quality by using BMPs, and to protect downstream waterways and wetlands.
- ▶ **Policy RS.P-16:** [For Suisun Marsh area] the County shall ensure that development in the County occurs in a manner which minimizes impacts of earth disturbance, erosion and water pollution.
- ▶ **Policy RS.P-17:** The County shall preserve the riparian vegetation along significant County waterways in order to maintain water quality and wildlife habitat values.
- ▶ **Policy RS.P-70:** Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.

Policy RS.P-68 and Policy RS.P-69 as described in Impact 4.5-1a also apply.

Conclusion

With implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-2b **On-Site and Downstream Erosion and Sedimentation – Maximum Development Scenario.** *Development and land use changes consistent with the 2008 Draft General Plan under the Maximum Development Scenario would increase the amount of impervious surfaces, thereby increasing the total volume and peak discharge rate of stormwater runoff. This could alter local drainage patterns, increasing watershed flow rates above the natural background level (i.e., peak flow rates). Increased peak flow rates may exceed drainage system capacities, exacerbate erosion in overland flow and drainage swales and creeks, and result in downstream sedimentation. Sedimentation, in turn, could increase the rate of deposition in natural receiving waters and reduce conveyance capacities, resulting in an increased risk of flooding. Erosion of upstream areas and related downstream sedimentation typically leads to adverse changes to water quality and hydrology. However, with adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with current grading, erosion, and flood control regulations, this impact would be **less than significant**.*

This impact is similar to Impact 4.5-2a for the Preferred Plan, except that there is the potential for a greater impact because more development would be permitted under the Maximum Development Scenario. With adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, however, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-3a **Construction-Related Water Quality Impacts – Preferred Plan.** *Construction and grading activities during development consistent with the 2008 Draft General Plan under the Preferred Plan could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms. However, with implementation of existing regulations and water quality policies and programs contained in the 2008 Draft General Plan, this impact would be **less than significant**.*

Construction and grading activities during development consistent with the 2008 Draft General Plan under the Preferred Plan could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality by altering the dissolved-oxygen content, temperature, pH, suspended-sediment and turbidity levels, or nutrient content, or by causing toxic effects in the aquatic environment. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms.

Erosion and Sediment Control Provisions

As described in Section 4.5.2, “Regulatory Framework,” above, Solano County’s SWMP is consistent with the ongoing NPDES Phase I and II stormwater permitting programs that regulate municipal storm drain systems, industrial facilities, and construction sites. NPDES permits generally identify effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities. Under the NPDES permitting program, the preparation and implementation of SWPPPs is required for construction activities.

A SWPPP includes site maps and a description of construction activities and identifies the BMPs that will be employed to prevent soil erosion and discharge of other construction-related pollutants, such as petroleum products, solvents, paints, and cement, that could contaminate nearby water resources. All NPDES permits also

have inspection, monitoring, and reporting requirements to ensure that BMPs are implemented according to the SWPPP and are effective at controlling discharges of stormwater-related pollutants. Types of BMPs include source controls, treatment controls, and site planning measures.

Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce nonstormwater discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of postconstruction permanent BMPs that will remain in service to protect water quality throughout the life of the project.

Relevant Policy and Programs of the 2008 Draft General Plan

The Resources chapter of the 2008 Draft General Plan contains the following policy and programs designed to minimize or eliminate construction-related impacts:

- ▶ **Policy RS.P-23:** Ensure that extension of new utilities and infrastructure facilities, including those that support uses and development outside the Delta, is consistent with the *Land Use and Resource Management Plan for the Primary Zone of the Delta*. Where construction of new utility and infrastructure facilities is appropriate, the effects of such new construction on the integrity of levees, wildlife, and agriculture activities shall be minimized to the extent feasible.
- ▶ **Program RS.I-20:** Amend the zoning ordinance to:
 - Include the area, policies and programs of the *Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation*.
 - Regulate construction on steep slopes. This would include slope/density provisions that reduce allowable density based on the steepness of slopes.
 - Direct the use of lighting fixtures that reduce glare and light pollution. The ordinance should provide standards for the type and location of lighting fixtures in development projects.
 - Regulate construction on ridge lines.
- ▶ **Program RS.I-39:** Restrict construction and drilling in tidal marsh and managed wetland areas to occur only during the dry months of the years to ensure these activities will not disturb wintering waterfowl.

In addition, Policy PF.P-32 in the Public Facilities and Services chapter (as described in Impact 4.5-1a) addresses construction-related impacts through requirements for stormwater BMPs during and after construction.

Conclusion

With adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-3b **Construction-Related Water Quality Impacts – Maximum Development Scenario.** *Construction and grading activities during development consistent with the 2008 Draft General Plan under the Maximum Development Scenario could result in soil erosion and stormwater discharges of suspended solids and increased turbidity. Such activities could mobilize other pollutants from project construction sites as contaminated runoff to on-site and ultimately off-site drainage channels. Many construction-related wastes have the potential to degrade existing water quality. Project construction activities that are implemented without mitigation could violate water quality standards or cause direct harm to aquatic organisms. However, with implementation of existing regulations and water quality policies and programs contained in the 2008 Draft General Plan, this impact would be **less than significant**.*

This impact is similar to Impact 4.5-3a for the Preferred Plan, except that there is the potential for a greater impact because more development would be permitted under the Maximum Development Scenario. With adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, however, combined with current grading, erosion, and flood control regulations, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-4a **Interference with Groundwater Recharge – Preferred Plan.** *Development and land use changes consistent with the 2008 Draft General Plan under the Preferred Plan would result in additional impervious surfaces, the diversion of groundwater to surface water, and a potential increase of private wells. Resulting reductions in groundwater recharge in Solano County groundwater basins could affect the yield of hydrologically connected wells and have adverse effects on sensitive plant communities in Jepson Prairie and other areas. However, with implementation of the proposed goal, policies, and programs in the 2008 Draft General Plan, this impact would be **less than significant**.*

Development and land use changes consistent with the 2008 Draft General Plan under the Preferred Plan would result in additional impervious surfaces, the diversion of groundwater to surface water through subsurface drainage features or localized dewatering measures, and a potential increase of private wells. As a result, levels of groundwater recharge in some Solano County groundwater basins would decline. Reductions in groundwater recharge in a given area could affect the yield of hydrologically connected wells and have adverse effects on sensitive plant communities.

Groundwater Use Provisions

Amendments to SB 318 (see “Urban Water Management Planning Act” in Section 4.5.2, “Regulatory Framework,” above) address drought contingency planning, water demand management, reclamation, and groundwater resources. Under the current law, all urban water suppliers with more than 3,000 service connections or water use of more than 3,000 afy are required to submit an UWMP to DWR every 5 years, which will ensure that groundwater is used at a sustainable rate.

Relevant Goal, Policies, and Programs of the 2008 Draft General Plan

Resources Chapter

The Resources chapter of the 2008 Draft General Plan contains the following goal, policies, and program designed to minimize or eliminate interference with groundwater recharge, maintain sustainable groundwater levels, and manage competition for groundwater from competing uses:

- ▶ **Goal RS.G-9:** Protect, monitor, restore, and enhance the quality of surface and groundwater resources to meet the needs of all beneficial uses.

- ▶ **Policy RS.P-65:** Together with the Solano County Water Agency, monitor and manage the County’s groundwater supplies.
- ▶ **Policy RS.P-66:** Encourage new groundwater recharge opportunities.
- ▶ **Policy RS.P-67:** Protect existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas.
- ▶ **Policy RS.P-74:** Require and provide incentives for site plan elements (such as permeable pavement, swales, and filter strips) that limit runoff and increase infiltration and groundwater recharge.
- ▶ **Program RS.I-70:** Together with the SCWA and the cities, create and maintain a comprehensive database of information regarding groundwater supply and quality. Seek funding to complete a countywide groundwater study that fills the gaps among aquifer-specific studies. Coordinate with the SCWA to get more information on its groundwater study and subsequent groundwater management programs.

Public Facilities and Services Chapter

The Public Facilities and Services chapter of the 2008 Draft General Plan contains the following policies and programs that pertain to groundwater recharge, groundwater levels, and competition for groundwater from competing uses:

- ▶ **Policy HS.P-4:** Encourage the use of stormwater detention that may also be used for groundwater recharge.
- ▶ **Policy HS.I-12:** Increase the use of stormwater detention as a possible source of groundwater recharge as appropriate and only when increased retention does not increase groundwater levels to a point at which it increases the potential risk of liquefaction.
- ▶ **Policy PF.P-32:** Require development projects to minimize pollution of stormwater, water bodies receiving runoff, and groundwater, and to maximize groundwater recharge potential by:
 - implementing planning and engineering design standards that use low-impact development techniques and approaches to maintain and mimic the natural hydrologic regime;
 - using “infiltration” style low-impact development technologies; and
 - following stormwater best management practices during and after construction, in accordance with relevant state-required stormwater permits.
- ▶ **Program PF.I-6:** Implement the recommendations from the *English Hills Specific Plan Groundwater Investigation* establishing minimum parcel sizes to ensure adequate groundwater supply and recharge for the English Hills area.
- ▶ **Program HS.I-10:** During project review, encourage the use of landscaping practices and plants that will reduce demand on water, retain runoff, decrease flooding, and recharge groundwater.

Conclusion

Adoption and implementation of the proposed goal, policies, and programs in the 2008 Draft General Plan would reduce the potential for impacts on groundwater levels that would result from increased impervious-surface coverage in areas that contribute to groundwater recharge. These measures include maintaining areas important to groundwater recharge and incorporating engineering and design standards for projects that would promote

infiltration and maintain adequate levels of groundwater recharge. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-4b **Interference with Groundwater Recharge – Maximum Development Scenario.** *Development and land use changes consistent with the 2008 Draft General Plan under the Maximum Development Scenario would result in additional impervious surfaces, the diversion of groundwater to surface water, and a potential increase of private wells. Resulting reductions in groundwater recharge in Solano County groundwater basins could affect the yield of hydrologically connected wells and have adverse effects on sensitive plant communities in Jepson Prairie and other areas. However, with implementation of the proposed goal, policies, and programs in the 2008 Draft General Plan, this impact would be **less than significant**.*

This impact is similar to Impact 4.5-4a for the Preferred Plan, except that there is the potential for a greater impact because more development would be permitted under the Maximum Development Scenario. Adoption and implementation of the proposed goal, policies, and programs in the 2008 Draft General Plan would reduce the potential for impacts on groundwater levels that would result from increased impervious-surface coverage in areas that contribute to groundwater recharge. These measures include maintaining areas important to groundwater recharge and incorporating engineering and design standards for projects that would promote infiltration and maintain adequate levels of groundwater recharge. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-5a **Exposure of People or Structures to Flood Hazards – Preferred Plan.** *Development and land use changes consistent with the 2008 Draft General Plan under the Preferred Plan would result in the development of residential or commercial structures in floodplains, thereby exposing people and structures to flood hazards. Similar exposure could occur in shoreline areas that would be subject to flooding because of extreme high tides or concurrent high tides and watershed flooding. Sea level rise associated with global climate change would exacerbate these risks. However, with implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with flood control regulations, this impact would be **less than significant**.*

Development and land use changes consistent with the 2008 Draft General Plan would result in the development of residential or commercial structures in floodplains, thereby exposing people and structures to flood hazards. Similar exposure could occur in shoreline areas that would be subject to flooding because of extreme high tides or concurrent high tides and watershed flooding. A large portion (30–40%) of developed and undeveloped lands in Solano County is subject to flooding because of periodic heavy winter rainfall, tidal fluctuations, and the potential for canal, levee, and dam failure from seismic activity (Exhibit 4.5-4). Sea level rise associated with global climate change would exacerbate these risks (see Section 6.2, “Effects Related to Climate Change,” in Chapter 6, “Other CEQA Considerations”).

Most flood-prone lands in Solano County are subject to inundation because of heavy rainfall and resulting stream overflows. A number of streams in the county have long histories of seasonal flooding, often resulting in significant damage. Such floods can occur anytime during the rainfall months from November 1 to May 1. Flood risk is intensified in the lower stream reaches by the likelihood of coincident high tides and strong offshore winds during heavy rainfall.

The potential for flood damage in the county is further aggravated by spreading urbanization. Urbanization is encroaching upon and reducing floodplain area in the low-lying areas while increasing the rates and volumes of runoff from overlying higher lands (e.g., through construction of structures and paving), thereby restricting natural infiltration. Potential for flood damage is high in the vicinity of Cordelia and Rockville along Green Valley, Dan Wilson, and Suisun Creeks. These streams have a long history of flooding, particularly along the lower reaches of Green Valley Creek, which are influenced by Suisun Bay tides. The most severe flood conditions occur in these areas when heavy rainfall coincides with high tides and offshore winds. Eighteen flood events have occurred in Solano County since 1937, or one every 3–4 years on average. The largest and most damaging flood occurred in 1955 and was estimated to be a 40-year event. Investigations indicate that larger flood-producing storms could be expected in the future (USACE 1967). Recent flood events include the December 31, 2005, storm that caused significant damage in several of the county’s cities and rural areas. The storms of December 13–16, 2002, also caused extensive localized flooding damage (Okita, pers. comm., 2006).

As explained in Impact 4.5-2a, the cities in Solano County are each responsible for their flood control projects; SCWA sometimes assists the cities and is also responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Delta (from precipitation and tides) rely on levees. Levee protection is addressed in Impact 4.5-6a, “Potential for Failure of a Levee.”

Relevant Policies and Programs of the 2008 Draft General Plan

Land Use Chapter

The Land Use chapter of the 2008 Draft General Plan contains the following policy and programs to mitigate potential impacts arising from development in 100-year flood hazard zones:

- ▶ **Policy SS.P-27:** Protect existing historic communities from floodwaters by supporting the ongoing maintenance of levees and other flood control mechanisms.
- ▶ **Program SS.I-14:** Work with local residents, the City of Fairfield, water agencies, and the Fairfield Unified School District to complete improvements to infrastructure and public facilities in Old Town Cordelia, including flood prevention infrastructure, a neighborhood park (possibly on the site of the former Green Valley Middle School), and streetscape improvements and street furniture, and to enhance the community’s recreational resources. Work with the water agencies to monitor recurring flooding in Old Town Cordelia and the performance of Cordelia Slough to determine whether it is functioning and will continue to function at a safe carrying capacity. Work with the school district to determine desirable future uses for the vacant former Green Valley Middle School site.
- ▶ **Program HS.I-1:** Develop and adopt a Sea Level Rise Strategic Program for Solano County. The Sea Level Rise Strategic Program (SLRSP) will have three primary objectives. These include (1) investigate the potential effects of sea level rise on Solano County, (2) identify properties and resources susceptible to SLR in order to prioritize management strategies, and (3) develop protection and adaptation strategies to meet the county’s and region’s goals. The Program will encompass all areas identified within a Sea Level Rise Planning Area

Preparation of an effective SLRSP is necessary to protect the county’s safety and economic well being. Due to the complexity and regional implications of sea level rise, preparation of the program should be coordinated with BCDC, Bay Delta Authority, and other relevant agencies. The SLRSP will contain the following components:

SLR Area Identification—The County, with the help of state and federal agencies, will need to investigate the effects of SLR with respect to the specific hydrological characteristics of the Bay-Delta area. The Intergovernmental Panel on Climate Change and the 2006 California Climate Action Team Report project

increases between 12 and 36 inches by the year 2100. While uncertainty exists regarding the projected height of sea level rise, both moderate and high projections are expected to result in sea levels that will affect the Bay-Delta area both directly and by increasing the frequency, duration, and magnitude of extreme water level events. Extreme water level events are coastal area floods created by a combination of high tides, Pacific climate disturbances such as El Niño, low pressure systems and associated storm surges. Extreme water level events are expected to increase substantially with elevated sea levels. Given a one foot rise in sea level, as predicted in low end SLR projections, the frequency of a 100-year event would increase tenfold. Additionally, elevated sea levels and increased extreme water level events are expected to exacerbate flooding and saltwater intrusion in the county. The SLRSP will need to investigate these issues further to protect infrastructure, property, resources, and lives.

Prioritization—As a second step, the county will identify areas susceptible to SLR in order to prioritize management strategies. This step should be coordinated with the Association of Bay Area Governments’ cost-benefit analysis and with BCDC’s regional prioritization process. Areas to be identified include the following:

- Properties that contain high value development and warrant protection.
- Areas where it may be more cost-effective to remove existing development than to protect low-value structures.
- Sites where hazardous substances exist and could be released into the environment due to sea level increases. These sites will need to be remediated prior to SLR inundation.
- Properties that are designated for future development, but have not yet been built. It may be better to remove development potential from such areas in order to reduce the public’s exposure to the risk associated with SLR.
- Valuable ecosystems such as marshlands and delta riparian areas that may become flooded as sea level rises.

Prioritization—The third component of the plan will require the development of management strategies to meet the county’s and region’s protection, adaptation, and resource enhancement goals. Management strategies will include, but are not limited to, the following:

- Create a sea level rise protection program that identifies the levees, seawalls, and other infrastructure and activities that will have to be constructed or carried out to safeguard high value areas from inundation.
- Produce a relocation and resource enhancement program that identifies: (1) the activities that will have to be carried out to remove or relocate facilities from those areas that are identified as being inappropriate for protection; and (2) the activities and programs that will have to be carried out to achieve environmental protection and enhancement in areas that the county and regional, states and federal agencies identify as being most suitable for these purposes.
- Update land use designations and development regulations in order to protect public safety, welfare, and health.
- Coordinate SLRSP strategies with strategies developed in the overarching county Climate Action Plan.

Other General Plan Chapters

The following policy and program from the Public Facilities and Services and Transportation and Circulation chapters of the 2008 Draft General Plan mitigate potential impacts arising from development in 100-year flood hazard zones:

- ▶ **Policy PF.P-36:** Encourage and pursue the consolidation of flood control management responsibilities within a single countywide entity.
- ▶ **Program TC.I-4:** Adopt road construction standards that account for flood hazards for public roads used as evacuation routes.

Conclusion

Adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with flood control regulations, would minimize the exposure of people or structures to flood hazards resulting from development under the 2008 Draft General Plan. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-5b **Exposure of People or Structures to Flood Hazards – Maximum Development Scenario.** *Development and land use changes consistent with the 2008 Draft General Plan under the Maximum Development Scenario would result in the development of residential or commercial structures in floodplains, thereby exposing people and structures to flood hazards. Similar exposure could occur in shoreline areas that would be subject to flooding because of extreme high tides or concurrent high tides and watershed flooding. Sea level rise associated with global climate change would exacerbate these risks. However, with implementation of the proposed policies and programs in the 2008 Draft General Plan, combined with flood control regulations, this impact would be **less than significant**.*

This impact is similar to Impact 4.5-5a for the Preferred Plan, except that there is the potential for a greater impact because more development would be permitted under the Maximum Development Scenario. Adoption and implementation of the proposed policies and programs in the 2008 Draft General Plan, however, combined with flood control regulations, would minimize the exposure of people or structures to flood hazards resulting from development under the 2008 Draft General Plan. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-6a **Potential for Failure of a Levee – Preferred Plan.** *When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property could result. The aging, fragile levee system in the Delta, which includes much of southeastern Solano County, protects farmland, highways, a railroad, natural gas and electric transmission facilities, and aqueducts. The Delta's levees also protect the residents of Rio Vista and multiple communities and rural areas in unincorporated Solano County. Such a levee could fail because of earthquake-induced slumping, landslides, and liquefaction. Implementation of the proposed policies and programs in the 2008 Draft General Plan under the Preferred Plan, combined with other relevant state and local regulations, would reduce the potential for effects on the county from levee failure. However, this impact would still be **significant**.*

When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property could result. The Delta includes much of southern, eastern, and southeastern Solano County. For protection against floods and high tides, the Delta relies on a maze of levees to protect land and key infrastructure. In all, more than 1,100 miles of levees are located in the Delta, including many built more than a century ago to protect farmland. Were it not for the levees, the Delta would be a 740,000-acre inland sea. The Delta's aging, fragile levee system protects farmland, highways, a railroad, natural gas and electric transmission facilities, and aqueducts that provide water to parts of the Bay Area. Delta levees also protect the residents of Rio Vista and multiple communities and

rural areas in unincorporated Solano County. A Delta levee in Solano County could fail because of earthquake-induced slumping, landslides, and liquefaction. The need to maintain and enhance the Delta levee system is one of the biggest and most urgent flood control concerns in Solano County.

Because levees are vulnerable to peat oxidation as well as sand, silt, and peat erosion, new material is continually added to maintain them. Subsiding farmlands adjacent to levees may increase water pressure against levees, adding to the potential for levee failure. In addition, most levees are not maintained to any specified standard, which can increase the likelihood of failure and inundation. Potential failure of levees as a result of liquefaction constitutes a flood hazard in much of the southern half of Solano County. Some enclosed areas lie several feet below sea level and are subsiding at a rate of up to 3 inches per year. Most of these diked areas are currently used for agriculture, and some lie so far below sea level that it would be economically infeasible to drain them should they be flooded as a result of levee failure. Failure of levees protecting Collinsville could flood parts of that community, causing damage to residential areas. No comprehensive studies have been performed on levee failure because of the difficulty of correctly assessing levee safety. Even inspected levees are prone to failure under certain conditions. Roads in Suisun Marsh and in the east county are constructed almost exclusively on levees. Thus, levee failures could also disrupt travel through these areas.

Procedures for Protection Against Threats of Levee Failure

As described in Section 4.5.2, “Regulatory Framework,” canal and levee inundation mapping procedures (19 CCR Section 2585) are required by the state OES for all canals and levees where human life is potentially endangered by canal or levee flooding inundation. Canal and levee owners are responsible for obtaining recent hydrologic, meteorological, and topological data as well as land surveys denoting the floodplain to be utilized for the preparation of a canal or levee inundation map.

Also as described in Section 4.5.2, the County OES provides for the development, establishment, and maintenance of programs and procedures to help protect the lives and property of Solano County residents from the effects of natural or human-caused disasters, including floods from levee failures. The County OES works with the County and individual city departments with disaster exercises and evacuation preparations. Additionally, the County OES conducts emergency preparedness training and awareness presentations for citizens and various organizations so that they will better understand what they should do before, during, and after a disaster or major emergency, including flooding from failure of a levee.

Relevant Policies of the 2008 Draft General Plan

Resources Chapter

The following policies from the Resources chapter of the 2008 Draft General Plan mitigate potential impacts related to the potential for levee failure:

- ▶ **Policy RS.P-23:** Ensure that extension of new utilities and infrastructure facilities, including those that support uses and development outside the Delta is consistent with the Land Use and Resource Management Plan for the Primary Zone of the Delta. Where construction of new utility and infrastructure facilities is appropriate, the effects of such new construction on the integrity of levees, wildlife, and agriculture activities shall be minimized to the extent feasible.

- ▶ **Policy RS.P-26:** Support the improvement and long-term maintenance of Delta levees to preserve land areas and channel configurations in the Delta by coordinating permit reviews, and guidelines for levee maintenance; supporting development of a long-term funding program for levee maintenance; protecting levees in emergency situations; and giving levee rehabilitation and maintenance priority over other uses of levee areas.

Public Health and Safety Chapter

The following policies and program from the Public Health and Safety chapter of the 2008 Draft General Plan mitigate potential impacts related to the potential for levee failure:

- ▶ **Policy HS.P-7:** Require new-development proposals in dam, canal, or levee inundation areas to consider risk from failure of these facilities and to include mitigation measures to bring this risk to a reasonable level.
- ▶ **Policy HS.P-8:** Work with responsible parties to ensure dams, levees, and canals throughout the county are properly maintained and/or improved.
- ▶ **Program HS.I-11:** Where new development for human occupancy is proposed within dam, canal, or levee inundation areas, require the applicant to prepare a report describing the results of an inspection of the dam, canal, or levee by a state-registered civil engineer, including the reliability of the facility during a 100-year flood, potential for failure during seismic shaking, likely inundation area, and predicted evacuation times. The report should also include any necessary dam, levee, or canal improvements to protect life and property in the proposed development.

Other General Plan Chapters

The following policies from the Land Use and Transportation and Circulation chapters of the 2008 Draft General Plan mitigate potential impacts related to the potential for levee failure:

- ▶ **Policy SS.I-8:** Explore additional funding mechanisms for levees to protect the Collinsville town site. Protect existing, historic communities from floodwaters by supporting the ongoing maintenance of levees and other flood control mechanisms.
- ▶ **Policy TC.P-23:** Evaluate and monitor the effects of water transportation and port activity on the levee system.

Conclusion

Adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with other relevant state and local regulations, would reduce the potential for effects on Solano County from levee failure. However, even with implementation of these policies, the potential for failure of a Delta levee would remain. Therefore, this impact would be significant.

Mitigation Measure

No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable** because the potential for failure of a Delta levee would remain even with implementation of the policies in the 2008 Draft General Plan and relevant state and local regulations.

IMPACT 4.5-6b **Potential for Failure of a Levee – Maximum Development Scenario.** *When levees fail, people and structures are exposed to inundation, and death, injury, or loss of property could result. The aging, fragile levee system in the Delta, which includes much of southeastern Solano County, protects farmland, highways, a railroad, natural gas and electric transmission facilities, and aqueducts. The Delta's levees also protect the residents of Rio Vista and multiple communities and rural areas in unincorporated Solano County. Such a levee could fail because of earthquake-induced slumping, landslides, and liquefaction. However, implementation of the proposed policies and programs in the 2008 Draft General Plan under the Maximum Development Scenario, combined with other relevant state and local regulations, would reduce the potential for effects on the county from levee failure. However, this impact would still be **significant**.*

This impact is similar to Impact 4.5-6a for the Preferred Plan. Adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with relevant state and local regulations, would reduce the potential for effects on Solano County from levee failure. However, even with implementation of these policies, the potential for failure of a Delta levee would remain. Therefore, this impact would be significant.

Mitigation Measure

No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable** because the potential for failure of a Delta levee would remain even with implementation of the policies in the 2008 Draft General Plan and relevant state and local regulations.

IMPACT 4.5-7a **Potential for Failure of a Dam – Preferred Plan.** *Of the 18 dams in Solano County, the state OES has identified 10 where dam inundation has the potential to cause human injury or loss of life. In the unlikely event of dam failure, people and structures are exposed to inundation, and death, injury, or loss of property could result. Implementation of the proposed policies and programs in the 2008 Draft General Plan under the Preferred Plan, combined with other relevant state and local regulations, would minimize the potential for effects on the county from dam failure. This impact would be less than significant.*

Dam inundation occurs when a dam is not structurally sound or is unable to withstand damages resulting from seismic activity. The degree and rapidity of dam failure depends on the dam's structural characteristics. Of the 18 dams in Solano County, the state OES has identified 10 where dam inundation has the potential to cause human injury or loss of life. For security reasons, maps showing dam inundation areas are not made available to the public, although the Association of Bay Area Governments found the following for Solano County: 16,766 urban acres are subject to dam inundation; 3,577 miles of roadway are in an area subject to dam inundation; and 23 critical health care facilities, schools, or County-owned facilities are in an area subject to dam inundation (ABAG, 2008). Staff in the County Department of Resource Management would evaluate projects in dam inundation areas on a case-by-case basis using the current data available to them (Solano County 2006).

Procedures for Protection Against Threats of Dam Failure

As described in Section 4.5.2, "Regulatory Framework," dam inundation mapping procedures (19 CCR Section 2575) are required by the state OES for all dams where human life is potentially endangered by dam flooding inundation.

Also as described in Section 4.5.2, the County OES provides for the development, establishment, and maintenance of programs and procedures to help protect the lives and property of Solano County residents from the effects of natural or human-caused disasters, including floods from dam failures. The County OES works with the County and individual city departments with disaster exercises and evacuation preparations. Additionally, the County OES conducts emergency preparedness training and awareness presentations for citizens and various organizations so that they will better understand what they should do before, during, and after a disaster or major emergency, including flooding from failure of a dam.

Public Health and Safety Chapter

The following policies and program from the Public Health and Safety chapter of the 2008 Draft General Plan mitigate potential impacts related to the potential for dam failure:

- ▶ **Policy HS.P-7:** Require new-development proposals in dam, canal, or levee inundation areas to consider risk from failure of these facilities and to include mitigation measures to bring this risk to a reasonable level.
- ▶ **Policy HS.P-8:** Work with responsible parties to ensure dams, levees, and canals throughout the county are properly maintained and/or improved.

- ▶ **Program HS.I-11:** Where new development for human occupancy is proposed within dam, canal, or levee inundation areas, require the applicant to prepare a report describing the results of an inspection of the dam, canal, or levee by a state-registered civil engineer, including the reliability of the facility during a 100-year flood, potential for failure during seismic shaking, likely inundation area, and predicted evacuation times. The report should also include any necessary dam, levee, or canal improvements to protect life and property in the proposed development.

Conclusion

Adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with other relevant state and local regulations, would minimize the potential for effects on Solano County from inundation as a result of dam failure. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.5-7b Potential for Failure of a Dam – Maximum Development Scenario. *Of the 18 dams in Solano County, the state OES has identified 10 where dam inundation has the potential to cause human injury or loss of life. In the unlikely event of dam failure, people and structures are exposed to inundation, and death, injury, or loss of property could result. Implementation of the proposed policies and programs in the 2008 Draft General Plan under the Maximum Development Scenario, combined with other relevant state and local regulations, would minimize the potential for effects on the county from dam failure. This impact would be **less than significant**.*

This impact is similar to Impact 4.5-7a for the Preferred Plan. Adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with relevant state and local regulations, would minimize the potential for effects on Solano County from inundation as a result of dam failure. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

4.5.4 RESIDUAL SIGNIFICANT IMPACTS

Even with implementation of the policies in the 2008 Draft General Plan and relevant state and local regulations, the potential for failure of a Delta levee would remain; no feasible mitigation is available to reduce the impact of implementation of the 2008 Draft General Plan on levees under either the Preferred Plan or the Maximum Development Scenario. Therefore, Impacts 4.5-6a and 4.5-6b would remain **significant and unavoidable**.

4.6 BIOLOGICAL RESOURCES

This section provides background information about sensitive biological resources within Solano County, the regulations and programs that provide for their protection, and an assessment of the potential impacts on biological resources of implementing the 2008 Draft General Plan. The description of existing conditions and several of the impact analyses draw on background materials and information supporting the *Solano Multi-Species Habitat Conservation Plan* (Solano HCP) (SCWA 2005), which is currently being developed.

Participants in the Solano HCP are Solano County Water Agency (SCWA), the City of Vacaville, the City of Fairfield, the City of Suisun City, the City of Vallejo, Solano Irrigation District (SID), Maine Prairie Water District (MPWD), the City of Rio Vista, the City of Dixon, Reclamation District 2068, Vallejo Sanitation and Flood Control District, and Fairfield-Suisun Sewer District. Although the County is not an applicant, SCWA gave the County permission to use the data developed for the Solano HCP toward the development of the 2008 Draft General Plan. The Biological Resources Background Report prepared for the 2008 Draft General Plan (Solano County 2006) was an adaptation of the Solano HCP. Similarly, the following description of existing conditions within the county is based in large part on the information presented in the Solano HCP.

4.6.1 EXISTING CONDITIONS

Solano County, despite its modest size, lies at the intersection of numerous geographical and geological provinces. This, in conjunction with variations in hydrology and climate, has resulted in the formation of unique biological and ecological conditions and a great diversity of native species and habitats. For simplicity, the conservation strategy for the Solano HCP was divided into four broad types of natural communities that closely correspond to broad geographic regions within the county and encompass a wide range of habitat types: the valley floor grassland and vernal pool natural community; the inner Coast Range natural community; the riparian, stream, and freshwater marsh natural community; and the coastal marsh natural community (Exhibit 4.6-1).

The valley floor grassland and vernal pool natural community encompasses the historical alluvial terraces or valley floor portions of the county. These areas currently support or likely historically supported, and are reasonably capable of being restored to, vernal pool habitats and surrounding grasslands within their immediate watershed; they also include the larger grasslands in the Montezuma Hills and Potrero Hills (Exhibit 4.6-1).

The inner Coast Range natural community encompasses the entire western margin of the county. This natural community includes the Sky Valley and Sulphur Springs Mountain area (Tri-City/County Planning Area), the area west of Green Valley (e.g., West Hills), the volcanic hills of the Rockville area, and the Vaca Mountains/Blue Ridge (Exhibit 4.6-1). It is distinguished from the lowland valley floor and vernal pool grassland community by geographic location, elevation, and soils (Exhibit 4.6-1). Consisting of ridges and valleys that trend in a northwestern direction, this natural community is better characterized as a geographical region because it combines a number of plant communities—grassland, oak woodland, oak savanna, and mixed chaparral/scrub—that form a continuum/mosaic over the entire inner Coast Range (Exhibit 4.6-1). This mosaic of different plant communities at various successional stages and ecotones provides a diverse array of habitat types for plants and wildlife.

Embedded throughout all of the other natural communities is the riparian, stream, and freshwater marsh natural community, which encompasses all freshwater, aquatic, marsh, and riparian habitats within Solano County (Exhibit 4.6-1). Conversely, the coastal marsh natural community refers only to those areas that lie within the historic influence of tidal action. This includes areas that either are currently influenced by tidal action or are diked and no longer affected by tides. These marshes exhibit a broad range of characteristics; they include the current and historic estuarine-influenced marshes of San Pablo Bay/lower Napa River, Southampton Marsh in the Carquinez Strait, Suisun Marsh, and tidally influenced freshwater marshes in the upper regions of the sloughs and creeks in the Sacramento–San Joaquin Delta (Delta) region of the county (Exhibit 4.6-1).

The northeastern portion of the county consists primarily of irrigated agriculture, which provides important habitat for several covered species (e.g., Swainson's hawk and burrowing owls). Agricultural areas were not defined as a natural community type. Nevertheless, the importance of agricultural resources to wildlife and important agricultural resources for sensitive species and for species federally and/or state listed as threatened and endangered are discussed in the "Agricultural Lands" section below because these are priority areas for biological resource conservation.

DESCRIPTIONS OF PLANT COMMUNITIES

The following is a brief description of the plant communities found and mapped within Solano County for the Solano HCP. For further details about habitat mapping techniques, refer to the Biological Resources Background Report (Solano County 2006) or the working draft of the Solano HCP (SCWA 2005).

Grassland

Large portions of North America's grasslands were formerly dominated by native perennial grasses interspersed with numerous native annual and perennial forbs (broad-leaved plants). The introduction of nonnative species, farming, and unrestricted continuous grazing of livestock after European settlement in the mid-19th century have contributed to the substantial reduction or elimination of native grasses in most of California, including Solano County. As a result, nonnative grassland is currently the dominant grassland community in the county and usually includes a large number of native and nonnative forb species as well.

Within Solano County, the broad, general category of "grassland" communities contains a number of recognized community types. However, for the purposes of the HCP, and given the accuracy of the mapping, grasslands were mapped and divided into two primary categories to segregate the grasslands into areas of similar ecological relationships or function, based largely on landform and geographical regions of the county. These categories were identified as inner Coast Range grassland and valley floor grassland associations. The valley floor grassland association contains a further subdivision to identify vernal pool associations (based on soil types). Descriptions of these associations are included below.

Grasslands within the Inner Coast Range

This category refers to the grasslands associated with drier conditions typically on hillsides, slopes, ridges, and flat areas with well-drained soil within the inner Coast Range and foothill terraces. Annual nonnative grasses and forbs are the dominant component of the majority of the grasslands in the county and form the characteristic component of the upland grassland community. Many of the nonnative grass and forb species are well adapted to colonizing and persisting in disturbed landscapes. As a result, their introduction, in concert with unrestricted continuous grazing and agricultural disturbance, has resulted in native grassland species being outcompeted and subsequently replaced with nonnative grasses. This type of plant community is common in the southwestern portion of Solano County but also occurs within other communities, including oak woodland/oak savanna, on levees within marsh communities, and in agricultural and developed areas (mapped as Ruderal Disturbed). This community corresponds with "Nonnative Grassland" as classified by Holland (1986).

Common nonnative grassland/ruderal species in Solano County include wild oats (*Avena barbata*, *A. fatu*), bromes (*Bromus diandrus*, *B. hordeaceus*), hare barley (*Hordeum murinum* ssp. *leporinum*), Italian wildrye (*Lolium multiflorum*), filarees (*Erodium* spp.), mustards (*Brassica niger*, *B. rapa*, *Hirschfeldia incana*), wild radish (*Raphanus sativus*), mallows (*Malva* spp.), vetches (*Vicia* spp.), and starthistles (*Centaurea* spp.). Native species that commonly occur with nonnative plants in disturbed situations include small-flowered lupine (*Lupinus bicolor*), fiddleneck (*Amsinckia* spp.), California goldfields (*Lasthenia californica*), California poppy (*Eschscholzia californica*), and owl's-clovers (*Castilleja* spp., *Triphysaria* spp.).



Solano County General Plan EIR

Exhibit 4.6-1

Vegetation and Cover Types

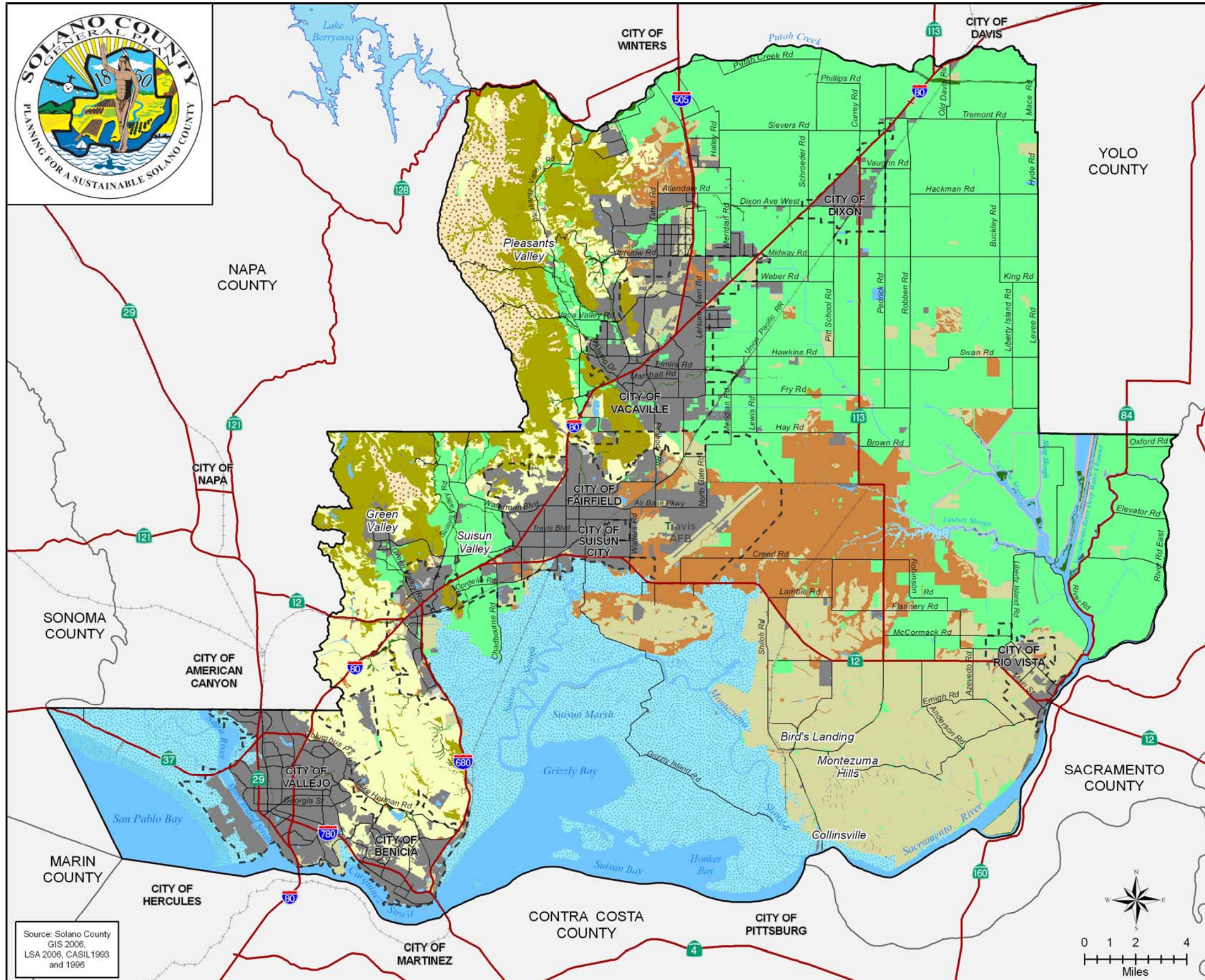
Legend

Vegetation and Cover Types

- Agriculture
- Grassland - Inner Coast Range
- Grassland - Valley Floor
- Grassland - Vernal Pool System
- Scrub/Chaparral
- Oak Savanna
- Oak Woodland
- Riparian
- Developed
- Pre-approved Development
- Marsh
- Tidal Flats
- Open Water
- Levee

Basemap Layers

- Roadways
- Highways
- Railroads
- Major Water Features
- Municipal Service Areas
- Adjacent Counties



Source: Solano County GIS 2006, LSA 2006, CASIL1993 and 1996

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"Planning for a Sustainable Solano County"

In spite of the large-scale introduction and spread of nonnative grasses and forbs, some native, perennial grasses are still present in small patches or intermixed stands with the nonnative grasses. The size of these patches usually depends on various environmental factors and the severity of disturbance. The common native grassland in Solano County is valley needlegrass grassland. This vegetation type corresponds to Holland's community of the same name (Holland 1986).

Common native grass species that dominate areas of native grassland are purple needlegrass (*Nassella pulchra*), one-sided blue-grass (*Poa secunda*), California fescue (*Festuca californica*), and creeping wildrye (*Leymus triticoides*). Other grasses that occur in lesser densities include blue wild-rye (*Elymus glaucus*) in shady areas such as the understory of oak woodland/oak savanna, and melic grasses (*Melica* spp.) and nodding needlegrass (*Nassella cernua*), which commonly grow in dry, often rocky grasslands. Wildflowers (forbs) often found in grasslands with a native component include yarrow (*Achillea borealis*), sanicles/snakeroots (*Sanicula* spp.), California dandelion (*Agoseris grandiflora*), California goldfields, brodiaeas (*Brodiaea* spp., *Dichelostemma* spp., *Triteleia* spp.), and mariposa lilies (*Calochortus* spp.).

Valley Floor Grasslands

The second major grassland association for the county is referred to as valley floor grassland. Both the inner Coast Range and valley floor grassland communities are currently dominated by many similar plant species (particularly introduced annual grasses and forbs); however, the historical functions of natural communities that would be expected to occur, and to a large extent the roles the communities provide for various special-status species, result in different conservation requirements for these two communities. The valley floor grasslands are dominated by two typically intermixed associations: vernal pool system grasslands and grassland associated with low hills such as the Montezuma Hills and Potrero Hills and upper terraces along the valley floor.

The vernal pool grassland association is characterized by the presence of seasonal wetlands that form in soil types where the downward movement or infiltration of water is impeded by dense clays or pans below the surface. Within this broad vernal pool habitat type, the true wetland vernal pool and swale plant communities typically only comprise a minor component (5% to 50%) of a broader grassland matrix. Vernal pool habitats have become very rare because they are often found in landscapes that favor agriculture. In the last 150 years the total area of vernal pools in the Central Valley has been reduced by 75%, and the loss between 1994 and 1997 continued at 1.5% per year (Solano County Farmlands & Open Space Foundation 2001). Historically there were an estimated 118,227 acres of potential vernal pool grassland in Solano County. Currently, an estimated 50,762 acres of potential vernal pool grassland habitat remain (43% of the historical potential), although much of the remaining vernal pool habitats have been highly altered through past land use activities.

Vernal pools are generally small, ephemeral (seasonal) wetlands that form in shallow depressions underlain by a hardpan (i.e., a layer near the ground surface that restricts the percolation of water). These depressions fill with rainwater and runoff from adjacent areas during the winter and may remain inundated from the spring to early summer. Vernal pools are found in areas of level or gently undulating topography in the lowlands of California, especially in the grasslands of the Central Valley. Rising spring temperatures cause the water to evaporate, promoting the growth of concentric bands of many plant species, especially native wildflowers, along the shrinking edge of the pool. Vernal pool vegetation in California is characterized by a high percentage of native species, several of which are endemic (restricted) to vernal pools. Many of these plant species, as well as a number of animal species, are federally listed or state listed as or otherwise considered rare, threatened, or endangered.

Northern claypan vernal pools are the most common pool type in Solano County. These sorts of vernal pool communities are prevalent in the central portion of the county, particularly east of Fairfield and Suisun City, extending beyond the Jepson Prairie preserve toward the county line. This community type is typically associated with basin-rim and low-terrace alluvial soils, including Antioch, San Ysidro, Pescadero, Solano, Millsap,

Sycamore, and Clear Lake series. The pools occur on neutral to alkaline, silica-cemented, hardpan soils that are often more or less saline.

Pools may be small, covering only a few square meters, or large, covering several hectares. The larger ones are referred to as vernal lakes or playa pools. The vegetation in the claypan pool is similar to that in the northern hardpan vernal pool (see below), but the vegetative cover is commonly not as tall. Characteristic native species include goldfields (*Lasthenia fremontii*, *L. glaberrima*), coyote thistles (*Eryngium* spp.), dwarf blennosperma (*Blennosperma nanum*), spreading alkali-weed (*Cressa truxillensis*), and Douglas' mesamint (*Pogogyne douglasii*).

Holland (1986) also mapped a small area of northern hardpan vernal pools in a relatively small area north of Vacaville. The pools occur on old, acidic, iron-silica cemented soils that are typically associated with the Corning, Redding, and San Joaquin soil series, although descriptions for the Corning soils in the county in the *Soil Survey of Solano County* (Bates et al. 1977) indicate more claypan conditions, at least in the upper soil horizons, rather than a cemented hardpan in the "typical" Corning soils. This technical difference has limited significance (Noss et al. 2002) because the majority of the species that are found in the northern claypan vernal pool (see above) are also found in the northern hardpan vernal pool. The primary difference is that the typically alkaline-adapted species are mostly absent from the hardpan vernal pools. Other species present in the northern hardpan vernal pool community are popcorn-flowers (*Plagiobothrys* spp.), willow-herbs (*Epilobium* spp.), downingias (*Downingia bicornuta*, *D. cuspidata*, *D. pulchella*), and a paintbrush (*Castilleja campestris*).

Other types of seasonal wetlands also exist in the county. Seasonal wetlands are typically distinguished from vernal pools by a longer or altered hydrology, the presence of more persistent emergent vegetation dominated by species such as rush (*Juncus* spp.) and spike rush (*Eleocharis* spp.) and nonnative plant species such as ryegrass and Mediterranean barley, and/or a reduced number of native forbs that typically grow in vernal pools. In many cases, the seasonal wetlands represent or occur in historic vernal pool habitats, but have lost many or all of their natural characteristics because of land use changes and disturbance. While often lacking significant native components of true vernal pools, seasonal wetlands can support species of concern and can provide important areas for vernal pool restoration.

The characteristic species of the grassland matrix in the vernal pool associations and in the higher ground and areas of low hills on the valley floor are typically dominated by many of the same introduced annual grasses and forbs that characterize the upland grassland community. These species include wild oats, various bromes and barleys, Italian wildrye, filarees, mustards, wild radish, mallows, vetches, and starthistles. In portions of the county, particularly in the Montezuma Hills, the valley-floor grasslands are also periodically cultivated for dryland production of oats, wheat, and barley. Although these areas are often regularly cultivated, many of the grassland ecosystem functions remain. Therefore, areas of dryland farming are included within the grassland community association versus being incorporated into the primarily irrigated agricultural community described below (note that the habitat mapping for the Solano HCP distinguished cultivated grasslands from noncultivated lands as a component of the baseline mapping).

The valley floor grassland and vernal pool conservation strategy also incorporates several other recognized plant communities: alkali playa, alkali meadow, and chenopod scrub. These community types intergrade with the vernal pools in the county (the northern claypan vernal pool type tends to exhibit some alkalinity). The level of habitat mapping conducted for the Solano HCP is not of sufficient detail to distinguish these community types from the broader vernal pool/seasonal wetland habitat type.

The alkali playa community occurs in poorly drained soils with high salinity or alkalinity caused by the evaporation of water that accumulates in closed depressions or drainages. The water table is often high and salt crusts are visible on the ground surface. This type of community, which includes chenopod scrub, is common in closed basins in deserts, but it also occurs in the Central Valley. Vegetation in this community consists of low-growing, grayish, small-leaved, often succulent shrubs that grow to 1 meter in height, although in Solano County

the height averages less than ½ meter. The total vegetative cover is mostly sparse because of the low distributional density of the shrubs and the poorly developed herbaceous understory. Characteristic species of this plant community in Solano County include seep-weed (*Suaeda moquinii*), alkali heath (*Frankenia salina*), pickleweed (*Salicornia virginica*), and several species of saltbush (*Atriplex* spp.).

Alkali meadow occurs on fine-textured, more or less permanently moist, alkaline soils and consists of dense to relatively open growth, dominated by low-growing, perennial grasses and sedges. It intergrades with nonnative grasslands and northern claypan vernal pools on drier, less alkaline soils. Characteristic species of this community include sedges (*Carex* spp.), saltgrass (*Distichlis spicata*), scratchgrass (*Muhlenbergia asperifolia*), and alkali sacaton (*Sporobolus airoides*).

For purposes of the Solano HCP, seasonal wetlands within the county that occur within areas historically supporting vernal pools and occurring on soil types associated with vernal pools are included within the overall vernal pool ecosystem conservation strategies. The Solano HCP also considers the upland components (contributing watersheds) as well as the wetland swales and pools to be an integral component of the vernal pool ecosystem. Seasonal wetlands, including vernal pools, can also occur in most community types such as upland grassland, agricultural, woodland, scrub/chaparral, developed–vacant/disturbed, and developed–rural residential communities. However, in these communities, wetlands typically compose a smaller percentage of the total area (on average less than 5%).

Marshes and Other Wetlands

Within Solano County, the term “marsh” encompasses a broad range of vegetation types. The primary distinguishing characteristic of marsh communities is the presence of persistent to perennial marsh vegetation, typically ranging from less than a foot to more than 12 feet in height. These marsh communities also include areas with relatively natural hydrological regimes (e.g., tidal influence) to marshes with altered, managed hydrologic systems.

Northern Coastal Salt Marsh

Coastal salt marsh is restricted to the upper intertidal zone of protected shallow bays, lagoons, and estuaries. Salt marsh is a highly “productive” plant community consisting of plants that are tolerant of saline soils and regular tidal inundations. The diking and filling of marshlands for agriculture and development in the 19th and 20th centuries severely diminished the acreage of the San Francisco Bay salt marshes. Although only about 10% of the historic tidal marshes remain, substantial areas of valuable managed wetlands remain within the historic margins of the bay.

The salt marsh community is composed of relatively low-growing plants, ranging in height from a few inches to about 3 feet. Plant composition changes with small differences in elevation along the edges of these marshes that affect the frequency and duration of tidal flooding. This community corresponds to Holland’s northern coastal salt marsh (Holland 1986).

Typically, bare mudflats are bordered by pure stands of the native cordgrass (*Spartina foliosa*), which, at the mean high-water level, become replaced by a dense cover of pickleweed (*Salicornia virginica*), the dominant species in salt marshes of San Francisco Bay. In the last 20 years, several invasive nonnative cordgrasses (*Spartina alterniflora*, *S. anglica*, *S. densiflora*, and *S. patens*) have become established in San Francisco Bay. At present, the area’s most significant infestation occurs in southern and central San Francisco Bay. In Solano County, known infestations are limited to *S. patens* in Southampton Marsh and *S. densiflora* in one location in the Napa Marshes. The nonnative cordgrasses readily hybridize with the native cordgrass and are threatening the natural ecology of San Francisco Bay.

Characteristic salt-tolerant plants of the upper pickleweed zone include alkali heath (*Frankenia salina*), marsh rosemary (*Limonium californicum*), jaumea (*Jaumea carnosa*), sand-spurreys (*Spergularia* spp.), and saltgrass

(*Distichlis spicata*). Marsh gumplant (*Grindelia stricta* var. *angustifolia*) is common on isolated mounds, on slightly elevated berms, along channels within the salt marsh, or along natural levees of tidal sloughs that are infrequently inundated.

Coastal salt marsh vegetation with typical zonation patterns and species composition described above is present in Solano County in variously sized areas along San Pablo Bay and Suisun Bay. Coastal salt marsh communities also occur in tidal and nontidal or diked variants. Although they share the dominant plant species and many other similar vegetational characteristics, the altered hydrological conditions in the diked, nontidal communities often do not support many of the uncommon plant and animal species found in the more natural tidal marshes.

Coastal Valley and Freshwater Marsh

Typical freshwater marsh develops in shallow standing or slow-moving water at the edge of ponds and streams, and at other sites that lack currents and are permanently flooded by freshwater. This community corresponds to Holland's coastal and valley freshwater marsh (Holland 1986).

This plant community is typically dominated by up to 12-foot-tall, perennial, emergent plants. Characteristic species include cattails (*Typha angustifolia*, *T. domingensis*, *T. latifolia*) and bulrushes (*Scirpus acutus*, *S. americanus*, *S. californicus*). Other smaller hydrophytic species are also present, including sedges (*Carex* spp.), flat-sedges (*Cyperus* spp.), bur-reed (*Sparganium eurycarpum*), and penny-wort (*Hydrocotyle verticillata*).

In Solano County, the freshwater marsh plant community is present in the upper reaches of Suisun Marsh, in portions of the Delta where saltwater intrusion is absent or at least minimal, and in association with numerous slow-moving freshwater streams and ponds.

Coastal Brackish Marsh

Brackish marsh vegetation develops in shallow standing or slow-moving waters in coastal bays, estuaries, and coastal lagoons, where freshwater meets salt water. Salinity may vary daily and seasonally depending on tide and level of freshwater input. Brackish marsh usually intergrades with salt marsh toward the saline water body and with freshwater marsh at the mouths of rivers, especially in the Delta. This community corresponds to Holland's coastal brackish marsh (Holland 1986).

Brackish marsh generally has species in common with both coastal salt marsh and freshwater marsh and is typically dominated by perennial, emergent, herbaceous plants up to 6 feet in height. The most common species are cattails (*Typha* spp.) and species of bulrush (*Scirpus* spp.), especially alkali rush (*Scirpus robustus*). Depending on the salinity, species of sedge (*Carex* spp.), rush (*Juncus* spp.), and pickleweed may be present.

Brackish marsh is extensively developed around Suisun Bay in Solano County, including Suisun Marsh, and at the mouth of the Delta. Much of the brackish marsh communities within the county occur in diked environments that are managed for waterfowl habitat values (nesting, feeding, resting, hunting). As with the northern salt marsh communities, the altered hydrological conditions in the diked, nontidal brackish communities often do not support many of the uncommon plant and animal species found in the more natural tidal marshes; however, such marshes can be highly important to other special-status wildlife species.

Riparian Habitats

Riparian vegetation occurs along water bodies such as intermittent and perennial streams, lakes, ponds, and floodplains that are the interface between terrestrial and aquatic ecosystems. Riparian areas, known for their high diversity of species and productivity, are distinctly different from surrounding lands because of soil and vegetation characteristics that are strongly influenced by the presence of water. Riparian vegetation also occurs in areas, such as seeps and springs, where the water table is sufficiently high to provide water to the roots of plants year round.

Riparian habitats are very important biologically because they support a great diversity of plant and animal species. They provide wildlife with important food, cover, and breeding sites in close proximity to water. Many animal species, especially migratory and resident birds and many amphibians, are restricted to riparian habitats.

Agricultural, residential, and industrial water use, as well as land development, has reduced the extent of riparian habitats substantially in California. Its biological importance and the dependence of many declining animal species on riparian habitats have made it a focus of many conservation efforts. Two types of natural riparian habitat occur in Solano County, riparian woodland and riparian scrub. Human-made levees also sometimes support riparian habitat.

Riparian Woodland

The dominant trees in riparian woodland are most commonly winter-deciduous, broadleaved trees, up to 60 feet in height, with a canopy cover ranging from relatively open to very dense. “True” riparian species (i.e., species that are dependent on available water year round) are found along major rivers and streams and other freshwater features. Cottonwoods (*Populus* spp.) and willows (*Salix* spp.), mixed with bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), box elder (*Acer negundo*), and California sycamore (*Platanus racemosa*), are the most commonly occurring “true” riparian trees in central California. Valley oak (*Quercus lobata*) is common in riparian areas in the Central Valley, as are various species of walnut (*Juglans californica* ssp. *hindsii*, *J. nigra*, *J. regia*). Other trees, including coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*), are components of riparian vegetation in woodland/forest areas but also grow in less moist environments. Riparian woodland commonly has a shrubby understory (see “Scrub” below). Equivalent communities as described by Holland might include Great Valley cottonwood riparian forest, Great Valley mixed riparian forest, Great Valley oak riparian forest, white alder riparian forest, and Central Coast live oak riparian forest (Holland 1986).

Riparian areas in Solano County have been severely degraded as a result of residential, commercial, and agricultural development. Although the structure (i.e., the vertical stratification of the riparian vegetation) has been maintained along some of the major streams in the county, the width of the “corridors” has been greatly reduced as a result of human activities. Riparian corridors are now commonly only as wide as the diameter of one tree’s canopy. In addition, sections of most major streams have been channelized and the natural riparian vegetation has been removed.

Well-developed riparian plant communities now occur primarily along the banks of small portions of the major creeks such as Putah Creek, Alamo Creek, Ulatis Creek, Dan Wilson Creek, Green Valley Creek, Ledgewood Creek, and Suisun Creek. In those remaining well-developed riparian areas, the tree canopy is dominated by Fremont’s cottonwood (*Populus fremontii*) and willows, including red willow (*Salix laevigata*), Pacific willow (*S. lucida* ssp. *lasiandra*), arroyo willow (*S. lasiolepis*), and sandbar willow (*S. exigua*). Scattered stands of willows and riparian shrubs (see below) are present along minor streams and drainages.

Riparian Scrub

An open to impenetrable scrub is almost always a component of riparian vegetation. Shrub species vary depending on the geographical location; broad-leaved, deciduous riparian thickets are usually dominated by any of several species of willow (*Salix* spp.), especially arroyo willow, forming dense thickets within the riparian corridor. Other shrubby species that may occur are blue elderberry (*Sambucus mexicana*), California blackberry (*Rubus ursinus*), Himalayan blackberry (*R. discolor*), California rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*), and California grape (*Vitis californica*). The herbaceous layer, if present, is a mix of grasses and forbs, commonly including Italian ryegrass and mugwort (*Artemisia douglasiana*). This community corresponds to Holland’s Central Coast riparian scrub (Holland 1986).

Levees

Water use and the draining of marshland for agricultural purposes in the county over the last century or more have resulted in the creation of many levees for water transport. Although these levees contain the water flow that is required to support riparian vegetation, they are typically cleared of vegetation for maintenance purposes. As a result, there are few trees or shrubs and the vegetation consists primarily of nonnative grasses and forbs associated with upland situations, with a few water-tolerant species in the more saturated zones. This vegetation is typically maintained through mowing and spraying to maintain the integrity of the levees

Presently, stands of mostly willows (commonly *Salix lasiolepis* and *S. gooddingii*) occur in scattered areas on and near the water's edge of some levees. Depending on the geographical location of the levee and the salt concentrations of the water body, herbaceous species adapted to freshwater or saline waters are present.

Oak Woodland/Oak Savanna

Oak woodland and oak savanna are dominated by oaks (*Quercus* spp.); however, the density of trees and structure of these plant communities vary within their distributional range depending on the dominant species of oak and several environmental parameters, such as soils, availability of water, aspect, and elevation. Oak woodland and oak savanna commonly intergrade, going from more dense (woodlands) to more open (savanna). These plant communities include broadleaved upland forest and cismontane woodland, as designated by the California Native Plant Society (CNPS) (2005). Similar Holland communities include Oregon oak woodland, Valley oak woodland, blue oak woodland, and coast live oak woodland (Holland 1986).

Oak woodlands, while not as diverse floristically, support an unusual diversity of animal species. This is a result of the many resources that oaks in particular provide, including nesting sites and abundant food such as large acorn crops. Many oak woodlands have been lost as a result of intensive agriculture and urban development. In addition, even in areas where oak woodlands persist, they have been significantly altered. This is evident in the predominant ground cover that consists primarily of nonnative annual grasslands that dominate grazed landscapes. Regeneration of oak woodlands has been reduced by disturbance from grazing by livestock and wildlife and increased seedling mortality from competition with nonnative grasses.

Oak Woodland

The absolute tree canopy cover in oak woodland communities ranges from 30% to 100%, depending on the aspect of the woodland; on moist, north- to east-facing slopes the cover is greater than on dryer, south- to west-facing areas. Species composition will also vary according to aspect and water availability. Coast live oak (*Quercus agrifolia*), a broad-crowned, evergreen tree up to 75 feet tall, and blue oak (*Q. douglasii*), a deciduous oak up to 60 feet tall, are commonly dominant trees in oak woodlands of Solano County. Other broad-leaved evergreen or deciduous trees, including interior live oak (*Q. wislizenii*), black oak (*Q. kelloggii*), California bay (*Umbellularia californica*), California buckeye (*Aesculus californica*), and walnut (*Juglans* spp.), are common associates in or at the edges of the woodlands.

Where the canopy cover is less dense and sunlight reaches the forest floor, diverse flora of mostly native shrubs and herbaceous species may be present. Shrubs in the understory may include current/gooseberry (*Ribes* spp.), woodland rose (*Rosa gymnocarpa*), poison oak (*Toxicodendron diversilobum*), and California hazelnut (*Cornus cornuta* var. *californica*). Grasses, forbs, and ferns that are present may include a variety of native species, including California fescue (*Festuca californica*), blue wildrye (*Elymus glaucus*), hound's-tongue (*Cynoglossum grande*), Dutchman's pipe (*Aristolochia californica*), Pacific pea (*Lathyrus vestitus*), California polypody (*Polypodium californicum*), goldback fern (*Pentagramma triangularis*), and woodfern (*Dryopteris arguta*).

Oak woodland is one of the dominant plant communities in the Vaca Mountains, at the eastern edge of the north Coast Range.

Oak Savanna

The canopy cover in oak savanna typically ranges from 10% to 30%. Dominant oak species in this plant community in Solano County are valley oak (*Quercus lobata*), growing on deep, alluvial soils on the Central Valley floor, and blue oak (*Q. douglasii*) and Oregon oak (*Q. garryana*), occurring in shallower soils and in other more xeric areas at higher elevations. Blue oak savanna commonly grades into blue oak woodland. In areas grazed by livestock, the shrubby understory in oak savanna is poorly developed, if present at all. In such areas, the herbaceous understory consists of mostly nonnative grasses and forbs; however, native wildflowers and grasses may be abundant in less disturbed areas.

Oak savanna occurs on the eastern, lower slopes of the Vaca Mountains, where it generally grades into oak woodland at higher elevations.

Mixed Chaparral/Scrub

Chaparral/scrub communities are characterized by often dense growth of low-growing scrub and brush species. Two basic scrub communities are present in the county: northern mixed chaparral and northern coastal scrub.

Northern Mixed Chaparral

Mixed chaparral is generally a structurally homogenous plant community dominated by dense, fire-adapted shrubs with hard leaves and a waxy coating. Shrub height and canopy cover each vary with factors such as age since the last burn, precipitation regime, species composition, slope aspect, and soil type. Mixed chaparral typically grows as a dense, nearly impenetrable thicket up to 4 meters in height with greater than 80% canopy cover. On sites with poor soil, including serpentine soils, the canopy cover may be less and the shrubs may be shorter. This community corresponds to Holland's northern mixed chaparral (Holland 1986).

In Solano County, chaparral is the dominant community at higher elevations in the Vaca Mountains, along the Napa County border. Species present include scrub oak (*Quercus berberidifolia*), manzanita (*Arctostaphylos* spp.), chaparral pea (*Pickeringia montana*), and chamise (*Adenostoma fasciculatum*). Herbaceous species may include needlegrass (*Nassella lepida*), California cudweed (*Gnaphalium californicum*), vinegar weed (*Trichostema lanceolatum*), woolly sunflower (*Eriophyllum lanatum*), and goldwire (*Hypericum concinnum*).

Northern Coastal Scrub

Northern coastal scrub, in contrast to chaparral, grows in sites that are slightly moister and is dominated by soft-leaved shrubs. Species composition will depend on the geographic location, soil, and climate, but typically one or a few shrub species dominate, and there may be herbaceous plants and grasses in the understory. Scrub habitat is common in ecotones between woodland and grassland, and the herbaceous species present will be those that are in the adjacent grassland.

Scrub communities in Solano County are often dominated by coyote bush (*Baccharis pilularis*) in relatively moist sites, and California sagebrush (*Artemisia californica*) and sticky monkey flower (*Mimulus aurantiacus*) in dry sites.

Agricultural Lands

Approximately 57% of Solano County lands are in some form of agricultural cultivation. Even when taken out of active production, agricultural land supports very few native plants; the majority of the noncultivated species are ruderal (weedy) nonnative grass and forb species. The value of agricultural lands to wildlife depends on the vegetation characteristics, cultivation practices, and flooding regimes of particular areas.

Croplands

Croplands are typically established in flat terrain on fertile soils and are greatly manipulated in terms of soil tillage, irrigation, crop rotation, and fertilization. Cropland vegetation is usually grown in a monoculture, using tillage or herbicides to eliminate unwanted vegetation. Cultivated species in such fields exhibit a variety of sizes and growing patterns that provide various heights and canopy covers. Agricultural fields are more or less continuous in the east-northeastern portion of Solano County, including the diked areas of the Delta.

Within Solano County, agricultural lands provide important habitat for numerous raptors, including the burrowing owl and Swainson's hawk.

Cultivated Grassland/Dryland Farming

A less intensive form of agriculture is carried out in the Montezuma Hills and in a few other areas in Solano County where irrigation water is not readily available and/or topography is not suitable for irrigation. In dryland farming areas, periodic fall tillage and seeding is employed to plant and grow various crops, including oats (*Avena* sp.), barley (*Hordeum* sp.), and wheat (*Triticum* sp.). In such areas, tillage may not occur every year. Few native herbaceous species remain in the cultivated grassland.

Cultivated grassland and dry-farmed areas are largely similar to the nonnative annual grasslands described above and provide very similar wildlife habitat. Therefore, the conservation measures associated with covered activities for these dryland agricultural areas are incorporated into the applicable upland or valley floor grassland community conservation strategy.

Developed Areas

Urban areas are located throughout Solano County, with the greatest concentration occurring along the axis of Interstate 80, the main transportation artery that runs northeast to southwest. Urban vegetation consists mostly of nonnative landscape plants; few native species, except some trees and shrubs, typically remain in an urban setting. Most of the vegetation in urban settings is maintained as a monoculture, such as in tree groves, street strips, and lawns. Urban vegetation consisting of large stands and/or dense stands of trees and shrubs can provide habitat for "urban adapted" wildlife and, in some cases, habitat for migrating species. Vacant lots and disturbed lands supporting ruderal vegetation were also included within this category as Urban-Vacant lands.

FISH AND WILDLIFE

Solano County's geography, with the Central Valley to the east, a large bay and estuary system to the south and west, and the Coast Range to the west and north, has resulted in a great diversity of habitat for wildlife. The valley floor grassland region of the county harbors a diversity of wildlife species. Songbird species found in the grasslands include western kingbird (*Tyrannis verticalis*), western meadowlark (*Sturnella neglecta*), cliff and barn swallows (*Hirundo pyrrhonata*, *H. rustica*), horned lark (*Eremophila alpestris*), red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), and northern mockingbird (*Mimus polyglottos*). Other common wildlife species associated with this natural community include Pacific treefrog (*Pseudacris regilla*), gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), western fence lizard (*Sceloporus occidentalis*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), California ground squirrel (*Spermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*).

The inner Coast Range natural community consists of a mosaic of plant communities that provide important habitat for several wildlife species. Oak woodlands in particular provide important resources to wildlife. Approximately 331 species depend on oak woodlands to varying degrees throughout their life cycle (Verner 1980, Barrett 1980, Block and Morrison 1998). Native amphibians and reptiles that potentially occur within this region

include arboreal salamander (*Aneides lugubris*), California slender salamander (*Batrachoseps attenuatus*), Pacific tree frog (*Hyla regilla*), western toad (*Bufo boreas*), southern alligator lizard (*Elgaria multicarinata*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), and common kingsnake (*Lampropeltis getulus*).

The riparian, stream, and freshwater marsh community supports tremendous biological diversity. Riparian habitat provides a diversity of wildlife with valuable nesting, cover, foraging, and movement habitat all within close proximity to water (RHJV 2000). Overall, riparian vegetation provides important habitat for more than 225 species of fish, amphibians, reptiles, birds, and mammals in California (RHJV 2000). The stream environment has many habitat types that appeal to a variety of fish species such as deep pools for resting, shallow riffles for foraging, and lagoon and estuary areas for nursery habitat. Steelhead, a species federally listed as threatened, use shallow riffle habitat for spawning and deep pools with well-developed cover for rearing (Leidy 2000). Chinook salmon tend to spawn in the main streams of rivers (or larger tributaries) in areas of gravel and cobble substrate. Other common native freshwater fish species in Solano County include hardhead (*Mylopharodon cenocephalus*), Sacramento blackfish (*Orthodon microlepidotus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), California roach (*Lavinia symmetricus*), three spine stickleback (*Gasterosteus aculeatus*), and riffle sculpin (*Cottus gulosus*).

Riparian, stream, and freshwater marsh systems are closely linked to the surrounding uplands, making up the watershed areas of this natural community. As such, there are important links between aquatic and upland communities. The development and alteration of a surrounding watershed can significantly alter the function and value of streams and wetlands that are vital for the survival of several upland species. For example, riparian zones have been identified as the most important habitats for land-bird species in California (RHJV 2000). The structural complexity and species diversity of riparian corridors provides habitat required for nesting, sheltering, and foraging. Insect production is high within the riparian corridor, providing a rich food source for insectivores such as vireos, warblers, swallows, wrens, and flycatchers. Riparian forest trees such as box elder, big-leaf maple, and birch are highly productive, producing food resources for seed feeders such as grosbeak, finches, and sparrows. Migrating species such as the warbling vireo, a neotropical species that travels from Central America to nesting areas along California's Central Coast, use riparian corridors to rest and feed during their annual migration. Riparian habitats are considered to be particularly valuable for neotropical migratory songbirds, which have declined in recent decades. The combination of cover, water, and food resources makes riparian habitat desirable for several species of mammals. In fact, approximately 25% of mammals in California are limited to or largely dependent on riparian and other wetland communities (Williams and Kilburn 1984). These include species that use multiple habitat types such as ringtails, common muskrats, raccoons, mule deer, coyotes, and bobcats. Bats have been observed to hyperaggregate over riparian areas, following the resource flux produced from emerging aquatic insects.

Amphibians, particularly California red-legged frogs and foothill yellow-legged frogs, primarily associated with the riparian, stream, and freshwater marsh natural community are also dependent on and use the watershed land, particularly within the inner Coast Range. Adult red-legged frogs are highly aquatic, but if water is no longer available during the summer, they have been observed using boulders, rocks, downed trees, logs, moist leaf litter, or small-mammal burrows in the upland areas as refuge (USFWS 2002). The inner Coast Range also provides critical dispersal habitat for these frogs. Populations of California red-legged frog persist and flourish where suitable breeding and foraging habitats (riparian, stream, and freshwater marsh habitat) are interspersed throughout the landscape and are interconnected by contiguous dispersal habitat (inner Coast Range habitat).

Coastal marsh habitat, particularly Suisun Marsh, is home to impressive fauna—221 bird species, 45 mammal species, 16 species of reptiles and amphibians, and more than 50 species of fish. Twelve of these animals are listed as threatened or endangered under either the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA)—one mammal, six birds, four fish, and one amphibian. During the fall and winter, the marsh habitat in Solano County provides a temporary home for a significant portion of the migratory waterfowl wintering in California (Brown 2004).

Suisun Marsh has a very diverse fish assemblage (Matern, Moyle, and Pierce 2002). The brackish, mid-estuary nature of Suisun Marsh results in two major pools from which Suisun Marsh fishes may be drawn: the marine/estuarine species pool and the freshwater species pool. The resulting marsh species pool contains 54 species, 25 of which are nonnative. There are 28 fish species commonly found in marsh channels, of which 14 are alien. The 16 most abundant species accounted for more than 99% of the catch, with nine of these species being native. Among the species found in marsh channels are three native species that are listed as endangered or threatened: winter-run chinook (federally listed and state-listed as endangered), spring-run chinook (federally listed and state-listed as threatened), Central Valley steelhead (federally listed as threatened) and Delta smelt (federally listed and state-listed as threatened). Another native fish, the Sacramento splittail, was a federally listed threatened species until early in 2004, when the U.S. Fish and Wildlife Service (USFWS) delisted the species. Protecting these native fish has dramatically influenced Suisun Marsh management, from operation of the salinity control gates to moving water onto the duck clubs for waterfowl management and leaching salts from the soil profile.

SPECIAL-STATUS PLANT AND WILDLIFE SPECIES

Special-status plant and wildlife species are those listed under the ESA and CESA, plants listed by CNPS's *Inventory of Rare and Endangered Vascular Plants of California*, and wildlife designated as species of special concern by the California Department of Fish and Game (DFG). The special-status species addressed in this report are based on a review of records in Solano County in the California Natural Diversity Database (CNDDB) and CNPS online inventory.

Special-Status Plant Species

A total of 41 special-status plant species are known to occur or have historically occurred in Solano County. Table 4.6-1 lists these species alphabetically by scientific name and identifies their current status and their associated habitat types.

Species	Status ¹			Habitat
	USFWS	DFG	CNPS	
Suisun Marsh aster <i>Aster lentus</i>	–	–	1B	Grows in brackish or freshwater marshes and along the banks of sloughs and watercourses, often occurring with common reed (<i>Phragmites</i> sp.), cattails (<i>Typha</i> spp.), bulrushes (<i>Scirpus</i> spp.), and blackberry (<i>Rubus</i> sp.).
Ferris's milk-vetch <i>Astragalus tener</i> var. <i>ferrisiae</i>	–	–	1B	Vernally mesic meadows and mildly alkaline flats in valley and foothill grassland, usually on dry, heavy clay or adobe soil. Flowers April through May.
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	–	–	1B	Grows in alkaline/saline soils in vernal wet playas, flats, and valley and foothill grassland. Flowers March through June.
Heartscale <i>Atriplex cordulata</i>	–	–	1B	Grows in sandy saline or alkaline flats or scalds, in chenopod scrub, meadows, and valley and foothill grassland. Blooms April through October, depending on local environmental conditions.
Brittlescale <i>Atriplex depressa</i>	–	–	1B	Grows in relatively barren areas with alkaline clay soils within chenopod scrub, meadows, playas, vernal pools, and valley and foothill grassland. Occasionally, it is found in riparian marshes. Blooms May through October, depending on local environmental conditions.

**Table 4.6-1
Special-Status Plant Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹			Habitat
	USFWS	DFG	CNPS	
San Joaquin spearscale <i>Atriplex joaquiniana</i>	–	–	1B	Grows in seasonal alkali wetlands and alkali sinks in chenopod scrub, meadows, playas, and valley and foothill grassland, with Mediterranean barley (<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>), alkali mallow (<i>Malvella leprosa</i>), and other alkali-associated plants. Blooms April through October, depending environmental conditions.
Vernal pool smallscale <i>Atriplex persistens</i>	–	–	1B	Grows in alkaline grasslands as well as in large and small claypan and alkaline vernal pools. Blooms July through October.
Big-scale balsamroot <i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i>	–	–	1B	Grows in thin, rocky soil on hillsides, sometimes on serpentine, grasslands and woodlands; blooms March through June.
Big tarplant <i>Blepharizonia plumose</i>	–	–	1B	Grows in thin soils in grasslands; blooms July through October.
Mt. Diablo fairy-lantern <i>Calochortus pulchellus</i>	–	–	1B	Grows in openings in chaparral, coastal scrub, and associated grasslands; blooms April through June.
Holly-leaved ceanothus <i>Ceanothus purpureus</i>	–	–	1B	Grows on dry, chaparral-covered, rocky, volcanic slopes. Flowers in early to late spring.
Congdon's tarplant <i>Centromadia parryi</i> ssp. <i>congdonii</i>	–	–	1B	Occurs in alkaline, often heavy clay soils in mesic areas within grassland communities with ruderal and native alkali-tolerant plants. Some disturbance appears to be necessary for its persistence. Blooms June through November; under the right conditions, may flower continuously over that period.
Pappose tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	–	–	1B	Occurs most frequently in mesic areas in coastal prairie, meadow, and grassland habitats, often on alkaline substrates. Some disturbance appears to be necessary for its persistence.
Suisun thistle <i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>	E	–	1B	Grows in the upper reaches of tidal marshes, most often near small watercourses such as sloughs or ditches dug for mosquito abatement. Blooms July through September.
Hispid bird's-beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	–	–	1B	Grows in saline or alkaline soils in vernal pools, meadows, sinks, inland playas, and valley and foothill grassland. Blooms June through September.
Soft bird's-beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	E	R	1B	Grows in coastal salt marshes, commonly in the marsh/upland transition zone with pickleweed (<i>Salicornia virginica</i>), jaumea (<i>Jaumea carnosa</i>), alkali heath (<i>Frankenia salina</i>), gumplant (<i>Grindelia stricta</i>), and saltgrass (<i>Distichlis spicata</i>). Habitats include seasonally flooded areas in hypersaline or euryhaline environments. Blooms July through November, depending on environmental conditions.
Recurved larkspur <i>Delphinium recurvatum</i>	–	–	1B	Grows in alkaline areas, in chenopod scrub, cismontane woodland, and valley and foothill grassland. It often grows in vernal moist or inundated areas. Blooms March through May.
Dwarf downingia <i>Downingia pusilla</i>	–	–	2	Grows in vernal pools, playa pools, and on margins of vernal lakes and other mesic areas within valley and foothill grassland, both in alkaline (saline) and nonalkaline soils. Flowers March through May.

**Table 4.6-1
Special-Status Plant Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹			Habitat
	USFWS	DFG	CNPS	
Mt. Diablo buckwheat <i>Eriogonum truncatum</i>	–	–	1A	Occurs in sandy soils of grassland, scrub and chaparral habitats on hillsides; blooms April through September.
Fragrant fritillary <i>Fritillaria liliacea</i>	–	–	1B	Grows in heavy clay soils (often with a serpentine influence) in cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland. This fritillary is one of the earliest spring flowers, blooming between February and April.
Adobe-lily <i>Fritillaria pluriflora</i>	–	–	1B	Grows in chaparral, cismontane, woodlands and foothill grasslands, usually on clay soils and sometimes on serpentine. Blooms February through April.
Boggs Lake hedge-hyssop <i>Gratiola heterosepala</i>	–	E	1B	Grows on clay substrates in vernal pools, small playa-type pools, marshy areas, on the margins of reservoirs and lakes, and in human-made habitats such as borrow pits and cattle ponds. Blooms April through August.
Brewer's western flax <i>Hesperolinon breweri</i>	–	–	1B	Grows mostly on rocky, serpentine soils in chaparral, cismontane woodland, and valley and foothill grassland. Blooms May through July.
Rose-mallow <i>Hibiscus lasiocarpus</i>	–	–	2	Grows on the margins of freshwater marshes, wet riverbanks, and on low, peat islands in sloughs. Blooms June through September.
Carquinez goldenbush <i>Isocoma arguta</i>	–	–	1B	Grows in alkaline soils on flats and low hills in valley and foothill grassland. It often occurs on low benches near drainages and on mounds in swale areas. Blooms August through December.
Northern California black walnut <i>Juglans hindsii</i>	–	–	1B	Grows in rocky and gravelly well-drained soils by the coast, along rivers and streams, occasionally up to the slopes of the Napa range and the riparian areas of foothill woodlands.
Contra Costa goldfields <i>Lasthenia conjugens</i>	E	–	1B	Grows in vernal pools, swales, and other depressions in open grassland and woodland communities, often in alkaline soils. Blooms from March through June, depending on environmental conditions.
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	–	–	1B	Grows in tidally influenced freshwater and brackish marshes, commonly on slough edges and levees. Blooms May through September.
Legenere <i>Legenere limosa</i>	–	–	1B	Grows in the bottoms of vernal pools and other wet depressions in grassland communities. Blooms April through June.
Heckard's pepper-grass <i>Lepidium latipes</i> var. <i>heckardii</i>	–	–	1B	Grows on alkaline flats and in alkaline grasslands along the edges of vernal pools. Flowers March through May.
Mason's lilaepsis <i>Lilaeopsis masonii</i>	–	R	1B	Grows in regularly flooded tidal zones; on mudbanks and flats along erosional creek banks, sloughs, and rivers; and in freshwater marshes, brackish marshes, and riparian scrubs that are influenced by saline water. Blooms April through November.
Delta mudwort <i>Limosella subulata</i>	–	–	2	Grows on intertidal flats and muddy banks of watercourses in estuarine areas, surrounded by brackish or freshwater marsh and riparian scrub communities. Blooms May through August.

**Table 4.6-1
Special-Status Plant Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹			Habitat
	USFWS	DFG	CNPS	
Baker's navarretia <i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	–	–	1B	Grows in vernal pools and other wet depressions in cismontane woodland, lower montane coniferous forest, meadows, and valley and foothill grassland, in adobe or alkaline soils. Blooms May through July.
Colusa grass <i>Neostapfia colusana</i>	T	E	1B	Grows in large or deep vernal pools, in lakes and shallow playas, in saline/alkaline adobe clay soils. Blooms May through August, depending on environmental conditions.
San Joaquin Valley orcutt grass <i>Orcuttia inaequalis</i>	T	E	1B	Grows in vernal pools or larger playa pools in clayey or sandy, generally alkaline soils. Blooms May through August, depending on environmental conditions.
Bearded popcorn-flower <i>Plagiobothrys hystriculus</i>	–	–	1A	Habitat is not well understood. Probably grows in vernal pools or wet sites in grasslands. Flowers in April and May.
Rayless ragwort <i>Senecio aphanactis</i>	–	–	2	Grows on drying alkaline flats in chaparral, cismontane woodland, and coastal scrub communities. Blooms January through April.
Showy indian clover <i>Trifolium amoenum</i>	E	–	1B	Found in a variety of habitats including low, wet swales, grasslands, and grassy hillsides. It has been observed growing on serpentine soils. Blooms from April to June.
Saline clover <i>Trifolium depauperatum</i> var. <i>hydrophilum</i>	–	–	1B	Grows in salt marshes and in alkaline soils in moist valley and foothill grasslands and vernal pools. Flowers April through June.
Crampton's tuctoria or Solano grass <i>Tuctoria mucronata</i>	E	E	1B	Found in drying, alkaline/saline clay bottoms of vernal pools, lakes, and shallow playa pools. It is associated with other vernal pool and wetland plants, including the endangered Colusa grass (<i>Neostapfia colusana</i>). Olcott Lake, where the original populations was found, is a large saline-alkaline playa pool within annual grassland. Solano grass blooms April through July.

Notes: CNPS = California Native Plant Society; DFG = California Department of Fish and Game; USFWS = U.S. Fish and Wildlife Service

¹ **Legal Status Definitions**

Federal Listing Categories

- E Endangered
- T Threatened (legally protected)
- FSC Federal Species of Concern (no formal protection)

State Listing Categories

- E Endangered
- T Threatened (legally protected)
- CSC California Species of Concern (no formal protection)
- R Rare

CNPS Categories

- 1A Plant species presumed extinct in California.
- 1B Plant species considered rare or endangered in California and elsewhere (but not legally protected under the federal Endangered Species Act or California Endangered Species Act)
- 2 Plant species considered rare or endangered in California but more common elsewhere (but not legally protected under the federal Endangered Species Act or California Endangered Species Act)

Sources: CNDDDB 2000–2004, 2005; CNPS 2005

Special-Status Wildlife Species

The vast diversity of vegetation types in Solano County provide habitat for a number of special-status animal species, as shown in Table 4.6-2.

Table 4.6-2 Special-Status Wildlife Species Known to Occur or Potentially Occurring in Solano County			
Species	Status ¹		Habitat
	USFWS	DFG	
Invertebrates			
Conservancy fairy shrimp <i>Branchinecta conservatio</i>	E	–	Occurs in ephemeral or temporary pools of somewhat turbid freshwater (vernal pools) that form in the cool, wet months of the year.
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	T	–	Inhabits pools with clear to tea-colored water, most commonly in grass or mud-bottomed swales, or basalt flow depression pools in unplowed grasslands, but sometimes in sandstone rock outcrops and alkaline vernal pools.
Midvalley fairy shrimp <i>Branchinecta mesovallensis</i>	FSC	–	Inhabits small, shallow, ephemeral, grass-bottomed vernal pools and swales at elevations between approximately 20 meters and 90 meters.
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T	–	Closely associated with blue elderberry (<i>Sambucus mexicana</i> or <i>S. velutina</i>), which is an obligate host for beetle larvae. Adult valley elderberry longhorn beetles are usually found upon or flying between elderberry plants.
Delta green ground beetle <i>Elaphrus viridis</i>	T	–	Appears to prefer grassland habitat that is interspersed with vernal pools or playa pools, which are larger vernal pools that typically hold water for long time periods.
Ricksecker's water scavenger beetle <i>Hydrochara rickseckeri</i>	FSC	–	Lives in weedy shallow, open water-associated freshwater seeps, springs, farm ponds, vernal pools, and slow-moving stream habitats.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	E	–	Inhabits seasonal vernal pools or swales that form in slight depressions after being inundated following fall and winter rains. The pools contain clear to highly turbid water and have an impervious hardpan, claypan, or basalt layer beneath the soil surface that retains the water for a few months at a time.
Fish			
Chinook salmon—winter-run <i>Oncorhynchus tshawytscha</i>	E	–	Tends to spawn in the main stems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Primary concerns are for passage/movement and water quality.
Chinook salmon—Central Valley fall/late fall-run ESU <i>Oncorhynchus tshawytscha</i>	Candidate	–	Tends to spawn in the main stems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Some potential breeding habitat. Concerns for water quality, passage, and riparian habitat protection.
Chinook salmon—spring-run <i>Oncorhynchus tshawytscha</i>	T	–	Tends to spawn in the main stems of rivers (or larger tributaries) in areas of gravel and cobble substrate. Primary concerns are for passage/movement and water quality

**Table 4.6-2
Special-Status Wildlife Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹		Habitat
	USFWS	DFG	
Steelhead—Central California Coast ESU <i>Oncorhynchus mykiss</i>	T	–	Inhabits riparian, emergent, palustrine habitat. Spawning and rearing habitat is usually characterized by perennial streams with clear, cool to cold, fast-flowing water with a high dissolved-oxygen content and abundant gravels and riffles. Breeding habitat present in county; many streams in county may qualify as critical habitat; concerns for water quality, passage, and riparian habitat protection.
Steelhead—Central Valley ESU <i>Oncorhynchus mykiss</i>	T	–	Breeding habitat present; many streams in county may qualify as critical habitat; concerns for water quality, passage, and riparian habitat protection.
Delta smelt <i>Hypomesus transpacificus</i>	T	T	Delta smelt are a euryhaline species (species adapted to living in freshwater and brackish water) that occupies estuarine areas with salinities below 2 grams per liter (2 parts per thousand). It spawns in shallow freshwater or slightly brackish water upstream of the mixing zone, mostly in tidally influenced backwater sloughs and channel-edge waters where solid substrate (cattails, tules, tree roots, and submerged branches) are present for the attachment of eggs.
Sacramento splittail <i>Pogonichtys macrolepidotus</i>	T	–	Seems to prefer shallow-water habitat with low salinity (0–10 parts per thousand) and spawns on submerged vegetation in temporarily flooded upland and riparian habitats.
Amphibians			
California tiger salamander <i>Ambystoma californiense</i>	T	–	Vernal pools and permanent waters in grasslands.
California red-legged frog <i>Rana aurora draytonii</i>	T	–	Utilizes a variety of aquatic, riparian, and upland habitats, including ephemeral ponds, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, perennial creeks, human-made aquatic features, marshes, dune ponds, lagoons, riparian corridors, blackberry thickets, nonnative annual grasslands, and oak savannas.
Foothill yellow-legged frog <i>Rana boylei</i>	–	CSC	Perennial creeks and streams usually with cobble bottoms.
Reptiles			
Western pond turtle <i>Emys (=Clemmys) marmorata</i>	FSC	CSC	Uses permanent or nearly permanent water bodies in a variety of habitat types. Can be found in ponds, marshes, rivers, streams, and irrigation ditches within grasslands, woodlands, and open forests.
Giant garter snake <i>Thamnophis gigas</i>	T	T	Found in aquatic, riparian, and upland habitats, including marshes, sloughs, small lakes, low-gradient streams, ponds, agricultural wetlands (irrigation and drainage canals, rice fields), and adjacent uplands.
Birds			
Cooper's hawk <i>Accipiter cooperii</i>	–	CSC	Primarily breeds in dense riparian and oak woodlands. Dense canopy cover is a consistent characteristic of Cooper's hawk nest sites throughout its range, and understories are often relatively open.

**Table 4.6-2
Special-Status Wildlife Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹		Habitat
	USFWS	DFG	
Sharp-shinned hawk <i>Accipiter striatus</i>	–	CSC	Common migrant and winter visitor throughout California. Prefers to nest in stands of dense young conifers or in mixed conifer-deciduous forests.
Tricolored blackbird <i>Agelaius tricolor</i>	FSC	CSC	Nests in dense cattails and tules, riparian scrub, and other low dense vegetation; forages in grasslands and agricultural fields.
Golden eagle <i>Aquila chrysaetos</i>	–	CSC, FPS	Prefers open terrain for hunting, such as grasslands, deserts, savannas, and early successional stages of forest and shrub habitats. Nests in rugged, open habitats with canyons and escarpments, typically on cliffs and rock outcroppings; however, it will also nest in large trees including oaks, sycamores, redwoods, pines, and eucalyptus.
Short-eared owl <i>Asio flammeus</i>	FSC	CSC	Annual and perennial grasslands, prairies, meadows, dunes, irrigated lands, and saline and fresh emergent marshes. Requires dense vegetation for resting and roosting cover, such as tall grasses, brush, ditches, and wetland vegetation.
Burrowing owl <i>Athene cunicularia</i>	–	CSC	Nests in burrows in areas of low-growing vegetation in grasslands and agricultural fields.
Swainson's hawk <i>Buteo swainsoni</i>	–	T	Nests in riparian forest and scattered trees; forages in grasslands and agricultural fields.
Mountain plover <i>Charadrius montanus</i>	FPT	CSC	Shortgrass plains, plowed fields, arid plains, alkali sink scrub, valley sink scrub, alkali playa, burned and annual grasslands, and open sagebrush areas that are barren or have very sparse vegetation (less than 10% cover).
Northern harrier <i>Circus cyaneus</i>	–	CSC	Habitat types include brackish and freshwater marshes, alpine meadows, grasslands, prairies, and agricultural lands. Wintering habitat includes fresh and saltwater wetlands, coastal dunes, grasslands, deserts, meadows, and croplands. Breeding habitat includes freshwater wetlands, coastal brackish wetlands, open wet meadows and grasslands, shrub-steppe, desert sinks, areas along rivers and lakes, and crop fields.
White-tailed kite <i>Elanus leucurus</i>	–	FPS	Trees and shrubs in grasslands and savannas.
Saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	FSC	CSC	Freshwater marshes, coastal swales, swampy riparian thickets, brackish marshes, salt marshes, and the edges of disturbed weed fields and grasslands that border soggy habitats.
Yellow-breasted chat <i>Icteria virens</i>	–	CSC	Requires dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground, and the borders of small ponds.
Loggerhead shrike <i>Lanius ludovicianus</i>	–	CSC	Open country for foraging; dense shrubs for nesting.
California black rail <i>Laterallus jamaicensis coturniculus</i>	–	T	Prefers tidal salt marshes with a heavy canopy of pickleweed (<i>Salicornia</i>) and an open structure below the canopy for nesting and accessibility.

**Table 4.6-2
Special-Status Wildlife Species Known to Occur or Potentially Occurring in Solano County**

Species	Status ¹		Habitat
	USFWS	DFG	
Suisun song sparrow <i>Melospiza melodia maxillaries</i>	FSC	CSC	Intermixed stands of bulrush (<i>Scirpus</i> spp.), cattail (<i>Typha</i> spp.), and other emergent vegetation provide ideal habitat.
San Pablo song sparrow <i>Melospiza melodia samuelis</i>	–	CSC	Inhabits emergent wetlands.
Osprey <i>Pandion haliaetus</i>	–	CSC	Uses rivers, lakes, reservoirs, bays, estuaries, and surf zones for foraging and large trees, snags, and dead topped trees in open forest habitats for cover and nesting.
Brown pelican <i>Pelecanus occidentalis</i>	–	FPS	Found in estuarine, marine subtidal, and marine pelagic waters.
California clapper rail <i>Rallus longirostris obsoletus</i>	E	E	Inhabits tidal salt and brackish marshes. It prefers tall stands of pickleweed (<i>Salicornia virginica</i>) and Pacific cordgrass (<i>Spartina foliosa</i>) but is also associated with gumplant (<i>Grindelia</i> spp.), saltgrass (<i>Distichlis spicata</i>), alkali heath (<i>Frankenia grandifolia</i>), and jaumea (<i>Jaumea carnosa</i>) in high marshes and pickleweed, cordgrass, and bulrush (<i>Scirpus</i> spp.) in the North Bay.
Mammals			
Pallid bat <i>Antrozous pallidus</i>	FSC	CSC	Roosts in caves, tunnels, and buildings; forages over a variety of habitats.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	FSC	CSC	Roosts in caves, tunnels, and buildings; forages over a variety of habitats.
Western mastiff bat <i>Eumops perotis</i>	–	CSC	Roosts in crevices of large outcrops; forages over a wide variety of habitats.
Salt-marsh harvest mouse <i>Reithrodontomys raviventris</i>	E	E, FPS	Dependent on dense cover of native halophytes (salt-tolerant plants); prefers pickleweed-dominated (<i>Salicornia virginica</i>) saline emergent wetlands as its habitat.
Suisun shrew <i>Sorex ornatus sinuosus</i>	FSC	CSC	Inhabits tidal marshes characterized by (in order of decreasing tolerance to inundation) <i>Spartina foliosa</i> (cordgrass), <i>Salicornia ambigua</i> , <i>S. virginica</i> (pickleweed), and <i>Grindelia cuneifolia</i> and <i>humulis</i> (gumplant), and brackish marshes dominated by <i>Scirpus californicus</i> (California bulrush) and <i>Typha latifolia</i> (cattail).
American badger <i>Taxidea taxus</i>	–	CSC	Occurs in a diversity of habitats. The primary requirements seem to be sufficient food, friable soils, and relatively open, uncultivated ground in grassland and savanna habitats.

Notes: DFG = California Department of Fish and Game; ESU = Evolutionarily Significant Unit; USFWS = U.S. Fish and Wildlife Service

¹ **Legal Status Definitions**

Federal Listing Categories

- E Endangered
- T Threatened (legally protected)
- FSC Federal Species of Concern (no formal protection)

State Listing Categories

- E Endangered
- T Threatened (legally protected)
- CSC California Species of Concern (no formal protection)
- FPS State Fully Protected Species

Sources: CNDDDB 2000–2004, 2005; CNPS 2005

4.6.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

U.S. Army Corps of Engineers

Section 404 of the Clean Water Act

The U.S. Army Corps of Engineers (USACE) is responsible under Section 404 of the federal Clean Water Act (CWA) for regulating the discharge of dredged or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in Title 33, Section 328.3(a) of the Code of Federal Regulations (33 CFR 328.3[a]) and include streams that are tributaries to navigable waters and adjacent wetlands. The lateral limits of jurisdiction for a nontidal stream are measured at the line of the ordinary high-water mark (33 CFR 328.3[e]) or the limit of adjacent wetlands (33 CFR 328.3[b]). Any permanent extension of the limits of an existing water of the United States, whether natural or human-made, results in a similar extension of USACE jurisdiction (33 CFR 328.5).

Waters of the United States fall into two broad categories: wetlands and other waters. Other waters include water bodies and watercourses such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands include marshes, wet meadows, seep areas, floodplains, basins, and other areas experiencing extended seasonal soil saturation. Seasonally or intermittently inundated features, such as seasonal pools, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and are dominated by wetland plants. Seasonally inundated water bodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the United States.

Waters and wetlands that cannot trace a continuous hydrological connection to a navigable water of the United States are not tributary to waters of the United States. These are termed “isolated wetlands.” Isolated wetlands are jurisdictional when their destruction or degradation can affect interstate or foreign commerce (33 CFR 328.3[a]). USACE may or may not take jurisdiction over isolated wetlands, depending on circumstances.

In general, a USACE permit must be obtained before placing fill or grading in wetlands or other waters of the United States. USACE will be required to consult with USFWS and/or the National Marine Fisheries Service (NMFS) under Section 7 of the ESA if the action subject to Clean Water Act permitting could result in take of federally listed species.

Section 10 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through USACE, for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging; disposal of dredged materials; and excavation, filling, rechannelization, or any other modification of a navigable water of the United States. The requirements of Section 10 of the Rivers and Harbors Act apply to all structures, from the smallest floating dock to the largest commercial undertaking. Section 10 further applies to any wharf, dolphin, weir, boom breakwater, jetty, groin, bank protection (e.g., riprap, revetment, bulkhead), mooring structures such as pilings, aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent, or semipermanent obstacle or obstruction.

In general, activities regulated under Section 10 of the Rivers and Harbors Act are similar to those regulated under Section 404 of the Clean Water Act, but the geographic extent of jurisdiction is much more restricted and is limited

to identified navigable waters of the United States. In Solano County, navigable waters are limited to the current and historic (as of 1899) tidal channels in Suisun Bay, Suisun Marsh, and the Delta and in the Sacramento River.

U.S. Fish and Wildlife Service

Federal Endangered Species Act

USFWS has jurisdiction over terrestrial and freshwater species listed as threatened or endangered under the ESA. In addition, NMFS has jurisdiction over marine and anadromous fish species listed under the ESA. This act protects listed animal species from “take,” which is broadly defined as to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct.” The term “harm” is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. The term “harass” is further defined by USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). An activity can be defined as a take even if it is unintentional or accidental. Listed plant species are provided less protection. Plants are legally protected under the ESA only if take occurs on federal land or from federal actions, such as issuing a wetland fill permit. Activities that could result in take of a federally listed species require an incidental-take authorization resulting from an ESA Section 7 consultation or an ESA Section 10 permit.

An endangered species is one that is considered in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the *Federal Register*.

In addition to endangered, threatened, and proposed species, USFWS maintains a list of candidate species. Candidate (formerly category 1 candidate) species are those for which USFWS has on file sufficient information to support issuance of a proposed listing rule.

Migratory Bird Treaty Act

USFWS is responsible for enforcing the Migratory Bird Treaty Act (Title 16, Section 703 of the United States Code [16 USC 703]), which prohibits the taking, hunting, killing, selling, or purchasing of migratory birds, parts of migratory birds, or their eggs and nests. In addition, it contains a clause that prohibits baiting or poisoning of these birds. As used in this act, take is defined as meaning “to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires.” Most of the native bird species that occur in Solano County are covered by this act.

National Marine Fisheries Service

The authority to list species as threatened or endangered under the ESA is shared by NMFS and USFWS. NMFS is responsible for enforcing federal ESA regulations (described above) for most marine and “commercial” species. Within Solano County, its primary regulatory role is addressing impacts on steelhead and other listed salmonids.

Magnuson-Stevens Fishery Conservation Act

The Magnuson-Stevens Act requires federal agencies that fund, permit, or carry out activities that may adversely affect the essential fish habitat (EFH) of federally managed fish species to consult with NMFS about the potential adverse effects of their actions on EFH. EFH is broadly defined by the act to include “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” In this region, EFH waters essentially include the substrates and associated biological communities within bays and estuaries of the coasts of

Washington, Oregon, and California, seaward from the high-tide line or extent of upriver saltwater intrusion, including Suisun Marsh and the Delta.

Marine Mammal Protection Act

NMFS is also the federal agency with jurisdiction over marine mammals that are protected under the Marine Mammal Protection Act. This act protects marine mammals such as harbor seals and California sea lions from take. Take under the Marine Mammal Protection Act is defined as “harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill a marine mammal.” It is necessary for federal lead agencies (such as USACE) to consult with NMFS about possible take of marine mammals.

Executive Order 13112: Invasive Species

Executive Order 13112, signed by President Bill Clinton on February 3, 1999, established the National Invasive Species Council. The council, as provided for in the executive order, includes the secretaries of the U.S. Departments of State, Treasury, Defense, Interior, Agriculture, Commerce, and Transportation and the Administrator of the U.S. Environmental Protection Agency. Executive Order 13112 directs the National Invasive Species Council to, among other duties, issue a national Invasive Species Management Plan. The council also encourages planning and action at local, tribal, state, regional, and ecosystem-based levels consistent with the Invasive Species Management Plan.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

State Water Resources Control Board and Regional Water Quality Control Boards

Section 401 Water Quality Certification

Under Section 401 of the Clean Water Act, projects that require a USACE permit for discharge of dredged or fill material must obtain a water quality certification or waiver confirming that the project complies with state water quality standards before the USACE permit is valid. State water quality is regulated and administered by the State Water Resources Control Board and its nine regional water quality control boards (RWQCBs). Solano County is within the jurisdiction of both the San Francisco Bay RWQCB and the Central Valley RWQCB.

Porter-Cologne Water Quality Act

The state and the RWQCBs also maintain independent regulatory authority over the placement of waste, including fill, into waters of the state under the Porter-Cologne Act. There are a couple of important differences between the federal and state regulations. First, the state regulations do not have an agricultural exemption to the Section 404 regulations. Second, the state may also choose to impose mitigation requirements even if USACE does not.

California Department of Fish and Game

DFG administers a number of regulations and laws to protect native plant, fish, and wildlife resources, as described below.

California Endangered Species Act

Section 2080 of the California Fish and Game Code prohibits take of any species that the commission determines to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.”

The federal and state lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from federal ESA regulations in that the state regulations include threatened and endangered plants on nonfederal lands within the definition of take.

CESA allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts on rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species populations and their essential habitats.

Through permits or memorandums of understanding, DFG also may authorize individuals, public agencies, universities, zoological gardens, and scientific or educational institutions to import, export, take, or possess any endangered species, threatened species, or candidate species of plants and animals for scientific, educational, or management purposes.

DFG also maintains lists of species of special concern, which are plants and animals that may have shown population declines or restricted distribution within the state, and/or are associated with habitats that are declining in California. These species, along with other special interest species, are inventoried in the CNDDDB. Impacts on special-status plants and animals may be considered significant under CEQA, depending on the particular circumstances.

California Fish and Game Code Section 1600

DFG also administers the issuance of streambed alteration agreements under Section 1600 of the California Fish and Game Code. Streambed alteration agreements are required for any project activities that would substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as such by DFG.

California Fish and Game Code 3503 and 3503.5

Section 3503 of the Fish and Game Code makes it unlawful to take, possess, or needlessly destroy the nests or eggs of any bird. Section 3503.5 makes it unlawful to take or possess birds of prey (hawks, eagles, vultures, owls) or destroy their nests or eggs. These regulations, in combination with the requirements under the federal Migratory Bird Treaty Act provide the regulatory basis requiring nest avoidance measures for species such as the burrowing owl and Swainson's hawk.

San Francisco Bay Conservation and Development Commission

The 27-member San Francisco Bay Conservation and Development Commission (BCDC) was created by the California Legislature in 1965 in response to broad public concern about the future of San Francisco Bay. BCDC is made up of appointees from various federal and state agencies and local governments. BCDC is charged with the following tasks:

- ▶ regulating all filling and dredging in San Francisco Bay (which includes San Pablo and Suisun Bays, sloughs and certain creeks and tributaries that are part of the bay system, salt ponds, and certain other areas that have been diked off from the bay);
- ▶ protecting Suisun Marsh, the largest remaining wetland in California, by administering the Suisun Marsh Preservation Act in cooperation with local governments;
- ▶ regulating new development within the first 100 feet inland from the bay to ensure that maximum feasible public access to the bay is provided;

- ▶ minimizing pressures to fill the bay by ensuring that the limited amount of shoreline area suitable for high-priority water-oriented uses is reserved for ports, water-related industries, water-oriented recreation, airports, and wildlife areas;
- ▶ pursuing an active planning program to study bay issues so that BCDC plans and policies are based on the best available current information;
- ▶ administering the federal Coastal Zone Management Act within the San Francisco Bay segment of the California coastal zone to ensure that federal activities reflect BCDC policies (e.g., BCDC must certify that a project requiring a USACE permit is consistent with the local coastal plans, in this case the Bay Plan, before a Section 404 permit or Section 10 permit issued by USACE is valid);
- ▶ participating in the regionwide federal and state program to prepare a long-term management strategy for dredging and dredge material disposal in San Francisco Bay; and
- ▶ participating in California’s oil spill prevention and response planning program.

BCDC’s jurisdiction includes:

- ▶ the open water, marshes, and mudflats of greater San Francisco Bay, including Suisun, San Pablo, Honker, Richardson, San Rafael, San Leandro, and Grizzly Bays and the Carquinez Strait;
- ▶ the first 100 feet inland from the shoreline around San Francisco Bay;
- ▶ the primary and secondary management areas of the Suisun Marsh (permitting authority in the secondary management area has been delegated to the County, but BCDC retains permitting authority in the primary management area or those areas below the contour line at 10 feet above mean sea level);
- ▶ portions of most creeks, rivers, sloughs, and other tributaries that flow into San Francisco Bay; and
- ▶ salt ponds, duck hunting preserves, game refuges, and other managed wetlands that have been diked off from San Francisco Bay.

Suisun Marsh Protection Act

In 1974, the California Legislature passed the Suisun Marsh Protection Act, designed to preserve Suisun Marsh from residential, commercial, and industrial development. The act directs BCDC and DFG to prepare a protection plan for Suisun Marsh “to preserve the integrity and assure continued wildlife use” of the marsh (BCDC 1976). The objectives of the protection plan are to preserve and enhance the quality and diversity of Suisun Marsh’s aquatic and wildlife habitats and to assure retention of upland areas adjacent to the marsh in uses compatible with its protection.

Delta Protection Commission

The Delta Protection Commission (DPC) is a state agency created under the Delta Protection Act of 1992. The jurisdiction of the DPC includes portions of five counties—Solano, Yolo, Sacramento, San Joaquin, and Contra Costa—and is referred to as the Primary Zone of the Delta. The Primary Zone is a portion of the “Legal Delta,” defined in Section 12220 of the California Water Code. The seats on the DPC are set out in the legislation and include the directors (or designee) of the California Department of Parks and Recreation, State Lands Commission, California Department of Water Resources, California Department of Boating and Waterways, DFG, and California Department of Food and Agriculture. Also on the DPC are one supervisor from each of the five counties in the Delta, three city representatives, and five representatives of reclamation districts.

The DPC is charged with preparation of a regional plan for the “heart” of the Delta to address land uses and resource management for the Delta area. Key land uses are identified in the legislation and include agriculture, wildlife habitat, and recreation. The DPC adopted its *Land Use and Resource Management Plan for the Primary Zone of the Delta* (DPC Plan) on February 23, 1995. In 2000, the policies within the DPC Plan were adopted as regulations (see Title 14, Chapter 3 of the California Code of Regulations). The DPC Plan was revised and reprinted in May 2002 and was forwarded to the five counties for incorporation into their general plans and zoning codes. The counties will then carry out the DPC Plan through their day-to-day activities.

The DPC has appeal authority over the actions of local governments. Thus, if any person believes that a local government has taken an action or approved a project that is not in conformance with the Delta Protection Act and DPC Plan, that local-government action can be appealed to the DPC. The appeal “suspends” the local permit, allowing the DPC the opportunity to review the action. If the DPC finds the local-government action to be in conformance with the Delta Protection Act and DPC Plan, the action can go forward; if, however, the DPC finds that the action is not in conformance, the DPC will forward its findings to the local government for further review.

Oak Woodlands Conservation Act

The California Oak Woodlands Conservation Act (California Fish and Game Code Section 1360 et seq.) acknowledges the importance of private land stewardship to the conservation of the state’s valued oak woodlands. The act established the California Oak Woodlands Conservation Program, which aims to conserve oak woodlands existing in the state’s working landscapes by providing education and incentives to private land owners. The program provides technical and financial incentives to private landowners to protect and promote biologically functional oak woodlands.

California Native Plant Society

CNPS, a nongovernmental conservation organization, has developed lists of plants of special concern in California. A CNPS List 1A plant is a species, subspecies, or variety that is considered extinct. A List 1B plant is considered rare, threatened, or endangered in California and elsewhere. A List 2 plant is considered rare, threatened, or endangered in California but is more common elsewhere. A List 3 plant is a species for which CNPS lacks necessary information to determine whether it should be assigned to a list. A List 4 plant has a limited distribution in California.

All of the plant species on List 1 and List 2 meet the requirements of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (CESA) of the California Fish and Game Code and are eligible for state listing. Therefore, plants appearing on List 1 or List 2 are considered to meet the criteria of CEQA Section 15380 and effects on these species are considered “significant” in this EIR.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Solano Multi-Species Habitat Conservation Plan

The U.S. Bureau of Reclamation, SCWA, and its eight member agencies, including the City of Vacaville, the City of Fairfield, the City of Suisun City, the City of Vallejo, Solano Irrigation District, and Maine Prairie Water District, are in the process of preparing an HCP for portions of Solano County. At the time of writing the EIR for the 2008 Draft General Plan, the HCP had not been adopted.

In March 1999, USFWS, in accordance with Section 7 of the ESA, issued a biological opinion (BO) regarding the renewal of the Solano Project water service contract between the U.S. Bureau of Reclamation and SCWA (USFWS 1999). The 25-year contract provides for continued delivery of Solano Project water for agricultural, municipal, and industrial purposes throughout the SCWA contract service area. The contract also provides for continued operations and maintenance of the Solano Project based on current operating parameters. Solano Project facilities include Lake Berryessa, Monticello Dam, Putah Diversion Dam, and the Putah South Canal.

The plan participants have agreed to implement conservation measures to ensure the protection of threatened and endangered species and their habitat within the SCWA contract service area. Full implementation of the conservation measures outlined in the BO for the renewal of the Solano Project water service contract (USFWS 1999) is key to the survival and recovery of listed species. As such, SCWA and the member agencies have developed an HCP for the Solano Project's contract service area. The Solano HCP is intended to support the issuance of a Section 10(a)1(B) "incidental take permit" under the ESA for activities associated with future water use in the Solano Project's contract service area. The plan participants also intend to secure incidental-take authorization from DFG for state-listed species (California Fish and Game Code Section 2080.1).

The Solano HCP addresses compliance with the terms and conditions of the Solano Project BO (USFWS 1999) for the following plan participants:

- ▶ SCWA
- ▶ City of Vacaville
- ▶ City of Fairfield
- ▶ City of Suisun City
- ▶ City of Vallejo
- ▶ Solano Irrigation District
- ▶ Maine Prairie Water District

The following agencies have chosen to voluntarily participate in the Solano HCP:

- ▶ City of Rio Vista
- ▶ City of Dixon
- ▶ Reclamation District 2068
- ▶ Vallejo Sanitation and Flood Control District
- ▶ Fairfield-Suisun Sewer District

The expanded scope of the Solano HCP includes take coverage for additional species. These additional species include federally listed fish species under the jurisdiction of NMFS and species listed as threatened or endangered under the CESA. The Solano HCP further addresses other species of concern (i.e., species recognized by groups such as DFG and CNPS as having declining or vulnerable populations, but not officially listed as threatened or endangered species). Seventy-one species are proposed to be covered under the Solano HCP.

4.6.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

The analysis of the effects of implementing the 2008 Draft General Plan on biological resources was based largely on the information collected for the development of the Solano HCP, which is also summarized in the Biological Resources Background Report (Solano County 2006), as well as additional information on the distribution of special-status species from the CNDDDB and CNPS's *Inventory of Rare and Endangered Vascular Plants of California*. The effects of implementation of the 2008 Draft General Plan were compared to environmental baseline conditions (i.e., existing conditions) to determine impacts. Existing conditions were determined using the countywide vegetation data collected for the Solano HCP (Exhibit 4.6-1). There is overlap between some policies and programs in the 2008 Draft General Plan as they pertain to biological resources. For instance, there are policies that may minimize impacts on biological resources in the Land Use, Agriculture, Resources, Public Health and Safety, and Public Facilities and Services elements of the 2008 Draft General Plan. The policies and implementation programs that either may lead to an impact or may minimize a potential impact are discussed for each resource. The impacts of the Preferred Plan and the Maximum Development Scenario are analyzed in all instances.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact related to biological resources is considered significant if the proposed project would do any of the following:

- ▶ have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;
- ▶ have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by DFG or USFWS;
- ▶ have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- ▶ interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of nursery sites by native wildlife;
- ▶ conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- ▶ facilitate the spread of or increase population levels of invasive, exotic species; or
- ▶ conflict with the provisions of an adopted HCP, natural community conservation plan, or other approved local, regional, or state HCP.

The potential for the 2008 Draft General Plan to conflict with an adopted HCP is discussed in Section 4.1, “Land Use.”

IMPACT ANALYSIS

This section provides an overview of the biological impacts of the 2008 Draft General Plan, including an overview of impacts related to development within the unincorporated portions of municipal service areas (MSAs) compared to other unincorporated areas of the county. The impacts are organized by various vegetation types found throughout Solano County. When individual impacts on special-status species could not be combined within an impact on a vegetation type, they were discussed separately. In all instances, there is an analysis of the impacts of the Preferred Plan and the Maximum Development Scenario. The significance of all impacts was determined by comparing the Preferred Plan and the Maximum Development Scenario against existing conditions using the significance criteria described above.

The habitat conversion projections for the Preferred Plan and the Maximum Development Scenario were the same for all land use categories. The primary differences between the two scenarios relate to density and timing of development. In general, the impact thresholds for these habitats are fairly low (e.g., large areas of contiguous habitat need to be preserved); once the density of development starts getting below the threshold of 20–40 acres, increased development density does not materially affect the long-term effects of development. Therefore, all impacts would be the same under both the Preferred Plan and the Maximum Development Scenario.

The largest overall effect under the 2008 Draft General Plan is the potential conversion of 23,940 acres of habitat areas to more urbanized or industrial uses. This includes lands within and outside of the MSAs. Table 4.6-3 shows the breakdown of acres of each vegetation type potentially affected by each respective land use designation under the 2008 Draft General Plan. The largest potential change of habitat could occur within lands designated Water Dependent Industrial. This is primarily because of the large area adjacent to Collinsville that has historically been

**Table 4.6-3
Potential Habitat Conversions by Vegetation Type under Buildout of the 2008 Draft General Plan**

General Plan Zoning	Vegetation Types											
	Agriculture	Upland Grassland	Valley Floor Grassland	Vernal Pool Grassland	Marsh	Oak Savanna	Oak Woodland	Open Water	Riparian	Scrub/Chaparral	Tidal Flats	Total
Commercial Recreation	53	0	33	2	10	0	0	27	0	0	0	125
General Industrial	0	0	2	0	0	0	0	0	0	0	0	2
Highway Commercial	80	1	19	26	0	0	0	4	0	0	0	130
Light Industrial	742	0	17	0	0	0	0	1	0	0	0	760
Public/Quasi-Public	834	10	190	76	0	0	0	35	6	0	0	1,151
Park and Recreation	237	139	402	58	285	0	496	33	25	68	8	1,751
Rural Residential	1,250	1,443	958	524	0	748	771	72	272	29	0	6,067
Service Commercial	32	0	9	6	0	0	0	0	3	0	0	50
Specific Project Area	912	456	417	1,364	3	224	460	45	28	0	0	3,909
Traditional Community—Mixed Use	2	0	1	0	0	0	0	1	3	0	2	9
Traditional Community—Residential	29	2	41	0	8	1	26	2	12	0	0	121
Urban Commercial	0	0	5	0	0	0	0	2	0	0	0	7
Urban Commercial—Highway Commercial	235	61	80	0	2	0	0	6	0	0	0	384
Urban Commercial—Service Commercial	2	0	12	124	2	0	0	1	0	0	0	141
Urban Industrial—Light Industrial	96	44	782	161	40	0	0	3	0	0	0	1,126
Urban Industrial—General Industrial	0	0	66	0	31	0	0	6	0	0	0	103
Urban Residential—Low	1,055	116	35	12	0	10	13	0	4	0	0	1,245
Urban Residential – Medium	21	0	0	0	0	0	0	0	1	0	0	22
UR-RR	68	0	0	16	0	12	0	0	0	0	0	96
Water Dependent Industrial	49	0	5,320	6	1,325	0	0	41	0	0	0	6,741
Total	5,697	2,272	8,389	2,375	1,706	995	1,766	279	354	97	10	23,940

Source: Data provided by LSA Associates in 2008

zoned Water Dependent Industrial, but has remained undeveloped. The land use designation that could potentially result in the second largest amount of habitat loss is Rural Residential. Unlike Water Dependent Industrial, the areas that would be newly designated Rural Residential are proposed in several locations throughout the county.

Despite this large amount of potential habitat loss within Solano County under the 2008 Draft General Plan, several policies greatly minimize the potential for adverse affects on biological resources. The central theme throughout the plan is to concentrate future growth around existing cities and urban centers. The concentration of urban development minimizes habitat fragmentation and edge effects and maintains the habitat values and natural open-space areas unique to Solano County. This theme is clearly stated in the following policies in the Land Use chapter:

- ▶ **Policy LU.P-1:** Collaborate with cities to guide development to the county's urban centers and promote sustainable development patterns.
- ▶ **Policy LU.P-2:** A cornerstone principle of this General Plan is the direction of new urban development and growth toward municipal areas. In furtherance of this central goal, the people of Solano County, by initiative measure, have adopted and affirmed the following provisions to assure the continued preservation of those lands designated ~~"Intensive Agriculture," "Extensive Agriculture,"~~ Agriculture, Watershed, Marsh, Park & Recreation, or Water Bodies & Courses ~~Development Strategy Policy No. 17; Agricultural chapter policies AG.P-31, AG.P-32, AG.P-33, AG.P-34, AG.P-35, and AG.P-36. Agricultural Lands Policies Nos. 9, 10, 11, 12, and 13; and Watershed Lands Policy No. 2.~~ The General Plan may be reorganized, and individual goals and policies may be renumbered or reordered in the course of ongoing updates of the General Plan in accord with the requirements of state law, but the provisions enumerated in this paragraph shall continue to be included in the General Plan until December 31, 2010, unless earlier repealed or amended by the voters of the County. *[Note to the reader: Policy LU.P-2 was established as part of the Orderly Growth Initiative. Proposed changes to these policies are subject to voter approval and thus are indicated in strikethrough and underline format.]*

Of the 23,940 acres of potential habitat loss that could occur under the 2008 Draft General Plan, approximately 4,486 acres fall within the MSAs of the cities. MSAs are areas where future development is to be provided with municipal or urban type services through city annexation. Existing land uses will be retained within the MSAs until annexed to a city.

Six of the seven cities within Solano County are currently in the process of developing an HCP. The cities of Dixon and Rio Vista are voluntary participants in the Solano HCP, and the cities of Vallejo, Suisun City, Fairfield, and Vacaville are participating in the HCP to fulfill the requirements of the Solano Project BO (USFWS 1999). The Solano HCP is still under development and is not an approved plan; however, additional short-term conservation measures for the cities outlined in the Solano Project BO require proponents of new projects to provide evidence of ESA compliance before approval of any action or project. Therefore, if impacts from the conversion of the 4,486 acres within the cities' MSAs are not mitigated under the Solano HCP, at least 3,569 acres within the MSAs of Vallejo, Suisun City, Fairfield, and Vacaville will comply with ESA, which will require mitigation of impacts on federally listed species. Accordingly, by having development within the MSAs occur through annexation into the cities, these land use policies potentially provide for sufficient mitigation of impacts on federally listed species by triggering these additional regulatory requirements. However, Policies LU.P-7 and LU.P-9 in the 2008 Draft General Plan would allow approval of temporary uses within MSAs that could alter or eliminate valuable habitats and resources, eliminating or reducing the ability to implement HCP conservation measures and funding mechanisms. These 2008 Draft General Plan policies are listed below:

- ▶ **Policy LU.P-7:** Permit temporary land uses and uses consistent with the current zoning on unincorporated lands within municipal service areas that do not conflict with planned land uses until the property is annexed to a city for urban development.

- ▶ **Policy LU.P-9:** Within the municipal service area in the Peabody Road area where development has already occurred and annexation does not appear likely within the foreseeable future, allow establishment of temporary uses with approval of a use permit.

In addition to this centralized theme for growth and the potential for fully mitigating impacts on federally listed species and their habitats through either the Solano HCP or Solano Project BO, the 2008 Draft General Plan identifies a Resource Conservation Overlay. This designation recognizes the presence of unique biological and natural resources in the county and promotes their protection by requiring study of potential effects if development is proposed in these locations and providing mitigation to support urban development in cities. By creating the Resource Conservation Overlay, the 2008 Draft General Plan provides the potential for project-specific impacts to be fully mitigated within the county, thus providing for the continued viability of sensitive species and natural communities. Policies and programs related to the Resource Conservation Overlay are described below:

- ▶ **Policy RS.P-3:** Focus conservation and protection efforts on high-priority habitat areas depicted in Figure RS-1 [of the 2008 Draft General Plan, reproduced here as Exhibit 4.6-2].
- ▶ **Program RS.I-1:** Establish a resource mitigation overlay district within the zoning ordinance to site and permit mitigation banks. The ordinance should include incentives to focus mitigation banks within the Resource Conservation Overlay areas.
- ▶ **Program RS.I-2:** Use the Resource Conservation Overlay on the Land Use Diagram to identify areas of the county with high-priority needs for biological resource management. Areas covered by the Resource Conservation Overlay are intended to provide options to establish mitigation banks for biological impacts generated outside the overlay district. Land use designations within the Resource Conservation Overlay are restricted to Agriculture, Marsh, Watershed, and Park and Recreation. The Resource Conservation Overlay shall be located within important biological or physical areas and habitats identified by the HCP and deemed suitable by the Solano County Board of Supervisors. Areas contained within the Resource Conservation Overlay include high-priority resources defined in Figure RS-1 [Exhibit 4.6-2] or subsequent updates.

The Resource Conservation Overlay contains the following resources:

- California red-legged frog critical habitat and core recovery areas
- Callippe butterfly priority conservation areas
- Giant garter snake priority conservation areas
- Priority habitat corridors
- Vernal pool conservation areas
- *Suisun Marsh Protection Plan* primary management zone

Additional policies in the Agriculture and Public Health and Safety chapters would further minimize impacts on different habitat types. The impacts on individual habitat types and additional policies designed to protect these habitats are discussed in more detail in Impacts 4.6-1 through 4.6-6. Additional impacts on special-status species, the mitigation for which is not included in the habitat mitigation measures, are discussed in Impacts 4.6-7 through 4.6-13. Impacts 4.6-14 and 4.6-15 address countywide impacts.

IMPACT 4.6-1a *Loss of Habitat for Swainson’s Hawk, Other Raptors, and Burrowing Owl – Preferred Plan. Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the conversion of 5,697 acres of agricultural habitat, resulting in the loss of habitat for Swainson’s hawk and other raptors, as well as burrowing owl and other resident and migratory wildlife species. This impact would be significant.*

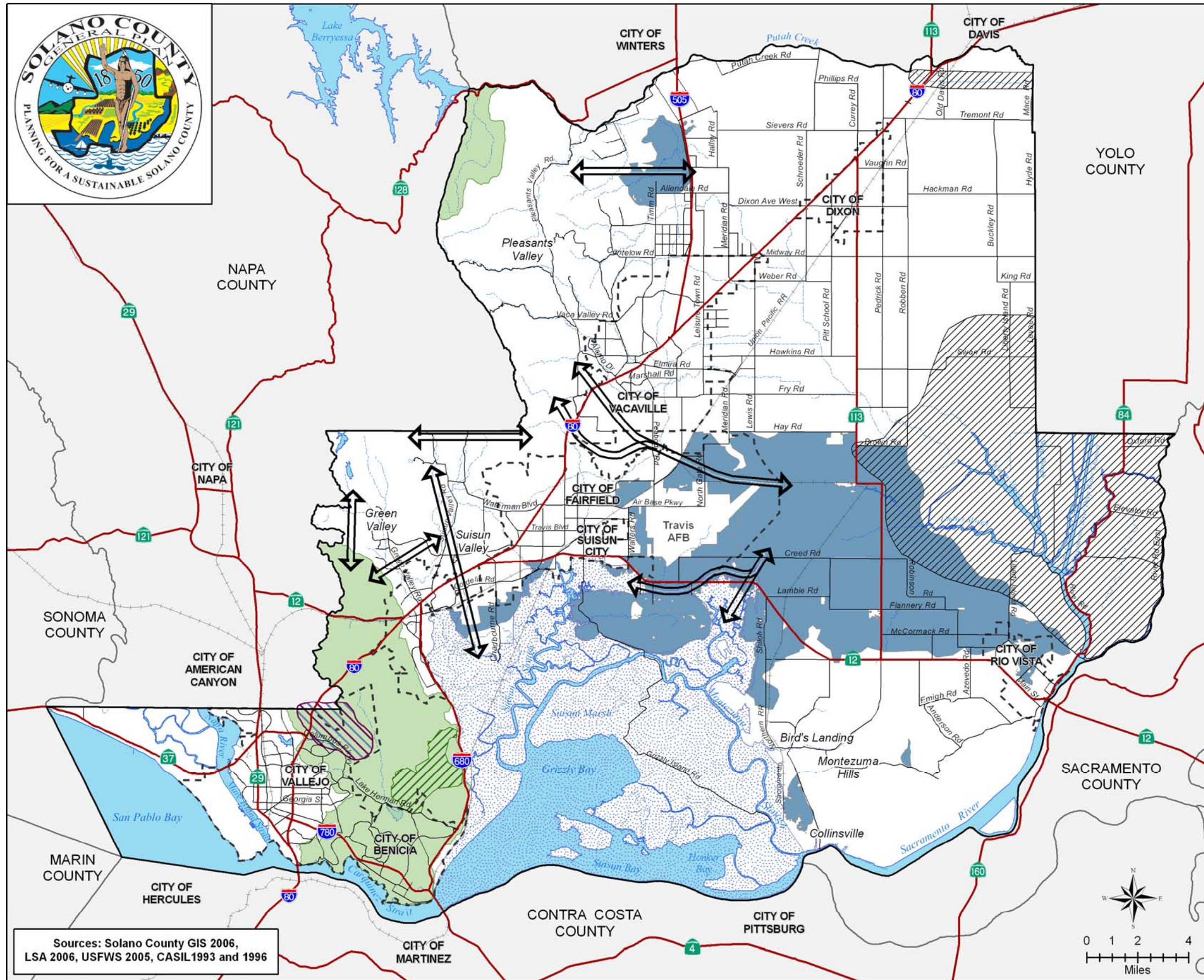
Within Solano County, agricultural lands provide important habitat for numerous raptors, including the Swainson’s hawk, which is state listed as threatened, and for the burrowing owl, a California species of special concern. Agricultural lands also provide foraging habitat for tricolored blackbirds (another California species of



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Exhibit 4.6-2

Priority Habitat Areas



Legend

- Corridors/Linkages
 - Suisun Marsh Protection Plan (April 1995) Primary Management Area
 - Giant Garter Snake Priority Conservation Area
 - Callippe Silverspot Butterfly Priority Conservation Area
 - High Value Vernal Pool Conservation Areas
 - California Red-legged Frog Final Critical Habitat (USFWS 2005)
 - California Red-legged Frog Core Recovery Area
- Basemap Layers
- Roadways
 - Highways
 - Railroads
 - Streams and Creeks
 - Major Water Features
 - Municipal Service Areas
 - Adjacent Counties

Sources: Solano County GIS 2006, LSA 2006, USFWS 2005, CASIL 1993 and 1996



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special concern) and numerous other resident and migratory wildlife species. The loss of important foraging habitat for these species would be a significant impact without policies or mitigation measures to compensate for the conversion of agricultural lands.

Relevant Policies and Program of the 2008 Draft General Plan

- ▶ **Policy LU.P-2:** A cornerstone principle of this General Plan is the direction of new urban development and growth toward municipal areas. In furtherance of this central goal, the people of Solano County, by initiative measure, have adopted and affirmed the following provisions to assure the continued preservation of those lands designated “~~Intensive Agriculture,~~” “~~Extensive Agriculture,~~” Agriculture, Watershed, Marsh, Park & Recreation, or Water Bodies & Courses ~~Development Strategy Policy No. 17; Agricultural chapter policies AG.P-31, AG.P-32, AG.P-33, AG.P-34, AG.P-35, and AG.P-36. Agricultural Lands Policies Nos. 9, 10, 11, 12, and 13; and Watershed Lands Policy No. 2.~~ The General Plan may be reorganized, and individual goals and policies may be renumbered or reordered in the course of ongoing updates of the General Plan in accord with the requirements of state law, but the provisions enumerated in this paragraph shall continue to be included in the General Plan until December 31, 2010, unless earlier repealed or amended by the voters of the County. *[Note to the reader: Policy LU.P-2 was established as part of the Orderly Growth Initiative. Proposed changes to these policies are subject to voter approval and thus are indicated in strikethrough and underline format.]*
- ▶ **Policy AG.P-4:** Require farmland conversion mitigation for either of the following actions:
 - a. a general plan amendment that changes the designation of any land from an agricultural to a nonagricultural use or
 - b. an application for a development permit that changes the use of land from production agriculture to a nonagricultural use, regardless of the General Plan designation.
- ▶ **Program AG.I-1:** Create and adopt a farmland conversion mitigation program and ordinance. Require compensation for loss of agricultural land. Establish appropriate mitigation ratios for the program or utilize a graduated mitigation mechanism. The mitigation ratio shall be a minimum of 1:1 (1 acre of farmland protected through mitigation for each acre of farmland converted) within the Agricultural Reserve Overlay areas. Higher standards may be applicable in other agricultural areas of the county. The program shall not present regulatory barriers to agri-tourism, agricultural services and agricultural processing in regions and within land use designations where such uses are permitted and encouraged. The program shall also establish mitigation within the same agricultural region as the proposed development project, or within the Agricultural Reserve Overlay district, as a preferred strategy. The program shall incorporate a fee option, and shall provide an exemption for farmworker housing. Mitigation lands shall be of similar agricultural quality to the lands being converted.

Conclusion

The above policies and program of the 2008 Draft General Plan would reduce the overall impact of loss of foraging or nesting habitat on Swainson’s hawks and other raptors and burrowing owl; however, there is no guarantee under the farmland conversion mitigation program that the protected farmland would fully mitigate the loss of foraging habitat because there is no policy for restricting crop types. Without specific crop restrictions, the preserved farmland could either currently consist of or be converted to crop types that do not provide foraging habitat for this species. Therefore, this impact would be significant.

Mitigation Measure 4.6-1a: Preserve Agricultural Foraging Habitat.

The County shall implement the following measures to mitigate permanent impacts of future projects consistent with the 2008 Draft General Plan on Swainson's hawk and burrowing owl foraging habitat in agricultural areas of Solano County:

(1) Preservation of Foraging Habitat. Agricultural foraging habitat shall be preserved and managed at a 1:1 ratio (mitigation impact acreage), where the foraging habitat preserved is of equal or better quality than the foraging habitat affected. Habitat preservation may be achieved through the purchase of credits at an authorized mitigation bank, fee title (with an applicable conservation easement dedicated to an approved organization), or purchase of suitable conservation easements directly from landowners. All habitat preserves established shall have a resource management plan prepared by one or more qualified persons experienced in the development and implementation of restoration, mitigation, and management plans for the Swainson's hawk and burrowing owl. At a minimum, the resource management plan shall do the following:

- ▶ specify control measures and programs for invasive exotic and noxious weeds, to be implemented in perpetuity and include annual surveys to visually assess and identify weed infestations and identify annual control measures;
- ▶ specify control measures for invasive and destructive nonnative animal species, to be implemented in perpetuity and include annual surveys to visually assess and identify new infestations and appropriate control measures;
- ▶ create a management endowment or other permanent funding mechanism that is acceptable to the long-term management entity and sufficient to manage the property in perpetuity, consistent with the approved management plan;
- ▶ provide for replacement of nesting habitat for the Swainson's hawk distributed throughout the agricultural areas of Solano County;
- ▶ specify maintenance requirements and responsibilities for implementation, long-term ownership and/or management responsibility, annual reporting requirements, and a funding mechanism; and
- ▶ provide for permanent preservation under a conservation easement that prohibits all of the following:
 - plantings of orchards and/or vineyards, except in designed farmstead areas;
 - cultivation of perennial vegetable crops and annual crops;
 - commercial feedlots (defined as any open or enclosed areas where domestic livestock owned by other than the grantor are grouped together for intensive feeding purposes);
 - horticultural specialties, including sod, nursery stock, ornamental shrubs, ornamental trees, and flowers;
 - commercial greenhouses or plant nurseries; and
 - commercial aquaculture of aquatic plants and animals and their byproducts.

(2) Additional Measures for Protection of Burrowing Owl Habitat. Agricultural habitat preserves shall meet the following additional criteria to mitigate the loss of burrowing owl foraging habitat:

- ▶ *Suitable Burrow and Cover Habitat.* A minimum of 1 acre of habitat per 80 acres of preserve land shall be permanently taken out of production to provide suitable nesting and cover habitat for burrowing owls. This 1 acre shall consist of one continuous block of habitat and shall not be adjacent to a County road or highway.

- ▶ *Artificial Burrows.* A minimum of two burrow complexes (three burrows per complex) shall be installed and maintained in perpetuity within the 1 acre of habitat set aside for burrowing owls.
- ▶ *Vegetation Height:* Within the 1 acre of habitat set aside from agricultural production for burrowing owls, management measures shall be implemented and adequately funded to maintain average effective vegetation height at 6 inches or less from February 1 through April 15, when owls typically select mates and nest burrows. In addition, the set-aside area must be kept free of tree and shrub canopy cover in perpetuity.

With implementation of these measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-1b **Loss of Habitat for Swainson’s Hawk, Other Raptors, and Burrowing Owl – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the conversion of 5,697 acres of agricultural habitat, resulting in the loss of habitat for Swainson’s hawk and other raptors, as well as burrowing owl and other resident and migratory wildlife species. This impact would be significant.*

This impact is the same as Impact 4.6-1a for the Preferred Plan. The acreage of agricultural habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan; therefore, the loss of habitat for Swainson’s hawk and other raptors, as well as burrowing owl and other resident and migratory wildlife species would be the same. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-1b: Preserve Agricultural Foraging Habitat.

This measure is the same as Mitigation Measure 4.6-1a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-2a **Loss of Value of Upland Grassland, Oak Woodland, Oak Savanna, and Scrub/Chaparral Habitats – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in the loss or reduced habitat value of 2,272 acres of upland grassland, 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be significant.*

Grassland, oak woodland, oak savanna, and chaparral/scrub habitat form a mosaic of vegetation types within the foothills of the western portions of Solano County. This mosaic of different plant communities at various successional stages provides a diverse array of habitat types for plants and wildlife, including several special-status species. Conserving, maintaining, and managing for the continued existence of this mosaic is critical to preserving the highest levels of biodiversity within the region. That is why impacts on these habitat types are combined together in one impact section, despite obvious differences.

Based on current vegetation mapping (Exhibit 4.6-1), approximately 5,130 acres of these interrelated habitats would lie within MSAs, areas zoned Rural Residential, Specific Project Areas, and other land use designations, resulting in some level of conversion of these habitats to other more urban conditions. The largest loss of these upland habitats would result from the conversion to rural residential and low-density urban residential development within designated MSAs. The majority of this zoning is within the rural residential area northwest of Vacaville, northwest of Fairfield, and north of Middle Green Valley, and in the Middle Green Valley Specific Project Area.

Rural residential development can leave substantial amounts of open habitat on individual lots and in clustered locations, but the quality and value of habitat on individual parcels can vary substantially based on how the land is used and managed. Studies in the Sierra Nevada foothills and in other areas have also shown that although the basic character of the habitat/environment in rural residential areas may remain visually similar to that in

undeveloped areas, rural residential development even on lot configurations of 1 acre, 5 acres, and up to 20 acres has been shown to result in changes to wildlife populations, with certain species declining and other, often urban-adapted species increasing in numbers (PRBO 2008, Merenlender and Heise 1999, Payne 2002).

Encroaching urbanization affects wildlife species in different ways; some species are more tolerant than others. Urbanization in California's oak woodland areas does not always result in distinct edges. Unlike the abrupt edges created by development and agriculture, encroaching urban development, particularly rural residential and estate residential developments, retain a certain degree of canopy cover. For example, Merenlender and Heise (1999) did not find a statistical difference between the percentage of hardwood cover (calculated using thematic mapper satellite data) on residential sites and on preserve sites; however, they did find substantial differences in bird populations between various land uses. They surveyed plots in relatively undisturbed hardwood rangeland in private parcels greater than 300 acres; ranchettes on 10- to 40-acre lots; and suburban areas with single-family homes on 0.5- to 2.5-acre lots. They found that tree density decreased with increasing housing density and that suburban areas had a marked increase in exotic plants because of residential gardens. The number of plant, bird, and butterfly species was also similar among land-use types. Conversely, the composition of bird species differed significantly among land-use types, illustrating that subdividing private land can have a substantial effect on species composition. Specifically, they found that the percentage of neotropical migrant birds, species that winter in Central and South America, was significantly higher on undeveloped sites than at ranchettes and small suburban lots.

The results of various studies evaluating rural residential development (PRBO 2008, Merenlender and Heise 1999, Payne 2002) suggest that smaller property sizes and associated disturbances likely reduce the diversity and abundance of rarer bird species, particularly neotropical migrants. Potential causes of changes and declines in wildlife populations include increases in urban-associated predators (e.g., feral and domestic cats and dogs, rats), increases in native predators (e.g., raccoons, skunks, scrub jays, crows, ravens), increases in nonnative species (e.g., starlings, house sparrows, domestic pigeons), habitat degradation (e.g., mowing, overgrazing), urban edge avoidance, and habitat fragmentation and problems with dispersal.

Relevant Policies and Programs of the 2008 Draft General Plan

The Land Use and Resources chapters of the 2008 Draft General Plan includes the following policies and programs that are intended to minimize impacts on these upland communities such that the actual loss would be less than the designated 5,130 acres; to protect habitat diversity and ecological health; and to recognize the importance and value of oak woodlands for wildlife.

Land Use Chapter

- ▶ **Policy LU.P-14:** Establish rural residential development in a manner that preserves rural character and scenic qualities and protects sensitive resources including agricultural lands, creeks, native trees, open spaces, and views.
- ▶ **Policy LU.P-17:** Encourage clustering of residential development when necessary to preserve agricultural lands, natural resource areas and environmental quality, to provide for the efficient delivery of services and utilities, and to mitigate potential health and safety hazard
- ▶ **Policy SS.P-5:** Maintain the rural character of Middle Green Valley while still allowing development to be guided into areas screened from Green Valley Road because of natural contours in the land, woodland vegetation, and/or riparian vegetation. Locate upland development in areas screened by landforms or vegetation.
- ▶ **Program LU.I-4:** Phase future residential development, giving first priority to those undeveloped areas zoned and designated for rural residential use and where rural residential development has already been established; second priority to undeveloped areas designated but not zoned for rural residential use and where rural residential development has already been established; and third priority to those undeveloped areas

designated for rural residential use. Also give priority to lands where public facilities and services are currently provided.

- ▶ **Program SS.I-1:** Adopt a plan (either a specific plan or master plan) to implement these policies for Middle Green Valley. That plan should specify:
 - the area covered by the plan;
 - techniques to ensure development is compatible with the rural character of Middle Green Valley and surrounding areas. Such techniques should include design guidelines and development standards;
 - guidelines for cluster development, including minimum and maximum lot sizes, development standards, and density bonus credits for clustered development;
 - the details of a transfer of development rights program (with an implementing ordinance), including: the designation of areas where development is preferred, creating appropriate and equitable re-zoning, clustering of housing, and determining the ratio of credits to property owners who voluntarily forego development;
 - the number of units and/or credits, with or without clustering, that will provide incentives for all landowners in the area to participate in a market driven transfer of development rights program, based on 400 units, subject to further study;
 - the location and dimensions of a wildlife corridor ("green corridor");
 - the maximum number of units any property owner can develop, with or without clustering;
 - the techniques to be applied voluntarily by property owners that ensure permanent protection and maintenance of resources/views on lands to remain undeveloped; and
 - the details of how the development would be served with water and wastewater service. Attempt to secure public water and wastewater service through a cooperative effort of property owners, residents, the County, and the City of Fairfield.

Resources Chapter

- ▶ **Policy RS.P-1:** Protect and enhance the County's natural habitats and diverse plant and animal communities, particularly occurrences of special-status species, wetlands, sensitive natural communities, and habitat connections.
- ▶ **Policy RS.P-2:** Manage the habitat found in natural areas and ensure its ecological health and ability to sustain diverse flora and fauna.
- ▶ **Policy RS.P-6:** Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way.
- ▶ **Program RS.I-3:** Develop and adopt an ordinance to protect oak woodlands as defined in Senate Bill (SB) 1334 and heritage oak trees.

Define heritage trees as the following: (a) trees with a trunk diameter of 15 inches or more measured at 54 inches above natural grade, (b) any oak tree native to California, with a diameter of 10 inches above natural grade, or (c) any tree or group of trees specifically designated by the County for protection because of its historical significance, special character or community benefit.

As regards heritage oak trees, this ordinance should include:

- rules regarding the removal, pruning, or disturbance of the critical root zone of a heritage tree;
- replacement ratio for healthy tree removal; and
- enforcement mechanisms for unlawful removal of trees.

As regards oak woodlands, the ordinance should include:

- lists of targeted tree species and age classes
- guidance to minimize the fragmentation of oak woodlands and provide linkages and corridors between stands; and
- requirements for the preparation of oak woodland management plans, which will be required for all development, agricultural uses (including grazing), and timber/fire wood collection within the county's oak woodlands.

Because grasslands, oak savanna, and oak woodlands are important components in maintaining water quality and minimizing flooding and erosion problems, several of the policies within the Water Resources and Quality section of the Resources chapter would minimize the potential impacts on these communities. For example, Policy RS.P-69 is designed to protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion (see Impact 4.6-4a below for additional policies designed to minimize water quality). These policies in combination with Policy RS.P-6 would likely greatly reduce project impacts on grassland, oak woodland, and oak savanna habitats.

Conclusion

Even though there are several policies that promote avoidance and minimization of impacts on oaks and an implementation program that specifies the need to plant replacement trees for oaks with a dbh greater than 10 inches, there are no policies specifying mitigation for direct and indirect impacts on the habitat itself. Therefore, the impact associated with the loss of this habitat type would be significant.

Even though there are policies that may minimize impacts and retain substantial areas in native/naturalized upland grassland, oak savanna, oak woodland, and scrub/chaparral, the subdivision of these communities into units less than approximately 40 acres would result in reductions in habitat values and biological diversity as discussed above. Payne's (2002) modeling of rural residential growth suggests that incorporation of active restoration and management of preserved lands could offset or fully mitigate the effects of rural residential development. Because there are no policies that require management or restoration of these habitats as mitigation for impacts, the impact of potential loss and degradation of these habitats through rural residential and higher density urban development would be significant.

Mitigation Measure 4.6-2a: Require a Habitat Inventory and Mitigation and Management Plans, and Specify a Replacement Ratio for Native Trees and Shrubs.

The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on upland grassland, oak woodland, oak savanna, and scrub/chaparral habitats:

(1) Habitat Inventory and Assessment. The County shall require all future projects to conduct, as a condition of project approval, appropriately timed biological resources inventories designed to assess the presence of wetlands, rock outcrops, serpentine or other unique edaphic substrates, and special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.

(2) Habitat Mitigation. Where conversion of upland grasslands, oak woodland, oak savanna, and scrub/chaparral is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans. The County shall develop minimum standards that address management and restoration requirements based on subdivision size, affected communities, presence of other valuable habitats and special-status species, and development in accordance with preserved-area edge ratios.

Where clustering of development results in a contiguous block of habitat greater than 40 acres with no more than a 1.25:1 development-to-preserve edge, affected acreage shall be calculated only for the development area and individual lots. Developments with higher development-to-preserve edge ratios and preserved areas less than 40 acres shall be required to implement additional habitat preservation and management activities based on the types and values of the habitats at the project site.

Preserved habitats shall also be subject to the following conditions:

- ▶ Preserved mitigation sites shall have equivalent woodland resources. Total area, canopy cover, woodland type, and habitat value shall be considered when determining whether off-site resources are equivalent to those of the project site.
- ▶ Preserved areas shall contain similar topographic and elevational gradients.
- ▶ All preserves established shall have a resource management plan that includes the minimum applicable requirements to this habitat associated species identified in Mitigation Measure 4.6-1a.

(3) Tree Replacement. In addition to the other requirements outlined in the oak woodland protection ordinance (Program RS.I-3), the ordinance shall specify a replacement ratio for all native trees and shrubs. The ratio shall be sufficient to restore canopy cover and stand characteristics similar to what was removed within a specified time frame. If mitigation of native tree removal is required, planting plans shall be included as part of the resource management plan for oak woodland prepared by one or more qualified persons experienced in the development and implementation of oak woodland and savanna restoration, mitigation, and management plans. Plans shall also include minimum survival standards, monitoring and maintenance requirements for a minimum of 10 years, and provisions for guaranteed replacement of trees, should survival fall below performance standards.

With implementation of these measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-2b Loss of Value of Upland Grassland, Oak Woodland, Oak Savanna, and Scrub/Chaparral Habitats – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the loss or reduced biological diversity and habitat values of 2,272 acres of upland grassland, 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be significant.*

This impact is the same as Impact 4.6-2a for the Preferred Plan. The acreage of upland grassland, oak woodland, oak savanna, and scrub/chaparral habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. The primary differences in the alternatives relate to development density and timing of development. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-2b: Require a Habitat Inventory and Mitigation and Management Plans, and Specify a Replacement Ratio for Native Trees and Shrubs.

This measure is the same as Mitigation Measure 4.6-2a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT **Loss or Reduction in Habitat Values of Valley Floor Grassland and Vernal Pool Grassland Habitats – Preferred Plan.** 4.6-3a *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in the loss or reduced habitat value of 8,389 acres of valley floor grassland habitat and 2,375 acres of vernal pool grassland habitat. This impact would be significant.*

Based on vegetation mapping for the Solano HCP, buildout of the 2008 Draft General Plan could result in the conversion to incompatible uses of approximately 8,389 acres of valley floor grassland habitat and 2,375 acres of vernal pool grassland habitat. The largest loss of valley floor grassland habitat (5,320 acres) results from conversion to Water Dependent Industrial in the Montezuma Hills; however, it is unlikely that all of the area zoned Water Dependent Industrial in the Montezuma Hills would be directly affected by development. Impacts in this area would be greatly minimized through the implementation of Program SS.I-6 (see “Relevant Policies and Programs of the 2008 Draft General Plan” below), which ensures that development within this area (i.e., within the Secondary Management Area of Suisun Marsh) is consistent with the policies of the *Suisun Marsh Protection Plan*. Vernal pools are less dense in this area, but they may also be affected by the development of facilities in areas zoned Water Dependent Industrial.

The second largest areas of impact on valley floor grassland and vernal pool habitat are from development in areas zoned Rural Residential north of Vacaville, Urban Industrial within the northeastern corner of Fairfield’s MSA and west of Suisun City, and Special Project Areas such as the *Fairfield Train Station Specific Plan* area within Fairfield’s MSA and the Lambie Industrial Park. The primary areas in which conversion of vernal pool habitat would occur within the county under the 2008 Draft General Plan are in the Lambie Industrial Park Specific Project Area and in the development of rural residential neighborhoods north of Vacaville.

Approximately 1,160 acres of valley floor grasslands and 596 acres of vernal pool grasslands could be affected within the MSAs of Fairfield, Suisun City, Vacaville, Vallejo, and Rio Vista. The areas in which the largest significant impact on valley floor grassland and vernal pool species could occur falls within the *Fairfield Train Station Specific Plan* area, the area adjacent to that designated Urban Industrial, and the area west of Suisun City that is designated Urban Industrial and Highway Commercial. These areas are planned to be annexed into the city before development, as stated under Policy LU.P-6. and these impacts would be mitigated through the Solano HCP or under the Solano Project BO.

If, however, impacts occur before annexation into the cities via the development of temporary uses, as authorized under Policies LU.P-7 and LU.P-9 (see “Relevant Policies and Programs of the 2008 Draft General Plan” below), those impacts would not be mitigated under the Solano HCP and would be significant, particularly in the northern portion of Fairfield’s MSA near Peabody and Vanden Roads.

In addition to the land use designations in the 2008 Draft General Plan, an unknown amount of valley floor grassland and vernal pool habitat could be affected through the development of wind energy resources in the Montezuma Hills. There is a 31,737-acre Wind Energy Resource Overlay encompassing the majority of the Montezuma Hills. This designation provides for and promotes the development of electricity-generating wind-powered facilities. The development of these facilities could result in the conversion of an unknown amount of valley floor grassland habitat. Vernal pools are less dense in this region of the county but are still present, and the pools and their associated species may be adversely affected by the expansion of these facilities as well.

The majority of intensive agriculture is located in the northeastern portion of the county within the Dixon, Elmira, Main Prairie, and Ryer Island agricultural regions, extending only partially into the Jepson Prairie agricultural region. The Jepson Prairie agricultural region contains the majority of Solano County’s vernal pool grassland resources. Intensive agriculture in the Jepson Prairie area has been limited by lower grade soils (capability class III or lower) with high salinity and alkalinity levels and the lack of water delivery for irrigation. Policy PF.P-13 (see “Relevant Policies and Programs of the 2008 Draft General Plan” below) in the Public Facilities and Services chapter promotes efforts by irrigation districts and others to expand Solano County’s irrigated agricultural areas. If irrigation systems expand into other areas of the county, particularly the Jepson Prairie region, this could result

in the conversion of an unknown amount of vernal pool grassland habitat to intensive agriculture. Because those areas are already zoned Agriculture, the designation of the Resource Conservation Overlay within this area would not provide additional protection from conversion from pasture to intensive agriculture. This conversion would be a significant impact.

Relevant Policies and Program of the 2008 Draft General Plan

The Land Use chapter of the 2008 Draft General Plan includes the following policies and program that are intended to minimize impacts on valley floor grassland habitat and vernal pool grassland habitat:

- ▶ **Policy LU.P-6:** Review and update the *Collinsville-Montezuma Hills Area Plan and Program* consistent with the Collinsville special study area land uses, policies and programs. The Area Plan policies and programs that apply to the secondary management area of the Suisun Marsh shall be reviewed and updated consistent with the Suisun Marsh Protection Plan.
- ▶ **Policy LU.P-7:** Permit temporary land uses and uses consistent with the current zoning on unincorporated lands within municipal service areas that do not conflict with planned land uses until the property is annexed to a city for urban development.
- ▶ **Policy LU.P-9:** Within the municipal service area in the Peabody Road area where development has already occurred and annexation does not appear likely within the foreseeable future, allow establishment of temporary uses with approval of a use permit.
- ▶ **Program SS.I-6:** Review and update the *Collinsville-Montezuma Hills Area Plan and Program* consistent with the Collinsville special study area land uses, policies and programs. The Area Plan policies and programs that apply to the secondary management area of the Suisun Marsh shall be reviewed and updated consistent with the *Suisun Marsh Protection Plan*.
- ▶ **Policy PF.P-13:** Support efforts by irrigation districts and others to expand Solano County's irrigated agricultural areas.

Conclusion

There policies above would reduce impacts on valley floor grassland and vernal pool habitat, but not to a less-than-significant level. The 2008 Draft General Plan does provide for a Resource Conservation Overlay on the major portions of the highest quality vernal pool grassland habitat in the county, but this overlay excludes some habitat areas that are essential to the survival and recovery of several federally listed plant and animal species, as well as several other special-status species. A total of 25 special-status plant species, seven special-status invertebrate species, one special-status amphibian species, and seven special-status bird species occur in valley floor grassland and vernal pool habitats in Solano County. In addition, vernal pool habitats are considered a sensitive natural community by DFG, and vernal pools are often considered jurisdictional wetlands by USACE and/or the Central Valley RWQCB. Therefore, this impact would be significant.

Mitigation Measure 4.6-3a: Require a Habitat Inventory, Buffer Zones, and Appropriate Avoidance and Compensatory Measures to Mitigate Habitat Loss.

The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on valley floor grassland and vernal pool habitats:

(1) Habitat Inventory and Assessment. The County shall require all future projects to conduct, as a condition of project approval, appropriately timed biological resources inventories designed to assess the presence of wetlands, other unique edaphic substrates, and special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.

(2) Buffer Zones for Extremely Rare and/or Range-Limited Species. If Colusa grass, Solano grass, San Joaquin Valley orcutt grass, Ferris's milkvetch, Conservancy fairy shrimp, Ricksecker's water scavenger beetle, or Delta green ground beetle are found to be present, populations of these species shall be protected. The County shall require projects to develop site-specific buffer zones that shall include, at a minimum, the immediate watershed for the occupied vernal pools and a minimum 500-foot buffer beyond the boundary of this immediate watershed.

(3) Habitat Mitigation. Compensatory mitigation for the conversion and loss of vernal pool and valley floor grassland habitats shall be provided at a 1:1 ratio through a combination of preservation of high-quality vernal pool and grassland habitat and the construction and restoration of vernal pool habitat. Where conversion of these communities is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans consistent with policies and implementation programs of the 2008 Draft General Plan. The County shall establish standards for preservation and restoration of uplands and wetlands (including vernal pool and swale habitats and seasonal wetlands) that are based on, but not limited to, the standards in USFWS's *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and the Solano HCP, and that take into account the needs of grassland-dependent special-species animals as well as more common species.

Preserved habitats shall also be subject to the following conditions:

- ▶ Preserved mitigation sites shall have equivalent or higher quality resources. All preserves established shall have a resource management plan that includes the minimum applicable requirements to this habitat associated species identified in Mitigation Measure 4.6-1a.
- ▶ All project applicants shall be required to provide proof to the County Department of Resource Management that they have obtained all necessary state and federal authorizations (e.g., USACE Section 404 permit, RWQCB Section 401 certification or waste discharge requirements, and compliance with ESA and CESA) before the issuance of any grading permits or other actions that could result in ground-disturbing activities.
- ▶ Preserves shall contain a large core area where ground-squirrel control is prohibited and shall maintain artificial burrow complexes until suitable, natural burrow densities can be reached.

(4) Habitat Mitigation for Special-Status Plant Species. Avoidance measures shall be used when feasible and compensatory mitigation shall be used when avoidance is not possible. Avoidance measures shall include establishing buffer zones to avoid effects on special-status plants; installing exclusion fencing around the existing plant populations before and during construction; and training construction personnel on the identification and location of special-status plants on the project site. Compensatory mitigation shall include replanting on-site or propagating plants at a nearby conservation site through seeding or translocation. Mitigation ratios shall be sufficient to achieve performance criteria of no net loss of either contiguous occupied habitat or the number of individual plants. This may require planting or restoration ratios higher than 1:1 to guarantee long-term success. Postproject monitoring shall verify that avoidance and mitigation measures are successful.

(5) Habitat Mitigation for Vernal Pool Invertebrates. Compensatory mitigation for vernal pool invertebrate species shall include the following additional requirements:

- ▶ The preservation component shall include habitat occupied by the affected species.
- ▶ The constructed/restored habitats shall incorporate a variety of pool conditions that include dense complexes of small and medium-sized pools with minimal spacing interspersed among widely spaced larger pools. Larger, turbid-water, playa-type pools shall also be incorporated where appropriate soil conditions are present. The appropriate species associations for these vernal pool types are as follows:
 - *Dense complexes of small and medium pools with minimal spacing:* Vernal pool fairy shrimp and midvalley fairy shrimp

- *Larger, deeper pools:* Vernal pool tadpole shrimp and California linderiella (as well as Conservancy fairy shrimp addressed below)
- *Playa pools with turbid water:* Conservancy, vernal pool and tadpole shrimp

(6) Habitat Mitigation for California Tiger Salamanders. Mitigation shall be required for any activities that result in the conversion of upland habitat within 2,100 feet of California tiger salamander breeding habitat (excluding lands separated from breeding sites by incompatible land uses) that result in the conversion of upland and/or aquatic breeding habitats for California tiger salamander to incompatible land uses (e.g., development, intensive recreation). Mitigation shall consist of two components: preservation and enhancement of suitable upland habitat, and preservation and construction of new breeding habitat consistent with the mitigation standards specified above.

With implementation of these mitigation measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-3b Loss or Reduction in Habitat Value of Valley Floor Grassland and Vernal Pool Grassland Habitats – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the loss or reduced habitat value of 8,389 acres of valley floor grassland habitat and 2,375 acres of vernal pool grassland habitat. This impact would be significant.*

This impact is the same as Impact 4.6-3a for the Preferred Plan. The amount of valley floor grassland and vernal pool grassland habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-3b: Require a Habitat Inventory, Buffer Zones, and Appropriate Avoidance and Compensatory Measures to Mitigate Habitat Loss.

This measure is the same as Mitigation Measure 4.6-3a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-4a Potential for Direct and Indirect Impacts on Riparian, Stream, and Open-Water Habitats – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in direct and indirect impacts on riparian, stream, and open-water habitats. This impact would be significant.*

Riparian, stream, and open-water habitats are usually considered one natural community association because of their interconnectedness and abilities to regulate water quality and provide important habitat to wildlife species, including several special-status species. Riparian habitats are considered sensitive habitat areas and are identified as special natural communities by DFG (CNDDDB 2001). Actions potentially affecting riparian habitats are generally regulated by DFG through a streambed alteration agreement under Section 1601 or Section 1603 of the California Fish and Game Code; they may also be regulated by USACE and the RWQCBs. As discussed in Section 4.5, “Hydrology and Water Resources,” compliance with required National Pollutant Discharge Elimination System permit requirements and implementation of site-specific stormwater control plans would mitigate impacts on water quality. Stream channels and open-water habitat (i.e., ponds or reservoirs) that are hydrologically connected to streams are classified as waters of the United States and are regulated by USACE. Actions occurring on stream channels, ponds, and lakes are also regulated by DFG. Discharge of fill into waters of the United States, including realignment of stream channels or placement of a stream channel into a pipeline, would be a significant impact.

Based on habitat mapping for the Solano HCP, approximately 354 acres of riparian habitat and 279 acres of open water contain land use designations that may lead to direct and indirect impacts on these habitats; however,

because of the sensitivity of these habitats and policies in the 2008 Draft General Plan (see below), much less habitat than what is zoned would be directly affected. Unlike the other habitat types, potential impacts on these habitats are dispersed throughout the county, and only 38 acres (5 acres of riparian vegetation and 33 acres of open-water habitat) fall within the MSAs of the cities.

Relevant Policies and Programs of the 2008 Draft General Plan

As described below, the Resources and Public Health and Safety chapters of the 2008 Draft General Plan includes several policies and programs designed to maintain water quality (primarily involving protection of habitat and minimizing indirect impacts from runoff) and to otherwise minimize impacts on riparian, stream, and open-water habitats.

Resources Chapter

- ▶ **Policy RS.P-64:** Require the protection of natural water courses.
- ▶ **Policy RS.P-67:** Protect existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas.
- ▶ **Policy RS.P-69:** Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.
- ▶ **Policy RS.P-70:** Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.
- ▶ **Policy RS.P-71:** Preserve riparian vegetation along county waterways to maintain water quality.
- ▶ **Policy RS.P-74:** Require and provide incentives for site plan elements (such as permeable pavement, swales, and filter strips) that limit runoff and increase infiltration and groundwater recharge.
- ▶ **Program RS.I-62:** Develop an ordinance that establishes a riparian buffer to protect water quality and ecosystem function. The minimum buffer width shall be determined according to existing parcel size. For parcels more than 2 acres in size, a minimum 150-foot development setback shall be provided. For parcels of 0.5–2.0 acres, a minimum 50-foot setback shall be provided. For parcels less than 0.5 acre a minimum 20-foot setback shall be provided. Exceptions to these development setbacks apply to parcels where a parcel is entirely within the riparian buffer setback or development on the parcel entirely outside of the setback is infeasible or would have greater impacts on water quality and wildlife habitat.
- ▶ **Program RS.I-64:** Protect natural watercourses through acquisition or dedication of adjacent land in fee or less than fee title during the process of reviewing and approving land development proposals.
- ▶ **Program RS.I-65:** Require site plan elements to limit runoff from new development. These measures might include reduced pavement or site coverage, permeable pavement, vegetation that retains and filters stormwater, and/or drainage features. Limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks.
- ▶ **Program RS.I-66:** Require proposed projects located within the Putah Creek and Ulatis Creek watersheds to minimize project-related stormwater runoff and pollution. Stormwater runoff and pollution loads resulting after development of projects shall not exceed predevelopment conditions.
- ▶ **Program RS.I-69:** Continue to require best management land use practices in the Barker Slough watershed.

The following policy and implementation program are designed to protect oak woodlands and other native trees, but would also provide protection to riparian habitats.

- ▶ **Policy RS.P-6:** Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way.
- ▶ **Program RS.I-3:** Develop and adopt an ordinance to protect oak woodlands as defined in Senate Bill (SB) 1334 and heritage oak trees.

Define heritage trees as the following: (a) trees with a trunk diameter of 15 inches or more measured at 54 inches above natural grade, (b) any oak tree native to California, with a diameter of 10 inches above natural grade, or (c) any tree or group of trees specifically designated by the County for protection because of its historical significance, special character or community benefit.

As regards heritage oak trees, this ordinance should include:

- rules regarding the removal, pruning, or disturbance of the critical root zone of a heritage tree;
- replacement ratio for healthy tree removal; and
- enforcement mechanisms for unlawful removal of trees.

As regards oak woodlands, the ordinance should include:

- lists of targeted tree species and age classes;
- guidance to minimize the fragmentation of oak woodlands and provide linkages and corridors between stands; and
- requirements for the preparation of oak woodland management plans, which will be required for all development, agricultural uses (including grazing), and timber/fire wood collection within the county's oak woodlands.

Public Health and Safety Chapter

- ▶ **Policy HS.P-1:** Prevent or correct upstream land use practices that contribute to increased rates of surface water runoff.
- ▶ **Policy HS.P-2:** Restore and maintain the natural functions of riparian corridors and water channels throughout the county to reduce flooding, convey stormwater flows, and improve water quality.
- ▶ **Policy HS.P-3:** Require new developments to incorporate devices capable of detaining the stormwater runoff caused by a 100-year storm event or to contribute to regional solutions to improve flood control, drainage, and water recharge.
- ▶ **Policy HS.P-9:** Preserve open space and agricultural areas that are subject to natural flooding and are not designated for future urban growth; prohibit permanent structures in a designated floodway where such structures could increase risks to human life or restrict the carrying capacity of the floodway.
- ▶ **Policy HS.P-16:** Require minimum setbacks for construction along creeks between the creek bank and structure, except for farm structures that are not dwellings or places of work, based on the susceptibility of the bank to lurching caused by seismic shaking.

- ▶ **Program HS.I-3:** Revise the County zoning ordinance to:
 - limit activities that contribute to increased rates of surface water runoff, such as overgrazing by livestock, clearing, and burning, which can reduce natural vegetative cover;
 - promote recreational, open space, and agricultural uses of upstream watershed areas, where appropriate;
 - limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks;
 - require development in upstream watershed areas to follow best management practices (BMPs) for stormwater management, including on-site detention and retention basins, appropriate landscaping, and minimal use of impervious surfaces; and
 - designate resource areas for preservation, including agriculture, wetlands, floodplains, recharge areas, riparian zones, open space, and native habitats.
- ▶ **Program HS.I-7:** During project review, encourage the use of stormwater management techniques in developed upstream watershed areas that protect low-lying areas from flooding and incorporate appropriate measures into the development review process to mitigate flooding and prevent erosion in and around county ditches.

Conclusion

Even though there are several policies and programs in the 2008 Draft General Plan that promote avoidance and minimization of impacts on riparian, stream, and open-water habitats, there is no policy specifying mitigation for direct impacts in the event that impacts cannot be avoided. Therefore, the loss or conversion of these habitat types could still occur. This impact would be significant.

Mitigation Measure 4.6-4a: Require an Inventory for Special-Status Species and Uncommon Habitats, and Appropriate Mitigation of Impacts on Valley Elderberry Longhorn Beetle, Salmonid, and Other Habitats.

The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on riparian, stream, and open-water habitats:

(1) Habitat Inventory and Assessment. The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to assess the presence of special-status species and uncommon natural habitats. Such a survey shall be completed as part of a complete application for a project.

(2) Habitat Mitigation. Where conversion of riparian and channel habitats is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans. The County shall develop minimum standards that address management and restoration requirements based on subdivision size, affected communities, presence of other valuable habitats and special-status species, and development in accordance with preserved-area edge ratios.

Preserved habitats shall also be subject to the following conditions:

- ▶ Preserved mitigation sites shall have equivalent riparian woodland resources. Total area, canopy cover, woodland type, and habitat value shall be considered when determining whether off-site resources are equivalent to those of the project site.
- ▶ Preserved areas shall contain similar topographic and elevational gradients.

- ▶ All preserves established shall have a resource management plan that includes the minimum applicable requirements for this habitat associated species identified in Mitigation Measure 4.6-1a. Compensatory mitigation requirements for removal of native trees and shrubs shall be met through tree replacement as specified in Mitigation Measure 4.6-2a.
- ▶ All project applicants shall be required to provide proof to the County Department of Resource Management that they have obtained all necessary state and federal authorizations (e.g., USACE Section 404 permit, RWQCB Section 401 certification or waste discharge requirements, DFG Section 1602 agreement, and compliance with ESA and CESA) before issuance of any grading permits or other actions that could result in ground-disturbing activities.

(3) Valley Elderberry Longhorn Beetle and Elderberry Shrub Mitigation. The following mitigation measures shall be implemented to avoid, minimize, and mitigate impacts on valley elderberry longhorn beetle:

(a) Any ground-disturbing activities within 100 feet of elderberry plants containing stems measuring 1 inch or greater in diameter at ground level shall conform to the following minimum avoidance measures:

- ▶ A setback shall be established measuring at least 20 feet from the dripline of each elderberry plant containing stems measuring 1 inch or greater in diameter at ground level from the edge of an established road, intensively farmed field, or facility (whichever is closer). The setbacks shall be fenced and flagged to identify the setback zone (i.e., areas into which equipment and materials shall not encroach). Fire fuel breaks (disked land) may not be included within the 20-foot setback; however, vegetation may be cleared by mowing (e.g., mower, mechanical trimmers, hand tools) to less than 2 inches in height. Where encroachment resulting in new soil disturbance (e.g., disking, trenching, grading) within the 20-foot setback zone is unavoidable, the project applicant shall provide compensatory mitigation at a 50% (1:2) ratio of the standard requirements identified below for habitat mitigation.
- ▶ Construction contractors shall be briefed on the need to avoid damaging elderberry plants and the possible penalties for not complying with these requirements.
- ▶ Work crews shall be instructed about the status of the beetle and the need to protect its elderberry host plant.
- ▶ No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant shall be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1 inch or greater in diameter at ground level.
- ▶ Mowing of grasses or ground cover shall occur only from July through April to reduce fire hazard. Mowing shall be done in a manner that avoids damaging plants (e.g., bark shall not be stripped away through careless use of mowing or trimming equipment).
- ▶ Trimming of elderberry stems less than 1 inch in diameter shall occur between September 1 and March 14. The recommended period for trimming is between November and the first 2 weeks in February, when the plants are dormant and after they have lost their leaves.

(b) In cases where removal of elderberry shrubs or their stems measuring 1 inch or greater (removal or trimming) is unavoidable, the affected elderberry shrubs shall be salvaged and replanted and additional elderberry shrubs and associated native riparian plants shall be planted according to the ratios specified in the following criteria:

- ▶ All elderberry shrubs scheduled for removal shall be transplanted to an approved, secure site (an approved mitigation bank location within Solano County or nonbank site approved by the County and USFWS). All nonbank relocation sites shall be protected by a conservation easement or other applicable protection measure, and funding shall provided for long-term monitoring and maintenance. Transplanting shall occur between June 15 and March 15. No elderberry shrub may be transplanted between March 16 and June 14, except

where isolated bushes are more than 0.5 mile away from other suitable valley elderberry longhorn beetle habitat and there is no sign of use (exit holes).

- ▶ A minimum of five elderberry seedlings or rooted cuttings and five associated native, woody riparian plants per removed elderberry bush shall be planted within the mitigation area, or applicable credits shall be purchased from a mitigation bank in Solano County approved to sell valley elderberry longhorn beetle credits.
- ▶ Transplanted elderberry and planted elderberry and associated native riparian plants shall be managed and monitored for a minimum of 5 years. A minimum of 80% of the transplanted elderberry and planted elderberry and associated species shall be alive and in good health at the end of the 5-year period. If survivorship rates drop below 80%, additional planting of applicable species (elderberry or associated native riparian species) shall occur and additional monitoring shall occur until the initial 80% survival rate is achieved for a minimum of 3 consecutive years. Monitoring reports shall be submitted to USFWS annually for review, approval, and compliance reporting.
- ▶ Mitigation planting shall occur, to the maximum extent practicable, in areas adjacent to the impact area and/or located to fill in existing gaps in riparian corridors. These requirements may be deleted once the species is delisted.

(4) Mitigation of Impacts on Salmonids. The following measures shall be implemented to avoid, minimize, and mitigate impacts on steelhead and chinook salmon, including those impacts that may result from new instream crossings:

(a) For projects that would result in impacts on streams that are known to support or have the potential to support salmonids—Green Valley, Suisun, American Canyon, and Putah Creeks, and to a lesser extent Ulatis, Alamo, Jameson Canyon, and Ledge wood Creeks and their tributaries—the following avoidance and minimization measures apply:

- ▶ Instream work shall be allowed only during specified work windows from June 1 to October 15 during low-flow conditions.
- ▶ No fill material, including concrete, shall be allowed to enter any waterways. Any concrete piers, footings, or other structures shall be poured in tightly sealed forms and shall not be allowed contact with surface waters until the cement has fully cured. This process takes a minimum of 14–28 days.
- ▶ Channel disturbance shall be kept to a minimum, no material shall be left in the channel, and if bridge footings are to be protected by riprap, the channel bottom elevation shall not be elevated above the natural channel bottom.
- ▶ For bridge removal, no portions of the old structure shall be left in the channel, and where abutments are removed, no depressions shall be left; they shall be filled in with clean river rock or gravel of an appropriate size (approximately 2–4 inches).
- ▶ Where practicable, bridge design shall be full span and avoid adversely affecting channel hydraulics. Bridge and road design shall prevent direct discharge (such as culverts or bridge drains) of any untreated stormwater runoff directly into any waterways.
- ▶ Construction BMPs and erosion control methods shall be utilized during construction. Such methods shall include revegetation of all bare soil before the rainy season and any other measures necessary to ensure that there is no increase in sediment entering waterways.
- ▶ If cofferdams are to be used, turbid water pumped out of the dam shall not be allowed to reenter the channel unless sediment has settled out so that there is no increase in turbidity in downstream waters.

- ▶ Construction sites shall be monitored to ensure that no salmonids are present that may be harmed. If salmonids are present, a qualified fishery biologist shall be required to capture and relocate the fish.

Where column repairs are to be done, materials used shall be nontoxic to aquatic life.

- ▶ All equipment refueling and maintenance shall occur outside the creek channel and appropriate measures shall be taken to prevent the discharge of fuels or other contaminants to the stream in the event of spills.
- ▶ Water that contacts wet concrete and has a pH greater than 9 shall be pumped out and disposed of outside the creek channel.

(b) All new stream crossings in streams that are known to, or that have the potential to, support salmonids shall follow the guidelines developed by NMFS to allow for safe passage of salmonids. For new instream crossings, the following alternatives and structure types shall be considered in order of preference:

1. Nothing—Road realignment to avoid crossing the stream
2. Bridge—Spanning the stream to allow for long-term dynamic channel stability
3. Streambed simulation strategies—Bottomless arch, embedded culvert design, or ford
4. Nonembedded culvert—Often referred to as a hydraulic design; associated with more traditional culvert design approaches, and limited to low slopes for fish passage
5. Baffled culver or structure designed with a fishway—For steeper slopes

If a segment of stream channel where a crossing is proposed is in an active salmonid spawning area, then only full-span bridges or streambed simulations are acceptable.

With implementation of these mitigation measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-4b Potential for Direct and Indirect Impacts on Riparian, Stream, and Open-Water Habitats – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in direct and indirect impacts on riparian, stream, and open-water habitats. This impact would be significant.*

This impact is the same as Impact 4.6-4a for the Preferred Plan. The amount of riparian, stream, and open-water habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-4b: Require an Inventory for Special-Status Species and Uncommon Habitats, and Appropriate Mitigation of Impacts on Valley Elderberry Longhorn Beetle, Salmonid, and Other Habitats.

This measure is the same as Mitigation Measure 4.6-4a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-5a Potential for Direct and Indirect Impacts on Seasonal Wetlands – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in direct and indirect impacts on seasonal wetlands. This impact would be significant.*

Seasonal wetlands are important natural resources. Not only do they provide valuable habitat to native plant and wildlife species, they also significantly help maintain water quality. The majority of the seasonal wetlands in Solano County are located within the vernal pool region (Exhibit 4.6-3); however, there is the potential for seasonal wetlands to occur throughout the county. Impacts on vernal pool wetlands are discussed in Impacts 4.6-4a and 4.6-4b above. Buildout of the 2008 Draft General Plan could result in direct and indirect impacts on seasonal wetlands.

Policy RS.P-67 in the Resources chapter of the 2008 Draft General Plan promotes the protection of existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas:

- ▶ **Policy RS.P-67:** Protect existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas.

Although this policy in the 2008 Draft General Plan may help to minimize impacts on seasonal wetlands, there is no policy specifying mitigation for direct impacts in the event that impacts cannot be avoided. Therefore, the loss or conversion of wetlands could still occur. This impact would be significant.

Mitigation Measure 4.6-5a: Require Surveys for Seasonal Wetlands and Replacement at a Minimum 2:1 Ratio.

The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to determine the presence of seasonal wetlands. The surveys shall be completed as part of a complete application for a project.

In addition, where conversion of seasonal wetlands is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans. Seasonal wetlands shall be replaced at a minimum 2:1 ratio.

With implementation of this mitigation measure, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-5b Potential for Direct and Indirect Impacts on Seasonal Wetlands – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in direct and indirect impacts on seasonal wetlands. This impact would be significant.*

This impact is the same as Impact 4.6-5a for the Preferred Plan. The amount of seasonal wetland habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-5b: Require Surveys for Seasonal Wetlands and Replacement at a Minimum 2:1 Ratio.

This measure is the same as Mitigation Measure 4.6-5a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.



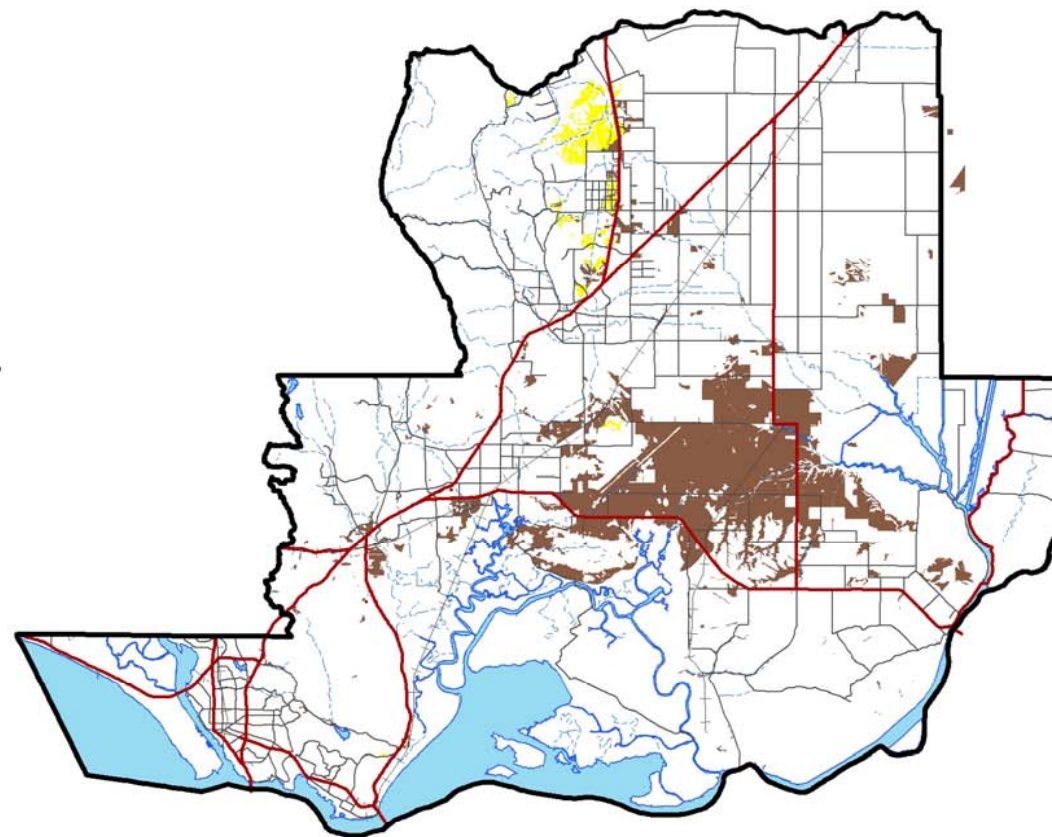
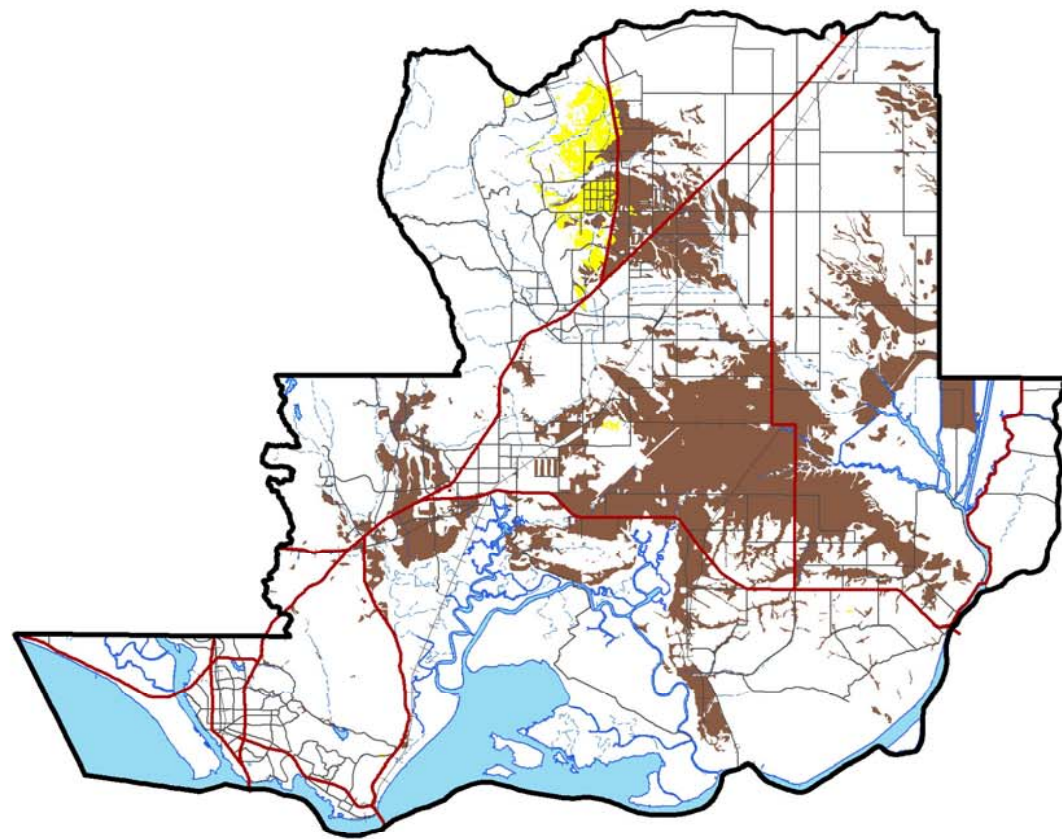
Solano County General Plan EIR

Exhibit 4.6-3

Historic and Current Potential Vernal Pools

Historic Potential Vernal Pool Areas
Hard pan: 7,379 acres
Clay pan: 110,848 acres

Current Potential Vernal Pool Areas
Hard pan: 3,843 acres
Clay pan: 46,919 acres



Legend

- Clay Pan
- Hard Pan
- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Solano County



Source: Solano County GIS 2006, LSA 2006, CASIL 1993 and 1996

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"Planning for a Sustainable Solano County"

IMPACT 4.6-6a Potential Direct and Indirect Impacts on Marsh and Tidal Flat Habitat – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in direct and indirect impacts on marsh and tidal flat habitat. This impact would be significant.*

Solano County contains extensive marshlands critical to the health and vitality of the estuary ecosystem in San Francisco Bay and the Delta. The county is home to the largest contiguous brackish-water marsh remaining on the West Coast of North America and encompasses more than 10% of California’s remaining natural wetlands. These areas provide habitat for diverse species, including several special-status species, and provides valuable ecosystem services. Under the 2008 Draft General Plan, zoning designations on approximately 1,706 acres of marsh habitat and 10 acres of tidal flat habitat could result in direct and indirect impacts on these habitat types.

Because marsh habitat provides critical habitat for several special-status species and provides important ecosystem functions, several plans and policies have been established and implemented to protect the various marshes within the county: the Suisun Marsh Protection Act, designed to preserve Suisun Marsh from residential, commercial, and industrial development; The Delta Protection Act of 1992; the *White Slough Specific Plan*; the Napa Sonoma Marsh Restoration Project; and the *Delta Vision and Strategic Plan*.

The 2008 Draft General Plan contains policies to incorporate the policies and provisions of these other plans, specifically the *Land Use and Resource Management Plan for the Primary Zone of the Delta* as mentioned in Policy RS.P-20, the Napa Sonoma Marsh Restoration Project as mentioned in Policy RS.P-31, and the Suisun Marsh Local Protection Program as mentioned in Program RS.I-12 (see “Relevant Policies and Program of the 2008 Draft General Plan” below).

Relevant Policies and Program of the 2008 Draft General Plan

- ▶ **Policy RS.P-20:** The goals, policies, and provisions of the *Land Use and Resource Management Plan for the Primary Zone of the Delta* are incorporated by reference. Ensure that all public and private management and development activities within the Primary Zone of the Delta are consistent with the goals, policies and provisions of the *Land Use and Resource Management Plan for the Primary Zone of the Delta* as adopted and as may be amended by the Delta Protection Commission.
- ▶ **Policy RS.P-31:** Require marsh restoration activities and land use development within the Napa Sonoma Marsh Restoration Project area to be consistent with the requirements of the Napa Sonoma Marsh Restoration Project.
- ▶ **Program RS.I-12:** Review and update the Solano County component of the Suisun Marsh Local Protection Program in coordination with the San Francisco Bay Conservation and Development Commission. The guidelines and standards identified in current policies should be incorporated into the County zoning ordinance and development guidelines. The update will address General Plan policies and other policies, programs and regulations within the Local Protection Program.

Conclusion

The incorporation of these policies to implement these other marsh protection plans would greatly decrease the impacts on marsh habitat as the 2008 Draft General Plan builds out. However, reliance on the protection measures in these plans may not fully mitigate potential impacts. Therefore, this impact would be significant.

Mitigation Measure 4.6-6a: Require Surveys for Wetlands and Special-Status Species, Develop an Avoidance and Mitigation Plan, and Replace Affected Habitats at a 2:1 Ratio.

The County shall require all future projects, as a condition of project approval, to conduct appropriately timed biological resources inventories designed to determine the presence of wetlands (marsh, tidal flat, and channel)

and associated special-status species. Such a survey shall be completed as part of a complete application for a project.

For projects that may have potential impacts on special-status plant and animal species within marsh habitat, the project applicants shall develop a site-specific resource avoidance and minimization plan for approval by the County, DFG, and USFWS.

Where conversion of marsh, channel, and tidal flat habitats is unavoidable as part of a project's development, the County shall require the project applicant to prepare and implement mitigation and management plans. At a minimum, affected habitats shall be replaced at a 2:1 ratio.

With implementation of this mitigation measure, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-6b Potential Direct and Indirect Impacts on Marsh and Tidal Flat Habitat – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in direct and indirect impacts on marsh and tidal flat habitat. This impact would be significant.*

This impact is the same as Impact 4.6-6a for the Preferred Plan. The amount of habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-6b: Require Surveys for Wetlands and Special-Status Species, Develop an Avoidance and Mitigation Plan, and Replace Affected Habitats at a 2:1 Ratio.

This measure is the same as Mitigation Measure 4.6-6a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-7a Loss or Disturbance of Raptor and Loggerhead Shrike Nests – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the loss or disturbance of raptor and loggerhead shrike nests from removal of trees and shrubs associated with the loss of 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be significant.*

Loggerhead shrike and several raptor species are considered species of concern by DFG, and impacts on nesting habitat would be significant. In addition, the federal Migratory Bird Treaty Act and California Fish and Game Code make it unlawful to destroy nests and eggs of most native birds, including raptors and loggerhead shrikes. Development in oak woodland/savanna and scrub/chaparral habitat (see Impact 4.6-2a) would require clearing and removal of trees and shrubs, and thus it would likely destroy bird nests and eggs.

Relevant Policy and Program of the 2008 Draft General Plan

The 2008 Draft General Plan also recognizes the importance and value of oak woodlands for wildlife:

- ▶ **Policy RS.P-6:** Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way.
- ▶ **Program RS.I-3:** Develop and adopt an ordinance to protect oak woodlands as defined in Senate Bill (SB) 1334 and heritage oak trees.

Define heritage trees as the following: (a) trees with a trunk diameter of 15 inches or more measured at 54 inches above natural grade, (b) any oak tree native to California, with a diameter of 10 inches above natural

grade, or (c) any tree or group of trees specifically designated by the County for protection because of its historical significance, special character or community benefit.

As regards heritage oak trees, this ordinance should include:

- rules regarding the removal, pruning, or disturbance of the critical root zone of a heritage tree;
- replacement ratio for healthy tree removal; and
- enforcement mechanisms for unlawful removal of trees.

As regards oak woodlands, the ordinance should include:

- lists of targeted tree species and age classes
- guidance to minimize the fragmentation of oak woodlands and provide linkages and corridors between stands; and
- requirements for the preparation of oak woodland management plans, which will be required for all development, agricultural uses (including grazing), and timber/fire wood collection within the county's oak woodlands.

Conclusion

Implementation of the above policy and implementation program of the 2008 Draft General Plan would likely reduce the impact of future project development under the plan on trees and nesting habitat. However, there are no policies specifying mitigation for destruction of raptor and loggerhead shrike nests. Therefore, this impact would be significant.

Mitigation Measure 4.6-7a: Require Nest Surveys and Buffers and Implement Mitigation Measures 4.6-1a, 4.6-2a, 4.6-3a, 4.6-4a, and 4.6-6a.

The County shall implement the following measures to mitigate impacts of future projects consistent with the 2008 Draft General Plan on raptor and loggerhead shrike nests:

(1) A qualified biologist shall conduct surveys for raptor and loggerhead shrike nests before pruning or removal of trees, ground-disturbing activities, or construction activities to locate any active nests on or immediately adjacent to the site. The surveys shall be designed and of sufficient intensity to document raptor nesting activity within 500 feet of planned work activities. Preconstruction surveys shall be conducted at 21-day intervals unless construction activities have been initiated in an area. Preconstruction surveys shall be conducted between February 1 and August 31. Locations of active nests shall be described and protective measures implemented. Protective measures shall include establishment of avoidance areas around each nest site. Avoidance areas shall be clearly delineated (i.e., by orange construction fencing) and shall be a minimum of 300 feet from the dripline of the nest tree or nest for raptors and 100 feet for shrikes. The active nest sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify any signs of disturbance. These protection measures shall remain in effect until the young have left the nest and are foraging independently or the nest is no longer active. A report shall be prepared at the end of each construction season detailing the results of the preconstruction surveys. The report shall be submitted to DFG by November 30 of each year.

(2) The County shall implement Mitigation Measures 4.6-1a, 4.6-2a, 4.6-3a, 4.6-4a, and 4.6-6a to reduce impacts on potential nesting habitat for raptors and loggerhead shrike.

With implementation of these mitigation measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-7b **Loss or Disturbance of Raptor and Loggerhead Shrike Nests – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the loss or disturbance of raptor and loggerhead shrike nests from removal of trees and shrubs associated with the loss of 1,766 acres of oak woodland, 995 acres of oak savanna, and 97 acres of scrub/chaparral habitats. This impact would be **significant**.*

This impact is the same as Impact 4.6-7a for the Preferred Plan. The amount of raptor and loggerhead shrike nesting habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-7b: Require Nest Surveys and Buffers and Implement Mitigation Measures 4.6-1a, 4.6-2a, 4.6-3a, 4.6-4a, and 4.6-6a.

This measure is the same as Mitigation Measure 4.6-7a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-8a **Loss or Disturbance of Bat Roost Sites and Loss of Foraging Habitat – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the disturbance of bat roost sites and loss of foraging habitat. This impact would be **significant**.*

At least three special-status bat species—pallid bat (*Antrozous pallidus*), Townsend’s big-eared bat (*Corynorhinus townsendii*), and Western mastiff bat (*Eumops perotis*)—occur within Solano County, and all of these species forage over a wide variety of habitat types. Total projected habitat loss for Solano County at buildout of the 2008 Draft General Plan is estimated to be up to 23,940 acres; however, the actual loss would likely be much less.

In addition to the special-status bat species, at least 12 other species can be expected to occur in the region. Six species alone were captured in a study conducted in the orchards of Suisun Valley (Walton 2005). Bats are known to roost in abandoned buildings and other human-made structures. A colony of thousands of Mexican free-tailed bats is roosting in the old Iwama Market in Suisun Valley. In addition to this large roost, a smaller bat colony of more than 100 individuals inhabits the Fairfield area and roosts under the Cordelia Road bridge over Suisun Creek (Walton 2005). Both of these locations are day roosts where bats go to rest during daylight hours; they may also become maternity roosts when the young are born.

Policy SS.P-10 in the Land Use chapter of the 2008 Draft General Plan is designed to establish neighborhood agricultural centers that expand agritourism in Suisun Valley:

- ▶ **Policy SS.P-10:** Establish neighborhood agricultural centers that expand agri-tourism in the [Suisun] Valley.

The development of agricultural tourist centers in Suisun Valley, particularly at the Iwama Market and Cordelia Road at Thomasson Lane, has the potential to result in the loss or disturbance of maternal roosting sites for bats. These are only two of the known roosting sites within Solano County. Bats are secretive animals, and not much is known about their presence within the county.

Given the large number of old barns and farm structures throughout Solano County, there is the potential that activities designated under the 2008 Draft General Plan could result in the loss or disturbance of an unknown number of maternal bat roosts. Therefore, this impact would be significant.

Mitigation Measure 4.6-8a: Require Surveys for Bat Roosting Habitat and Development of Roost Replacements, and Implement Mitigation Measures 4.6-1a through 4.6-4a.

The County shall require project applicants, as a condition of project approval, to implement the following measures to mitigate impacts on bat roost sites and foraging habitat:

(1) A qualified biologist shall be retained to conduct surveys to identify and assess bat roosting habitat on or immediately adjacent to the project site. The surveys shall be designed and of sufficient intensity to document bat roosting within 500 feet of planned work activities. Locations of active roosts shall be described and protective measures implemented. Protective measures shall include establishment of avoidance areas around each roost site. Avoidance areas shall be clearly delineated (i.e., by orange construction fencing) and shall be a minimum of 100 feet from each roost site. The active roost sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify any signs of disturbance. These protection measures shall remain in effect until the young have left the roost and are foraging independently or until the roost is no longer active. A report shall be prepared at the end of each construction season detailing the results of the preconstruction surveys.

(2) Site- and species-specific roost replacements shall be developed for roost sites lost or disturbed as a result of project construction. A roost replacement plan shall be prepared by a qualified biologist and shall be subject to review and approval by the County, in consultation with DFG.

(3) Mitigation Measures 4.6-1a through 4.6-4a shall be implemented to reduce impacts on bat foraging habitat.

With implementation of these mitigation measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-8b *Loss or Disturbance of Bat Roost Sites and Loss of Foraging Habitat – Maximum Development Scenario. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the disturbance of bat roost sites and loss of foraging habitat. This impact would be significant*

This impact is the same as Impact 4.6-8a for the Preferred Plan. The number of bat roost sites and amount of bat foraging habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-8b: Require Surveys for Bat Roosting Habitat and Development of Roost Replacements, and Implement Mitigation Measures 4.6-1a through 4.6-4a.

This measure is the same as Mitigation Measure 4.6-10a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-9a *Direct Mortality of Bats and Birds from Expansion of Wind Energy Resources – Preferred Plan. Development and establishment of wind turbines within the Wind Energy Resource Overlay proposed in the 2008 Draft General Plan under the Preferred Plan could cause significant mortality of special-status bats and raptors as well as other migratory and resident birds. This impact would be significant.*

Wind turbines are a well-documented source of avian and bat mortality, particularly for raptors (Howell and DiDonato 1991, Orloff and Flannery 1992, CEC 2004). Although the Altamont Pass Wind Resource Area has received the most scientific scrutiny and public attention, a few studies have shown that use of the Solano County Wind Resource Area in the Montezuma Hills by raptors may actually be higher than at Altamont (Orloff and Flannery 1992, Curry & Kerlinger 2006). Researchers conducting the postconstruction monitoring study of avian and bat fatality for the High Winds Wind Power Project in Solano County found 163 avian incidents and 116 bat remains during standardized surveys (Curry & Kerlinger 2006). The 163 avian incidents represented 35 species,

including seven raptor species (American kestrel, red-tailed hawk, ferruginous hawk, rough-legged hawk, white-tailed kite, golden eagle, and barn owl). There were 71 raptor incidents, 60 songbird incidents, and 22 incidents involving other avian species. The 116 bat remains represented four different species (hoary bat, Mexican free-tailed bat, western red bat, and silver-haired bat). The largest number of bat incidents occurred during the fall migration period (Curry & Kerlinger 2006).

The mortality rates of birds and bats from this study are from an area of only 6,400 acres. By contrast, the Wind Energy Resource Overlay proposed in the 2008 Draft General Plan would encompass 31,737 acres within the Montezuma Hills. The Wind Energy Resource Overlay designation would provide for and promote the development of electricity-generating wind-powered facilities. In addition to the Wind Resource Overlay, Program RS.I-37 (see “Relevant Policy and Programs of the 2008 Draft General Plan” below) would continue to allow the development of commercial wind turbines within areas zoned Exclusive Agricultural (A), Limited Agricultural (A-L), Water-Dependent Industrial (WDI), Limited Manufacturing (M-L), General Manufacturing (M-G), and Watershed and Conservation (W). This amendment would open up the majority of Solano County for the development of commercial wind turbines.

The development of and expansion of electricity-generating wind-powered facilities could result in the direct mortality of a large number of bats and birds, including several species of special concern, such as golden eagles and white-tailed kites, and neotropical migrant songbirds during their fall and spring migration periods. Given the documented long-term adverse effects of wind resource facilities on native resident and migratory wildlife species, expansion of wind energy would result in a significant impact.

Relevant Policy and Programs of the 2008 Draft General Plan

The 2008 Draft General Plan includes the following policy and programs intended to reduce the potential for mortality of bats and birds from expansion of wind energy resources:

- ▶ **Policy RS.P-56:** Encourage the use of technology or siting to minimize adverse impacts from energy production facilities on the environment, including wildlife and agricultural resources.
- ▶ **Program RS.I-37:** Amend and maintain the zoning ordinance to guide the siting of commercial, nonaccessory wind turbine installations. Include the following standards into the ordinance:
 - Require a minimum setback of 1,000 feet or three times total turbine height, whichever is greater, from a dwelling unit, residential building site, or land zoned for residential uses.
 - Require a minimum setback of three times total turbine height from any zoning district (other than residential) which does not allow wind turbines.
 - Require a minimum setback of three times total turbine height from any property line, public roadway, transmission facility, or railroad. This minimum setback may be waived in the case of wind farms located on adjacent parcels, provided an agreement has been reached between the neighboring property owners.
 - Require a setback of 1/4 mile from the right-of-way of any scenic roadway.
 - In the Cordelia Hills, wind energy development shall be set back to those areas which are beyond the sight of existing residential neighborhoods and areas planned for residential development, and setback to areas beyond view from I-80 and I-680. No turbine shall be sited within this zone.
 - Define noncommercial wind energy generators as "wind-driven machines" that convert wind energy into production of electrical power for the primary purpose of on-site use and not for resale, that are 100 feet or less in height, and that have a total rated power output of 100 kilowatts or less.

- Establish a procedure for plan check and testing of wind electric generators prior to use permit or building permit approval. Certification of all detailed plans for electrical systems, electrical substations, support towers, and foundations by California licensed professional engineers shall be required. Performance testing of wind turbine generators shall be required to ensure against catastrophic failure.
 - Include commercial wind turbine development as an allowable use in the following zone districts:
 - Exclusive Agricultural (A)
 - Limited Agricultural (A-L)
 - Water-Dependent Industrial (r-WD)
 - Limited Manufacturing (M-L)
 - General Manufacturing (M-G)
 - Watershed and Conservation (W)
 - Non-commercial wind energy development shall be allowed in districts as currently provided for in the ordinance.
- **Program RS.I-48:** During review of wind turbine generator proposals, consider the following:
- Wind turbine generators shall not be located in areas that conflict with the mission of Travis Air Force Base or other air operation facilities.
 - Submittal requirements for use permit applications within the wind resource areas include the following:
 - Following review of the applicant's site plan by county planning staff, a biological assessment would be required if it is determined that sensitive biological resources identified by the Resource Conservation Overlay (Figure RS-1 [Exhibit 4.6-2]) could be affected by the proposed project. If the proposed wind turbine siting would fall within or near areas of sensitivity, additional biological assessment of the probable impacts of the project would be required as part of the permit application. Findings of the biological assessment would determine need for biological resource monitoring and mitigation for protection of biological resources. For projects proposed in areas of low biological sensitivity, no additional biological information would be required.
 - Requirements of CEQA shall be met through the public notice and hearing process for negative declarations.
 - Additional environmental information beyond that required for permit processing would not be required for projects proposed within the wind resource areas.

(This is an abbreviated list of the points outlined within Program RS.I-48.)

- **Program RS.I-51:** Review studies and reports and incorporate recommended standards and guidelines to reduce bird and bat mortality rates. These guidelines may include new technology or alternative siting of turbines.

Conclusion

Incorporation of the above policy and implementation programs into the 2008 Draft General Plan would reduce impacts on bats and birds from the expansion of wind resources. However, this impact would still be significant.

Mitigation Measure 4.6-9a: Require Project-Specific Collision Risk Assessments, Enhanced Avoidance and Minimization Measures, Appropriate Compensatory Habitat Mitigation, and Contingency Plans.

The County shall implement the following measures to reduce the risk of direct mortality of bats and birds from the expansion of wind energy resources in Solano County:

(a) Collision Risk Assessment. Consistent with Policy RS.I-48, the County shall require project applicants for wind turbine generator proposals to include a collision risk assessment or a “Pre-permitting Assessment” as outlined in *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* as part of the application for project entitlement (CEC and DFG 2007). The risk assessment shall determine whether projected overall avian and bat fatality rates are low, moderate, or high relative to other projects and shall provide measures to avoid overall avian and bat casualties attributable to collisions with wind turbines.

(b) Avoidance and Minimization. Policy RS.P-56 encourages the use of technology or siting to minimize adverse impacts from energy production facilities on the environment, including wildlife. This policy shall be expanded to require all project proposals for the development of wind energy to implement the following measures when selecting a project site and turbine layout and developing the facility’s infrastructure:

- ▶ Fragmentation and habitat disturbance shall be minimized.
- ▶ Buffer zones shall be established to minimize collision hazards (for example, placement of turbines within 100 meters of a riparian area shall be avoided).
- ▶ Impacts shall be reduced with appropriate turbine design and layout.
- ▶ Artificial habitat for prey at the turbine base area shall be reduced.
- ▶ Lighting that attracts birds and bats shall be avoided.
- ▶ Power line impacts shall be minimized by placing lines under ground whenever possible.
- ▶ Use of structures with guy wires shall be avoided.
- ▶ Nonoperational turbines shall be decommissioned.

(c) Habitat Mitigation. The County shall require project applicants for new wind turbine generator proposals, before and as a condition of project approval, to consult with DFG, USFWS, and species experts in the development of site-specific ratios and fees to use in establishing compensation formulae. The compensation formulae shall be biologically based and reasonable, shall provide certainty about the availability and sufficiency of funds to be expended, and shall assure that the mitigation will continue to provide biological resource value over the life of the project. At a minimum, the following list of potential options shall be considered in developing compensatory mitigation:

- ▶ Off-site conservation and protection of essential habitat:
 - Nesting and breeding areas
 - Foraging habitat
 - Roosting or wintering areas
 - Migratory rest areas
 - Habitat corridors and linkages

► Off-site conservation and habitat restoration:

- Restored habitat function
- Increased carrying capacity

► Off-site habitat enhancement:

- Predator control programs
- Removal of exotic/invasive species

(d) Postconstruction Monitoring and Contingency Plans. Accurately assessing the potential for bat and bird mortality from wind resource projects is difficult, and once completed, such a project could have unanticipated fatalities. Therefore, before issuing a permit, the County shall require project applicants for any new wind turbine generator proposals to include a contingency plan to mitigate high levels of unanticipated fatalities. Permit conditions shall explicitly establish a range of compensatory mitigation options to offset unexpected fatalities and the thresholds that will trigger implementation. The need for compensatory mitigation for unexpected impacts shall be determined by postconstruction monitoring. Postconstruction monitoring shall conform to the guidelines outlined in *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (CEC and DFG 2007).

With implementation of these additional measures, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-9b Direct Mortality of Bats and Birds from Expansion of Wind Energy Resources – Maximum Development Scenario. *Development and establishment of wind turbines within the Wind Energy Resource Overlay proposed in the 2008 Draft General Plan under the Maximum Development Scenario could cause significant mortality of special-status bats and raptors. This impact would be significant.*

This impact is the same as Impact 4.6-9a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-9b: Require Project-Specific Collision Risk Assessments, Enhanced Avoidance and Minimization Measures, Appropriate Compensatory Habitat Mitigation, and Contingency Plans.

This measure is the same as Mitigation Measure 4.6-11a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-10a Loss of Habitat and Mortality of California Red-Legged Frogs – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the loss of habitat and direct mortality of California red-legged frogs. This impact would be significant.*

The California red-legged frog is federally listed as threatened. California red-legged frogs are presumed to have been extirpated from aquatic habitat on the valley floor. However, suitable California red-legged frog habitat does still exist in areas of Solano County away from the valley floor. Such habitat occurs primarily in the hills in the western portion of the county, particularly in the Vaca Mountains, Suisun Valley, and Green Valley, including Terminal Reservoir northwest of Fairfield, and the triangle of tri-city/county open space roughly defined by Interstates 80, 680, and 780 between Vallejo, Cordelia, and Benicia. However, the only known records for the frog are from the tri-city/county open-space area and the hills north of Interstate 80 (identified as the Jameson Canyon–Lower Napa River Core Recovery Area) and in the Stebbins Cold Canyon Preserve in the northwest corner of the county.

Buildout of the 2008 Draft General Plan under the Preferred Plan could result in direct loss of upland and aquatic habitat for the California red-legged frog. The majority of the impacts would occur within the Jameson Canyon–Lower Napa River Core Recovery Area, which extends into the Middle Green Valley Specific Project Area. Most potential impacts on red-legged frogs would be from development within this area and along the western edge of Fairfield in Cordelia. Development within the Fairfield MSA would likely occur after annexation into the city limits, and these impacts would be mitigated under the Solano HCP or the Solano Project BO. However, no policies are proposed in the 2008 Draft General Plan to reduce the direct loss of upland and aquatic habitat for California red-legged frogs for development projects outside of the MSA. Therefore, this impact would be significant.

Mitigation Measure 4.6-10a: Require Implementation of Specified Mitigation for California Red-Legged Frog Habitat Loss, as well as Management Plans and Applicable Funding Mechanisms.

For all proposed development sites in the western foothills in Solano County outside of the Jameson Canyon–Lower Napa River Core Recovery Area (where the presence of California red-legged frog is assumed), the County shall require project applicants to retain a qualified biologist. The biologist shall conduct surveys following standard USFWS protocols to identify and assess California red-legged frog habitat. If California red-legged frogs are present or the proposed project is located within the Jameson Canyon–Lower Napa River Core Recovery Area, the County shall require the project applicant to implement the following habitat mitigation measures as a condition of project approval:

- ▶ All projects involving development or a change of land use that would convert upland habitats to incompatible uses (certain agricultural uses may not impede frog movement in upland areas) shall mitigate impacts on specific habitat components at the following ratios:
 - 3:1 ratio for upland and seasonal wetland movement habitats
 - 4:1 for aquatic breeding and summer hydration habitats and adjacent uplands with 200 feet of the aquatic habitat
- ▶ Management plans and applicable funding mechanisms consistent with the guidance specified in Mitigation Measures 4.6-2a and 4.6-4a shall also be implemented.

With implementation of this mitigation measure, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-10b **Loss of Habitat and Mortality of California Red-Legged Frogs – Maximum Development Scenario.**
*Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the loss of habitat and direct mortality of California red-legged frogs. This impact would be **significant**.*

This impact is the same as Impact 4.6-10 for the Preferred Plan. The amount of California red-legged frog habitat potentially lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-10b: Require Implementation of Specified Mitigation for California Red-Legged Frog Habitat Loss, as well as Management Plans and Applicable Funding Mechanisms.

This measure is the same as Mitigation Measure 4.6-10a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-11a Potential for Direct and Indirect Effects on Callippe Silverspot Butterfly and Its Habitat – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in direct loss of potential upland dispersal and breeding habitat for the Callippe silverspot butterfly, as well as indirect effects. This impact would be significant.*

Buildout of the 2008 Draft General Plan could result in direct loss of potential upland dispersal and breeding habitat for the callippe silverspot butterfly. Most impacts would occur in the area northwest of Cordelia within the Middle Green Valley Specific Project Area and areas of planned rural residential development. Most potential impacts on callippe silverspot butterfly would be from development within this area and within the western edge of Fairfield in Cordelia. Development within the Fairfield MSA would likely occur after annexation into the city limits, and these impacts would be mitigated under the Solano HCP or the Solano Project BO. However, no policies are proposed to reduce direct and indirect impacts on callippe silverspot butterflies and their habitat outside of the MSA. Therefore, this impact would be significant.

Mitigation Measure 4.6-11a: Require Implementation of Specified Avoidance and Minimization Measures and Habitat Mitigation Measures for Impacts on Callippe Silverspot Butterfly.

The County shall require project applicants, as a condition of project approval, to implement the following measures to mitigate impacts on callippe silverspot butterfly and their habitat:

(a) Avoidance and Minimization. The project applicant shall implement the following measures to avoid and minimize impacts on callippe silverspot butterfly:

- ▶ *Survey.* A qualified biologist shall conduct appropriately timed surveys, consistent with the habitat inventory requirements outlined in Mitigation Measures 4.6-2a and 4.6-2b, to determine the presence of adult butterflies or any of the following habitat requirements: larval food plants (violet or Johnny jump-up), adult nectar plants, and hilltops.
- ▶ *Core Breeding Areas.* If core stands of larval viola (*Viola pedunculata*) host plants and adult nectar sources are present, these stands shall be preserved by establishing appropriate open-space buffers (minimum 300-foot buffer from incompatible uses), land dedications (including management endowment funding), and other incentives for maintaining compatible land uses. Permanent loss of core breeding habitat shall be limited to no more than 20% of any breeding habitat. Core breeding habitat is defined as, at minimum, a 1-acre block of habitat with viola density of at least 10%. The core breeding area also includes the outer edge of the viola stands where the viola density is at least one plant per square meter or 1% of the total cover.
- ▶ *Corridors.* Natural open-space corridors with a minimum width of 300 feet, oriented along hilltops and ridgelines, shall be provided to connect core stands of larval viola host plants and adult nectar sources and allow for dispersal of adults between core breeding areas.
- ▶ *Construction Windows in Buffer Zones.* Short-term construction or other incompatible land use activities within 300 feet of core stands of larval viola larval host plants or adult nectar sources and in corridor areas shall be limited to the period between August–April, when the callippe silverspot butterfly is not active (flying, feeding, mating, laying eggs).

(b) Habitat Mitigation. If callippe silverspot butterflies are present or the project would be located within areas of suitable butterfly habitat, the project applicant shall implement the following habitat mitigation:

- ▶ If the project involves development or a change of land use that would result in the conversion of upland habitats to incompatible uses, the project shall mitigate impacts on specific habitat components at a 3:1 ratio.

- ▶ The following measures shall be implemented to reduce impacts on core stands of larval viola larval host plants, adult nectar sources, and associated buffer habitats within the callippe silverspot butterfly habitat areas:
 - Additional compensatory mitigation for the conversion or loss of known or potential breeding habitat (i.e., a core breeding area) shall be provided at a 3:1 ratio, with preservation of known occupied habitat areas. Permanent loss of core breeding habitat shall be limited to no more than 20% of any breeding habitat.
 - Additional compensatory mitigation for indirect impacts from new development within 300 feet of known or potential breeding habitat shall be provided at a 1.5:1 ratio, with preservation of known occupied habitat.
- ▶ Management plans and applicable funding mechanisms consistent with the guidance specified in Mitigation Measures 4.6-2a and 4.6-4a shall also be implemented.

With implementation of this mitigation measure, in addition to the policies and programs contained in the 2008 Draft General Plan, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-11b Potential for Direct and Indirect Effects on Callippe Silverspot Butterfly and Its Habitat – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in direct loss of potential upland dispersal and breeding habitat for the Callippe silverspot butterfly, as well as indirect effects. This impact would be significant.*

This impact is the same as Impact 4.6-11a for the Preferred Plan. The amount of Callippe silverspot butterfly habitat lost under the Maximum Development Scenario would be the same as under the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-11b: Require Implementation of Specified Avoidance and Minimization Measures and Habitat Mitigation Measures for Impacts on Callippe Silverspot Butterfly.

This measure is the same as Mitigation Measure 4.6-11a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.6-12a Potential Spread of or Increase in Populations of Invasive Exotic Species – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the spread of or increases in populations of invasive exotic species. This impact would be significant.*

The 2008 Draft General Plan recognizes the potential adverse effects of invasive exotic species on the ability of Solano County to sustain its rich biodiversity. Development consistent with the plan could introduce or spread noxious weeds into currently uninfested areas, possibly resulting in the displacement of special-status plant species and degradation of habitats for special-status wildlife. Plants or seeds may be dispersed on construction equipment if appropriate measures are not implemented. In addition, a study conducted in Sonoma County showed that dividing large undeveloped oak woodland parcels into smaller 10- to 40-acre rural residential lots increased the number of exotic plants (Merenlender 1998, as cited in Giusti et al. 2005).

Noxious weeds are sorted by “pest ratings” by the California Department of Food and Agriculture, with the highest priority weeds rated “A,” and by the California Exotic Pest Plant Council, with the highest priority weeds rated “A-1” or “A-2.” Executive Order 13112 (February 3, 1999) calls for the issuance of a national Invasive Species Management Plan and encourages local planning and action against invasive species consistent with this plan. However, noxious weeds could spread or increase within Solano County as a result of activities consistent

with the 2008 Draft General Plan. Because the 2008 Draft General Plan contains no specific policies or implementation programs regarding prevention of the spread of invasive exotic species, this impact would be significant.

Mitigation Measure 4.6-12a: Require Avoidance and Minimization Measures and Implementation of Invasive Exotic Species Management Plans.

The County shall require project applicants, as a condition of project approval, to implement the following measures to avoid the spread of or increase in populations of invasive exotic species:

(a) Avoidance and Minimization. Project applicants in areas of potential noxious weed infestations shall hire a qualified botanist to identify and map infestation areas before commencement of construction. Construction activities shall avoid infestation areas, if feasible. If avoidance is infeasible, construction supervisors shall be educated regarding weed identification and the importance of controlling and preventing the spread of noxious weed infestations. Construction equipment that comes into contact with a noxious-weed infestation area shall be cleaned at a designated wash station after leaving the infestation area. The location of the wash station shall be designated by the qualified botanist in coordination with the construction supervisor.

(b) Invasive Exotic Species Management Plans. Development projects that require habitat mitigation shall implement control programs for invasive exotic species as part of restoration and management plans. These plans shall include a monitoring and maintenance component that details the procedures for preventing recurrence and spread of invasive exotic species such as yellow star thistle, purple star thistle, Medusa-head, goatgrass, perennial pepperweed, Russian thistle, and any other noxious weed species.

With implementation of this mitigation measure, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.6-12b Potential Spread of or Increase in Populations of Invasive Exotic Species – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the spread of or increases in populations of invasive exotic species. This impact would be significant.*

This impact is the same as Impact 4.6-12a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.6-12b: Require Avoidance and Minimization Measures and Implementation of Invasive Exotic Species Management Plans.

This measure is the same as Mitigation Measure 4.6-14a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

4.6.4 RESIDUAL SIGNIFICANT IMPACTS

With implementation of the mitigation described above, all impacts on biological resources would be reduced to a less-than-significant level. No residual significant impacts would exist.

4.7 GEOLOGY AND SOILS

4.7.1 ENVIRONMENTAL SETTING

This section presents the geologic and seismic hazards as well as the soil and mineral resources in Solano County. The topics in this section overlap with Section 4.1, “Land Use,” and Section 4.8, “Agricultural Resources,” of this EIR. The Geology and Soils Background Report prepared for this EIR (Solano County 2006a) was the primary source of information for this section, and contains additional details about geological conditions in Solano County.

TOPOGRAPHY AND REGIONAL GEOLOGY

Mountains and valleys dominate the western part of Solano County, extending from the Carquinez Strait close to the city of Benicia north through Green Valley and Pleasants Valley into Napa County toward Lake Berryessa. These mountain ranges and associated valleys are:

- ▶ the Sulfur Springs Mountains and Sky Valley, located north of Benicia and east of Vallejo;
- ▶ the Chimiles, Green Valley, and Suisun Valley northwest of Fairfield; and
- ▶ Blue Ridge, Pleasants Valley, and the English Hills north of Vacaville.

Flat broad valleys, marshes, sloughs, bays, islands, and low-lying hills associated with the Sacramento River Alluvial Fan dominate the south and east parts of Solano County. Major topographic features in the southern and eastern parts of the county are:

- ▶ Suisun Slough, Suisun Marsh, Grizzly Bay, Suisun Bay, Honker Bay, Grizzly Island, and the Potrero Hills, south of Suisun City;
- ▶ the Montezuma Hills, Kirby Hill, and Montezuma Slough, west of Rio Vista; and
- ▶ Lindsay Slough, Cache Slough, Skag Slough, and the Sacramento River Deep Water Ship Channel, north of Rio Vista.

Geologic structural subunits within Solano County as mapped by the U.S. Geological Survey (USGS) are separated into three categories: Quaternary surficial deposits, early Pleistocene and older rocks, and the Franciscan Complex. The Franciscan Complex has surficial outcrops in the west and north of the county but most likely underlies most of the county’s other geologic subunits. Geologic complexes within Solano County are shown in Exhibit 4.7-1. Of the geologic complexes listed within Solano County, the Franciscan Complex has a high potential to contain ultramafic rock, and therefore serpentinite and asbestos. Refer to the “Asbestos” section below for more information related to the potential location of asbestos-containing rocks.

Holocene Alluvium (Holocene: Recent–10,000 years old)

These Late Holocene alluvial deposits overlie older Pleistocene alluvium and/or the upper Tertiary bedrock formations. This alluvium consists of sand, silt, and gravel deposited in fan, valley fill, terrace, or basin environments. This unit is typically in smooth, flat valley bottoms, in medium-sized drainages, and other areas where terrain allows a thin veneer of this alluvium to deposit, generally in shallowly sloping or flat environments (Graymer et al. 2002).

Pleistocene Alluvium (Pleistocene: 10,000–1.8 million years old)

The majority of alluvium in the central and eastern portion of the county consists of sedimentary deposits that are Plio-Pleistocene in age. These less permeable sediments are basin, landslide intertidal, terrace, or riverbank deposit.

Montezuma Formation (Plio-Pleistocene: 10,000–3.6 million years old)

Another quaternary deposit within the county is the Montezuma Formation, which makes up the majority of the Montezuma Hills between Collinsville and the city of Rio Vista. The Montezuma Formation is a delta-deposited conglomerate consisting of poorly consolidated reddish-orange mudstone, sands, silts, and gravels.

The Tehama Formation (Pliocene: 1.8–5.3 million years old)

The Tehama Formation lies directly below the Montezuma Formation, and is exposed between the Montezuma Hills and the Kirby Hills, as well as north of Vacaville. This formation is composed of sandstone, siltstone, conglomerate, and volcanoclastic (ash fragments) rocks (Wagner et al. 1987, Graymer et al. 2002). This formation is associated with, and can be identified by the Putah Tuff member which yielded a radiometric age of 3.3 million years (Miller 1966).

Neroly Sandstone (Late Miocene: 5–15 million years old)

This formation is exposed near Vacaville and consists of blue-gray, fine- to coarse-grained sandstone, but can locally contain tuffaceous sandstone, tuffaceous mudstone, as well as conglomerates.

Putnam Peak Basalt (Miocene: 5–23 million years old)

The Miocene Putnam Peak Basalt is exposed in the southwestern hills of the county north of Vallejo and Benicia. This basalt is perhaps the remnant of extensive flood basalts that extended from the Sierra Nevada to the Coast Range. This igneous rock unit locally contains columnar jointing.

The Sonoma Volcanics (Pliocene to late Miocene: 1.8–15 million years old)

The Sonoma Volcanics are extensively exposed in the southwestern portion of the county, especially near Green Valley. This igneous rock unit consists predominantly of andesite and rhyolite, which can be subdivided into at least three volcanic sequences of different ages and eruptive sources, all of which flank active faults that parallel the San Andreas Fault System (Clahan 2005).

The Markley Shale (Eocene: 35–55 million years old)

The Markley shale is exposed northwest of Vacaville in the Potrero Hills and in a thin band between the Montezuma Hills and the Potrero Hills. This light grey or white shale weathers yellow and tan, and contains sandstone locally.

Nortonville Shale (Eocene: 35–55 million years old)

The Nortonville Shale is a brown to gray mudstone with minor amounts of siltstone and sandstone, and is the only member of the Kreyenhagen Formation exposed in the county. This geologic unit is exposed in a thin band along the foothills of the Potrero Hills and in the north-south trending Pleasants Valley.

Domengine Sandstone (Eocene: 35–55 million years old)

The Domengine Sandstone is gray-weathered, locally crossbedded white sandstone and is exposed within the county along the foothills of the Potrero Hills just west of the Green Valley fault.

Vacaville Shale (Eocene: 35–55 million years old)

This geologic unit is made up of brown, thin-bedded and laminated mudstone and gray shale.



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Exhibit 4.7-1

Geologic Subunits

Legend

Quaternary

- Holocene Alluvium
- Pleistocene Alluvium
- Montezuma Formation

Upper Tertiary

- Tehama Formation
- Neroly Sandstone
- Putnam Peak Basalt
- Sonoma Volcanics

Lower Tertiary

- Capay Formation
- Markley Formation
- Nortonville Shale
- Domingene Sandstone
- Vacaville Shale
- Martinez Formation

Mesozoic

- Forbes Formation
- Guinda Formation
- Funks Formation
- Sites Formation
- Yolo Formation
- Venado Formation
- Undivided
- Franciscan Complex

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Great Valley Sequence



Source: USGS Open File Report 97-744, Solano County GIS 2006, CASIL1993 and 1996

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Capay Formation (Eocene: 35–55 million years old)

In the county, the Capay Formation is exposed near the Potrero Hills. The formation varies in thickness between 10 feet and 500 feet and consists of a shale and sandstone unit, which is dated as Eocene.

Martinez Formation (Paleocene: 55–65 million years old)

The Martinez Formation consists of massive, medium- and coarse-grained sandstones. The formation is approximately 3,100 feet thick with a 1,500-foot lower sandstone unit and 1,600-foot upper sandy shale.

Forbes Formation (Late Cretaceous: 65–100 million years old)

The Forbes Formation consists of massive beds of fine- to coarse-grained wacke with shell fragments that grades into interbedded siltstone and shale.

Guinda Formation (Late Cretaceous: 65–100 million years old)

The Guinda Formation is a thick-bedded to massive, coarse- to fine-grained wacke that grades up into gray siltstone and shale.

Funks Formation (Late Cretaceous: 65–100 million years old)

The Funks Formation consists of a tan weathering, gray marine siltstone and mudstone. This geologic unit also includes thin beds of wacke.

The Sites Formation (Late Cretaceous: 65–100 million years old)

The Sites Formation consists of thick-bedded, laminated gray wacke, and thick beds of dark gray carbonaceous siltstone.

The Yolo Formation (Late Cretaceous: 65–100 million years old)

The Yolo Formation is distinctly and moderately thick-bedded, fine- to coarse-grained sandstone with mudstone and siltstone locally.

The Venado Formation (Late Cretaceous: 65–100 million years old)

The Cenomanian (93–99 million years old) Venado Formation consists of more than 1,000 feet of massive sandstone, shale, and conglomerate.

Franciscan Complex (Late Jurassic and Early Cretaceous: 100–160 million years old)

The Franciscan Group is an aggregate of various marine rock types ranging from ultramafic volcanic rocks to sedimentary rocks. Franciscan sandstones are adjacent to and underlie the county.

VOLCANIC ACTIVITY

Solano County is within the Northern Coast Range region of the Pacific Mountain System. The Pacific Mountain System region is one of the most geologically young and tectonically active in North America (USGS 2006). The generally rugged, mountainous landscape of this province provides evidence of ongoing mountain-building. The Pacific Mountain System straddles the boundaries between several of Earth's moving plates—the source of the monumental forces required to build the sweeping arc of mountains that extends from Alaska to the southern

reaches of South America. This province includes the active and sometimes deadly volcanoes of the Cascade Range and the young, steep mountains of the Pacific border and the Sierra Nevada.

The Northern Coast Range mountain system extends north from San Francisco Bay to the South Fork Mountains of northern Humboldt County. This mountain range consists of two parallel belts of mountains: one along the coast, and the other farther inland. The two belts of mountains are separated by a long valley that is drained by the Eel River, the Russian River, and their tributaries as well as several short rivers that drain the western slopes of the range. The Clear Lake volcanic field lies within the Northern Coast Range approximately 100 kilometers north of Solano County (Topinka 1997). Volcanism in the Clear Lake volcanic field is considered to be largely nonexplosive. One major airfall tuff and no ash flows have occurred in this field. The latest eruptive activity occurred approximately 10,000 years ago (Wood and Kienle 1990)

Solano County is not located within the Clear Lake Volcanic Field or within that portion of the Clear Lake area subject to potential hazards from future eruptions. There are no documented volcanoes in the county, and no known risks associated with volcanic activity.

SEISMICITY

Solano County is located within an area of Northern California known to be seismically active. Seismic activity may result in geologic and seismic hazards: seismically induced fault displacement and rupture, ground shaking, liquefaction, lateral spreading, landslides and avalanches, and structural hazards. Exhibit 4.7-2 shows the location of earthquake epicenters, known faults, and areas most likely to experience significant damage from earthquake-related ground shaking.

Earthquakes are measured based on either energy released (Richter Magnitude scale) or the intensity of ground shaking at a particular location (Modified Mercalli scale). The Richter Magnitude scale measures the magnitude of an earthquake based on the logarithm of the amplitude of waves recorded by seismographs, with adjustments made for the variation in the distance between the various seismographs and the epicenter of the earthquake. The Richter scale starts with 1.0 and has no maximum limit. The scale is logarithmic—an earthquake with a magnitude of 2.0 is 10 times the magnitude (30 times the energy) of an earthquake with a magnitude of 1.0. The Modified Mercalli scale is an arbitrary measure of earthquake intensity; it does not have a mathematical basis. This scale is composed of 12 increasing levels of intensity that range from imperceptible shaking (Scale I) to catastrophic destruction (Scale XII). Table 4.7-1 provides a description of the Modified Mercalli Intensity scale.

Faults

Geologic evidence indicates that Solano County is laced with a number of faults—fractures or fracture zones in the earth's crust along which there has been displacement of the two sides relative to one another parallel to the fracture. The displacement may be a few inches to several feet. Cumulative displacement through geologic time may reach miles.

If any surface displacement in excess of an inch or two along one of these faults were to occur beneath a building, transportation facility, main utility line, or aqueduct, the effects could be catastrophic. Therefore, it is important to know the relative likelihood of future movement along these faults and to plan accordingly.

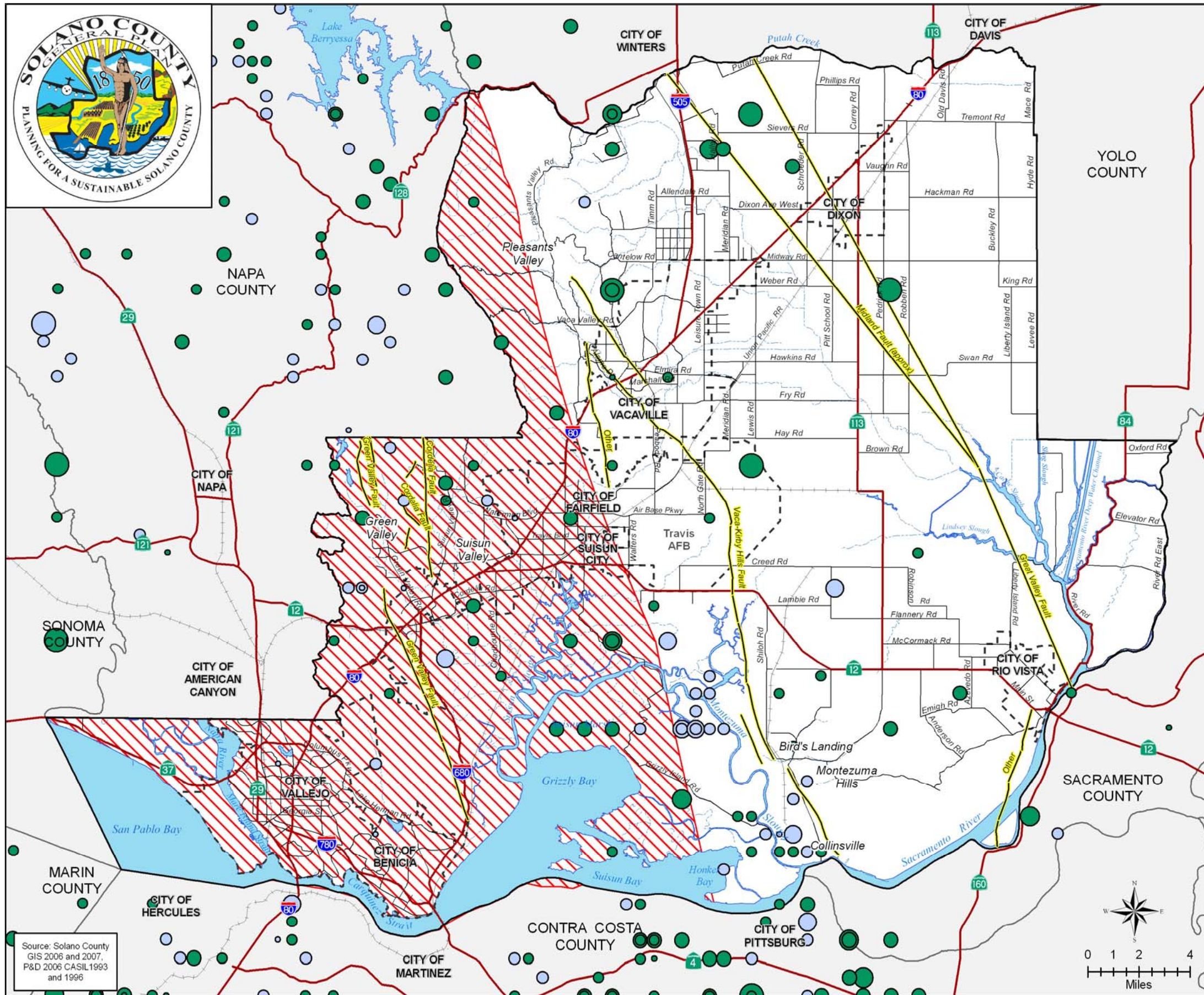
Faults in Solano County include the Green Valley Fault, the Cordelia Fault, the Midland–Rio Vista Fault, and the Vacaville–Kirby Hills Fault, as well as the Carneros–Franklin Fault and the Great Valley Thrust. Known fault traces are shown on Exhibit 4.7-1. Some are considered active (i.e., capable of displacement in the near future). Others, although not recognized as active, must be considered as potentially active until they are investigated more closely. Table 4.7-2 presents known faults in Solano County, as well as faults in surrounding areas which might be expected to affect Solano County.



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Exhibit 4.7-2

Regional Seismicity



Legend

NEIC Earthquakes (1974 - Present)

Magnitude

- 1.9 - 2.5
- 2.6 - 3.5
- 3.6 - 4.9
- 5.0 - 5.2

NEIC Earthquakes (1889 - 1973)

Magnitude

- 0.0
- 0.1 - 2.5
- 2.6 - 3.5
- 3.6 - 4.9
- 5.0 - 6.4

— Fault Locations

▨ Highest Potential Earthquake Damage Area

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- - - Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006 and 2007, P&D 2006 CASIL1993 and 1996



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**Table 4.7-1
Modified Mercalli Index**

Intensity	Effect
I	Not felt. Marginal and long period effects of large earthquakes.
II	Felt by persons at rest, on upper floors, or favorably placed.
III	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV, wooden walls and frame creak.
V	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
VI	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle).
VII	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
VIII	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluvial areas sand and mud ejected, earthquake fountains, sand craters.
X	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
XI	Rails bent greatly. Underground pipelines completely out of service.
XII	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.
<p>Notes:</p> <p>Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.</p> <p>Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.</p> <p>Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.</p> <p>Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.</p> <p>Source: ABAG 2003</p>	

Active Faults

An active fault is one along which historic movement has been documented. Active faults are recognized by the following criteria:

- ▶ Historic fault movement
- ▶ Displacement of Holocene deposits (soil or rock less than 10,000 years old)
- ▶ Evidence of fault creep (slow ground displacement without accompanying seismic events)
- ▶ Seismic activity along fault plane
- ▶ Displaced survey lines
- ▶ Geomorphic evidence (including offset stream courses, sag ponds, scarps, fault troughs, and fault saddles)

Fault Source	Approximate Distance and Direction	Historic Seismicity	Maximum Moment Magnitude (Mw)
Cordelia	In County	Not published	Not published
Concord/Green Valley	In County	Historic active creep	6.9
Great Valley Thrust	In County	Mw 6.0, 1889 Mw 6.8, 1892 Mw 5.5, 1902 Mw 6.4, 1983	6.6
Vacaville–Kirby Hills–Pittsburg	In County	M < 4	Not published
Midland-Rio Vista	In County	None within last 700,000 years	Not published
Carneros-Franklin	In County	M 6.4 (1898)	6.4
West Napa	5 miles west	2003	6.5
Hunting Creek–Berryessa	5 miles	Holocene active	6.9
Clayton–Marsh Creek Greenville	8–9 miles south-southwest	M 5.8, 1980	7.0
Rodgers Creek	5–10 miles west	Holocene active	7.0
Mt. Diablo Thrust	10–12 miles southwest	Holocene active	6.7
Calaveras	15 miles south-southwest	M 5.6–M 6.4, 1861 M 4–M 4.5 swarms 1970 1990	6.8
Hayward	30 miles west	M 6.8, 1868 M 5.6, 1889 Many < M 4.5	7.1
San Andreas	45 miles west	M 7.1, 1989 M 8.25, 1906 M 7.0, 1838 Many < M 6	7.9
Maacama	50 miles N/NW	M 4.8, 1977	6.9
Source: CGS/USGS 1996			

At present, segments of only two faults in Solano County are known to be active: the Green Valley Fault and the Concord Fault. The trace of the Concord Fault trends northwestward through the City of Concord into Solano

County, just northeast of Benicia. It has been studied in detail by Robert Sharp (1973), who documented right lateral creep along the fault trace. In 1955, an earthquake of Magnitude 5.4 occurred on the Concord Fault, causing population centers in the planning area to experience intensities of V–VI (maximum intensity at the epicenter was VII). This was sufficient to break windows and glassware and crack plaster.

The Green Valley Fault has been the focus of past studies by the California Division of Mines and Geology (Dooley 1972), and is currently being investigated by USGS. This fault trends northwest along the eastern front of the Benicia Hills and appears to have right lateral offset (Dooley 1972), which means that the western side has moved northward relative to the eastern side, or vice versa. The fault shows many features associated with recent activity: offset fences and power lines, location of microearthquake epicenters along the fault trace, scarps in Holocene alluvium, disrupted drainage patterns, and a conspicuous alignment of topographic depressions and saddles.

The Green Valley Fault has also been investigated by a number of consultants in connection with proposed development projects in Green Valley. These investigations have included trenching and geophysical surveys, and have provided additional evidence of recent activity. Although the fault can be traced from Suisun Bay northward across the county line, definitive evidence of activity is lacking north of where it crosses Green Valley Creek. The heavy vegetative cover in these areas makes both aerial photographic and field studies difficult.

Both the Concord Fault and the Green Valley Fault (south of the Green Valley crossing) have been designated as active faults by the state, and have been included in Special Studies Zones under the Alquist-Priolo Geologic Hazards Zones Act (Chapter 7.5, Division of Public Resources Code). The zone of actual rupture on a fault is generally small compared to the area that is subjected to severe ground shaking. Displacement along the Green Valley Fault could be as much as 2½ feet for an earthquake of Magnitude 6+. It is possible to greatly reduce damage from such fault rupture by avoiding construction on active fault traces.

Fault rupture along the Green Valley Fault can be expected to cause damage to Interstate 80 (I-80), State Routes (SRs) 12 and 21, and the Southern Pacific Railroad line through Cordelia. Freeway overcrossings may be displaced or may collapse as a result of fault movement. Designated county evacuation routes to the south, I-80 and I-680, should not be relied upon as postearthquake routes since they are subject to blockage by earthquake-induced damage or collapse.

A number of water, gas, and oil pipelines cross active segments of the Green Valley Fault within the county and could create flooding, fire, and pollution problems if earthquake-induced rupture were to occur. There are several ways, however, to reduce the hazard of pipeline rupture. Smaller fault displacements can be accommodated by expansion joints or flexible piping at fault crossings. New oil and water mains are often provided with this or similar features when laid across a known active fault. Natural gas, oil, and water pipelines are often equipped with pressure-operated shutoff or block valves that stop transmission when there is free flow somewhere in the line.

The Southern Pacific Pipeline Company (Main Office, Los Angeles) has two pipelines that cross the Green Valley Fault, paralleling the Southern Pacific Railroad alignment from Suisun City to Benicia. These are both petroleum pipelines, one 7 years old and one 10 years old. The block valves nearest to the Green Valley Fault crossing are at Benicia to the south and Suisun City to the north. No automatic valving is used on these lines.

Pacific Gas Transmission Company operates three major gas transmission lines that cross the Green Valley Fault. A 10-inch line to Marin and a 16-inch line to Sonoma have been laid westward from Cordelia through Jameson Canyon. A third pipeline brings gas to Vallejo from the two other lines in Cordelia. Block valves at the company's Cordelia Regulation Station can shut off flow to all lines crossing the fault. Valves on the other side of the fault are located 2 miles west of Cordelia, in Jameson Canyon, and about 6 miles south of Cordelia (Sedway/Cooke 1977).

Other Faults

Although other faults in the county are not considered active, it should not be assumed that all of them are inactive. Often faults are not recognized as active until the urbanization process allows them to be analyzed more closely. For example, the accurate determination of microearthquake epicenters requires a sufficient network of seismograph stations around the area of interest. However, such networks are usually installed in high-priority areas where earthquake research is important (i.e., in urban areas of high seismicity). The National Center of Earthquake Research (a branch of USGS) expanded their detection network to include most of southern Solano County. When current investigations are published, the pattern of microseismic activity within the county may suggest other faults that could be active (Sedway/Cooke 1977).

Leighton and Associates (1975) considered the Franklin and Southampton Faults to be potentially active because their trend and sense of movement suggest that they may be part of the Calaveras Fault system. They have recommended more detailed study of these and several smaller faults in the Vallejo area. Several other faults within the county—the Vaca Valley Fault, the Kirby Hills Fault, and the Lagoon Valley Fault—could be active. Activity on the Midland Fault is also unknown. It was discovered by oil and gas explorations in the eastern part of the county, and represents a displacement of rocks 3,000–4,000 feet below the surface, but has no known surface expression. If this fault was to prove active and an earthquake were to occur on it, surface rupture would be unlikely, but considerable damage from ground shaking could be expected (Sedway/Cooke 1977).

Earthquake Probability

USGS data for historic earthquakes indicate that several earthquakes have occurred between 1889 and the present as shown in Exhibit 4.7-2. These earthquakes ranged in magnitude from less than 1.0 to 6.4 on the Richter scale. Rupture along one of the faults has the potential to generate an earthquake of a similar or higher magnitude than those that have historically occurred in the county.

Ground Shaking

Solano County is an area of relatively high seismicity and will be subject to earthquake shaking in the future. No part of the county will be free from the effects of seismic shaking. Earthquake-triggered landslides are a potential major problem that can be induced by only moderate ground shaking. Ground failure in the form of liquefaction, lurching, and settlement could also result from shaking. Flood damage from earthquake-induced dam failure, canal and levee damage, and tsunamis and seiches are also threats. Each of these topics is discussed elsewhere in this EIR.

Depending upon the magnitude, proximity to epicenter, and subsurface conditions (bedrock stability and the type and thickness of underlying soils) present at a given point beneath the earth's surface, ground shaking damage would vary from slight to intensive. For example, the wet unconsolidated soils of the Suisun Marsh would have a high ground response, while areas of hard rock generally would experience lower intensities of shaking, but would be subject to other earthquake-induced hazards such as landslides. The peat and organic soils found within the Sacramento–San Joaquin Delta (Delta) would experience large-scale amplification of seismic waves.

Liquefaction

Soil liquefaction results from loss of strength during earthquake shaking. The most susceptible soils are loosely consolidated, water-saturated soils. Under certain conditions, loosely consolidated soils may tend to amplify shaking and increase structural damage. Water-saturated soils compound the problem because of their susceptibility to liquefaction and corresponding loss of shear strength.

The liquefaction of soils can cause them to move laterally outward from under buildings, roads, pipelines, transmission towers, railroad tracks, and other structures such as bridges. Damage is usually greatest to large or heavy structures on shallow foundations, and takes the form of cracking, tilting, and differential settlement.

Where gentle slopes exist, such as on stream or slough banks, liquefaction may also cause lateral-spreading landslides. Whole buildings can be moved downslope by this type of ground failure. Where the condition is known to exist, proper structural and foundation design can usually minimize or eliminate liquefaction hazards to new construction.

Soil layers with high liquefaction potential are present in the existing and former marsh areas of the county, which are underlain by saturated bay mud. Portions of the county subject to liquefaction are shown in Exhibit 4.7-3.

Liquefaction potential in Solano County has increased in recent years because of a rising water table in many parts of the county. Before 1958, the primary source of agricultural water was local wells drilled into the Tehama Formation, an extensive aquifer in the central and eastern parts of the county. However, by 1959, surface water from the Putah South Canal was available at low agricultural rates, and many irrigation wells were abandoned. The cessation of pumping in agricultural areas has resulted in a dramatic groundwater rise since 1959. Where these water conditions are combined with loose, fine-grained sands (i.e., prime agricultural soils), liquefaction potential is high.

Tsunamis and Seiches

Tsunamis are long-period waves commonly caused by vertical faulting of the ocean floor. Such earthquake-associated waves (often erroneously called tidal waves) can cause considerable damage when they reach shallow coastal areas. Although Thailand, Indonesia, India, Japan, Alaska, Hawaii, and California have all experienced damaging tsunamis, such waves do not reach the California coast very often. Ritter and Dupre (1972) estimated that the frequency interval of a tsunami with a 20-foot run-up at the Golden Gate is about once every 200 years. (The amount of run-up is the vertical height above still-water level that the rush of water reaches.) A 30-foot wave might be expected every 500 years. However, a study made in 1960 and 1964 indicates that a tsunami entering San Francisco Bay would be reduced in height by 50% as it passes Point San Pedro, and by 90% before reaching Carquinez Strait (Ritter and Dupre 1972). The only areas of the county that would be subject to inundation tsunamis are the southwestern part of Mare Island and Island No. 1 southwest of SR 37. The possibility of a tsunami being generated in San Pablo Bay (by the Hayward Fault, for example) was also considered. However, the shallowness of the bay, and the predominant strike-slip motion of the active faults crossing the bay, indicate that such an event is unlikely. Even if a tsunami were to occur, the resulting wave would not be high enough to inundate large areas.

A seiche is a stationary wave produced in reservoirs, lakes, and other closed or restricted bodies of water by ground shaking. The phenomenon is similar to the oscillations which result when a bowl of water is shaken. When they occur in large reservoirs, such waves can cause overtopping of dams, posing a serious threat to adjacent areas.

Structural Hazards from Earthquakes

Earthquake-generated ground shaking is by far the greatest single cause of earthquake damage. Solano County has a history of earthquake shaking that goes back more than 150 years. Important historic earthquakes are listed in Table 4.7-3.

Different types of structures are subject to different levels of ground shaking damage. Conventional one- and two-story wood-frame residential structures generally have performed very well during strong earthquake ground shaking. Collapse or total destruction of wood-frame homes is rare, even during strong earthquakes, except in cases where these structures are affected by ground rupturing or landsliding, or are affected by extremely high ground acceleration. For example, several famous photographs taken after the great 1906 San Francisco earthquake showed wood-frame homes standing intact and apparently undisturbed just a few feet away from the main scar of ground rupturing along the San Andreas Fault line (Sedway/Cooke 1977).

**Table 4.7-3
Historic Earthquakes within 50 Miles of Solano County with Magnitude Greater than VI**

Date	Epicentral Area (Earthquake Fault)	Maximum Intensity
June 9, 1836	East San Francisco Bay (Hayward Fault)	IX–X
June 10, 1838	San Francisco/San Mateo County (San Andreas Fault)	IX–X
October 8, 1865	Santa Cruz Mountains (San Andreas Fault)	IX
October 21, 1868	East San Francisco Bay (Hayward Fault)	X
April 19, 1892	Vacaville (unknown fault)	IX
April 21, 1892	Winters (unknown fault)	IX
October 11, 1891	Napa/Sonoma	VII–VIII
May 19, 1902	Elmira/Vacaville	VI–VII
April 18, 1906	San Francisco (San Andreas Fault)	XI
October 23, 1955	Concord	VII
October 1, 1969	Santa Rosa	VII–VIII
October 17, 1989	Loma Prieta	IX

Sources: Bonilla and Buchanan 1970, USGS 2006

Studies of more recent earthquakes show that the following types of structural damage from earthquake shaking can be expected to occur to some modern wood-frame homes of the type found in Solano County:

- ▶ Possible shifting of homes on foundations. This problem has been minimized in recent years by requirements that adequate structural connection between house frames and foundations be provided.
- ▶ Damage to masonry chimneys or facades. Damage or toppling of unreinforced brick walls or chimneys commonly occurs in strong ground shaking. Code-required reinforcement and chimney ties can help minimize damage, but will not prevent it completely.
- ▶ Falling of unbraced water heaters, with possible fire hazard.
- ▶ Cosmetic damage, especially cracking of plaster, and some glass breakage.

Damage to unconventional “custom” type houses is often more severe in earthquakes (Sedway/Cooke 1977).

Not surprisingly, the damage ratio, expressed as a percentage of loss of value to the “average” residential area caused by an earthquake, becomes higher with increasing intensity of ground shaking. Studies with estimates applicable to typical Bay Area conditions suggest that the damage ratio associated with various intensities of shaking would be approximately as shown in Table 4.7-4. Thus, a rough estimate of the levels of housing damage expected in the county in a great earthquake, with intensity values of VIII–IX, would be on the order of 10% of the value of all housing.

Commercial and industrial buildings are more difficult to classify than tract housing, because of the variety of building types found in the county. In older areas, one- and two-story wood frame and stucco structures could be expected to show fair performance in earthquakes. Older unreinforced masonry buildings, however, particularly those constructed prior to 1933 (when improved building codes were adopted in California), are not resistant to



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Exhibit 4.7-3

Liquefaction Hazards

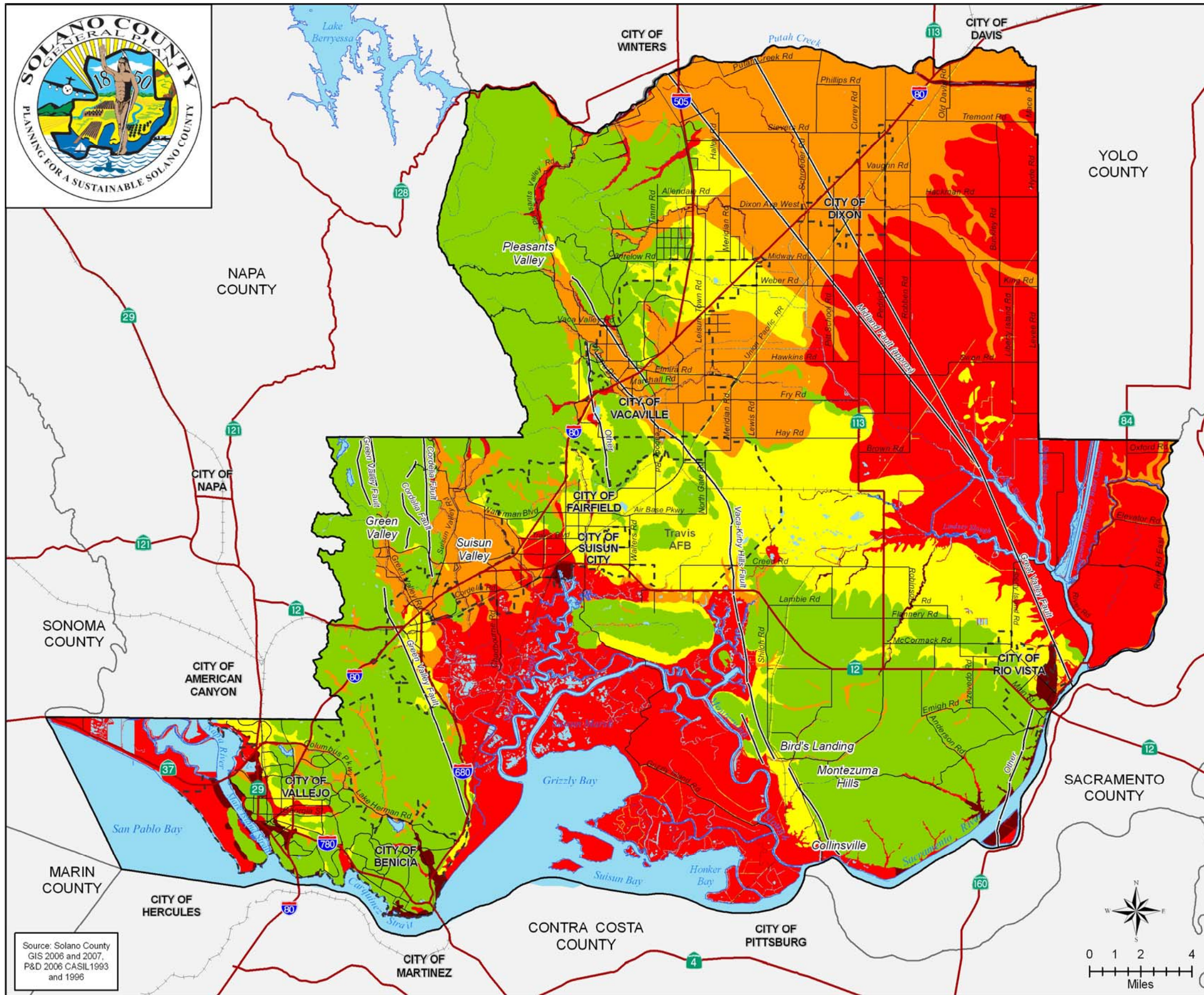
Legend

Liquefaction Potential

- Very Low
- Low
- Moderate
- High
- Very High
- Area Not Mapped

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties



Source: Solano County GIS 2006 and 2007, P&D 2006 CASIL1993 and 1996

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earthquake shaking and may be severely damaged during strong shaking. The fall of decorative masonry parapets and cornices sometimes found on such buildings had been a major cause of injuries during previous quakes (Sedway/Cooke 1977).

A small number of pre-1933 masonry buildings in the county may present public safety hazards during seismic shaking, since they were constructed prior to seismic-related revisions to the building code. An intensity value of VIII–IX on the Modified Mercalli Scale will probably cause partial or total collapse of at least one or two of these structures. Two-story masonry buildings are particularly susceptible to major damage and collapse during an earthquake.

**Table 4.7-4
Mercalli Scale Shaking Intensity**

Intensity	Damage Ratio Percentage
V	0.1
VI	0.5
VII	2.5
VIII	8.3
IX	12.1

Source: California Division of Mines and Geology 1965

With regard to newer buildings, single-story wood-frame or tilt-up construction has generally sustained only moderate damage during earthquake shaking, although past experience in San Fernando suggests that minimum code requirements with respect to roof-to-wall connections in tilt-up buildings may not be adequate to assure public safety, especially in high-occupancy commercial buildings. Hence, roof or wall collapse must be considered a possibility in at least a minority of tilt-up buildings during VIII–IX intensity shaking. During a strong earthquake, the damage and safety of tilt-up buildings in industrial areas would depend to some degree on the special structural design precautions and care in supervision of construction which had been provided to these buildings (Sedway/Cooke 1977). This, of course, would depend mainly on the owner of the building, with the county’s or city’s responsibility being limited to a general plan check or spot inspection aimed at assuring conformance with code requirements.

Freeway and railroad interchanges in Solano County could also be susceptible to collapse as a result of earthquake shaking. The Loma Prieta earthquake of 1989 (Magnitude 7.1) resulted in the total or partial collapse of seven interchange structures and damage to a number of others. In general, all bridges in Solano County on the state highway system have been examined and the most vulnerable retrofitted to no-collapse criteria. This ensures that in the most devastating of seismic events, bridges closest to the event may be damaged, in some cases requiring closure, but will not collapse. In moderate events the bridges will remain serviceable with modest to no repairs being required. Although no bridge is invulnerable, newer bridges will generally have the best performance, because design is based on the most recent research in seismic performance (Sikorsky, pers. comm., 2006).

Lurch cracking is another phenomenon that occurs during earthquake ground shaking and involves the horizontal movement of soil masses toward the open face of creek banks. Creekside homes are especially vulnerable to damage from lurch cracking.

Despite these generalizations, the extent to which a specific structure is damaged is a function of the design and construction quality of the particular building and the local soil conditions. The specific characteristics of shaking that can be expected at a given site and the reaction of a certain type of structure to such shaking must be determined on an individual basis by site investigation.

SLOPE STABILITY AND LANDSLIDING

Landslides, land slips, mudflows, and debris flows have been the subject of numerous studies in the San Francisco Bay region. In this geologically young area, continued uplift of the Coast Range has resulted in widespread susceptibility to mass movement, particularly in upland areas. The use of aerial photos to map landslides has shown that these mountainous areas are frequently covered by massive landslides a mile or more in length. The age of these giant landslide features is not well known, but some of them probably originated in a period of greater rainfall several thousand years ago. Despite their age, these large landslides are generally quite unstable, and can be reactivated by grading operations or other development activities.

Landslide susceptibility is a function of various combinations of factors: rainfall, rock and soil types, slope, aspect, vegetation, seismic conditions, and human construction. Currently, USGS is preparing a slope instability map based on the premise that landslides occur most often on slopes steeper than 15%, in areas with a history of landslides, and in areas underlain by certain geologic units. A brief description of all five categories is presented here, along with the distribution of each category throughout the county.

Category 1

Areas of 0–5% slope, which are not underlain by known landslide deposits or other deposits known to be unstable at low slope angles, are Category 1 areas. Although generally stable, locally steep slopes (such as along water courses) may be susceptible to slope failures. Category 1 consists primarily of the floodplain area located between Montezuma Hills and Putah Creek.

Category 2

Category 2 includes areas of 5–15% slope that are not underlain by landslide deposits or other deposits highly susceptible to slope failure on moderate slopes. Category 2 lands are found throughout the western half of the county, especially in the Vallejo/Benicia area and east of the English Hills.

Category 3

Category 3 includes areas of greater than 15% slope that are not underlain by landslide deposits or other bedrock units susceptible to landslides. This category is generally stable, but may include small unmapped landslides or small areas of unstable bedrock. Most of the Vaca Mountains (including Cement Hill) are in Category 3. Other areas in this category are located between Suisun and Green Valleys, and northwest of the English Hills.

Category 4

Category 4 includes areas of greater than 15% slope that are underlain by bedrock units highly susceptible to landsliding, but are not underlain by landslide deposits. The English Hills, the highlands between Vallejo and Benicia, the Potrero Hills, and the hills northwest of Fairfield all have large areas of Category 4 land.

Category 5

Category 5 includes areas of 0–90 degree slope that are underlain by or immediately adjacent to landslide deposits. Category 5 areas include many types of terrain, but most commonly are fairly steep hillsides underlain by bedrock, which is highly susceptible to landslides. This category also includes some small or narrow (less than 1,000 feet wide) areas not underlain by landslides. Category 5 lands exist mainly in the mountains west of Green Valley from Columbus Parkway and Lake Herman Road to Wild Horse Creek. Another area dominated by landslide deposits is located east of Twin Sisters and west of Suisun Valley. These two areas contain many very large landslides and represent the greatest concentration of landslides in the county. Other hillsides are not free of this problem; however, and slope failures have been mapped in both the English Hills and Vaca Mountains (including Cement Hill).

Slope instability results in the loss of millions of dollars annually in the nine Bay Area counties. Taylor and Brabb (1972) showed that more than \$25 million was lost as a result of landslide damage in the Bay Area during the winter of 1968-69. Although this cost is somewhat higher than the annual average because of unusually high rainfall, similar amounts of rainfall can be expected to fall at least once a decade, and these may cause widespread landsliding. The county has a history of relatively low dollar loss from landslides because of the lack of large-scale development intrusion into hillside areas.

Landslide damage also varies according to the type of slope failure that occurs. When private homes are involved in landslides, they often become total losses to their owners because resale value is greatly reduced by demonstrated conditions. Mudflows may do only minor structural damage, but because of their rapid movement, they are capable of trapping or burying people, and seriously damaging landscaping, building interiors, and parked automobiles. Even when structures themselves are placed on stable bedrock, landslides and small landslips can present problems for access roads and utility maintenance. Slope failures can also cause blockage of water courses and resulting flood damage during months of high flow.

Seismic conditions can intensify slope instability problems, particularly if shaking occurs when the ground is wet. Even moderate earthquakes can cause slope failures. For example, a Magnitude 5.3 earthquake that occurred in San Francisco in March 1957 triggered a number of slides along the coast, blocking SR 1. The maximum intensity of this earthquake was only VII on the Modified Mercalli Scale. Within the county, the hills near the active Green Valley fault are especially prone to seismically induced landsliding because of their proximity to a potential epicentral area. This proximity to an active fault may be partly responsible for the very large number of landslide deposits that exist there at the present time (Sedway/Cooke 1977).

SOILS

The Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA) provides soils surveys and reports for Solano County. Exhibit 4.7-4 shows the soil associations in the county.

Soil properties influence the development of building sites, including the site selection, structure design, construction, performance after construction, and site and structure maintenance. The NRCS soil database for Solano County indicates the limitations of soils within the county with respect to dwellings, dwellings with basements, and small commercial buildings.

Soils limitations are rated numerically. The rating system indicates the extent to which the soils are limited by all of the soil features that affect building site development. The ratings are given by NRCS as decimal fractions ranging from 0.01 to 1.00, least limiting to most limiting. Areas defined as water or areas related to mining activities such as borrow pits, miscellaneous water features, quarries, salt ponds, and water were not rated within the NRCS soil database because construction of any dwelling or commercial buildings is considered inappropriate within such areas. Soils designated as having "No Limitations" possess features that are favorable for the specified use. Five soils within Solano County have no limitations with respect to dwellings, dwellings with basements, and small commercial buildings: made land, Reiff fine sandy loam, Tujunga fine sand, Yolo loam and Yolo loam, clay substratum.

Exhibits 4.7-5, 4.7-6, 4.7-7, 4.7-8, and 4.7-9 show soil limitations with respect to dwellings and commercial buildings. As defined by NRCS, dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper.

Soil limitation ratings listed in the NRCS database for Solano County are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification).¹ The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

As shown in Exhibit 4.7-5, soils located around rivers, ponds, and lakes are typically those with limitations related to ponding, saturation, and flooding. Most of the land surrounding Grizzly Bay, Honker Bay, Suisun Bay, and San Pablo Bay are prone to ponding, saturation, and flooding. Land surrounding the Sacramento River and the Napa River and tributaries to these rivers are also prone to these limitations. These limitations can affect the load-supporting capacity of a soil.

As shown in Exhibit 4.7-6, soils located in areas of steep topography such as the mountains surrounding Pleasants Valley, Green Valley, and the Montezuma Hills are prone to erosion when they are disturbed. There is a direct correlation between slope and erosion hazard. Areas with fewer topographic differences are not as prone to erosion hazards.

Shrink-swell potential is the relative change in volume to be expected with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes damage to building foundations, roads, and other structures. A high shrink/swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating. As shown in Exhibit 4.7-7, most of the areas with the greatest limitations related to shrink-swell potential are located in the floodplains of the rivers and tributaries that traverse the county.

Depth to bedrock determines the ease and amount of excavation that can occur during construction. Shallow depth to bedrock can limit the ease and amount of excavation. Hardness of bedrock also determines the degree of limitations related to excavations. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation. As shown in Exhibit 4.7-8, areas with shallow bedrock are generally in areas associated with mountains, hills, and rock outcrops.

Slope gradient influences the retention and movement of water, the potential for soil slippage and accelerated erosion, the ease with which machinery can be used, soil-water states, and the engineering uses of the soil. As shown in Exhibit 4.7-9, areas with large limitations related to slopes are associated with mountains and hills.

Agricultural Soils

NRCS provides soils surveys and reports for Solano County. Exhibit 4.7-4 shows the soil associations in the county. Several soil associations in Solano County are suitable for agriculture. As described in Section 4.8, "Agricultural Resources," of this EIR, most of the high-yield soils are located in the low-lying basin area around the tributaries of the Sacramento River.

¹ The Unified Classification System is used to classify soils for engineering purposes. This specifically refers to the American Society for Testing and Materials (ASTM) Standard: D2487-06 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). All soil surveys related to soil engineering properties must be conducted in accordance with the ASTM Standard. NRCS references the Unified Classification System and ASTM Standards in all soil survey manuals and survey documents related to soils. Soil compressibility is defined as the resistance against volume decrease when soil is subjected to a mechanical load. Soil compression behavior can be influenced by organic matter in soil, soil moisture content, and bulk density. The Unified Classification System provides a standardized means to determining the soil properties that contribute to compressibility.



Solano County General Plan EIR

Exhibit 4.7-4

Soils Associations

Legend

Soil Associations

Nearly Level to Moderately Sloping, Well-Drained to Somewhat Poorly Drained Soils on Alluvial Fans

Yolo-Brentwood, Yolo-Sycamore, and Rincon-Yolo associations

Nearly Level to Gently Sloping, Moderately Well-Drained to Very Poorly Drained Soils on Basin Rims, Alluvial Fans, and Deltas, and in Basins, Dredge Spoil Areas, and Salt Water Marshes

Capay-Clear Lake, Sacramento, Egbert-Ryde, Valdez, Joice-Suisun, and Reyes-Tamba associations

Nearly Level to Moderately Steep, Well-Drained to Somewhat Poorly Drained Soils on Terraces and in Basins

San Ysidro-Antioch, Corning, and Solano-Pescadero associations

Gently Sloping to Very Steep, Well-Drained and Somewhat Excessively Drained Soils on Dissected Terraces and Mountainous Uplands

Altamont-Diablo, Dibble-Los Osos, Millsholm, Maymen-Los Gatos, and Hambright-Toomes associations

Basemap Layers

Roadways

Highways

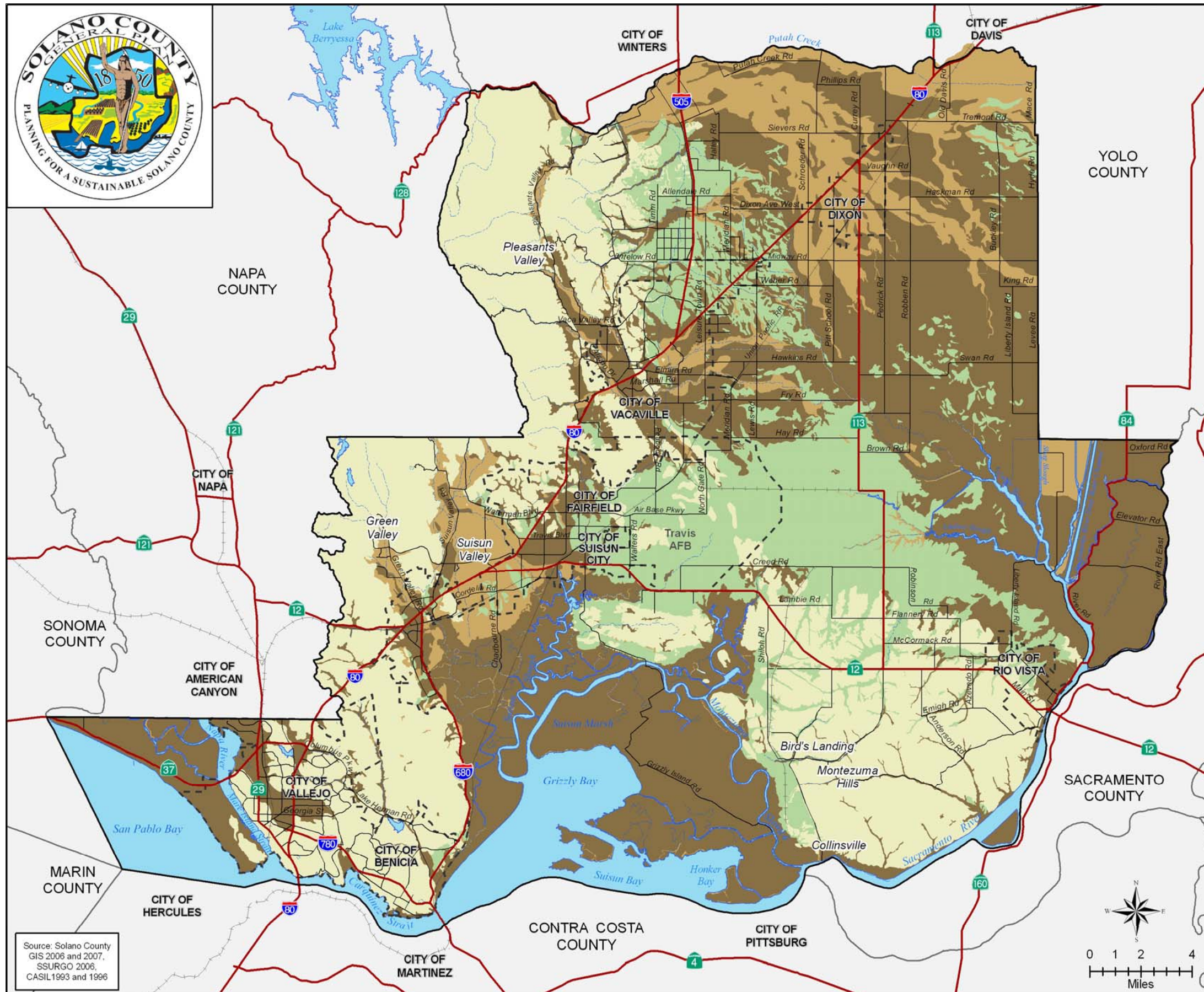
Railroads

Streams and Creeks

Major Water Features

Municipal Service Areas

Adjacent Counties



Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL 1993 and 1996

005 3/21/08

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Solano County General Plan EIR

Exhibit 4.7-5

Ponding, Saturation and Flooding

Legend

Soil Subject to Ponding

None

Rare

Frequent

Basemap Layers

Roadways

Highways

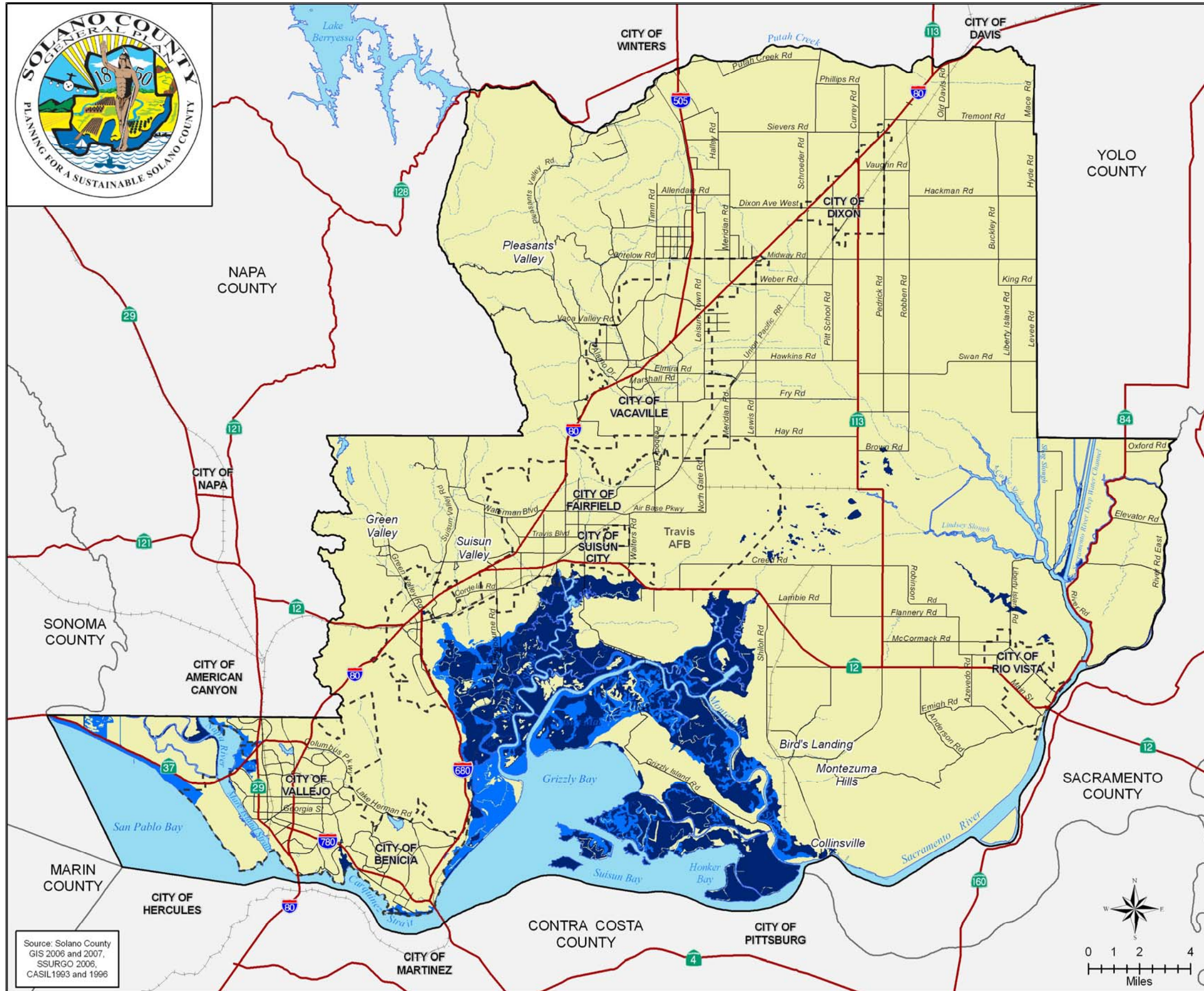
Railroads

Streams and Creeks

Major Water Features

Municipal Service Areas

Adjacent Counties



Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL1993 and 1996

"Planning for a Sustainable Solano County"

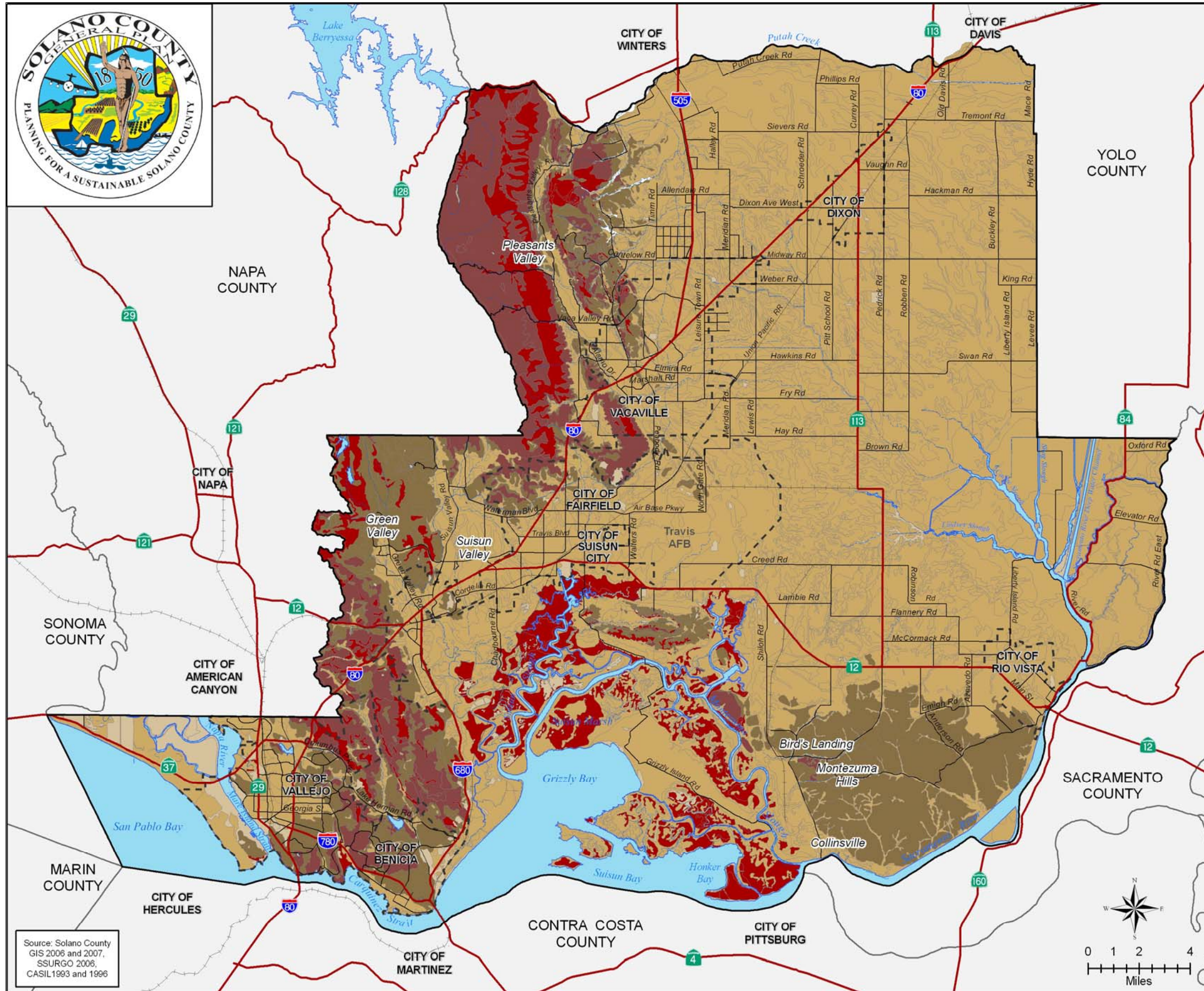
006 3/21/08



Solano County General Plan EIR

Exhibit 4.7-6

Erosion Hazards of Disturbed Soils



Legend

Erosion Hazards

- Not Rated
- Slight
- Moderate
- Severe
- Very Severe

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL1993 and 1996



007 3/21/08

"Planning for a Sustainable Solano County"



Solano County General Plan EIR

Exhibit 4.7-7

Shrink-Swell Potential

Legend

Shrink-Swell Potential

High

Moderate

Basemap Layers

Roadways

Highways

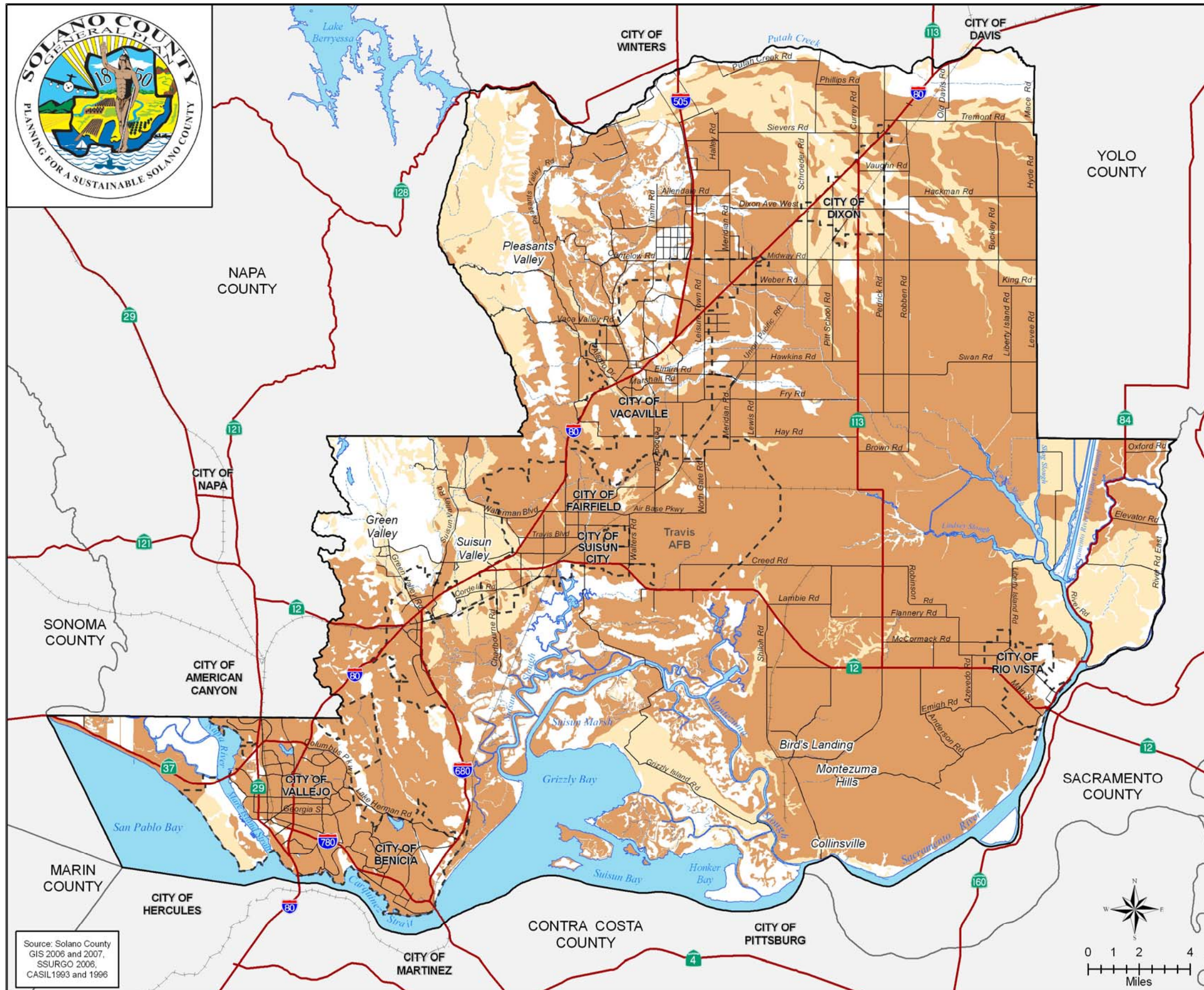
Railroads

Streams and Creeks

Major Water Features

Municipal Service Areas

Adjacent Counties



Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL1993 and 1996

008 3/21/08

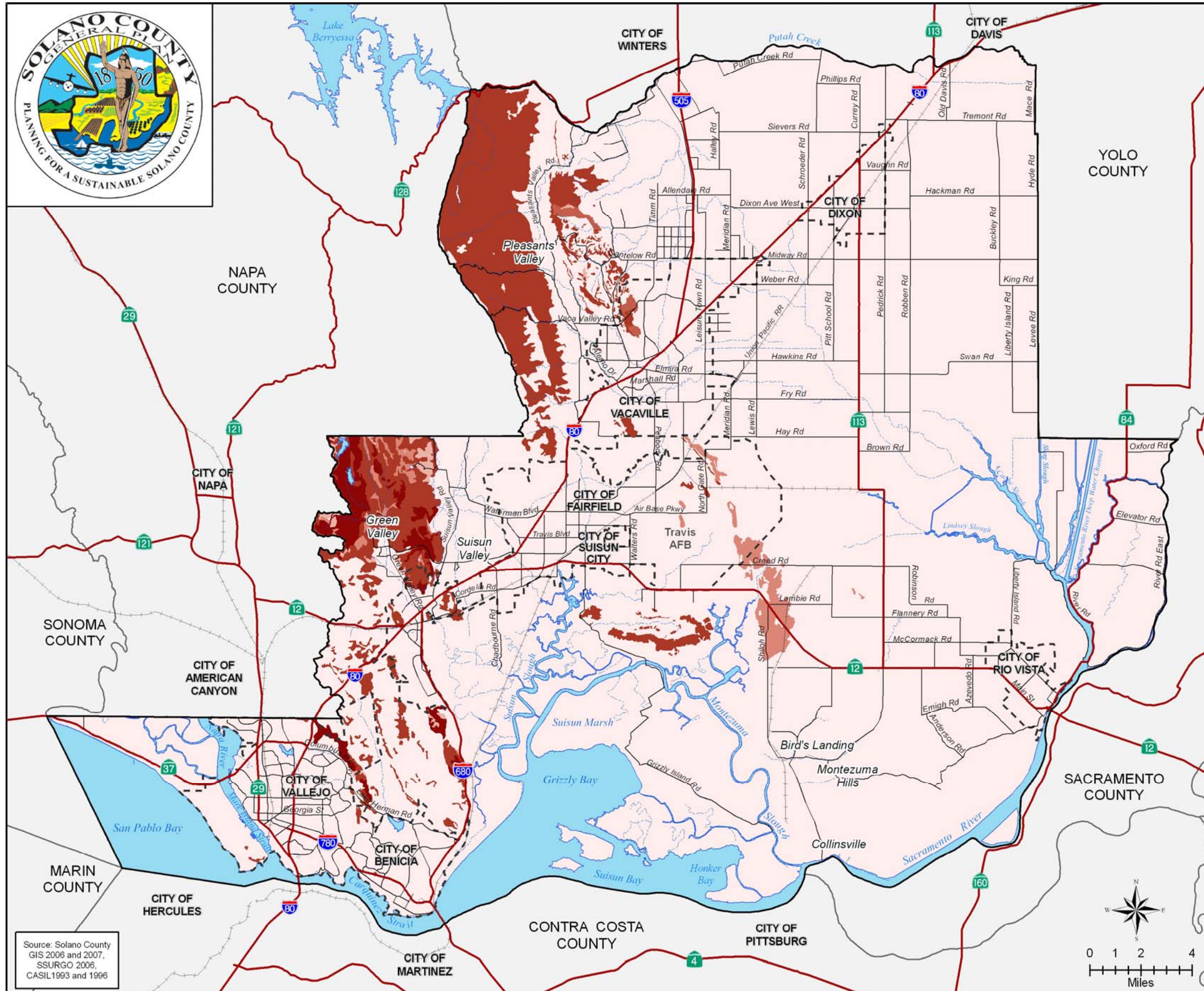
"Planning for a Sustainable Solano County"



Solano County General Plan EIR

Exhibit 4.7-8

Depth to Bedrock



Legend

Depth to Bedrock (cm)

- Greater than 83
- 78 - 83
- 41 - 77
- 39 - 40
- 32 - 38
- 31

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL 1993 and 1996



009 3/21/08

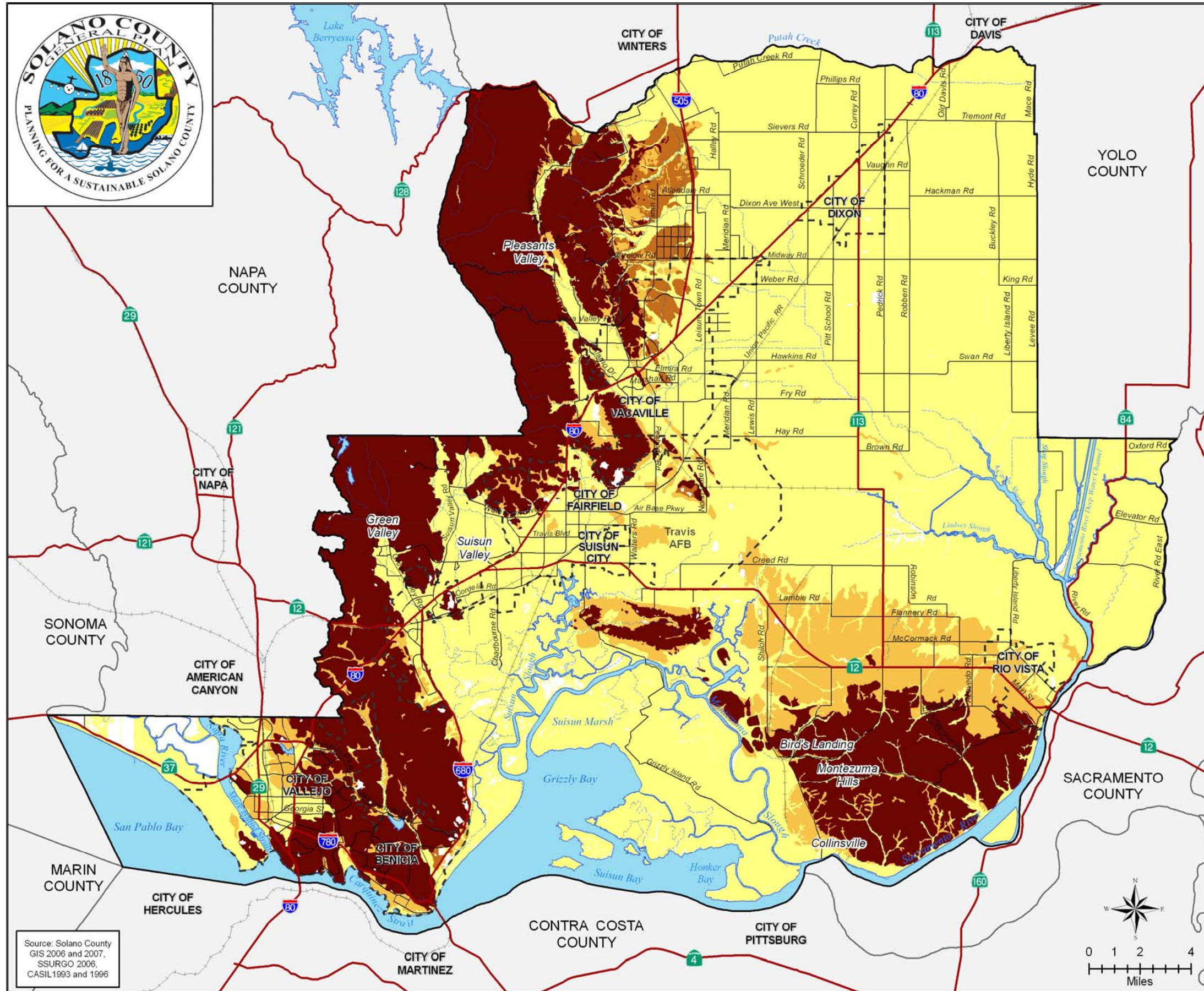
"Planning for a Sustainable Solano County"



Solano County General Plan EIR

Exhibit 4.7-9

Slope Hazards



Legend

Slope by percentage

- Less than 4%
- 4 - 7.9%
- 8 - 14.9%
- 15% and greater

Basemap Layers

- Roadways
- Highways
- Railroads
- Streams and Creeks
- Major Water Features
- Municipal Service Areas
- Adjacent Counties

Source: Solano County GIS 2006 and 2007, SSURGO 2006, CASIL1993 and 1996



010 3/21/08

"Planning for a Sustainable Solano County"

Soils capable of supporting irrigated orchards are located in the northern and western regions of Solano County. Other soils that are capable of supporting irrigated field crops and dryland grain farming are located in the low-lying valley areas in the western and in the northeastern parts of the county. Soils capable of supporting vineyards are located along the slopes of mountains and hills in the western and northern part of the county. These soils are typically clustered around streams and rivers.

Most of the undeveloped land in the western hills and southeastern area of the county is designated by the Farmland Mapping and Monitoring Program of the California Department of Conservation, Division of Land Resource Protection (see Section 4.8.2, “Regulatory Setting,” in Section 4.8, “Agricultural Resources”) as Grazing land. Select areas such as the Suisun Valley and the area surrounding the city of Dixon in the northern part of the county are designated Prime Farmland. Other land interspersed between the Prime Farmland and Grazing land identified in the county, and not in urban development or marshy floodplain, are designated Farmland of Statewide Importance or Unique Farmland.

Additional information related to agricultural soils and agricultural resources is provided in Section 4.8, “Agricultural Resources.”

SOIL HAZARDS

Subsidence and Differential Settlement

Land subsidence is vertical downward movement of the ground surface as the soil densifies. Subsidence-prone peat soils in Solano County include soils of Suisun Marsh and the Napa River delta of Vallejo, which were drained in the early 1900s by the development of a levee system. When exposed to the air, these soils tend to oxidize. Oxidation lowers the elevation of these exposed areas by as much as 0.3 foot per year. The high organic soils on Ryer Island and along Lindsay and Cache Sloughs are also subject to settlement and subsidence (Weir 1950).

The question of subsidence caused by gas withdrawal from the numerous natural gas fields scattered across the planning area is often raised, but if there is some subsidence attributable only to gas withdrawal, it is probably of minor significance in comparison to the degree of subsidence caused in gas field areas by peat oxidation. No specific information on subsidence from gas extraction within the county has been located.

Land settlement is a gradual lowering of the ground surface that results from compression or consolidation of soft, poorly consolidated fine-textured deposits (clays and silts). Settlement can be induced by dewatering and placing heavy loads on potentially compressible soils and sediments. Many of the fine-textured bay mud deposits that exist in and adjacent to the Delta are susceptible to settlement and present a potential hazard for road construction and development in southern Solano County (Sedway/Cooke 1977).

Shrink-Swell Potential

Perhaps 20–30% of the county’s flat land is underlain by soil having a high settlement or shrink-swell potential, as shown in Exhibit 4.7-6. Expansive or shrink-swell soils contain significant amounts of clay minerals that swell when wet and shrink when dry. These clays tend to swell despite the heavy loads imposed by large structures. Damage (such as cracking of foundations) results from differential movement and from the repetition of the shrink-swell cycle. In some cases, this problem may be avoided by removing the top soil layer before placing a foundation.

Soils having high shrink-swell potential in at least the top 12 inches are found throughout the county, especially in the eastern one-third, and are often referred to as “adobe” soils. Travis Air Force Base and the cities of Fairfield and Rio Vista are also largely underlain by expansive-soil deposits. Although these soils can be an expensive nuisance, awareness of their existence before construction often means that the problem can be eliminated through foundation design.

Erosion

A number of soils within Solano County are considered to have high potential for erosion. Highly erosive soils can damage roads, bridges, buildings, and other structures. NRCS soil erosivity is based on slope and on soil erodibility factors. Soil loss is caused by sheet or rill erosion in areas where 50–75% of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance (USDA 2004). Exhibit 4.7-5 shows erosion hazards in Solano County by NRCS erosion hazard ratings. Erosion hazards of disturbed soil are described as slight, moderate, severe, or very severe:

- ▶ Slight: Erosion is unlikely under ordinary climatic conditions.
- ▶ Moderate: Some erosion is likely and erosion control measures may be needed.
- ▶ Severe: Erosion is very likely and erosion control measures such as revegetation of bare areas may be needed.
- ▶ Very Severe: Significant erosion is expected, loss of soil productivity and off-site damage are likely and erosion control measures are costly and generally impractical.

As shown in Exhibit 4.7-5, areas with greatest potential erosion hazards are located in the hills both east and west of Pleasants Valley and Green Valley, the hills east of Vallejo, and throughout Suisun Marsh.

MINERAL RESOURCES

Mineral resources mined or produced within Solano County include mercury, sand and gravel, clay, stone products, calcium, and sulfur. Table 4.7-5 provides detail on the mineral resources produced and the names of the mines that produce and mine them. Exhibit 4.7-9 includes mineral resource producers in Solano County.

Solano County falls within Mineral Resources Zones described in California Surface Mining and Reclamation Act (SMARA) Mineral Land Classification Reports SR 146 Parts I and III, and SR 156. These classification projects assisted the board in adopting and designating lands needed for their mineral content.

The classification system is intended to ensure consideration of statewide or regionally significant mineral deposits by the County in planning and development administration. These mineral designations are intended to prevent incompatible land use development on areas determined to have significant mineral resource deposits. Permitted uses within a mineral resource zone include mining, uses that support mining such as smelting and storage of materials, or uses that will not hinder future mining such as grazing, agriculture, large-lot rural development, recreation, and open space.

The most important zone with respect to the presence of resources is MRZ-2, which is defined as “areas where adequate information indicates that significant mineral (aggregate) deposits are present or where it is judged that there is a high likelihood for their presence.” This zone is applied to known mineral deposits or where well-developed lines of reasoning, based on economic geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high. MRZ-3 zones suggest the potential for aggregate deposits. This zone is less definitive than MRZ-2 and is defined as “areas containing mineral deposits the significance of which cannot be evaluated from available data.”

Known mineral resource zones in Solano County consist of an area located northeast of Vallejo, south and southeast of Green Valley, areas south and east of Travis Air Force Base, and pockets located within both Vacaville and Fairfield, as shown in Exhibit 4.7-9. Most known mineral deposits in Solano County are located near water bodies on the west. For instance, most of the mercury mines are clustered between Blue Rock Springs Creek, Sulfur Springs Creek, and Rindler Creek. The stone, gravel, sand, and clay mines are spread out around the county.

**Table 4.7-5
Mineral Resources**

Mine Name	Mineral Resource Produced
St. Johns Mine	Mercury
Hastings Mine	Mercury
Borges Prospect	Mercury
Brownlie Property	Mercury
Vallejo	Mercury
Gravel pit	Sand and gravel
Unnamed location	Mercury
Valley Gravel Co. Pit	Sand and gravel
Standard Oil deposit	Clay
Tolenas Springs	Stone—crushed/broken
Jerico Plant	Calcium
Red Rock Quarry, Ltd.	Stone
Quarry	Stone
Parish Brothers	Stone
Lake Herman	Stone
Pacific Portland Cement Co.	Stone—crushed/broken
Denverton Pit	Stone—crushed/broken
Goodyear Quarry	Stone—dimension
Sand Pit	Sand and gravel
Nelson Hill Quarry	Stone
Peterson Pit	Sand and gravel
Greenstone Quarry	Stone
Cordelia Quarry	Stone
Franklin	Stone
Q Ranch Pit	Sand and gravel
Potrero Pit	Sand and gravel
Explosive Technology Pit	Sand and gravel
Cement Hill	Stone—Crushed/broken
Parrish Quarry	Stone—Crushed/broken
Lake Herman Quarry	Crushed stone
Rio Vista Sand Pit	Sand and gravel
Benicia Refinery	Sulfur

Source: USGS 2005

Asbestos

No asbestos is mined in Solano County; however, serpentinite is associated with the Franciscan complex located in the Sulfur Springs mountain range east of the city of Vallejo. Serpentinite is composed of serpentine minerals or magnesium silicates. Serpentinite has a greenish cast and has a greasy or silky feel. One of the minerals often

found in serpentinite is chrysotile. Chrysotile is commonly referred to as asbestos. Geologic features associated with the Franciscan complex of the Sulfur Springs mountain range may contain asbestos.

Mercury

As shown in Exhibit 4.7-9, several mines are located in Solano County that extract mercury or mercury-containing minerals. Mercury-producing mines include St. Johns Mine, Hastings Mine, Borges Prospect, Brownlie Property, Vallejo, and an unnamed location. Mines with mercury-producing ore are located in the Sulfur Springs mountain range east of the city of Vallejo.

Radon

The U.S. Environmental Protection Agency (EPA) lists Solano County as part of Zone 3 (2006). Zone 3 has the lowest potential radon hazard (less than 2 picocuries per liter [pCi/L]). However, according to the California Department of Health Services' (DHS's) *California Indoor Radon Levels* (2006), out of the 32 radon tests conducted in Solano County in 2006, two produced results greater than the action level of 4 pCi/L. These tests occurred in the zip code 95687, which corresponds to the part of the city of Vacaville that lies southeast of I-80.

4.7.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal laws regulate the use of farmland and soils related to farming through the USDA NRCS. NRCS produces soil surveys that assist planners in determining which land uses are suitable for specific soil types and locations.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The California Geological Survey (CGS) provides regulatory information pertaining to soils, geology, mineral resources, and geologic hazards.

Mineral Resource Protection Laws

CGS maintains and provides information about California's nonfuel mineral resources. California ranks second in the United States in nonfuel mineral production. In 2005, more than 30 nonfuel commodities were produced from 820 California mines (CGS 2006a). CGS offers information about handling hazardous minerals and SMARA mineral land classifications.

Hazardous Minerals

CGS monitors minerals related to environmental and public health issues such as asbestos, mercury, and radon. In cooperation with the California Air Resources Board (ARB), CGS provides geologic information on natural asbestos occurrences in California to state and local government agencies, as well as to the general public. In cooperation with other agencies and university research groups, CGS provides information about activities at historic mine sites related to mercury issues. Also, CGS works with the California Department of Public Health (formerly DHS) to provide information and advice related to radon occurrence in California.

Asbestos

Asbestos is a naturally occurring mineral in California. Asbestos occurrences are most commonly associated with the mineral serpentinite and partially serpentinitized ultramafic rocks (CGS 2006b). Asbestos is a known carcinogen, and inhalation of asbestos fibers may result in the development of lung cancer, mesothelioma, and gastrointestinal cancer (IRIS 2008a). In support of concerns raised about the possible health hazards that may

occur during activities that disturb asbestos-containing rocks and soils, CGS issued Special Publication 124, *Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California* (CGS 2002). These guidelines provide a starting point for geologists involved in conducting or reviewing naturally occurring asbestos investigations (CGS 2002).

ARB and the U.S. Occupational Safety and Health Administration (OSHA) also have regulations related to asbestos. In 2000, ARB updated its adopted asbestos Airborne Toxic Control Measure to reduce the threshold for asbestos content in ultramafic rock in surfacing materials to 0.25%, as determined by ARB Method 435 (CGS 2002). ARB thereby regulates human exposure to airborne asbestos. OSHA regulates human exposure to asbestos through worker safety regulations, as described in Title 29, Section 1910 of the Code of Federal Regulations [i.e., 29 CFR 1910] and 29 CFR 1926, as listed on the OSHA Web site (OSHA 2006). The OSHA asbestos standards provide detailed information regarding asbestos sampling and analysis, as well as mandated work practices.

Mercury

Mercury is present in the environment as a result of both natural processes and human activities. Natural sources of mercury include volcanoes, hot springs, and natural mercury deposits. Sources related to human activities include coal combustion, waste incineration, certain industrial activities, and some mining activities. California environmental mercury issues relate to historical mining operations in two ways. The first involves mercury mining activity that occurred between 1846 and 1981, during which time about 100 million kilograms of mercury were produced within the state. The second is to historic gold mining activities that took place between 1848 and the first part of the 20th century, which depended on gold recovery processes using mercury. Significant quantities of mercury were lost to the environment during both of these activities (CGS 2006c).

Exposure to bioavailable mercury causes developmental neuropsychological impairment (IRIS 2008b). Mercury occurs in various forms and compounds in the environment, some of which are not bioavailable. The principal route of human exposure is through consumption of methyl mercury–contaminated fish (CGS 2006c). The federal Water Pollution Control Act (2002) provides for water pollution control activities. This act regulates the discharge of pollutants; provides for the protection and propagation of fish, shellfish, and wildlife; and provides for recreation in and on the water, among other policies and provisions.

Radon

Radon gas forms during the decay of uranium that is naturally found in rock, water, and soil. Radon migrates to the surface via cracks or fractures in the earth's crust, and is sometimes carried through overlying substrate by other soil gases such as methane, ethane, propane, carbon dioxide, and helium (Churchill 2003).

Breathing air with elevated levels of radon gas may result in an increased risk of developing lung cancer. Radon-222 is the isotope of most concern to public health because it has a much longer half-life (3.8 days) than other radon isotopes (radon-219 at 4 seconds and radon 220 at 55.3 seconds). The longer half-life allows radon-222 to migrate farther through the soil; therefore, much more radon-222 is usually available to enter buildings than any of the other radon isotopes. Not everyone exposed to radon will develop lung cancer, but EPA and the National Cancer Institute estimate that the annual number of lung cancer deaths in the United States attributable to radon is between 7,000 and 30,000.

The average concentration of radon in American homes is about 1.3 pCi/L and the average concentration in outdoor air is about 0.4 pCi/L. EPA recommends that individuals avoid long-term exposure to radon concentrations above 4 pCi/L. The only way to know what the radon level is in a building or home is to test the air. Fortunately, radon testing is relatively simple and inexpensive. If indoor-air testing indicates radon levels exceeding 4 pCi/L, EPA recommends that remediation actions be considered (CGS 2006d).

Surface Mining and Reclamation Act of 1975

SMARA requires all jurisdictions to incorporate mapped mineral resources designations approved by the California Mining and Geology Board within their general plans. SMARA was enacted to limit new development in areas with significant mineral deposits. The California Department of Conservation's Office of Mine Reclamation and the California Mining and Geology Board are jointly charged with ensuring proper administration of the act's requirements. The California Mining and Geology Board promulgates regulations to clarify and interpret the act's provisions, and also serves as a policy and appeals board. The Office of Mine Reclamation provides an ongoing technical assistance program for lead agencies and operators, maintains a database of mine locations and operational information statewide, and is responsible for compliance-related matters (OMR 2006).

Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. This state law was a direct result of the 1971 San Fernando Earthquake, which was associated with extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures. Surface rupture is the most easily avoided seismic hazard (CGS 2006e). The Alquist-Priolo Earthquake Fault Zoning Act only pertains to geologic hazards associated with surface fault rupture. This law does not pertain to any other geologic hazards.

The purpose of the act was to prevent construction of buildings used for human occupancy on the surface trace of active faults. As part of the law, the State Geologist must establish regulatory zones, called Earthquake Fault Zones, around surface traces of active faults. Earthquake Fault Zones vary in width, but average approximately one-quarter mile wide. Once the State Geologist establishes Earthquake Fault Zones, appropriate maps are issued and distributed to all cities, counties, and state agencies that might be affected by Earthquake Fault Zones. These maps assist local agencies in planning and controlling new or renewed construction.

In accordance with the Alquist-Priolo Earthquake Fault Zoning Act, before permitting a proposed project, local agencies must require a geologic investigation that demonstrates that structures for human occupancy will not be constructed across active faults. If an active fault is found during the geologic investigation, all structures designated for human occupancy must be set back from the fault.

California Seismic Hazards Mapping Act of 1990

The Seismic Hazards Mapping Act of 1990 directs CGS to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The purpose of the act is to reduce threats to public safety and to minimize loss of life and property by identifying and mitigating these seismic hazards. The Seismic Hazards Mapping Act was passed by the California Legislature after the 1989 Loma Prieta earthquake.

Seismic Hazard Mapping Program geologists compile information about the locations of areas prone to liquefaction and earthquake-induced landslides. These areas are designated Zones of Required Investigation. The Seismic Hazards Mapping Act requires that site-specific geotechnical investigations be performed to identify seismic hazards and to formulate mitigation measures before permitting of developments designed for human occupancy within the Zones of Required Investigation.

Site investigations determine whether structural design or modification of the project site is necessary to ensure safer development. A copy of each approved geotechnical report, including the mitigation measures, is required to be submitted to the program within 30 days of approval of the report. A certified engineering geologist or registered civil engineer with competence in the field of seismic hazard evaluation is required to prepare, review, and approve each geotechnical report. The Seismic Hazards Mapping Act requires peer review by either local agency staff or a retained consultant. It must be noted that the California Department of Conservation does not

have authority to approve or disapprove the geotechnical report. Rather, the data are utilized for future updates as well as to monitor the effectiveness of the act. In addition, cities and counties are to incorporate the seismic hazard zone maps into their general plan Safety Elements. Both the Seismic Hazards Mapping Act and the natural hazard disclosure statement also require sellers of real property to disclose to buyers if property is in a seismic hazard Zone of Required Investigation.

California Uniform Building Code

The State of California provides minimum standards for building design through the California Building Standards Code (California Code of Regulations [CCR] Title 24). The California Building Code is based on the Uniform Building Code, which is used widely throughout the United States and has been modified for California conditions with numerous more detailed and/or more stringent requirements.

The California Building Standards Commission (BSC) is responsible for coordinating, managing, adopting, and approving building codes in California. In July 2007, the BSC adopted and published the 2006 International Building Code (IBC) as the 2007 California Building Code (CBC). This new code became effective on January 1, 2008 and updated all the subsequent codes under CCR Title 24.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND LAWS

The County is responsible for implementation of state and federally mandated laws and regulations related to geology and soils before permitting projects. In addition, several portions of the County Code relate to geology, soils, and other geologic hazards.

Chapter 6.3 and 6.4, Solano County Code—Building and Sewage Standards

Chapter 6.3 of the County Code provides regulations for building, including adoption of the Uniform Building Code. Chapter 6.4 includes regulations governing on-site sewage disposal systems and permitting.

Chapter 29, Solano County Code—Surface Mining and Reclamation

Chapter 29 of the County Code provides regulations for surface mining and reclamation of mining areas under the authorization and direction of SMARA. This chapter was adopted to comply with SMARA and fulfill the purposes of the act. The provisions provided in this chapter apply to the unincorporated areas of Solano County.

Chapter 31, Solano County Code—Grading and Erosion Control

Chapter 31 of the County Code provides regulations related to grading and erosion control. In conjunction with Chapter 70 of the Uniform Building Code, this chapter sets forth the means for controlling soil erosion, sedimentation, increased rates of water runoff, and related environmental damage. It does so by establishing minimum standards and providing regulations for the construction and maintenance of fills, excavations, cuts and clearing of vegetation, revegetation of cleared areas, drainage control, and protection of exposed soil surfaces to protect downstream waterways and wetlands and promote the safety, public health, convenience, and general welfare of the community (Solano County 2006b).

4.7.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact on geologic resources is considered significant if the proposed project would:

- ▶ expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
 - strong seismic ground shaking;
 - seismic-related ground failure, including liquefaction; or
 - landslides;
- ▶ result in substantial soil erosion or the loss of topsoil;
- ▶ be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- ▶ be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- ▶ have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- ▶ result in the loss of availability of a known mineral resource that would be of value to the region and residents of the state; or
- ▶ result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

IMPACT ANALYSIS

IMPACT 4.7-1a **Potential for Fault Rupture – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in development of areas subject to potential substantial adverse effects from the rupture of a known earthquake fault. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to fault rupture. This impact would be less than significant.*

A fault is a zone of deformation in the crust of the earth along which rocks on one side have moved relative to those on the other side. Most faults are the result of repeated displacements over a period of time. A fault trace is the surface expression of an area of definitive fault displacement. If any surface displacement in excess of an inch or two along one of these faults were to occur beneath a building, transportation facility, main utility line, aqueduct, etc., the effects could be catastrophic. Therefore, it is important to know the relative likelihood of future movement along these faults and to plan accordingly.

At present, segments of only two faults in the county are known to be active: the Green Valley Fault and Concord Fault. The trace of the Concord Fault trends northwestward through the city of Concord into Solano County, just northeast of Benicia. In 1955, an earthquake of Magnitude 5.4 occurred on the Concord Fault, causing population centers in Solano County to experience intensities of V–VI (maximum intensity at the epicenter was VII). This was sufficient to break windows and glassware and crack plaster.

The Green Valley Fault can be traced from Suisun Bay northward across the county line. However, definitive evidence of activity is lacking north of where it crosses Green Valley Creek. Both the Concord Fault and the Green Valley Fault (south of the Green Valley crossing) have been designated as active faults by the state, and are included in Special Studies Zones under the Alquist-Priolo Geologic Hazards Zones Act. Displacement along the Green Valley Fault could be as much as 2½ feet for an earthquake of Magnitude 6+ (Sedway/Cooke 1977). It is possible to greatly reduce damage caused by such fault rupture by avoiding construction on active fault traces.

Fault rupture along the Green Valley Fault can be expected to cause damage to I-80, SRs 12 and 21, and the Southern Pacific Railroad line through Cordelia. Freeway overcrossings may be displaced or may collapse as a result of fault movement. Designated county evacuation routes to the south, I-80 and I-680, should not be relied upon as postearthquake routes because they are subject to blockage by earthquake-induced damage or collapse.

Several water, gas, and oil pipelines cross active segments of the Green Valley Fault within the county and could create flooding, fire, and pollution problems if earthquake-induced rupture were to occur. There are several ways, however, to reduce the hazard of pipeline rupture. Smaller fault displacements can be accommodated by expansion joints or flexible piping at fault crossings. New oil and water mains are often provided within this or similar features when laid across a known active fault. Natural gas, oil, and water pipelines are often equipped with pressure-operated shutoff or block valves that stop transmission when there is free flow somewhere in the line.

Although many existing important transportation and pipeline facilities cross the Green Valley Fault line and are potentially subject to future impacts from fault rupture, the 2008 Draft General Plan includes the following policies and programs intended to reduce future exposure to fault rupture:

- ▶ **Policy HS.P-12** calls on the County to require new development proposals in areas of moderate or high seismic hazard to consider risks caused by seismic activity and to include project features that minimize these risks.
- ▶ **Policy HS.P-13** requires the County to review and limit the location and intensity of development and placement of infrastructure in identified earthquake fault zones.
- ▶ **Policy HS.P-14** requires the County to identify and minimize potential hazards to life and property caused by fault displacement and its impact on facilities that attract large numbers of people, are open to the general public, or provide essential community services and that are located within identified earthquake fault zones.
- ▶ **Policy HS.P-15** requires the County to reduce risk of failure and reduce potential effects of failure during seismic events through standards for the construction and placement of utilities, pipelines, or other public facilities located on or crossing active fault zones.
- ▶ **Policy HS.P-17** requires the County to restrict the crossing of ground failure areas by new public and private transmission facilities, including power and water distribution lines, sewer lines, and gas and oil transmission lines.
- ▶ **Program HS.I-18** requires the County to revise its zoning ordinance to limit development occurring in geologic hazard areas, including active fault traces and fault zones. Structures would be prohibited in active fault trace areas. Under the Alquist-Priolo Earthquake Fault Zoning Act, structures for human occupancy must be set back at least 50 feet from active fault traces. The County would further limit development intended for human occupancy within 100 feet of active fault trace areas to one-story wood-frame structures.
- ▶ **Program HS.I-20** requires the County to create or modify design requirements for new utilities that would guide the construction and placement of these utilities. These design requirements would include avoidance of fault traces, and design features intended to limit the effects of fault rupture.

- ▶ **Program HS.I-22** calls on the County to require geotechnical evaluation and recommendations before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential hazards from Alquist-Priolo Earthquake Fault Zones or other identified fault zones. New development would be required to incorporate project features that avoid or minimize the identified hazards. Costs related to providing or confirming required geotechnical reports would be borne by the project applicant.
- ▶ **Program HS.I-23** calls on the County to would require owners of all existing or proposed oil, gas, water, and sewer pipelines that cross active faults to file an operations plan describing the probable effects of pipeline failure at the fault and the various emergency facilities and procedures that exist to ensure that failure does not threaten public safety.
- ▶ **Program HS.I-24** calls on the County to provide current data to the public regarding geologic hazards. The County would coordinate with cities to gather and periodically assess new geologic data—fault zone activity, landslide activity, and distribution of shrink-swell soils.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database to be maintained in the County’s geographic information system (GIS). The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data, which would include active faults and relative seismic shaking hazards, would be made available to the public.

Implementation of the 2008 Draft General Plan’s goals, policies, and programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code), would reduce the potential for substantial adverse effects due to fault rupture. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-1b **Potential for Fault Rupture – Maximum Development Scenario.** *Maximum buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in development of areas subject to potential substantial adverse effects from the rupture of a known earthquake fault. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to fault rupture. This impact would be less than significant.*

This impact is the same as Impact 4.7-1a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-2a **Potential for Exposure to Seismic Ground Shaking – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in development of areas prone to seismic ground shaking. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground shaking. This impact would be less than significant.*

Earthquake-generated ground shaking is by far the greatest single cause of earthquake damage. Solano County has a history of earthquake shaking documented back more than 150 years. The county is in an area of relatively high seismicity, and will be subject to earthquake shaking in the future. No part of the county will be free from the effects of seismic shaking.

Depending on the magnitude, proximity to epicenter, and subsurface conditions (bedrock stability and the type and thickness of underlying soils), ground shaking damage will vary from slight to intensive. For example, the wet unconsolidated soils of Suisun Marsh would have a high ground response, while areas of hard rock generally would experience lower intensities of shaking, but would be subject to other earthquake-induced hazards such as landslides. The peat and organic soils found within the Delta area would experience large-scale amplification of seismic waves. Although few in number, structures located in these areas would be subject to severe shaking during an earthquake.

Different types of structures are subject to different levels of ground shaking damage. Conventional one- and two-story wood-frame residential structures generally have performed very well during strong earthquake ground shaking. Collapse or total destruction of wood-frame homes is rare, even during strong earthquakes, except in cases where these structures are affected by ground rupturing or landsliding, or are affected by extremely high ground acceleration. Unreinforced masonry buildings and other buildings constructed before 1930 that have not been seismically retrofitted would be most likely to suffer structural failure or collapse as a result of seismic ground shaking.

Freeway and railroad interchanges in Solano County would be very susceptible to collapse as a result of earthquake shaking. Lurch cracking is another phenomenon that occurs during earthquake ground shaking and involves the horizontal movement of soil masses toward the open face of creek banks. Creekside homes are especially vulnerable to damage from lurch cracking.

The 2008 Draft General Plan includes several policies and programs intended to minimize the effects of seismic ground shaking:

- ▶ **Policy HS.P-12** calls on the County to require new development proposals in areas of moderate or high seismic hazard to consider risks caused by seismic activity and to include project features that minimize these risks.
- ▶ **Policy HS.P-15** requires the County to reduce the risk of failure and reduce potential effects of failure during seismic events through standards for the construction and placement of utilities, pipelines, or other public facilities located on or crossing active fault zones.
- ▶ **Policy HS.P-16** calls on the County to require minimum setbacks for construction along creeks between the creek bank and structure (except for farm structures that are not dwellings or places of work) based on the susceptibility of the bank to lurching caused by seismic shaking.
- ▶ **Policy HS.P-17** requires the County to restrict the crossing of ground failure areas by new public and private transmission facilities, including power and water distribution lines, sewer lines, and gas and oil transmission lines.
- ▶ **Program HS.I-19** requires the County to adopt and enforce the most current versions of the International Building Codes, as modified by the California Building Standards Commission. These codes include seismic safety criteria.
- ▶ **Program HS.I-20** requires the County to create or modify design requirements for new utilities that would guide the construction and placement of these utilities. These design requirements are intended in part to reduce risks associated with seismic ground shaking.
- ▶ **Program HS.I-21** calls on the County to require geotechnical investigation and recommendations for buildings meant for public occupancy within geologic hazard areas. A state-certified engineering geologist would produce a report examining development issues that considers geologic hazards found on-site, along with the requirements of any regulations concerning the hazard area.

- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database to be maintained in the County’s GIS. The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data would include active faults and relative seismic shaking hazards, and would be made available to the public.

Implementation of the 2008 Draft General Plan’s goals, policies, and programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code) would reduce the potential for substantial adverse effects due to exposure to seismic shaking. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-2b **Potential for Exposure to Seismic Ground Shaking – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in development of areas prone to seismic ground shaking. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground shaking. This impact would be less than significant.*

This impact is the same as Impact 4.7-2a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-3a **Potential for Seismic Ground Failure – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in development of areas prone to seismic-related ground failure, including liquefaction. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground failure. This impact would be less than significant.*

Seismic ground failure refers to conditions such as soil liquefaction, associated lateral spreading, landslides, and collapse resulting from loss of strength during earthquake shaking. The liquefaction of soils can cause them to move laterally outward from under buildings, roads, pipelines, transmission towers, railroad tracks, and other structures such as bridges. Damage is usually greatest to large or heavy structures on shallow foundations and takes the form of cracking, tilting, and differential settlement. Where gentle slopes exist, such as on stream or slough banks, liquefaction may cause lateral-spreading landslides. Whole buildings can be moved downslope by this type of ground failure. Where the condition is known to exist, structural and foundation design can usually minimize or eliminate liquefaction hazard to new construction.

Soil layers with high liquefaction potential are particularly common in those county areas of existing and former marshland underlain by saturated bay mud and where prime agricultural soils are combined with high water tables. Liquefaction potential in the central and eastern portions of the county has increased in recent years because of a groundwater table rise brought about by the cessation of groundwater withdrawal from wells tapping the area’s extensive subsurface aquifer in favor of a new and less costly surface water source, the Putah South Canal.

The 2008 Draft General Plan includes several policies and programs that control development in areas subject to seismic-related ground failure hazards:

- ▶ **Policy HS.P-12** requires new development proposals in areas of moderate or high seismic hazard to consider risks caused by seismic activity (including liquefaction, lateral spreading, landslides, and settlement) and include project features that minimize these risks.
- ▶ **Policy HS.P-16** calls on the County to require minimum setbacks for construction along creeks between the creek bank and structure (except for farm structures that are not dwellings or places of work) based on the susceptibility of the bank to lurching caused by seismic shaking.
- ▶ **Program HS.I-18** requires the County to revise its zoning ordinance to limit development occurring in geologic hazard areas, including landslide susceptibility zones and creek banks susceptible to lurching.
- ▶ **Program HS.I-19** requires the County to adopt and enforce the most current versions of the International Building Codes, as modified by the BSC. This program would result in use of construction features that minimize the effects of seismic-related ground failure.
- ▶ **Program HS.I-21** calls on the County to require geotechnical investigation and recommendations for buildings meant for public occupancy within geologic hazard areas. A state-certified engineering geologist would be required to produce a report examining development issues that considers soil, slope, or geologic hazards, as well as off-site soil instability.
- ▶ **Program HS.I-22** calls on the County to require geotechnical evaluation and recommendations before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential hazards from landslides, liquefaction, steep slopes, erosion, subsidence, and fault zones. New development would be required to incorporate project features that avoid or minimize the identified hazards.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database to be maintained in the County's GIS. The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data, including relative seismic shaking hazards, relative landslide susceptibility, and relative liquefaction susceptibility, would be made available to the public.

Implementation of the 2008 Draft General Plan's goals, policies, and programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code) would reduce the potential for substantial adverse effects due to exposure to seismic-related ground failure. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-3b **Potential for Seismic Ground Failure – Maximum Development Scenario.** *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario would result in development of areas prone to seismic-related ground failure, including liquefaction. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to reduce the potential for substantial adverse effects due to exposure to seismic ground failure. This impact would be **less than significant**.*

This impact is the same as Impact 4.7-3a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-4a **Potential for Exposure to Landslides – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in development of areas prone to landslides. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to landslides. This impact would be less than significant.*

Landslides, land slips, mudflows, and debris flows have been the subject of numerous studies in the San Francisco Bay region. In this geologically young area, continued uplift of the Coast Range has resulted in widespread susceptibility to mass movement, particularly in upland areas. The use of aerial photos to map landslides has shown that these mountainous areas are frequently covered by massive landslides a mile or more in length. The age of these giant landslide features is not well known, but some of them probably originated in a period of greater rainfall several thousand years ago. Despite their age, these large landslides are generally quite unstable, and can be reactivated by grading operations or other development activities.

Landslide susceptibility is a function of various combinations of factors including rainfall, rock and soil types, steepness of slope (especially slopes greater than 15%), slope orientation, vegetation, seismic conditions, and human construction. USGS divides areas into four slope stability categories—least, marginally, generally, and most susceptible to landsliding.

Landslide damage also varies according to the type of slope failure that occurs. When private homes are involved in landslides, they often become total losses to their owners because resale value is greatly reduced by demonstrated conditions. Mudflows may do only minor structural damage, but because of their rapid movement, they are capable of trapping or burying people, and seriously damaging landscaping, building interiors, and parked automobiles. Even when structures themselves are placed on stable bedrock, landslides and small land slips can present problems for access roads and utility maintenance. Slope failures can also cause blockage of water courses and resulting flood damage during months of high flow.

Seismic conditions can intensify slope instability problems, particularly if shaking occurs when the ground is wet. Within the county, the hills near the active Green Valley Fault are especially prone to seismically induced landsliding because of their proximity to a potential epicentral area. This proximity to an active fault may be partly responsible for the very large number of landslide deposits that exist there at the present time (Sedway/Cooke 1977). However, Solano County has a history of relatively low dollar loss from landslides because of the lack of large-scale development intrusion into hillside areas.

The 2008 Draft General Plan includes a policy and programs that are intended to limit the effects of landslides on developed areas:

- ▶ **Policy HS.P-19** requires the County to minimize development in areas with high landslide susceptibility.
- ▶ **Program HS.I-18** requires the County to revise its zoning ordinance to limit development occurring in geologic hazard areas, including landslide susceptibility zones. This includes limiting development within landslide areas 3 and 4 to agriculture, open space, or other nonurban uses. Program HS.I-18 also requires the County to adopt and implement hillside slope/density and land capacity ordinances within landslide area 2.
- ▶ **Program HS.I-21** calls on the County to require geotechnical investigation and recommendations for buildings meant for public occupancy within geologic hazard areas. A state-certified engineering geologist would produce a report examining development issues, considering soil, slope, and geologic hazards, including potential off-site impacts caused by slope instability, as well as the requirements of any regulations concerning the hazard area.
- ▶ **Program HS.I-22** calls on the County to require geotechnical evaluation and recommendations before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential

hazards from landslides and steep slopes. New development would be required to incorporate project features that avoid or minimize the identified hazards.

- ▶ **Program HS.I-24** requires the County to provide current data to the public about geologic hazards. The County would coordinate with cities to gather and periodically assess new geologic data—fault zone activity, landslide activity, and distribution of shrink-swell soils.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database to be maintained in the County’s GIS. The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data, including relative landslide susceptibility, would be made available to the public.

Implementation of the 2008 Draft General Plan’s policies and programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code), would reduce the potential for exposure to landslides. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-4b **Potential for Exposure to Landslides – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in development of areas prone to landslides. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent exposure to landslides. This impact would be less than significant.*

This impact is the same as Impact 4.7-4a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-5a **Soil Erosion or Loss of Topsoil – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in substantial soil erosion or the loss of topsoil. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be less than significant.*

A number of soils within Solano County are considered to have high potential for erosion. Highly erosive soils can damage roads, bridges, buildings, and other structures. Soil loss can be caused by sheet or rill erosion in areas where 50–75% of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. Areas of Solano County with the greatest potential erosion hazards are located in the hills both east and west of Pleasants Valley and Green Valley, the hills east of Vallejo, and throughout Suisun Marsh.

Erosion is a large-scale impact caused by human activity and disturbance of surface soil, wind, and water. Erosion cannot be eliminated altogether in areas with moderate to high topographic relief such as western Solano County. The 2008 Draft General Plan includes several programs designed to reduce the potential impacts of erosion:

- ▶ **Program HS.I-19** requires the County to adopt and enforce the most current versions of the International Building Codes, as modified by the BSC. These codes include erosion control measures and best management practices.

- ▶ **Program HS.I-22** calls on the County to require geotechnical evaluation and recommendations before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential hazards from erosion. New development would be required to incorporate project features that avoid or minimize the identified erosion hazards.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database, to be maintained in the County's GIS. The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data, which would include moderate and high erosion hazards, would be made available to the public.

Implementation of the 2008 Draft General Plan's programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code) would reduce the potential for erosion caused by buildout of the land use diagram under the Preferred Plan through application of best management practices and engineering controls. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-5b **Soil Erosion or Loss of Topsoil – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in substantial soil erosion or the loss of topsoil. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be **less than significant**.*

This impact is the same as Impact 4.7-5a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-6a **Potential for Unstable Soils – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in construction of occupied structures in areas located on a geologic unit or soil that is unstable or that would become unstable, potentially resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be **less than significant**.*

Unstable soils include soils subject to landsliding, lateral spreading, liquefaction, or collapse. This kind of hazard can result from earthquake shaking (i.e., liquefaction, lateral spreading, landslides, collapse), caused by seasonal saturation of soils and rock materials (subsidence), or caused by grading and construction activities.

Soil liquefaction (and associated lateral spreading, landslides, and collapse) results from loss of strength during earthquake shaking. The liquefaction of soils can cause them to move laterally outward from under buildings, roads, pipelines, transmission towers, railroad tracks, and other structures such as bridges. Damage is usually greatest to large or heavy structures on shallow foundations, and takes the form of cracking, tilting, and differential settlement. Where gentle slopes exist such as on stream or slough banks, liquefaction may cause lateral-spreading landslides. Whole buildings can be moved downslope by this type of ground failure. Where the condition is known to exist, structural and foundation design can usually minimize or eliminate liquefaction hazard to new construction.

Soil layers with high liquefaction potential are particularly common in those county areas of existing and former marshland underlain by saturated bay mud and where prime agricultural soils are combined with high water tables. Liquefaction potential in the central and eastern portions of the county has increased in recent years because of a groundwater table rise brought about by the cessation of groundwater withdrawal from wells tapping the area's extensive subsurface aquifer in favor of a new and less costly surface water source, the Putah South Canal.

Subsidence and settlement are localized hazards, commonly caused by the withdrawal of fluids (such as groundwater) from subsurface reservoirs or from the collapse of surface soils over subterranean caves or mines. Settlement results when weak or porous soils (such as fill soils) are compressed as a result of construction activities.

The 2008 Draft General Plan includes several policies and programs that would control development in areas subject to unstable soil hazards:

- ▶ **Policy HS.P-12** requires new development proposals in areas of moderate or high seismic hazard to consider risks caused by seismic activity (including liquefaction, lateral spreading, landslides, and settlement) and include project features that minimize these risks.
- ▶ **Policy HS.P-16** calls on the County to require minimum setbacks for construction along creeks between the creek bank and structure (except for farm structures that are not dwellings or places of work) based on the susceptibility of the bank to lurching caused by seismic shaking.
- ▶ **Program HS.I-18** requires the County to revise its zoning ordinance to limit development occurring in geologic hazard areas, including landslide susceptibility zones and creek banks susceptible to lurching.
- ▶ **Program HS.I-19** requires the County to adopt and enforce the most current versions of the International Building Codes, as modified by the BSC. This program would result in construction features that minimize the effects of unstable soils.
- ▶ **Program HS.I-21** calls on the County to require geotechnical investigation and recommendations for buildings meant for public occupancy within geologic hazard areas. A state-certified engineering geologist would be required to produce a report examining development issues that considers soil, slope, or geologic hazards, as well as off-site soil instability.
- ▶ **Program HS.I-22** calls on the County to require geotechnical evaluation and recommendations before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential hazards from landslides, liquefaction, steep slopes, erosion, subsidence, and fault zones. New development would be required to incorporate project features that avoid or minimize the identified hazards.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database to be maintained in the County's GIS. The GIS would be used to identify areas containing hazards and constraints that could potentially affect the type or level of development allowed in these areas. These data, including relative seismic shaking hazards, relative landslide susceptibility, relative liquefaction susceptibility, and soils subject to high water levels, would be made available to the public.

Implementation of the 2008 Draft General Plan's goals, policies, and programs, as well as implementation of existing regulations (including the Alquist-Priolo Fault Earthquake Fault Zoning Act, the California Seismic Hazards Mapping Act, and the California Uniform Building Code) would reduce the impacts of unstable soils on buildout of the 2008 Draft General Plan under the Preferred Plan through application of best management practices and engineering controls. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-6b **Potential for Unstable Soils – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in construction of occupied structures in areas located on a geologic unit or soil that is unstable or that would become unstable, potentially resulting in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Policies and programs contained in the 2008 Draft General Plan, and existing regulations, would implement best practices to prevent soil erosion and topsoil loss. This impact would be less than significant.*

This impact is the same as Impact 4.7-6a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-7a **Construction in Areas with Expansive Soils – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in construction of occupied structures in areas with expansive soils. This impact would be less than significant.*

Expansive or shrink-swell soils contain significant amounts of clay minerals that swell when wet and shrink when dry. These clays tend to swell despite the heavy loads imposed by large structures. Damage (such as cracking of foundations) results from differential movement and from the repetition of the shrink-swell cycle. Soils having high shrink-swell potential in at least the top 12 inches are found throughout Solano County, especially in the eastern one-third, and are often referred to as “adobe” soils. Travis Air Force Base and the cities of Fairfield and Rio Vista are also largely underlain by expansive-soil deposits. Awareness of the presence of expansive soils before construction often means that the problem can be eliminated through foundation design.

The 2008 Draft General Plan includes a policy and several programs that would control development in areas of expansive soils:

- ▶ **Policy HS.P-18** requires the County to make information about soils with a high shrink-swell potential readily available. The County would then require proper foundation designs in these areas.
- ▶ **Program HS.I-21** requires geotechnical investigation and recommendations for buildings meant for public occupancy within geologic hazard areas. A state-certified engineering geologist would produce a report examining development issues that considers soil hazard conditions found on-site, including expansive-soil hazards.
- ▶ **Program HS.I-22** requires that geotechnical evaluation and recommendations be completed before new development in areas of moderate or higher hazards. This geotechnical evaluation would analyze the potential hazards from expansive soils. New development would then be required to incorporate project features that avoid or minimize the identified expansive-soil hazards.
- ▶ **Program HS.I-24** requires the County to provide current data to the public regarding geologic hazards. The County would coordinate with cities to gather and periodically assess new geologic data, including distribution of shrink-swell soils.
- ▶ **Program HS.I-25** requires the County to develop a geologic constraints and hazards database, to be maintained in the County’s GIS. The GIS would be used to identify areas containing hazards and constraints

that could potentially affect the type or level of development allowed in these areas, including areas with high-clay-content soils, indicating shrink-swell potential. These data would be made available to the public.

Implementation of the County's policy and programs would result in application of best management practices, including avoidance of areas with expansive soils, or geotechnical engineering to reduce impacts of expansive soils. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-7b Construction in Areas with Expansive Soils – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in construction of occupied structures in areas with expansive soils. This impact would be less than significant.*

This impact is the same as Impact 4.7-7a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-8a Construction in Areas with Soils with Poor Septic Suitability – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in construction of occupied structures in areas with soils poorly suited to septic systems. This impact would be less than significant.*

Soil limitations with respect to septic systems are described as either low, moderate, or severe. These ratings are based on slope, soil depth, permeability, depth to the water table, and whether or not the soil is subject to ponding. Adverse effects associated with septic suitability of soils can be avoided through proper in-situ soil percolation testing and septic system design, construction monitoring, and postconstruction monitoring and maintenance.

The 2008 Draft General Plan includes a policy and several programs that control the use of septic systems in the county:

- ▶ **Policy PF.P-21** ensures that sewage treatment systems not have a negative impact on groundwater quality.
- ▶ **Program PF.I-19** requires the County to review and revise the County Code to ensure that it incorporates current best practices to minimize the impacts of on-site septic systems and sewage treatment systems. This revision would address standards within Chapters 6.4, 12.2, 13.10, 26, 28, and 31 of the County Code.
- ▶ **Program PF.I-20** mandates several requirements for septic systems during review of development proposals:
 - Require septic systems to be located outside of primary groundwater recharge areas, or where that is not possible, require shallow leaching systems for disposal of septic effluent.
 - Require new septic systems or leach fields to be installed at least 100 feet away from natural waterways, including perennial or intermittent streams, seasonal water channels, and natural bodies of standing water. Make an exception for the repair of existing systems if the buffer cannot be maintained and if adequate provisions are made for protecting water quality.
 - Require the use of alternative wastewater treatment techniques to respond to site characteristics, as determined by the California Department of Public Health (formerly DHS) and regional water quality control boards.

- Require new development with septic systems to be designed to prevent nitrates and other pollutants of concern from septic disposal systems from impairing groundwater quality.
- ▶ **Program PF.I-22** requires the County to continue to enforce the abatement of ailing septic systems that have been demonstrated as causing a health and safety hazard.
- ▶ **Program PF.I-23** requires the County to continue inspection of individual sewage facilities to ensure that they are not adversely affecting water quality.

This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-8b **Construction in Areas with Soils with Poor Septic Suitability – Maximum Development Scenario.** *Maximum buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in construction of occupied structures in areas with soils poorly suited to septic systems. Policies and programs contained in the 2008 Draft General Plan would reduce these impacts to a **less-than-significant** level.*

This impact is the same as Impact 4.7-8a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-9a **Loss of Availability of Known Mineral Resources – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in urban development in areas known to contain mineral resources, causing a loss of availability of a known mineral resource of value to the region and residents of the state. This impact would be **less than significant**.*

Known mineral resource zones in Solano County consist of an area located northeast of Vallejo, south and southeast of Green Valley, areas south and east of Travis Air Force Base.

Land use designations for most of these mineral resource zones, including the area northeast of Vallejo, south and east of Travis Air Force Base, are unchanged. The 2008 Draft General Plan designates an area of Green Valley, which overlaps with the remaining mineral resource zone, as a Specific Project Area. Development of this area would be governed by a specific plan.

A policy and programs in the 2008 Draft General Plan would reduce the impacts of the plan on mineral resources:

- ▶ **Policy RS.P-32** requires the County to preserve, for future use, areas with important mineral resources by preventing residential, commercial, and industrial development that would be incompatible with mining practices.
- ▶ **Program RS.I-16** calls on the County to designate land uses in mineral areas appropriately to ensure compatibility between mineral extraction and surrounding uses.
- ▶ **Program RS.I-19** calls on the County to remain aware of studies that may reveal the presence of additional, economically viable sources of mineral resources in the county.

This impact would be less than significant.

IMPACT 4.7-9b **Loss of Availability of Known Mineral Resources – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in urban development in areas known to contain mineral resources, causing a loss of availability of a known mineral resource of value to the region and residents of the state. This impact would be less than significant.*

This impact is the same as Impact 4.7-9a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.7-10a **Potential for Loss of Availability of Locally Important Mineral Resource Recovery Sites – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would not result in the loss of availability of any locally important mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan. This impact would be less than significant.*

The *Tri-City and County Cooperative Plan* identifies an area south of I-80 near Lynch Canyon as an Aggregate Mineral Resource Area. In the 2008 Draft General Plan the area would be designated as Agriculture and would fall within the Tri-City Cooperative Planning Area and the Resource Conservation Overlay. This designation would allow mineral resource extraction in the area. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation is required.

IMPACT 4.7-10b **Potential for Loss of Availability of Locally Important Mineral Resource Recovery Sites – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. This impact would be less than significant.*

This impact is the same as Impact 4.7-10a for the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation is required.

4.7.4 RESIDUAL SIGNIFICANT IMPACTS

All impacts related to geology and soils would be less than significant. No mitigation beyond the 2008 Draft General Plan policies and programs is required, and no residual significant impacts would exist.

4.8 AGRICULTURAL RESOURCES

This section includes an explanation of the various criteria and methods used to evaluate the significance and quality of agricultural land in Solano County, a description of the existing agricultural resources in the county, and an evaluation of how implementation of the 2008 Draft General Plan would affect agricultural resources in Solano County. Additional information related to agricultural resources and activities in Solano County can be found in the Land Use, Geology and Soils, and Local Economy Background Reports prepared for the 2008 Draft General Plan (Solano County 2006a, 2006b, 2006c). In addition, detailed information related to agricultural resources in Solano County can be found in the agricultural reports prepared for the 2008 Draft General Plan, available from the following Web site: <www.solanocountygeneralplan.net>.

4.8.1 EXISTING CONDITIONS

Agriculture has historically been an important industry in Solano County and a central part of the county's identity. Agricultural lands account for more land than any other land use in the county. Agriculture also contributes to the regional economic health and prosperity, defines much of the county's visual character, supports wildlife habitats and migration corridors, provides open space and recreational amenities for residents and visitors, and separates urban land uses defining the county's cities.

Several agricultural studies and reports have been prepared to determine the current (2007) condition of agriculture. Among these studies was the Solano Agricultural Futures Project, prepared by the University of California Agricultural Issues Center. This project identified 10 distinct agricultural regions, each characterized as a separate farming system according to commodities grown, soil conditions, cultivation practices and water conditions. These regions were Winters; Dixon Ridge; Elmira and Maine Prairie; Montezuma Hills; River Island; Suisun and Green Valleys; Pleasants, Vaca, and Lagoon Valleys; Jepson Prairie; and Western Hills. In addition to these nine regions, the County has identified Green Valley as a separate region because of the agricultural characteristics of the valley and 2008 Draft General Plan policies recommending a specific plan for Middle Green Valley.

Overall, there has been a trend involving an increase in farm size and a decrease in the number of farms in Solano County. The average farm size in Solano County in 2002 was 384 acres, an increase from 378 acres in 1997 (U.S. Department of Agriculture 2002). In addition, of the county's 915 farms in 2002, more than 60% were small farms (ranging in size from 1 acre to 49 acres), 27% were mid-size farms (ranging in size from 50 acres to 500 acres), and 12% were farms larger than 500 acres (U.S. Department of Agriculture 2002).

In 2007, Solano County had 365,651 acres of agricultural lands, which represents approximately 74% of the unincorporated county's total land area. According to the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), changes in Solano County land uses between 1984 and 2006 (see Table 4.8-1) identify a loss of Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, Unique Farmland) during the last 2 decades (FMMP 2006). Specifically, the amount of Important Farmland in the county decreased from 180,855 acres in 1984 to 157,736 acres in 2006, which represents a 13% loss. The largest part of the lost Important Farmland was a result of conversion to urban land or low-density development.

FMMP Land Use	Acres		Change, 1984–2006	
	1984	2006	Acres	Percent
Prime Farmland	152,140	139,536	-12,604	-8.3%
Statewide Importance	12,613	7,164	-5,449	-43.2%
Unique Farmland	16,102	11,036	-5,066	-31.5%

Table 4.8-1 Farmland Conversions (1984–2006)				
	Acres		Change, 1984–2006	
<i>Important Farmland Total</i>	180,855	157,736	-23,119	-12.8%
Grazing Land	220,008	202,826	-17,182	-7.9%
Urban and Built-up Land	40,145	58,628	+18,483	+46.0%
Water (more than 40 acres)	50,579	49,749	-830	-1.6%
Other Land	90,430	113,433	+23,003	+25.4%
Note: FMMP = Farmland Mapping and Monitoring Program Source: FMMP 2006				

4.8.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

Federal Farmland Protection Act

The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture (USDA), is the agency primarily responsible for implementing the federal Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize federal contributions to the conversion of farmland to nonagricultural land uses by ensuring that federal programs are administered in a manner compatible with state government, local government, and private programs designed to protect farmland. The FPPA established the Farmland Protection Program (FPP).

NRCS administers the FPP, which is a voluntary program that provides funds to help purchase development rights to keep productive farmland in agricultural land uses. This program provides matching funds to state, local, and tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. Participating landowners agree not to convert the land to nonagricultural land uses and retain all rights to the property for future agriculture production. A minimum 30-year term is required for conservation easements and priority is given to applications with perpetual easements. NRCS provides up to 50% of the fair market value of the easement (NRCS 2008).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Cortese-Knox-Hertzberg Local Government Reorganization Act

The Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (Cortese-Knox-Hertzberg Act) (California Government Code Section 56000 et seq.) defines prime agricultural land according to several criteria, which include the NRCS's Land Capability Class System and the Storie Index. Prime agricultural land is defined by the Cortese-Knox-Hertzberg Act as:

...an area of land, whether a single parcel or contiguous parcels, that have not been developed for a use other than an agricultural use and that meets any of the following qualifications:

- (a) Land that, if irrigated, qualifies for rating as class I or class II in the USDA Natural Resources Conservation Service land use capability classification, whether or not the land is actually irrigated, provided that irrigation is feasible.

- (b) Land that qualifies for rating 80 through 100 Storie Index Rating.
- (c) Land that supports livestock used for the production of food and fiber and that has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture in the National Handbook on Range and Related Grazing Lands, July, 1967, developed pursuant to Public Law 46, December 1935.
- (d) Land planted with fruit or nut-bearing trees, vines, bushes, or crops that have a nonbearing period of less than five years and that will return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than four hundred dollars (\$400) per acre.
- (e) Land that has returned from the production of unprocessed agricultural plant products an annual gross value of not less than four hundred dollars (\$400) per acre for three of the previous five calendar years.

NRCS has prepared a soil survey for all of Solano County that includes a Land Capability Classification system that places soils into agricultural suitability categories. The land capability classes reflect the soil's ability to support common crops and pasture plants without compromising the soil's quality over the long term. The Land Capability Classification system uses eight Land Capability Classes (I through VIII) to rank soils. Prime Farmland generally corresponds to Land Capability ratings of Class I or Class II and soils that are less suitable for farming are assigned to classes with higher numbers.

NRCS also assigns Storie Index Ratings that rank soil characteristics according to their suitability for agriculture from Grade 1 soils (80–100 rating), which have few or no limitations for agricultural production and are considered prime soils, to Grade 6 soils (less than a rating of 10), which are not suitable for agriculture. Use of Storie Index ratings is another way to determine the presence of Important Farmland. Under this system, soils identified as less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or completely removed. Grade 3 soils are only fairly well suited to intensively grown irrigated crops. Soils in Grades 4 and 5 are generally only used for rangeland. Grade 6 soils are generally unsuited for any agricultural purpose. In addition, NRCS provides farmland classifications for individual soil units.

Williamson Act

The California Land Conservation Act of 1965 (i.e., Williamson Act) is one agricultural conservation tool currently used in California. Under the Williamson Act, local governments can enter into contracts with private property owners to protect land for agricultural and open space purposes. This voluntary program offers tax breaks by assessing lands based on actual use (agricultural or open space) as opposed to their potential full market value, creating a financial incentive to maintain farmland and open space, as opposed to allowing conversion to other uses.

The Williamson Act program uses 10-year contracts that renew annually until either party files a notice of nonrenewal. If an owner decides to opt out, the land is still protected for 10 years while the tax liability increases in annual increments up to its full market value. Additionally, existing Williamson Act contracts on lands classified by the California Department of Conservation as Important Farmland can be extended to 20-year Farmland Security Zone contracts (i.e., super Williamson Act contracts), which offer landowners greater property tax savings.

Statewide, more than 16.5 million acres have been protected under Williamson Act contracts, representing more than half of the state's agricultural and open space lands. In Solano County, roughly 215,000 acres are held in Williamson Act contracts, representing 62% of the county's agricultural lands.

Farmland Mapping and Monitoring Program

The California Department of Conservation, Division of Land Resource Protection, administers the FMMP to analyze impacts on the state's agricultural resources. Land is rated based on its soil characteristics and irrigation status. These ratings are then used to help prioritize conservation efforts. The FMMP uses the term "Important Farmland" to describe parcels that meet certain criteria.

In Solano County, three Important Farmland types have been identified: Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. According to the FMMP:

- ▶ **Prime Farmland** is "farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date."
- ▶ **Unique Farmland** is "farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date."
- ▶ **Farmland of Statewide Importance** is "farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date."

Based on 2006 mapping data, approximately 139,459 acres in Solano County are identified by the FMMP as Important Farmland. These lands are concentrated in the northeastern portion of the county because of the prevalence of grazing activity in southern areas.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Right-to-Farm Ordinance

Chapter 2.2 of the Solano County Code protects farm operations from nuisance complaints associated with residential uses located next to active agricultural operations. These complaints often cause farm operators to cease or curtail operations. They may also deter others from investing in farm-related improvements that would support the county's agricultural economy. This "right-to-farm ordinance," as it is commonly known, guarantees the right to continue agricultural operations, including but not limited to cultivating and tilling the soil, burning agricultural byproducts, irrigating, raising crops and/or livestock, and applying approved chemicals in a proper manner to fields and farmland. This ordinance limits the circumstances under which agriculture may be considered a nuisance. To prevent future conflicts, notice of this ordinance will be given to purchasers of real property in the county.

4.8.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

The environmental analysis in this section is based on a review of FMMP Important Farmland maps. As part of the analysis, this EIR examines the Important Farmland classifications that are used by FMMP to determine the agricultural significance of the lands within Solano County (Prime Farmland, Unique Farmland, and Farmland of Statewide Importance).

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact on agricultural resources is considered significant if the proposed project would:

- ▶ convert Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) as determined by the FMMP Important Farmland criteria;
- ▶ conflict with existing zoning for agricultural use, or conflict with a Williamson Act contract; or
- ▶ involve other changes in the existing environment that, because of their location or nature, could result in conversion of Important Farmland to nonagricultural use.

IMPACT ANALYSIS

IMPACT 4.8-1a **Loss of Important Farmland – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in the conversion of Important Farmland to nonagricultural uses. Approximately 21,971 acres of existing agricultural land uses in Solano County, including approximately 4,131 acres of Important Farmland, would be converted to urban uses. This impact would be *significant*.*

The County has identified that in 2007 existing agricultural land uses totaled 365,651 acres. With implementation of the 2008 Draft General Plan under the Preferred Plan, approximately 21,971 acres of existing agricultural land uses, including 4,171 acres of Important Farmland, would be converted to nonagricultural land uses, which represents an approximate 6% reduction (see Table 3-2 in Chapter 3, “Project Description”). A total of 343,680 acres of agricultural land uses would remain with implementation of the 2008 Draft General Plan.

According to Important Farmland designations identified by FMMP, Solano County currently has approximately 157,736 acres of Important Farmland. Of this acreage, approximately 139,536 acres are designated as Prime Farmland, 11,036 acres are designated as Unique Farmland, and approximately 7,164 acres are classified as Farmland of Statewide Importance. With implementation of the 2008 Draft General Plan, approximately 4,131 acres of Important Farmland would be converted to urban land uses (3,417 acres of Prime Farmland, 511 acres of Unique Farmland, and 203 acres of Farmland of Statewide Importance).

Two programs intended to protect agricultural activities and/or prevent the conversion of agricultural land are the State of California’s Williamson Act and the County’s Right-to-Farm Ordinance (see Section 4.8.2). As described below, some policies and programs of the 2008 Draft General Plan would protect agricultural land, while others would have the potential to exacerbate the loss of such land.

Relevant Policies and Program of the 2008 Draft General Plan

Policies and Program to Protect Agricultural Land

During the preparation of the 2008 Draft General Plan, the community identified the importance of agriculture and farming to Solano County’s identity and culture. Numerous communities in Solano County have expressed a common desire to maintain a distinct sense of identity and to remain physically separated from other cities. Community separators are an effective means of achieving this goal. All the cities in the county, as well as some neighboring communities, have established agreements and plans to maintain land between urban communities as open space and agricultural uses. The Agriculture chapter of the 2008 Draft General Plan identifies goals, policies, and implementing programs that guide the County toward fulfilling its vision for agricultural resources and its desire to ensure the long-term protection of agricultural opportunities through recognition of economic, environmental, and social equity benefits. The following statements are derived from the County’s vision and desire for agriculture:

- ▶ ensuring that agriculture endures as an essential part of Solano County’s identity and lifestyle;
- ▶ maintaining and promoting agriculture as an important business and major contributor to Solano County’s economy;
- ▶ preserving additional values of agricultural land, including important scenic value within the rural environment, providing habitat, providing options for recreation, and serving as a separator defining the county’s distinct cities; and
- ▶ providing opportunities for agriculture to serve as an educational tool and tourist draw.

In addition, the 2008 Draft General Plan incorporates the following policies and implementation program aimed at protecting agricultural land, including Important Farmland, in Solano County.

- ▶ **Policy LU.P-17:** Encourage clustering of residential development when necessary to preserve agricultural lands, natural resource areas and environmental quality, to provide for the efficient delivery of services and utilities, and to mitigate potential health and safety hazards.
- ▶ **Policy SS.P-9:** Preserve agricultural production as the principal use of the [Suisun] Valley’s farmlands.
- ▶ **Policy SS.P-12:** Limit minimum agricultural parcel sizes in the Suisun Valley to encourage viable agricultural and ranching use. New parcels shall not be created which are smaller than 20 acres in size.
- ▶ **Policy AG.P-4:** Require farmland conversion mitigation for either of the following actions:
 - a. a general plan amendment that changes the designation of any land from an agricultural to a nonagricultural use or
 - b. an application for a development permit that changes the use of land from production agriculture to a nonagricultural use, regardless of the General Plan designation.
- ▶ **Policy AG.P-5:** Create an Agricultural Reserve Overlay designation on the Land Use Diagram that identifies an agricultural mitigation bank area in which the County will encourage private landowners to voluntarily participate in agricultural conservation easements.
- ▶ **Policy AG.P-6:** Encourage eligible property owners to participate in a County-led agricultural preserve program.
- ▶ **Policy AG.P-7:** Explore and if feasible implement a voluntary transfer of development rights (TDR) program to help protect agricultural resources by guiding development to more suitable areas.
- ▶ **Policy AG.P-28:** Recognize that agriculture is to be the predominant land use in the Dixon Ridge, Elmira and Maine Prairie, Montezuma Hills, Ryer Island, and Winters regions. These are agricultural areas where preservation efforts should be focused and conflicting land uses avoided. Table [4.8-2] describes minimum parcel size in each Agricultural region.

Table 4.8-2 Minimum Parcel Size per Agricultural Region	
Agricultural Region	Minimum Lot Size
Winters	40 acres
Dixon Ridge	40 acres
Elmira and Maine Prairie	40 acres—northwest portion (Elmira) 80 acres—southeast portion (Maine Prairie) See Figure AG-5 [in the 2008 Draft General Plan]
Montezuma Hills	160 acres
Ryer Island	80 acres
Suisun Valley	20 acres
Green Valley	20 acres
Pleasants, Vaca, and Lagoon Valleys	40 acres—parcels with current A-40 zoning 20 acres—parcels with current A-20 zoning See Figure AG-6 [in the 2008 Draft General Plan]
Jepson Prairie	160 acres
Western Hills	160 acres—west of Pleasants Valley Road 20 acres—east of Pleasants Valley Road and in the Tri-City and County area See Figures AG-7 and AG-8 [in the 2008 Draft General Plan]
Source: Solano County 2008	

- ▶ **Policy RS.P-14:** Support agricultural uses and activities within the [Suisun Marsh] primary management area that are compatible with or are intended for the maintenance or improvement of wildlife habitat.
- ▶ **Policy RS.P-15:** Support agricultural uses within the [Suisun Marsh] secondary management area that are consistent with protection of the Suisun Marsh, such as grazing and grain production. In the event such uses become infeasible, permit other uses that are compatible with protection of the marsh.
- ▶ **Policy RS.P-68:** Retain rural character in areas between cities by promoting agricultural uses within community separators.
- ▶ **Policy RS.P-70:** Encourage cities to maintain defined community separators in appropriate productive agricultural or open space use.
- ▶ **Policy RS.P-76:** Preserve and maintain watershed areas characterized by slope instability, undevelopable steep slopes, high soil erosion potential, and extreme fire hazards in agricultural use. Watershed areas lacking water and public services should also be kept in agricultural use.
- ▶ **Policy HS.P-9:** Preserve open space and agricultural areas that are subject to natural flooding and are not designated for future urban growth; prohibit permanent structures in a designated floodway where such structures could increase risks to human life or restrict the carrying capacity of the floodway.
- ▶ **Program AG.I-1** calls on the County to create and adopt a farmland conversion mitigation program and ordinance. The ordinance would require projects that result in the conversion of agricultural lands to mitigate the impacts through the purchase of agricultural easements or through the payment of an in-lieu fee to the county. The mitigation ratio shall be a minimum of 1:1 (1 acre of farmland protected through mitigation for

each acre of farmland converted) and the easement shall protect land of equal or greater quality in the same agricultural region or within the Agricultural Reserve Overlay.

In addition to policies of the 2008 Draft General Plan, the proposed general plan would also create an Agricultural Reserve Overlay, which would contribute to the cities' efforts to maintain community separators. The intent of the overlay is to preserve the valued agricultural landscapes that exist in the areas between the communities of Vacaville and Dixon and between Dixon and Davis by encouraging private landowners to voluntarily participate in land conservation.

The Agricultural Resource Overlay designation is intended to focus agricultural mitigation banks for future development projects subject to County and city agricultural mitigation programs. Projects affecting agricultural resources in other areas of the county or in participating cities could mitigate this impact by paying in-lieu fees used to purchase agricultural easements from willing landowners within the overlay area. Easements would be held by the County, cities, or relevant land trusts, while the landowner maintains ownership and management control.

Policies that Could Exacerbate Loss of Agricultural Land

Although the majority of policies in the 2008 Draft General Plan related to agriculture are aimed at preserving agricultural land uses, the plan includes three policies that could exacerbate the loss of agricultural land, including Important Farmland, in the county:

- ▶ **Policy LU.P-25:** Promote industrial development in the unincorporated county in cases where locating such development near urban areas is not appropriate because of the potential for air pollution, odors, or noise; because such development is related to agriculture; or because the development has other specific unique site requirements that are not feasible or available in cities.

- ▶ **Policy AG.P-33:** To comply with state law regarding the provision of low- and very-low income housing as those terms are or may be defined by state law, lands within the Agriculture designation on the Land Use Diagram may be changed to a residential designation. No more than 50 acres of land may be redesignated for this purpose in any calendar year. Such redesignation may be made only upon each of the following findings:
 - the findings stated in subparagraphs (e) and (f) in AG.P-31 above are met;
 - use of the land redesignated under this policy will be limited to a low- and very-low income housing development, pursuant to a legally valid Housing Element of this General Plan;
 - there is no existing residential designated land available for the low- and very-low income housing; and
 - the redesignation of lands, and construction of low- and very-low income housing on those lands, is required to comply with state law requirements for provision of such housing.

- ▶ **Policy AG.P-34:** Lands within the Agriculture designation may be redesignated to Park & Recreation only for public recreation and public open space uses and only if the uses permitted by the new designation will not interfere with or be in conflict with agricultural operations.

Implementation of these policies has the potential to promote the conversion of agricultural land, including Important Farmland, by promoting industrial development, by providing low- and very low-income housing, and by redesignating agricultural land for park and recreation uses.

In addition, the 2008 Draft General Plan would establish a Wind Energy Resource Overlay that would promote development of electricity-generating wind-powered facilities. This designation recognizes areas that contain significant wind resources and promotes alternative and renewable energy sources that can be produced from

resources available in the county. Although the Wind Energy Resource Overlay would allow the continuation of agricultural uses, the construction and maintenance of wind turbines themselves would require removing a certain amount of agricultural land from production.

Conclusion

The 2008 Draft General Plan provides numerous policies that are intended to protect future productivity of agricultural land uses in Solano County and to mitigate their loss (i.e., Agricultural Reserve Overlay). However, portions of the 2008 Draft General Plan have the potential to exacerbate the loss of agricultural land for wind energy production, for park and recreation uses, for industrial land uses, and for low- and very-low income housing. Overall, implementation of land uses envisioned in the 2008 Draft General Plan under the Preferred Plan would continue to result in the loss of agricultural land uses, including Important Farmland, to urban development. This impact would be significant.

Mitigation Measure

Because any actions taken by the County, including policies and programs in the proposed 2008 Draft General Plan, would only partially offset conversions of Important Farmland associated with urban development, full compensation for losses of Important Farmland and a net loss of Important Farmland would still occur in Solano County. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.8-1b **Loss of Important Farmland – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the conversion of Important Farmland to nonagricultural uses. Approximately 32,727 acres of existing agricultural land uses in Solano County, including approximately 4,131 acres of Important Farmland, would be converted to urban uses. This impact would be significant.*

This impact is similar to Impact 4.8-1a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the continued loss of agricultural land uses, including Important Farmland, to urban development. This impact would be significant.

Mitigation Measure

Because any actions taken by the County, including policies and programs in the proposed 2008 Draft General Plan, would only partially offset conversions of Important Farmland associated with a higher density of urban development, full compensation for losses of Important Farmland and a net loss of Important Farmland would still occur in Solano County. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.8-2a **Conflict with Williamson Act Contracts – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in the development of urban land uses on lands under a Williamson Act contract. Approximately 1,682 acres of land in Solano County are under a Williamson Act contract and would be converted to urban uses as envisioned in the 2008 Draft General Plan. To allow for urban development, these agricultural land uses would be removed from protection under the Williamson Act. This impact would be significant.*

In 2007 existing agricultural land uses totaled 365,651 acres. With implementation of the 2008 Draft General Plan under the Preferred Plan, approximately 1,682 acres of existing agricultural land uses protected under a Williamson Act contract would be converted to an urban land use.

The Williamson Act is one agricultural conservation tool currently used in California that allows local governments to enter into contracts with private-property owners to protect land for agricultural and open space purposes. This voluntary program offers tax breaks by assessing lands based on actual use (agricultural or open space) as opposed to their potential full market value, creating a financial incentive to maintain farmland and open space, as opposed to allowing conversion to other uses.

The 2008 Draft General Plan includes implementation programs that are intended to entice property owners in Solano County to participate in the Williamson Act program:

- ▶ **Program AG.I-6:** Provide incentives for landowners to participate in the Williamson Act and Farmland Security Zone programs, including subsidy of application filing fees and assistance with the application process. Develop a conservation plan aimed at consolidating agricultural preserves and Williamson Act contracts to maintain large parcel sizes needed for productive agriculture. Ensure that agricultural parcels are maintained at a minimum parcel size sufficient to remain a farmable unit. Pursue grant funds under the provisions of the California Farmland Conservancy Program to assist with implementation of this and other measures contained in this chapter.
- ▶ **Program AG.I-9:** Focus preservation efforts, including use of Williamson Act contracts and conservation easements, in areas where agriculture is to be the predominant land use. Maintain large minimum parcel sizes in these regions, and discourage rezoning that would negatively affect farming operations. Recognize that agriculture is to be the predominant land use in the Dixon Ridge, Elmira and Maine Prairie, Montezuma Hills, Ryer Island, and Winters regions. Support long-term viability of commercial agriculture and discourage inappropriate development of agricultural lands within the Delta.
- ▶ **Program AG.I-17:** Establish programs to preserve farmland, and encourage eligible property owners to participate in a County-led preserve program. Programs such as those listed below shall encourage maximum flexibility for agricultural operations:
 - A Farmland Security Zone program (Super Williamson Act). This program, in tandem with others in this section, will encourage the consolidation of the fragmented pattern of agricultural preserves and Williamson Act contracts, and the retention of these contracts in agricultural, watershed, and marshland areas.

Although the 2008 Draft General Plan includes policies to encourage property owners to participate in the County's Williamson Act program, urban land uses envisioned in the 2008 Draft General Plan under the Preferred Plan would continue to result in the removal of 1,682 acres of existing agricultural land currently under a Williamson Act contract. Therefore, this impact would be significant.

Mitigation Measure

Because any actions taken by the County, including policies in the proposed 2008 Draft General Plan, would only entice, but not require, property owners to continue agricultural operations of their property, full compensation for losses of agricultural operations protected by a Williamson Act contract from urban development would still occur in Solano County. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.8-2b **Conflict with Williamson Act Contracts – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in the development of urban land uses on lands under a Williamson Act contract. Approximately 1,682 acres of land in Solano County is under a Williamson Act contract and would be converted to urban uses as envisioned in the 2008 Draft General Plan. To allow for urban development, these agricultural land uses would be removed from protection under the Williamson Act. This impact would be **significant**.*

This impact is similar to Impact 4.8-2a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in removal of 1,682 acres of existing agricultural land currently under a Williamson Act contract. This impact would be significant.

Mitigation Measure

Because any actions taken by the County, including policies in the proposed 2008 Draft General Plan, would only entice, but not require, property owners to continue agricultural operations of their property, full compensation for losses of agricultural operations protected by a Williamson Act contract from higher density of urban development would still occur in Solano County. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

4.8.4 RESIDUAL SIGNIFICANT IMPACTS

Although the 2008 Draft General Plan has programs and policies aimed at protecting existing agricultural lands, including Important Farmland, these policies and programs (e.g., conservation easements, mitigation banks) would only partially offset conversions of Important Farmland associated with development. Because no new farmland would be made available and the productivity of existing farmland would not be improved as a result of implementing agricultural protection policies and programs, full compensation for losses of farmland would not be achieved and a net loss of Important Farmland would still occur in Solano County. Therefore, Impacts 4.8-1a and 4.8-1b would remain **significant and unavoidable**.

Although the 2008 Draft General Plan has policies aimed at promoting the County's Williamson Act program and at enticing property owners to take advantage of the program, development envisioned in the 2008 Draft General Plan would require removing existing agricultural lands from protection under a Williamson Act contract. Therefore, Impacts 4.8-2a and 4.8-2b would remain **significant and unavoidable**.

4.9 PUBLIC SERVICES AND UTILITIES

This section addresses the following public services in the unincorporated area of Solano County:

- ▶ Water supply services
- ▶ Wastewater management services
- ▶ Solid waste management and recycling
- ▶ Parks and recreation services
- ▶ Public education services
- ▶ Fire protection and emergency services
- ▶ Criminal justice services
- ▶ Library services

The existing conditions and regulatory framework are described separately for each topic, and are followed by a set of impacts and mitigation measures for public services and utilities as a whole. The topics discussed in this section overlap with other sections of this EIR, including Section 4.1, “Land Use”; Section 4.5, “Hydrology and Water Resources”; and Section 4.8, “Agriculture.” Parks and recreation services are described in Section 4.14, “Recreation.” Public services impacts are most closely related to the Public Facilities and Services Background Report prepared for the 2008 Draft General Plan (Solano County 2006).

4.9.1 EXISTING CONDITIONS

WATER SUPPLY SERVICES

Incorporated areas of the county within municipal service areas (MSAs) obtain water from the Solano County Water Agency (SCWA). SCWA also provides water to unincorporated areas for agriculture and some domestic water use. SCWA relies on two primary water sources, the U.S. Bureau of Reclamation’s (Reclamation’s) Solano Project, which provides surface water through Monticello Dam, and the California Department of Water Resources’ (DWR’s) State Water Project (SWP), which supplies surface water to Solano County through the North Bay Aqueduct. Unincorporated areas of Solano County rely on water from myriad sources. Portions of unincorporated areas are located within MSAs and are served by existing water districts. Unincorporated areas outside of MSAs demand water for agricultural and domestic purposes, with agriculture being the largest water user. The discussion below describes the water sources and supply in Solano County, including surface water supplied through SCWA, groundwater sources, local supplies of surface water provisions through existing water districts, and public and private water wells. Section 4.5, “Hydrology and Water Resources,” provides additional background on water quality and supplies in Solano County.

Solano County Water Agency Water Supplies

Solano Project

The Solano Project was sized to meet only the projected water needs of Solano County. The physical facilities of the Solano Project are Monticello Dam, Putah Diversion Dam, and the Putah South Canal (Exhibit 4.5-1 in Section 4.5, “Hydrology and Water Resources”). The amount of water contracted (207,350 acre-feet per year [afy]) is approximately the firm yield of the Solano Project. The firm yield is an engineering calculation based on a specified water amount every year during the driest hydrologic period on record. For the Solano Project, the driest hydrologic record was from 1916 to 1934. This is a conservative method of determining water supply from a reservoir and results in a very dependable water supply.

Water Supply Contracts

SCWA has entered into agreements with cities, water districts, and state agencies to provide water from the Solano Project. The contracts with the Solano Project's member agencies are for the full supply available from the project. The Solano Project's contracting agencies are the Cities of Fairfield, Suisun City, Vacaville, and Vallejo; Solano Irrigation District (SID); Maine Prairie Water District (MPWD); the University of California, Davis; and California State Prison, Solano.

Contract entitlements for each agency are listed in Table 4.9-1. Reclamation is contractually committed to deliver the full contract amount of water from the Solano Project unless the supply does not physically exist (e.g., the reservoir is empty). All Solano Project contractors, municipal or agricultural, are on an equal basis for Solano Project water supply.

Agency	Annual Entitlement (acre-feet)
City of Fairfield	9,200
City of Suisun City	1,600
City of Vacaville	5,750
City of Vallejo	14,600
Solano Irrigation District	141,000
Maine Prairie Water District	15,000
University of California, Davis	4,000
California State Prison, Solano	1,200
Project Operating Loss (average estimated)	15,000
Total Project	207,350

Source: SCWA 2005a

SID and the Rural North Vacaville Water District (RNVWD) provide municipal, industrial, and/or agricultural water distribution and treatment services to portions of the unincorporated areas of Solano County. MPWD serves unincorporated areas south of Dixon between service areas of the SID and the reclamation districts. Reclamation Districts (RDs) 2068 and 2098 serve eastern portions of the county and approximately 14 other reclamation districts provide water services throughout unincorporated areas of the county, largely for agricultural purposes (Hardesty, pers. comm., 2008). Other portions of the county not served by water districts dependent on private and community groundwater wells, as well as surface water obtained from localized tributaries to the Sacramento River. Exhibit 4.5-1 in Section 4.5, "Hydrology and Water Resources," shows water service areas and facilities in Solano County, and Table 4.9-2 shows the existing water purveyors' projected available water supply for unincorporated portions of the county.

Source	Available Water Supply (Acre-Feet per Year)
Rural North Vacaville Water District	545
Solano Irrigation District	161,000
Maine Prairie Water District	25,000

**Table 4.9-2
Water Availability for Unincorporated Areas of Solano County**

Source	Available Water Supply (Acre-Feet per Year)
Reclamation District 2068	75,000
Vallejo Lakes System (Suisun Valley and Green Valley)	400
City of Suisun City	1,600
City of Vacaville	5,750
Reclamation District 2098 and Other Reclamation Districts	Unknown ¹
Diversion from Local Waterways	Unknown ¹
Independent Groundwater Wells	Unknown ²
Total	269,295³

Notes:

¹ Water is obtained from local waterways and is utilized almost exclusively for agricultural purposes.

² Independent groundwater wells include small systems and private wells. These systems have no restrictions on amount of water used.

³ The available water supply for the unincorporated areas of Solano County would include other sources, such as groundwater and local surface water, that have not currently been quantified.

Source: SCWA 2005b

Agricultural Water

Solano Irrigation District

SID provides water to agricultural areas as well as urbanized areas in the county. Most of the growers within the SID use surface water from the Solano Project supplied by SID (Table 4.9-3), but SID also operates wells to supplement its surface water supply from the Solano Project. Growers outside of districts that provide surface water rely entirely on groundwater unless they have individual rights to surface water supplies. However, reclaimed water is also used in certain applications.

**Table 4.9-3
Solano Irrigation District's Available Water Supply**

Source	Available Water Supply (Acre-Feet per Year)
Solano Irrigation District	141,000
Maine Prairie Water District exchange	10,000
Groundwater	10,000
Total	161,000

Source: SCWA 2005b

Maine Prairie Water District

MPWD has annual contract rights to 15,000 acre-feet (af) of Solano Project water. MPWD can purchase additional Solano Project water from SID as needed. On occasion MPWD has sold small amounts of Solano Project water to California State Prison, Solano. MPWD has an irrigation tailwater exchange agreement (1984)

with SID that allows MPWD to exchange 10,000 af of its Solano Project water for SID’s irrigation tailwater. Under the terms of the agreement, MPWD can receive 2 af of irrigation tailwater for each acre-foot of Solano Project water exchanged to SID. The agreement has officially expired, but the terms have been extended by a letter agreement until further notice. MPWD has surface water rights to local streams that supplement its water supply from the Solano Project and SID. The contribution to MPWD’s water supply from local surface water sources is currently not quantified. MPWD’s available water supply is shown in Table 4.9-4.

Table 4.9-4 Maine Prairie Water District’s Available Water Supply	
Source	Available Water Supply (Acre-Feet per Year)
Solano Project	5,000
Solano Irrigation District Exchange	20,000 (irrigation tailwater)
Local Surface Water Rights	Variable
Total	25,000
Source: SCWA 2005b	

Reclamation District 2068

RD 2068 has riparian and appropriative water rights to surface water from the Sacramento–San Joaquin River Delta (Delta). The riparian right is currently exercised but not adjudicated. The appropriative rights consist of two licenses and one permit pending licensing with the oldest dating back to the early 1920s. The licenses are unquantified. The permit stipulates a water right amount of 75,000 af annually as long as the permit is in effect. However, on average RD 2068 provides between 50,000 and 55,000 afy (this figure varies depending on water availability). RD 2068 water is used primarily for agricultural purposes.

Other Reclamation Districts

As mentioned, unincorporated areas of the county are served by several other reclamation districts. RD 2098, while primarily responsible for levee maintenance provisions, provides water for irrigation purposes obtained from local surface water. RD 2060 serves areas near Hastings Island, providing irrigation and pasture water from local surface water sources. RD 2104 provides local surface water to several individual landowners, which is used primarily for agricultural purposes. The aggregate of the four reclamation districts, including RD 2068, provides water for approximately 30,000 acres of irrigated agricultural land. In total, Solano County contains approximately 14 different reclamation districts that provide largely levee, flood, and stormwater services, but also provide local surface water supplies for agricultural activities in their respective regions. However, because the water is obtained from local surface water sources, primarily the Sacramento River tributary system, the amount of water utilized is largely not quantified and varies yearly depending on availability. RD 2068’s available water supply is shown in Table 4.9-5.

Table 4.9-5 Reclamation District 2068’s Available Water Supply	
Source	Available Water Supply (Acre-Feet per Year)
Local Surface Water	75,000
Total	75,000
Source: Solano County 2005b	

Surface Water Supplies

In the eastern Delta part of Solano County, many growers divert water directly from local waterways. Growers hold riparian rights (water rights that derive from land ownership) or appropriative rights. Records do not exist to quantify the amount of this water that is used. MPWD and several reclamation districts provide surface water obtained from tributaries to the Sacramento River to their growers in the eastern portion of the county and do not currently use groundwater underlying their districts (Hardesty, pers. comm., 2008). These supplies are very reliable because water is always available in this part of the Delta (SCWA 2005b).

Domestic Water Service

Solano Irrigation District

SID provides domestic water service to several areas of the county and the cities of Dixon, Suisun City, and Vacaville. The primary domestic water service areas are the Gibson Canyon area (treated water), Pleasant Valley area (point-of-entry systems), Tolenas area (treated water), Peabody Road (treated water for commercial and industrial uses), and Blue Ridge Oaks (treated water). Most of the SID water is derived from surface water from the Solano Project supplied by SID (Table 4.9-3), but SID also operates wells to supplement its surface water supply from the Solano Project.

City of Vallejo Lakes System

Currently the City of Vallejo Lakes System provides treated water to the unincorporated communities in Suisun Valley, Old Town Cordelia, Green Valley, and unincorporated islands in Vallejo. As part of the development of the City of Vallejo Lakes System, Vallejo agreed to serve some residents in the area. The largest lake, Lake Curry, has a storage capacity of 10,700 af; the lake's yield is about 3,750 afy (Table 4.9-6). Vallejo is attempting to get permission from Reclamation to transport water from Lake Curry via the Putah South Canal to its water treatment plant in Vallejo. This would more fully utilize the yield from Lake Curry.

**Table 4.9-6
City of Vallejo Lakes System's Available Water Supply**

Source	Available Water Supply (Acre-Feet per Year)
Lakes Frey and Madigan	400
Lake Curry	3,750 (currently not available)

Source: Solano County 2005b

Suisun City and the City of Vacaville

Suisun City provides domestic water to portions of the Suisun Valley in unincorporated Solano County. The City of Vacaville provides domestic water to the Vine Street area, located just outside of the Vacaville city limits in the unincorporated county.

Rural North Vacaville Water District

RNVWD provides groundwater to domestic water users from two wells that draw from the aquifer found in the Tehama Formation (see Section 4.5, "Hydrology and Water Resources"). This supply is limited to a total capacity of approximately 522 connections and includes two deep wells (1,500 feet). The two pumps are rated to provide approximately 800 af (500 gallons per minute [gpm]). Over the last 3 years the Tehama Formation water table has dropped approximately 30 feet. Because of this drop, under current conditions (2008), the pumps are only allowed

to pump approximately 545 af (338 gpm) (Table 4.9-7). In 2007, RNVWD provided approximately 237 af of water. Currently the aquifer where RNVWD obtains its water is being tapped by private entities in rural areas, and by the City of Vacaville, which is installing a deep-well pump upstream of the RNVWD facility (Bellem, pers. comm., 2008).

Table 4.9-7 Rural North Vacaville Water District's Available Water Supply	
Source	Available Water Supply (Acre-Feet per Year)
Groundwater	545
Total	545
Source: SCWA 2005b	

Groundwater Use

Most rural residential landowners have individual shallow groundwater wells that serve their domestic needs. Some small rural residential water systems also distribute groundwater to their customers. The cities of Rio Vista and Dixon are served exclusively by groundwater from basins underlying the cities. Vacaville obtains approximately one-third of its municipal water supply from groundwater underlying the city.

Public agencies that overlie the Solano Subbasin (see Section 4.5, “Hydrology and Water Resources”) have developed groundwater management plans as specified in Assembly Bill (AB) 3030 (Chapter 947, Statutes of 1992), a state law that authorizes local agencies to prepare groundwater management plans. SCWA prepares biannual reports on groundwater levels for the groundwater basin. Groundwater level data come from DWR and local public agencies that utilize the groundwater basin. These reports show no trend of groundwater overdraft with current levels of groundwater use (SCWA 2005a). However, according to the County’s Department of Resource Management, and as noted above, the Tehama Formation, which is the county’s largest notable water aquifer, has experienced a 30-foot drop in recent years, which suggests that overdraft conditions have occurred (Bellem, pers. comm., 2008).

Water Demand

Potential increased water demand that would occur under the 2008 Draft General Plan is controlled by the intensity and distribution of future land uses, both urban and agricultural. The greatest water user in the county is agriculture, followed by residential, industrial, and commercial land uses. An analysis of sustainable water supply and demand, including the preparation of detailed water balance budgets, have been completed for portions of the county; however, currently a countywide water budget that compares available and sustainable supply in the unincorporated areas of the county along with expected demand associated with the proposed 2008 Draft General Plan land use changes is not available.

Solano County has limited surface water and groundwater resources, a component of which is allocated for urban and rural water supplies. The available water supply is a consequence of natural conditions, such as climate (precipitation and evaporation), soil permeability, topography, and hydrogeology (the capacity, location, and quality of aquifers), and management activities that function to enhance or redistribute the water supply. The long-term sustainability of supplies requires major comprehensive management across jurisdictions, as well as planning for emergencies such as drought or disruption of infrastructure.

WASTEWATER MANAGEMENT SERVICES

In Solano County, existing wastewater treatment is provided by wastewater facilities within MSAs; where treatment systems are not available, including most rural areas of the county, wastewater is treated using centralized systems and on-site septic systems. Within MSAs wastewater treatment is provided by cities and districts primarily through the annexation process. The Division of Environmental Health of the County's Department of Resource Management regulates wastewater provisions throughout the unincorporated areas outside of MSAs, with larger systems subject to the approval by the San Francisco Bay Regional Water Quality Control Board (RWQCB) and the Central Valley RWQCB.

Wastewater Collection and Treatment Agencies Outside of Existing MSAs

Each of the cities in Solano County—Benicia, Dixon, Fairfield, Rio Vista, Suisun, Vacaville, and Vallejo—is currently served by municipal sewer and wastewater systems. Some parcels in the unincorporated county near cities are served by sewer and wastewater services from adjacent cities and sewer districts. The City of Vacaville serves the unincorporated community of Elmira, which is adjacent to the service area for the Vacaville sewer system and is limited to infill development. The Suisun-Fairfield Sewer District provides sewer service to the unincorporated community of Cordelia and parts of Suisun Valley from Rockville Road south to the Fairfield city limits. The Vallejo Sanitation and Flood Control District provides sewer service to the Vallejo unincorporated islands. The City of Dixon provides service to a few parcels directly outside of Dixon. Extension of service from the agencies into the unincorporated area beyond the MSAs is limited by policies regulated and implemented by the Solano County Local Agency Formation Commission (LAFCO) through mechanisms such as establishing an out-of-agency extension of service or an existing extended service area.

Individual On-Site Wastewater Treatment Systems

The majority of developments in the unincorporated county, those not served by municipal sewer or small-scale treatment systems, operate individual on-site wastewater treatment systems. More than 90% of the properties in the unincorporated county that are not served by city municipalities are served by such systems.

Water treatment using a septic system depends on gravity to move sewage effluent through the soil, where the effluent is treated by the biological activity in the soil. Some properties also employ either an aerobic treatment unit or a sand filter, or both, to assist in treatment. A permit is required from the County to install, repair, or modify a septic system. Under this permitting system, records are kept for all septic tanks within the county. Problems with septic systems have been reported when heavy rains saturate the soil and the systems' leaching mechanisms do not operate at full capacity, potentially releasing raw sewage. Untreated sewage on the ground can lead to increased human exposure, adverse health affects, and groundwater pollution.

A few developments in the unincorporated county have their own small package treatment systems. Some have RWQCB permits for sewage ponds. Developments with existing small package treatment systems include the Twin Creeks Condominium Project in Green Valley and the recreational vehicle parks in the Midway Road area.. However, for new small package treatment systems the equivalent amount of wastewater generated by 200 units is generally the minimum to make centralized small treatment systems economically viable (Englebright, pers. comm., 2008).

The Division of Environmental Health of the County's Department of Resource Management oversees the permitting, design, and implementation process for the installation of individual on-site waste disposal systems (septic systems and engineered systems), and ensures that projects comply with RWQCB requirements. Because of the largely rural nature of the unincorporated areas, the County relies on existing wastewater treatment systems of municipalities and their existing treatment systems.

Wastewater Treatment Facilities for Existing MSAs

Wastewater treatment plants (WWTPs) located in Solano County are Vacaville’s Diatomaceous Earth Plant, Vacaville Easterly WWTP, Fairfield-Suisun Subregional WWTP, Vallejo Sanitation and Flood Control District Treatment Plant, Rio Vista Beach Drive Plant WWTP, Rio Vista Northwest WWTP, City of Dixon WWTP, and City of Benicia WWTP. These plants filter and treat water used by county businesses and residents. Table 4.9-8 shows the capacity, current use, and remaining capacity for the WWTPs in Solano County.

Wastewater Treatment System	Service Area	Capacity (mgd)	Current Use (mgd)	Remaining Capacity (mgd)
Vacaville Diatomaceous Earth Plant	Sewer: Vacaville City Limits and Elmira	10	10	0
Vacaville Easterly Wastewater Treatment Plant	Sewer: Vacaville City Limits and Elmira	15	10	5
Fairfield-Suisun Subregional Wastewater Treatment Plant	Fairfield and Suisun	45.4	45.4	0
Vallejo Sanitation and Flood Control District Treatment Plant	Vallejo Service Area	15.5	12.5	3.0
Rio Vista Beach Drive Plant Wastewater Treatment Plant	Rio Vista Service Area	0.65	0.58	0.07
Rio Vista Northwest Wastewater Treatment Plant	Rio Vista Service Area	2.0	1.0	1.0
City of Dixon Wastewater Treatment Plant	City of Dixon Service Area	1.8	1.4	0.4
City of Benicia Wastewater Treatment Plant	City of Benicia Service Area	4.5 18 peak hour	2.66	1.84
Approximate Remaining Capacity				11.31
Note: mgd = million gallons per day Sources: City of Benicia 2005, City of Dixon 2005, City of Fairfield 2003, City of Rio Vista 2006, City of Suisun City 2005, City of Vacaville 2004, City of Vallejo 2005				

City of Vacaville

The City of Vacaville Public Works Department is responsible for the city's wastewater collection and treatment system. The City of Vacaville provides sewer service to development within the city limits. In addition, in accordance with a written agreement dated 1995 between the City of Vacaville and the County, sewer service is provided to certain parcels within the unincorporated community of Elmira. The city is served by three wastewater treatment facilities: the Vacaville Diatomaceous Earth Plant, with a capacity of 10 million gallons per day (mgd); and the Vacaville Easterly WWTP, with a capacity of 15 mgd (City of Vacaville 2004; Galway, pers. comm., 2008).

Fairfield and Suisun

The Fairfield-Suisun Subregional WWTP provides tertiary treatment of wastewater generated from domestic, commercial, and industrial sources within the city boundaries of Fairfield and Suisun City. Sewer service is

provided to Old Town Cordelia and Suisun Valley Road south of Rockville Road to the Fairfield city limits. Service is also provided to Travis Air Force Base and the Anheuser-Busch brewery. The plant is owned by Fairfield-Suisun Sewer District and is located on Chadbourne Road just southeast of Interstate 80 (I-80). The sewage system is divided into four sewage basins that drain by gravity to four major pump stations. The Cordelia Basin generally covers the Cordelia area, the Inlet Basin covers the western portion of Fairfield, and the Suisun and Central Basins cover the central and eastern portions of Fairfield and all of Suisun City. The Fairfield-Suisun Sewer District is in the midst of a planned program of facilities construction that will increase treatment plant, trunk sewer, and pump station capacities to accommodate future growth within the general plan limits of Fairfield and Suisun City. (City of Suisun City 2005.)

City of Vallejo

The Vallejo Sanitation and Flood Control District provides and operates the WWTP, wastewater pump stations and force mains, and the trunk main collection facilities in Vallejo, some adjacent unincorporated areas, and Mare Island. The sewage connection system comprises about 300 miles of pipe and 21 pump stations, the largest of which is the Sears Point Pump Station with a capacity of 23 mgd. The district's WWTP, located off Ryder Street, has a current rating of 15.5 mgd. Actual average dry-weather flows currently are about 12.5 mgd. Currently, the plant has a capacity of 60 mgd for secondary treatment plus 25 mgd for primary and disinfection.

Rio Vista

The Beach Drive Plant is currently in the final stages of an upgrade to approximately 0.65 mgd capacity and is operating at about 90% of that capacity. The Beach Drive plant has the capacity to serve no more than 100 additional homes. The existing Trilogy plant has a capacity of only 200,000 gallons per day (gpd). The Northwest WWTP will be constructed in phases; the first phase likely will have capacity of 1.0 mgd, which could serve approximately half of the projected 2020 population demand for this plant. The first phase of the Northwest WWTP is sufficient to assume full wastewater treatment, collection, and disposal previously accommodated by the Trilogy Plant. A second phase is currently proposed to be constructed after 2010 that likely will be the same size as the first phase, with a total planned capacity at buildout of 2.0 mgd. The Northwest WWTP will be operated in conjunction with the existing Beach Drive plant. (City of Rio Vista 2006.)

Dixon

The City of Dixon provides sewer service and operates the wastewater treatment plant (located 3 miles south of Dixon along Pedrick Road), wastewater pump stations and force mains, and the trunk main collection facilities. The City of Dixon is currently updating its wastewater facilities master plan to meet future growth needs and the requirements of the Central Valley RWQCB. The City of Dixon currently operates under a RWQCB cease-and-desist order, which requires it to expand its wastewater treatment disposal system to accommodate existing flows, prevent inundation from bypassed overflows, and allow a minimum of 5 years of growth with the annual flow consistent with 100-year seasonal rainfall conditions. The cease-and-desist order also requires the City of Dixon to address salt-related groundwater degradation at the WWTP. Current influent base flows are about 1.4 mgd. The overall processing capacity of the facility is limited by the lowest of treatment, storage, disposal capacity, or conveyance. Processing capacity is currently limited by treatment to about 1.6 mgd. Additional aerators could be added to increase the treatment capacity to about 1.8 mgd (City of Dixon 2005).

Benicia

The City of Benicia owns and operates the facilities providing wastewater service to users within its service area, which is coterminous with the city limits. The plant has a permitted, average dry-weather flow design capacity of 4.5 mgd and a peak-hour wet-weather secondary treatment capacity of 18 mgd. The plant currently discharges an average dry-weather flow of 2.66 mgd (2003 data). Plant capacity is a function of both flow (volume of water) and loading (pollutant concentration). Capacity of the plant is adequate to handle wastewater generated by both

existing and projected uses within the city limits, as defined by the 1999 city general plan for the 2020 planning horizon, including the Benicia Business Park and the Pine Lake area (City of Benicia 2005).

The City of Benicia and the Valero Refinery are pursuing a recycled-water project that would divert a significant fraction of the city's WWTP effluent to the refinery for use as cooling-tower makeup. Studies conducted to date conclude that a project to deliver 2 mgd of effluent is the most feasible. By using the treated effluent, the refinery will reduce its demand on the City of Benicia's surface water supplies.

SOLID WASTE MANAGEMENT AND RECYCLING

Solid Waste Management

Contractors Serving the Unincorporated County

The County contracts for collection, processing, and disposal services for solid waste, recyclables, and organic waste. Various service providers serve the unincorporated communities outside of Solano County's cities. Allied Waste (Allied Waste Industries) serves the unincorporated area outside of Benicia; Vacaville Sanitary Service (Norcal Waste Systems) serves the unincorporated areas outside of Dixon, Vacaville, and Vallejo; Solano Garbage Company (Republic Services) serves the unincorporated areas outside of Fairfield and Suisun City; and Rio Vista Sanitation Service (Garaventa Enterprises) serves the unincorporated area outside of Rio Vista.

Landfills Located within and/or Serving the Unincorporated County

Two privately owned landfills are located in the unincorporated area of Solano County. Potrero Hills Landfill is owned by Republic Services and located outside of Suisun City near State Route (SR) 12. Hay Road Landfill, owned by Norcal Waste Systems, is located east of Vacaville and Dixon near SR 113.

Remaining Capacity of Landfills

The California Integrated Waste Management Act requires that jurisdictions maintain a 50% or better diversion rate for solid waste. The County implements this requirement through its contractual agreements for collection, processing, and disposal of solid waste, recyclables, and organic waste. Per the agreements between the County and the service providers, each provider is responsible for meeting the minimum recycling diversion rate of 50% on a quarterly basis. Future development is required to comply with the applicable solid waste franchise's recycling system, and thus would meet the County's and California's solid-waste diversion regulations. The County's integrated waste-management plan (IWMP) was developed in response to AB 75 (Chapter 764, Statutes of 1999), which required each state agency and large state facility to develop such a plan. This legislation requires the County to report annually on the implementation of its IWMP.

Based on current disposal rates, Phase I of the Potrero Hills Landfill is estimated to accept waste until about 2010. Fluctuations in annual waste volumes that could occur with changes in the jurisdictions that deliver waste to the site and the volumes of waste generated by individual jurisdiction would affect the actual closure date (Solano County 2003). A Phase II expansion that is currently in the planning and construction process would add 35 years of capacity to this landfill after 2010, meaning that disposal capacity would be provided until approximately 2045. The Hay Road Landfill is expected to provide capacity until approximately 2069. No new landfills are planned in the county.

No incinerators or other nonlandfill facilities within Solano County accept solid waste for disposal.

Recycling

Recycling facilities located in the following cities also serve neighboring unincorporated communities: Benicia (Pleasant Hill Bayshore Disposal), Dixon (Dixon Sanitary Service), Fairfield/Suisun/Travis Air Force Base

(Solano Garbage Company), Rio Vista (Rio Vista Sanitation Service), Vacaville (Vacaville Sanitary Service), and unincorporated Vallejo (Vacaville Sanitary Service).

No improvements or new facilities are planned to recycling facilities that serve the unincorporated portions of Solano County.

Household Hazardous Waste

With regard to household hazardous waste, AB 939 (Chapter 1095, Statutes of 1989) established requirements for cities and counties to develop and implement plans for the safe management of these wastes. To help achieve this, AB 939 requires that each city and county prepare and submit a Household Hazardous Waste Element.

Household hazardous waste can include materials that are corrosive, toxic, reactive, or flammable. Examples of such items include latex and oil-based paints, solvents, poisons, cleansers, batteries, and automotive fuels. Household hazardous waste facilities that serve the unincorporated area are located at the Rio Vista Corporation Yard, Solano Garbage Company's Recycling Center, and Vacaville Sanitary Service's Recycling Center, as well as Napa County's Devlin Road Transfer Station. Operating hours vary; an appointment may be required.

Despite its relatively low volume when compared to the total waste stream, household hazardous waste presents a public health risk if it is inadvertently mixed with solid waste entering landfills. Examples of common household hazardous waste include waste oils, automotive batteries, latex paints, pesticides, household chemicals, automobile antifreeze, and household batteries. The Household Hazardous Waste Element of the County's Source Reduction and Recycling Element (see "State Plans, Policies, Regulations, and Laws" in the discussion of solid-waste regulations in Section 4.9.2, "Regulatory Framework," below) identifies the following goals:

- ▶ To protect public health and safety, to minimize damage to the environment, to protect property from the adverse effects of [household] hazardous waste, to promote an environment for industrial responsibility, and to maintain the economic viability of the planning area and the state.
- ▶ To manage [household] hazardous wastes over the long term in a way that is consistent with sound and safe management practices in this order of priority: source reduction, recycling and reuse, treatment (on-site and off-site), and residuals disposal.
- ▶ To provide a policy basis for working with other governments in the region and the state toward the effective management of [household] hazardous wastes generated in the region and the state in accordance with the [household] hazardous waste management hierarchy.

To provide for environmentally sound management of all the household hazardous wastes projected to be generated in Solano County, the Household Hazardous Waste Element identifies and addresses the county's existing conditions, provides implementation programs, and evaluates alternatives and public education programs regarding source reduction and preventing household hazardous wastes from entering landfills.

PUBLIC EDUCATION SERVICES

Public School Districts Serving the Unincorporated County

Nine school districts lie partially or completely within the county boundary. Two of the school districts, Winters Joint Unified School District and Davis Joint Unified School District, are based in Yolo County, although their service areas extend into northern Solano County. The other seven school districts serve the majority of students within the county. These districts are listed below and include the number of schools shown in parentheses. Schools located in unincorporated areas include Suisun Valley K-8 School, Tolenas School, and Solano Community College. In all of the remaining tables in this section related to countywide school statistics, River Delta Joint Unified School District (which is headquartered in Rio Vista and covers parts of Solano County) is

considered a Solano County district even though Ed-Data Education Data Partnership (from which most of the following data were acquired) lists it as a Sacramento County district.

- ▶ **Benicia Unified School District (8):** Five elementary, one middle, one high, one continuation
- ▶ **Dixon Unified School District (8):** Four elementary, one middle, one high, one alternative, one continuation
- ▶ **Fairfield-Suisun Unified School District (29):** 18 elementary, five middle, three high, one continuation, two community day
- ▶ **River Delta Joint Unified School District (11):** Five elementary, one middle, two high, one alternative, one continuation, one community day
- ▶ **Travis Unified School District (9):** Five elementary, one middle, one high, one continuation, one community day
- ▶ **Vacaville Unified School District (17):** 10 elementary, two middle, two high, one K–12, one continuation, on community day
- ▶ **Vallejo City Unified School District (29):** 16 elementary, five middle, four high, one alternative, one special education, one continuation, one community day
- ▶ **Winters Joint Unified School District (5):** Two elementary, one middle, one high, one continuation
- ▶ **Davis Joint Unified School District (17):** 10 elementary, three junior high, two high, one alternative, one continuation

Schools in the county vary in their grade-level configuration. Most elementary schools in the county serve grades K–5, middle schools serve grades 6–8, and high schools serve grades 9–12.

Enrollment

Table 4.9-9 provides enrollment figures from 2002 through 2007 for all seven school districts in the county (as well as the districts in Yolo County that serve portions of Solano County) and for the students in the county that are accounted for under the auspices of the County Department of Education and through charter schools, according to Ed-Data Education Data Partnership (2008) (along with River Delta Joint Unified School District, which includes parts of Solano County, but is listed under Sacramento County). In 2007, more than 72,000 students were enrolled in the districts within Solano County. The county has experienced a gradual decline in enrollment for the last 5 years (2002–2007), at an average rate of approximately -1.23%.

Year	Enrollment 2002-03	Enrollment 2003-04	Enrollment 2004-05	Enrollment 2005-06	Enrollment 2006-07	Average growth rate/year
Solano County School Districts						
Benicia USD	5,423	5,366	5,283	5,130	5,020	-1.89%
Dixon USD	3,933	3,929	3,977	4,050	4,088	1.0%
Fairfield-Suisun USD	22,972	23,241	23,370	23,377	23,074	-0.11%
River Delta JUSD	2,490	2,465	2,479	2,341	2,219	-2.8%

**Table 4.9-9
Solano County Student Enrollment Figures by District**

Year	Enrollment 2002-03	Enrollment 2003-04	Enrollment 2004-05	Enrollment 2005-06	Enrollment 2006-07	Average growth rate/year
Travis USD	5,363	5,380	5,322	5,335	5,299	0.24%
Vacaville USD	14,806	13,887	14,086	13,704	13,268	-2.67%
Vallejo USD	19,872	19,462	18,981	18,312	17,725	-2.81%
Solano County OED	419	472	470	519	574	8.4%
Solano County Charter Schools	1,399	891	938	1,105	1,718	10.56%
Countywide	76,677	75,093	74,906	73,873	72,985	-1.23%
School Districts in Yolo County that Serve Portions of Solano County						
Winters JUSD	2,038	2,012	1,968	1,940	1,799	-1.03%
Davis JUSD	8,827	8,711	8,642	8,537	8,647	-0.44%
Notes: JUSD = Joint Unified School District; OED = Office of Education; USD = Unified School District Source: Ed-Data Education Data Partnership 2008						

Role of County Department of Education

The County Office of Education operates many educational programs and services that directly benefit students in Solano County. Such programs and services include alternative education programs, workforce education and training programs, special education classes and transition services, business management and support services, technology and information services, instructional support services, and transportation services.

Private Schools

Most private schools in Solano County are located in incorporated areas. Universal Health Services' Keystone School in Elmira, with grades K–12, is the only private school located in an unincorporated community (Keystone Education 2006). Dixon, Benicia, and Suisun City each have one private school. Neighborhood Christian School (preschool–grade 8) is located in Dixon, St. Dominic Elementary School (preschool–grade 8) is located in Benicia, and Our Christian Scholastic Academy (K–8) is located in Suisun City. Fairfield has 12 private schools, Vacaville has six private schools, and Vallejo has 12 private schools (NCES 2006). Following is a list of schools and their corresponding grade levels in Fairfield, Vacaville, and Vallejo:

Fairfield

- ▶ Calvary Baptist School (K–12)
- ▶ Children's World Learning (preschool and kindergarten)
- ▶ Community United Methodist Kindergarten (preschool and kindergarten)
- ▶ Cornerstone Christian Academy (K–12)
- ▶ Harvest Valley School (preschool–grade 12)
- ▶ Holy Spirit School (K–8)
- ▶ Kinder Care Learning Center (preschool and kindergarten)
- ▶ Lighthouse Christian School (preschool–grade 4)
- ▶ Solano Christian Academy (preschool–grade 8)
- ▶ Saint Timothy Orthodox Academy (10–11)

- ▶ Trinity Lutheran School (K–5)
- ▶ We R Family Christian School (preschool–3)

Vacaville

- ▶ Bethany Lutheran PS & Day School (K–6)
- ▶ F.A.I.T.H Academy (1–12)
- ▶ Notre Dame School (K–8)
- ▶ Royal Oaks Academy (preschool–grade 6)
- ▶ Vacaville Adventist (K–8)
- ▶ Vacaville Christian Schools (preschool–grade 12)

Vallejo

- ▶ Hilltop Christian School (preschool–grade 8)
- ▶ Jesus is Alive Christian Academy (K–9)
- ▶ Kindercare Learning Center (preschool and kindergarten)
- ▶ La Petite Academy (preschool and kindergarten)
- ▶ New Horizons (preschool and kindergarten)
- ▶ North Hills Christian School (K–12)
- ▶ Reignierd School (K–12)
- ▶ Special Touch Learning Academy (preschool–grade 2)
- ▶ Saint Basil Elementary School (preschool–grade 8)
- ▶ Saint Catherine of Siena School (K–8)
- ▶ Saint Patrick–Saint Vincent High School (9–12)
- ▶ Saint Vincent Ferrer School (K–8)

FIRE PROTECTION AND EMERGENCY SERVICES

Fire Districts Serving the Unincorporated County

Solano County does not have its own fire department. The following individual fire districts serve the unincorporated county:

- ▶ California Department of Forestry and Fire Protection (CDF)–Gordon Valley Fire Station,
- ▶ Cordelia Fire Protection District (FPD),
- ▶ Dixon FPD (under contract with City of Dixon Fire Department),
- ▶ East Vallejo FPD (under contract with the City of Vallejo Fire Department),
- ▶ Montezuma FPD,
- ▶ Suisun FPD, and
- ▶ Vacaville FPD.

CDF provides fire protection to several unincorporated communities in Solano County. Battalion 1415’s Gordon Valley station serves West Hills, Green Valley, Vaca/Lagoon Valley, and Pleasants Valley. Dixon FPD is currently under contract with the City of Dixon Fire Department and utilizes the city’s station. Also, East Vallejo FPD is under contract with the City of Vallejo Fire Department to provide services to unincorporated Southeast Vallejo.

Staff Levels

Staff members in each fire district may consist of full or part-time firefighters, administrative staff, and volunteers. CDF’s Gordon Valley Fire Station is a volunteer station with 15 volunteer firefighters. Cordelia FPD consists of three full-time firefighters and 55 volunteers. Dixon FPD has 23 full-time employees and 35

volunteers. East Vallejo FPD has six full-time employees. Montezuma FPD has three full-time firefighters and 28 volunteers. Suisun FPD has, on average, 40 volunteers. Vacaville FPD has six full-time employees and about 70 volunteers.

Equipment

Each fire district employs different resources to aid them in fighting fires and in conducting rescue efforts. There are different types of engines and the type of engine used is dependent on the fire being suppressed, as described below (National Park Service 2006).

Type 1: Structural Engine with Minimum Pump Capacity of 1,000 gpm

- ▶ 400-gallon tank
- ▶ 200 feet of 1-inch hose
- ▶ 400 feet of 1½-inch hose
- ▶ 1,200 feet of 2½-inch hose
- ▶ At least 20 feet of ladder
- ▶ Requires a minimum crew of four

Type 2: Structural Engine with Minimum Pump Capacity of 500 gpm

- ▶ 400-gallon tank
- ▶ 300 feet of 1-inch hose
- ▶ 500 feet of 1½-inch hose
- ▶ 1,000 feet of 2½-inch hose
- ▶ 20 feet of ladder
- ▶ Requires a minimum crew of three
- ▶ Wildland engines

Type 3: Wildland Engine with Minimum Pump Capacity of 120 gpm

- ▶ 500-gallon tank
- ▶ 800 feet of 1-inch hose
- ▶ 1,000 feet of 1½-inch hose
- ▶ Gross vehicle weight rating generally greater than 20,000 pounds
- ▶ Requires a minimum crew of three

Gordon Valley has one Type 1 engine. Cordelia FPD has two Type 1 engines, one Type 2 engine, two Type 3 engines, one water tender, and one air support vehicle. Dixon FPD has four Type 1 engines, two water tenders, and a rescue squad. East Vallejo FPD has two Type 1 engines. Montezuma FPD has two Type 1 engines, one Type 2 engine, five Type 3 engines, one water tender, and two staff vehicles. Suisun FPD has three Type 1 engines, three Type 3 engines, four water tenders, and a rescue vehicle. Vacaville FPD has five Type 1 engines, six Type 3 engines, four water tenders, and two rescue vehicles.

Locations

CDF has 21 administrative units statewide with 806 fire stations. Solano County is a part of the South Division of the Sonoma-Lake-Napa Unit. The station most likely to service Solano County is the Gordon Valley station, located at 1345 Wooden Valley Road in Napa County. Cordelia FPD has two stations, one in Suisun Valley at 1624 Rockville Road and one in Old Town Cordelia at 2155 Cordelia Road. Dixon FPD does not have a station but utilizes the one located at 205 Ford Way in Dixon. East Vallejo FPD has two stations, located at 1335 Fulton Avenue and 1005 Oakwood Avenue in Vallejo. Montezuma FPD has five stations, located at 21 North Fourth Street in Rio Vista and in the county at 2251 Collinsville Road, 3545 Shiloh Road, and 6669 Birds Landing, and

9495 State Highway 220 in Walnut Grove. Suisun FPD has two stations, located at 4965 Clayton Road in Suisun Valley and 625 Jackson Street in Fairfield. Vacaville FPD has four stations, located at 420 Vine Street in Gibson Canyon, 6080 "A" Street in Elmira, 4135 Cantelow Road in English Hills, and 8684 Pleasants Valley Road at Lake Solano Park.

Service and Response Standards and Current Performance

Service and response standards are the desired response rates each fire district would like to achieve. Current performance is the actual response rate that being achieved by each district. Response time designations are given to metropolitan, urban, suburban, and rural areas as guidelines to adequate service levels. A metropolitan designation (population of more than 200,000 people with more than 3,000 people per square mile) requires a response time of 4–5 minutes about 80% of the time. An urban designation (population of more than 30,000 people with a density of more than 2,000 people per square mile) requires a response time of 5–6 minutes about 80% of the time. A suburban designation (population between 10,000 and 29,999 or with a density of 1,000–2,000 people per square mile) requires a response time of 5–6 minutes 80% of the time. A rural designation (population is less than 10,000 people or with a density of less than 1,000 people per square mile) requires a response time of 8–10 minutes 70% of the time.

All of the unincorporated Solano County fire districts have a rural designation. Because CDF's Gordon Station is composed of volunteer fighters, there is no response standard. However, the station's response time is about 4 minutes on average (Bryden, pers. comm., 2006). East Vallejo FPD has a standard of 4 minutes or less and it is estimated that it is achieved 90% of the time (Parker, pers. comm., 2006). Montezuma FPD and Suisun FPD do not report their average response times. Cordelia FPD and Vacaville FPD have achieved their desired response times of 8–10 minutes, with a response time of 10 minutes or less and 9 minutes, 44 seconds, respectively. Dixon FPD's average response time is 11 minutes, 1 second, exceeding the service level maximum (Solano County 2006).

ISO Ratings

The Insurance Services Office (ISO) assigns fire districts grades of 1–10 (1 being the highest rating and 10 being the lowest rating) so that insurance companies can determine the cost of hazard insurance premiums for their customers. ISO determines whether the fire department tests its pumps regularly and inventories each engine company's nozzles, hoses, breathing apparatus, and other equipment. ISO also reviews individual fire departments' records to determine the type and extent of training provided to firefighters, response times, and level of staffing.

Following are the ISO ratings for each fire district:

- ▶ CDF's Gordon Valley Station: 6/9
- ▶ Cordelia FPD: 5/9
- ▶ Dixon FPD: 5/9
- ▶ East Vallejo FPD: 3
- ▶ Montezuma FPD: 9
- ▶ Suisun FPD: 5 at locations with public water supply/9 at locations without public water supply
- ▶ Vacaville FPD: 6/9

Most of the fire districts have two ISO ratings because they must serve rural areas located farther away, with longer response times. The Gordon Valley station does not have its own ISO rating. Instead, the Napa County Fire Department's ISO rating applies to all their stations, including Gordon Valley, and is listed above. The 9 rating is given when an area is not within 1,000 feet of a fire hydrant (Avina, pers. comm., 2006). For Dixon FPD, the 9 rating is the result of subpar response times in Allendale, Maine Prairie, and the I-505 vicinity. Cordelia FPD services the Suisun Marsh area, which does not contain hydrants and therefore reduces the effectiveness of

the FPD. Vacaville FPD's second ISO rating of 9 is because of its poor service times to Blue Ridge Road, Mt. Vaca, and tops of Gate Canyon Road.

Planned Improvements or Reorganizations

There are no planned improvements for the fire districts within Solano County at this time. However, in the Solano County Fire Protection Districts' Municipal Service Review (final report), a reorganization committee was recommended to the Solano County LAFCO. The LAFCO is responsible for encouraging orderly and efficient local governmental agencies, discouraging urban sprawl, and preserving prime agricultural land by controlling the boundaries of most cities and special districts with the county. The reorganization committee will be given the task of developing short-term and long-term goals for efficient, coordinated fire service throughout the county. The committee will also develop the specifics of a transition plan over the next 5 years.

Call Statistics

Following is a representative list of the number of response calls received by each fire district over a given year (year shown after the name of each fire district) and, for comparison, the number of calls received during the year that fell 5 years before each respective given year:

- ▶ CDF's Gordon Valley: 2005—89 (earlier call numbers were not available)
- ▶ Cordelia FPD: 2004—651 (earlier call numbers were not available)
- ▶ Dixon FPD: 2005—1,900; 2000—1,621
- ▶ East Vallejo FPD: 2005—527 (earlier call numbers were not available)
- ▶ Montezuma FPD: 2002—199; 1997—Approximately 175–180
- ▶ Suisun FPD: 2003—593 (earlier call numbers were not available)
- ▶ Vacaville FPD: 2003—575; 1998—394

Emergency Services in the Unincorporated County

The Solano Emergency Medical Services Cooperative (SEMSC), in its role as the local emergency medical service (EMS) agency, provides pre-hospital emergency care to any persons within the jurisdiction of the agency needing such service through a comprehensive and coordinated arrangement of appropriate health and safety resources (Solano Emergency Medical Services Cooperative 2006).

Essential elements of the SEMSC's duties include:

- ▶ Rapid response: To minimize the time from emergency event to arrival of resources
- ▶ Competency in practice: To apply clinical field medicine to highest standards using best practices
- ▶ Accountability: To measure, validate, report, and improve processes for the delivery of care

CDF's Gordon Valley Station has a rescue squad and provides basic pre-hospital emergency care. However, the station is made up of volunteers, and the number of people who assist with emergency medical services fluctuates (Bryden, pers. comm., 2006).

Twenty-one of Dixon FPD's paid employees serve the EMS function of the district. Seven of these are paramedics and 14 are emergency medical technicians (EMTs). In addition, 33 volunteers assist with EMS. Of these, 31 are EMTs and two are paramedics. Dixon FPD relies on a private ambulance service to provide emergency service vehicles and related equipment.

Cordelia FPD has four paid employees who assist with the EMS function of the district. Two of these are EMTs and two are paramedics. In addition, 55 volunteers assist with this function. Six of these are paramedics and 49 are EMTs. Cordelia FPD uses a private ambulance service.

East Vallejo FPD employs a paramedic in both of its two stations.

Montezuma FPD has three paid employees who assist with the EMS function of the district. One of these is an EMT. In addition, 22 volunteers, two of whom are EMTs, assist with this function. A private ambulance service is on-site at the main station but is not officially part of the fire district. One ambulance is available on-site.

Vacaville FPD has 24 employees, all of whom are paramedics, to assist with the EMS function of the district. In addition, 73 volunteers assist with this function. Information was not available as to the number of volunteers who are EMTs or paramedics. A private ambulance service is used.

Suisun FPD EMS personnel include two paramedics and 10 EMTs.

Underserved Areas in the Unincorporated County

The following summarizes the respective fire districts' service area challenges:

- ▶ CDF's Gordon Valley Station has trouble serving the Vaca Mountains and Twin Sisters region because of the distance and rough terrain (Bryden, pers. comm., 2006).
- ▶ Cordelia FPD has difficulty serving the Lake Herman area because of distance. However, this has not been a major issue because of the low number of emergency calls in that area (Kemp, pers. comm., 2006).
- ▶ Dixon FPD has an average response time of greater than 10 minutes to the Allendale area. This fire district is not currently planning to improve its response time because of a lack of funds (Dorris, pers. comm., 2006).
- ▶ East Vallejo FPD does not have any service area issues to report at this time (Parker, pers. comm., 2006).
- ▶ Montezuma FPD does not have any service area issues to report at this time (Simi, pers. comm., 2006).
- ▶ Suisun FPD's facility at 4965 Clayton Road has difficulty servicing some portions of its service area because of a lack of volunteers (Glantz, pers. comm., 2006).
- ▶ Vacaville FPD's response time to the Blue Ridge area exceeds the 8- to 10-minute standard because of poor road conditions in the area (Wood, pers. comm., 2006).

None of the fire districts disclosed whether any areas would need improved service in the future.

CRIMINAL JUSTICE SERVICES

The Office of the Sheriff is a state constitutional office headed by an elected sheriff in each county. The Solano County Sheriff's Office is responsible for providing public safety services in the county including patrol, investigations, custody of adult offenders, and coroner services. The County Sheriff's Office also provides a variety of support services including maintenance of criminal records, operation of the County jail, security at County court facilities, and dispatch of public safety personnel. Through comprehensive community, intergovernmental, and employee partnerships, the County Sheriff's Office provides effective law enforcement, safe, humane, secure jails, and security for the Superior Courts (Solano County Sheriff's Office 2006).

Administrative duties of the County Sheriff's Office include:

- ▶ directing and planning the department's services by establishing its mission and setting goals,
- ▶ establishing departmental policies and procedures,

- ▶ providing effective financial and asset management,
- ▶ maintaining a healthy and productive workforce,
- ▶ continually reviewing work processes and methods for currency and quality of service and making improvements as necessary, and
- ▶ providing technical and management support services, including automation, project management, labor relations, and personnel administration.

The Sheriff's Office is divided into three major divisions: Public Safety, Administration, and Custody. These divisions work in close partnership with each other to provide a high level of service to the citizens of Solano County. In addition to specialty deputy sheriff positions including SWAT, marine patrol, criminal and coroner investigations, canine, narcotics enforcement, court services, bicycle enforcement, a crowd control team, and the service of civil process, the Sheriff's Office is staffed by correctional officers, sheriff service technicians, public safety dispatchers, evidence technicians, legal procedures clerks, and administrative staff (Solano County Sheriff's Office 2006).

Sheriff Services in the Unincorporated County

The Sheriff's Office is responsible for the unincorporated areas of Solano County. Its main office is located at 530 Union Avenue in Fairfield. The Solano County Sheriff's Office has an operating budget of \$68 million and employs more than 500 people, including 116 sworn law enforcement professionals. This amounts to approximately 0.006 officer per resident of the unincorporated county. No information regarding service and response standards and current performance is available (Shelton, pers. comm., 2006). There are currently no planned improvements or reorganizations.

Crime Rates

Following are crime statistics (number of incidents of crime, by type) for the unincorporated areas of Solano County in 2003:

- ▶ Homicide: 0
- ▶ Forcible rape: 16
- ▶ Robbery: 18
- ▶ Aggravated assault: 128
- ▶ Burglary: 274
- ▶ Motor vehicle theft: 23
- ▶ Larceny-theft \$400 and under: 161
- ▶ Larceny-theft over \$400: 89
- ▶ Arson: 35

Most of the crimes committed in the unincorporated areas in the county were property crimes, with burglary being committed 274 times. Aggravated assault is also a frequent crime, with 128 individual incidents in 2003 (Office of the Attorney General 2006).

Areas of Unincorporated County with Particular Crime Problems

According to the County Sheriff's Office, there are no specific areas within the unincorporated portions of Solano County that have more reports of criminal activity than any other (Evans, pers. comm., 2006). The crimes mentioned above are distributed fairly evenly throughout the unincorporated county.

LIBRARY SERVICES

Facilities

Solano County currently has eight public libraries located in Rio Vista, Suisun, Fairfield (two), Vallejo (two), and Vacaville (two). The County also operates the County law library. Existing public library facilities, their current square footage available for public use, and public meeting and study rooms are listed in Table 4.9-10.

Library	Location	Size (sq. ft.)	Meeting Rooms	Meeting Room Capacity	Group Study Rooms	Public Computers
Fairfield Civic Center Library	Fairfield	32,054	1	78	4	65
Fairfield Cordelia Library	Fairfield	15,600	1	78	3	43
John F. Kennedy Library	Vallejo	46,874	1	264	2	63
Rio Vista Library	Rio Vista	5,370	1	30	0	8
Springstowne Library	Vallejo	3,024	0	0	0	8
Suisun City Library	Suisun City	4,752	0	0	0	8
Vacaville Public Library—Cultural Center	Vacaville	24,266	1	30	2	44
Vacaville Public Library—Town Square	Vacaville	15,000	1	78	2	35

Note: sq. ft. = square feet
Source: Solano County 2001

Service Standards and Current Performance

In 2001, Solano County had 569,806 volumes recorded in its countywide collection. The collection includes books, magazines, newspapers, videocassettes, audiocassettes, compact discs, DVDs, CD-ROMs, electronic books, and government documents (Solano County 2001). This equates to roughly 1.6 volumes per capita. The service standard for metropolitan areas are 2.875 volumes per capita and 3.2 volumes per capita in rural areas. There are 1.9 seats per 1,000 in population (668 seats); however, there should be three seats per 1,000 in population in metropolitan areas and five seats per 1,000 in population in rural areas. Twenty computers should be included in each facility for general use (or one computer per 1,000 in population) and four to 12 for technical training; however, only 0.4 computers per 1,000 population (155 computers countywide) are available for use. Essentially, Solano County's library facilities are not currently meeting any of the relevant service standards.

Planned Improvements or Reorganizations

Many changes and improvements are being planned for the Solano County Library system. Proposed library renovations, expansions, and relocations include renovating the existing Fairfield-Suisun Community Library (renamed the Solano County Library—Fairfield Civic Center, aka Fairfield Civic Center Library), expanding the existing Vacaville Public Library and Rio Vista Library, relocating the Springstowne Library and John F. Kennedy Library in Vallejo as well as the Suisun City Library into facilities that are newer and more strategically placed according to demand, and adding seven new branch libraries in areas with little or no library service. These seven recommended locations are Cordelia, North Fairfield, Northeast Fairfield, North Vacaville, downtown Vacaville, Northeast Vallejo, and Northwest Vallejo. The Fairfield Civic Center Library revitalization and construction of a new library in Vacaville Town Square and Cordelia have already been achieved.

4.9.2 REGULATORY FRAMEWORK

WATER SUPPLY SERVICES

Beneficial uses and water quality objectives for surface water and groundwater resources are protected by a number of federal, state, and local governments. Section 65302 of the California Code of Regulations requires a city or county general plan to address water supply as a topical issue using an urban water management plan (UWMP) as a primary source document. Programs and regulations related to drinking water quality, water supply, and wastewater treatment and disposal are described below.

Federal Plans, Policies, Regulations, and Laws

The federal government sets minimum standards for the protection of water quality, including for drinking water and environmental protection, and has jurisdiction over flow in some waters where rivers or streams cross state boundaries. It has built and maintains several large water supply and irrigation projects in California. The federal government also has a voice in water management through its jurisdiction over energy regulation (for hydroelectric projects), and where endangered fish and aquatic species occur within a water body (see Section 4.6, “Biological Resources,” for a discussion of the federal Endangered Species Act).

Safe Drinking Water Act

Drinking-water quality is based on two general standards: (1) organic and inorganic water contaminants that may have detrimental effects on health and safety, and (2) aesthetic qualities of water that may make water unpalatable or unpleasant to customers. The Safe Drinking Water Act of 1974 established the U.S. Environmental Protection Agency (EPA) as the primary government entity with responsibility for setting national drinking-water standards for public water systems. Since 1974, EPA has set national water quality standards for more than 80 contaminants in drinking water. The National Primary Drinking Water Standards establish the maximum allowable contaminant levels (MCLs) allowed in public distribution systems. The National Secondary Drinking Water Standards establish the MCLs that apply to potable water supplies at the point of delivery to the customer. Although EPA and state governments enforce water quality standards, local governments and private water suppliers are ultimately responsible for the quality of water supplies.

Safe Drinking Water Act of 1974

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the quality of public drinking water. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, which are rivers, lakes, reservoirs, springs, and groundwater wells. The Safe Drinking Water Act authorizes EPA to set national health-based standards for drinking water to protect against pollutants. EPA, states, and local agencies then work together to make sure that these standards are met (EPA 1999).

Section 303(d) of the Clean Water Act

Section 303(d) of the Clean Water Act requires states to develop lists of water bodies (or segments of water bodies) that will not attain water quality standards after implementation of minimum required levels of treatment by point-source dischargers (e.g., municipalities and industries). Section 303(d) requires states to develop a total maximum daily load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of loading that the water body can receive and still meet water quality standards. The TMDL must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. (“Point” source pollution is defined by Section 502(14) of the Clean Water Act as any discernible, confined, and discrete conveyance from which pollutants may be discharged, such as drainage pipes, ditches, channels, animal feeding operation, or vessel or other floating craft, but not irrigated agriculture. “Nonpoint” pollution is any source not defined by the act as a “point” source, such as land runoff, precipitation,

seepage, and atmospheric deposition.) National Pollutant Discharge Elimination System (NPDES) permit limitations for listed pollutants must be consistent with the load allocation prescribed in the TMDL.

The most recently approved (2002) Clean Water Act Section 303(d) list for California identifies various waterways that are water quality–impaired for a number of constituents. On July 25, 2003, EPA gave final approval to California’s 2002 Section 303(d) list of water quality–limited segments.

The waterways within Solano County that are on the list are identified in Table 4.5-6 in Section 4.5, “Hydrology and Water Resources.”

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act establishes a requirement to obtain a permit before conducting any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. This permit is issued by the U.S. Army Corps of Engineers.

State Plans, Policies, Regulations, and Laws

California Water Code

The California Water Code outlines the general state authority and responsibilities over water in California. It establishes DWR as the primary research and supply development and management agency for water, the State Water Resources Control Board (SWRCB) for overall water quality policy development and for dealing with water rights issues, and nine RWQCBs for regulation, enforcement, and protection of the beneficial uses of water.

Porter-Cologne Water Quality Control Act of 1969

The 1969 Porter-Cologne Water Quality Control Act established the SWRCB and the nine RWQCBs as the primary state agencies with regulatory authority over water quality. Under the act, the SWRCB has the ultimate authority over state water rights and water quality policy, and the RWQCBs are responsible for overseeing water quality on a day-to-day basis at the local/regional level.

Surface Water Rights

The SWRCB has jurisdiction over all water rights in California under the common-law public-trust doctrine. Section 1735 of the California Water Code provides the regulatory framework for long-term transfers, subject to the requirements of CEQA (SWRCB 2008).

Appropriative water rights allow the diversion of surface water for beneficial use. Before 1914, appropriative water rights involved a simple posting to describe intent and scope of water use, diversion, or construction of diversion activities. Since 1914, the sole method for obtaining appropriative water rights has been to file an application with the SWRCB. Before it can issue a water rights permit, the SWRCB must demonstrate the availability of unappropriated water. Both pre- and post-1914 appropriative water rights may be lost if the water has gone unused for a period of 5 years.

Riparian water rights apply only to lands that are traversed by or border on a natural watercourse. Riparian owners have a right (correlative with the right of each other riparian owner) to share in the reasonable beneficial use of the natural flow of water that passes the owners land. No permit is required for such use. Riparian water must be used reasonably, beneficially, and solely on riparian (adjacent) land and cannot be stored for later use.

Groundwater Rights

The state requires that counties enact regulations covering well design to protect groundwater quality from surface contamination, and to ensure proper well construction and development for domestic use. However, these regulations are not related to the quantity of water extracted. Counties can also enact an ordinance to ensure that wells developed on one property do not interfere with the use of adjacent wells. In some areas of overuse, and where there is a high dependence on groundwater, groundwater rights are determined judicially in what are termed “adjudicated groundwater basins.” There are no adjudicated groundwater basins in Solano County.

Water Supply Regulations

There are two principal laws in California regarding planning for water supply and ensuring adequate water availability for new planned and approved growth.

SB 610

Senate Bill (SB) 610 (Chapter 643, Statutes of 2001; Water Code Sections 10910–10915) made changes to the Urban Water Management Planning Act to require additional information in UWMPs if groundwater is identified as a source available to the supplier. The information required includes a copy of any groundwater management plan adopted by the supplier, a copy of the adjudication order or decree for adjudicated basins, and if nonadjudicated, whether the basin has been identified as being overdrafted or projected to be overdrafted in the most current DWR publication on that basin. If the basin is in overdraft, that plan must include current efforts to eliminate any long-term overdraft. A key provision in SB 610 requires that any project subject to CEQA supplied with water from a public water system be provided a specified water supply assessment, except as specified in the law.

SB 221

SB 221 (Chapter 642, Statutes of 2001; Government Code Section 66473.7) prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s). This requirement also applies to increases of 10% or more of service connections for public water systems with less than 500 service connections. The law defines criteria for determining “sufficient water supply” such as using normal, single-dry, and multiple-dry year hydrology and identifying the amount of water that the supplier can reasonably rely on to meet existing and future planned uses. Rights to extract additional groundwater, if used for the project, must be substantiated.

Cities and counties are required to determine the adequacy of water supply identified for proposed projects. SB 610 applies to various projects including residential, commercial, industrial, hotels, and mixed use, as defined in Section 10912 of the California Water Code:

10912. For the purposes of this part, the following terms have the following meanings:

(a) “Project” means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- (4) A proposed hotel or motel, or both, having more than 500 rooms.
- (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.

- (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Verification of water supply sufficiency is provided through the preparation of a water supply assessment (WSA), compiled by the water purveyor or city/county. This legislation prohibits the approval of a project without written confirmation that the water supply will be available prior to completion of project construction.

AB 901 (Chapter 644, Statutes of 2001) requires UWMPs to include information relating to the quality of existing sources of water available to an urban water supplier over given time periods and the manner in which water quality affects water management strategies and supply.

Groundwater Management Plans

The 1993 Groundwater Management Act (California Water Code Section 10750), commonly referred to as AB 3030, was designed to provide local public agencies in California with increased management authority over groundwater resources. AB 3030 was developed in response to EPA Comprehensive State Groundwater Protection Programs (Lanferman 2002). Development of a groundwater management plan is voluntary, not mandatory, and may be developed for certain defined local agencies located within DWR-defined groundwater basins (DWR 2008). Cities and counties may cooperate with these providers. The plan can cover groundwater quantity management, groundwater quality management, or both. Once the plan has been adopted, rules and regulations must also be developed to implement the groundwater management program called for in the plan. A groundwater management plan was updated for SID in 2006. The regulatory setting for groundwater management is discussed in greater detail in Section 4.5, “Hydrology and Water Resources.”

State Drinking Water Quality Regulations

The California Department of Public Health (DPH) (formerly California Department of Health Services) is responsible for regulating public drinking-water systems and monitoring them for compliance with the California Water Code and national standards for drinking-water quality (California Department of Public Health 2008). Public water systems are defined as systems that provide water to at least 25 individuals or provide 15 or more service connections for at least 60 days per year (EPA 2008). SCWA and SID and their water contractors are examples of public water systems. Small water systems serve at least five but not more than 14 connections and do not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. DPH provides water quality monitoring data and follow-up compliance activities.

Urban Water Management Plan

The UWMP, prepared by SCWA, provides a planning tool for participating agencies to develop and deliver water supplies to the county’s service area. SCWA updated the UWMP and the plan was approved in 2005. The UWMP evaluates past, present, and projected future demand and supply in 5-year increments through 2030. The projected demand is based on the participating agencies projected buildout, population growth projections for the agencies and other areas within the service area (SCWA 2005a).

Regional and Local Plans, Policies, Regulations, and Ordinances

Solano County General Plan

Acquisition of land for and construction of water supply facilities in the unincorporated area is subject to County review for consistency with the *Solano County General Plan* (General Plan) under Section 65402 of the Government Code. Many public-agency sponsors will strive to develop facilities that are consistent with the General Plan, but they have the authority to override the County’s determination and proceed with acquisition and construction.

Solano County Code of Regulations

The County Code, including various ordinances, provides a regulatory framework for implementing General Plan policies and programs. The County Code includes provisions covering well permitting and construction, water conservation and landscape water usages, stormwater quality management, and the design and construction of on-site wastewater disposal systems, such as septic tank and leachfield systems.

Solano County Environmental Health Services Division

The Environmental Health Services Division is responsible for implementing County water systems and wells programs, including the small public water systems and wells program and the on-site sewage disposal program (Solano County 2008). The Environmental Health Services Division is responsible for granting groundwater well permits in unincorporated areas of the county. The well permitting process varies depending on the availability of groundwater at the location of the proposed well.

Wells located in incorporated areas are often permitted by the corresponding city governments. The well permitting process for incorporated areas is dependent on city ordinances and varies throughout the county. The County does not have any jurisdiction over wells within the boundaries of most incorporated cities.

Although the standards for groundwater well permits in a given groundwater availability area govern their physical design and provide some restrictions on the location of wells, they do not control the use or quantity of water extracted, nor do they currently address the sustainable capacity of the underlying aquifer to supply groundwater. Detailed procedures for determining potential well interference effects (the interference of a proposed well on the pumping rate, drawdown, or long term supply of an adjacent well) are also not contained in the current County Code. These issues may be addressed during the CEQA review process for those projects which are subject to CEQA, particularly for projects in water scarce areas.

Solano County Local Agency Formation Commission

One of the responsibilities of the Solano County LAFCO is the provision of out-of-agency service contracts. The Solano County LAFCO is responsible for administering out of agency extension of services, existing extended service areas, connections, and the level of service contemplated by the existing service provider. According to Section 56133 of the Government Code, a city or district may provide new or extended services by contract or agreement outside its boundaries through written approval from the Solano County LAFCO.

WASTEWATER SERVICES

Federal Plans, Policies, Regulations, and Laws

U.S. Environmental Protection Agency (Clean Water Act)

The Clean Water Act assists in the development and implementation of waste treatment management plans and practices by requiring provisions for treatment of waste using the best practicable technology before there is any discharge of pollutants into receiving waters, as well as the confined disposal of pollution so that it will not migrate to cause water pollution or other environmental pollution.

National Pollutant Discharge Elimination System

The Water Permits Division within the EPA Office of Wastewater Management leads and manages the NPDES permit program, which oversees stormwater management and sewer and sanitary sewer overflows.

State Plans, Policies, Regulations, and Laws

The SWRCB, in coordination with two of the nine RWQCBs, regulates water quality, including issuance of discharge permits in Solano County. The RWQCBs issue waste discharge requirements for major point-source discharges, such as municipal wastewater treatment plants and industrial facilities.

Regional and Local Plans, Policies, Regulations, and Ordinances

Solano County Department of Environmental Management

The development of individual on-site waste disposal systems (septic systems and engineered systems) is regulated by the County Department of Environmental Management. Projects involving centralized community systems are permitted through the San Francisco Bay RWQCB and Central Valley RWQCB, divisions of the SWRCB. The SWRCB's nine RWQCBs are charged with protecting groundwater and surface water quality within each region of the state, so any proposal that entails the disposal of significant quantities of wastewater must be reviewed for its cumulative environmental effects.

Solano County Local Agency Formation Commission

One of the responsibilities of the Solano County LAFCO is the provision of out-of-agency service contracts. The Solano County LAFCO is responsible for administering out-of-agency extension of services, existing extended service areas, connections, and the level of service contemplated by the existing service provider. According to Section 56133 of the Government Code, a city or district may provide new or extended services by contract or agreement outside its boundaries through written approval from the Solano County LAFCO.

SOLID WASTE

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws pertaining to solid waste are applicable.

State Plans, Policies, Regulations, and Laws

The California Integrated Waste Management Act (AB 939; Chapter 1095, Statutes of 1989) requires city and county jurisdictions to identify an implementation schedule to divert 50% of the total waste stream from landfill disposal by the year 2000 and beyond. The act requires each county to submit an IWMP to the California Integrated Waste Management Board (CIWMB) that includes an adopted Source Reduction and Recycling Element from each of its cities as well as a county-prepared Source Reduction and Recycling Element for the unincorporated area. The element identifies existing and future quantities and types of solid waste, an inventory of existing disposal sites, a determination of its economic feasibility, enforcement programs, and implementation schedule. The Source Reduction and Recycling Element must include the following components:

- ▶ waste characterization;
- ▶ source reduction; recycling;
- ▶ composting;
- ▶ solid waste facility capacity;
- ▶ education and public information;
- ▶ funding;
- ▶ special waste (e.g., asbestos, sewage sludge); and
- ▶ household hazardous waste.

The element contains numerous goals, programs, and policies to comply with AB 939 related to the net reduction in generation of solid waste.

In addition to the Source Reduction and Recycling Element, the IWMP requires the County to submit a countywide siting element that specifies area(s) within the jurisdiction for disposal of solid-waste generation that provides for a minimum of 15 years of capacity.

In compliance with Public Resources Code Section 41821 et seq., the County annually submits a report to the CIWMB, based on the previous calendar year, that discusses progress toward implementing waste diversion programs as described in the County's waste-management planning documents. This report also includes the calculated annual diversion rate for the unincorporated area of the county, which is currently meeting the AB 939 goal of more than 50% diversion.

Regional and Local Plans, Policies, Regulations, and Ordinances

According to the Source Reduction and Recycling Element, the unincorporated portions of Solano County disposed of approximately 14,100 tons of solid waste in the calendar year 1990. Of the waste disposed through the service providers, 6,045 tons were residential waste, 1,766 tons were from commercial sources, and 1,927 were from industrial waste. Other Solano County residents self-hauled 4,336 tons of waste to landfills in Solano County, Napa County, or Yolo County.

In 2000, the County's residential diversion was estimated to be about 44%. Although the estimated percentage of source reduction is below the AB 939 target, a greater percentage of diversion would likely occur as implementation of the programs identified in the Source Reduction and Recycling Element are continued and the quantification of data becomes more efficacious. The total diversion through current and new recycling programs is estimated to increase to more than 50% as the residential areas of unincorporated Solano County expand their recycling efforts through the programs in the Source Reduction and Recycling Element.

Ordinance No. 1495 of Chapter 11 of the County Code enacted imposition of a per-ton waste deposit fee at any permitted solid-waste landfill to mitigate the associated costs directly related to the acts of the hauling and disposal of solid waste generated by both the in-county population and out-of-county populations. The purpose of the fee is to reimburse the direct costs of enforcement of Public Resources Code Section 40000 et al., preparation and updates to the IWMP, and litter control.

PUBLIC EDUCATION SERVICES

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws pertaining to public education services are applicable.

State Plans, Policies, Regulations, and Laws

SB 50 (Chapter 407, Statutes of 1998) and Proposition 1A (1998) provided a comprehensive school facilities financing and reform program. The provisions of SB 50 prohibit local agencies from denying land use approvals on the basis that school facilities are inadequate and reinstate the school facility fee cap for legislative actions. Section 65996 of the Government Code states that the development fees authorized by SB 50 are deemed to be "full and complete school facilities mitigation."

Section 17620(a)(1) of the California Education Code states that the governing board at any school district is authorized to levy a fee, charge, dedication, or other requirement against any construction within the boundaries of the district, for the purpose of funding the construction or reconstruction of school facilities.

The California Department of Education administers California's public education system at the state level. The State Board of Education, by statute, is the governing and policy-determining body of the California Department of Education. Among other things, the board adopts rules and regulations for the government of the state's public schools, adopts curriculum frameworks in core subject-matter areas, approves academic standards for content and

student performance in the core curriculum areas, and adopts tests for the Standardized Testing and Reporting (STAR) program and the California High School Exit Examination.

Regional and Local Plans, Policies, Regulations, and Ordinances

Acquisition of land for and construction of public education facilities in the unincorporated area is subject to County review for consistency with the General Plan under Section 65402 of the Government Code. Although many public-agency sponsors will strive to develop facilities that are consistent with the General Plan, they have the authority to override the County’s determination and proceed with acquisition and construction.

FIRE PROTECTION AND EMERGENCY SERVICES

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws pertaining to fire protection and emergency services are applicable.

State Plans, Policies, Regulations, and Laws

No state plans, policies, regulations, or laws pertaining to fire protection and emergency services are applicable.

Regional and Local Plans, Policies, Regulations, and Ordinances

No regional or local plans, policies, regulations, or ordinances pertaining to fire protection and emergency services are applicable.

CRIMINAL JUSTICE SERVICES

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws pertaining to criminal justice services are applicable.

State Plans, Policies, Regulations, and Laws

No state plans, policies, regulations, or laws pertaining to criminal justice services are applicable.

Regional and Local Plans, Policies, Regulations, and Ordinances

The Solano County 2008 Capital Improvement Program governs funding for County criminal justice facilities.

LIBRARY SERVICES

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws pertaining to library services are applicable.

State Plans, Policies, Regulations, and Laws

No state plans, policies, regulations, or laws pertaining to library services are applicable.

Regional and Local Plans, Policies, Regulations, and Ordinances

The *Solano County Library Strategic Plan (FY 2006/07–2008/08)*, the *Solano County Library Facilities Master Plan (2001)*, and the Solano County 2008 Capital Improvement Program govern the library system’s operations, facilities construction and improvement program, and funding for capital improvements.

4.9.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

Water Supply Services

The 2008 Draft General Plan would result in increased residential, commercial, and industrial land uses, and a decrease in agricultural land uses, as a result of increasing population growth. This analysis is based on the following water demand assumptions shown in Table 4.9-11 and Table 4.9-12. The two tables show water demand projections for the Preferred Plan and the Maximum Development Scenario. Water projections are made based on the projected population and amount of commercial land acreage proposed under each development scenario. Projected industrial water use is not projected in this analysis because of the variability of water needs for each individual industrial use, and the net change in water demand by converting agricultural lands to rural residential use is not estimated in Table 4.9-11 because of the variability of agricultural water needs (for example, dryland versus irrigated farming and differences in water needs for different crops). As noted in the analysis following Table 4.9-15 (Impact 4.9-1a), a change in land use from irrigated agriculture to a developed use would decrease water demand; therefore, the analysis below likely overestimates the net additional water demand and resulting impacts.

Land Use	Water Demand (afy)				
	Baseline— Existing Population	Preferred Plan		Maximum Development Scenario	
		Population	Change	Population	Change
Residential	17,719	27,435	9,716	42,953	25,234
Agriculture	2,269	4,940	2,671	9,879	7,610
Special-Purpose Areas	0	7,081	7,081	9,273	9,273
Total Population	19,988	39,455	19,467	62,105	42,117
Projected Water Demand*	2,240	4,424	2,184	6,955	4,715
Notes: afy = acre-feet per year * Projection assumes 100 gallons per day (gpd) per person (Marin County 2007). Source: Data provided by Solano County in 2008					

**Table 4.9-12
Projected Water Demand based on Commercial Acreage
in the Unincorporated Areas of Solano County**

Land Use	Water Demand (afy)				
	Baseline— Existing Acreage	Preferred Plan		Maximum Development Scenario	
		Acreage	Change	Acreage	Change
Commercial	640	1,036	396	1,036	396
Projected Water Demand*	851	1,378	526	1,378	526

Notes:

afy = acre-feet per year

* Projection assumes that commercial land use would generate 1,185.5 gallons per day per acre. This assumption comes from Marin County based on a study of historical North Marin water use conducted for North Marin Water District (NMWD) and summarized in the Marin CWP Update Draft EIR (Marin County 2007).

Source: Solano County 2008

Wastewater Services

The 2008 Draft General Plan would result in increased residential, commercial, and industrial land uses, and a decrease in agricultural land uses, as a result of increasing population growth. This analysis is based on the following wastewater demand assumptions shown in Table 4.9-13. The table shows water demand projections for the Preferred Plan and the Maximum Development Scenario. Wastewater projections are made based on the projected population growth associated with each development scenario. This analysis quantifies generation of wastewater on a per-capita basis only. Commercial and industrial uses would vary substantially in the amount of wastewater treatment requirements, and based on current background information, an average generation value is not available for projecting commercial and industrial wastewater generation numbers.

**Table 4.9-13
Projected Wastewater Demand based on Population Increase
in the Unincorporated Areas of Solano County**

Land Use	Wastewater Demand (mgd)				
	Baseline— Existing Population	Preferred Plan		Maximum Development Scenario	
		Population	Change	Population	Change
Residential	17,719	27,435	9,716	42,953	25,234
Agriculture	2,269	4,940	2,671	9,879	7,610
Special Purpose Areas	0	7,081	7,081	9,273	9,273
Total Population	19,988	39,455	19,467	62,105	42,117
Projected Wastewater Demand*	1.5	2.96	1.46	4.66	3.16

Notes:

mgd = million gallons per year

* Projection assumes 75 gallons per day (gpd) per person (Bell, pers. comm., 2006)

Source: Data provided by Solano County in 2008

Solid Waste

Impacts on solid-waste disposal facilities were determined by analyzing the capacity of existing landfills and those planned for in the future, and the ability of the landfills to serve future development proposed under the Preferred Plan and the Maximum Development Scenario.

According to EPA, the average person in the United States generates an average of 4.6 pounds of solid waste per day. Table 4.9-14 shows the projected creation of solid waste in Solano County based on the projected population increase associated with each buildout scenario.

Table 4.9-14 Projected Generation of Solid Waste based on Population Increase in the Unincorporated Areas of Solano County					
Land Use	Solid Waste Generation (lb/day)				
	Baseline— Existing Population	Preferred Plan		Maximum Development Scenario	
		Population	Change	Population	Change
Residential	17,719	27,435	9,716	42,953	25,234
Agriculture	2,269	4,940	2,671	9,879	7,610
Special-Purpose Areas	0	7,081	7,081	9,273	9,273
Total Population	19,988	39,455	19,467	62,105	42,117
Solid Waste Generated	91,945	181,493	89,548	285,683	193,738
Notes:					
lb/day = pounds per day					
* Projection assumes 4.6 pounds of solid waste per day per person (EPA 2008).					
Source: Data provided by Solano County in 2008					

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact related to public services and utilities is considered significant if the proposed project would do any of the following

Water Resources

- ▶ have insufficient water supplies available to serve the project from existing entitlements and resources, or require new or expanded entitlements; or
- ▶ require or result in the construction of new water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

Wastewater Services

- ▶ exceed wastewater treatment requirements of the applicable RWQCB; or
- ▶ require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;

Solid Waste Management and Recycling

- ▶ be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs; or
- ▶ not comply with federal, state, and local statutes and regulations related to solid waste;

Public Education Services

- ▶ result in the need for new or altered schools, the construction of which could cause significant environmental impacts, to maintain acceptable performance objectives;

Fire Protection and Emergency Services

- ▶ result in the need for new or altered fire protection facilities, the construction of which could cause significant environmental impacts, to maintain acceptable response times or other performance objectives; or
- ▶ expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands;

Criminal Justice Services

- ▶ result in substantial adverse physical impacts associated with the provision of new or physically altered criminal justice facilities, the need for new or physically altered criminal justice facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for criminal justice services; or

Library Services

- ▶ result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities, the need for new or physically altered library facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios or other performance objectives for library services.

IMPACT ANALYSIS

IMPACT 4.9-1a **Insufficient Water Supplies to Meet the Future Water Demand in Unincorporated Areas Served by the County – Preferred Plan.** *Land uses and development consistent with the Preferred Plan would increase the demand for water. Available water sources would be insufficient to serve some of the unincorporated areas of the county with the buildout of the Preferred Plan. New methods to obtain water and additional sources of supply would be required. This impact would be **significant**.*

As mentioned in Section 4.9.1, “Existing Conditions,” above, water provided in Solano County is derived from myriad sources. Unincorporated areas of the county are located both within and outside of existing MSAs. For this analysis, water provisions are divided into two categories: agricultural water service and domestic water service. The primary suppliers for agricultural water services include SID; MPWD; RDs 2068, 2098, 2060, and 2104; other reclamation districts; and local surface water. The primary suppliers for domestic water service include SID, the City of Vallejo, the City of Suisun City, the City of Vacaville, and RNVWD. Independent groundwater wells and local waterway diversions are utilized in areas where no service provider is available. The water districts mentioned rely on water largely from surface water sources, including primarily SCWA and the Solano Project, and the North Bay Aqueduct.

Population versus Demand for Water

The Association of Bay Area Governments' regional population forecast projects that the population of unincorporated Solano County would be 26,000 by 2030. However, implementation of the 2008 Draft General Plan could result in an estimated population of 39,455 by 2030 if buildout of all residential designated land were to occur at average historic densities (Table 4.9-15).

Existing Population (2000)	Projected Population with the 2008 Draft General Plan (2030)		ABAG Projections for Unincorporated Solano County (2030)
	Growth under the Preferred Plan	Growth with Total Buildout (Maximum Development Scenario)	
19,988	39,455	59,443	26,000
Note: ABAG = Association of Bay Area Governments Sources: Solano County 2006, data provided by Solano County in 2008			

As shown in Table 4.9-11 above, conservatively estimating an increase in demand for potable water of 100 gallons per person per day (Marin County 2007) would correspond to an additional demand for high-quality potable water of 2,184 afy with the Preferred Plan, based on population increase. As shown in Table 4.9-12 above, assuming that commercial land use generates 1,185.5 gpd per acre (Marin County 2007), the 2008 Draft General Plan would correspond to an additional demand for high-quality potable water of 526 afy based on commercial acreage. The total projected water needs with the Preferred Plan would be 2,710 afy.

Agricultural Conversion and Rural Residential Land Uses

Increases in land designated for residential, industrial, and commercial uses would result in conversions of irrigated agricultural acreage. Intensive irrigation of agricultural row crops typically consumes more water per acre than other land uses. According to DWR, irrigated agricultural crops typically consume 1 afy to 2.3 afy per acre, while suburban and urban residential uses typically consume 0.3 afy to 0.4 afy. Combined with effective water conservation, water recycling, and recharge practices, conversion of intensely irrigated agricultural land to typical urban uses can often result in a net decrease in water use.

Increases in rural residential land uses are largely proposed north of Vacaville, in the Pleasant Valley Area, and in Green Valley and Suisun Valley. The proposed residential land uses are located in currently developing areas and urban areas, to cluster new development corresponding to population growth near existing development, which would also encourage the use of existing water services, and would reduce the need for new infrastructure improvements. As mentioned in Section 4.9.1, "Existing Conditions," above, many of these areas are within existing MSAs. Areas north of Vacaville are served by the City of Vacaville, the Pleasant Valley area is within SID's service area, and Green Valley and Suisun Valley are within the service areas of the City of Vallejo and Suisun City. However, development would occur outside of MSAs, in which case water would be provided through annexation of additional properties into existing MSA boundaries associated with new development.

Projected population growth that would occur under the 2008 Draft General Plan would result in increases in water demand; however, the amount of increase would vary depending on future water use and management practices and the intensity and distribution of future land uses with future development. New development within the MSAs would rely on expansion of existing infrastructure; however, outside of existing MSAs, infrastructure would be limited to the existing providers' existing infrastructure with infill development.

Most new development would rely on groundwater wells. Groundwater and local supplies of surface water, which are the major water sources for areas outside of existing MSAs, are generally consistent but can fluctuate depending on factors such as well reliability, aquifer depletion, and water availability.

The Division of Environmental Health of the County's Department of Resource Management is responsible for permitting personal water wells and is ensuring that existing regulations are met in regard to water quality and supply. Long-term sustainability of county water supplies depends on both natural conditions (e.g., climate, soil permeability, topography, hydrogeology) and water supply management practices (distribution, conservation, reuse, and enhancement of supplies).

Water Conservation Measures

Water conservation measures are and would continue to be implemented to help reduce per-capita water demands (SCWA 2005a). In Solano County, cities and special wastewater districts are responsible for wastewater treatment. Each of the cities and wastewater special districts has its own individual plan for water recycling. These efforts would be outlined in the individual cities' UWMPs. Water recycling is recognized as an important part in the Solano agencies' *Integrated Regional Water Management Plan* (IRWMP), but cities and districts are responsible for implementation (SCWA 2005a).

Environmental enhancement, habitat protection, and water supply operating restrictions resulting from endangered or threatened species may result in decreases in the total amount of water supplies available. Limitations to water supply can affect reliability of the water supply, which in turn would affect the ability to support future population growth in Solano County cities and unincorporated areas.

SWP supplies are limited in dry years, resulting in concern about water supply reliability in such years. SWP contracts specify that all SWP contractors be reduced proportionally when there is a water shortage. Most SWP contractors are developing their own projects to augment SWP supplies, such as local facilities for surface water storage and groundwater banks. Many of the methods used to increase SWP supply are tied to statewide water issues. The California Bay-Delta Authority (i.e., the CALFED program) is implementing plans to enhance ecosystem restoration, increase water supply, promote efficient water use, improve water quality, and improve Delta levees. One of the main tenets of the authority is to seek improvements simultaneously in all of the facets of its programs.

SCWA, the primary water purveyor in the county, actively participates in planning to ensure that reliable water supplies are available to meet customers' needs and the growing current and future needs of the county. SCWA recently developed an IRWMP that identifies and prioritizes all the water resource-related actions for the Solano agencies, and prioritizes SCWA actions to maintain a continued water supply. SCWA prepares an UWMP every 5 years, consistent with the requirements set forth in the California Water Code. Furthermore, approval of specific plans and large-scale development projects located within the county would continue to require preparation of a WSA pursuant to the California Water Code to analyze the ability of water supplies to meet the needs of the project, in the context of existing and planned future water demands. State general plan law requires that the 2008 Draft General Plan incorporate these provisions.

Because water supply sources are not always contained within jurisdictional boundaries, cooperation and coordination between all relevant regulatory agencies, municipalities, public and private water suppliers, and other stakeholders is critical.

Significant improvements in water use efficiency, water reuse and reclamation, and water conservation are critical to the long-term viability of the county's water supplies. Several policies and programs contained in the 2008 Draft General Plan would encourage an increase in the role of water conservation and the role of safe, beneficial reuse of secondary- or tertiary-treated wastewater in meeting the water supply needs of both urban and rural users. However, although the policies below would encourage public water suppliers to act in accordance with county

desires, they cannot be compelled to do so. As a result, these policies may not be effective in reducing water supply impacts.

Supply for Population Growth in the Unincorporated County

Unincorporated areas of the county currently have access to approximately 263,445 afy of known water supply, which would continue to be utilized for agriculture, residential, commercial and industrial uses.

The County currently has permitted private groundwater wells within the Tehama Formation, the largest notable water aquifer, which has experienced a 30-foot drop in recent years. Demand for high-quality potable water under the Preferred Plan would be approximately 2,710 afy. Because the unincorporated areas currently have access to more than 263,445 afy of water, supply should be sufficient to provide for the proposed population growth in the unincorporated areas of the county. Portions of this increase in commercial and residential development would be a result of conversion of agricultural lands, which is known to use more water per acre than these other land uses. However, a large portion of the area that is being proposed for development in the 2008 Draft General Plan is currently nonirrigated land, outside of an existing service area of a water agency that could supply water. Consequently, most of the new development proposed in the 2008 Draft General Plan would require individual groundwater wells.

It should be noted that water supplies from other water sources, including groundwater wells, the various reclamation districts, and individual diversions from local waterways are largely not quantified in Solano County. The County began recording groundwater well installations in the late 1980s, and many wells were established before this time. No record exists of those wells, and no projection can be made as to how much water they are using (Bell, pers. comm., 2006). Furthermore, agriculture is one of the largest consumers of water in the unincorporated county, and sources of water supply for agricultural properties include a large number of personal wells and surface water diversions from nearby waterways. Many of these diversions of surface water are not quantified, and it is currently unknown how much water is being used for agricultural purposes.

Conservation or reuse and reclamation practices, and acquisition of new water sources for additional water supply would continue to be required to support an IRWMP. Policies included in the 2008 Draft General Plan provide a framework for the County to pursue both avenues to ensure a sufficient water supply consistency for the county's growing population. Proposed policies encourage new developments in previously urbanized areas and the use of cluster developments to minimize sprawl and to limit the need for new infrastructure. Existing regulations requiring preparation of WSAs would ensure that larger projects proposed in unincorporated areas of the county prove that existing water capacity is available. These regulations, policies, and programs as well as those contained in Section 4.5, "Hydrology and Water Resources," would reduce the onset and severity of water supply deficiencies, which are presently unknown.

All lands outside of the jurisdictional boundaries of the seven incorporated cities compose unincorporated Solano County and constitute the geography to which the 2008 Draft General Plan would apply. As shown in Table 3-2 in Chapter 3, "Project Description," buildout of the 2008 Draft General Plan would result in a total (i.e., long-term buildout to 2030) of 39,455 people, or an increase of approximately 19,467 people over the population of the existing land use (as of 2006). "Short-term" is not specifically quantified or defined in either the SB 610/SB 221 regulations or in the decision in *Vineyard Citizens for Responsible Growth v. City of Rancho Cordova* (described in Section 4.5, "Hydrology and Water Resources"). "Short-term" is therefore defined here as buildout to 2010. Using the total population projections of Table 4.5-5 to extrapolate the short-term population change in the unincorporated areas results in a population of 22,585, an increase of 3,118 people compared with the population of the existing (2006) land use.

The water demands necessary to serve buildout of the 2008 Draft General Plan are shown in Tables 4.9-11 and 4.9-12. SCWA's water supply sources were calculated for all of Solano County, both the MSAs and the

unincorporated areas that constitute buildout of the 2008 Draft General Plan. These water supply sources are shown in Tables 4.9-1 and 4.9-2.

State Water Project Water Supply and Demand

The short-term and long-term water yield of the SWP North Bay Aqueduct is shown in Table 4.5-3. The County has contractual water through 2035 from the SWP. Although the total annual amount of SWP water for Solano County shown in Table 4.5-3 is the “Table A” allocation (i.e., the official SWP contractual amount) running to 2035 and renewable thereafter, the SWP will not be able to deliver its full contractual amount. For example, in 1991 and 1992, water allocations for SWP urban contractors were reduced to 30% and 45% of contracted supply, respectively, and in 2001 SWP supplies were curtailed to 39% of contracted supply. Several variables affect SWP deliveries: regulatory standards, operating rules, reservoir carryover supplies, demand in service areas, and most importantly, precipitation (SCWA 2005b). Table 4.9-16 shows the projected supplies and demands for Solano County under normal, single dry, and multiple dry years.

Table 4.9-16					
SWP Water Supply and Demand for Solano County, 2010–2030					
	Supply and Demand (afy)				
	2010	2015	2020	2025	2030
Normal Water Year					
Supply ¹	40,855	41,070	41,070	41,070	41,070
Demand ²	47,506	47,756	47,756	47,756	47,756
<i>Difference (Supply minus Demand)</i>	(6,651)	(6,686)	(6,686)	(6,686)	(6,686)
Single Dry Year					
Supply ³	29,929	30,086	30,086	30,086	30,086
Demand ²	47,506	47,756	47,756	47,756	47,756
<i>Difference (Supply minus Demand)</i>	(17,577)	(17,670)	(17,670)	(17,670)	(17,670)
Multiple Dry Years					
Supply ⁴	19,477	19,580	19,580	19,580	–
Demand ²	47,506	47,756	47,756	47,756	–
<i>Difference (Supply minus Demand)</i>	(28,029)	(28,176)	(28,176)	(28,176)	
Notes:					
SWP = State Water Project					
¹ Assumes normal year supply is 86% of SWP contract amount.					
² Assumes demand is equal to contract amounts					
³ Assumes single dry year supply is 63% of SWP contract.					
⁴ Assumes multiple dry year supply is 41% of SWP contract.					
Source: SCWA 2005a					

Table 4.9-16 does not include Article 21 water, which is water that is available in excess of Table A contract amounts when there is water available in the Delta in excess of what can be pumped and stored in the SWP system. For North Bay Aqueduct water contractors, Article 21 water is available whenever the Delta is in excess conditions. Excess conditions in the Delta occur when the SWP and Reclamation’s Central Valley Project are pumping the maximum amount allowed, all Delta standards are met, and water is still available for export. Although SCWA has not used its full SWP contract amount in many years, a simplifying conservative assumption for demand estimation in the UWMP was that users would utilize the full contractual amounts of SWP water. SWP contractors are allowed to carry over unused water to the next calendar year. “Carryover water” becomes the first water used in the following year (SCWA 2005a).

Putah Creek Accord

Water rights to Solano Project water are solely for Solano County water users (SCWA 2005b). The Condition 12 Settlement Agreement placed a cap on future water development in the watershed of Lake Berryessa. The Putah Creek Accord, negotiated in 2000, provides instream flow needs for Putah Creek downstream of the Putah Diversion Dam. The settlement provides for increased flows to Putah Creek, but includes reduced flows when Lake Berryessa is low in storage and includes a process for addressing illegal diversion of surface water in Putah Creek. Before the settlement, approximately 21,000 afy was released to Putah Creek to meet instream flow needs. The settlement requires the previous release amount as a baseline, with additional flows at specified times. Additionally, set flows were required at specified downstream flow locations. In normal hydrologic conditions the additional flows from the settlement amount to about an additional 1,000 afy, or 22,000 afy. In drier years the amount of additional flows increases. The Putah Creek Accord is taken into account in calculating the firm yield described above in this chapter (SCWA 2005b).

Solano Project Drought Measures Agreement

As part of the renewal of the water supply contract for the Solano Project, the contracting cities (Fairfield, Vacaville, Vallejo, and Suisun City) entered into an agreement with the two agricultural Solano Project contracting districts (SID and MPWD) to share water supplies during drought periods. The “Drought Measures Agreement” was executed concurrently with the renewed Solano Project water supply agreements in 1999. The agreement is based on Solano Project storage levels, which trigger specific actions as follows:

- ▶ When Solano Project storage is less than 800,000 af on December 1, a drought contingency plan is developed. If storage is greater than 1.1 million af by the following April 1, the plan is suspended.
- ▶ When Solano Project storage is between 550,000 and 800,000 af on April 1, each of the parties to the agreement will forgo at least 5% of their contract amount that year. If storage is between 450,000 and 550,000 af on April 1, the parties forgo at least 10%. These forgone amounts are called “restricted carryover” and are credited to the party forgoing the water. This restricted carryover cannot be withdrawn from storage until Solano Project storage exceeds 800,000 af or is less than 450,000 af on a subsequent April 1. The concept is that the restricted carryover should not be used until conditions improve (storage in excess of 800,000 af) or worsen (storage less than 450,000 af). There is a further restriction for SID and MPWD.
- ▶ If storage is less than 450,000 af, the restricted carryover can be used or sold only for municipal purposes. When April 1 storage is below 450,000 af, no restricted carryover is accumulated, and full contract amounts are available. Restricted carryover cannot exceed 50% of any party’s annual contract amount. Restricted carryover is in addition to any voluntary carryover that is allowed under the Solano Project contracts.
- ▶ If Solano Project storage is less than 400,000 af on April 1, a drought emergency is declared. This will trigger the Solano Irrigation District Drought Impact Reduction Program. Under this program, SID growers will fallow land and provide up to 20,000 afy for voluntary sale to cities (not restricted only to those with Solano Project contracts). Such a drought fallowing program was implemented in 1991, creating 15,000 af of SID water that was sold to cities and SCWA.

Vallejo Agreements

Vallejo often has water supplies in excess of its current needs. Vallejo has entered into agreements with Benicia, Napa County, and Fairfield for sales and exchanges. Other city water exchange and banking agreements are described in Section 4.5, “Hydrology and Water Resources.”

Relevant Goals, Policies, and Programs of the 2008 Draft General Plan

Implementation of the following goals, policies, and implementation programs in the Resources and Public Facilities and Services chapters of the 2008 Draft General Plan would ensure that steps are taken to promote sufficient water supply.

Resources Chapter

- ▶ **Policy RS.P-65:** Together with the Solano County Water Agency, monitor and manage the County's groundwater supplies.
- ▶ **Program RS.I-70:** Together with the SCWA and the cities, create and maintain a comprehensive database of information regarding groundwater supply and quality. Seek funding to complete a countywide groundwater study that fills the gaps among aquifer-specific studies. Coordinate with the SCWA to get more information on its groundwater study and subsequent groundwater management programs.

Public Facilities and Services Chapter

- ▶ **Goal PF.G-1:** Provide adequate public services and facilities to accommodate the level of development planned by the County.
- ▶ **Goal PF.G-2:** Ensure that residents throughout Solano County have access to essential public facilities and services.
- ▶ **Policy PF.P-1:** Provide public facilities and services essential for health, safety, and welfare in locations to serve local needs.
- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-3:** Increase efficiency of water, wastewater, stormwater, and energy use through integrated and cost-effective design and technology standards for new development and redevelopment.
- ▶ **Policy PF.P-4:** Ensure that adequate land is set aside within the unincorporated county for public facilities to support future needs.
- ▶ **Policy PF.P-5:** Design and locate new development to maximize the use of existing facilities and services and to coordinate with the cities the need for additional County services.
- ▶ **Policy PF.P-6:** Guide development requiring urban services to locations within and adjacent to cities.
- ▶ **Policy PF.P-7:** Coordinate with the cities to strongly encourage compact urban development within city urban growth areas to avoid unnecessary extension or reconstruction of roads, water mains, and services and to reduce the need for increased school, police, fire, and other public facilities and services.
- ▶ **Policy PF.P-8:** Notify the appropriate agencies (e.g., school districts, public safety, water) of new development applications within their service area early in the review process to allow sufficient time to assess impacts on facilities.
- ▶ **Policy PF.P-9:** Actively support efforts of the Solano County Water Agency, water districts, and regional water suppliers and distributors, to ensure that adequate high-quality water supplies are available to support current and future development projects in Solano County.

- ▶ **Policy PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.
- ▶ **Policy PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
- ▶ **Policy PF.P-12:** Protect the county's public water supply and delivery infrastructure from natural disasters or acts of terrorism.
- ▶ **Policy PF.P-13:** Support efforts by irrigation districts and others to expand Solano County's irrigated agricultural areas.
- ▶ **Policy PF.P-14:** In areas identified with marginal water supplies, require appropriate evidence of adequate water supply and recharge to support proposed development and water recharge.
- ▶ **Policy PF.P-15:** Domestic water for rural development shall be provided through the use of on-site individual wells or through public water service.
- ▶ **Policy PF.P-16:** Provide and manage public water service through public water agencies.
- ▶ **Policy PF.P-17:** Limit public water infrastructure to developed areas or those designated for future development to prevent growth-inducing impacts on adjoining agricultural or open space lands.
- ▶ **Policy PF.P-18:** The minimum lot size for properties to be served by individual on-site wells and individual on-site sewage disposal systems shall be 5 acres. Where cluster development is proposed with on-site wells and sewage disposal systems, parcels may vary in size provided the overall density of the project is not greater than 5 acres per parcel and that no individual parcel is less than 1 acre in size.
- ▶ **Policy PF.P-19:** The minimum lot size for properties to be served by public water service with individual on-site sewage disposal systems shall be 2.5 acres. Where cluster development is proposed with public water service and on-site sewage disposal systems, parcels may vary in size provided the overall density of the project is not greater 2.5 acres per parcel and that no individual parcel is less than 1 acre in size.
- ▶ **Program PF.I-6:** Implement the recommendations from the *English Hills Specific Plan Groundwater Investigation* establishing minimum parcel sizes to ensure adequate groundwater supply and recharge for the English Hills area.
- ▶ **Program PF.I-9:** Continue to require preparation of a water supply assessment pursuant to the California Water Code to analyze the ability of water supplies to meet the needs of regulated projects, in the context of existing and planned future water demands. Review the availability of water to serve new developments in the unincorporated area before permitting such developments and ensure that the approval of new developments will not have a substantial adverse impact on water supplies for existing water users.
- ▶ **Program PF.I-11:** Require new development proposing on-site water supplies in areas identified with marginal water supplies to perform a hydrologic assessment to determine whether project plans meet the County's hydrologic standards.
- ▶ **Program PF.I-13:** Investigate the potential for innovative recycled water systems in Solano County, such as the use of greywater for domestic and agricultural purposes, and identify sources of funding for implementation of these systems.

- ▶ **Program PF.I-14:** Work with local partners and water agencies to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public can take to reduce water use. Encourage water purveyors to provide incentives for customers that use water more efficiently.
- ▶ **Program PF.I-17:** Develop an information sharing program in cooperation with public water suppliers as necessary to make appropriate data available to the public pertaining to water supply and water use in each supplier's jurisdiction.

Conclusion

Because of the relatively small increase in water demand of 2,710 afy with the population growth proposed under the Preferred Plan and the expected increase in available water supplies from the conversion of agricultural lands to other uses, current water supplies should be sufficient to serve the proposed growth in the unincorporated areas. However, incorporated areas of Solano County are expected to experience much greater population growth through the planning period of the 2008 Draft General Plan. The entire county is projected to increase from a population of approximately 421,657 in 2005 to 677,628 by 2030 (SCWA 2005a). Because the population of unincorporated areas is projected to increase by 39,455, incorporated areas would experience an increase of approximately 216,500 persons.

Independent groundwater wells, including small systems and private wells, have no restrictions on the amount of water used and have not been currently quantified. The majority of water users in rural areas of the county would continue to be dependent on groundwater to meet their water needs. Uncertainty about long-term availability of water supplies and facilities and the lack of direct County jurisdiction over public water supplies in the region results in a level of uncertainty about the adequacy of future supplies in unincorporated areas. Further, recent depletion of the Tehama Formation aquifer would suggest that groundwater availability may also be compromised in the future. Therefore, this impact would be significant.

Mitigation Measure 4.9-1a(1): Implement Measures to Ensure Sufficient Water Supplies for Development Projects.

The County shall implement the following measures to ensure sufficient water supplies for land development projects in the unincorporated county under the 2008 Draft General Plan:

- ▶ Before approval of any tentative small-lot subdivision map for a proposed residential project of more than 500 dwelling units, the County shall comply with SB 221 requirements for verification of sufficient subdivision water supplies, as specified in Section 66473.7 of the Government Code.
- ▶ Before approval of any tentative small-lot subdivision map for a proposed residential project of 500 or fewer units, the County need not comply with Section 66473.7 or formally consult with the public water system that would provide water to a proposed subdivision, but shall nevertheless make a factual showing or impose conditions similar to those required by Section 66473.7 to ensure an adequate water supply for development authorized by the map.
- ▶ Before recordation of any final small-lot subdivision map, or before County approval of any project-specific discretionary approval or entitlement required for nonresidential land uses, the County or the project applicant shall demonstrate, based on substantial evidence, the availability of a long-term, reliable water supply from a public water system for the amount of development that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of a written verification that existing sources are or will be available and that needed physical improvements for treating and delivering water to the project site will be in place before occupancy.

Mitigation Measure 4.9-1a(2): Implement a Countywide Groundwater Balance Budget and Monitoring Program.

Ongoing groundwater monitoring is critical for evaluating existing conditions and comparing groundwater extractions against projected sustainable yields on a countywide basis. To achieve this, a countywide groundwater balance budget shall be developed that incorporates the provisions of Policy RS.P-65, which calls for coordination with SCWA to monitor and manage the county's groundwater supplies, and Program RS.I-70, which requires the County Department of Resource Management, together with SCWA and the cities, to create and maintain a comprehensive database of information about groundwater supply and quality, and to complete a countywide groundwater study that fills the gaps among disparate aquifer-specific studies in the county. This groundwater balance budget and monitoring program shall be implemented to facilitate evaluation of current groundwater conditions. It shall also provide evaluation of the effectiveness of the 2008 Draft General Plan goal, policies, and programs associated with Impact 4.5-4a in Section 4.5, "Hydrology and Water Resources," that pertain to groundwater-recharge efforts and sustainable groundwater levels.

Although Mitigation Measure 4.9-1a(1) may work to reduce some portion of the impact associated with water supply, it would not reduce this impact to a less-than-significant level. Similarly, implementation of Mitigation Measure 4.9-1a(2) would partially reduce the impact of insufficient water supplies associated with uncertain future availability of groundwater. However, the ability of groundwater supplies to meet the increased water demand resulting from the implementation of the 2008 Draft General Plan would remain uncertain. For this reason, the impact would remain **significant and unavoidable**.

IMPACT 4.9-1b **Insufficient Water Supplies to Meet the Future Water Demand in Unincorporated Areas Served by the County – Maximum Development Scenario.** *Land uses and development consistent with the Maximum Development Scenario would increase the demand for water. Available water sources would be insufficient to serve some of the unincorporated areas of the county with the buildout of the Maximum Development Scenario. New methods to obtain water and additional sources of supply would be required. This impact would be significant.*

This impact is similar to Impact 4.9-1a described above; however, the increased density of buildout for the Maximum Development Scenario would require additional water supply of 2,531 afy over the Preferred Plan, for a total of 5,241 afy (see Tables 4.9-11 and 4.9-12). For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.9-1b(1): Implement Measures to Ensure Sufficient Water Supplies for Development Projects.

This mitigation measure is the same as Mitigation Measure 4.9-1a(1) for the Preferred Plan.

Mitigation Measure 4.9-1b(2): Implement a Countywide Groundwater Balance Budget and Monitoring Program.

This mitigation measure is the same as Mitigation Measure 4.9-1a(2) for the Preferred Plan.

For the same reasons as described for the Preferred Plan, implementation of these mitigation measures would reduce the impact, but not to a less-than-significant level. This impact would remain **significant and unavoidable**.

IMPACT 4.9-2a **New or Expanded Water Supply Facilities – Preferred Plan.** *Expansion and extension of water supply and distribution facilities is required for buildout of the 2008 Draft General Plan under the Preferred Plan. Although goals and policies have been identified to reduce impacts, construction of these facilities could result in significant effects on the environment. This impact would be significant.*

Demand for water would continue to increase with the population and job growth projected under the 2008 Draft General Plan, and the need for additional water supply facilities could increase. Increased density of development

in unincorporated areas of the county would require provision of additional water. Portions of the unincorporated county where future growth could be expected would be located within existing MSAs, and would obtain services from those districts. Areas outside of MSA boundaries would be served through annexation of additional properties into existing MSA boundaries or would require individual water wells. Consequently, most of the new development would be expected to require individual wells.

Facilities required to serve projected population growth and development could include additional groundwater wells, water treatment facilities within various service districts, pipelines, pump houses, and wells. As water reuse increases, facilities that recycle used water may also be needed, depending on the needs of each public water purveyor. The site-specific impacts of these facilities cannot be determined until such facilities are proposed and subjected to environmental review. Typical impacts related to new facilities would be the responsibility of those service districts where expansion is proposed, but would likely consist of impacts from construction-related noise, dust, and grading. The fact that water facilities may be located near streams or water bodies would mean that impacts on fish and wildlife, erosion, and streamflow may also occur.

Relevant Policies and Programs of the 2008 Draft General Plan

To meet the demands related to increased water facility and supply, several policies and programs in the 2008 Draft General Plan would reduce some of the environmental impacts related to the demand for new or expanded water facilities:

- ▶ **Policy PF.P-5:** Design and locate new development to maximize the use of existing facilities and services and to coordinate with the cities the need for additional County services.
- ▶ **Policy PF.P-6:** Guide development requiring urban services to locations within and adjacent to cities.
- ▶ **Policy PF.P-7:** Coordinate with the cities to strongly encourage compact urban development within city urban growth areas to avoid unnecessary extension or reconstruction of roads, water mains, and services and to reduce the need for increased school, police, fire, and other public facilities and services.
- ▶ **Policy PF.P-9:** Actively support efforts of the Solano County Water Agency, water districts, and regional water suppliers and distributors, to ensure that adequate high-quality water supplies are available to support current and future development projects in Solano County.
- ▶ **Policy PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
- ▶ **Policy PF.P-14:** In areas identified with marginal water supplies, require appropriate evidence of adequate water supply and recharge to support proposed development and water recharge.
- ▶ **Policy PF.P-16:** Limit public water infrastructure to developed areas or those designated for future development to prevent growth-inducing impacts on adjoining agricultural or open space lands.
- ▶ **Policy PF.P-19:** The minimum lot size for properties to be served by public water service with individual on site sewage disposal systems shall be 2.5 acres. Where cluster development is proposed with public water service and on site sewage disposal systems, parcels may vary in size provided the overall density of the project is not greater 2.5 acres per parcel and that no individual parcel is less than 1 acre in size.
- ▶ **Program PF.I-13:** Investigate the potential for innovative recycled water systems in Solano County, such as the use of greywater for domestic and agricultural purposes, and identify sources of funding for implementation of these systems.

- ▶ **Program PF.I-14:** Work with local partners and water agencies to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public can take to reduce water use. Encourage water purveyors to provide incentives for customers that use water more efficiently.
- ▶ **Program PF.I-18:** Develop an information sharing program in cooperation with public water suppliers as necessary to make appropriate data available to the public pertaining to water supply and water use in each supplier's jurisdiction.

Conclusion

Although the policies described above may reduce some of the adverse environmental impacts associated with the construction and operation of new or expanded water supply facilities, analysis of site-specific impacts is beyond the scope of this EIR. Such impacts would be evaluated as part of a separate environmental review for the individual project. This impact would be significant.

Mitigation Measure

No mitigation is available beyond the updated 2008 Draft General Plan policies and programs discussed in the impact analysis above. This impact would remain **significant and unavoidable**.

IMPACT 4.9-2b **New or Expanded Water Supply Facilities – Maximum Development Scenario.** *Expansion and extension of water supply and distribution facilities is required for buildout of the 2008 Draft General Plan under the Maximum Development Scenario. Although goals and policies have been identified to reduce impacts, construction of these facilities could result in significant effects on the environment. This impact would be significant.*

This impact is similar to Impact 4.9-2a described above; however, the increased density of buildout for the Maximum Development Scenario would increase demand for water facilities more than under the Preferred Plan. Although the policies described above may reduce some of the adverse environmental impacts associated with the construction and operation of new or expanded water supply facilities, analysis of site-specific impacts is beyond the scope of this EIR. Such impacts would be evaluated as part of a separate environmental review for the individual project. For the same reasons as described above, this impact would be significant.

Mitigation Measure

No mitigation is available beyond the updated 2008 Draft General Plan policies and programs discussed under Impact 4.9-2a above. This impact would remain **significant and unavoidable**.

IMPACT 4.9-3a **Increased Wastewater Treatment Demand – Preferred Plan.** *Land uses and development consistent with the 2008 Draft General Plan under the Preferred Plan would generate additional wastewater flows that would be served by city municipal treatment facilities and individual sewer systems, and larger development would be permitted for the construction of small-scale treatment facilities. The County is responsible for permitting and managing wastewater treatment outside of MSAs, in which individual sewer systems and small centralized treatment facilities are used on a case-by-case basis. The County does not have quantifiable data available showing total demand and capacity of these individual systems; therefore, the ability to serve the buildout of the 2008 Draft General Plan is unknown. Although some uncertainty exists about the long-term ability to serve the county's future wastewater needs, current regulations and policies would provide a mechanism to provide wastewater services to areas where future development is expected. This impact would be significant.*

Buildout of the 2008 Draft General Plan under the Preferred Plan would result in increased urban development in unincorporated areas that would generate additional wastewater. Portions of new development would occur within MSAs, which would be provided wastewater services by those municipalities. The majority of new development approved by the county would occur outside MSAs and would be served by individual septic systems and a small number of centralized treatment systems. Development occurring within MSAs would be approved by cities through annexation.

According to the Preferred Plan buildout scenario, development requiring municipal services would be encouraged near existing developed and urbanized areas within MSAs, where existing infrastructure is currently available. Such development would be approved by cities through annexation. The County anticipates additional residential development and some agricultural industrial development occurring in rural portions of the county. Population projections used in this analysis include only areas outside of existing MSAs, which would rely on individual on-site wastewater systems; larger developments that would generate the equivalent wastewater to 200 or more units may be served by centralized systems. As shown in Table 4.9-12 above, the Preferred Plan would generate an additional 1.46 mgd of wastewater related to residential developments.

Current County records of the number of individual wastewater systems do not quantify existing capacity limits. New developments are assessed for generation amounts, and treatment requirements are permitted on a case-by-case basis (Bell, pers. comm., 2006).

Relevant Policies and Programs of the 2008 Draft General Plan

The following policies and programs in the 2008 Draft General Plan address wastewater and provide a framework to ensure that sufficient wastewater capacity is provided:

- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-4:** Ensure that adequate land is set aside within the unincorporated county for public facilities to support future needs.
- ▶ **Policy PF.P-5:** Design and locate new development to maximize the use of existing facilities and services and to coordinate with the cities the need for additional County services.
- ▶ **Policy PF.P-6:** Guide development requiring urban services to locations within and adjacent to cities.
- ▶ **Policy PF.P-7:** Coordinate with the cities to strongly encourage compact urban development within city urban growth areas to avoid unnecessary extension or reconstruction of roads, water mains, and services and to reduce the need for increased school, police, fire, and other public facilities and services.
- ▶ **Program PF.I-1:** Use the County's Capital Improvement Program to identify, plan, and provide for future public facilities and improvements. Capital Improvement Program projects shall be reviewed annually for consistency with General Plan policies and coordinated with current and future development.
- ▶ **Program PF.I-4:** Coordinate with the cities and the Solano County Local Agency Formation Commission to ensure that urban development in areas included within the cities' municipal service areas are served by a full range of urban services (e.g., public water and sewer, public transit, safety and emergency response services, parks, trails, open spaces) through city annexation.
- ▶ **Program PF.I-5:** Maintain the zoning ordinance to specify minimum lot sizes for properties with on-site sewage and on-site wells.
- ▶ **Program PF.I-21:** When reviewing development proposals,

- Require septic systems to be located outside of primary groundwater recharge areas, or where that is not possible, require shallow leaching systems for disposal of septic effluent.
 - Require new septic systems or leach fields to be installed at least 100 feet away from natural waterways, including perennial or intermittent streams, seasonal water channels, and natural bodies of standing water. Make an exception for the repair of existing systems if the 100-foot setback area cannot be maintained and if adequate provisions are made for protecting water quality.
 - Require the use of alternative wastewater treatment techniques to respond to site characteristics, as determined by the California Department of Health Services and regional water quality control boards.
 - Require new development with septic systems to be designed so as to prevent nitrates and other pollutants of concern from septic disposal systems from impairing groundwater quality.
- ▶ **Program PF.I-22:** On-site sewage disposal systems for individual lots and subdivisions may be operated by private property owners. A public agency shall permit and manage centralized community sewage disposal systems. If lands proposed for community sewage disposal systems are not within the boundaries of an existing public sewage treatment agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the sewer service, which may be contracted to a private entity with oversight by the public entity. Sewer treatment facilities shall be designed to provide sewer service to developed areas and areas designated for future development within the General Plan.

Conclusion

Current project review procedures and policies and programs included in the 2008 Draft General Plan would provide a framework that would ensure adequate wastewater services for unincorporated areas through similar avenues that are currently taking place, such as development of small-scale treatment systems and individual stand-alone wastewater systems (septic tanks and engineered systems), outside MSAs and through the utilization of municipal treatment systems within MSAs. Compliance with policies and programs would improve the likelihood that the increased demand for these services would be met. Furthermore, the County requires that new developments apply for and comply with permits for individual stand-alone and small-scale treatment systems. Although some uncertainty exists about the long-term ability to serve the growing county's wastewater needs, current regulations and policies would provide an effective mechanism to provide wastewater services to areas where future development is expected. Therefore, this impact would be significant.

Mitigation Measure 4.9-3a: Implement Measures to Ensure Sufficient Wastewater Collection and Removal Systems for Development Projects.

The County shall implement the following measures to ensure the availability of adequate wastewater collection and removal systems for land development projects in the unincorporated county under the 2008 Draft General Plan:

- ▶ Before approval of any tentative subdivision map for a proposed residential project, the County shall formally consult with the wastewater system provider that would serve the proposed subdivision to make a factual showing or impose conditions to ensure the availability of an adequate wastewater removal system for the proposed development.
- ▶ Before recordation of any final small-lot subdivision map, or before County approval of any project-specific discretionary approval or entitlement for nonresidential land uses, the County or the project applicant shall demonstrate, based on substantial evidence, the availability of a long-term, reliable wastewater collection system for the amount of development that would be authorized by the final subdivision map or project-specific discretionary nonresidential approval or entitlement. Such a demonstration shall consist of a written

verification that existing treatment capacity is or will be available and that needed physical improvements for treating wastewater from the project site will be in place before occupancy.

Although implementation of Mitigation Measure 4.9-3a would assist the County in ensuring that sufficient service capacity is available to serve future growth projected in the 2008 Draft General Plan, it would not reduce this impact to a less-than-significant level. For this reason, the impact would remain **significant and unavoidable**.

IMPACT 4.9-3b **Increased Wastewater Treatment Demand – Maximum Development Scenario.** *Land uses and development consistent with the 2008 Draft General Plan under the Maximum Development Scenario would generate additional wastewater flows that would be served by city municipal treatment facilities and individual sewer systems, and larger development would be permitted for the construction of small-scale treatment facilities. The County is responsible for permitting and managing wastewater treatment outside of MSAs, in which individual sewer systems and small centralized treatment facilities are used on a case-by-case basis. The County does not have quantifiable data available showing total demand and capacity of these individual systems; therefore, the ability to serve the buildout of the 2008 Draft General Plan is unknown. Although some uncertainty exists about the long-term ability to serve the growing county's wastewater needs, current regulations and policies would provide an effective mechanism to provide wastewater services to areas where future development is expected. This impact would be **significant**.*

This impact is similar to Impact 4.9-3a described above; however, the increased density of buildout for the Maximum Development Scenario would increase demand for wastewater facilities more than the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.9-3b: Implement Measures to Ensure Sufficient Wastewater Collection and Removal Systems for Development Projects.

This mitigation measure is the same as Mitigation Measure 4.9-3a for the Preferred Plan. For the same reasons as described above, this impact would remain **significant and unavoidable**.

IMPACT 4.9-4a **New or Expanded Wastewater Facilities – Preferred Plan.** *Land uses and development consistent with the 2008 Draft General Plan under the Preferred Plan would result in an increased need for wastewater facilities. Construction of these facilities could result in site-specific impacts. This impact would be **significant**.*

Provision of adequate wastewater system capacity in MSAs of Solano County is largely the responsibility of public agencies that are not under the jurisdiction of the County. These agencies must not only maintain their systems and facilities to serve existing users, but also must expand as needed to accommodate projected growth within each agency's jurisdiction. However, as mentioned above, more than 90% of areas not served by the City of Vallejo, the Suisun-Fairfield Sewer District, or city municipalities outside of the MSAs are served by individual stand-alone waste water systems. These are self-contained systems and the County is responsible for permitting and inspecting them. If larger development were proposed in unincorporated areas where utilization of an existing treatment system would be warranted, compliance with regulations instituted by the RWQCB and the County's Environmental Health Division, as well as County project review, would be required.

As shown on the proposed land use map for the Preferred Plan (Exhibit 3-2 in Chapter 3, "Project Description"), future development would be promoted largely in the vicinity of existing urbanized areas. As the demand for wastewater treatment increases with population and job growth, the need for additional facilities would also increase. The site-specific impacts of these facilities cannot be determined until the facilities are proposed and subjected to environmental review. Typical impacts would likely result from construction-related noise, dust, grading, and water pollution. The fact that wastewater facilities may be located near streams or water bodies would mean that impacts on fish and wildlife, erosion, and streamflow may also occur.

Relevant Policies and Program of the 2008 Draft General Plan

The 2008 Draft General Plan includes a number of policies and a program that would help limit potential impacts related to the construction of needed wastewater facilities, as described below.

Resources Chapter

- ▶ **Policy RS.P-23:** Ensure that extension of new utilities and infrastructure facilities, including those that support uses and development outside the Delta, is consistent with the *Land Use and Resource Management Plan for the Primary Zone of the Delta*. Where construction of new utility and infrastructure facilities is appropriate, the effects of such new construction on the integrity of levees, wildlife, and agriculture activities shall be minimized to the extent feasible.
- ▶ **Policy RS.P-68:** Preserve and maintain watershed areas characterized by slope instability, undevelopable steep slopes, high soil erosion potential, and extreme fire hazards in agricultural use. Watershed areas lacking water and public services should also be kept in agricultural use.
- ▶ **Policy RS.P-69:** Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.
- ▶ **Policy RS.P-70:** Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.
- ▶ **Program RS.I-12:** Review and update the Solano County component of the Suisun Marsh Local Protection Program in coordination with the San Francisco Bay Conservation and Development Commission. The guidelines and standards identified in current policies should be incorporated into the County zoning ordinance and development guidelines. The update will address General Plan policies and other policies, programs and regulations within the Local Protection Program.

Public Facilities and Services Chapter

- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-3:** Increase efficiency of water, wastewater, stormwater, and energy use through integrated and cost-effective design and technology standards for new development and redevelopment.
- ▶ **Policy PF.P-5:** Design and locate new development to maximize the use of existing facilities and services and to coordinate with the cities the need for additional County services.
- ▶ **Policy PF.I-21:** When reviewing development proposals,
 - Require septic systems to be located outside of primary groundwater recharge areas, or where that is not possible, require shallow leaching systems for disposal of septic effluent.
 - Require new septic systems or leach fields to be installed at least 100 feet away from natural waterways, including perennial or intermittent streams, seasonal water channels, and natural bodies of standing water. Make an exception for the repair of existing systems if the 100-foot setback area cannot be maintained and if adequate provisions are made for protecting water quality.
 - Require the use of alternative wastewater treatment techniques to respond to site characteristics, as determined by the California Department of Health Services and regional water quality control boards.

- Require new development with septic systems to be designed so as to prevent nitrates and other pollutants of concern from septic disposal systems from impairing groundwater quality.
- **Policy PF.P-22:** Ensure that new and existing septic systems and sewage treatment systems do not negatively affect groundwater quality.

Conclusion

Although policies and programs of the 2008 Draft General Plan would likely reduce many of the environmental impacts related to the construction and expansion of wastewater treatment facilities to a less-than-significant level, analysis of potential impacts without identified sites and complete designs would be speculative and would be addressed at the time that the facilities are proposed. Additionally, the completion of master facilities plans, improvements to existing facilities, and the construction of new WWTPs is beyond the control of the County and would be the responsibility of the wastewater treatment provider.

Physical alterations, including expansion of any existing facilities within existing community areas, would be expected to disturb existing land and land use in amounts related to the type of facility proposed. The potential significant adverse environmental effects associated with providing such facilities and services would be evaluated in future specific environmental reviews, and would incorporate mitigation as necessary to reduce the magnitude of potential effects. Therefore, this impact would be significant.

Mitigation Measure

No mitigation is available beyond the 2008 Draft General Plan policies and program discussed in the impact analysis above. This impact would remain **significant and unavoidable**.

IMPACT 4.9-4b **New or Expanded Facilities – Maximum Development Scenario.** *Land uses and development consistent with the 2008 Draft General Plan under the Maximum Development Scenario would result in an increased need for wastewater facilities. Construction of these facilities could result in site-specific impacts. This impact would be significant.*

This impact is similar to Impact 4.9-4a described above; however, the increased density of buildout for the Maximum Development Scenario would increase demand for wastewater facilities more than the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure

No mitigation is available beyond the 2008 Draft General Plan policies and program discussed under Impact 4.9-4a above. This impact would remain **significant and unavoidable**.

IMPACT 4.9-5a **Increased Demand for Solid Waste Disposal – Preferred Plan.** *Future population growth through buildout of the 2008 Draft General Plan under the Preferred Plan would result in an increase of generated solid waste that could exceed existing capacity. Implementation of proposed policies in the 2008 Draft General Plan, in combination with existing state regulations, would reduce the potential impacts from increased demand for solid waste disposal. This impact would be less than significant.*

Growth permitted under the 2008 Draft General Plan would result in additional solid waste in Solano County. The Preferred Plan would project the generation of 19,467 new residents, which, based on EPA's estimated individual solid-waste generation rate of 4.6 pounds per day per person, would result in the generation of approximately 16,342 tons of garbage per year.

The Hay Road Landfill currently accepts approximately 2,400 tons per day, and the Potrero Hills Landfill accepts approximately 1,500 tons per day (Solano County 2003). The Hay Road Landfill has existing capacity and is expected to remain in operation for approximately 64 years, while the Potrero Hills Landfill has existing capacity and is projected to remain in operation until approximately 2058. The current and planned capacity of the Potrero Hills Landfill and the Hay Road Landfill would be sufficient to serve the population growth projected to occur under the 2008 Draft General Plan with the Preferred Plan, which could add 45 tons per day at full buildout.

Relevant Policies of the 2008 Draft General Plan

Implementation of the following policies contained in the 2008 Draft General Plan would ensure that sufficient landfill capacity is provided throughout the county:

- ▶ **Policy PF.P-23:** Ensure that land uses adjacent to solid waste disposal sites will not conflict with the current or possible future use of solid waste disposal sites. Keep land adjacent to disposal sites that handle toxic and hazardous wastes in compatible land uses.
- ▶ **Policy PF.P-24:** Ensure that disposal operations for solid waste are performed in a manner compatible with surrounding land uses. Ensure that at the end of such operations the site is restored to a use compatible with surrounding land uses.
- ▶ **Policy PF.P-25:** Collaborate with the state, regional, and city agencies and landfill operators to ensure that the capacity of available landfills is sufficient. Prioritize capacity for waste generated within the county. Ensure that programs are designed to meet or exceed state requirements for landfill capacities.
- ▶ **Policy PF.P-26:** Implement and participate in local and regional programs that encourage source reduction and recycling of solid and hazardous wastes in Solano County.
- ▶ **Policy PF.P-27:** Require responsible waste management practices, including recycling and composting. Coordinate with service providers to compost green waste and encourage local farmers to use this.
- ▶ **Policy PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source.
- ▶ **Policy PF.P-29:** Design all new landfill sites to reduce or eliminate off-site odor, leachate, transportation, vector, and other potential effects on nearby properties.
- ▶ **Policy PF.P-30:** Collaborate with other counties to create a joint recycling program that accepts recyclable materials that are not currently recycled in Solano County.

Conclusion

Implementation of policies in the 2008 Draft General Plan would ensure that the County complies with applicable regulations related to the disposal and reduction of solid waste, and in general reduces the amount of solid waste it disposes of. Therefore, with implementation of the policies in the 2008 Draft General Plan, as well as compliance with the California Integrated Waste Management Act, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-5b **Increased Demand for Solid Waste Disposal – Maximum Development Scenario.** *Future population growth through buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in an increase of generated solid waste that could exceed existing capacity. Implementation of proposed policies in the 2008 Draft General Plan, in combination with existing state regulations, would reduce the potential impacts from increased demand for solid waste disposal. This impact would be less than significant.*

This impact is similar to Impact 4.9-5a described above; however, the increased density of buildout for the Maximum Development Scenario would increase the demand for solid-waste services above that of the Preferred Plan. The Maximum Development Scenario would result in generation of additional solid waste in Solano County. Generation of 42,117 new residents is projected, which, based on EPA's estimated individual solid-waste generation rate of 4.6 pounds per day per person, would result in the generation of 35,357 tons of garbage per year.

The Hay Road Landfill currently accepts approximately 2,400 tons per day, and the Potrero Hills Landfill accepts approximately 1,500 tons per day (Solano County 2003). The Hay Road Landfill has existing capacity and is expected to remain in operation for approximately 64 years, while the Potrero Hills Landfill has existing capacity and is projected to remain in operation until approximately 2058. The current and planned capacity of the Potrero Hills Landfill and the Hay Road Landfill would be sufficient to serve the population growth projected to occur under the 2008 Draft General Plan with the Maximum Development Scenario, which could add 96 tons per day at full buildout.

Implementation of policies in the 2008 Draft General Plan would ensure that the County complies with applicable regulations related to the disposal and reduction of solid waste, and in general reduces the amount of solid waste it disposes of. Therefore, with implementation of the proposed policies in the 2008 Draft General Plan, as well as compliance with the California Integrated Waste Management Act, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-6a **Demand for Public Education Services – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in increased demand for public education services. Implementation of policies in the 2008 Draft General Plan would substantially reduce construction-related impacts of development of new facilities. This impact would be less than significant.*

Implementation of the 2008 Draft General Plan could result in an estimated population of 38,702 by 2030 if buildout of all land designated as residential were to occur at average historic densities under the Preferred Plan. Although student enrollment has shown an average decline over the last 5 years, based on the growth that could be accommodated in the 2008 Draft General Plan, it can be assumed that new school facilities would need to be constructed. The actual location of new and expanded facilities would depend on where growth occurs relative to city limits and planning areas; schools would probably be located in residential areas, near the student populations they serve.

New development projects would be assessed impact fees in accordance with SB 50 (1998) to finance capital improvements for public school facilities. Payment of these fees would help to ensure that adequate facilities are provided concurrently with growth. Note that potential environmental impacts that may occur as a result of new or expanded public school facilities would be analyzed as part of a separate environmental review process.

Relevant Policies of the 2008 Draft General Plan

The 2008 Draft General Plan includes policies to provide sufficient educational facilities to meet the demands of existing and new development. The following policies from the Public Services and Facilities chapter address potential impacts on schools:

- ▶ **Policy PF.P-41:** Coordinate with local school districts and the community college district to plan for and set aside adequate sites for future facilities.
- ▶ **Policy PF.P-42:** Locate educational facilities appropriately to make efficient use of existing and planned facilities, including park and recreational facilities.
- ▶ **Policy PF.P-43:** Coordinate with the local school districts in developing and implementing school facility mitigation plans to ensure the necessary financing for the provision of new school facilities.
- ▶ **Policy PF.P-44:** Coordinate with the local school districts and other public and private education providers to ensure that quality education is available for Solano residents of all ages.

Conclusion

Although buildout of the 2008 Draft General Plan would increase enrollment within the school districts that are near or over capacity, policies identified in the plan are intended to address impacts related to the projected population growth for Solano County. Potentially significant impacts that may result from increased enrollment in schools are addressed by these goals and policies, and the required payment of impact fees. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-6b Demand for Public Education Services – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in increased demand for public education services. Implementation of policies in the 2008 Draft General Plan would substantially reduce construction-related impacts of development of new facilities. This impact would be less than significant.*

This impact is similar to Impact 4.9-6a described above; however, the increased density of buildout for the Maximum Development Scenario would create more demand for public education services than the Preferred Plan. Although buildout of the Maximum Development Scenario would increase enrollment within the school districts that are near or over capacity, goals and policies identified in the 2008 Draft General Plan are intended to address impacts related to the projected population growth for Solano County. Potentially significant impacts that may result from increased enrollment in schools are addressed by these goals and policies, and the required payment of impact fees. Therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-7a Demand for Additional Fire Protection and Emergency Services Facilities – Preferred Plan. *Development and operation of fire protection and emergency services are addressed by a goal and various policies in the 2008 Draft General Plan. Adherence to the goal and policies would reduce impacts related to projected population growth for Solano County under the Preferred Plan. This impact would be less than significant.*

Implementation of the 2008 Draft General Plan under the Preferred Plan would allow for additional residents, businesses, and other development, which would increase the need for fire protection and emergency services.

The 2008 Draft General Plan is intended to achieve steady and orderly growth that allows for the adequate provision of services and community facilities. To support this goal as it relates to fire protection and emergency services, the plan outlines policies to ensure the provision of adequate services in Solano County. The following goal and policies from the Public Services and Facilities chapter address potential impacts on fire protection and emergency services:

- ▶ **Goal PF.G-3:** Provide effective and responsive fire and police protection, and emergency response service.
- ▶ **Policy PF.P-1:** Provide public facilities and services essential for health, safety, and welfare in locations to serve local needs.
- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-36:** Ensure accessible and cost-effective fire and emergency medical service throughout the county. Facilitate coordination among city and county fire agencies and districts to improve response times, increase services levels, provide additional training, and obtain essential equipment.
- ▶ **Policy PF.P-38:** Identify and require incorporation of fire protection and emergency response measures in the review and approval of new projects.

Implementation of the goal and policies included in the 2008 Draft General Plan would address impacts related to population growth for Solano County under buildout of the plan. Therefore, this impact would be less than significant.

IMPACT 4.9-7b Demand for Additional Fire Protection and Emergency Services Facilities – Maximum Development Scenario. *Development and operation of fire protection are addressed by a goal and various policies in the 2008 Draft General Plan. Adherence to the goal and policies would reduce impacts related to projected population growth for Solano County under the Preferred Plan. This impact would be less than significant.*

This impact is similar to Impact 4.9-7a described above; however, the increased density of buildout under the Maximum Development Scenario would create more demand for law enforcement services than the Preferred Plan. Implementation of the goal and policies included in the 2008 Draft General Plan would address impacts related to population growth for Solano County under buildout of the plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-8a Demand for Additional Law Enforcement Facilities – Preferred Plan. *Implementation of the 2008 Draft General Plan under the Preferred Plan would increase the demand for a new or expanded Sheriff's Office substation and detention facilities. Policies from the 2008 Draft General Plan would apply to potential impacts associated with the construction and operation of law enforcement facilities. This impact would be less than significant.*

Implementation of the 2008 Draft General Plan would allow for additional residents, businesses, and other development, which would increase the need for law enforcement services provided by the County Sheriff's Office.

The 2008 Draft General Plan is intended to achieve steady and orderly growth that allows for the adequate provision of services and community facilities. To support this goal as it relates to law enforcement, the 2008 Draft General Plan outlines policies to ensure the provision of adequate police services needed to provide a safe environment in Solano County. The following goal and policies from the Public Services and Facilities Element address potential impacts on law enforcement service:

- ▶ **Goal PF.G-3:** Provide effective and responsive fire and police protection, and emergency response service.
- ▶ **Policy PF.P-1:** Provide public facilities and services essential for health, safety, and welfare in locations to serve local needs.
- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-39:** Provide an effective and responsive level of police protection (including facilities, personnel, and equipment) through the Solano County Office of the Sheriff and in coordination with city police departments.
- ▶ **Policy PF.P-40:** In the review and approval of County and City projects, identify and consider the law enforcement needs generated by the project.

Because this 2008 Draft General Plan goal and these policies are intended to address impacts related to the projected population growth for Solano County anticipated for general plan buildout under the Preferred Plan, potentially significant impacts that may result from increased demand for law enforcement services and facilities are mitigated by implementation of these goals and policies. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-8b Demand for Additional Law Enforcement Facilities – Maximum Development Scenario. *Implementation of the 2008 Draft General Plan under the Maximum Development Scenario would increase the demand for a new or expanded Sheriff's Office substation and detention facilities. Policies from the 2008 Draft General Plan would apply to potential impacts associated with the construction and operation of law enforcement facilities. This impact would be less than significant.*

This impact is similar to Impact 4.9-8a described above; however, the increased density of buildout for the Maximum Development Scenario would create more demand for law enforcement services than the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.9-9a Increased Demand for Library Facilities – Preferred Plan. *Solano County's library facilities are not currently meeting any of the existing service standards. Implementation of the 2008 Draft General Plan would result in the demand for new or expanded County Library facilities to maintain acceptable service levels. Current policies and plans included in the 2008 Draft General Plan under the Preferred Plan would address the provision of library services. However, because the County already does not meet any of the existing service standards, this impact would be significant.*

The County's library facilities have been unable to keep pace with the growing size of Solano County's population. Expansion of existing branches as well as construction of new facilities would be required to maintain an acceptable level of service. The construction of these facilities could result in significant environmental impacts. Such impacts could include dust, noise, erosion and sedimentation from construction and grading activities. However, the specific environmental impacts of constructing new facilities are addressed by various plans, policies, and mitigation measures identified in other sections of this EIR.

The 2008 Draft General Plan provides the following policies that would assist in providing library services to the growing population in Solano County:

- ▶ **Policy PF.P-2:** Require new development and redevelopment to pay its fair share of infrastructure and public service costs.
- ▶ **Policy PF.P-4:** Ensure that adequate land is set aside within the unincorporated county for public facilities to support future needs.
- ▶ **Policy PF.P-8:** Notify the appropriate agencies (e.g., school districts, public safety, water) of new development applications within their service area early in the review process to allow sufficient time to assess impacts on facilities.

These and other policies and programs of the proposed 2008 Draft General Plan would help to offset the need for additional library services by requiring new development to pay fair-share fees and for the County to review and assess potential impacts of new development on existing services. However, because the County already does not meet any of the existing service standards, this impact would be significant.

Mitigation Measure

No mitigation is available beyond the updated 2008 Draft General Plan policies discussed in the impact analysis above. This impact would remain **significant and unavoidable**.

IMPACT 4.9-9b **Increased Demand for Library Facilities – Maximum Development Scenario.** *Solano County's library facilities are not currently meeting any of the existing service standards. Implementation of the 2008 Draft General Plan would result in the demand for new or expanded County Library facilities to maintain acceptable service levels. Current policies and plans included in the 2008 Draft General Plan under the Maximum Development Scenario would address the provision of library services. However, because the County already does not meet any of the existing service standards, this impact would be **significant**.*

This impact is similar to Impact 4.9-9a described above; however, the increased density of buildout for the Maximum Development Scenario would create a greater need for additional library facilities than the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure

No mitigation is available beyond the 2008 Draft General Plan policies discussed under Impact 4.9-9a above. This impact would remain **significant and unavoidable**.

4.9.4 RESIDUAL SIGNIFICANT IMPACTS

As described in Impacts 4.9-1a and 4.9-1b, land use and development consistent with the 2008 Draft General Plan would result in increased demand for water supply, and new methods to obtain water and additional sources of supply would be required. Mitigation Measures 4.9-1a and 4.9-1b would require future developments to obtain approval from the County that sufficient water services would be available. Although the mitigation measures

would help reduce such impacts to an extent, the mitigation would not reduce Impacts 4.9-1a and 4.9-1b to a less-than-significant level.

Impacts 4.9-3a and 4.9-3b would result in increased demand for wastewater treatment, which would require expansion of existing services. The 2008 Draft General Plan contains policies and programs to ensure that sufficient water supply and wastewater services are provided; however, the plan would not reduce these impacts to a less-than-significant level.

Further, no mitigation is available beyond the updated 2008 Draft General Plan policies discussed in the impact analysis above for Impacts 4.9-2a, 4.9-4a, and 4.9-9a for the Preferred Plan and Impacts 4.9-2b, 4.9-4b, and 4.9-9b for the Maximum Development Scenario.

Therefore, Impacts 4.9-1a, 4.9-2a, 4.9-3a, 4.9-4a, and 4.9-9a for the Preferred Plan and Impacts 4.9-1b, 4.9-2b, 4.9-3b, 4.9-4b, and 4.9-9b for the Maximum Development Scenario would remain **significant and unavoidable**.

4.10 CULTURAL AND PALEONTOLOGICAL RESOURCES

This section presents baseline conditions for cultural and paleontological resources in unincorporated Solano County. The baseline conditions were identified through background research and consultation with interested parties; no field studies were undertaken. For the purposes of the 2008 Draft General Plan EIR, the information presented in this section comprises the project's "environment," or physical conditions that exist in the area that will be affected by a proposed project (Public Resources Code [PRC] Section 21060.5). The project's environment constitutes the baseline physical conditions by which a lead agency determines whether an impact is significant (Bass, Herson, and Bogdan 1999).

4.10.1 EXISTING CONDITIONS

CULTURAL RESOURCES

This subsection presents the existing conditions for cultural resources in the project area. Existing conditions include the project area's regulatory context and cultural baseline conditions (i.e., the nature and distribution of known cultural resources, and the project area's prehistoric, ethnographic, and historical background). The existing conditions are the basis for assessing the likelihood and severity of potential impacts on cultural resources in the project area. Cultural resources, for the purposes of this document, are sites, buildings, structures, objects, and districts that may have traditional, cultural, or historical significance. CEQA requires that effects on cultural resources by discretionary projects be considered in the planning process.

This subsection presents the result of the background research conducted for this baseline conditions document. The prehistory and ethnographic background of Solano County are described first, followed by an overview of development during the historic period.

Prehistoric Overview

Portions of the Prehistoric Overview section were adapted from *Archaeological Survey for the Lower Lagoon Valley Project, Vacaville, Solano County, California* (Wohlgemuth, Rosenthal, and Maniery 2003).

The study area lies at the southern end of the North Coast Range, between two of the most archaeologically studied regions in central California: the San Francisco Bay Area and the Sacramento–San Joaquin Delta (Delta). Many of the earliest and most influential studies in central California archaeology occurred in these neighboring regions.

The following discussion focuses on the archaeology of the area and provides a brief summary of the area's cultural history. Time periods discussed have been modified from those of Fredrickson (1974) to reflect recent findings by Meyer and Rosenthal (1997).

More prehistoric archaeological sites have been excavated within the Green Valley than any other portion of Solano County (Phebus 1990; Wiberg 1992, 1993, 1996). Few other Solano County areas have been extensively archaeologically excavated.

Lower Archaic Period

The Lower Archaic Period dates to 10,000–6,000 Years Before Present (BP). The oldest known archaeological component in this region of central California is from the Los Vaqueros Reservoir area in eastern Contra Costa County. Two archaeological sites at the reservoir (CA-CCO-637 and -696) have recently produced artifacts and human burials dating between 9,870 and 6,600 years ago (Meyer and Rosenthal 1997, 1998). These Lower Archaic cultural deposits were buried at depths between 2 and 4 meters below the surface in alluvial fan/floodplain sediments along Kellogg Creek.

The combined Lower Archaic assemblage at Los Vaqueros Reservoir included handstones and millingslabs, cobble-core tools, and a wide-stemmed obsidian projectile point. At least three human burials dating to this time period were discovered, one of which was buried under a stone cairn. Small but diverse floral and faunal assemblages indicate that a variety of animal and plant species were utilized. Acorns (*Quercus* sp.), wild cucumber (*Marah* sp.), and manzanita berries (*Arctostaphylos* sp.) were the dominant plant resources. Obsidian from both the North Coast Range and eastern Sierra Nevada was utilized. Overall, the Lower Archaic assemblage from Contra Costa County appears to have affinities with assemblages assigned to the Borax Lake Pattern in the North Coast Range and “Millingstone Horizon” assemblages in coastal central and southern California.

Initial Middle Archaic Period

The Initial Middle Archaic Period dates to 6,000–4,500 BP. With the exception of isolated human burials (Henn, Jackson, and Schlocker 1972), extensive early Middle Archaic deposits were not known in the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) region until the Los Vaqueros Reservoir project in 1996 (Meyer and Rosenthal 1997, 1998). Prehistoric archaeological site CA-CCO-637, located in a small valley, included deeply buried components in an alluvial fan adjacent to Kellogg Creek. This site deposit was found in a buried soil and included a diverse assortment of habitation debris, residential and processing features, and several human burials.

Several characteristics of this important deposit at CA-CCO-637, including exclusive use of the mortar and pestle, suggest that this assemblage may be affiliated with the Berkeley Pattern, previously placed no further back in time than the Terminal Middle Archaic or Early Period (Fredrickson 1974). Among the distinctive artifacts associated with this component is one of the oldest dated shell bead lots in Central California (4,160 BP), and a unique type of pestle apparently used with a wooden mortar (Meyer and Rosenthal 1997).

Terminal Middle Archaic Period

The Terminal Middle Archaic Period dates to 4,500–2,500 BP. Several buried sites in Contra Costa and Solano Counties date to this period, including CA-CCO-637 and CA-CCO-696 at Los Vaqueros Reservoir (Meyer and Rosenthal 1997, 1998); CA-CCO-308 in the San Ramon Valley (Fredrickson 1966); and CA-SOL-315 (Wiberg 1992) and CA-SOL-391 (Wohlgemuth and Rosenthal 1999) in Green Valley. A surface site dated to this period sits on a hillside overlooking the southern side of San Pablo Bay (CA-CCO-474/H). Initial use of shell mound sites along San Francisco Bay also appears to have begun during the Terminal Middle Archaic (Banks and Orlins 1985, Broughton 1997, Lightfoot 1997). The Terminal Middle Archaic is equivalent to the Early Period in Dating Scheme B of Bennyhoff and Hughes (1987), the earliest time period covered by that scheme.

All of the Terminal Middle Archaic sites in Solano County have produced human remains, and most contain intact burials. A variety of artifacts are associated with this time period, including side-notched and stemmed projectile points, rectangular abalone ornaments, shaped and unshaped mortars and pestles, and rectangular Olivella shell beads (Fredrickson 1966, Meyer and Rosenthal 1997). The vibrant Windmill Culture is well established in the lower Sacramento Valley during this period, but no evidence of its distinctive mortuary pattern has been discovered in Solano County.

Obsidian from the North Coast Range and eastern Sierra was utilized (Jackson 1974, Meyer and Rosenthal 1997, Waechter 1992, Wiberg 1996). In the study area, however, obsidian from a source in northern Napa Valley was used almost exclusively to make the majority of tools, and this source of toolstone comprises the bulk of the manufacturing residue that has been found in Solano County sites including CA-SOL-315, CA-SOL-355/H, and CA-SOL-356 (Wiberg 1996). Nut and berry crops (i.e., acorn, manzanita, and pine nut) appear to be the primary plant resources targeted during this time period. Marine shellfish species were an important subsistence resource (Banks and Orlins 1985, Waechter 1992), as were marine fishes and mammals (Broughton 1997, Simons 1992). Interior sites include a similar assortment of faunal resources, although freshwater fish, shellfish species, and terrestrial mammals were used exclusively.

Upper Archaic Period

The Upper Archaic Period dates to 2,500–1,300 BP. Upper Archaic deposits have been identified throughout the lowland valleys of the Coast Ranges and along the shores of San Francisco and Suisun Bays. These sites are typically located near freshwater drainages, often in buried contexts (Banks and Orlins 1979, 1981, 1985; Cook and Elsasser 1956; Fredrickson 1966, 1968; Hammel 1956; Heizer 1950; Holman and Clark 1982; Lightfoot 1997; Meyer and Rosenthal 1997; Waechter et al. 1995).

Upper Archaic sites are typically composed of well-developed midden deposits containing many human burials and residential features, reflecting long-term residential villages. The earliest Upper Archaic sites contain classic Berkeley Pattern assemblages, characterized by a well-developed bone tool and ornament industry, numerous saucer and saddle-shaped Olivella shell beads, abalone ornaments and pendants, and unshaped and well-shaped mortars and pestles. Projectile points are typically shouldered lanceolate forms, although side-notched and stemmed points also occur, along with large lanceolate-shaped bifaces. Burials are typically placed in a flexed position with strict orientation patterns identified at different sites (Fredrickson 1973).

Subsistence remains indicate that acorns and other large nuts and seeds were an important part of the diet during the Upper Archaic, with a growing emphasis on small-seeded resources (Meyer and Rosenthal 1997, Wohlgemuth 1998). Faunal assemblages continue to reflect either marine or terrestrial species, depending mostly on the location of the site (Broughton 1997; Fredrickson 1966, 1968; Meyer and Rosenthal 1997; Wiberg 1992), with marine shellfish first occurring in appreciable amounts in interior valley sites (Fredrickson 1966, 1968).

Emergent Period

The Emergent Period dates to 1,200–200 BP. The distinctive cultural pattern of the Emergent Period, the Augustine Pattern, is marked by the appearance, for the first time, of small arrow-sized projectile points, beautifully trimmed show mortars, flanged pestles, flanged steatite pipes, and chevron-designed bird-bone tubes. As the Emergent Period began, the Meganos culture, which originated in the San Joaquin Valley circa 500 B.C. to A.D. 100, appears to have retreated to the southern Delta region (Bennyhoff 1994).

Emergent Period deposits have been documented from most interior valleys and bayshore locations, as well as from upland contexts where habitation and task-specific sites have been reported (Atchley 1994; Baker 1987; Banks and Orlins 1979; Bramlette 1989; Fredrickson 1966, 1968; Holson et al. 1993; Lillard, Heizer, and Fenenga 1939; Meyer and Rosenthal 1997; Wills 1994). Buried sites dating to the Emergent Period have been found in some of the interior valleys (Fredrickson 1966, Meyer and Rosenthal 1997, Wiberg 1996), although most of the recorded sites have surface manifestations. Typically, these sites consist of well-developed midden deposits containing both cremated and intact human burials, and residential features, including house floors.

It was also during the Emergent Period that bedrock mortar milling stations were first established in the Bay Area, beginning around 1,300 years ago (Meyer and Rosenthal 1997). Portable mortars and pestles continued to be used, although smaller ones were preferred. Changes in the size of these tools may have been in response to the dramatic increase in the use of small-seeded plant resources (Meyer and Rosenthal 1997). Olivella and clam shell disc beads are frequently found with Emergent Period burials and in midden deposits. Bead manufacturing debris has been found, suggesting that at least some of these beads were made locally (Meyer and Rosenthal 1997, Wiberg 1996). Obsidian from the Napa Valley was used almost exclusively, arriving in the form of small, un-modified pebbles or large flake blanks, later made into serrated arrow points (Meyer and Rosenthal 1997, Wiberg 1996).

At this time, large mammals appear to have taken a more prominent role in the diet than small-seeded resources. Marine shellfish and marine fishes were moved inland in much larger quantities during the Emergent Period (Baker 1987, Fredrickson 1968, Meyer and Rosenthal 1997). Large villages of hundreds of people are thought to have been located in the Delta region, while small hamlets composed of one or two extended families were located in many of the smaller valleys.

Ethnographic Overview

Several ethnohistorical and ethnographic accounts describe the Patwin and the Miwok who were the native inhabitants of what is now Solano County (Kroeber 1925, 1932; Maloney 1943, 1944; McKern 1922, 1923; Powers 1976 [1877]). When Europeans first entered central California, the area west of the Sacramento River and north of Suisun Bay was occupied by a series of linguistically and culturally related tribelets. These groups appeared to have no political unity or collective identity, but did speak dialects of the same historically related language. This linguistic similarity led Powers (1877) to call the groups “Patwin,” a term each group used in reference to themselves. The Patwin, along with their neighbors the Nomlaki and Wintu, are Wintuan speakers. The Wintuan language is part of the larger Penutian language family, which also includes Miwok, Maidu, Costanoan, and Yokuts.

The Patwin appear to have been the linguist and cultural group in Solano County at first contact with Europeans. However, there are discrepancies as to who inhabited the eastern portion of Solano County along the Sacramento River and within the tidal plain, including the Montezuma Hills. Johnson (1978) indicates the area in question was an unclaimed region utilized by several groups and territorial boundaries have been disputed. However, she also states that both banks of the Sacramento River were Patwin territory (1978). Kroeber (1932), Levy (1978), and Bennyhoff (1977) map the Plains Miwok residing east of the Patwin and adjacent to the Sacramento River. Bennyhoff (1977) also maps the Patwin residing throughout Solano County.

Plains Miwok territory covered both banks of the Cosumnes and Mokelumne rivers, and included both banks of the Sacramento River from approximately Rio Vista to Sacramento (Levy 1978). The foothills of the Sierra formed the eastern boundary of Plains Miwok territory (Bennyhoff 1977). Linguistically, the Plains Miwok were part of the Eastern group of the two subdivisions of Miwokan speakers (Levy 1978).

Because the discrepancy has not been resolved as to the boundary between Patwin and Miwok, the overview focuses only on the Patwin.

Political and Social Organization

The Patwin were organized into tribelets consisting of a primary village and several smaller associated villages. Each village was under the direction of a chief who attained his office through paternal descent. When the chief had no son, or the son was determined incompetent, a new chief was chosen by the village elders. The village chief was mainly responsible for organizing economic and ceremonial activities.

The chief was responsible for organizing and directing communal activities (such as hunts and other tasks), and allocating nut, fruit, and seed gathering areas. Ceremonial activities were under the direction of the chief who, in consultation with the village elders, decided on “what ceremony should be held, what days should open and close the procedure, and what guests should be invited” (McKern 1922).

McKern (1922) divided Patwin social organization into three groupings based on familial ties. These groupings include the paternal family, the family social group, and the household. The paternal family was the most inclusive unit, and included the patriarch, his brothers and sisters, his sons and daughters, and so on. The family social unit consisted of all members of the paternal family, except the headman’s married sisters (whose husbands had established their own households) and married men who resided with their wives’ families. The latter exception lasted until the married male acquired enough wealth to establish his own household, at which time he was once again under the direction of the paternal headman. The household was composed of that portion of a family living under one roof, and was often composed of a man, his wife, his unmarried offspring, and his married daughters and their husbands and children (McKern 1922).

Certain families within Patwin society were said to possess special knowledge, charms, and rituals, which allowed them to excel at ceremonial, occupational, shamanistic, or official pursuits (Johnson 1978, McKern 1922). While the methods of these pursuits were no different than those used by nonspecialist families, the special knowledge,

rituals, and charms of the “functional family” were said to be an advantage. Such pursuits are described by McKern (1922), and include fishing, arrow making, goose and duck hunting, salt harvest, basket making, ceremonial activities, and shamanistic duties, among others. Membership in a functional family provided an individual with acknowledged status. Those families who had no functional specialty were said to have lower social prestige (McKern 1922).

Villages and Structures

Numerous ethnographic village locations were reported for the Patwin (Johnson 1978). In the Sacramento Valley, villages were located along the Sacramento River and all major drainages that drain the eastern and southern slopes of the Coast Ranges, including Putah, Ulatis, and Suisun Creeks. As described by Kroeber (1925):

The valley people evidently had their permanent villages on the river itself—that is, in the marsh belt—but appear to have left this during the dry half of the year to live on the adjacent plains, mostly by the side of drainages.

The permanent village was usually organized such that the chief’s house was at the center, and the dance house rested either at the northern or southern margins of the community. The sweat house, or sudatory, was either to the west or east of the dance house, with its door facing the dance house. The menstrual hut lay as far away from the ceremonial dance house as possible, usually at the opposite end of the village. Family dwellings were not arranged in any particular grouping, and any vacant spot within the village was considered suitable for house construction (McKern 1923).

Permanent houses, typically of the semi-subterranean type, usually sheltered more than one household, each occupying different sides of the dwelling. Characteristically, Patwin houses were greater than 20 feet in diameter, and had only one door which faced either east or west. A fire pit was located at the center of the house between the two main support beams under a smoke hole in the earthen roof. Temporary shelters were often seasonally occupied when families were away from the permanent winter village. These temporary shelters, primarily used for protection against the summer sun and infrequent rains, consisted of a brush-covered shed, four corner posts, and a flat roof (McKern 1923).

Subsistence

A variety of animals were taken by the Patwin, including deer, pronghorn, elk, rabbit, and various species of fish and birds. Deer, ducks (*Aythya* spp.), geese (*Anserini*), quail, and mud hen were caught in various nets. Fish species including chub (*Scomber japonicus*), salmon (*Oncorhynchus* sp.), sturgeon (*Acipenser* sp.), hardhead (*Mylopharodon conocephalus*), and trout (*Salmo* sp.). Steelhead (*Oncorhynchus mykiss*) were also taken with nets. Decoys were used to hunt ducks and deer; deer head decoys were worn by hunters to approach or attract their prey. Other animals, including most raptors and carnivores, were hunted for their feathers or pelts, which were used for ceremonial or utilitarian purposes.

Salt was extracted from salt grass by burning the grass and collecting the residue, which appeared as a blackish “cake.” Tobacco was collected from along river banks and smoked in a long wooden pipe. The Sacramento Valley plain yielded numerous plant species collected for their seed, including, among others, sunflower (*Helianthus* sp.), clover (*Trifolium* sp.), red maids (*Calandrinia ciliata*), and a yellow flower (Johnson 1978). Acorns, a Patwin staple harvested from the Valley oak, were pulverized, leached in sand basins, and baked into bread in a leaf-lined pit. Freshwater mussels (*Anodonata californiensis*) were collected from along the banks of major drainages, as were blackberries (*Rubus ursinus*), wild grapes (*Vitis californica*), and, during the proper season, tule roots. Brodiaea bulbs were also collected seasonally and either baked or boiled.

Seasonal vernal pools, a common feature in the southern half of Solano County, were likely part of an early spring subsistence strategy when other food sources were scarce (Roop 1981). Lithic debitage, manos, millingstones,

pestels used with wooden mortars, hammerstones, and mortars that have been identified at prehistoric sites near vernal pools, suggest Patwin resource exploitation (Roop 1981, Moratto 1984).

Ethnohistory

In the late 18th and early 19th centuries, Spanish missionaries, and European and American trappers and explorers, entered Northern California. Spanish emissaries from Missions San Francisco de Asis, San Francisco Solano, and San Jose actively proselytized the Patwin people. The earliest historic records, beginning around 1800, consist of Spanish mission registers of baptisms, marriages, and deaths of Indian neophytes. During the 1830s and 1840s, the Patwin territory was taken over by Mexicans and Americans. By the 1860s, the few Patwin who had survived almost 100 years of epidemics and conflict with the Spanish, Mexican, and Euro-Americans were either working as laborers for ranches, or were placed on small reservations established by the United States government (Johnson 1978).

Mission records provided tribelet names and locations. The Malacas lived east of today's Fairfield, on the plains of the north side of Suisun Bay. They had close ties with the Suisuns, who also resided in the vicinity of Fairfield. The Malacas moved to Mission Dolores from 1810 until 1816, at the same time as the Suisuns, and the Malacas may have been assumed to be Suisuns (Milliken 1995). The Tolenas, who lived in Green Valley north of the Suisun Plain, moved to Mission Dolores from 1815 until 1820. Nineteen Tolenas also moved to Mission San Jose (Milliken 1995). The Ululato, who lived in the vicinity of today's Vacaville, moved to Mission Dolores from 1815 until 1822, then to Mission San Francisco Solano from 1824 to 1833 (Milliken 1995).

Johnson (1978) suggests that as many as 75% of the Patwin population died during the devastating malaria epidemic of 1833 and smallpox epidemic of 1837. By the 1850s and 60s, the few remaining Patwin either found work on ranches or were relocated by the United States government to small rancherias near Cortina and Colusa (Johnson 1978, Keegan 1989). Despite the massive population declines due to diseases, and a 1972 census listing 11 Patwin, Patwin people still reside in Solano County and many intermarried with the Wintu (Johnson 1978).

Historic Period Overview

This subsection presents a general historical overview of Solano County, followed by a more detailed description of towns and settlements that have become recognizable communities today.

General Historical Overview

Members of the Pedro Fages expedition of 1772 were the first people of European descent to reach the Carquinez Strait. Four years later, the de Anza expedition also reached the strait while looking for a land route to Point Reyes. Although native people regularly crossed the strait in tule boats, these reed crafts were not suitable for transporting the Europeans' horses. Europeans did not cross the strait until 1810, when Gabriel Moraga led a raid against the Suisun tribe on the strait's north shore.

In 1817, another Spaniard, Jose Antonio Sanchez, was sent from the Presidio of San Francisco to combat the Suisun. According to some sources, Sanchez's group captured a small group of Suisun, including a young man named Sem-Yeto. Sem-Yeto, baptized Francisco Solano at the newly-founded Mission San Francisco Solano in 1824, became an influential figure in the North Bay county later named for him, due, in part, to his friendship with another young man, Mariano Guadalupe Vallejo (Keegan 1989).

In 1835, General Mariano Guadalupe Vallejo was ordered by the Mexican government to colonize the Fairfield/Suisun area to protect interior Spanish interests from the Russians at Fort Ross. The lower part of the Sacramento Valley and Delta areas were then settled rapidly as the Mexican government granted large tracts of land and access to the region's natural resources. Francisco Solano apparently allied himself and his group of Patwin with Vallejo to gain political advantage over rival native groups.

In 1837, in return for his service to Mexico, Chief Solano was granted Rancho Suisun, an area that encompassed Fairfield and part of Suisun Valley. Some Patwin remained in the area; Chief Solano's adobe and other Patwin houses are believed to have been located in the northern portion of Suisun Valley. In 1846, Chief Solano traveled north and spent the next four years in the Pacific Northwest, finally returning to Solano County in 1850, where he died. The location of his grave is uncertain (CSCCHC 1977).

Solano County contained five confirmed Mexican land grants (Beck and Haase 1974). The first of the land grants was Rancho Suisun (see above). Rancho Tolenas, adjacent to Rancho Suisun, included part of Fairfield and extended north into Napa County. The patent was issued in 1840 to Jose Francisco and Antonio Armijo (Hoover et al. 1990). Juan Felipe Peña and Juan Manuel Vaca were granted Rancho de los Putos in the 1840s. Rancho de los Putos comprised almost 18,000 acres, including Lagoon Valley, Vaca Valley, and Vacaville. Rancho Rio de Los Putos, adjacent to Puta Creek in the northwestern portion of the county, was granted to William Wolfskill in 1842. Also called the Wolfskill Grant, Rancho Rio de los Putos was developed by four Wolfskill brothers, who planted extensive orchards, including a stand of olive trees that still remains today. Rancho Los Ulpinos was granted to John Bidwell in 1844. Bidwell's rancho was adjacent to the Sacramento River. Also in 1844, General Mariano Vallejo established a settlement named Eureka in a portion of his unconfirmed Rancho Suscol; later, this settlement was renamed Vallejo in his honor. Benicia and Cordelia were also within Rancho Suscol. Rancho Sobrante, another unconfirmed rancho, included today's towns of Montezuma, Birds Landing, Collinsville, and Denverton (Marschner 2000).

The primary economy during the Rancho Period was the hide and tallow trade. Large herds of cattle were raised and slaughtered for their hides, which were traded for goods and services. Each hide was worth one dollar in trade and referred to as a "California dollar." The hides were shipped to New England and used in the shoe and boot industry. Tallow was derived from the fat and used to make candles and soap. There was little value to the meat and dead carcasses littered fields and ports.

In the late 1840s and 1850s, former gold seekers and pioneers began settling Solano County, where they raised livestock and cultivated fruit orchards, vineyards, wheat, barley, and oats. Produce and livestock were transported overland by wagons to the many sloughs throughout the county, and then shipped by water to waiting markets. Twelve townships were established in Solano County between 1850 and 1871. Although the largest towns were adjacent to San Pablo and Suisun Bays, the majority of towns were situated at the ends of sloughs or channels that primarily ran through the eastern portion of the county. In 1868, the completion of the California Pacific Railroad through Solano County allowed the shipment of goods to East Coast markets, significantly bolstering economic development, agricultural production, and population growth. In 1913, the Oakland, Antioch, and Eastern Railway, a high-speed electric interurban railway, opened its 93-mile route from San Francisco to Sacramento, through largely unpopulated parts of Solano County (Bay Area Electric Railroad Association 2006). In 1928, the Sacramento Northern Railway purchased the railway, but the Depression and the popularity of the automobile contributed to the end of passenger service in 1940; by 1987 the railway had been abandoned (Robertson 1998).

Currently, Solano County's most prevalent economic activities continue to be agriculture and livestock. A wide variety of vegetables, fruit, and nuts are grown, with walnuts being the most recent crop that has gained favor. The county is in the top five California producers of corn, lamb, sheep, and Sudan grass hay. In 2000, Solano County celebrated its 150th anniversary (Solano County 2006). Although the county has increasingly become a bedroom community for Sacramento and the San Francisco Bay area, major companies such as Anheuser-Busch, BIOSOURCE Technologies, Chiron, Costco, Genentech, and Pacific Bell are located in Solano County. Travis Air Force Base is also an asset to the local economy.

Community-Specific Overview

A brief discussion of current and former towns, cities, and geographic areas within Solano County follows.

Batavia

Batavia was a California Pacific Railroad station between Elmira and Dixon (Gudde 1998). Today there are several houses on Batavia Road about a mile southwest of Dixon.

Benicia

Benicia was born from an agreement between Lieutenant Robert Stemple, a young Kentucky dentist, and Thomas Larkin, a prominent settler, to purchase a tract of land from General Mariano Vallejo. Completing the purchase in 1847, Stemple and Larkin established a settlement on the Carquinez Strait, naming it Benicia in honor of the general's wife. By the end of 1847, 15 buildings, a wharf, and a hotel had been built, and Benicia began a new era of civil government.

Benicia's advantageous location on the Carquinez Strait offered a convenient and profitable shipment point for supplies and miners heading to the Sierra Nevada gold fields. Benicia's strategic importance as an entrepot to the gold fields led the U.S. Army to build the three-story Benicia Arsenal for defense against foreign incursions and Indian attacks. In 1850, the Pacific Mail and Steamship Company established a facility in Benicia to accommodate the increasing freight and mail traffic between California and the eastern United States. Industrial activity buzzed in Benicia as wharves were built to handle the ever-increasing flow of maritime commerce. As commerce and industry flourished, residents were drawn to Benicia, and in 1850 houses numbered over 100.

Benicia's prominence is indicated by two governmental distinctions conferred upon it during California's early statehood. Benicia was the first city incorporated in California, and briefly served as the state capital in 1853 and 1854. When Sacramento was selected as the permanent capital, Benicia lost a measure of political influence, but retained a host of prominent citizens active in financial, social, and religious circles. Several religious schools were established in Benicia, and it became known as a refined, relatively quiet community, contrasting starkly with California's rough-and-ready mining and ranching communities.

In the 1860s and 1870s, easy water access and the railroad were two important precursors to industrial development in Benicia. In 1879, Southern Pacific extended rail lines to Benicia's waterfront and began operation of the first railcar ferry west of the Mississippi River. The ferry operated from 1879 to 1930, and was a funnel point for freight from the east destined for San Francisco, as well as a means to ship finished products from Benicia to market.

As Benicia's industries and waterfront grew, so did its economic base. The Hume Carquinez Packing Company began canning salmon in 1865, and continued in this capacity until a ban on inland commercial salmon fishing waters limited supply in 1955. The tanning industry was even more visible and, due to Benicia's central location, more lucrative. In the late 19th and early 20th centuries, a huge demand for tanned hides encouraged the growth of a tanning industry geared to mass production, and Benicia became the principal hide tanning center on the Pacific Coast. The tanning industry ceased in Benicia by 1930. Today, Benicia is primarily residential, and was designated one of the Best Places to Live by *Money* magazine in 2005 (City of Benicia 2006).

Bird's Landing

In 1876, Bird's Landing was established and named for John Bird, who had purchased 900 acres between Collinsville and Denverton to set up a trade and shipping center. Bird arrived in 1865 and named the shipping center Montezuma Crossing. By 1876, Bird had constructed a blacksmith shop, and the new post office was in Moses Dinkenspiel and Jacob Frank's new general store. Local ranchers sold their products and purchased other products at the general store. Willow Spring, the town's first school, was also built in 1876. Bird purchased a half interest in the general store in 1882, and owned the property until he passed away in 1921. Bird's Landing continued to grow and prosper until the early 1930s when a fire destroyed much of the town. Bird's store is listed on the National Register of Historic Places (NRHP) and was sold after his death. In addition to his store, a saloon remains, although the town is currently a small village (Bowen 2000a).

Cement

Cement was a Pacific Portland Cement Company town and factory built on Cement Hill in 1902. The town, just northeast of Fairfield, was connected by a short rail-line to the California Pacific Railroad. Sanborn Insurance maps prepared from 1912 and 1925 depict extensive industrial and residential facilities to extract raw materials for cement production, as well as to house and care for the large workforce necessary for the company town's success. Tufa deposits (i.e., clays used to make cement) were exhausted in 1927, and the town of Cement was abandoned. Today, the former town and its structures are part of a working ranch (Keegan 1989, CSCCHC 1977).

Collinsville

Collinsville was built as a fishing village on pilings above the tide line near the mouth of Montezuma Slough. The town was named after C.J. Collins, who settled in the town in 1859. In 1867, the name was changed to Newport, but was restored to Collinsville in 1872 (Gudde 1949).

In 1872, E. I. Upham purchased the town and developed a successful shipping point on the Sacramento River. Salmon fishing and packing dominated the local industry, and, by 1882, Collinsville had three canneries. However, debris produced by hydraulic mining upstream from Collinsville destroyed fish spawning habitat, and all the canneries closed by 1886 (Bowen 2005a).

Following the decline of the canning industry in Collinsville, the town moved upstream from its original location. Houses along Collinsville Road were abandoned, and are being slowly reclaimed by the marsh (CSCCHC 1977).

Cordelia

Cordelia was named after the wife of Captain Robert H. Waterman, the man who laid out the townsite of Fairfield. Originally several hundred yards south of its current location, the town that was to become Cordelia was moved when the final alignment of the California Pacific Railroad was determined. At the time of the railroad's completion through Solano County in 1868, the town was given the name Bridgeport, Captain Robert H. Waterman's home town in Connecticut. However, because there was already a litany of nascent California towns called Bridgeport, the town's name was changed to Cordelia, which it has remained ever since. Benicia is the only city in Solano County that is older than Cordelia.

Cordelia was originally an inland shipping port at the head of Cordelia Slough, where quarried stone was shipped to San Francisco for building construction and street paving. However, Suisun City's natural advantages as a port led it to overtake Cordelia as the area's primary shipping location.

Cordelia continues to be a small town that is better known as the junction of Interstates 80 and 680 (I-80 and I-680). The town contains the Thompson Bar, one of the oldest taverns in Solano County. Travis Air Force Base runways were built with basalt stone quarried from the former Thomasson Hill, currently known as Nelson Hill (Bowen 2001a).

Denverton

Denverton was originally named Nurse's Landing after a dentist, S. K. Nurse. Nurse built his home there in 1853, and a year later constructed a storehouse and wharf to support this burgeoning port only 10 miles east of Fairfield. In 1858, the town's name changed when U.S. Congressman J. W. Denver established a post office, and Nurse was charged with the responsibility of being Denverton's postmaster (Keegan 1989).

Shiloh Church was built between Denverton and Bird's Landing in 1870. Although the church was destroyed by fire in 1875, it was rebuilt the next year south of present day State Route (SR) 12. Shiloh Church, refurbished in 1955, was designated as a Solano County Point of Historical Interest in 1969.

By 1878, Denverton had a blacksmith shop, a meat market and a store, a wheelwright, a hotel, and a school. However, the town's economic demise was precipitated by construction of the California Pacific Railroad, which provided easy access to ship goods, and the construction of SR 12, which bypassed the town (Bowen 2000b). Cattle and sheep ranching, and wheat farming were Denverton's economic focus through the years. Today, the Western Railway Museum is located on SR 12 in Denverton.

Dixon

Prior to the completion of the California Pacific Railroad through Solano County in 1868, Dixon did not exist. A 10-acre plot of land was donated by Thomas Dickson for the new train station. In the spirit of thanking their benefactor, the town's inhabitants intended to name the new facility Dickson's Station. However, the name was misspelled, and the town became known as Dixon. After 1868, entire homes and even a Methodist Church were rolled on logs from Silveyville to Dixon.

Grain crops dominated agricultural production in Dixon until the early 20th century, when large-scale irrigation developed and farmers began growing alfalfa and raising cattle. By 1914, Dixon was known as the Dairy City. Today, Dixon continues to be called Dairy City, although few dairies remain. The few remaining dairies, however, produce as much milk today as during Dixon's peak dairy-producing years in the 1930s (Goerke-Shrode 2000).

Elmira

Stephen Hoyt laid out a 40-acre town, Vaca Station, prior to the 1868 completion of the California Pacific Railroad. The town was just east of Vacaville, hence the name. However, two train stops with similar names, Vaca and Vacaville, became problematic. Town members met and decided on Elmira, the New York birthplace of a local respected lawyer and teacher.

Elmira was the transport center for the Vaca and Pleasants Valleys' fruits and vegetables. One of the original townships of Solano County, the original downtown was approximately one mile south of its current location. The downtown moved north due to the location of the railroad

Due to fires, few late 1800 buildings exist in Elmira, though Elmira's Four Square Church, more than 100 years old, still exists. As recently as the 1970s, older buildings have been destroyed by fire. Elmira continues to be a small town as the new highways and roads have by-passed the area (Bowen 2001b).

Fairfield

In 1859, Captain Robert H. Waterman laid out the townsite of Fairfield, which he named after his hometown in Connecticut. Waterman, a clippership captain, decided to settle in Fairfield with his wife Cordelia (for whom the Cordelia area of Fairfield is named). In 1858 the county seat was moved from Benicia to Fairfield and in 1860 the first county buildings were built (Gudde 1998). By the 1870s, many of the cattle ranchos in Solano County had been replaced by fruit and nut orchards (Hoover et al. 1990). Thousands of acres in the county were also devoted to producing vegetables, grains, and seeds, as well as hay. At the turn of the century, Fairfield was formally incorporated as a city.

In 1942, the U.S. Air Force built a major installation on a tract of land to the east of Fairfield, and west of the current project area, giving a tremendous boost to the local economy. Travis Air Force Base became one of the major departure points for military units heading for combat in Vietnam. The base was annexed to Fairfield in 1966 (Hoover et al. 1990).

The opening of I-80 through Fairfield in the 1960s and the resulting increase in commercial traffic allowed Fairfield to become the agricultural and business hub of Solano County. Although Fairfield is a mixture of rural areas and suburban developments, and the city has attracted such businesses as Anheuser-Busch, AT&T, and Costco, much of Solano County retains its agricultural origins.

Green Valley

The first European settlers in Green Valley grew grapes for wine on the valley slopes and maintained the flats for field crops. Green Valley became well known for its grapes and many wineries prospered. The largest winery was established and owned by F.S. Jones, who settled in Green Valley in the 1860s. Jones had 90 acres of wine grapes and a wine cellar capable of holding 50,000 gallons of wine. Disaster struck in the 1870s when a root disease destroyed many plants and most grape growers never recovered. Fortunately, most growers had also grown cherry trees, and cherry orchards grew successfully for generations (Delaplane 1995a). Gold was found in the area in 1887 and mining continued into the early 20th century (Bowen 2002a). Basalt was also quarried.

Jepson Prairie

In the 1850s, Jepson Prairie provided grazing lands for European imported sheep and cattle. Agriculture was not an option due to the poor soil consistency. The area contains many vernal pools whose flora was first described by Willis Linn Jepson in 1892. The 1913 completion of the Sacramento Northern Railway between Sacramento and Oakland led to the development of Dozier Station, on the northern boundary of the prairie. A 1914 attempt at developing the prairie followed, but failed within several years. Though no homes were ever built many eucalyptus trees were planted. Today, little of the original 13 million acre prairie remains. However, the remaining portions are protected and have been recognized as a National Natural Landmark by the National Park Service.

Maine Prairie

Maine Prairie appeared on the 1877 Map of Solano County. The area was also known as Knight's Landing, after William Knight who operated a rope ferry at the only Sacramento River crossing in 1846. Maine Prairie, one of the original townships, was on the stage line that ran south from Dixon. The town was situated at the head of navigation on the Maine Prairie Slough, where wheat and wild oat hay were shipped from surrounding towns, and was one of the most important grain shipping points in California. The flood of 1862 destroyed the town. Some buildings were reconstructed after the flood, but rail service became the preferred shipping method, and the town disappeared (Keegan 1989, Hoover et al. 1990).

Montezuma

Spanish explorers began traveling in and through Montezuma and the Montezuma Hills in the 1800s. In 1811, Padre Adella and 68 men sailed from Suisun Bay through the sloughs and channels to the Sacramento River. Many Patwin villages were observed during their voyage through Montezuma Slough to Suisun Bay. No Patwin villages were sighted, however, in 1823 when Otto von Kotzebue sailed his frigate up the Sacramento River.

Lansford W. Hastings laid out Montezuma City as a Mormon settlement in 1847. His adobe remains and is listed on the NRHP. Hastings' Mormon settlement was never occupied by Mormons, and until 1852, his adobe was the only building in the vicinity.

Lindsey Powell Marshall and his two sons arrived in 1852, covered the Hastings adobe with a painted wooden shell, and resided there for the next 50 years. In 1854, several Norwegians moved into the Montezuma Hills where they raised long-horned cattle and merino sheep. The area became known as Little Norway.

Pleasants Valley

James and William Pleasants, father and son, settled the valley north of today's Vacaville in 1850. The land was outside the public domain and remained wild. The valley was occupied by grizzly bears, deer, and elk and James Pleasants became a professional hunter. The Wolfskill brothers, of Rio de los Puntos Rancho to the north, gave Pleasants grape cuttings and sheep to start a farm. Thus began the agricultural development of the valley. James Pleasants built his redwood home in 1880. After the family abandoned the house during the 1960s, it was vandalized and the family had the house burned down since it was not inhabitable. His son, William built his own

home and it is currently occupied by one of his descendants (Keegan 1989, Bowen 2006). The Pleasants house has recently been listed in the NRHP.

Rio Vista

Colonel N. H. Davis established the town site of Rio Vista as Brazos del Rio in 1855. As the only steamboat landing between Sacramento and Benicia, the town prospered. In 1858, the Rio Vista post office was established. The town was famous for its salmon.

Rio Vista was rebuilt further away from the river after the flood of January 1862 destroyed the town and its wharves. The town continued to be an important port for agricultural products (Keegan 1989).

Today, the city has an agricultural economy with commercial businesses adjacent to the Sacramento River and along SR 12.

Rockville

Jesus Molino, a Patwin, had an adobe house and cultivated lands near Rockville in the 1840s. The adobe is believed to have been removed during construction of the Stonedene Mansion (Bowen 2005b). The town prospered in the early 1850s following J. M. Perry's establishing a blacksmith shop near today's Solano Community College. Local farmers frequented the blacksmith shop and soon a general store, and a tavern, Manka's Corner, were established. The town, the former home of Chief Solano, continued to develop after the stage depot was established in the mid-1850s.

Silveyville

In 1852 Elijah Silvey founded Silveyville half way between Suisun City and Sacramento. Gold prospectors passed through the town that consisted of a saloon, a hotel, and a corral. The town prospered and soon added a blacksmith and a store. Various grains including oats, barley, wheat and alfalfa were grown on the lands surrounding Silveyville. Residents abandoned the town in 1868 and moved to Dixon for access to the California Pacific Railroad (Keegan 1989). The Village of Silveyville was designated as a Solano County Point of Historical Interest in 1976. The village location is listed as 200 yards east of Batavia Road.

Suisun City

Suisun was named for a Patwin village or tribelet. The name has appeared in Spanish records since 1807, although at times it is spelled Suysun. Suisun Valley was one of the major fruit producing areas in Solano County and Suisun Slough provided easy shipping access. Suisun City was established to take advantage of this location and became the trade center for central Solano County until the Great Depression. Today, redevelopment is reviving Suisun City's downtown.

Suisun Marsh

Suisun Marsh is the largest contiguous estuarine marsh in the United States. In 1859, San Francisco duck hunters began expeditions to the marsh. An 1879 hunting report stated that one person could shoot 100 to 200 ducks every day during the September through November hunting season. In 1879, California Pacific Railroad train tracks ran within the marsh connecting Benicia and Fairfield. Several whistle-stop stations, that required flagging down the train, were within the marsh including Teal, Cygnus, and Jacksnipe stations. The tracks sank a foot or more every year despite constant upkeep. There are currently more than 150 hunting clubs within the marsh that consist of a building on piers with a veranda (Goerke-Shrode 2001).

The Suisun Marble and Quarry Company, approximately four miles north of Suisun City, was established after the 1855 discovery of extremely high-grade marble in the vicinity. The marble was quarried and shipped

throughout the United States. Soda springs ran through and adjacent to the quarry, and when analyzed they were found to contain a high mineral content that could remedy multiple illnesses. The lands surrounding the quarry were purchased in 1858 by Thomas M. Swan, who developed a health resort and sold the spring waters. Tolenas Springs Soda was sold for 30 years, but by the early 20th century the resort closed and a 1924 fire destroyed the resort buildings (Goerke-Shrode 2004).

Suisun Valley

Jose Francisco Armijo visited the Suisun Valley area in 1835 and received a land grant from Mariano Vallejo in 1839. The 13,000-acre grant extended from Suisun Marsh to Manka's Corners. Following the final approval of the grant in 1840, Armijo and his family settled the land southeast of Manka's Corners the next year. Armijo planted fruit and raised cattle that was sold to the miners and settlers who arrived in the 1849 Gold Rush. Armijo and the other local ranchers became very prosperous.

Armijo died in 1851, at which time some of his lands were sold off. A tree near his adobe, beneath today's Rancho Solano golf course and homes, was rumored to contain Armijo's hidden stash of gold. The gold has never been found and the family cemetery was moved prior to the new Rancho Solano development (Bowen 2002b). The final remains of Armijo's adobe, approximately 5 miles northwest of Fairfield, collapsed in 1900.

Tremont

In 1855, Tremont was designated as one of the original townships within Solano County. The township was the northeast portion of the county, south of Putah Creek. Although 83 farmers were listed in the 1860 census, a town never developed in Tremont. A church, and a combination post office/store with an upstairs one-room school made up the "downtown." Davisville, today's Davis, and Sacramento, an overnight trip away from Tremont, were the closest business and merchandise centers. After the completion of the California Pacific Railroad in 1868, a depot-warehouse called Foster's Station, after George Foster who donated the land and built the structure, became a flag-stop. Grain and produce stored at the warehouse was freighted to other cities. The name of the flag-stop soon changed to Tremont for unknown reasons. Old records refer to the town as Tremont and Fremont. (Delaplane 1995b).

Today, the Tremont Church, built in 1871 by the Tremont Mite Society, occasionally opens for special events, funerals, or weddings. The Tremont Cemetery, adjacent to the church, is also extant.

Vacaville

The fruit industry around Vacaville began as early as the late 1850s, when Ansel W. Putnam and John Dolan, local nursery owners, along with William and Simpson Thomas, constructed a road from Pleasants Valley to Suisun City. This roadway, which later became known as Pleasants Valley Road, provided for the shipment of fragile fruit from the Vaca, Pleasant, and Laguna Valleys to major markets. This key transportation route spurred the purchase of land in the area for commercial fruit and vegetable farming. The construction of two major rail lines by 1870 broadened the market even further by allowing shipment of fruit and vegetables across the United States. By the 1890s, Vaca Valley and the foothills of the Vaca Mountains were covered with orchards encompassing almost all of the available nonirrigated land (Limbaugh and Payne 1978).

Local farmers found early on that fruit grown on the hillside ripened earlier than that on the valley floor. This allowed the region to market seasonal fruit much earlier and longer than other fruit districts in California. This factor, together with the influx of inexpensive labor from Chinese immigrants and an ample water supply, made the Vacaville fruit district successful from the start. Peaches, apricots, table grapes, and cherries became the most important and popular crops of the district (Limbaugh and Payne 1978, Wickson 1888).

Today, in addition to farmland, biotech firms, including Genentech, Chiron, BIOSOURCE Technologies, and ALZA Pharmaceutical, have locations in Vacaville. The city also has one of the largest factory outlet complexes in California (Solano County 1999, City of Vacaville 2006).

Vallejo

General Mariano Guadalupe Vallejo was granted the 11-square-league Rancho Soscol in 1844 by the Mexican government. The grant included today's Vallejo, Benicia, and Cordelia. In 1850 Vallejo offered 156 acres of his land as the home for the new state capital of California. He promised to lay out the city of "Eureka" and pledged \$370,000 for the construction of the state capitol, botanical gardens, a university, hospitals, schools and a state penitentiary. The state legislature accepted Vallejo's proposal but requested that the new city be named "Vallejo." The capital moved from San Jose to Vallejo in 1851. When state legislatures visited the new capitol in 1852, they discovered the new city had not been built. They met at the site of the capitol, 219 York Street, and discussed moving for a third time. In 1853 the legislature moved the capitol to Benicia (Hoover et al. 1990).

In 1852 the United States Congress purchased Mare Island to establish a naval shipyard, and by 1854 Mare Island was named a permanent naval installation, the first on the West Coast. For the next decade, Vallejo was known for its shipyard and as a farming community. Service by the California Pacific Railroad in 1867 brought urban development to the town. The railroad ran from Vallejo to Sacramento with steamboat connections to San Francisco. People were drawn by the accessible employment at Mare Island and Starr Mills, the warm climate, and relatively inexpensive land. Vallejo was incorporated in 1868 and grew quickly. The city was developed in a grid pattern and housing ranged from Italianate to vernacular cottages. Neighborhoods east of downtown housed the wealthy merchants and manufacturers. North of downtown along the waterfront, apartments and "working class" homes developed (Vallejo Naval and Historical Museum 2006).

By 1894 Vallejo operated its own waterworks. During the 1890s additional demand for ships due to the Spanish-American War brought new residents seeking employment. These new residents required homes and life's necessities causing Vallejo to continue growing. Electric railroad cars ran from Vallejo to Napa, and ferry service was available to San Francisco by 1905. The streets in the Western Georgia neighborhood formed Vallejo's downtown (Vallejo Naval and Historical Museum 2001).

During World War II 40,000 nonmilitary individuals were employed at the Mare Island shipyards. Several Federal Government agencies built multiunit buildings to house the shipbuilders and their families. Housing was located across the Napa River on the hills overlooking the Carquinez Strait (Lee and Lee 2000). Between 1941 and 1943 the population of Vallejo increased from 20,000 to 100,000 (Rolle 1987).

During the 1920s residential neighborhoods in Vallejo were still situated in the historic downtown areas and the outlying areas were devoted to agriculture. Major highways were built in the late 1920s connecting the city and its population began moving beyond downtown. In the 1950s and 1960s, highways became interstates and populations expanded in the agricultural areas. In the 1970s and 1980s, new residential neighborhoods developed along I-780 between Vallejo and Benicia (Caltrans 1989).

Known Cultural Resources

This subsection describes the methods used to prepare this background report, as well as a summary of identified cultural resources in the project area.

Methods

The information for this cultural resources baseline conditions report was obtained through background research and consultation with interested parties. This work was done to:

- ▶ identify cultural resources within the project area;
- ▶ gather the archaeological, ethnographic, and historical information necessary to describe the existing cultural resource setting; and

- ▶ elicit information or concerns from knowledgeable and interested parties about the 2008 Draft General Plan in relation to the county’s cultural resources.

Background Research

Background research consisted of a records search and literature review. The records search was conducted on March 7–9 and March 21, 2006, at the Northwest Information Center (NWIC) of the California Historical Resources Information System, Sonoma State University, Rohnert Park, California. The NWIC, an affiliate of the California Office of Historic Preservation, is the official state repository for cultural resource records and reports for Solano County. The records search identified recorded cultural resources in the study area, as well as the general trend of historical land use and development through time. The following cultural resource inventories were also reviewed:

- ▶ *California Inventory of Historic Resources* (California Department of Parks and Recreation 1976);
- ▶ *Five Views: An Ethnic Historic Site Survey for California* (California Office of Historic Preservation 1988);
- ▶ *California Historical Landmarks* (California Office of Historic Preservation 1996);
- ▶ *California Points of Historical Interest* (California Office of Historic Preservation 1992); and
- ▶ *Directory of Properties in the Historic Property Data File* (California Office of Historic Preservation, August 8, 2005). The directory includes the listings of the NRHP, the California Register of Historical Resources (CRHR), California Historical Landmarks, and California Points of Historical Interest.

Table 4.10-1 categorizes the cultural resources identified during the records search. This table corresponds to the “Archaeological Sites” section below.

Table 4.10-1 Recorded Cultural Resources in Solano County	
Cultural Resource Type	Number of Resources Found
Bedrock mortar stations	*31
Buildings and structures contributing to a district	3
Burial sites	*2
Farms, ranches, homesteads, and single-family properties	48
Historical buildings and structures	*37
Historical refuse scatters	43
Isolates and miscellaneous	10
Petroglyphs	2
Prehistoric artifact scatters and midden sites	*62
Prehistoric occupation sites with burials	*16
Prehistoric occupation sites with no known burials	21
Roads, bridges, dams, & railroads	18
Stone fences	11
<p>* Certain sites fall into more than one category and have been counted more than once to accurately reflect site type. Therefore, the total count for this table does not match the “Archaeological Sites” section below. Source: Records search at Northwest Information Center of the California Historical Resources Information System, Sonoma State University, Rohnert Park, California</p>	

Interested Party Consultation

Letters and maps were sent to interested parties to solicit information and concerns regarding cultural resources in Solano County. The parties contacted and the results of the contacts are summarized below.

Native American Consultation

On April 27, 2006, a letter and map depicting the project area were sent to the Native American Heritage Commission (NAHC) in Sacramento requesting a review of its Sacred Lands File for any Native American cultural resources in the project area. Ms. Debbie Pilas-Treadway, NAHC Environmental Specialist III, responded in a faxed letter dated May 17, 2006, that the Sacred Lands File shows a sacred site within the project area (see “Traditional Cultural Properties” subsection below).

On March 18, 2008, the Rumsey Indian Rancheria of Wintun (Rumsey) responded in writing to a letter from the County describing the 2008 Draft General Plan. Rumsey identified goals, policies, and programs that it felt should be included in the 2008 Draft General Plan to identify and preserve Native American cultural resources. This section was revised to take into account the comments by Rumsey, and several mitigation measures were expanded or clarified.

Historical Consultation

On April 27, 2006, a letter and map depicting the project area were sent to the Benicia Historical Museum at the Camel Barns (Benicia Museum), Benicia, California. No response to the letter has been received to date. On May 30, 2006, a follow-up telephone call was made to the Benicia Museum. Ms. Tania Borostyan, office manager, stated that she was unaware of the letter, and had not been directed by the Benicia Museum’s management to respond to it. She requested a faxed copy of the letter to follow up with director of the Benicia Museum; a copy of the letter was faxed to Ms. Borostyan on May 30, 2006. No response to the faxed letter has been received to date.

On April 27, 2006, a letter and map depicting the project area were sent to the Solano County Historical Society, Fairfield, California. No response to the letter has been received to date. No telephone number was available from local directories or the society’s Web site, so follow-up was not possible.

On April 27, 2006, a letter and map depicting the project area were sent to the Vacaville Museum, Vacaville, California. No response to the letter has been received to date. On May 30, 2006, a follow-up telephone call was made to the Vacaville Museum. Ms. Carol Wilcox, receptionist and clerk, stated that she was not aware of any historic preservation issues that should be addressed.

On April 27, 2006, a letter and map depicting the project area were sent to the Vallejo Naval and Historical Museum, Vallejo, California. No response to the letter has been received to date. On May 30, 2006, a follow-up telephone call was made to the museum. Mr. Jim Kern, museum director, stated that the Vallejo Naval and Historical Museum’s mission relates to Vallejo and Mare Island, and he currently does not have any information about cultural resources outside of those areas that should be addressed in the 2008 Draft General Plan. He stated that he will review a description of the 2008 Draft General Plan to determine whether there are any historic preservation issues that he feels should be addressed.

Archaeological Sites

The background research identified a total of 203 cultural resources recorded as archaeological sites in Solano County. Of these 203 resources, 67 are historical archaeological sites; 126 are prehistoric archaeological sites; and 10 are both prehistoric and historical. No archaeological districts are recorded in the county. One of the prehistoric archaeological sites is eligible for listing in the NRHP and the CRHR, and one of the historical archaeological sites is eligible for the NRHP and CRHR (and is also listed in the California Inventory of Historic Resources). The lack of resources with documented eligibility for the NRHP or CRHR merely indicates that the

majority of resources have not been evaluated for such eligibility. Please see Appendix E for a table listing the archaeological sites identified during research conducted for this EIR analysis.

Built Environment

The background research identified 242 cultural resources recorded as part of the built environment of Solano County. Of these 242 resources, 162 are buildings; 79 are structures; and one is a district. (A building is a shelter for human activity, such as a house, barn, store, or theater. A structure is created for other purposes than human shelter or activity, such as a bridge, fence, lighthouse, or windmill.) Eleven buildings are individually listed in or eligible for listing in the NRHP and CRHR; three buildings appear individually eligible for listing in the NRHP and CRHR (one of which is also listed as a California State Historical Landmark and listed in the California Inventory of Historic Resources); five structures are individually eligible for listing in the NRHP and CRHR; and two districts are eligible for or listed in the CRHR. Most of these buildings date to the mid-1800s and either were associated with ranching complexes or served as private residences. Two of the buildings listed are churches, both of which were constructed in the mid to late 19th century. Three of the listed resources are bridges, built around the turn of the 20th century. Additionally, two resources that may or may not still have evidence of their built environment elements are listed in the California Inventory of Historic Resources; these two resources were not included in the totals above. The totals presented above are based on existing documentation and noncomprehensive surveys of Solano County; as more of the unincorporated county is inventoried for built environment cultural resources, the number of eligible resources will likely increase substantially. Please see Appendix E for a table containing the built-environment resources identified during research conducted for this EIR analysis.

Traditional Cultural Properties

Consultation with interested parties identified at least one possible Traditional Cultural Property (TCP) in the project area. Generally speaking, a TCP can be defined as a type of property or resource that is eligible for inclusion in the NRHP or CRHR because of an association with cultural practices or beliefs of a living community that are crucial to maintaining the community's cultural identity.

In a faxed letter dated May 17, 2006, the NAHC in Sacramento responded to a request for a search of the Sacred Lands File. The NAHC indicated the presence of an area of traditional, religious, and cultural importance to Native American individuals and organizations in the project area. This area may be subject to direct or indirect impacts from short-term or long-term project development. Although the specific location of the culturally sensitive area is not divulged to protect its integrity, the presence of such a location in the project area has been confirmed. It is anticipated that consultation conducted pursuant to California Senate Bill 18, which requires local agency consultation with Native American tribes during general or specific plan adoption or amendment, will clarify the nature of Native American concerns regarding cultural sites in the project area.

Archaeological Sensitivity

General observations about archaeological sensitivity (i.e., the possible occurrence of archaeological deposits) can be made based on the characteristics and distribution of known cultural resources.

Areas in which prehistoric archaeological sites are likely to be present within Solano County include but are not limited to areas adjacent or near to year-round or seasonal water courses, valley floors, bases of hills, and some ridgetops with accessible areas with a very moderate slope. In particular, Green Valley, Lagoon Valley, Suisun Valley, and the vicinity of Cordelia are considered sensitive for prehistoric archaeological deposits. Areas in which historic archaeological resources are likely present include but are not limited to areas with large, old eucalyptus trees or any other stand or grouping of nonnative trees that appear old (such as orchards); near railroads; historic farms and ranches; historic downtowns; and places where old structures are indicated on historic maps but are no longer standing (Jones & Stokes Associates 2002).

Paleontological Resources

This section presents the existing conditions for paleontological resources in the project area. Existing conditions include the project area's regulatory context and paleontological baseline conditions (i.e., the nature and distribution of known fossil resources, and the project area's geological and paleontological background). The existing conditions are the basis for assessing the likelihood and severity of potential impacts to paleontological resources in the project area.

This section describes the paleontological background of Solano County. A general geological and paleontological overview of the county is presented first, followed by a summary of the county's geologic units and the types of fossils they may contain. A geological map of Solano County is presented as Exhibit 4.7-1 in Section 4.7, "Geology and Soils."

Geological and Paleontological Overview

The county's diverse geological setting spans 144 million years, from the early Jurassic Period through today. Geologically, the western portion of the county is made up of the north-south trending Sacramento and San Joaquin Valleys, as well as a small portion of the Northern California Coast Ranges. The Northern California Coast Range in Solano County is known as the Vaca Mountains, which consist of Cretaceous and Tertiary strata that has been uplifted and tilted eastward. A large predominantly Quaternary plain lies to the east of the Vaca Mountains. In the southwestern portion of the county, Pliocene and late Miocene volcanic deposits are commonly found. The Pleistocene Montezuma Hills lie just north of the confluence of the Sacramento and San Joaquin Rivers, where they drain to Suisun Bay. Suisun and Montezuma Sloughs mark a large tidal wetland that enters Grizzly Bay along the southern border of the county.

Along the northwestern border of county, west of the Coast Range Fault, the Franciscan Complex (spanning in time the late Jurassic and early Cretaceous) can be found. The Jurassic-Cretaceous Franciscan Complex is juxtaposed with lower Cretaceous strata west of the Green Valley, the city of Benicia, and the city of Vallejo, and is separated from the Great Valley Group by the Coast Range Fault. East of the Napa Valley, Pliocene Sonoma Volcanics crop out. The Franciscan group consists of highly deformed, metamorphosed rocks attributed to the occurrence of an east-dipping subduction zone along the western North American plate margin.

The Vaca Mountains, adjacent to the Franciscan Complex, are east of the Green Valley Fault. Cretaceous and lower Tertiary rocks of the Vaca Mountains are interbedded, and consist of marine sandstone and shale that belong to the Great Valley Sequence. Six geological formations have been identified in the Upper Cretaceous sediments; from oldest to youngest, these are the Fiske Creek, Venado, Yolo, Sites, Funks, Guinda, and Forbes Formations (Kirby 1943). The units are exposed along a north-south axis, dipping below the surface steeply towards the east. Tertiary rocks of the Eocene Capay Formation, the Miocene Neroly Formation and Putnam Peak basalt, the Pliocene-Pleistocene Tehama Formation, and the Pleistocene Putah Tuff overly the Great Valley strata in the east of the Vaca Mountains.

The Potrero Hills lie just east of the Sonoma Volcanics and north of Suisun Bay. These hills consist of Eocene Markley Sandstone, Nortonville Shale, and Capay Formation. East of the Potrero Hills are the Montezuma Hills in the southeast portion of the county. The Montezuma Hills are poorly consolidated clayey sands of the Early Pleistocene Montezuma Formation. Younger Quaternary alluvial deposits fill large portions of the scattered valleys throughout the entire county (Wagner and Bortugno 1987, Wagner et al. 1987).

The east-central and northeastern parts of Solano County are relatively flat and characterized by a Holocene and Pleistocene alluvial plain with sporadic exposure of the Pliocene Tehama Formation. Fine-grained, organically rich Holocene intertidal deposits are found in the southern portion of the county where sediments form delta deposits along the bay margins.

Geologic Unit Summary

The geological units within the county are described below from youngest to oldest and are also listed on the geologic map (Exhibit 4.7-1 in Section 4.7-1, “Geology and Soils”).

Holocene Alluvium (Holocene: Recent–10,000 years old)

These Late Holocene alluvial deposits overlie older Pleistocene alluvium and/or the upper Tertiary bedrock formations in the. This alluvium consists of sand, silt, and gravel deposited in fan, valley fill, terrace, or basin environments. This unit is typically in smooth, flat valley bottoms, in medium-sized drainages and other areas where terrain allows a thin veneer of this alluvium to deposit, generally in shallowly sloping or flat environments (Graymer, Jones, and Brabb 2002). These alluvial deposits contain vertebrate and invertebrate fossils of extant, modern taxa (Helley et al. 1979), which are generally not considered paleontologically significant.

Pleistocene Alluvium (Pleistocene: 10,000–1.8 million years old)

The majority of alluvium in the central and eastern portion of the county consists of sedimentary deposits that are Plio-Pleistocene in age. These less permeable sediments are basin, landslide intertidal, terrace, or riverbank deposit. Vertebrate fossils found in Late Pleistocene alluvium are representative of the Rancholabrean land mammal age from which many taxa are now extinct (Bell et al. 2004) and include but are not limited to bison, mammoth, ground sloths, saber-toothed cats, dire wolves, cave bears, rodents, birds, reptiles and amphibians (Bell et al. 2004, Helley et al. 1979, Hertlein 1951, Savage 1951, Stirton 1951). These alluvial deposits are highly sensitive for paleontological resources.

Montezuma Formation (Plio-Pleistocene: 10,000–3.6 million years old)

Another quaternary deposit within the county is the Montezuma Formation, which makes up the majority of the Montezuma Hills between Collinsville and the city of Rio Vista. The Montezuma Formation is a delta-deposited conglomerate consisting of poorly consolidated reddish-orange mudstone, sands, silts, and gravels. The Montezuma Formation is highly fossiliferous (Savage 1951, Stirton 1951). Sixteen vertebrate fossil localities have been recorded from this formation within the county. Fossils typical of this formation represent Rancholabrean-age terrestrial faunas, and range from microvertebrate tooth and limb fossils of rodents, birds, amphibians and reptiles, to larger fossils from animals such as horse, deer, bison and mammoths (Savage 1951, Stirton 1951, Wolff 1971, Bell et al. 2004). This formation has a high paleontological sensitivity.

The Tehama Formation (Pliocene: 1.8–5.3 million years old)

The Tehama Formation lies directly below the Montezuma Formation, and is exposed between the Montezuma and the Kirby Hills, as well as north of Vacaville. This formation is composed of sandstone, siltstone, conglomerate, and volcanoclastic (ash fragments) rocks (Wagner et al. 1987; Graymer, Jones, and Brabb 2002). This formation is associated with and can be identified by the Putah Tuff member, which yielded a radiometric age of 3.3 million years (Miller 1966). This series of fluvial deposits is 2,000 feet thick on average and contains fragmentary vertebrate bones (Russell 1927). Although only one vertebrate fossil locality is recorded from this formation within the county, the Tehama Formation contains significant fossils (Graymer, Jones, and Brabb 2002) and has high paleontological sensitivity.

Neroly Sandstone (Late Miocene: 5–15 million years old)

This formation is exposed near Vacaville and consists of blue-gray, fine- to coarse-grained sandstone, but can locally contain tuffaceous sandstone, tuffaceous mudstone, and conglomerates. The Neroly Formation is known to contain large clam beds and few vertebrate fossils (Stirton 1939). Invertebrate fossils from the Neroly formation are indicative of brackish, estuarine, and fluvial environments (Clark 1915, Weaver 1949). The invertebrate fossil assemblages from this formation represent a significant paleontological resource.

Putnam Peak Basalt (Miocene: 5–23 million years old)

The Miocene Putnam Peak Basalt is exposed in the southwestern hills of the county north of Vallejo and Benicia. This basalt is perhaps the remnant of extensive flood basalts that extended from the Sierra Nevada to the Coast Range. This igneous rock unit locally contains columnar jointing. The Putnam Peak Basalt does not contain fossils and has no paleontological significance.

The Sonoma Volcanics (Pliocene to late Miocene: 1.8–15 million years old)

The Sonoma Volcanics are extensively exposed in the southwestern portion of the county, especially near Green Valley. This igneous rock unit consists predominantly of andesite and rhyolite, which can be subdivided into at least three volcanic sequences of different ages and eruptive sources, all of which flank active faults that parallel the San Andreas Fault System (Clahan et al. 2005). The Sonoma Volcanics have a high paleontologic sensitivity, with 29 vertebrate fossil localities recorded in the county (Blake, Graymer, and Jones 2000).

The Markley Shale (Eocene: 35–55 million years old)

The Markley shale is exposed northwest of Vacaville in the Potrero Hills and in a thin band between the Montezuma and Potrero Hills. This light grey or white shale weathers yellow and tan, and contains sandstone locally. The Markley Formation has produced carbonized plant remains and microfossils such as foraminifera and diatoms (Graymer, Jones, and Brabb 2002). Fossils common to the Markley Formation have low paleontological sensitivity because of their relative abundance. Assemblages of abundant fossils, however, can still be significant.

Nortonville Shale (Eocene: 35–55 million years old)

The Nortonville Shale is a brown to gray mudstone with minor amounts of siltstone and sandstone, and is the only member of the Kreyenhagen Formation exposed in the county. This geologic unit is exposed in a thin band along the foothills of the Potrero Hills and in the north-south trending Pleasants Valley. The sandstone contains invertebrate marine fossils such as fossil echinoid spines (Graymer, Jones, and Brabb 2002) and such assemblages are paleontologically significant.

Domengine Sandstone (Eocene: 35–55 million years ago)

The Domengine Sandstone is gray-weathered, locally crossbedded white sandstone and is exposed within the county along the foothills of the Potrero Hills just west of the Green Valley fault. This sedimentary marine formation contains invertebrate shells, including the highest diversity of mollusks reported from the Pacific Coast (Graymer, Jones, and Brabb 2002). Fossils are also abundant in the coarse to medium-grained calcareous sandstone concretions common to the lower part of this formation (Bailey 1897). This formation is paleontologically sensitive. Three invertebrate fossil localities are recorded in the county.

Vacaville Shale (Eocene: 35–55 million years ago)

This geologic unit is made up of brown, thin-bedded and laminated, mudstone and gray shale. This unit contains foraminifers and nanoplankton of middle and early Eocene age (Prothero and Brabb 2001), and also marine invertebrate microfossils (Graymer, Jones, and Brabb 2002), which generally have low paleontological significance because of their sheer numbers.

Capay Formation (Eocene: 35–55 million years old)

In Solano County, the Capay Formation is exposed near the Potrero Hills. The formation varies in thickness between 10 feet and 500 feet and consists of a shale and sandstone unit, which is dated as Eocene. The Capay Formation contains numerous invertebrate marine fossils—shells (Weaver 1949). The Capay Formation has high

paleontological sensitivity with 102 recorded invertebrate fossil localities. Graymer, Jones, and Brabb (2002) suggested that the Capay Formation belongs to the Vacaville Shale.

Martinez Formation (Paleocene: 55–65 million years old)

The Martinez Formation consists of massive, medium- and coarse-grained sandstones. The formation is approximately 3,100 feet thick with a 1,500 foot lower sandstone unit and 1,600-foot upper sandy shale. Most of the fossiliferous faunas in the Martinez occur in the lower 800-foot-thick sandstone unit. This formation contains extensive microfossils (foraminifera) and marine invertebrate fossils, primarily mollusks (Weaver 1949; Graymer, Jones, and Brabb 2002). Marine invertebrate fossil assemblages are paleontologically significant.

Forbes Formation (Late Cretaceous: 65–100 million years ago)

The Forbes Formation consists of massive beds of fine- to coarse-grained wacke with shell fragments that grades into interbedded siltstone and shale. This unit contains Late Cretaceous foraminifers and may contain significant invertebrate marine fossils (Graymer, Jones, and Brabb 2002).

Guinda Formation (Late Cretaceous: 65–100 million years old)

The Guinda Formation is a thick-bedded to massive, coarse- to fine-grained, wacke that grades up into gray siltstone and shale. This formation contains Late Cretaceous radiolarians and foraminifers. There are no fossils recorded in the Guinda Formation in the county, but fossils from this formation are of paleontological significance (Graymer, Jones, and Brabb 2002).

Funks Formation (Late Cretaceous: 65–100 million years ago)

The Funks Formation consists of a tan weathering, gray marine siltstone and mudstone. This geologic unit also includes thin beds of wacke. The Funks Formation shale beds contain Late Cretaceous (Santonian) foraminifers (Graymer, Jones, and Brabb 2002). As described above, these microfossils are not generally considered to be paleontologically significant.

The Sites Formation (Late Cretaceous: 65–100 million years ago)

The Sites Formation consists of thick bedded, laminated, gray wacke and thick beds of dark gray carbonaceous siltstone. The unit is up to 6,000 feet thick and has been attributed to the Late Cretaceous through foraminiferal analysis (Graymer, Jones, and Brabb 2002). No significant fossils have been found in this formation.

The Yolo Formation (Late Cretaceous: 65–100 million years old)

The Yolo Formation is distinctly and moderately thick bedded, fine- to coarse-grained sandstone with mudstone and siltstone locally. The unit contains Carbonaceous debris and the mudstone beds have Late Cretaceous radiolarians and foraminifers (Graymer, Jones, and Brabb 2002).

The Venado Formation (Late Cretaceous: 65–100 million years old)

The Cenomanian (99–93 million years old) Venado Formation consists of more than 1,000 feet of massive sandstone, shale and conglomerate. This unit may contain few marine shells; however, the Venado Formation is of low paleontological significance (Ghosh and Lowe 1993).

Franciscan Complex (Late Jurassic and Early Cretaceous: 100–160 million years old)

The Franciscan Group is an aggregate of various marine rock types ranging from ultramafic volcanic rocks to sedimentary rocks. Franciscan sandstones are adjacent to and underlie the county. Franciscan Group sandstones

are known to contain marine invertebrates such as ammonites, which are extinct relatives to modern squid (Armstrong and Gallagher 1977; Hertlein 1951, 1956; Schlocker, Bonilla, and Imlay 1954). Although rare, vertebrate fossils are known and have been recorded in Franciscan Group sediments in California (Welles 1953). The unit has a high paleontological significance.

Known Paleontological Resources

This subsection describes the methods used to prepare this background report, as well as a summary of identified paleontological resources in the county.

To identify known fossil locations in the county, an online fossil locality search was conducted on May 13, 2006, using the Berkeley Natural History Museums' online database, specifically data from the University of California Museum of Paleontology, Berkeley. Relevant paleontological and geological literature for Solano County and its vicinity was reviewed for a characterization of the county's geology and paleontological sensitivity.

The locality search identified 238 fossil localities within or directly adjacent to the county. Of this total, 69 localities consist of vertebrate specimens and 169 are invertebrate specimens. The localities occur in 12 distinguishable geologic formations, all of which are known to contain fossils. Most sedimentary geological units and some of the igneous geological units of Solano County are paleontologically sensitive.

4.10.2 REGULATORY CONTEXT

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws pertaining to cultural resources or paleontological resources are applicable.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Environmental Quality Act

Cultural Resources

CEQA applies to all discretionary projects undertaken or subject to approval by the state's public agencies (Title 14, Section 15002[i] of the California Code of Regulations [i.e., 14 CCR Section 15002[i)]. CEQA states that it is the policy of the State of California to "take all action necessary to provide the people of this state with... historic environmental qualities...and preserve for future generations examples of the major periods of California history" (California Public Resources Code [PRC] Sections 21001[b] and 21001[c]). Under the provisions of CEQA, "A project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (14 CCR Section 15064.5[b]).

CEQA defines a "historical resource" as a resource that meets one or more of the following criteria:

- ▶ listed in, or eligible for listing in, the CRHR;
- ▶ listed in a local register of historical resources (as defined at PRC Section 5020.1[k]);
- ▶ identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code; or
- ▶ determined to be a historical resource by a project's lead agency (14 CCR Section 15064.5[a]).

A historical resource consists of “Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California...Generally, a resource shall be considered by the lead agency to be ‘historically significant’ if the resource meets the criteria for listing in the California Register of Historical Resources” (14 CCR Section 15064.5[a][3]).

CEQA requires that historical resources and unique archaeological resources be taken into consideration during the CEQA planning process (14 CCR Section 15064.5, PRC Section 21083.2). If feasible, adverse effects on the significance of historical resources must be avoided, or the effects mitigated (14 CCR Section 15064.5[b][4]). The significance of a historical resource is impaired when a project demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for the CRHR. If there is a substantial adverse change in the significance of a historical resource, the preparation of an environmental impact report may be required (14 CCR Section 15065[a]).

If the cultural resource in question is an archaeological site, CEQA (14 CCR Section 15064.5[c][1]) requires that the lead agency first determine if the site is a historical resource as defined in 14 CCR Section 15064.5(a). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource (14 CCR Section 15064.5[a], California Office of Historic Preservation 2001). If the archaeological site does not qualify as a historical resource but does qualify as a unique archaeological site, then the archaeological site is treated in accordance with PRC Section 21083.2 (14 CCR Section 15069.5[c][3]). In practice, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource (Bass, Herson, and Bogdan 1999).

CEQA defines a “unique archaeological resource” as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following criteria (PRC Section 21083.2[g]):

- ▶ contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information;
- ▶ has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- ▶ is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an impact on a historical or archaeological resource is significant, CEQA requires feasible measures to minimize the impact (14 CCR Section 15126.4[a][1]). Mitigation of significant impacts must lessen or eliminate the physical impact that the project will have on the resource. Generally, the use of drawings, photographs, and/or displays does not mitigate the physical impact on the environment caused by demolition or destruction of a historical resource. However, CEQA requires that all feasible mitigation be undertaken even if it does not mitigate impacts to a less-than-significant level (California Office of Historic Preservation 2001a, 2001b; see also 14 CCR Section 15126.4[a][1]).

Paleontological Resources

Paleontological resources are fossilized remains of plants and animals, and associated deposits. Appendix G of the State CEQA Guidelines requires that a determination be made as to whether a project would directly or indirectly destroy a unique paleontological resource or site or unique geological feature. If an impact would be significant, CEQA requires feasible measures to minimize the impact (14 CCR Section 15126.4[a][1]).

Human Remains

The disturbance of human remains without authority of law is considered a felony (Health and Safety Code Section 7052). If human remains are Native American in origin, they are within the jurisdiction of the NAHC (Health and Safety Code Section 7052.5c, PRC Section 5097.98). According to state law (Health and Safety Code Section 7050.5, PRC Section 5097.98), if human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

- ▶ the county coroner has been informed and has determined that no investigation of the cause of death is required; and
- ▶ if the remains are of Native American origin:
 - the descendants of the deceased Native Americans have had 48 hours from time of access to the location of the remains to make a recommendation to the landowner or person responsible for the excavation work for means of treating or disposing of with appropriate dignity the human remains and any associated grave goods, as provided in PRC Section 5097.98, or
 - the NAHC was unable to identify a descendent or the descendant failed to make a recommendation within 48 hours after being granted access to the location of the remains.

The following actions must be taken by the landowner whenever (1) the NAHC is unable to identify a descendant; (2) the descendants identified fail to make a recommendation; (3) the landowner or authorized representative rejects the descendants' recommendations, and the mediation provided for in PRC Section 5097.94(k), if invoked, fails to provide measures acceptable to the landowner:

- ▶ the landowner, or the landowner's authorized representative, shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance; and
- ▶ the landowner shall provide for the protection of the reinterment site by doing one or more of the following:
 - recording the site with the NAHC or the appropriate information center of the California Historical Resources Information System,
 - utilizing an open-space or conservation zoning designation or easement, or
 - recording a document with the county in which the property is located.

According to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052) (Jones & Stokes Associates 2002).

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

No regional or local plans, policies, regulations, or laws pertaining to cultural resources or paleontological resources are applicable.

PROFESSIONAL PALEONTOLOGICAL STANDARDS

The Society of Vertebrate Paleontology has identified vertebrate fossils, their taphonomic and associated environmental indicators, and fossiliferous deposits as significant nonrenewable paleontological resources.

Botanical and invertebrate fossils and assemblages may also be considered significant resources (Conformable Impact Mitigation Guidelines Committee 1995).

4.10.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section discusses impacts on cultural and paleontological resources. Cultural resources are districts, sites, buildings, structures, and objects that are significant for their archaeological, historical, architectural, and/or traditional cultural values. Paleontological resources are the fossilized remains of biological organisms, their traces, and associated deposits. This analysis considers the possible impacts of the 2008 Draft General Plan on cultural and paleontological resources, as well as the extent to which the goals, policies, and implementation programs of the 2008 Draft General Plan would avoid, reduce, or offset such impacts. Mitigation recommendations are provided, as warranted, to supplement the goals, policies, and implementation programs.

This section analyzes both the Preferred Plan and the Maximum Development Scenario. At the scale of this program-level document, the difference between these two plans will not substantially affect the results of the analysis in terms of the types of potential impacts.

Based on Appendix G of the State CEQA Guidelines, an impact on cultural and paleontological resources is considered significant if the proposed project would:

- ▶ cause a substantial adverse change in the significance of a historical resource as defined in State CEQA Guidelines Section 15064.5 (14 CCR Section 15064.5), including rural historic landscapes and/or traditional cultural properties that may be present;
- ▶ cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
- ▶ directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- ▶ disturb any human remains, including those interred outside of formal cemeteries.

IMPACT **Removal of Historical Built-Environment Resources – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in the removal of historical built-environment resources. This impact would be **significant**.*

4.10-1a

Solano County contains many historically significant built-environment resources. Such resources may be clustered in an area unified by a historical theme (e.g., the Birds Landing and Collinsville areas) or they may be found at discrete locations far from developed areas. Although historical built-environment resources in the county have been identified and recorded, it is likely that the majority of such resources still remain unidentified.

The 2008 Draft General Plan contains goals, policies, and implementation programs that provide for the identification and preservation of significant buildings and structures. Specifically, Program RS.I-29 requires the development of “historic preservation programs and development guidelines to prevent the loss of significant historic buildings and structures.” This implementation program would presumably include procedures for identifying, evaluating, and protecting historical built-environment resources at the permitting stage. However, no details are provided about the scope and methods of the guidelines. Until such a program has been adopted by the County, it must be assumed that development in accordance with the 2008 Draft General Plan may result in a substantial adverse change in the significance of historical built-environment resources. In addition, conflicts between development and historical built-environment resources will inevitably occur, even with such a program. As a result, development pursuant to the 2008 Draft General Plan may remove historical built-environment resources, resulting in substantial adverse change in the significance of the resources.

Identified and unidentified historical built-environment resources in Solano County may meet the definition of historical resources under 14 CCR Section 15064.5(a). Should a historical built-environment resource meet that definition, development in accordance with the 2008 Draft General Plan under the Preferred Plan may result in a substantial adverse change in the resource's significance. This impact would be significant.

Mitigation Measure 4.10-1a: Determine Historical Significance of Built-Environment Resources Subject to Removal and Require Implementation of Recommended Feasible Mitigation.

California case law, as well as 14 CCR Section 15126.4(b)(2), state that generally no amount of mitigation is sufficient to reduce the impact of completely removing a built-environment historical resource to a less-than-significant level (*League for the Protection of Oakland's Architectural and Historic Resources v. City of Oakland*, 55 Cal.App.4th 896; 60 Cal.Rptr.2nd 821 [1991]). However, PRC Section 21002.1(b) states that each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so. Under CEQA, one type of mitigation involves minimizing the severity of the impact, but not necessarily reducing it to a less-than-significant level.

Therefore, until historic preservation review guidelines have been developed pursuant to Program RS.I-29 of the 2008 Draft General Plan and are in place, if a building or structure more than 45 years of age will be removed in conjunction with a County permitting process, the County shall determine whether that building or structure meets the definition of a historical resource under 14 CCR Section 15064.5(a). As a basis for making this determination, the following steps shall be taken:

- ▶ The project applicant shall conduct a records search at the NWIC to access the existing archival database for historical built-environment resources, and to obtain recommendations for additional study, if appropriate.
- ▶ The project applicant shall implement the recommendations of the NWIC as pertains to additional study. If an architectural study is recommended, the County shall require that the work be conducted for the project applicant by a qualified architectural historian. (A qualified architectural historian is defined as an individual who meets the Secretary of the Interior's Professional Qualifications Standards in architectural history [36 Code of Federal Regulations 61].) At a minimum, the study shall enable the County to determine:
 - whether the building or structure qualifies as a historical resource (as defined at 14 CCR Section 15064.5);
 - whether there would be a substantial adverse change in the significance of the resource (if it does so qualify); and
 - if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts.
- ▶ If the building or structure qualifies as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the project applicant to implement feasible mitigation as recommended by the architectural historian.

It is anticipated that conflicts between land development and the preservation of significant buildings or structures would occur, resulting in instances where historical resources would be removed to accommodate development. Because it is possible that a building meeting the definition of a historical resource would be removed, this impact would remain **significant and unavoidable** even with the implementation of the mitigation listed above (14 CCR Section 15126.4[b][2]).

IMPACT 4.10-1b **Removal of Historical Built-Environment Resources – Maximum Development Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in the removal of historical built-environment resources. This impact would be significant.*

This impact is the same as Impact 4.10-1a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.10-1b: Determine Historical Significance of Built-Environment Resources Subject to Removal and Require Implementation of Recommended Feasible Mitigation.

This measure is the same as Mitigation Measure 4.10-1a above. For the same reasons as described above, under the Maximum Development Scenario this impact would remain **significant and unavoidable**.

IMPACT 4.10-2a **Alteration of Historical Built-Environment Resources – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in the alteration of historical resources. This impact would be significant.*

As with most cultural resources in Solano County, the majority of historical built-environment resources likely have not yet been identified. Identified and unidentified historical built-environment resources may meet the definition of historical resources under 14 CCR Section 15064.5. Should a resource meet that definition, development in accordance with the 2008 Draft General Plan under the Preferred Plan that results in a substantial adverse change in the resource’s significance would result in a significant impact. Alterations could result from adverse changes to the physical structure itself, or from adjacent development that adversely alters the immediate setting of the resource. However, if the development is done in a manner consistent with the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Secretary’s Standards), then any potential impacts would be mitigated to a less-than-significant level (14 CCR Section 15064.5[b][3]).

The 2008 Draft General Plan contains goals, policies, and implementation programs that provide for the identification and preservation of significant buildings and structures. Specifically, Program RS.I-29 requires the development of “historic preservation programs and development guidelines to prevent the loss of significant historic buildings and structures.” A more specific set of implementation programs addresses the Old Town Cordelia Historic District, a significant concentration of historical built environment resources. Programs SS.I-15 through SS.I-17 call for architecturally compatible street furniture and signage, design standards and guidelines to ensure compatible new development, and incentives to encourage the preservation of historical buildings.

As described previously in Impact 4.10-1a, no details are provided about the scope and methods of the historic preservation program or design guidelines. Until such a program has been adopted by the County, it must be assumed that development in accordance with the 2008 Draft General Plan may result in a substantial adverse change in the significance of historical built-environment resources. If such development were done in a manner consistent with the Secretary’s Standards, any potential impact would be less than significant. However, because some development may not be consistent with the Secretary’s Standards, this impact would be significant.

Mitigation Measure 4.10-2a: Determine Historical Significance of Built-Environment Resources Subject to Building Alteration or Alteration of Setting, and Require Implementation of Recommended Feasible Mitigation.

If development actions would alter buildings or structures more than 45 years of age, or would alter the settings of such buildings or structures, the County shall determine whether these proposed actions would result in a substantial adverse change in the significance of a historical resource. As described below, the approach for determining impacts from the structural alteration of a building or structure shall differ from the approach for determining impacts from the alteration of setting.

Determining Potential Impacts from Building Alteration

Until review guidelines providing for the identification, evaluation, and protection of historical built-environment resources have been developed pursuant to Program RS.I-29 of the 2008 Draft General Plan and are in place, if a building or structure more 45 years of age would be altered in conjunction with a County permitting process, the County shall determine whether the building or structure meets the definition of a historical resource under 14 CCR Section 15064.5(a). As a basis for making this determination, the following steps shall be taken:

- ▶ The project applicant shall conduct a records search at the NWIC to determine whether the subject building or structure qualifies as a historical resource through previous listing or identification, and to obtain recommendations for additional study, if appropriate.
- ▶ The project applicant shall implement the recommendations of the NWIC. If additional architectural study is recommended (either to evaluate the significance of an unevaluated building or structure, or to develop mitigation recommendations for a previously identified historical resource), the County shall require that the work be conducted for the project applicant by a qualified architectural historian. At a minimum, the evaluation study shall enable the County to determine:
 - whether the building or structure qualifies as a historical resource (as defined at 14 CCR Section 15064.5);
 - whether there would be a substantial adverse change in the significance of the resource (if it does so qualify); and
 - if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts.
- ▶ If the building or structure qualifies as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the project applicant to implement feasible mitigation as recommended by the architectural historian.

It is anticipated that conflicts between land development and the preservation of significant buildings or structures would occur, resulting in instances where historical resources would be altered to accommodate development. Because it is possible that a building meeting the definition of a historical resource would be altered, this impact would remain **significant and unavoidable** even with the implementation of the mitigation listed above (14 CCR Section 15126.4[b][2]).

Determining Potential Impacts from the Alteration of Setting

This determination shall be made for new development that would occur adjacent to buildings or structures that are 45 years of age or older. The County shall determine whether the development has a reasonable possibility of resulting in impacts on adjacent historical resources, should they be present, by altering the resources setting. This determination shall be based on the nature and scale of the development, the existing architectural context of the development location, the age of the adjacent buildings or structures, and the level of community concern about the proposed project.

If the County finds that a reasonable possibility of an impact on the setting of adjacent historical resources exists, the following steps shall be taken:

- ▶ The project applicant shall conduct a records search at the NWIC to determine whether buildings or structures adjacent to the project site qualify as historical resources through previous listing or identification, and to obtain recommendations for additional study, if appropriate.

- ▶ The project applicant shall implement the recommendations of the NWIC. If additional architectural study is recommended (either to evaluate the significance of an unevaluated adjacent building or structure, or to develop mitigation recommendations), the County shall require that the work be conducted for the project applicant by a qualified architectural historian. At a minimum, the evaluation study shall enable the County to determine:
 - whether the buildings or structures adjacent to the project site qualify as a historical resource (as defined at 14 CCR Section 15064.5);
 - whether there would be a substantial adverse change in the significance of those resources (if they do so qualify); and
 - if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts.
- ▶ If the buildings or structures adjacent to the project site qualify as a historical resource, and a substantial adverse change in its significance would occur, the County shall require the implementation of feasible mitigation as recommended by the architectural historian.

It is anticipated that conflicts between land development and the preservation of significant buildings or structures would occur during the implementation of the 2008 Draft General Plan. Alterations may result in a substantial adverse change in the settings of historical resources. However, it is anticipated that the mitigation recommended above would reduce this potential impact to a **less-than-significant** level.

IMPACT **Alteration of Historical Built-Environment Resources – Maximum Development Scenario.**
 4.10-2b *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in the alteration of historical resources. This impact would be **significant**.*

This impact is the same as Impact 4.10-2a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.10-2b: Determine Historical Significance of Built-Environment Resources Subject to Building Alteration or Alteration of Setting, and Require Implementation of Recommended Feasible Mitigation.

This measure is the same as Mitigation Measure 4.10-2a above. For the same reasons as described above, under the Maximum Development Scenario this impact would remain **significant and unavoidable** for building alteration, but implementation of this mitigation measure would reduce this impact to a **less-than-significant level** with regard to the alteration of setting.

IMPACT **Destruction of Prehistoric and Historical Archaeological Deposits – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in the destruction of prehistoric and/or historical archaeological deposits. This impact would be **significant**.*
 4.10-3a

Solano County contains many recorded archaeological deposits, both prehistoric and historical. Areas of the county in which prehistoric archaeological deposits are likely to be present include but are not limited to areas adjacent to or near year-round or seasonal water courses, valley floors, bases of hills, and some ridgetops with accessible areas with a very moderate slope. In particular, Green Valley, Lagoon Valley, Suisun Valley, and the vicinity of Cordelia are considered sensitive for prehistoric archaeological deposits. Areas in which historical archaeological deposits are likely include historical downtowns; areas near railroads; historical farms and ranches; places where old structures are indicated on historical maps but are no longer standing; and areas with large, old eucalyptus trees or any other stand or grouping of nonnative trees that appear old (such as orchards).

As with built-environment resources, it is likely that the majority of prehistoric and/or historical archaeological deposits in the county still remain unidentified. Additionally, prehistoric archaeological deposits could be present under overlying noncultural sediments that prevent site identification through surface survey. Identified or unidentified prehistoric and/or historical archaeological deposits may meet the definition of historical resources under 14 CCR Section 15064.5, or unique archaeological resources under PRC Section 21083.2(g).

The 2008 Draft General Plan contains goals, policies, and implementation programs that address archaeological deposits. Program RS.I-25, the implementation program that is most pertinent to archaeological deposits, contains the following requirements:

- ▶ Require cultural resources inventories of all new development projects in areas identified with medium or high potential for archeological or cultural resources. Where a preliminary site survey finds medium to high potential for substantial archaeological remains, the County shall require a mitigation plan to protect the resource before issuance of permits. Mitigation may include:
 - having a qualified archaeologist present during initial grading or trenching (monitoring),
 - redesign of the project to avoid archaeological resources (this is considered the strongest tool for preserving archaeological resources),
 - capping the site with a layer of fill, and/or
 - excavation and removal of the archaeological resources and curation in an appropriate facility under the direction of a qualified archaeologist.
- ▶ Alert applicants for permits within early settlement areas to the potential sensitivity. If significant archaeological resources are discovered during construction or grading activities, such activities shall cease in the immediate area of the find until a qualified archaeologist can determine the significance of the resource and recommend alternative mitigation.

Although broad, the requirements of Program RS.I-25 are not precisely defined. For example, there is no explanation of what constitutes a “sensitive area,” what criteria were used to define such areas, who made the determination, or what constitutes a cultural resource. Additionally, there is no requirement to conduct planning-related cultural resource archival research at the NWIC; as an officially recognized information repository, the NWIC contains information that is essential for cultural resource project planning in the public and private sectors.

Prehistoric and historical archaeological deposits, some of which may qualify as historical or unique archaeological resources under CEQA, are known to exist in Solano County. 2008 Draft General Plan development actions could result in a substantial adverse change (e.g., damage or destruction) in the significance of archaeological deposits that meet either definition. Therefore, this impact would be significant.

Mitigation Measure 4.10-3a: Require Preparation of a Cultural Resources Study and Implementation of Recommended Feasible Mitigation for Destruction of Prehistoric and Historical Archaeological Deposits.

The County shall include the following requirements in addition to those contained in Program RS.I-25 of the 2008 Draft General Plan:

- ▶ Project applicants shall conduct, at a minimum, a records search at the NWIC to access the existing archival database for cultural resources in a subject project area, as well as to receive an assessment of the project area’s cultural resource sensitivity and recommendations for additional study, if appropriate.

- ▶ Project applicants shall prepare cultural resources studies for all development projects requiring discretionary County approval, based on the recommendations made by the NWIC as part of the records search. Each cultural resources study shall be conducted by an individual listed on the consultant list maintained by the NWIC. The scope of the study shall be tailored to the nature of the project, the sensitivity of the project area, and community concern about potential project effects (e.g., Native American community concerns about human remains and prehistoric archaeological deposits). The professional judgment of the NWIC staff, cultural resources consultant and County planning staff shall be the primary basis for determining the level of effort for the study. Not every development review for cultural resources will require the same level of effort. At a minimum, the study shall provide the technical basis for the County to make the following determinations:
 - whether there are any historical resources (as defined at 14 CCR Section 15064.5) or unique archaeological resources (as defined at PRC Section 21083.2[g]) in the project area;
 - whether there would be a substantial adverse change in the significance of such resources as a result of the project;
 - if a substantial adverse change would occur, what steps can be taken to avoid, minimize, or offset such impacts; and
 - whether Native American tribal and historical organizations were provided an opportunity to comment on the adequacy of the cultural resources study, or about the conclusions and recommendations therein.
- ▶ The County shall, at its discretion and based on tribal inquiries, refer the study's conclusions and recommendations to the tribal organization in whose traditional territory the study was conducted for the purposes of garnering input on the potential for impacts and the means to alleviate such impacts.
- ▶ Upon completion of the cultural resources study (and tribal review of the study, if undertaken), the County shall require the project applicant to implement the feasible recommendations of the cultural resources professional (and tribe, if applicable) as a condition of project approval.
- ▶ If archaeological monitoring or excavation relating to prehistoric archaeological sites or areas of prehistoric archaeological sensitivity is required by the County, the County shall provide an opportunity for Native American monitors from culturally affiliated descendant groups to participate in the monitoring or excavation at tribal expense.

This mitigation measure would provide the basis for the County to make a finding, supported by substantial evidence, on the likelihood of potentially significant impacts to archaeological deposits under CEQA. In accordance with 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.

It is anticipated that conflicts would occur between land development and the preservation of significant archaeological deposits. Situations would occur in which legally significant archaeological deposits would be damaged or destroyed as part of project implementation. Policies and implementation programs contained in the 2008 Draft General Plan address these situations and partially provide for the identification, evaluation, and mitigation of impacts on archaeological deposits. These policies and implementation programs include Policies RS.P-37 and RS.P-39, and Programs RS.I-25, RS.I-26, RS.I-27, RS.I-28, and RS.I-48. The requirements of the 2008 Draft General Plan, with the inclusion of the mitigation presented above, would reduce potential impacts on archaeological deposits to a **less-than-significant** level.

IMPACT **Destruction of Prehistoric and Historical Archaeological Deposits – Maximum Development**
4.10-3b **Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in the destruction of prehistoric and/or historical archaeological deposits. This impact would be **significant**.*

This impact is the same as Impact 4.10-3a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.10-3b: Require Preparation of a Cultural Resources Study and Implementation of Recommended Feasible Mitigation for Destruction of Prehistoric and Historical Archaeological Deposits.

This measure is the same as Mitigation Measure 4.10-3a above. For the same reasons as described above, under the Maximum Development Scenario implementation of this mitigation measure would reduce the impact to a **less-than-significant** level.

IMPACT **Loss of Integrity of Rural Historic Landscapes – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in new buildings, roadways, or related facilities that would diminish the integrity of rural historic landscapes. This impact would be **less than significant**.*

Overview

Solano County is rooted in agricultural history, and expressions of this heritage can be found as tangible signatures on the landscape of the unincorporated county. Although the records search did not identify any rural historic landscapes, it is likely that portions of the county, based on its rural nature and history, comprise historic landscapes that reflect activities or development associated with a specific historical context. The National Park Service (1989) defines a rural historic landscape as

... a geographical area that historically has been used by people, or shaped and modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.

Although they may be linked to other types of activities, rural historic landscapes are often associated with agriculture; this type of activity is commonly cited as a character defining land use of such districts. Rural historic landscapes are also a type of district that may be eligible for listing in the NRHP; by extension, if a district appears eligible for listing in the NRHP, that district will almost invariably also appear eligible for listing in the CRHR, and will be a historical resource under CEQA.

The 2008 Draft General Plan acknowledges the importance of maintaining the agricultural character of unincorporated Solano County, and the plan contains many goals, policies, and implementation programs geared to preventing the diminishment of the visual and open space qualities that distinguish potential rural historic landscapes in Solano County. These measures, which are presented throughout the Land Use, Agriculture, Resources, and Economic Development Elements, contain extensive requirements that will reduce the potential for changes in land use that would diminish the historical integrity of potential rural historic landscapes. As stated on page AG-14 of the 2008 Draft General Plan:

... a large part of the reported loss of Important Farmlands (classifications of Prime, Statewide Importance, and Unique) is attributable to their conversion to urban land or low-density development included in the category of other land.

The loss of these farmlands contributes to a loss of association with a significant historical theme in Solano County, thereby diminishing (and in some cases destroying) the integrity of potential rural historic landscapes.

The goals, policies, and programs included in the 2008 Draft General Plan, when considered with related County plans and programs, maintain the major visual qualities of the landscape and sustain the integrity of potential rural historic landscapes. The positive relationship between regulating substantial new development and maintaining a rural historic landscape's historical integrity has been long recognized. As stated by the National Park Service,

New construction and incompatible land uses covering extensive acreage – such as residential subdivisions, modern mining or quarrying operations, refuse dumps, and landfill, limited access highways and their interchanges – cause the greatest damage. Not only do they introduce major visual intrusions and interrupt the continuity of the historic scene, but they reshape the land, disturb subsurface remains, and introduce ahistorical characteristics.

Large rural districts may be able to absorb new development and still maintain their overall historic integrity, provided large-scale intrusions are concentrated in relatively few locations and cover a proportionately small percentage of the overall acreage.

Relevant Goals, Policies, and Programs of the 2008 Draft General Plan

Listed below are the goals, policies, and programs that would help to maintain the historical integrity of potential rural historical landscapes in Solano County. These measures and plans are organized by the general goal that unifies each approach.

- ▶ **Maintaining Historical Architecture.** Goals SS.G-3 and SS.G-4; Policies SS.P-20, SS.P-21, and SS.P-28; and Programs SS.I-9, SS.I-17, and SS.I-27 focus on preserving existing clusters of historical built-environment resources, as well as individual resources that are both documented and yet to be identified. Their aim is to allow for economic development while ensuring that the historic fabric present in the historical environment remains intact, and to continue the identification and evaluation of historically significant buildings and structures. An emphasis is placed on Old Town Cordelia, but historical built-environment resources throughout the General Plan Update area are addressed.
- ▶ **Ensuring Compatible Development (Historical).** Policies ED.P-3, SS.P-19, and SS.P-29 and Programs ED.I-6 and SS.I-15 seek to encourage new development that is synergistic with existing historical built-environment resources. The previous category dealt mostly with the regulation of changes that may directly affect the historic fabric; this category refers more to moderating future development in areas containing older buildings and structures to ensure that successive land uses and architecture are compatible with the previous and surrounding uses.
- ▶ **Developing Design Guidelines.** Program SS.I-16 (Cordelia) calls for the implementation of design guidelines and development standards to ensure that new development is appropriately scaled to existing historical built environment features.
- ▶ **Agricultural Buffer Areas.** Policies LU.P-10 and RS.P-60 and Program LU.I-12 address the need for buffers to separate the growth of nonagricultural uses in municipalities from neighboring agricultural uses. This goal would segregate modern development from the historical agricultural setting of potential landscapes.
- ▶ **Resource Conservation and Overlays.** Policies AG.P-3, AG.P-6, AG.P-29, and RS.P-6 and Programs AG.I-2, RS.I-3, and RS.I-33 provide for resource conservation. They include land use management overlays that regulate areas containing sensitive watershed or agriculture areas that may contribute to the historical setting of a landscape.
- ▶ **Ensuring Compatible Development (Agriculture).** Policies AG.P-30, RS.P-35, RS.P-36, SS.P-10, SS.P-11, and SS.P-16 and Programs AG.I-12, AG.I-13, RS.I-21, SS.I-1, and SS.I-3 direct that development be geared to the agricultural context of Solano County, and that neighborhood agricultural centers be established to encourage and expand agritourism.

- ▶ **Maintaining Agricultural Character.** Goals RS.G-4 and SS.G-2; Policies AG.P-2, AG.P-3, AG.P-7, AG.P-33, LU.P-1, LU.P-14, LU.P-20, RS.P-25, SS.P-4, and SS.P-9; and Programs AG.I-7, AG.I-10, AG.I-14, AG.I-18, AG.I-22, LU.I-5, and RS.I-3 include measures to limit the unnecessary conversion of agricultural land, deintensify development whose scale may conflict with agricultural uses, and provide incentives for development that maintains or enhances the viability of existing agricultural land uses.
- ▶ **Regulating Urban Expansion.** Goal RS.G-4; Policies LU.P-16, LU.P-17, LU.P-21, LU.P-26, RS.P-25, and SS.P-12; and Programs AG.I-18, LU.I-3, LU.I-4, and SS.I-2 regulate the expansion of urban land uses beyond municipal service areas, as well as in other areas of the unincorporated county in which such development is called for and encouraged.

Relevant Other Plans, Programs, and Initiatives

Several plans, programs, and initiatives that are in place or planned by the County contribute to the preservation of agricultural land uses and potential rural landscapes. These measures are beneficial to the preservation of potential rural historic landscapes because they provide controls to prevent unregulated conversion of agricultural land that may diminish the historical integrity of such landscapes. Each measure contains land use incentives or controls that make the continuation of agricultural and rural land uses a primary goal. This emphasis, in turn, reinforces the associated agrarian context that would be a character defining feature of rural historic landscapes in Solano County.

- ▶ **Orderly Growth Initiative.** In 1994, the Orderly Growth Initiative extended through 2010 the provisions of Measure A passed in 1984. The initiative restricts the redesignation of land designated as agriculture or open space and prevents large-scale and mixed-use developments outside of municipal areas.
- ▶ **Tri-City and County Cooperative Plan for Agriculture and Open Space Preservation.** The cooperative plan was developed between the County and the cities of Fairfield, Vallejo, and Benicia to guide land use planning and preserve agricultural resources and open space south of SR 12 and I-680.
- ▶ **Williamson Act.** The Williamson Act, passed in 1965, is a widely used tool for protecting agricultural lands and open space. It allows local governments to enter into 10-year agreements with landowners to assess land based on its existing agricultural or open space uses rather than on its potential full-market value. This incentive has induced landowners to enter into agreements for the protection of 62% of the county's agricultural land, or roughly 215,000 acres.
- ▶ **Right-to-Farm Ordinance.** This ordinance limits the circumstances in which an agricultural operation could be determined to be a nuisance and compelled to cease agricultural activities.
- ▶ **Solano Land Trust.** The Solano Land Trust is a nonprofit organization that permanently protects agricultural land and ranchland, as well as open space, through acquisition, conservation easements, and land management. To date, the Solano Land Trust has permanently protected 19,403 acres of land.
- ▶ **Transfer of Development Rights.** The County intends to establish a Transfer of Development Rights program to transfer the development potential from a sensitive area, such as prime agricultural lands, to a location more suitable for development. In exchange for compensation, the land owned by those "sending" the development rights is permanently protected from development.
- ▶ **Farmland Mitigation.** The County intends to develop an ordinance to establish mitigation requirements for agricultural land converted to nonagricultural uses as a result of pressure from adjacent conversions. Mitigation would be in the form of conservation easements or in-lieu fees; ratios are yet to be determined, but would likely be 1:1.

- ▶ **Agricultural Reserve Overlay.** The County has proposed an Agricultural Reserve Overlay. The County would encourage voluntary landowner participation in conservation easements, and would also establish the area as an agricultural mitigation bank. Easements on land in the overlay district would be purchased through the payment of in-lieu fees collected as part of the conversion of agricultural land in other parts of the county.

Conclusion

It is likely that rural historic landscapes, as defined above, exist in Solano County. Such districts may qualify as historical resources under CEQA. Development in accordance with the 2008 Draft General Plan may alter the landscape of Solano County. However, because of the 2008 Draft General Plan Update’s extensive goals, policies, and programs, as well as other related plans and programs that would minimize the diminishment of such landscapes’ integrity, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.10-4b **Loss of Integrity of Rural Historic Landscapes – Maximum Development Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in new buildings, roadways, or related facilities that would diminish the integrity of rural historic landscapes. This impact would be less than significant.*

This impact is the same as Impact 4.10-4a for the Preferred Plan. For the same reasons as described above, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.10-5a **Adverse Effects on Montezuma Hills and Suisun Marsh Area Cultural Resources – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in new buildings, roadways, or related facilities that would adversely affect cultural resources in the Montezuma Hills and Suisun Marsh area. This impact would be significant.*

Comments received on the Notice of Preparation for the 2008 Draft General Plan noted the traditional character, historical buildings, cemeteries, and other features in the Montezuma Hills and Suisun Marsh areas. The 2008 Draft General Plan recognizes the special character of the Montezuma Hills and Suisun Marsh, and provides for the maintenance of those characteristics that define these areas as historically distinct. Several plans and programs and 2008 Draft General Plan goals, policies, and implementation programs will guide development; when considered in concert with the mitigation recommendations made in this Draft EIR, the 2008 Draft General Plan would reduce the severity of potential impacts on cultural resources in the Montezuma Hills and Suisun Marsh area. Implementation of the following plans and programs and 2008 Draft General Plan goal, policies, and programs would reduce such impacts:

- ▶ **Goal SS.G-3 and Policies SS.P-20 and SS.P-27** contain measures that acknowledge the historical character of the communities in the Montezuma Hills. These measures call for the preservation of significant buildings in the communities of Birds Landing and Collinsville, development that is consistent with the character of these rural communities, and protection of these communities from flood events. These Study Area measures, specific to historical resources and the traditional character of the Montezuma Hills area, would be used to update the *1979 Collinsville–Montezuma Hills Area Plan and Program*. Expanded focus would be given to maintaining and enhancing the traditional communities of Collinsville and Birds Landing, and ensuring that new uses are compatible with those communities.

- ▶ **Policy RS.P-9** goes beyond the preservation of buildings and structures to provide for the restoration of historic marshes to wetland status, thereby restoring the historical environmental context of the Montezuma Hills communities. Similarly, the Suisun Marsh Local Protection Program and *Suisun Marsh Protection Plan* seek to maintain the ecological balance of this sensitive marsh area, thus further maintaining the natural qualities that comprised the historical setting in the vicinity of Collinsville and Birds Landing.
- ▶ **Program RS.I-35** follows on this goal by calling for monitoring of the use levels of Suisun Marsh to ensure that protection of the marsh environment is given due consideration.
- ▶ **Policy AG.P-29 and Program AG.I-10** call for measures that will reinforce the area’s land use setting, in recognition of agriculture as a dominant historical theme in the Montezuma Hills area. Policy AG.P-29 recognizes that agriculture is to be the predominant land use in the Montezuma Hills area (among other areas), and that preservation efforts should be focused and conflicting land uses avoided. Program AG.I-10 calls for focused agricultural preservation efforts (including Williamson Act contracts and conservation easements) in areas where agriculture is to be the predominant land use (e.g., Montezuma Hills), thereby reinforcing this area’s historical setting.

The Montezuma Hills are located in the 2008 Draft General Plan’s Wind Energy Resource Overlay. Wind energy development would likely result in the installation of tall wind-generating structures that could be a discordant additions to the setting of historical resources. The changes in the setting, depending on the type of resource and the reasons for its significance, may result in a substantial adverse change in the significance of the resource. Therefore, this impact would be significant.

Mitigation Measure 4.10-5a: Conduct Viewshed Analysis and Install Buffers or Consider Alternate Siting Locations for Wind-Generating Structures to Reduce Impacts on Montezuma Hills Cultural Resources.

The County shall consider potential impacts on historical resources that may occur from the installation of wind-generating structures in the Montezuma Hills, and shall conduct a viewshed analysis. If the analysis indicates that an impact on historical resources is likely, the County shall implement feasible mitigation measures, such as installing visual buffers and/or considering alternate siting locations that would reduce the severity of such impacts. In accordance with 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.

Implementation of this mitigation measure in conjunction with the goals, policies, and programs identified previously, would reduce the severity of potential impacts on cultural resources in the Montezuma Hills and Suisun Marsh area to a **less-than-significant** level.

IMPACT 4.10-5b **Adverse Effects on Montezuma Hills and Suisun Marsh Area Historical Resources – Maximum Development Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in new buildings, roadways, or related facilities that would adversely affect cultural resources in the Montezuma Hills and Suisun Marsh area. This impact would be significant.*

This impact is the same as Impact 4.10-5a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.10-5b: Conduct Viewshed Analysis and Install Buffers or Consider Alternate Siting Locations for Wind-Generating Structures to Reduce Impacts on Montezuma Hills Cultural Resources.

This measure is the same as Mitigation Measure 4.10-5a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT **Loss of Integrity of Traditional Cultural Properties – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in new buildings, roadways, or related facilities that would diminish the integrity of TCPs. This impact would be **significant**.*

4.10-6a

A TCP is generally defined as a district (including landscapes), building, structure, site, or object that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that:

- ▶ are rooted in that community's history, and
- ▶ are important in maintaining the continuing cultural identity of the community (National Park Service 1990).

Examples of TCPs include a location associated with the beliefs of a Native American tribe; a rural community whose organization reflects its traditions; an urban neighborhood that is home to a particular cultural group; or a location where Native American religious practitioners have historically performed ceremonial activities. A TCP is not, however, confined to association with Native American communities. It can be of value to other ethnicities, to a neighborhood, to social groups, and to communities (see King 2003). In Solano County, for example, agricultural organizations, such as the 4-H Club, may have places that are important in maintaining the continuing cultural identity of their community. The same significant qualities that render a TCP eligible for the NRHP will almost always also render it eligible for the CRHR, making it a historical resource under CEQA.

One potential TCP was identified during the archival records search for the 2008 Draft General Plan. The presence of the potential TCP was confirmed by the NAHC in Sacramento, but its location was not disclosed out of respect for those who value the resource. This is not unusual in the case of Native American TCPs, as the sensitive nature of an important place may prevent the community that values it from revealing details to outsiders. It is also likely that there are additional TCPs in Solano County that have yet to be identified. As with rural historic landscapes, the relative lack of abundance of documented TCPs does not indicate that other such places do not exist in the county.

The 2008 Draft General Plan contains goals, policies, and programs to facilitate the consideration of potential impacts on TCPs. The Resources Element discusses these issues in the context of Senate Bill (SB) 18 requirements. SB 18 (Chapter 905, Statutes of 2004) requires that local governments (city and county) consult with Native American groups to aid in the protection of Native American cultural places through local land use planning. The intent of SB 18 is to provide an opportunity to participate in local land use decisions at an early stage to protect or mitigate impacts on cultural places. SB 18 requires local governments to consult with Native American groups before adopting and amending both general plans and specific plans, and when open space or areas proposed as open space contain cultural places.

The 2008 Draft General Plan identifies several tasks that the County intends to carry out through consultation with Native Americans:

- ▶ creating a dialogue between County and tribal governments to identify cultural places and consider such sites in land use planning decisions,
- ▶ developing a program to systematically avoid conflicts with Native American cultural places by ensuring that local and tribal governments are provided with information early in planning processes,
- ▶ evaluating the potential for permanently protecting certain Native American cultural places by designating them as open space,
- ▶ developing proper management and treatment plans for cultural places, and
- ▶ developing a program to enable tribes to manage their cultural places.

To accomplish these tasks, the 2008 Draft General Plan contains a policy and program specifically geared to Native American consultation:

- ▶ **Policy RS.P-39**, which calls for the County to consult with Native American governments to identify and consider Native American cultural places in land use planning; and
- ▶ **Policy RS.I-27**, which lists programs the County may engage in, including:
 - ensuring that local and Native American governments are provided with information early in the planning process,
 - working with Native American governments to preserve and protect Native American cultural sites by designating them as open space where possible,
 - providing management and treatment plans to preserve cultural places, and
 - working with Native American groups to manage their cultural places.

The tasks, policies, and programs identified in the 2008 Draft General Plan compose an effective mechanism for consulting with Native American groups to identify, protect, and, when necessary, mitigate impacts on potential TCPs. However, the 2008 Draft General Plan as written indicates that the County “intends” to pursue the consultative tasks, and that the actions identified by Program RS.I-27 “may include” certain elements. These tasks appear to be optional, and, as such, there is no certainty that they will be undertaken. Therefore, it cannot be concluded that potential impacts on TCPs, which would have been addressed through the implementation of the 2008 Draft General Plan, would be mitigated if the policies and programs are conditional. In addition, there is no provision made for impacts on TCPs that are not associated with Native American tribes.

Development associated with the implementation of the 2008 Draft General Plan may alter those characteristics that qualify, directly or indirectly, a TCP for the NRHP (and, by extension, the CRHR) in such a way that its historical integrity is diminished. The alteration may involve the destruction of an important place, or a change in the place may diminish its importance. Any such alteration may result in a substantial adverse change in the significance of the resource. Therefore, this impact would be significant.

Mitigation Measure 4.10-6a: Require Consultation with Native Americans and Consideration of Non-Native American TCPs.

The County shall make the conditional consultation expressed in Program RS.I-27 mandatory as part of the 2008 Draft General Plan, as well as a component of any area plans developed pursuant to the 2008 Draft General Plan. Additionally, the County shall require that any cultural resources studies undertaken for permitting under the 2008 Draft General Plan shall address the possibility that TCPs may include those important to non-Native American community groups. If such non-Native American TCPs are identified, impact mitigation recommendations of the consulting cultural resource professional shall be implemented by the County. In accordance with 14 CCR 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.

With implementation of this mitigation measure, in addition to the policies and programs contained in the 2008 Draft General Plan Update, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.10-6b **Loss of Integrity of Traditional Cultural Properties – Maximum Development Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in new buildings, roadways, or related facilities that would diminish the integrity of Traditional Cultural Properties. This impact would be **significant**.*

This impact is the same as Impact 4.10-6a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure 4.10-6b: Require Consultation with Native Americans and Consideration of Non-Native American TCPs.

This measure is the same as Mitigation Measure 4.10-6a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.10-7a **Destruction of Paleontological Resources – Preferred Plan.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in the destruction of paleontological resources. This impact would be **potentially significant**.*

A fossil locality search identified 238 localities in Solano County. Of these 238 localities, 29% are vertebrate and 71% are invertebrate. In addition to the documented occurrence of paleontological resources, most sedimentary geological units and some of the igneous geological units in the county are paleontologically sensitive.

Based on the guidelines issued by the Society of Vertebrate Paleontology, vertebrate fossils, their taphonomic and associated environmental indicators, and fossiliferous deposits are defined as significant nonrenewable paleontological resources. Botanical and invertebrate fossils and assemblages may also be considered significant resources (Conformable Impact Mitigation Guidelines Committee 1995).

Paleontological resources and paleontologically sensitive sediments are present in Solano County. The likelihood that any ground-disturbing activities would encounter “unique,” scientifically important paleontological resources is site-specific and depends on (1) the type of geologic formation that is present where the ground-disturbing activities would occur, (2) the depth of excavation activities, and (3) the size of the project (larger projects that involve more ground disturbance are more likely to encounter unique, scientifically important paleontological resources). The 2008 Draft General Plan does not contain goals, policies, and implementation programs that address paleontological resources. However, paleontological resources are included in the significance thresholds of Appendix G of the CEQA Checklist, and projects undertaken in furtherance of the objectives of the 2008 Draft General Plan may inadvertently damage or destroy paleontological resources. This impact would be potentially significant.

Mitigation Measure 4.10-7a: Determine the Need for a Paleontological Resources Analysis and Implement Recommended Mitigation.

The County shall implement the following measures:

- (a) Actions that do not meet the CEQA definition of a “project” and therefore do not require an environmental analysis under the CEQA process shall not be required to perform a paleontological resources analysis.
- (b) All projects in Solano County that are subject to a CEQA evaluation shall include a site-specific analysis of paleontological resources. At a minimum, the site-specific analysis shall include a review of the types of the geologic formation(s) present at the project site and a determination of the likelihood that those formation(s) would contain a “unique paleontological resource” as stated in Title 14, California Code of Regulations, Appendix G (the CEQA checklist). If the site-specific analysis determines that a project may have an adverse effect on a “unique paleontological resource,” the County shall require that project-specific mitigation measures be implemented to address the following:

- ▶ cessation of work in the vicinity of the find and notification of the County Planning Department and the lead agency for the project;
- ▶ retention by the project applicant of a qualified paleontologist to evaluate the resource and prepare a proposed mitigation plan, which may include some or all of the following elements: a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings; and
- ▶ implementation of recommendations made by the paleontologist, where the lead agency for the project determines that said recommendations are necessary and feasible.

Implementation of this mitigation measure would result in avoidance of damage to, and further study of, “unique” scientifically important paleontological resources, and would therefore reduce potentially significant impacts on unique paleontological resources to a **less-than-significant** level.

IMPACT 4.10-7b Destruction of Paleontological Resources – Maximum Development Scenario. *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in the destruction of paleontological resources. This impact would be **potentially significant**.*

This impact is the same as Impact 4.10-7a for the Preferred Plan. For the same reasons as described above, this impact would be potentially significant.

Mitigation Measure 4.10-7b: Determine the Need for a Paleontological Resources Analysis and Implement Recommended Mitigation.

This measure is the same as Mitigation Measure 4.10-7a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

IMPACT 4.10-8a Disturbance of Human Remains – Preferred Plan. *Development within Solano County in accordance with the 2008 Draft General Plan under the Preferred Plan may result in the disturbance of human remains, including those interred outside of formal cemeteries. This impact would be **significant**.*

Human remains in an archaeological context have been identified in Solano County, and future development will undoubtedly encounter additional remains that are yet to be identified. Avoidance of possible impacts on human remains is the preferred approach, especially in light of the importance of such remains to descendant communities. However, avoidance is not always possible. Projects undertaken in furtherance of the objectives of the 2008 Draft General Plan may encounter and disturb human remains. Therefore, this impact would be significant.

Mitigation Measure 4.10-8a: Require Pre-Project Consideration of the Possibility of Human Remains Discoveries, and Require Appropriate Consultation with Descendant Communities.

Based on the requirements of Mitigation Measure 4.10-3a (Require Preparation of a Cultural Resources Study and Implementation of Recommended Feasible Mitigation for Destruction of Prehistoric and Historical Archaeological Deposits), the County shall require project applicants to address the possibility of human remains occurring in given project sites in pre-project planning, based on the results of project-specific archival research and/or field study.

However, the possibility that human remains will be encountered in unexpected locations cannot be discounted. If a project undertaken pursuant to the 2008 Draft General Plan encounters human remains, the procedures set forth in PRC Section 5097.98 (the procedures governing the accidental discovery of human remains) shall be followed.

(Note that the requirements of PRC Section 5097.98 were amended by statute in September 2006, and modify the requirements for human remains discovery as described in 14 CCR Section 15064.5[e].) If, in following the requirements of PRC Section 5097.98, the human remains are determined to not be of Native American origin (and are not the remains of a recent decedent subject to the coroner's authority), then the County shall require the project applicant to consult with the appropriate descendant community regarding means for treating or disposing of the human remains, and any associated items, with appropriate dignity. Pursuant to 14 CCR Section 15126.4(a)(2), this mitigation shall be incorporated into the 2008 Draft General Plan.

The 2008 Draft General Plan emphasizes the early integration of Native American viewpoints and concerns during land use planning. Specifically, the County planning process and SB 18-mandated consultation are provided for in the 2008 Draft General Plan as represented by Policy RS.P-39 and Program RS.I-27. Implementation of Mitigation Measure 4.10-8a, in conjunction with the notification and collaborative planning requirements of Policy RS.P-39 and Program RS.I-27, would ensure that any remains are treated appropriately according to state law, and in a manner that takes into account the wishes of the descendant community. Therefore, this impact would be reduced to a **less-than-significant** level.

IMPACT 4.10-8b **Disturbance of Human Remains – Maximum Development Scenario.** *Development within Solano County in accordance with the 2008 Draft General Plan under the Maximum Development Scenario may result in the disturbance of human remains, including those interred outside of formal cemeteries. This impact would be significant.*

This impact is the same as Impact 4.10-8a for the Preferred Plan. For the same reasons as described above, this impact is considered significant.

Mitigation Measure 4.10-8b: Require Pre-Project Consideration of the Possibility of Human Remains Discoveries, and Require Appropriate Consultation with Descendant Communities.

This measure is the same as Mitigation Measure 4.10-8a above. For the same reasons as described above, implementation of this mitigation measure under the Maximum Development Scenario would reduce the impact to a **less-than-significant** level.

4.10.4 RESIDUAL SIGNIFICANT IMPACTS

It is anticipated that conflicts between land development and the preservation of significant buildings or structures would occur, resulting in instances where historical resources would be removed to accommodate development. Because it is possible that a building meeting the definition of a historical resource would be removed, Impact 4.10-1a under the Preferred Plan and Impact 4.10-1b under the Maximum Development Scenario would remain **significant and unavoidable** even with the implementation of mitigation.

It is anticipated that conflicts between land development and the preservation of significant buildings or structures would occur, resulting in instances where historical resources would be altered to accommodate development. Because it is possible that a building meeting the definition of a historical resource would be altered, Impact 4.10-2a under the Preferred Plan and Impact 4.10-2b under the Maximum Development Scenario would remain **significant and unavoidable** for building alteration even with the implementation of mitigation (although these impact would be reduced to a less-than-significant level with implementation of mitigation with regard to the alteration of setting).

4.11 AESTHETIC RESOURCES

This section includes an explanation of the various criteria and methods used to evaluate the significance and quality of aesthetic resources in Solano County, a description of the existing aesthetic resources in the county, and an evaluation of how implementation of the 2008 Draft General Plan would affect aesthetic resources in the county. Additional information related to aesthetic resources and activities in Solano County can be found in Chapter 1 of the Land Use Background Report prepared for the 2008 Draft General Plan (Solano County 2006).

4.11.1 EXISTING CONDITIONS

This section describes the existing environmental conditions at the time the notice of preparation (NOP) was filed pursuant to Section 15125 of the State CEQA Guidelines. The NOP for the 2008 Draft General Plan was filed on December 27, 2007.

Agricultural landscapes, the Sacramento–San Joaquin Delta (Delta) and marshlands, and oak- and grass-covered hills are the primary aesthetic resources in Solano County. Aesthetic resources promote a high quality of life for the county’s residents. Prominent scenic resources in Solano County include marshlands and Delta waters located to the south, the Coast Range extending in a north-south direction north and west of Fairfield, meandering hills between Cordelia and Benicia, and expanses of agricultural lands located primarily in the eastern half of the county.

Agriculture has historically been both an important industry in Solano County and a central part of the county’s identity. Agricultural lands account for more land than any other land use, which in turn defines much of the county’s visual character, supports wildlife habitats and migration corridors, provides open space and recreational amenities for residents and visitors, and acts as a separator defining the county’s cities.

Solano County contains extensive marshlands critical to the health and vitality of the estuary ecosystem in the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) area. The county is home to the largest contiguous brackish water marsh remaining on the west coast of North America and encompasses more than 10% of California’s remaining natural wetlands.

Solano County’s oak woodlands provide a unique resource of biological and scenic value. Oak woodlands are defined as areas that contain native oak trees of a certain size. Woodlands in Solano County provide habitat for a wide range of animal and plant species. In addition, woodlands moderate air and water temperatures, reduce soil erosion, facilitate nutrient cycling, and sustain water quality. Human pressures such as development, firewood harvesting, and agricultural conversions and natural effects such as the lack of oak regeneration and Sudden Oak Death threaten longevity of oak woodlands in the county and throughout the state.

Heritage trees also provide a unique scenic resource for residents and visitors to Solano County. Heritage trees are generally defined by their size, native origin, or historical value. These trees provide a sense of place, increase the aesthetics of communities and roadways, reduce energy costs associated with air conditioning, and increase the value of private property.

The Coast Range is the most prominent background visual resource throughout Solano County because of its unique geography. The topography in the eastern half of the county is primarily flat, which allows the Coast Range to stand out visually in the background of most views. Oak woodlands and grasslands stretch over the hillsides and are primarily undeveloped. In particular, the majority of ridgelines created by the Coast Range are currently in their natural form. Residents in Solano County identified ridgelines as a prominent and important visual resource that should be protected.

Urban growth occurring during recent decades has caused certain scenic resources to be lost or obscured; however, Solano County continues to retain a wealth of intact viewsheds. The County’s existing scenic resources

policies and implementation programs work in two ways. First, they protect valued landscape features found throughout the county; second, they ensure that new urban or rural development within the scenic roadway corridors is developed in a manner that respects and maintains the integrity of the viewsheds.

Existing light and glare originates primarily from existing urban centers (e.g., Fairfield, Vallejo, Vacaville, Benicia) located in the western half of the county. The eastern half of Solano County does not exhibit prominent sources of nighttime lighting, except from the communities of Dixon and Rio Vista, because of the dominant agricultural nature of the area.

4.11.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws pertaining to aesthetics are applicable.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Scenic Highway Program

The California Department of Transportation (Caltrans) manages the California Scenic Highway Program. The goal of the program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to highways. For designated highways, Caltrans requires local jurisdictions to implement a monitoring program that monitors and enforces scenic-corridor protection measures to preserve scenic views. The local agency is required to report to Caltrans once every 5 years on the success and continued enforcement of the protection measures. Caltrans requires developers of projects located adjacent to a state scenic highway to consult with the agency to determine whether the project would constitute a minor, moderate, or major intrusion to the scenic quality of the corridor. A minor intrusion is one that either is complementary to the landscape or is recognized for its cultural or historical significance (e.g., widely dispersed buildings with visual screenings). A moderate intrusion is one that is integrated into the landscape and does not degrade or obstruct scenic views (e.g., orderly and well-landscaped developments with or without roadway screening). A major intrusion is one that dominates the landscape and degrades or obstructs views (e.g., dense and continuous development that dominates the view).

There are not any officially designated scenic highways in Solano County. However, a stretch of State Route (SR) 37 located between the city of Vallejo and the county's western boundary is defined as an "eligible state scenic highway—not officially designated" by the California Scenic Highway Mapping System (Caltrans 2008). Additionally, SR 160, directly adjacent to the county border in Sacramento County, is a state-designated Scenic Highway.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

No regional or local plans, policies, regulations or laws pertaining to aesthetics are applicable.

4.11.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

This visual impact analysis evaluates the visual changes that would occur with implementation of the 2008 Draft General Plan using the standards of quality, consistency, and symmetry typically used for a visual assessment. The visual impacts were compared against the thresholds of significance discussed below. The visual impacts of the 2008 Draft General Plan were evaluated by comparing existing land uses with buildout of designated land uses under the 2008 Draft General Plan.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact related to aesthetic resources is considered significant if the proposed project would:

- ▶ have a substantial adverse effect on a scenic vista;
- ▶ substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- ▶ substantially degrade the existing visual character or quality of the site and its surroundings; or
- ▶ create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

IMPACT ANALYSIS

IMPACT 4.11-1a **Adverse Impacts on Scenic Vistas – Preferred Plan.** *Prominent views in Solano County include marshlands and Delta waters, the Coast Range, meandering hills, and expanses of agricultural lands. Views of the Coast Range and nearby hills are considered a scenic vista in Solano County. Views of the Coast Range could be partially or totally blocked by future urban land uses in Solano County. Further, urban development in Solano County would permanently alter the foreground and middle ground views from vehicles traveling along Interstate 80 (I-80), I-505, SR 37, and I-680. The 2008 Draft General Plan identifies areas that would be converted from existing open spaces to urban land uses. Because the 2008 Draft General Plan under the Preferred Plan envisions development of urban land uses that could partially or wholly block views of the Coast Range (a countywide scenic vista), this impact would be **significant**.*

Solano County encompasses numerous unique views: views of marshlands and Delta waters to the south, the Coast Range extending in a north-south direction north and west of Fairfield, meandering hills between Cordelia and Benicia, and expanses of agricultural lands primarily in the eastern half of the county. From these unique views in Solano County, views of the Coast Range and nearby hills are considered a scenic vista in Solano County because they are the one scenic resource viewable from a distance and from throughout the county.

Implementation of the 2008 Draft General Plan would result in construction of urban land uses adjacent to and surrounding the segments of I-80, I-505, I-680, and SR 37, which are popular travel routes in Solano County. Urban development could include large and tall buildings, soundwalls, berms, and other infrastructure (e.g., roadways, overpasses) that could partially or wholly block views of the Coast Range from specific areas in Solano County. Depending on the height of buildings constructed, development under the 2008 Draft General Plan could also obscure views of the Coast Range from highways and freeways in the county.

The 2008 Draft General Plan includes goals and policies that are intended to preserve the aesthetic quality and viewsheds in Solano County:

- ▶ **Policy RS.P-42:** Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.
- ▶ **Policy RS.P-66:** Require the siting of energy facilities in a manner compatible with surrounding land uses and in a manner that will protect scenic resources.

Although the 2008 Draft General Plan would provide general guidelines for design of future urban development projects, it does not specifically identify the design elements that would be implemented (e.g., landscape earthforms, building architecture, façade treatments, lighting fixtures) or the effectiveness of the design elements in reducing the visual impacts of the development. Policies in the 2008 Draft General Plan require urban

development to implement features that would reduce the potential impacts on views of the Coast Range (a countywide scenic vista); however, the urban development envisioned in the 2008 Draft General Plan under the Preferred Plan would permanently alter views, partially or wholly, of the Coast Range. Therefore, this impact would be significant.

Mitigation Measure

Implementation of policies in the 2008 Draft General Plan would ensure that subsequent projects are designed with design concepts and elements that would lessen significant impacts associated with preserving scenic views in the county. However, development of urban land uses would permanently change views throughout Solano County and countywide scenic vistas. No feasible mitigation measures or policies are available that could fully preserve the existing visual qualities of Solano County while allowing development of urban land uses under the Preferred Plan. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-1b **Adverse Impacts on Scenic Vistas – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would envision development of urban land uses that could partially or wholly block views of the Coast Range, a countywide scenic vista in Solano County. Views of the Coast Range could be partially or totally blocked by future urban land uses in Solano County. Further, urban development in Solano County would permanently alter the foreground and middle ground views from vehicles traveling along I-80, I-505, SR 37, and I-680. The 2008 Draft General Plan identifies areas that would be converted from existing open spaces to urban land uses. Because the 2008 Draft General Plan under the Maximum Development Scenario envisions development of urban land uses that could partially or wholly block views of the Coast Range (a countywide scenic vista), this impact would be **significant**.*

This impact is similar to Impact 4.11-1a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would continue to allow development of urban land uses that would partially or completely block views of a unique scenic vista in Solano County (i.e., the Coast Range). The analysis for the Preferred Plan concluded that urban development as envisioned in the 2008 Draft General Plan would permanently alter views, partially or wholly, of the Coast Range. Because the Maximum Development Scenario would result in similar urban development, views of a scenic resource would also be permanently altered under this scenario. This impact would be significant.

Mitigation Measure

For the same reasons as described for the Preferred Plan above, no feasible mitigation is available to reduce this impact. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-2a **Damage to Scenic Resources within a State Scenic Highway – Preferred Plan.** *Development of urban land uses in Solano County under the Preferred Plan, specifically the area surrounding the city of Rio Vista, would be visible from SR 160, which is a state-designated scenic highway in Sacramento County. The 2008 Draft General Plan identifies extensive agricultural land uses surrounding the existing urban development in Rio Vista. Caltrans has identified agricultural areas and small towns viewable from SR 160 as scenic resources. The 2008 Draft General Plan identifies continuation of existing agricultural land uses surrounding existing urban development in Rio Vista. However, the 2008 Draft General Plan also promotes development of electricity-generating wind-powered facilities that would be viewable from SR 160. This impact would be **significant**.*

No state scenic highways currently extend through Solano County. The closest state scenic highway to Solano County is SR 160 in Sacramento County. At its southernmost extent, SR 160 runs adjacent to the Sacramento River and directly across from Solano County. Specifically, the city of Rio Vista, located in the southeasternmost portion of the county, is visible from SR 160. Caltrans has identified agricultural areas and small towns viewable from SR 160 as scenic resources. For the purposes of this analysis, Rio Vista is characterized as a “small town.”

The *City of Rio Vista General Plan 2001* proposes urban development in parts of the unincorporated areas of the city's sphere of influence. Under the 2008 Draft General Plan the existing agricultural land uses would remain until annexation occurs. Upon annexation, the development would convert existing views of agricultural lands and could potentially reduce the "small town" character of Rio Vista. Although the potential development could affect scenic resources viewable from SR 160, such impacts would occur as a result of development approved by the City of Rio Vista and are outside the purview of the 2008 Draft General Plan. The City of Rio Vista will be required to review the potential impacts of converting agricultural land to development as part of a separate CEQA analysis.

The 2008 Draft General Plan includes the following policies and implementation programs that are intended to preserve scenic views in Solano County:

- ▶ **Policy LU.P-14:** Establish rural residential development in a manner that preserves rural character and scenic qualities and protects sensitive resources including agricultural lands [defined in the Agriculture chapter of the General Plan], creeks, native trees, open spaces, and views.
- ▶ **Policy RS.P-42:** Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.
- ▶ **Policy RS.P-44:** Protect the visual character of designated scenic roadways.
- ▶ **Policy RS.P-66:** Require the siting of energy facilities in a manner compatible with surrounding land uses and in a manner that will protect scenic resources.
- ▶ **Program RS.I-25:** Preserve the visual character of scenic roadways through design review, designating alternate routes for faster traffic, regulating off-site advertising, limiting grading in the view corridor through the grading ordinance, limiting travel speeds, and providing pullover areas with trash and recycling receptacles.
- ▶ **Program RS.I-41:** Amend and maintain the zoning ordinance to guide the siting of commercial, nonaccessory wind turbine installations. Include the following standards into the ordinance:
 - Require a setback of 1/4 mile from the right-of-way of any scenic roadway.

In addition, the 2008 Draft General Plan would establish a Wind Energy Resource Overlay that would promote development of electricity-generating wind-powered facilities in the southernmost portion of Solano County and near SR 160. This designation recognizes areas that contain significant wind resources and promotes alternative and renewable energy sources that can be produced from resources available in the county. Because the Wind Energy Resource Overlay would promote construction of additional wind turbines, scenic views of the area south of Rio Vista and viewable from SR 160 could be significantly altered from existing conditions.

Although the 2008 Draft General Plan under the Preferred Plan would provide general guidelines for design of future urban development, including wind turbines, to protect scenic views, it does not specifically identify the design elements that would be implemented (e.g., landscape earthforms) or the effectiveness of the design elements in reducing the visual impacts of the development. Policies of the 2008 Draft General Plan require urban development to be designed to reduce the potential impacts on scenic views of the agricultural lands viewable from SR 160; however, development of wind turbines as envisioned in the 2008 Draft General Plan could substantially and permanently alter views of scenic resources from a state-designated scenic highway. Therefore, this impact would be significant.

Mitigation Measure 4.11-2a(1): Require Consultation with Caltrans before Approval of Individual Development Projects near Rio Vista.

The County shall require that project applicants for development projects within 1 mile of SR 160, or otherwise having the potential to be visible from SR 160 as determined by the County based on information provided by the applicant, consult with Caltrans, and that Caltrans review proposed land use plans before project approval. The applicants shall implement design measures recommended by Caltrans to minimize impacts on scenic resources from SR 160 to the maximum extent practical. Recommended design measures could include the use of setbacks, nonreflective building materials, and specific design features (e.g., overhang, finishes, paint) that create a pleasing aesthetic. If the project applicant can demonstrate that the development is not visible from SR 160, then design measures shall not be required.

Mitigation Measure 4.11-2a(2): Require Project Applicants to Submit Tentative Maps and Landscaping, Lighting, and Design Plans to the County before Approval of Individual Development Projects near Rio Vista.

The County shall require project applicants for development projects within 1 mile of the city of Rio Vista, or otherwise having the potential to be visible from the city as determined by the County based on information provided by the applicant, to submit tentative maps and landscaping, lighting, and design plans to the County for review and approval before approval of the development projects. The plans shall demonstrate that all feasible and practical design measures (e.g., landscaping, open space buffers, use of neutral colors) have been incorporated into the project to achieve or exceed all requirements of 2008 Draft General Plan policies and minimize the project's impacts on scenic resources, consistent with County standards. If the project applicant can demonstrate that the development is not visible from SR 160, then design measures shall not be required.

Implementation of Mitigation Measures 4.11-2a(1) and 4.11-2a(2) for the Preferred Plan would ensure that future project applicants would implement all feasible design measures to minimize significant impacts on views of scenic resources from SR 160. However, future urban development projects would permanently alter views of scenic resources from SR 160, and no other feasible mitigation is available that would be able to protect views of existing scenic resources while at the same time allowing urban development. Therefore, this impact would remain **significant and unavoidable**.

IMPACT **Damage to Scenic Resources within a State Scenic Highway – Maximum Development Scenario.**
4.11-2b *Development of urban land uses in Solano County under the Maximum Development Scenario, specifically the area surrounding the city of Rio Vista, would be visible from SR 160, which is a state-designated scenic highway in Sacramento County. The 2008 Draft General Plan identifies extensive agricultural land uses surrounding the existing urban development in Rio Vista. Caltrans has identified agricultural areas and small towns viewable from SR 160 as scenic resources. The 2008 Draft General Plan identifies continuation of existing agricultural land uses surrounding existing urban development in Rio Vista. However, the 2008 General Plan also promotes development of electricity-generating wind-powered facilities that would be viewable from SR 160. This impact would be **significant**.*

This impact is similar to Impact 4.11-2a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would continue to promote development of electricity-generating wind-powered facilities that would be viewable from a scenic highway (i.e., SR 160). The analysis for the Preferred Plan concluded that development of wind turbines as envisioned in the 2008 Draft General Plan could substantially and permanently alter views of scenic resources from a state-designated scenic highway. Because the Maximum Development Scenario would also allow development of wind turbines viewable from a state-designated scenic highway, this impact would be significant.

Mitigation Measure 4.11-2b(1): Require Consultation with Caltrans before Approval of Individual Development Projects near Rio Vista.

This measure is the same as Mitigation Measure 4.11-2a(1) above.

Mitigation Measure 4.11-2b(2): Require Project Applicants to Submit Tentative Maps and Landscaping, Lighting, and Design Plans to the County before Approval of Individual Development Projects near Rio Vista.

This measure is the same as Mitigation Measure 4.11-2a(2) above.

For the same reasons as described for the Preferred Plan above, this impact would remain **significant and unavoidable**.

IMPACT 4.11-3a **Degradation of Visual Character – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan would substantially alter the visual character of Solano County through conversion of agricultural and open space lands to developed urban uses. Assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether such an alteration would also be considered a substantial degradation of the visual character. For this analysis, a conservative approach was taken to analyzing the potential for degradation of the visual character in Solano County. This impact would be **significant**.*

Agricultural landscapes, the Delta and marshlands, and oak- and grass-covered hills are the primary aesthetic resources in Solano County. Prominent scenic resources in Solano County include marshlands and Delta waters to the south, the Coast Range extending in a north-south direction north and west of Fairfield, meandering hills between Cordelia and Benicia, and expanses of agricultural lands located primarily in the eastern half of the county.

With implementation of the 2008 Draft General Plan under the Preferred Plan, visual conditions of new urban development in the county would be similar to existing views of suburban settings found throughout the county (e.g., the city of Vallejo, the city of Fairfield, the development corridor along I-80). Further, implementation of urban development envisioned in the 2008 Draft General Plan would extend the existing urban development boundaries farther outward. Open space, especially in an urbanizing setting, is valued for its visual quality. In Solano County, agricultural lands are equally valued for their visual quality.

Numerous communities in Solano County have expressed a common desire to maintain a distinct sense of identity and to remain physically separated from other cities. Community separators are an effective means of achieving this goal. The cities in the county, as well as some neighboring communities, have established agreements and plans in order to maintain land between urban communities as open space and agricultural uses. In response, the 2008 Draft General Plan would create an Agricultural Reserve Overlay to contribute to the cities' efforts. The intent of the overlay is to preserve the valued agricultural landscapes that exist in the areas between the communities of Vacaville and Dixon and between Dixon and Davis by encouraging private landowners to voluntarily participate in land conservation. The Agricultural Resource Overlay is intended to facilitate the County's various farmland protection goals and to maintain scenic resources along the I-80 corridor.

The 2008 Draft General Plan includes numerous policies that are intended to preserve the visual character in Solano County:

- ▶ **Policy LU.P-11:** Within municipal service areas, work with cities to protect and maintain designated community buffers within city jurisdiction compatible with adjoining agricultural uses.
- ▶ **Policy LU.P-14:** Establish rural residential development in a manner that preserves rural character and scenic qualities and protects sensitive resources including agricultural lands [defined in the Agriculture chapter of the General Plan], creeks, native trees, open spaces, and views.

- ▶ **Policy LU.P-16:** Preserve the character and quality of existing Traditional Community areas without expanding these communities further into unincorporated areas.
- ▶ **Policy LU.P-22:** Ensure that commercial and industrial development that occurs adjacent to a city is developed consistent with the development design standards of the adjacent city.
- ▶ **Policy SS.P-1:** Maintain the rural character of Middle Green Valley while still allowing development to be guided into areas screened from Green Valley Road because of natural contours in the land, woodland vegetation, and/or riparian vegetation. Locate upland development in areas screened by landforms or vegetation.
- ▶ **Policy SS.P-2:** Balance the protection of resources in Middle Green Valley (e.g., viewsheds, oak woodlands, riparian habitat, sustainable agricultural use) while allowing development to occur.
- ▶ **Policy SS.P-4:** Provide a variety of incentives and techniques to encourage property owners to preserve natural and visual resources, in addition to the transfer of development rights in Middle Green Valley.
- ▶ **Policy SS.P-11:** Ensure that future development fits the scale of the Suisun Valley's rural and agricultural context.
- ▶ **Policy SS.P-16:** Develop design guidelines to promote community character and facilitate tourism within neighborhood agricultural/tourist centers.
- ▶ **Policy SS.P-21:** Preserve the residential character of the Collinsville town site; ensure that any future nonresidential uses are compatible with the residential character and that an adequate buffer is established between residential and nonresidential uses.
- ▶ **Policy SS.P-28:** Prevent the loss of significant historic buildings and structures and support incentives that encourage individual property owners to preserve the historic character of Old Town Cordelia properties and to learn about the history of the town.
- ▶ **Policy SS.P-29:** Ensure that any future development in Old Town Cordelia is appropriately designed and scaled to fit in with the community's historic context.
- ▶ **Policy RS.P-22:** Ensure that development of wind turbines in the Suisun Marsh will not have substantial adverse ecological or aesthetic impacts on the marsh.
- ▶ **Policy RS.P-26:** Provide for public access and recreational uses that expand and diversify recreational opportunities within the Suisun Marsh such as bird watching, picnicking, hiking, duck hunting, and nature study. Recreation activities that could result in adverse effects on the environment or aesthetic qualities of the Suisun Marsh should not be permitted.
- ▶ **Policy RS.P-42:** Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.
- ▶ **Policy RS.P-66:** Require the siting of energy facilities in a manner compatible with surrounding land uses and in a manner that will protect scenic resources.
- ▶ **Policy RS.P-67:** Work with cities to maintain open space separators around cities to preserve their identity and character.
- ▶ **Policy RS.P-68:** Retain rural character in areas between cities by promoting agricultural uses within community separators.

- ▶ **Policy RS.P-69:** Retain community separators of sufficient size to ensure the continued economic sustainability of areas in productive agricultural use.
- ▶ **Policy RS.P-70:** Encourage cities to maintain defined community separators in appropriate productive agricultural or open space use.
- ▶ **Policy HS.P-49:** Encourage design that minimizes negative effects of noise without compromising aesthetic values and pedestrian and auto connectivity.

The 2008 Draft General Plan incorporates numerous policies aimed at retaining important natural features (e.g., creeks, oak woodlands) and agricultural lands for their visual qualities and maintaining views from highways. Further, the 2008 Draft General Plan would implement an Agricultural Overlay Zone intended to assist in preserving valued agricultural landscapes. Although these 2008 Draft General Plan policies would reduce visual impacts of future urban development, the loss of existing visual resources (e.g., agricultural lands, open spaces, oak woodlands) would continue to occur with development of urban land uses throughout Solano County.

Additionally, the 2008 Draft General Plan would establish a Wind Energy Resource Overlay that would promote development of electricity-generating wind-powered facilities. This designation recognizes areas that contain significant wind resources and promotes alternative and renewable energy sources that can be produced from resources available in the county. Because the Wind Energy Resource Overlay would promote construction of wind turbines, the visual character in the southernmost portion of Solano County could change significantly from existing conditions.

The existing agricultural and open space land uses in Solano County are considered by some individuals to be a valuable visual resource. Individuals may consider the conversion of agricultural land uses and open spaces to urban and wind energy development as a loss of an aesthetically pleasing and valuable viewshed. Agricultural lands and open space are a valuable aesthetic resource, and this resource would continue to diminish in Solano County with implementation of the 2008 Draft General Plan under the Preferred Plan. This impact would be significant.

Mitigation Measure 4.11-3a: Require Preparation of Design Guidelines and Landscaping Standards.

The County shall require project applicants to prepare comprehensive design guidelines and landscaping standards as conditions of approval of development projects to address impacts on aesthetic resources associated with the conversion of agricultural and open space land uses to urban and wind energy development.

Implementation of Mitigation Measure 4.11-3 would ensure that design guidelines and landscaping standards would be included as part of future development projects and that future urban and wind energy development remains within aesthetic guidelines established in policies of the 2008 Draft General Plan. However, there is no mechanism to allow implementation of development projects while avoiding the conversion of the local viewsheds from agricultural land uses and open spaces to urban and wind energy development. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-3b **Degradation of Visual Character – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would substantially alter the visual character of Solano County through conversion of agricultural and open space lands to developed urban uses. Assessment of visual quality is a subjective matter, and reasonable people can disagree as to whether such an alteration would also be considered a substantial degradation of the visual character. For this analysis, a conservative approach was taken to analyzing the potential for degradation of the visual character in Solano County. This impact would be **significant**.*

This impact is similar to Impact 4.11-3a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would continue to allow development of urban land uses that would substantially alter the visual character of Solano County through conversion of agricultural and open space lands to developed urban and wind energy uses. The analysis for the Preferred Plan concluded that agricultural lands and open space are a valuable aesthetic resource in Solano County and that this resource would continue to diminish with urban and wind energy development as envisioned in the 2008 Draft General Plan. Because the Maximum Development Scenario would result in similar urban and wind energy development, this impact would be significant.

Mitigation Measure 4.11-3b: Require Preparation of Design Guidelines and Landscaping Standards.

For the same reasons as described for the Preferred Plan above, this impact would remain **significant and unavoidable**.

IMPACT 4.11-4a **Increase in Nighttime Lighting and Daytime Glare – Preferred Plan.** *Urban development projects within Solano County under the Preferred Plan would require nighttime lighting and could construct facilities with reflective surfaces that could inadvertently cast light and glare toward motorists on area highways and roadways under day and nighttime conditions. However, the degree of darkness experienced in the eastern portion of Solano County would not substantially diminish as a result of implementing the 2008 Draft General Plan and would effectively retain views of stars and other features of the night sky. Although urban development envisioned in the 2008 Draft General Plan would increase the amount of nighttime light and daytime glare primarily adjacent to existing urban communities in Solano County, a Specific Project Area would introduce a new source of nighttime lighting in a rural portion of the county. This impact would be **significant**.*

Urban communities in Solano County (e.g., the cities of Fairfield, Vallejo, and Rio Vista) currently generate significant sources of light, glare, or light trespass into the night sky. The majority of new urban development envisioned in the 2008 Draft General Plan would be located adjacent to these existing urban communities. However, the 2008 Draft General Plan identifies a Specific Project Area located approximately 4 miles southeast of Travis Air Force Base, in a predominantly agricultural area. If this Specific Project Area developed with urban land uses, a new source of nighttime light and glare would be located in an area currently obscured from significant sources of nighttime lighting. In addition, development of individual projects throughout Solano County would require lighting of roadways, parks, schools, and other facilities associated with urban land uses.

The 2008 Draft General Plan includes the following policy and implementation programs that are intended to reduce impacts from nighttime lighting and glare in Solano County:

- ▶ **Policy RS.P-43:** Support and encourage practices that reduce light pollution and preserve views of the night sky.
- ▶ **Program RS.I-24:** Amend the zoning ordinance to:
 - direct the use of lighting fixtures that reduce glare and light pollution. The ordinance should provide standards for the type and location of lighting fixtures in development projects.
- ▶ **Program RS.I-26:** In new developments, require the use of fixtures that direct light toward target areas and shield it from spillage.
- ▶ **Program RS.I-27:** Provide education on light pollution and how individuals and development proposals may decrease impacts.

A substantial increase in the amount of nighttime light and glare would result from development of urban land uses throughout Solano County, potentially obscuring views of stars and other features of the night sky. In

addition, nighttime lighting in future urban development areas, or the presence of reflective surfaces on buildings in these areas (e.g., reflective window glazing), could result in light and glare shining onto motorists traveling along highways and roadways in day and nighttime conditions. Policies of the 2008 Draft General Plan focus on reducing impacts that could result from lighting sources. However, urban development envisioned in the 2008 Draft General Plan would continue to require substantial new lighting and could result in construction of buildings with reflective surfaces that could cast glare toward motorists on local roadways. Specifically, the 2008 Draft General Plan identifies a Specific Project Area in an agricultural area void of substantial lighting sources. Development of urban land uses identified in the 2008 Draft General Plan under the Preferred Plan would introduce substantial new light sources adjacent to existing urban communities and in a rural portion of Solano County, which would cause light trespass into the night sky and would create a new source of skyglow and could obscure views of stars and other features of the night sky. This impact would be significant.

Mitigation Measure 4.11-4a(1): Require Lighting and Building Materials that Minimize Glare and Reflectance.

The County shall require project applicants to implement the following measures as conditions of approval of development projects:

- (1) Light fixtures shall be installed that have light sources aimed downward and shielded to prevent glare or reflection or any nuisance, inconvenience, and hazardous interference of any kind on adjoining streets or property.
- (2) Exterior building materials on nonresidential structures shall be composed of a minimum 50% low-reflectance, nonpolished finishes.
- (3) Bare metallic surfaces (e.g., pipes, vents, light fixtures) shall be painted to minimize reflectance.

Mitigation Measure 4.11-4a(2): Require Preparation of Design Guidelines with Appropriate Lighting and Signage Standards.

The County shall require project applicants to prepare comprehensive design guidelines as conditions of approval of development projects. The design guidelines shall include lighting standards that are structured to balance the safety of residents with the value of darkness. At a minimum, the lighting standards shall prohibit the use of harsh mercury vapor, low-pressure sodium, or fluorescent bulbs for public lighting or residential neighborhoods. Guidelines shall also be provided regarding appropriate lighting and signage in office and/or commercial areas to prevent light and glare from adversely affecting motorists and adjacent land uses. The design guidelines shall be submitted to the County for review and approval.

With implementation of Mitigation Measures 4.11-4a(1) and 4.11-4a(2) and implementation of policies in the 2008 Draft General Plan under the Preferred Plan, the potential light and glare impacts of future development projects would be minimized to the maximum extent practicable. Although implementation of policies in the 2008 Draft General Plan would reduce impacts related to light and glare, new urban development envisioned in the plan would permanently add nighttime lighting into a rural area that is relatively void of nighttime lighting. No other mitigation measures are feasible that would fully preserve existing nighttime views while at the same time allowing urban development. Therefore, this impact would be **significant and unavoidable**.

IMPACT 4.11-4b

Increase in Nighttime Lighting and Daytime Glare – Maximum Development Scenario. *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would envision development of urban land uses that would require nighttime lighting and could construct facilities with reflective surfaces that could inadvertently cast light and glare toward motorists on area highways and roadways under day and nighttime conditions. However, the degree of darkness experienced in the eastern portion of Solano County would not substantially diminish as a result of implementing the 2008 Draft General Plan and would effectively retain views of stars and other features of the night sky. Although urban development envisioned in the 2008 Draft General Plan would increase the amount of nighttime light and daytime glare primarily adjacent to existing*

*urban communities in Solano County, a Specific Project Area would introduce a new source of nighttime lighting in a rural portion of the county. This impact would be **significant**.*

This impact is similar to Impact 4.11-4a for the Preferred Plan. Urban development envisioned in the Maximum Development Scenario of the 2008 Draft General Plan would continue to require substantial new lighting and could construct buildings with reflective surfaces that could cast glare toward motorists on local roadways, including a Specific Project Area located in an agricultural area. The Maximum Development Scenario would result in urban development similar to that of the Preferred Scenario. Therefore, this impact would be significant.

Mitigation Measure 4.11-4b(1): Require Lighting and Building Materials that Minimize Glare and Reflectance.

This measure is the same as Mitigation Measure 4.11-4a(1) above.

Mitigation Measure 4.11-4b(2): Require Preparation of Design Guidelines with Appropriate Lighting and Signage Standards.

This measure is the same as Mitigation Measure 4.11-4a(1) above.

For the same reasons as described for the Preferred Plan above, this impact would remain **significant and unavoidable**.

4.11.4 RESIDUAL SIGNIFICANT IMPACTS

Implementation of policies in the 2008 Draft General Plan would ensure that subsequent projects are designed with design concepts and elements that would lessen significant impacts associated with preserving scenic views in the county. However, development of urban land uses and wind turbine projects would permanently change views throughout Solano County and countywide scenic vistas. No feasible mitigation measures or policies are available that could fully preserve the existing visual qualities of Solano County while allowing development of urban land uses under the Preferred Plan or the Maximum Development Scenario. Therefore, Impacts 4.11-1a and 4.11-1b would remain **significant and unavoidable**.

Implementation of Mitigation Measures 4.11-2a(1) and 4.11-2a(2) for the Preferred Plan and Mitigation Measures 4.11-2b(1) and 4.11-2b(2) for the Maximum Development Scenario would ensure that future project applicants would implement all feasible design measures to minimize significant impacts on views of scenic resources from SR 160. However, future urban development projects would permanently alter views of scenic resources from SR 160, and no other feasible mitigation is available that would be able to protect views of existing scenic resources while at the same time allowing urban development. Therefore, Impacts 4.11-2a and 4.11-2b would remain **significant and unavoidable**.

Because of the location of future urban development envisioned in the 2008 Draft General Plan, no feasible mitigation is available to address impacts on aesthetic resources associated with the conversion of agricultural and open space land uses to urban development. Design, architectural, development, and landscaping standards would be included as part of future development projects and would ensure that future urban development remains within aesthetic guidelines established in policies of the 2008 Draft General Plan; however, there is no mechanism to allow implementation of development projects while avoiding the conversion of the local viewsheds from agricultural land uses and open spaces to urban development. Therefore, Impacts 4.11-3a and 4.11-3b would remain **significant and unavoidable**.

With implementation of Mitigation Measures 4.11-4a(1) and 4.11-4a(2) for the Preferred Plan and Mitigation Measures 4.11-4b(1) and 4.11-4b(2) for the Maximum Development Scenario, and implementation of policies in the 2008 Draft General Plan, the potential light and glare impacts of future development projects would be minimized to the maximum extent practicable. Although implementation of 2008 Draft General Plan policies

would reduce impacts related to light and glare, new urban development envisioned in the plan would permanently add nighttime lighting into a rural area that is relatively void of nighttime lighting. No other mitigation measures are feasible that would fully preserve existing nighttime views while at the same time allowing urban development. Therefore, Impacts 4.11-4a and 4.11-4b would remain **significant and unavoidable**.

4.12 ENERGY

This section describes the supply and use of energy in Solano County, as well as local actions to conserve energy and use it more efficiently. The county obtains energy from a variety of nonrenewable and renewable sources. Today, establishing methods and a framework for increasing use and development of renewable energy sources is a growing priority because of increasing quantification of pollution impacts related to energy use and its localized effects on habitat and ecological functions as well as quality-of-life issues affecting communities.

4.12.1 EXISTING CONDITIONS

EXISTING ENERGY SOURCES

The generating capacity of a unit of energy is expressed in megawatts (MW) or kilowatts (kW). One MW provides enough energy to power 1,000 average California homes per day. Net generation refers to the gross amount of energy produced by a unit minus the amount of energy the unit consumes. Generation is typically measured in megawatt-hours (MWh), kilowatt-hours (kWh), or gigawatt-hours (GWh).

The following energy sources are utilized in Solano County:

- ▶ Electricity
 - Power plants
 - Wind facilities
 - Solar facilities
 - Dams and hydroelectric facilities
- ▶ Fossil fuels
 - Natural gas resources
 - Petroleum refining
- ▶ Geothermal resources
- ▶ Alternative energy and renewable energy resources

The following sections describe these existing sources of energy.

Electricity

Over the past 10 years, electricity generation in California has undergone a transition. Historically, California has relied heavily on oil- and gas-fired plants to generate electricity. Spurred by regulatory measures and tax incentives, California's electrical system has become more reliant on renewable energy sources, including cogeneration, wind energy, solar energy, geothermal energy (described separately below), biomass conversion, transformation plants, and small hydroelectric plants. Unlike petroleum production, generation of electricity is usually not tied to the location of the fuel source and can be delivered great distances via the electrical grid. Pacific Gas and Electric Company (PG&E) supplies electricity to Solano County. The county acts as a major transmission line corridor serving the greater Bay Area.

Power Plants

Three fossil-fueled power plants—the Potrero Power Plant, the Pittsburg Power Plant, and the Contra Costa Power Plant—are located in nearby San Francisco and Contra Costa Counties. The Potrero Power Plant borders Solano County to the south. These power plants consist of a mix of 10 steam turbine units and three combustion turbine units. Each of these plants generates electricity primarily from steam turbines and boilers fueled by natural gas (PG&E 1998).

Additionally, a significant percentage of California's electricity supply comes from the in-state Diablo Canyon and San Onofre nuclear power plants. Solano County does not contain a nuclear power plant.

As a part of the overall strategic plan to prevent future energy blackouts and other energy shutdowns, the State of California engaged Calpine Corporation to build a series of “peaker” projects, which are smaller energy facilities that operate only during periods of high power demand. As part of this program, four natural gas–fueled peaker facilities were built in Solano County and became operational in 2003 (Calpine Corporation 2006):

- ▶ *Creed Energy Center* is located in the Lambie industrial area. This facility has one combustion turbine that produces electricity during times of peak demand with a capacity of 47 MW.
- ▶ *Wolfskill Energy Center* is located in Fairfield. The facility has one combustion turbine with a capacity of 48–49 MW of electricity during peak demand.
- ▶ *Goose Haven Energy Center* is located in the Lambie industrial area. This facility's production capacity during times of peak demand is 47 MW of electricity.
- ▶ *Lambie Energy Center* is located near the Lambie industrial area. This facility has one combustion turbine with a peak-demand production capacity of 47 MW of electricity.

All electricity generated goes to the grid and is dispatched by the Independent System Operator (Trottier, pers. comm., 2006). Valero's Cogeneration Power Plant in the city of Benicia will add 102 MW of energy for the county. The power plant will be operated at the Valero Refining Company. The plant is not yet operational.

Wind Facilities

A wind energy system converts the kinetic energy in the wind into mechanical or electrical energy that can be utilized for practical purposes. Wind electric turbines generate electricity for homes and businesses and for sale to utilities. Wind electricity can be generated on a small residential scale with small turbines (typically a few kW or less in capacity, but some as large as 30 kW), or on a utility scale via large wind farms.

Wind energy plays an integral role in California's electricity portfolio. According to the California Energy Commission (CEC), the Solano County resource area contributes 6% of all new wind development in California. In 2000, turbines in wind farms in California generated about 1.27% of the state's total electricity resource, enough to light a city the size of San Francisco. Additionally, hundreds of people are using smaller wind turbines to produce electricity for their homes and businesses; however, this amount of energy is not easily quantified.

Existing utility-scale wind power generation facilities can be found in five major resource areas in California; Solano County, Altamont, San Geronio, Tehachapi, and Pacheco. Solano County has a capacity to generate 165 MW and produces 102 GWh of wind power generation, with most of that power produced during spring and summer (April–September), when winds are stronger. Medium-sized turbines are used to generate power in Solano County, including 600 turbines with a capacity of 11–199 kW and 17 turbines with a capacity of 200–499 kW (CEC 2005a). As of 2003, approximately 700 turbines were located in Solano County, and the number of turbines is expected to grow with the construction of new projects, such as the Shiloh I Wind Plant project and the enXco V project, both discussed below.

Collinsville–Montezuma Hills Wind Resource Area

The County designated the western portion of the Collinsville–Montezuma Hills Wind Resource Area as land suitable for wind energy development in the 1987 *Wind Turbine Siting Plan* and EIR, based on wind energy monitoring and assessment studies conducted in the late 1970s and 1980s by CEC, PG&E, and the U.S. Bureau of Reclamation (Reclamation). These studies determined that the area experienced enough strong and steady winds to support several commercial wind plants. The 2008 Draft General Plan has delineated the boundary of this area based on updated CEC data. The area is depicted in the land use diagram as the Wind Resource Overlay. In the 2008 Draft General Plan the Wind Resource Overlay identifies the Collinsville–Montezuma Hills area as the primary wind resource area in the county.

Winds in this area are created by the combination of warm summer air in the Sacramento Valley with cooler air from the Pacific Ocean and San Francisco Bay flowing through gaps in the coastal hills into the Sacramento Valley. This difference in temperature and atmospheric surface pressure circulation results in high wind speeds in the wind resource area. Based on the wind resource assessment conducted by Shiloh, the average annual wind speed in this area at a height of 213 feet above ground level is 16.4 miles per hour. Several commercial wind plants have already been constructed in this wind resource area or are currently in the development stages.

Collinsville–Montezuma Hills Wind Facilities

In addition to the agricultural land, several commercial energy-producing facilities are located within Solano County, specifically in the Collinsville–Montezuma Hills area. Owners of the commercial wind plant facilities in the Collinsville–Montezuma Hills area include Sacramento Municipal Utility District (SMUD); High Winds LLC; Energy Montezuma Wind; LLC; enXco V, PPM Energy (Shiloh); and Shiloh Wind Partners, LLC.

The enXco V project, which was originally built in 1989 and 1990 by U.S. Windpower (USW), is located on the north and south sides of Birds Landing Road and Montezuma Hills Road. The enXco V project currently operates 600 individual USW 56-100 turbines, each with the capacity to generate 100 kW of electricity. The project is in the process of replacing the USW 56-100 turbines with newer, more efficient models. A draft initial study/mitigated negative declaration to remove 90 of the existing 56-100 turbines and replace them with six new General Electric 1.5-MW turbines was prepared for enXco's project and issued by the County in June 2004. The older models are approximately 91–111 feet high to the tip of the blade; the 1.5-MW replacement turbines would measure 340 feet high. The 510 remaining 56-100 turbines will remain in service. The County is currently reviewing this project.

The High Winds Project is also located immediately adjacent to the Shiloh property boundaries. In late 2003 and 2004, High Winds LLC constructed 90 1.8-MW Vestas V-80 turbines for a combined capacity of 162 MW on more than 6,000 acres of leased land. The Vestas are 351 feet high to the tip of the blade. This project has been operational since 2004.

SMUD currently operates a 15-MW facility on 3,300 acres consisting of approximately 23 660-kW Vestas V-47 turbines. This facility was constructed in 2004 on property to the east of the High Winds Project. SMUD is now in the final permitting and approval stages for an additional 85 MW, bringing the total project output to 100 MW.

The Shiloh I Wind Plant Project is proposed to consist of up to 120 wind turbines, approximately 41 miles of underground and overhead utility lines, a new substation and switchyard with supporting structures, and conductors interconnecting with PG&E's electric transmission system and eight meteorological towers in southeastern Solano County. An additional 3,600 square feet would be added onto the existing 3,600-square-foot enXco V operations and maintenance building. This project would be located west of the existing enXco V and High Winds plant projects (Solano County 2005).

The California Public Utilities Commission (CPUC) approved PG&E's contract to purchase up to 75 MW of wind energy from PPM Energy's Shiloh I Wind project (EnergyVortex 2006). With this agreement, PG&E will

meet its annual goal of increasing its renewable purchases by a minimum of 1% of retail load. PG&E has a long history of developing, generating, and purchasing renewable power. The utility currently supplies 31% of its customer load from renewable resources: 18% from its large hydroelectric facilities, and 13% from small hydrologic and other renewable resources that qualify under California's Renewable Portfolio Standard Program (RPS) Program. In total, nearly 50% of PG&E's retail load is served from generating resources that have no carbon dioxide emissions that contribute to global warming. Since PG&E began its RPS Program, it has entered into 13 contracts for 443 MW of renewable energy, enough power to serve more than 325,000 customers. California's program requires each investor-owned utility to increase its procurement of eligible renewable generating resources by 1% of load per year to achieve a 20% RPS goal (EnergyVortex 2006).

Other Wind Resource Areas

The County contains three additional areas with notable wind energy resources: the Vaca Mountains area in northeastern Solano County, the Potrero Hills area in the central county, and the Cordelia Hills between Suisun Marsh and the Napa Valley. The Cordelia Hills contain several ridges that are valuable for wind energy production and have a small number of wind turbine developments. The Vaca Mountains area is within a County-designated watershed and Potrero Hills area is within the Secondary Management Area of Suisun Marsh (Solano County 1987).

Solar Facilities

Because of favorable climatic conditions in Solano County, large-scale use of solar energy represents a major potential energy resource. The county has excellent solar resource potential, and some commercial-scale solar developments have occurred in Solano County, including the County Government Center. Besides the government center, the county also houses two other large solar photovoltaic systems—a facility in the city of Vallejo with a capacity of 108 kW and another in the city of Fairfield with a capacity of 230 kW (CEC 2006).

Solar power plants are very land intensive compared to conventional power plants, requiring several acres of reflectors, pipelines, and transmission lines. Small solar generators for domestic and business use will probably become more widely used; however, there are currently no large-scale solar power plants in Solano County besides those described previously.

Dams and Hydroelectric Facilities

In addition to rivers and streams, small hydroelectric plants can be sited in irrigation canals and water treatment plants. The Solano Project borders the northeast extremity of San Francisco Bay and provides municipal and agricultural water and energy to the cities of Solano County. Lake Berryessa, the reservoir area behind Monticello Dam, is located in nearby Napa County. Monticello Dam is the main feature of the Solano Project. Other important features are Putah Diversion Dam, Putah South Canal with a small terminal reservoir, and supporting wasteways, laterals, and drainage works. The project was designed to irrigate approximately 6,000 acres of land. In 1992, the total irrigated area was 71,445 acres (Reclamation 2006).

At capacity, Lake Berryessa stores 1.6 million acre-feet of water and is one of the largest bodies of fresh water in California. The Monticello Dam Power Plant, built in 1983, is located at the base of Monticello Dam, and has three generators with a combined capacity of 11,500 kW (Reclamation 2006). The electrical power is sent mostly to the North Bay area. The dam was built under Federal Energy Regulatory Commission (FERC) license number 2780.

The Solano Irrigation District (SID) owns and operates the hydroelectric power plant at Monticello Dam (SID 2006).

Fossil Fuels

Fossil fuels are both extracted and refined in Solano County. Substantial natural gas resources exist in the southern portion of the county near the San Francisco Bay/Sacramento–San Joaquin Delta area. A petroleum refinery is located in within Benicia’s city limits.

Natural Gas Resources

Natural gas is a hydrocarbon fuel found in reservoirs beneath the earth’s surface, composed primarily of methane (CH₄), and used for space and water heating, process heating, electricity generation, and transportation fuel. PG&E supplies natural gas in Solano County. Use of natural gas is expected to increase in the coming years because it is a relatively clean alternative to other fossil fuels like oil and coal. This is true in California and throughout the western United States, where many new natural gas–fired electrical generation plants are being brought online. In addition, the U.S. accounts for the largest portion of the world’s natural gas consumption (currently about 45%), but holds only about 3% of the world’s reserves. Thus, there is great interest in importing liquefied natural gas from other parts of the world. Today, 35% to 40% of the electricity consumed in California is generated using natural gas (CEC 2003). However, it is anticipated that the world’s supplies of natural gas are only expected to last about another 50 years and another fuel type will be required.

Most of the new gas retrieval activity is taking place in proven gas fields. There are about 900 active wells in the state (DOC 2005). In some cases, such as the Denverton Creek field in Solano County, field boundaries are being extended when the new well drilling proves successful. Other production fields in the county are located in Lindsey Slough, Van Sickle Island, Elkhorn Slough, Millar, Cache Slough, Sherman Island, Winters, Ryer Island, Suisun Bay, and the Rio Vista field, to name a few (DOC 2001). From these fields in Solano County in December 2005, 1,030,173 thousand cubic feet of gas was produced with the daily production of 33,231 thousand cubic feet from 148 operational wells (DOC 2005). Some proven production fields in Solano County—the Dixon, East Dixon, Davis Southeast, Saxon, Liberty Island, Liberty Cut, and Dry Slough fields—have been abandoned because of their declining production (DOC 2001). Additionally, there is one significant natural gas storage field in Solano County at Kirby Hill.

The Rio Vista Gas field is the largest producer of dry gas (20.8 billion cubic feet) in all of District 6 of the California Department of Conservation (DOC), Division of Oil, Gas, and Geothermal Resources (2004), which encompasses all of Northern California south to Contra Costa County. Lindsey Slough ranks third in the district for production with 3.6 billion cubic feet. The production from these two major gas fields is less than the amount produced in 2003, and the trend will continue to show a general decline in gas production.

Petroleum Refining

Essentially all of the county’s transportation fuels are imported. Fuel operations in the county involve petroleum refining rather than production. The Valero Refinery, located in Benicia, is the fourth largest employer in the county (Solano County 2003). There is no production of petroleum fuels from oil wells located in the county (DOC 2002).

Geothermal Resources

Geothermal power uses heat from below the earth’s surface to produce electricity or heat buildings and water systems. Geothermal direct use projects generally have less intensive environmental impacts than electrical generating projects. Geothermal power produces little to no air pollution and is extremely reliable during the lifetime of the power plant. Geothermal applications cover a range of uses, from small-scale geothermal heat pumps used in homes to large-scale power plants that provide electricity.

California is the world’s largest generator of electricity from geothermal energy. In 2005, California received nearly 5% of its electrical energy from geothermal resources (about 14,000 GWh). The state has more than 600

active, high-temperature geothermal wells (with fluids over 212 degrees Fahrenheit) and 230 injection wells (DOC 2002). Currently, California's geothermal generating capacity is approximately 1,870 MW from both dry steam- and liquid-dominated resources. In the state, 46 geothermal power plants are widely dispersed from north to south with most development taking place at The Geysers, the Salton Sea, and Coso Known Geothermal Resource Areas (CEC 2005b).

Whether significant geothermal resources exist in Solano County is still unknown. Surveys conducted by state and federal geologic agencies do not indicate that Solano County possesses large amounts of high-temperature resources, but the potential for significant new geothermal resource areas in and near Solano County capable of generating electric power does exist. However, it is known that Solano County contains three geothermal springs located in the western portion of the county. These springs, the Vallejo White Sulfur Springs, Tolenas Springs, and an unnamed spring (DOC 2002), all produce low-temperature geothermal resources.

Alternative Energy and Renewable Energy Resources

Transformation projects (also known as resource recovery projects or "waste-to-energy" development) convert agricultural and municipal wastes, respectively, to fuel or electricity. The primary reason for most transformation projects is to dispose of wastes, and the energy produced is a useful byproduct to offset disposal costs. Landfill gas recovery systems and methane fermentation projects both produce methane gas, which can be burned in a gas turbine to generate electricity. Methane gas can be recovered from landfills and sewage treatment plants and converted to electricity. Solano County does produce large volumes of agricultural waste, much of which is disposed of by open burning. Transformation plants are an alternative method of disposing of these wastes.

Direct combustion projects, where agricultural refuse or municipal solid waste is burned to generate electricity, have greater environmental impacts and are usually more controversial than methane-producing projects. Transformation technologies are still relatively new to California. Transformation plants have been proposed statewide as a solution to the state's diminishing landfill capacity. Proposals throughout the state have sparked public opposition over issues regarding odor, toxic wastes, air pollutant emissions, noise, and traffic.

The Potrero Hills Landfill, located outside of Suisun City, is currently working on permit applications and environmental approval to allow modifications to the existing landfill, including the addition of a landfill gas-to-energy operation involving either a power plant that generates electricity or addition of a processing unit that pressurizes the landfill gas for off-site export or for vehicle fuel. The proposed expanded operations will be located southeast of current operations on site.

EXISTING ENERGY USERS

California has focused on developing a diversity of energy sources and on increasing energy efficiency. As of 1994, petroleum provided more than half (51%) of the primary energy used in California. (Primary energy is energy that is used directly, for instance, as fuel in cars.) Natural gas was second, with about one-third (34% in 1994), followed by a mix of other sources, including nuclear (6%), hydroelectric (5%), geothermal (3%), and coal (1%). California produces about 45% of the energy used here. The rest is imported from other states (45%) and foreign countries (10%). In terms of energy use, about half the energy (49% in 1994) goes to transportation, about a quarter (27%) for industrial use, and the rest for commercial and residential uses. (CEC 1997). The following sections provide more information on energy users in California and energy use by County government.

In California, residential users account for the second highest portion of energy demand, behind the commercial sector. Transportation energy use accounts for the majority of residential use. Commercial industries account for a large portion of energy demand and use. In the late 1980s, the commercial sector surpassed residential users, even as population increased (CEC 2003).

Current and near-term electricity consumption is expected to grow at a slightly faster rate than during the 1990s, but growth is not expected to be as strong as in the 1980s. This is consistent with underlying economic forecasts projecting a slow recovery beginning in 2004. The residential sector is projected to grow the fastest, at an average of 3% per year, while the commercial sector is projected to grow at 2% per year (CEC 2003).

The users of energy resources in Solano County are those people who live, work, learn, and recreate within the county. Cities within Solano County include Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo (Solano County 2006). All but two of these cities are located along I-80. Benicia is located in southern Solano County near the intersection of I-680 and I-780. Rio Vista is located in the eastern portion of the county, near the intersection of State Routes 84, 12, and 113. According to the California Department of Finance's January 2006 population estimates, the population of Solano County is approximately 422,848, an increase of approximately 7% over the 2000 U.S. Census. The majority of the county's population (95.3%) is located within the incorporated cities. The estimated population of the unincorporated county is approximately 19,736 (California Department of Finance 2006). According to the Association of Bay Area Governments, Solano County is the fastest-growing of the nine Bay Area counties, with a population projected to reach 547,120 people by 2020 (Doyle and Conrad 2002). This represents a 38.7% increase over 2000 and a 61.2% increase since 1990. The amount of population growth experienced in the county will affect energy resources and availability. Energy demand will increase as population increases and only fuel efficiency and conservation will curb usage from escalating beyond available supplies.

Since the 1980s, Solano County has undertaken numerous energy efficiency projects, as well as installed its own combined heat and power system at its Fairfield campus. Nonetheless, the county continued to face increasing energy costs. In 2001, California's energy landscape was in turmoil, and energy prices were anticipated to soar by 46%. County administrators were keen to use distributed energy resources to reduce energy costs, upgrade County buildings, meet the County's renewable energy goals, and minimize impacts on the environment. In April 2001, the County Board of Supervisors authorized the County Administrator to install additional energy-efficient solutions in County buildings.

The County Government Center was designed, constructed, and equipped with energy-efficient and sustainable design measures, materials, and devices that are both feasible and cost effective. The more than \$100 million project, which spans three blocks in the city of Fairfield, includes an administration center that consolidates 15 County departments, a 43,000-square-foot probation building, a five-level parking center, and a public plaza and courtyard (Buildings.com 2006). The new County Government Center exemplifies smart growth, embracing many sustainable design and build development elements utilizing extensive use of solar electricity, energy efficiency upgrades, and cogeneration. These measures provide great examples of sustainable energy use for other large institutional, industrial, and commercial uses.

The County is contributing to California's sustainability through a comprehensive program of solar electricity, energy efficiency, and cogeneration. The County is significantly reducing operating costs by installing 349 kW of solar power and expanding its Fairfield campus cogeneration heat and power system from 1,450 kW to more than 3,000 kW of electricity, enough to power more than 3,000 homes. For these achievements, the County was awarded the U.S. Environmental Protection Agency's Green Power Leadership award in 2003.

In March 2003, a 230-kW solar electric system was installed on the County's Health & Social Services Building. Covering 18,000 square feet, this system is one of the largest in the county and provides 36% of the building's peak electrical requirements. The County's combined solar and cogeneration system was implemented in November 2004 at the newly constructed County Government Center. The complex's new parking structure includes a 119-kW solar electric carport, which provides shaded parking for vehicles on the top floor while simultaneously generating electricity for the county. The County anticipates annual savings of \$800,000 in combined energy reduction costs, which yield a lifetime savings of \$16 million. With annual electricity and natural gas costs on the order of \$1 per square foot, the County has one of the most efficient government centers in California (Powerlight 2006).

Agriculture, industry, and water supply and wastewater treatment operations consume approximately one-third of the electricity used in California. Energy represents the largest controllable cost of providing water or wastewater services to the public. Similar to other energy users, agriculture faces the challenge of enhancing productivity while sustaining its resource base and protecting the environment. In Solano County, agriculture is a key component of the economy and environment. Because energy costs affect profits directly, farmers are often highly aware of the energy costs associated with their operations in general and with individual pieces of machinery in particular. Public and private funding is available to leverage the costs of farm productivity improvements.

4.12.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

U.S. Congress

Beginning in the late 1990s, Congress introduced a tax subsidy on the production of renewable wind-generated electricity. The availability, expiration, and potential extension of the Production Tax Credit causes the boom and bust production of energy that typifies wind development in the United States. The Production Tax Credit's limitations have determined the role of the wind energy industry in the United States, and contributed to the dominance of electric utility subsidies.

Congress also periodically directs federal agencies to use increasing amounts of renewable energy or otherwise aid private companies in developing wind energy. One example is the U.S. Department of Energy's Wind Powering America initiative, which, among other tasks, has created Wind Working Groups in each state with a wind resource.

National Energy Act

The National Energy Act of 1978 was a legislative response by the U.S. Congress to the 1973 energy crisis. It includes the following statutes:

- ▶ Public Utility Regulatory Policies Act (PURPA) (Public Law 95-617)
- ▶ Energy Tax Act (Public Law 95-318)
- ▶ National Energy Conservation Policy Act (NECPA) (Public Law 95-619)
- ▶ Power Plant and Industrial Fuel Use Act (Public Law 95-620)
- ▶ Natural Gas Policy Act (Public Law 95-621)

Some of the more notable legislative acts are discussed below.

Public Utility Regulatory Policies Act

PURPA was passed by Congress in 1978 as part of the National Energy Act to promote greater use of renewable energy. This law created a market for nonutility electric power producers to permit independent power producers to connect to their lines and to pay for the electricity that was delivered. Although PURPA is a federal law, implementation was left to the states and a variety of regulatory regimes developed, although in many states virtually nothing was done.

Energy Tax Act

The Energy Tax Act (Public Law 95-318) was also passed by Congress in 1978 as part of the National Energy Act. It was a response to the 1973 oil crisis and promoted fuel efficiency and renewable energy through taxes and tax credits.

National Energy Conservation Policy Act

NECPA (Public Law 95-619) is a U.S. statute signed into law in 1978 as part of the National Energy Act. NECPA requires utilities to provide residential consumers with energy conservation audits and other services to encourage slower growth of electricity demand. NECPA was amended in 1985 by the Energy Policy and Conservation Act Amendments of 1985 (Public Law 99-58).

U.S. Department of Energy

The U.S. Department of Energy is responsible for energy policy and nuclear safety. Its purview includes the nation's nuclear weapons program, nuclear reactor production for the U.S. Navy, energy conservation, energy-related research, radioactive waste disposal, and domestic energy production. Many of these activities are funded through the Department's system of national laboratories.

Federal Energy Management Program

The U.S. Department of Energy's Federal Energy Management Program works to reduce the cost and environmental impact of the federal government by advancing energy efficiency and water conservation, promoting the use of distributed and renewable energy, and improving utility management decisions at federal sites (U.S. Department of Energy 2006).

Energy Policy Act

The Energy Policy Act of 1992, recent executive orders, and presidential directives require federal agencies to meet a number of energy and water management goals, among other requirements. For example, federal agencies are called upon to reduce their energy use by 35% by 2010 in comparison to 1985 levels. Federal agencies rely on effective coordination and sound guidance to help meet this requirement. The Federal Energy Management Program reports agencies' progress annually, manages interagency working groups, and offers policy guidance and direction (U.S. Department of Energy 2006).

The Energy Policy Act of 2005 (U.S. House of Representatives HR 6), was signed into law by President Bush on August 8, 2005. Subtitle A of HR 6, Federal Programs, reestablishes a number of federal agency goals and contains relevant, amended portions of NECPA.

Federal Energy Regulatory Commission

FERC regulates and oversees energy industries in the economic, environmental, and safety interests of the American public. FERC is the federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. FERC also reviews and authorizes liquefied natural gas terminals, interstate natural gas pipelines, and nonfederal hydropower projects. Production of electricity is overseen by the states; however, FERC has jurisdiction over certain matters (FERC 2006).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California's RPS, established in 2002 by Senate Bill (SB) 1078 (Chapter 516, Statutes of 2002), requires electricity providers to procure an annual increase of at least 1% of their electricity supplies from renewable resources so as to achieve a 20% renewable mix by no later than 2017. More recently, the CEC, the CPUC, and the California Power Authority (CPA) approved the *Energy Action Plan*, accelerating the 20% target date to 2010 (CEC 2005c).

California Energy Commission

Established in 1974 by the Warren-Alquist Act (Public Resources Code Section 25000 et seq.), CEC is the state's primary energy policy and planning agency. The commission has five major responsibilities: forecasting future energy needs and keeping historical energy data, licensing thermal power plants 50 MW or larger, promoting energy efficiency through appliance and building standards, developing energy technologies and supporting renewable energy, and planning for and directing the state response to an energy emergency.

California offered generous tax subsidies in the early 1980s for renewable power development. The state also ordered utilities to not only buy electricity from independent power generators but also directed utilities to set a price and offer standard contracts. California's subsidies and the standard offer contracts launched the commercial wind industry in the country. By the end of 1985, approximately 1,500 MW of wind energy capacity had been installed and wind turbines throughout California were producing 2 terawatt-hours per year (U.S. Department of Energy 2006).

Wind industry investments have already provided both economic and employment benefits to California. With the RPS requiring 20% renewable generation by 2017, these benefits will continue to grow. In 2003, the CEC released a report on renewable resource development summarizing technical potential and projected development from 2003 to 2017 (CEC 2005d). The goal was to provide some preliminary statewide estimates for increasing renewable generation based on new resource assessments. The renewable resource report also summarizes accelerated renewable energy needs to meet the statewide Energy Action Plan RPS goal of 20% by 2010, although it does not account for infrastructure improvements or operational enhancements needed to increase the use of renewable resources.

California Public Utilities Commission

The CPUC has authority to set electric rates, regulate natural gas utility service, protect consumers, promote energy efficiency, and ensure electric system reliability (CPUC 2006). The CPUC-regulated electricity market in California serves 10.48 million customers with 32,347 miles of transmission lines and 239,112 miles of distribution lines for a total economic value of \$17.8 billion.

California Power Authority

The CPA provides taxable municipal bond financing for the construction of new generation projects to meet the state's energy needs and to maintain healthy electricity reserves. The CPA is authorized to issue up to \$5 billion in revenue bond financing for renewable, peaking, and base load generation projects, as well as conservation and energy efficiency measures.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Current Solano County General Plan

Energy Element

The *Solano County General Plan* Energy Element prepared in 1982 contains goals pertaining directly or indirectly to energy development, including four goals specifically related to wind energy (Solano County 1987a):

- ▶ Develop policies and programs that assure adequate energy supplies for Solano County while maintaining the attractiveness of the County as a place to live and work.
- ▶ Encourage the utilization of passive and renewable energy resources.
- ▶ Maximize the energy conservation of structures and transportation systems.

- ▶ Encourage compatibility with federal, state and regional energy goals and city and county general plans.
- ▶ Minimize economic inequities of energy programs and policies.

The County's *Wind Turbine Siting Plan* became part of the Energy Element when it was adopted in 1987. The *Wind Turbine Siting Plan* requires turbines to be sufficiently removed from certain receptors to protect human health and safety, as well as ensure land use compatibility. Turbines must be located a distance of three times the turbine height from any zoning district that does not allow wind turbines or any property line, public roadway, transmission facility, or railroad. The siting plan also requires a one-quarter-mile setback from scenic roadways. These requirements may be waived upon approval by the County and permission of the landowner if the adjoining property is a wind facility (Solano County 1987).

Environmental Resource Management Element, Resource Conservation and Open Space Plan

The Environmental Resource Management Element of the *Resource Conservation and Open Space Plan*, prepared in 1973 and amended 1982, addresses wildlife habitat management and preservation, agriculture, water quality, utilities, facilities, and transportation. The element states that areas in Solano County that have a wind resource available should be considered for prudent development of wind energy. Environmental impacts may occur in certain areas located within Suisun Marsh if wind energy development were to occur in these resource areas.

Solano County Zoning Regulations and Business License Tax

The County adopted Chapter 28, Zoning Regulations, in March 1983, specifying locations for wind turbine generators for commercial and noncommercial users in the unincorporated area of Solano County. The County collects a business license tax on wind turbine projects under County Code Chapter 11, Section 11-160. The tax rate is 0.00003 cents per kWh. This tax typically generates a few thousand dollars per year (Englebright 2006).

General Plans for Cities in Solano County

Wind resource areas are located within the spheres of influences of the cities of Fairfield, Benicia, Vallejo, and Rio Vista. The general plans for these cities individually contain policies and/or background information regarding energy use in their respective cities.

4.12.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

The energy consumption throughout Solano County is a direct product of land use patterns, employment patterns, individual habits, and various environmental factors. This impact analysis examines existing energy infrastructure and supplies, population growth patterns, and trending economic demographic patterns to correlate a determination of future energy demands and supplies relative to the proposed development scenarios of the 2008 Draft General Plan.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix F of the State CEQA Guidelines, an energy impact is considered significant if the proposed project would:

- ▶ develop land uses and patterns causing wasteful, inefficient, and unnecessary consumption of energy or construct new or retrofitted buildings that would have excessive energy requirements for daily operation; or

- ▶ result in the need for new systems or substantial alterations to electrical, natural gas, or communication systems infrastructure.

IMPACT ANALYSIS

IMPACT 4.12-1a Effects on Energy Consumption from Land Use Locations and Patterns – Preferred Plan. *Buildout of the 2008 Draft General Plan under the Preferred Plan could affect energy usage through inefficient land use patterns that increase dependency on single-occupant vehicles; however, the proposed land use patterns and goals and policies would promote compact, cluster developments in the vicinity of existing infrastructure and developed areas, which would reduce transportation-related energy usage and the need for expanded infrastructure. Therefore, this impact would be **less than significant**.*

Land use patterns significantly affect energy consumption in either a positive or negative manner. The location of new development near existing development and the types of land uses close to each other affects the amount of travel and transportation-related energy demands. For example, compact and multiuse development can greatly reduce transportation-related energy demands by allowing residential development near shopping and work centers.

Historic land use patterns have resulted in largely scattered communities. Solano County can support reductions in transportation-related energy consumption through land use planning that locates housing, jobs, and shopping close to one another and encourages transportation by bicycle, on foot, and via public transit. Replacing the import of goods and export of waste with increased production and consumption of local goods (such as locally grown food) and local waste processing (through recycling, reusing, and composting) can also help reduce vehicle miles traveled. Increasing the proportion of energy-efficient vehicles can lower vehicle energy consumption, and alternative-fuel vehicles may help to diversify the energy resources upon which the transportation sector relies. The County also has the opportunity to support further development of state laws and programs that promote infill development, transit-oriented development, smart growth, and reduced use of automobiles.

Goals, policies, and programs in the 2008 Draft General Plan would further assist the County in reducing the amount of energy consumption caused by land use patterns. Goal LU.G-4 encourages land use development patterns and circulation and transportation systems that promote health and wellness and minimize impacts on agriculture and natural resources, energy consumption, and adverse effects on air quality.

The 2008 Draft General Plan includes the following policies and program promoting efficient land use that would reduce transportation-related energy use:

- ▶ **Policy LU.P-2:** A cornerstone principle of this General Plan is the direction of new urban development and growth toward municipal areas. In furtherance of this central goal, the people of Solano County, by initiative measure, have adopted and affirmed the following provisions to assure the continued preservation of those lands designated “~~Intensive Agriculture,~~” “~~Extensive Agriculture,~~” Agriculture, Watershed, Marsh, Park & Recreation, or Water Bodies & Courses Development Strategy Policy No. 17; Agricultural chapter policies AG.P-31, AG.P-32, AG.P-33, AG.P-34, AG.P-35, and AG.P-36. Agricultural Lands Policies Nos. 9, 10, 11, 12 and 13; and Watershed Lands Policy No. 2. The General Plan may be reorganized, and individual goals and policies may be renumbered or reordered in the course of ongoing updates of the General Plan in accord with the requirements of state law, but the provisions enumerated in this paragraph shall continue to be included in the General Plan until December 31, 2010, unless earlier repealed or amended by the voters of the County. *[Note to the reader: Policy LU.P-2 was established as part of the Orderly Growth Initiative; proposed changes to this policy are subject to voter approval and thus are indicated in strikethrough and underline format.]*

- ▶ **Policy LU.P-17:** Encourage clustering of residential development when necessary to preserve agricultural lands, natural resource areas and environmental quality, to provide for the efficient delivery of services and utilities, and to mitigate potential health and safety hazards.
- ▶ **Policy LU.P-19:** Locate commercial development in locations that provide maximum access to the primary consumers of such services and where necessary services and facilities can be provided.
- ▶ **Policy LU.P-21:** Locate, design, and site commercial and industrial development, including locations near ferries, rail, and ports, in a manner that minimizes traffic congestion and other negative effects on surrounding residential and agricultural uses.
- ▶ **Program LU.I-7:** When reviewing development proposals, work with applicants to establish development patterns that result in shorter motor vehicle trips, make alternative transit modes viable, and encourage physical activity.

Implementation of these policies and this program in the 2008 Draft General Plan would support increasing energy efficiency and would assure that implementation of the plan under the Preferred Plan would not result in increased energy demands from wasteful land use planning. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.12-1b **Effects on Energy Consumption from Land Use Locations and Patterns – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could affect energy usage through inefficient land use patterns that increase dependency on single-occupant vehicles; however, the proposed land use patterns and goals and policies would promote compact, cluster developments in the vicinity of existing infrastructure and developed areas, which would reduce transportation-related energy usage and the need for expanded infrastructure. This impact would be **less than significant**.*

This impact is similar to Impact 4.12-1a above, although the increased density of development under the Maximum Development Scenario would result in a higher overall level of demand for energy. Implementation of policies and a program in the 2008 Draft General Plan would support increasing energy efficiency and would assure that implementation of the plan under the Maximum Development Scenario would not result in increased energy demands from wasteful land use planning. For the same reasons as described above for the Preferred Plan, under the Maximum Development Scenario this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.12-2a **Increased Energy Demand and Need for Additional Energy Infrastructure – Preferred Plan.** *Future population growth through buildout of the 2008 Draft General Plan under the Preferred Plan would increase the demand for energy and the need for additional energy resources to meet this demand; however, the proposed regulations and policies included in the 2008 Draft General Plan would ensure that sufficient energy supplies would be available. This impact would be **less than significant**.*

Increased demand for energy is a byproduct of all future land uses and development consistent with the *Solano County General Plan*. As growth in the county increases, energy demand also increases. Energy is consumed for heating, cooling, and electricity in homes and businesses; for public infrastructure and service operations; and for agriculture, resource extraction, industry, commercial, and rural uses.

In California, residential users account for the second highest portion of energy demand, behind the commercial sector. Transportation-related energy use accounts for the majority of residential use. Commercial industries account for a large portion of energy demand and use. Energy use by the residential sector is projected to grow the fastest, at an average of 3% per year, while energy use by the commercial sector is projected to grow at 2% per year (CEC 2003).

Agriculture, industry, and water supply and wastewater treatment operations consume approximately one-third of the electricity used in California. Energy represents the largest controllable cost of providing water or wastewater services to the public. Like other energy users, agriculture faces the challenge of enhancing productivity while sustaining its resource base and protecting the environment. In Solano County, agriculture is a key component of the economy and environment.

Because of the county's rural nature and its residents' high rate of long-distance commuting, Solano County residents rely heavily on the automobile. Petroleum production and development has been, and will continue to be, vital to the economies of both Solano County and California. The county's economy will continue to be influenced by oil and natural-gas production issues. Although efforts are being made to increase alternative modes of travel that would not be as dependent upon the automobile, energy consumption related to vehicle travel will continue to rise.

Efforts to reduce energy consumption in the transportation sector are critical to the establishment of a secure energy future for the county, and decreasing the number of vehicle miles traveled is probably the most effective measure to reduce overall petroleum use. The County can support reductions in transportation-related energy consumption through land use planning that locates housing, jobs, and shopping close to one another and encourages transportation by bicycle, on foot, and via public transit. The County can support these efforts by continuing to utilize alternative-fuel, hybrid and electric, and light-duty diesel vehicles within its fleet, and by encouraging larger commercial and industrial users to do the same. Replacing the import of goods and export of waste with increased production and consumption of local goods (such as locally grown food) and local waste processing (through recycling, reusing, and composting) can also help reduce vehicle miles traveled. Increasing the proportion of energy-efficient vehicles on the county's roads can lower vehicle energy consumption, and alternative-fuel vehicles may help to diversify the energy resources upon which the transportation sector relies. The County also has the opportunity to support further development of state laws and programs that promote infill development, transit-oriented development, smart growth, and reduced use of automobiles.

According to the California Department of Finance's January 2006 population estimates, the population of Solano County is approximately 422,848, an increase of approximately 7% over the 2000 U.S. Census. The majority of the county's population (95.3%) is located within the incorporated cities. The estimated population of the unincorporated county is approximately 19,736 (California Department of Finance 2006). According to the Association of Bay Area Governments, Solano County is the fastest-growing of the nine Bay Area counties, with a population projected to reach 547,120 people by 2020 (Doyle and Conrad 2002). This represents a 38.7% increase over 2000 and a 61.2% increase since 1990. The amount of population growth experienced in the county would affect energy resources and availability. Energy demand would increase as population increases.

Increased energy usage would require additional energy supplies to meet increasing demand. Sources would likely continue to be the same sources that supply energy needs today. Statewide energy demand will continue to be supplied by a combination of fossil fuels, hydroelectric, wind, cogeneration, and other sources. In the near future, the primary energy resource will continue to be oil and gas that is either produced domestically or imported from oil-producing countries worldwide. However, the County has taken dramatic steps to increase its reliance on renewable energy sources, such as wind and solar energy, and plans to continue to develop new renewable projects while increasing conservation measures and energy use efficiency.

Many federal, state, and regional regulations are currently being implemented to ensure that sufficient energy supplies are available to the public. Some of the existing federal regulations provide conservation strategies and

incentives to promote the development of renewable energy sources, such as PURPA, the Energy Tax Act, the Energy Policy Act, and the NECPA. CEC is a state agency responsible for promoting energy efficiency, developing energy technologies, supporting renewable energy, and planning and directing response to energy emergencies. CEC also provides incentives and subsidies for implementing renewable energy developments. CPUC is another state agency that assists in regulating utility services and ensuring electric system reliability, while the CPA provides taxable municipal bond financing for the construction of new generation projects.

Regionally, the County has been actively promoting wind turbine development through its *Wind Turbine Siting Plan*. The southern and western portions of Solano County were identified as major resource areas for wind energy development within the state of California by CEC and PG&E in a wind assessment program undertaken jointly in 1979 and 1980. The county's location near large energy markets is encouraging applications for wind development. A number of new projects have been proposed and approved in recent years within the county's wind resource areas. These agencies and related regulations are designed to ensure that sufficient energy supply is available for the public in Solano County.

Relevant Policies of the 2008 Draft General Plan

The following policies are proposed in the 2008 Draft General Plan to further assist the County in meeting its energy needs:

- ▶ **Policy RS.P-57** directs the County to ensure that energy conservation measures are implemented and that reduced energy demand is achieved through the use of energy-efficient technology and practices.
- ▶ **Policy RS.P-58** calls on the County to provide incentives for city and county residents and businesses to produce and use renewable sources of energy.
- ▶ **Policy RS.P-61** directs the County to enable production of renewable energy from resources available in Solano County, such as solar, water, wind, and biofuels, and to reduce the reliance on energy resources from outside the county.
- ▶ **Policy RS.P-64** states that the County will provide information, marketing, training, and education to support reduced energy consumption, the use of alternative and renewable energy sources, and green building practices.

Further, the 2008 Draft General Plan would permit noncommercial wind energy development in various districts as currently allowed in the Zoning Ordinance. Commercial wind turbine development would be an allowable use in the following districts: Exclusive Agricultural (A), Limited Agricultural (A-L), Water-Dependent Industrial (r-WD), Limited Manufacturing (M-L), General Manufacturing (M-G), and Watershed and Conservation (W).

In addition, the County currently has a number of programs and projects that would continue to reduce future energy demand and increase efficiency, as discussed in Section 4.12.1, "Existing Conditions."

Conclusion

The policies described above would contribute to a reduction in the increase in energy demand and would promote opportunities for increased production in ways that reduce the depletion of nonrenewable resources. Energy usage and demand would continue to increase as a consequence of future growth, and automobile travel would continue for some time to be the travel mode of choice; however, existing federal, state, and local regulations and policies would be implemented and would ensure that sufficient energy supplies are available to serve the needs of the county. Under the Preferred Plan, therefore, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.12-2b **Increased Energy Demand and Need for Additional Energy Infrastructure – Maximum Development Scenario.** *Future population growth through buildout of the 2008 Draft General Plan under the Maximum Development Scenario would increase the demand for energy and the need for additional energy resources to meet this demand; however, the proposed regulations and policies included in the 2008 Draft General Plan would ensure that sufficient energy supplies would be available. This impact would be **less than significant**.*

This impact is similar to Impact 4.12-2a described above; however, the increased density of buildout for the Maximum Development Scenario would create more demands for energy than the Preferred Plan. The County currently has a number of programs and projects that would continue to reduce future energy demand and increase efficiency as discussed in Section 4.12.1, “Existing Conditions.”

Further, policies described above would contribute to a reduction in the increase in energy demand and would promote opportunities for increased production in ways that reduce the depletion of nonrenewable resources. Energy usage and demand would continue to increase as a consequence of future growth, and automobile travel would continue for some time to be the travel mode of choice; however, existing federal, state, and local regulations and policies would be implemented and would ensure that sufficient energy supplies are available to serve the needs of the county. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

4.12.4 RESIDUAL SIGNIFICANT IMPACTS

All impacts related to energy would be less than significant. No residual significant impacts would exist.

4.13 HAZARDS AND HAZARDOUS MATERIALS

Human-caused hazards that may potentially have an effect on Solano County include hazardous and toxic materials (including facilities regulated by the U.S. Environmental Protection Agency [EPA], hazardous waste and disposal, toxic releases, leaking underground storage tanks [USTs], and brownfields), military installations, and other airports and airport hazards. The following section describes the existing conditions of these hazards in Solano County.

4.13.1 EXISTING CONDITIONS

HAZARDOUS AND TOXIC MATERIALS—EPA-REGULATED FACILITIES

Travis Air Force Base (AFB) encompasses an area of about 5,025 acres adjacent to the city of Fairfield. The base was placed on the EPA National Priorities List in 1989 as a Superfund project.

HAZARDOUS WASTE

The County Department of Resource Management is the certified unified program agency (CUPA) for all cities and unincorporated areas in Solano County. The CUPA was created by the California Legislature to minimize the number of business inspections and fees. As CUPA, the County Department of Resource Management is responsible for the following tasks and programs:

- ▶ Staff members of the department's Environmental Health Services Division conduct the permitting and inspection of businesses that handle quantities of hazardous materials or hazardous waste greater than or equal to 55 gallons, 500 pounds, or 200 cubic feet of a compressed gas at any time. An estimated 1,200 businesses in Solano County are regulated by this program.
- ▶ In conjunction with the Hazardous Materials Business Plan Program, staff members inspect businesses for compliance with the Hazardous Waste Control Act and respond to complaints of illegal disposal of hazardous waste. The County Department of Environmental Management also inspects businesses that treat hazardous wastes, pursuant to permit by rule, conditional authorization, or conditional exemption.
- ▶ Hazardous materials management plans address emergency response to incidents involving businesses handling hazardous materials in excess of 55 gallons or 500 pounds, or 200 cubic feet of gas. Plans include an inventory of hazardous materials that is updated annually. Hazardous materials may be new or waste materials that are toxic, reactive, ignitable, or corrosive. Hazardous waste is subject to storage time limits, disposal requirements, and labeling requirements on containers.
- ▶ Most hazardous waste may be stored for only 90 days, but there are exceptions for small-quantity generators under certain circumstances. Hazardous wastes are reported on the annual inventory of hazardous materials as part of the hazardous materials management plan.

TOXIC RELEASES

Agricultural Spraying

Several herbicides and insecticides classified by the California Department of Food and Agriculture as potentially injurious to humans are used in Solano County for weed control and for pest control in the vineyard, orchard, and row crop lands located throughout the county (Sedway/Cooke 1977).

A primary concern involves croplands adjacent to residential areas and other sensitive receptors. For this reason, state law stipulates that aerial application of herbicides/pesticides shall not be conducted within 300 feet of

residential areas, and ground application of these pesticides/herbicides shall not be conducted within 100 feet of residential areas (Howard, pers. comm., 2006).

The primary method of reducing exposure and injury from pesticide or herbicide application in Solano County is the permitting process. This process requires that applicants utilize only approved pesticides and herbicides in the specified manner and ensures that sensitive receptors such as hospitals, schools, sensitive crops and sensitive habitats are avoided. The County began its state-certified restricted permit process in 1980. This process is equivalent to CEQA's requirements and is exempt from site-specific CEQA reporting. In 1989 the County began requiring full-use reporting, which records and reports the application of nonrestricted materials by operator number. In 2005 the County began participation in a statewide effort to achieve consistency in both permitting and compliance in all counties under the Enforcement Response Policy (Howard, pers. comm., 2006).

In addition to the permitting process, the County Department of Agriculture ensures compliance through on-site inspections that include compliance with pesticide and herbicide drift restrictions, worker protection requirements, pesticide/herbicide label instructions, and any other permit conditions. Annual training is also required for those applying pesticides or herbicides. Agricultural workers are also encouraged to participate in training in the handling and usage of pesticides and herbicides. During this training applicators and other workers are also taught how to use personal protective equipment, including respiratory equipment (Howard, pers. comm., 2006).

Pipelines

Nine reported pipeline releases of petroleum products occurred between 1981 and 2004 (Solano County Department of Environmental Health 1998, EPA 2006):

- ▶ **Santa Fe Pacific pipeline, vicinity of Marshview Road, 1981.** The spill was cleaned up at this site. The lead agency is the San Francisco Bay Regional Water Quality Control Board (RWQCB). No further work was required.
- ▶ **Santa Fe Pacific pipeline, Morrow/Goodyear Roads, 1987.** Up to 50 barrels of oil were lost when a backhoe damaged the pipeline. Cleanup was accomplished immediately after the release and groundwater monitoring wells were installed and monitored for a year. Monitoring showed that the cleanup was successful and no further work was required.
- ▶ **Santa Fe Pacific pipeline, Elmira Pump Station, 1990.** There was a release due to vandalism, but contamination remained in the containment berm. No further work was required.
- ▶ **Exxon dock area, 1990.** A flange failed at the dock. There was no report of residual contamination and no further work was required.
- ▶ **Santa Fe Pacific pipeline, vicinity of Fox Road, 1993.** A collection trench was installed and a treatment system is in place. So far, 750 barrels of fuel oil have been removed. The extent of the contamination is still being evaluated. The lead agency for this cleanup is the Central Valley RWQCB. Work at the site will continue until there is no threat to groundwater.
- ▶ **Santa Fe Pacific pipeline, vicinity of Peabody and Vanden Roads, 1994.** An unknown amount of fuel was lost and at least 218 gallons are known to have been removed so far. A collection and treatment system was installed in summer 1997 and is currently operating. The lead agency for this cleanup is the San Francisco Bay RWQCB. Work at the site will continue until there is no threat to groundwater.
- ▶ **Santa Fe Pacific pipeline, vicinity of the city of Elmira, 1996.** Up to 60,000 gallons of fuel were lost. There are three collection trenches and a treatment system in Elmira. The full extent of contamination is thought to

have been finally determined and was published in 1998. The lead agency for this cleanup is the Central Valley RWQCB. Work at the site will continue until there is no threat to groundwater.

- ▶ **Chevron pipeline, 1997.** An anchor damaged the pipeline with no release occurring. No further work was required.
- ▶ **Kinder Morgan Energy Partners pipeline, Suisun Marsh, 2004.** On April 27, 2004, a corroded underground fuel pipeline running through Suisun Marsh in Solano County ruptured and spilled more than 103,000 gallons of diesel fuel into the state's largest tidal wetland, home to migratory waterfowl and the endangered salt marsh harvest mouse. The U.S. Coast Guard and the pipeline owner, Kinder Morgan Energy Partners, took initial measures to recover the fuel and prevent it from spreading, but called on EPA to clean up and restore the marsh. By September 2004, after the work was done, 616 tons of contaminated soil had been removed. Tests showed that the mud remaining in the marsh no longer posed a threat to the environment.

LEAKING UNDERGROUND STORAGE TANKS

All USTs are subject to monitoring for leakage. Most tanks are double walled and are equipped with electronic systems to detect leaks. All tanks are permitted annually and all new tanks and tank repairs are permitted for installation by the County Department of Resource Management. An estimated 227 sites located throughout the county are within the responsibility of this program (State Water Resources Control Board 2006).

BROWNFIELDS

Brownfields are properties that are contaminated, or thought to be contaminated, and are underutilized because of perceived remediation costs and liability concerns. When agricultural and green spaces are developed for residential, commercial, or industrial uses, infrastructure such as roads and sewers must be developed. That redundant infrastructure depletes scarce tax dollars and adds to the burden on California's environment. Redeveloping frequently urban brownfield properties optimizes the use of existing infrastructure and protects precious resources.

The County Department of Resource Management maintains a list of all of the approximately 500 brownfield sites within the county and works with state and federal agencies to ensure proper cleanup or maintenance of these sites.

Some brownfields have been redeveloped in Solano County, including the former 29-acre Basic Vegetable Products property that was contaminated with lead. The Redevelopment Agency of Vacaville entered into a voluntary cleanup agreement with the California Department of Toxic Substances Control (DTSC) in 1995 to oversee cleanup of the contaminated soil. The cleanup was completed in June 1995 and the lead concentration is now below residential standards. A one-story, 90,000-square-foot building now covers most of the previously contaminated area and serves as the Vacaville Skating Center, serving more than 15,000 people per month (DTSC 2006).

TRANSPORTATION OF HAZARDOUS AND TOXIC MATERIALS

Although considerations for land use hazards associated with transport of cargo are not specifically required by state planning legislation, they are addressed in the California Health and Safety Code. For this reason, it is important that an assessment of potential hazards be made and that state regulations regarding hazardous cargo be monitored.

Land use hazards associated with transport of hazardous cargo exist in Solano County because several major, interstate transportation routes pass through the area and a wide range of hazardous cargo is regularly transported along these routes. Types of hazardous cargo regularly transported out of, into, and through Solano County by

freeway or railroad include flammable liquids, corrosive materials, compressed and/or poisonous gases, explosives, flammable solids, and irritating materials.

Some potential exists, for example, for spills of flammable liquids after a highway or railway mishap, subsequent ignition of the liberated contents because of its inherently low “flash point,” and possible human casualties and/or property damage in the path of the burning liquid. Burning spillage can also drain into nearby streams and drainage facilities (e.g., roadside storm drains), spreading fire and increasing the area of contamination. Such mishaps have occurred in Solano County’s recent past (Sedway/Cooke 1977).

WILDFIRE RISK AREAS

Areas at risk for extreme wildfires are designated by the California Department of Forestry and Fire Protection (CDF) as those lands where dense vegetation with severe burning potential prevails. The highest current areas at risk for very high wildfires are found in western Solano County, in the foothills and mountainous watershed areas. The Cordelia Hills, Potrero Hills, Cement Hills, and western English Hills are all designated as high-risk fire areas. Before nearby lowlands were urbanized, vegetation in these west foothill and mountainous communities was naturally maintained by periodic fire. As nearby lands were developed, natural wildfires were suppressed, resulting in the further buildup of fire-prone brush and woodlands. These efforts to suppress natural processes have resulted in larger, more damaging fires.

AIRPORTS

Solano County contains three airports: Travis Air Force Base (Travis AFB), the Nut Tree Airport, and the Rio Vista Municipal Airport. The potential for aircraft crash landings make airports hazardous to life and property. Adjacent areas can also be exposed to high level of noise and air pollution. The Solano County Airport Land Use Commission (ALUC) is the agency in Solano County empowered by state law to prepare the airport land use compatibility plan (ALUCP) for airports and heliports in the county. The Solano County ALUC oversees orderly development of airports and adoption of land use measures that minimize public exposure to excessive noise and safety hazards in areas around public airports, to the extent that these areas are not already devoted to incompatible uses.

Travis Air Force Base

Travis AFB occupies approximately 7,100 acres of land, with two 11,000-foot runways oriented along the northeast-southwest diagonal away from existing housing developments. Travis AFB is home to the world's largest military airlift unit, the 60th Air Mobility Wing, and the wing’s reserve counterpart, the 349th Air Mobility Wing. In 1995, the function of the base was expanded by the addition of air refueling assets from March AFB. The U.S. Department of Defense has been using the site for military operations since the early 1940s.

In June 2002, the ALUC adopted an updated ALUCP, now called the *Travis AFB Land Use Compatibility Plan* (Travis LUCP). The Travis LUCP addresses restrictions on residential development using compatibility zones. Nonresidential development is also addressed by the Travis LUCP according to the number of people per acre and established noise sensitivity of different land uses and activities.

Nut Tree Airport

The 4,700-foot runway at the Nut Tree Airport accommodates a variety of aircraft, from light aircraft to corporate jets. The airport property is located within the city limits of Vacaville, approximately 2 miles northeast of downtown Vacaville in an area of urban expansion. The 1988 ALUCP defines compatibility zones in the area around the Nut Tree Airport. Potentially incompatible land uses and land use policies are confined to the jurisdictional area of the City of Vacaville.

Rio Vista Municipal Airport

The Rio Vista Municipal Airport (Baumann Field) is located along the north side of Baumann Road in the northern portion of Rio Vista. The land use compatibility plan for the Rio Vista Municipal Airport delineates six compatibility zones.

4.13.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

EPA is the principal federal agency involved with hazardous materials regulation. Two primary federal regulations pertaining to hazardous materials—the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—are administered by EPA. In addition, the Federal Aviation Administration (FAA) is the principal agency involved with regulating navigable airspaces (i.e., Federal Aviation Regulations [FAR] Part 77).

Resource Conservation and Recovery Act

A regulatory program is administered by EPA through RCRA. RCRA covers hazardous materials at all facilities and sites in the country through their entire usage cycle, from manufacture through transportation, treatment, storage, and disposal.

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA, more commonly known as Superfund, was passed in 1980 to facilitate the cleanup of hazardous waste sites. The Superfund program, administered by EPA, is responsible for identifying contaminated sites and quantifying the risks to health and the environment. The program was amended in 1986 by the Superfund Amendment and Reauthorization Act, Title III (community right-to-know laws), which stipulates that past and present owners of land contaminated with hazardous substances will be held responsible, with certain exceptions, for the cost of cleanup.

Federal Aviation Regulations Part 77

FAR Title 14, Part 77, establishes standards and notification requirements for objects affecting navigable airspace associated with construction on or near airports. Notification serves as the basis for:

- ▶ evaluating the effect of the construction or alteration on operating procedures,
- ▶ determining the potential hazardous effect of the proposed construction on air navigation,
- ▶ identifying mitigating measures to enhance safe air navigation, and
- ▶ charting of new objects.

Notification allows FAA to identify potential aeronautical hazards in advance, thus preventing or minimizing the adverse impacts on the safe and efficient use of navigable airspace. Any person or organization who intends to sponsor any of the following construction or alterations must notify FAA:

- ▶ Any construction or alteration exceeding 200 feet above ground level.
- ▶ Any construction or alteration:
 - within 20,000 feet of a public-use or military airport that exceeds a 100:1 surface from any point on the runway of each airport, with at least one runway more than 3,200 feet;

- within 10,000 feet of a public-use or military airport that exceeds a 50:1 surface from any point on the runway of each airport, with its longest runway no more than 3,200 feet; or
 - within 5,000 feet of a public-use heliport that exceeds a 25:1 surface.
- ▶ Any highway, railroad, or other traverse way whose prescribed adjusted height would exceed that above noted standards.
 - ▶ When requested by FAA.
 - ▶ Any construction or alteration located on a public-use airport or heliport, regardless of height or location.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The state regulations that govern hazardous materials are equal to or more stringent than federal regulations. California has been granted primary oversight responsibility by EPA to administer and enforce hazardous waste management programs. State regulations have detailed planning and management requirements to ensure that hazardous wastes are handled, stored, and disposed of properly to reduce risks to human health and the environment. Several key state laws pertaining to hazardous wastes are discussed below. In addition, DTSC, the State Water Resources Control Board (SWRCB), and the Integrated Waste Management Act also regulate the generation of hazardous materials, also described below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act (Section 25500 et seq. of the California Health and Safety Code), also known as the Business Plan Act, defines hazardous materials as raw or unused materials that are part of a process or manufacturing step. Although hazardous materials are not strictly defined as hazardous wastes, the health concerns involved are similar, and facility descriptions, materials inventories, and emergency response plans are required. Reports pursuant to this act are filed with the County.

Hazardous Waste Control Act

The Hazardous Waste Control Act is implemented by regulations contained in Title 26 of the California Code of Regulations that describe requirements for the proper management of hazardous wastes. The act created the state hazardous waste management program, which is similar to but more stringent than the federal RCRA program. The program includes hazardous waste criteria for:

- ▶ identification and classification;
- ▶ generation and transportation;
- ▶ design and permitting of recycling, treatment, storage, and disposal facilities;
- ▶ treatment standards;
- ▶ operation of facilities and staff training; and
- ▶ closure of facilities and liability requirements.

The Hazardous Waste Control Act and Title 26 regulations list more than 800 potentially hazardous materials and establish criteria for identifying, packaging, and disposing of such wastes. Under these regulations, the generator of hazardous waste material must complete a manifest that accompanies the material from the point of generation to transportation to the ultimate disposal location, with copies of the manifest filed with DTSC.

Emergency Services Act

Under the Emergency Services Act (California Government Code Section 8850 et seq.), the state developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies.

Quick response to incidents involving hazardous materials or hazardous waste is a key part of the plan. The Governor's Office of Emergency Services administers the plan, coordinating the responses of other agencies, including EPA, the California Highway Patrol, RWQCBs, air quality management districts, and county disaster response offices.

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

Proposition 65, a California ballot measure passed in November 1986, requires the governor to publish at least annually a list of chemicals known to the state to cause cancer or reproductive toxicity. Proposition 65 is administered under the California Office of Environmental Health Hazard Assessment.

Hazardous Waste and Substances Sites List

The Hazardous Waste and Substances Sites List (Cortese list) is a planning document required by California Government Code Section 65962.5. DTSC is required to compile the list, which consists of potentially contaminated sites in the state. It is used by state agencies, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites.

Underground Storage Tank Program

The California Department of Public Health (formerly the California Department of Health Services) and the SWRCB list hazardous sites of USTs listed for remedial action because of unauthorized release of toxic substances. Leak prevention, cleanup, enforcement, and tank testing certification are the elements of the UST Program, which is administered by the SWRCB.

California Integrated Waste Management Act

This act requires the development and implementation of household hazardous-waste disposal plans. The CIWMB oversees compliance with this act and enforces operational plans for solid-waste facilities.

Unified Program

The California Environmental Protection Agency grants to qualifying local agencies oversight and permitting responsibility for certain state programs pertaining to hazardous waste and hazardous materials. This is achieved through the Unified Program, created by state legislation in 1993 to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for the following emergency and management programs:

- ▶ Hazardous materials release response plans and inventories (business plans)
- ▶ California Accidental Release Prevention Program
- ▶ UST Program
- ▶ Aboveground Petroleum Storage Act Requirements for Spill Prevention, Control and Countermeasure plans
- ▶ Hazardous Waste Generator and On-site Hazardous Waste Treatment (tiered permitting) Programs
- ▶ California Uniform Fire Code: Hazardous material management plans and hazardous material inventory statements

California Department of Forestry and Fire Protection

CDF is responsible for protecting and maintaining privately owned wildlands, providing emergency services, and responding to wildland fires throughout California. The Gordon Valley station of CDF Battalion 1415 provides fire protection to several unincorporated communities in Solano County: West Hills, Green Valley, Vaca Valley, Lagoon Valley, and Pleasants Valley.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Airport Land Use Commissions

California law governing the creation, composition, powers, and duties of airport land use commissions (ALUCs) is generally set forth in Article 3.5, Chapter 4 of the State Aeronautics Act (Sections 21670–21676 of the California Public Utilities Code). Section 21670 creates ALUCs in counties having at least one airport operated for the benefit of the general public and served by an air carrier certified by the Public Utilities Commission or the Civil Aeronautics Board and authorizes the ALUC to study and make recommendations upon height restrictions of buildings near airports and for the use of land surrounding airports. The ALUC acts primarily as an advisory body to jurisdictions having the power to plan and zone. The County ALUC is the agency in Solano County empowered by state law to prepare the airport land use compatibility plan (ALUCP) for airports and heliports in the county. The County ALUC ensures the orderly development of airports and the adoption of land use measures to minimize the public's exposure to excessive noise and safety hazards within areas around public airports, to the extent that these areas are not already devoted to incompatible uses. The ALUC was established on December 7, 1971 under Ordinance 781, which granted to the Solano County Airport Advisory Committee the responsibilities of the Airport Land Use Commission. The Commission is staffed by the Solano County Department of Resource Management.

The Solano County Office of Emergency Services (Solano OES) oversees the development, establishment, and maintenance of programs and procedures to protect lives and property of county residents from the effects of natural or human-caused disasters. Those disasters to which the county is subject and for which the office must train and properly respond include floods, earthquakes, major fires, storms, radiological or hazardous material incidents, aircraft accidents, mass casualty incidents, and any other emergency-related function.

Solano OES manages and coordinates disaster response, terrorism response, search and rescue missions, flood response, and other major emergencies within its sphere of influence. It works with city and County departments with fire suppression activities, evacuations, hazardous materials incidents, disaster exercises, planning, and use of resources through the SEMS/Incident Command System. Additionally, Solano OES conducts emergency preparedness training and awareness presentations for citizens and various organizations so they better understand what they should do before, during, and after a disaster or major emergency.

Fire Districts

In addition to CDF (see “California Department of Forestry and Fire Protection” above), the following individual fire districts serve the unincorporated county:

- ▶ Cordelia Fire Protection District (FPD),
- ▶ Dixon FPD (under contract with City of Dixon Fire Department),
- ▶ East Vallejo FPD (under contract with City of Vallejo Fire District, for service to unincorporated southeast Vallejo),
- ▶ Montezuma FPD,

- ▶ Suisun FPD, and
- ▶ Vacaville FPD.

4.13.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

This analysis considers the range and nature of foreseeable hazardous materials use, storage, and disposal resulting from implementation of the 2008 Draft General Plan, and identifies the primary ways that these hazardous materials could expose individuals or the environment to health and safety risks. As discussed in Section 4.13.2, “Regulatory Framework,” compliance with applicable federal, state, and regional and local health and safety laws and regulations by residents and businesses in the county would generally protect the health and safety of the public. State and local agencies are required to enforce applicable requirements. In determining the level of significance, the analysis assumes that development in the county would comply with relevant federal, state, and local ordinances and regulations.

The general types of businesses and the range and types of uses that are expected to be located in the county can be identified; however, the specific businesses are unknown at this time. Future development in the unincorporated county could involve a variety of land uses, including residences, commercial uses, industrial uses, community uses, office space, open space, public services facilities (i.e., educational and institutional uses), and agriculture. As a result, this analysis assumes and evaluates a broad range of potential uses that could handle hazardous materials.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, a hazards and hazardous materials impact is considered significant if the proposed project would:

- ▶ create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- ▶ create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- ▶ emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- ▶ be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- ▶ result in a safety hazard for people residing or working in the project area, for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport;
- ▶ result in a safety hazard for people residing or working in the project area, for a project within the vicinity of a private airstrip;
- ▶ impair implementation of or physically interfere with an adopted emergency-response plan or emergency-evacuation plan; or

- ▶ expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

IMPACT ANALYSIS

IMPACT 4.13-1a **Release of Hazardous Materials – Preferred Plan.** *Future population growth through buildout of the 2008 Draft General Plan under the Preferred Plan would result in an increase in the routine transport, use, and/or disposal of hazardous materials, which could result in exposure of such materials to the public through either routine use or accidental release. Implementation of proposed 2008 Draft General Plan policies, in combination with existing federal and state regulations, would reduce the potential impacts related to the routine transportation of hazardous materials. This impact would be **less than significant**.*

Land uses and development consistent with the 2008 Draft General Plan would allow new residential, commercial, industrial, and agricultural uses. Increased residential development would result in increased use, storage, and disposal of household hazardous materials within the county. Increased commercial and industrial development would also result in increased use, storage, and/or disposal of hazardous materials during routine operations. Of particular concern are facilities with USTs or other methods of storage that could be impaired during a seismic event or could otherwise accidentally leak into the soil, water, or air. Such facilities include gas stations, automotive repair shops, and dry cleaners. Groundwater could become contaminated from these impairments.

The amount of hazardous materials transported through the county on major arterials, regional highways, and state routes is likely to increase as a result of development allowed by the 2008 Draft General Plan.

Transportation of hazardous materials is regulated by the California Highway Patrol, California Department of Transportation, and U.S. Department of Transportation (Hazardous Materials Transportation Act), and other regulatory agencies provide standards designed to avoid releases (including provisions regarding securing materials and container design). In addition, the following 2008 Draft General Plan policies and programs would address the routine transport of hazardous materials within the county:

- ▶ **Policy HS.P-26:** Minimize the risks associated with transporting, storing, and using hazardous materials through methods that include careful land use planning and coordination with appropriate federal, state, or County agencies.
- ▶ **Policy HS.P-27:** Work to reduce the health risks associated with naturally occurring hazardous materials such as radon, asbestos, or mercury.
- ▶ **Policy HS.P-28:** Encourage the use of programs and products by businesses that will result in a reduction of hazardous waste and materials.
- ▶ **Policy HS.P-29:** Promote hazardous waste management strategies in this order of priority: source reduction, recycling and reuse, on-site treatment, off-site treatment, and residuals disposal.
- ▶ **Policy HS.P-30:** Locate facilities for transfer, treatment, storage and disposal of hazardous wastes using the siting criteria described in the Hazardous Waste Management Plan. The facilities shall be developed and operated to ensure the protection of the environment and compatibility with surrounding land uses.
- ▶ **Policy HS.P-31:** Encourage regional efforts to implement alternatives to land disposal of untreated hazardous wastes, and participate in interjurisdictional agreements that balance the economic efficiencies of siting facilities with the responsibility of each jurisdiction to manage its fair share of hazardous wastes generated within the region.

- ▶ **Program HS.I-37:** Continue implementation of the Certified Unified Program Agency (CUPA) program, identifying businesses that use, store, and/or transport hazardous materials in the county. Review, revise, and continue permitting and inspection practices for these businesses. Provide fire departments in the county with a list of such businesses to encourage hazardous material training before an event occurs. Continue to monitor operations of businesses that handle regulated quantities of hazardous materials. Require compliance with measures aimed at reducing associated health and environmental risks.
- ▶ **Program HS.I-38:** Encourage and promote programs and processes that reduce use of hazardous materials through implementation of the Green Business Program. Provide incentives for businesses to support “green” practices that result in less hazardous waste and the mitigation of existing waste. Such incentives might include tax breaks for brownfield redevelopment or providing environmentally friendly cleaning products at a reduced rate.

The above 2008 General Plan policies and programs and current regulations would not prevent all potential releases of hazardous materials but would serve to minimize both the frequency and the magnitude of such releases. In combination with existing federal and state regulations, these policies would also reduce the potential impacts of the routine transportation of hazardous materials on county roadways under the Preferred Plan. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-1b **Release of Hazardous Materials – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would create more potential for the release of hazardous materials than the Preferred Plan. However, implementation of proposed 2008 Draft General Plan policies, in combination with existing federal and state regulations, would reduce the potential impacts related to the routine transportation of hazardous materials. This impact would be less than significant.*

This impact is similar to Impact 4.13-1a for the Preferred Plan. Policies and programs of the 2008 Draft General Plan and current regulations would not prevent all potential releases of hazardous materials but would serve to minimize both the frequency and magnitude of such releases. In combination with existing federal and state regulations, these policies would reduce the potential impacts from the routine transportation of hazardous materials on county roadways under the Maximum Development Scenario. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-2a **Safety Hazards Associated with Public and Private Airports – Preferred Plan.** *Implementation of the proposed 2008 Draft General Plan under the Preferred Plan could locate development within the vicinity of a public-use or private airstrip, potentially resulting in a safety hazard for people residing or working in the area. Policies and plans included in the 2008 Draft General Plan would address these hazards. This impact would be less than significant.*

Implementation of the proposed 2008 Draft General Plan could result in land uses and development located near airports located within Solano County. The County ALUC is the agency in Solano County empowered by state law to prepare the ALUCP for airports and heliports in the county. The County ALUC ensures the orderly development of airports and the adoption of land use measures to minimize the public’s exposure to excessive noise and safety hazards within areas around public airports, to the extent that these areas are not already devoted to incompatible uses.

The County ALUC has adopted plans, the policies of which apply to all existing airports in the county and to any new airport or heliport (except private-use facilities) that may be proposed in the future. Plans address current airport facilities located throughout the county, including Nut Tree Airport, Rio Vista Municipal Airport, and Travis AFB.

State law requires local agencies to modify their general plans and any affected specific plans to be consistent with ALUCPs. A general plan must address compatibility planning issues and avoid direct conflicts with compatibility planning criteria. Solano County zoning regulations restrict heights within defined airport flight obstruction areas, which are defined more broadly for military airports than commercial airports in recognition of Travis AFB.

The location of land uses utilizing significant quantities of hazardous materials near airports raises the possibility that aircraft accidents could result in explosions, fire, or other occurrences that could cause the release of these materials and subsequent exposure of employees and other people to harm. Development in the vicinity of airports would be subject to discretionary review as well as review by the County ALUC. Projects would be required to comply with the ALUC's adopted *Comprehensive Airport Land Use Plan* (CALUP). The CALUP provides safety, noise, and compatibility standards that reduce the likelihood of accidents affecting land uses on the ground. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-2b **Safety Hazards Associated with Public and Private Airports – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would create potential for safety hazards associated with public and private airports. However, current policies and plans included in the proposed 2008 Draft General Plan would address these hazards. This impact would be less than significant.*

This impact is similar to Impact 4.13-2a for the Preferred Plan. The location of land uses utilizing significant quantities of hazardous materials near airports raises the possibility that aircraft accidents could result in explosions, fire, or other occurrences that could cause the release of these materials and subsequent exposure of employees and other people to harm. Development in the vicinity of airports would be subject to discretionary review as well as review by the County ALUC. Projects would be required to comply with the ALUC's adopted CALUP. The CALUP provides safety, noise, and compatibility standards that reduce the likelihood of accidents affecting land uses on the ground. As a result, this impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-3a **Interference with an Adopted Emergency-Response Plan – Preferred Plan.** *Implementation of the proposed 2008 Draft General Plan under the Preferred Plan would add additional traffic and residences requiring evacuation in case of an emergency. Implementation of proposed policies would ensure conformance with local emergency-response programs and continued cooperation with emergency-response service providers. This impact would be less than significant.*

An efficient roadway and circulation system is vital for the evacuation of residents and the mobility of fire suppression, emergency response, and law enforcement vehicles. Implementation of the 2008 Draft General Plan under the Preferred Plan would add additional traffic and residences requiring evacuation in case of an emergency. Solano OES is continuing to coordinate with local jurisdictions to develop evacuation routes in the event of a natural disaster. As described in Section 4.13.2, "Regulatory Framework," Solano OES oversees the

development, establishment, and maintenance of programs and procedures to protect lives and property of county residents from the effects of natural or human-caused disasters.

In addition, the following 2008 Draft General Plan policies would ensure conformance with local emergency-response programs and continued cooperation with emergency-response service providers:

- ▶ **Policy HS.P-32:** Work to ensure the adequacy of disaster response and coordination in the county and the ability of individuals to survive disasters.
- ▶ **Policy HS.P-33:** Plan and designate evacuation and aid routes. Work to create a comprehensive circulation system that is effective in allowing emergency access to and from all parts of the county and that provides alternative routes during unexpected events such as flooding, fires, or hazardous materials accidents that require evacuation.
- ▶ **Policy HS.P-34:** Promote public education and awareness regarding what to do, where to go, and how to evacuate in the event of a catastrophic disaster, such as wildfires, earthquakes, or toxic material spills.
- ▶ **Policy HS.P-35:** Encourage full coordination and communication between federal, state, and local agencies regarding disaster planning and preparedness.
- ▶ **Policy HS.P-36:** Encourage full cooperation with medical facilities, schools, local radio stations, nonprofit organizations, and the private sector in disaster planning and preparedness.
- ▶ **Policy HS.P-37:** Ensure that populations requiring special assistance are included in disaster planning and preparedness.

Implementation of these General Plan policies would ensure that future development would not interfere with emergency response plans. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-3b *Interference with an Adopted Emergency-Response Plan – Maximum Development Scenario. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would create demands for emergency-response activities. However, implementation of proposed 2008 Draft General Plan policies would ensure conformance with local emergency-response programs and continued cooperation with emergency-response service providers. This impact would be less than significant.*

This impact is similar to Impact 4.13-3a for the Preferred Plan. Implementation of these 2008 Draft General Plan policies would ensure that future development would not interfere with emergency-response plans. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-4a **Exposure of Structures to Urban and Wildland Fires – Preferred Plan.** *Implementation of the 2008 Draft General Plan under the Preferred Plan would expose unincorporated areas of the county to risks related to both urban and wildland fires. Compliance with California Building Code regulations, city Fire Code requirements, and other state and local fire safety requirements would minimize wildland fire risks. In addition, proposed 2008 Draft General Plan policies would ensure that people and structures would not be exposed to significant risk of loss of injury involving wildland fires. This impact would be less than significant.*

Areas at risk for extreme wildfires are designated by CDF as those lands where dense vegetation with severe burning potential prevails. The highest current areas at risk for fires are found in western Solano County, in the foothills and mountainous watershed areas, and also in grasslands located throughout the county. The Benicia Hills, Potrero Hills, Cement Hills, and western English Hills are all designated as high-risk fire areas. Before nearby lowlands were urbanized, vegetation in these west foothill and mountainous communities was naturally maintained by periodic fire. As nearby lands were developed, natural wildfires were suppressed, resulting in the further buildup of fire-prone brush and woodlands. These efforts to suppress natural processes have resulted in larger, more damaging fires.

Fire districts serving the unincorporated county are listed in Section 4.13.2, “Regulatory Framework.” New development would be required by law to incorporate California Building Code, city Fire Code requirements, and other applicable state and local fire safety requirements. In addition, the following 2008 Draft General Plan policies would ensure that people and structures would not be exposed to significant risk of loss of injury involving wildland fires:

- ▶ **Policy HS.P-20:** Require that structures be built in fire defensible spaces and minimize the construction of public facilities in areas of high or very high wildfire risk.
- ▶ **Policy HS.P-21:** Prohibit non-farm-related development and road construction for public use in areas of extreme wildfire risk.
- ▶ **Policy HS.P-22:** Require new developments in areas of high and very high wildfire risk to incorporate fire-safe building methods and site planning techniques into the development.
- ▶ **Policy HS.P-23:** Work with fire districts or other agencies and property owners to coordinate efforts to prevent wildfires and grassfires through fire protection measures such as consolidation of efforts to abate fuel buildup, access to firefighting equipment, and provision of water service.
- ▶ **Policy HS.P-24:** Seek an appropriate balance between preventing and fighting fires and retaining the County’s valuable visual and natural resources.
- ▶ **Policy HS.P-25:** Continue to encourage the consolidation of fire districts through the LAFCO [local agency formation commission] process.

Implementation of these General Plan policies would ensure that people or structures would not be exposed to a significant risk of loss of injury involving wildland fires. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

IMPACT 4.13-4b **Exposure of Structures to Urban and Wildland Fires – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would have the potential to expose structures to urban and wildland fires. However, compliance with California Building Code regulations, city Fire Code requirements, and other state and local fire safety requirements along with proposed 2008 Draft General Plan policies would ensure that people and structures would not be exposed to significant risk of loss of injury involving wildland fires. This impact would be **less than significant**.*

This impact is similar to Impact 4.13-4a for the Preferred Plan. Implementation of the 2008 Draft General Plan policies listed under Impact 4.13-4a would ensure that people or structures would not be exposed to a significant risk of loss of injury involving wildland fires. This impact would be less than significant.

Mitigation Measure

No mitigation beyond the 2008 Draft General Plan policies and programs is required.

4.13.4 RESIDUAL SIGNIFICANT IMPACTS

All impacts related to hazards and hazardous materials would be less than significant. No mitigation beyond the 2008 Draft General Plan policies and programs is required, and no residual significant impacts would exist.

4.14 RECREATION

This section evaluates the potential impacts of the 2008 Draft General Plan on parks and other recreational facilities in Solano County. The section provides a description of existing parklands in the unincorporated county and within the seven cities. The section also briefly discusses Quimby Act requirements and the 2003 Parks and Recreation Element as they relate to the implementation of the 2008 Draft General Plan. Information utilized in the writing of this section was obtained in part from the Public Services background report prepared for the 2008 Draft General Plan (Solano County 2006).

4.14.1 EXISTING CONDITIONS

PARKS

State Parks

The California Department of Parks and Recreation operates two parks in Solano County: the Benicia Capitol State Historic Park and the Benicia State Recreation Area. Both parks are located in the city of Benicia. The Benicia Capitol State Historic Park is the site of California's third seat of government (1853–1854). The original building has been restored with reconstructed period furnishings and exhibits. The Benicia State Recreation Area is an area of marshland, grassy hillsides, and rocky beaches along the narrowest portion of the Carquinez Strait. This area is predominantly marshland, but it also provides hiking, jogging, and biking trails, and fishing and picnic areas (California Department of Parks and Recreation 2006).

Solano County Parks

Four regional parks are located in the unincorporated area of Solano County: Lake Solano Park, Sandy Beach Park, Belden's Landing Water Access Facility, and Rockville Hills Regional Park. Three of these parks are maintained by the County. These parks are described below.

- ▶ Lake Solano Park is located at the base of the Coast Range foothills west of Winters and at the north end of the county along Putah Creek. The park contains a campground, picnic sites, group picnic facilities, a free boat launch for nonpowered vessels, parking, and public restrooms.
- ▶ Sandy Beach Park is located near Rio Vista on the Sacramento River. The park has a boat-launch ramp, campsites, picnic grounds, a hiking trail, roads for bicycling and driving, a beach, and volleyball and horseshoe pitch courts.
- ▶ Belden's Landing Water Access Facility is located southeast of Suisun City in the Montezuma Slough/Grizzly Island area. The day-use facility includes a boat-launch ramp, a fishing pier, restrooms, and parking.
- ▶ Rockville Hills Regional Park is located in the unincorporated area but is owned and managed by the City of Fairfield.

No neighborhood or community parks are located in the unincorporated area.

City Parks

The incorporated cities provide both neighborhood and community parks for residents of the cities and unincorporated areas. Following is a summary of park facilities within the cities.

Benicia has more than 700 acres of existing parks. Lake Herman Regional Park, the largest park in Benicia, covers 577 acres. In 1997, Benicia adopted a parks, trails, and open space master plan that seeks to expand the existing network of parks, trails, and bikeways.

Dixon has four parks—Hall Park, Northwest Park, Women’s Improvement Club Park, and Linear Park—covering more than 80 acres. The City of Dixon imposes a parkland acquisition and development fee on all new residential developments to accommodate park demand resulting from new developments.

Fairfield has 14 neighborhood parks and two community parks, totaling 233 acres. The City of Fairfield is proposing development of several new facilities, including 10 additional neighborhood parks serving a half-mile radius and three additional community parks serving a 2-mile radius, which would add an additional 400 acres to its parks system.

Rio Vista has seven parks covering 15 acres. Because of Rio Vista’s proximity to the Sacramento River, water-related recreation facilities, such as a pier and boat launch, are also available for use.

Suisun City has eight parks that together cover 127 acres. Six of the parks are neighborhood parks, one is a community park, and one is a regional park. These parks primarily serve city residents.

Vacaville has more than 520 acres of parks, in addition to 1,906 acres of urban open space surrounding the city. Lagoon Valley Park, which spans about 300 acres on the western edge of Vacaville, is owned and operated by the City of Vacaville. The majority of the city’s public open space is found in the hillsides around Lagoon Valley and to the west of Browns Valley (including Old Rocky and the Glen Eagle open space area). Vallejo has approximately 145 acres of neighborhood, community, and regional parks. The Greater Vallejo Recreation District oversees the park planning for the City of Vallejo.

Benicia, Fairfield, and Vallejo are also currently collaborating with the County in planning a 10,000-acre open space—the Tri-City and County Cooperative Planning Area for Agriculture and Open Space.

OPEN SPACE AND TRAILS

The *State of California General Plan Guidelines* define open-space lands as any parcel or area of land or water that is essentially unimproved and devoted to open-space uses, including undeveloped forestlands, agricultural lands, rangeland, marshland, and recreational lands. In Solano County, open-space lands fall into three general categories: resource-oriented open space, conservation open space, and recreational open space. This section of the EIR is concerned with open-space lands that can accommodate varying levels of public recreation. Activities in these areas include hiking, mountain biking, horseback riding, picnicking, bird watching, fishing, hunting, and boating. Support facilities such as parking lots, staging areas, restrooms, and individual and group picnic areas may also occur in such areas.

In addition to the three County and two state parks mentioned above, Solano County has 10 open-space areas (132,500 acres) open to public recreation. These areas, listed in Table 4.14-1, provide county and city residents and visitors with substantial recreational opportunities.

A network of trails exists within the unincorporated county and the cities. New trails are being added to make the system more accessible and connected. Because of limited County data, the quantity of trail miles and the quantity of publicly accessible open space could not be determined at the time of writing. For this reason, this analysis does not include open space or trails in the park provision ratio.

RECREATIONAL PROGRAMS

Solano County does not provide recreational programs for residents. Such activities are provided by cities and private recreational organizations and are, in many cases, available to residents of the unincorporated county.

**Table 4.14-1
Open-Space Resources within Solano County**

Open-Space Area	Acres	Uses
Blue Ridge Berryessa	5,000	Hiking
Grizzly Island Wildlife Area	13,250	Bird watching
Jepson Prairie	9,250	Nature study
Lagoon Valley Open Space	2,500	Hiking
Mare Island Wetlands	2,500	Bird watching, hiking
Rockville Hills Park	1,000	Hiking, biking
Suisun Marsh	74,000	Hunting, hiking
Tri-City & County, including Lynch Canyon	14,000	Hiking, mountain biking, horse riding in Lynch Canyon
Vacaville-Dixon Separator	4,500	Hiking, mountain biking, horse riding
Vallejo Lakes	6,500	Picnicking, boating, fishing

Source: Data provided by Solano County in 2008

4.14.2 REGULATORY FRAMEWORK

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

No federal plans, policies, regulations, or laws pertaining to recreation are applicable.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

Quimby Act (California Code 66477)

The Quimby Act requires the dedication of land and/or imposes a requirement of fees for park and recreational purposes as a condition of approval of a tentative map or parcel map.

REGIONAL AND LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Solano County Park and Recreation Element (2003)

The Park and Recreation Element of the *Solano County General Plan*, adopted in June 2003 (2003 General Plan), is intended to provide a long-range guide for the development of regional recreation facilities and the preservation of natural and historical resources in Solano County. The element establishes a park provision standard of 10 acres per 1,000 residents. The Park and Recreation Element of the 2003 General Plan will be continued and folded into the 2008 Draft General Plan. The policies and programs contained in the update will complement and augment the 2003 Park and Recreation Element, providing additional guidance on the development and management of parks, open space, and other recreational facilities.

4.14.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an impact on recreation is considered significant if the proposed project would:

- ▶ increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- ▶ include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

IMPACT ANALYSIS

IMPACT 4.14-1a **Need for New or Expanded Parks or Recreational Facilities – Preferred Plan.** *Buildout of the 2008 Draft General Plan under the Preferred Plan would result in a need for new or expanded parks and recreation facilities. Buildout at average densities would result in a condition where demand for parks outstrips the existing supply. The County would have only 5.4 acres of parkland per 1,000 residents. This would be substantially lower than the County's adopted parkland provision standard of 10 acres per 1,000 residents. This impact would be *significant*.*

The Park and Recreation Element of the 2003 General Plan contains goals, objectives, and policies meant to guide the development and management of the county's parks and recreational facilities. Objective 2 of the element requires an acres-to-population park standard of 10 total acres of local and regional parkland for every 1,000 persons living in the county. Policy A of Objective 2 directs the County to work with other agencies and private interests to provide for adequate regional parkland and facilities. Policy C of Objective 2 requires the County to encourage local agency efforts to achieve their objectives for providing local parkland. The 2008 Draft General Plan does not replace the 2003 Park and Recreation Element. It does, however, contain additional policies and implementation measures that augment the element. Of relevance to this discussion, Policy RS.P-43 encourages the County to support the provision of public and private lands for use in a trail network and bike paths. While these policies are included in the two documents, neither the Park and Recreation Element nor the 2008 Draft General Plan contains a policy mechanism to ensure that the County's standard is achieved.

Environmental impacts that may occur as a result of the new or expanded parks will be evaluated as part of a separate environmental analysis. At this time the location of future parks is unknown and cannot be included within the EIR for the 2008 Draft General Plan. Review will occur when development of such parks is proposed.

As of 2008 the County has 213 acres of parkland and a population of 20,125. This yields a ratio of 10.6 acres per 1,000 residents. Buildout of the 2008 Draft General Plan under the Preferred Plan would result in a population of 39,448. If no additional parkland is added in that time, a ratio of 5.4 acres of parkland per 1,000 residents would result. This would be substantially below the established standard. The Park and Recreation Element requires 10 acres of parkland per 1,000 residents, but there are no explicit policies, implementation programs, or plans in the element or elsewhere in the 2008 Draft General Plan that state how conformance with the standard will be achieved. This impact would be significant.

Mitigation Measure 4.14-1a: Require Developers to Pay Fair-Share Park and Recreation Impact Fees.

As a condition of approval of all residential development, the County shall require project developers to mitigate any adverse impacts on park and recreational facilities through the payment of a fair-share impact fee. The park mitigation impact fees shall be designed to mitigate impacts reasonably related to a proposed residential development and must be used to acquire or develop park and recreational facilities. "Development," for the purposes of this measure, shall mean all single-family structures requiring a building permit, condominium and multifamily residential units, planned residential development, and all multifamily structures that require building permits, but shall exclude remodel or renovation permits that do not result in additional dwelling units. Impact fees shall be based on a fee formula developed by the County. Payment of the required impact fee shall occur before the issuance of any building permit.

Mitigation Measure 4.14-1 would ensure adequate provision of parklands and recreation facilities and ensure that supply kept up with the increased demand from the growing population. For this reason, the impact would be reduced to a **less-than-significant** level.

IMPACT 4.14-1b **Need for New or Expanded Parks or Recreational Facilities – Maximum Development Scenario.** *Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in a need for new or expanded parks and recreation facilities. Buildout at maximum densities would result in a condition where demand for parks outstrips the existing supply. In 2008 the County has 213 acres of parkland. The County would have only 3.4 acres of parkland per 1,000 residents. This would be substantially lower than the County's adopted parkland provision standard of 10 acres per 1,000 residents. This impact would be **significant**.*

This impact is similar to Impact 4.14-1a for the Preferred Plan. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario would result in a population of 62,105. If no additional parkland is added in that time, a parkland provision ratio of 3.4 acres of parkland per 1,000 residents would result. This would be substantially less than the established standard of 10 acres per 1,000 residents. The Park and Recreation Element requires the standard to be met, but there are no explicit policies, implementation programs, or plans in the element or elsewhere in the 2008 Draft General Plan that state how conformance with the standard will be achieved. This impact would be significant.

Mitigation Measure 4.14-1b: Require Developers to Pay Fair-Share Park and Recreation Impact Fees.

This measure is the same as Mitigation Measure 4.14-1a above. For the same reasons as described above, the impact would be reduced to a **less-than-significant** level.

IMPACT 4.14-2a **Physical Deterioration of Parks or Recreational Facilities due to Increased Use – Preferred Plan.** *Population increases resulting from the buildout of the 2008 Draft General Plan under the Preferred Plan would increase use of the county's existing parks and recreational facilities. This increased demand could result in the deterioration of parks and recreational facilities. This impact would be **significant**.*

Objective 1 of the 2003 Park and Recreation Element requires the coordination of the planning and development of regional recreational facilities. Policy E of Objective 1 directs the County to pursue cost-effective joint or reciprocal agreements with other governmental jurisdictions or private groups for the acquisition, development, and operation of regional recreational facilities. Policy B of Objective 1 requires the County to work with local agencies and districts in identifying regional recreational needs and supporting plans and programs for those facilities. No policies or programs exist that describe how the parks or other recreational facilities will be maintained or how new facilities will be developed.

Buildout of the 2008 Draft General Plan under the Preferred Plan could result in the deterioration of existing parks and recreation facilities. This impact would be significant.

Mitigation Measure 4.14-2a: Implement Mitigation Measure 4.14-1a.

The County shall implement Mitigation Measure 4.14-1a as described above. Mitigation Measure 4.14-1a would ensure adequate provision of parklands and recreation facilities and ensure that supply kept up with the increased demand from the growing population. This would reduce impacts associated with overuse. For this reason, the impact would be reduced to a **less-than-significant** level.

IMPACT 4.14-2b **Physical Deterioration of Parks or Recreational Facilities due to Increased Use – Maximum Development Scenario.** *Population increases resulting from the buildout of the 2008 Draft General Plan under the Maximum Development Scenario would increase use of the county's existing parks and recreational facilities. This increased demand could result in the deterioration of parks and recreational facilities. This impact would be **significant**.*

This impact is similar to Impact 4.14-2a for the Preferred Plan. As stated above, buildout at maximum densities would result in 3.4 acres of parkland per 1,000 residents. This is much less than the County's park provision standard of 10 acres per 1,000 residents. The increased population and associated overuse of facilities could result in the physical deterioration of the county's park resources. Buildout of the 2008 Draft General Plan under the Maximum Development Scenario could result in the deterioration of existing parks and recreation facilities. This impact would be significant.

Mitigation Measure 4.14-2b: Implement Mitigation Measure 4.14-1a.

This measure is the same as Mitigation Measure 4.14-2a above. For the same reasons as described above, the impact would be reduced to a **less-than-significant** level.

4.14.4 RESIDUAL SIGNIFICANT IMPACTS

With implementation of the mitigation described above, all impacts on recreation would be reduced to a less-than-significant level. No residual significant impacts would exist.

5 ALTERNATIVES TO THE PROPOSED PROJECT

5.1 INTRODUCTION

Section 15126.6(a) of the State CEQA Guidelines states the following:

An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

This section of the State CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. Section 15126.6(b) further states the purpose of the alternatives analysis as follows:

Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The State CEQA Guidelines further require that the alternatives be compared to the proposed project's environmental impacts and that the "no project" alternative be considered (State CEQA Guidelines Section 15126.6[e]). In defining "feasibility" (e.g., "... feasibly attain most of the basic objectives of the project ..."). State CEQA Guidelines Section 15126.6(f)(1) states, in part:

Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

In determining what alternatives should be considered in the EIR, it is important to acknowledge the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a) of the State CEQA Guidelines.

For the purposes of this EIR, the "project," as described in the various CEQA guidance summarized above, is the 2008 Draft General Plan. Please see Section 3.3 in Chapter 3, "Project Description," for the objectives of the update to the *Solano County General Plan* (General Plan).

5.2 ALTERNATIVES EVALUATED IN THIS EIR

Project alternatives are intended to reduce or eliminate the potentially significant adverse environmental effects of the 2008 Draft General Plan, while attempting to meet most of the project objectives, as stated in Chapter 3, “Project Description.”

An EIR is required to contain a discussion of a reasonable range of alternatives to the project, or to the location of the project, that could feasibly attain the basic objectives of the project (State CEQA Guidelines Section 15126.6[a]). The comparative merits of the alternatives should also be presented. In addition to the guidance described in Section 5.1 above, CEQA provides the following guidelines for considering alternatives to the project:

- ▶ If an alternative would cause one or more significant environmental effects in addition to those that would be caused by the project, the significant effects of the alternatives shall be discussed, but in less detail than the significant effects of the project. (State CEQA Guidelines Section 15126.6[d])
- ▶ The “no project” alternative shall be evaluated. If the environmentally superior alternative is the no project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. (State CEQA Guidelines Section 15126.6[e])
- ▶ The range of alternatives required by an EIR is governed by the “rule of reason” that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and informed public participation. An EIR need not consider an alternative whose effect cannot be ascertained and whose implementation is remote and speculative. (State CEQA Guidelines Section 15126.6[f])

5.2.1 PREVIOUS GENERAL PLAN ALTERNATIVES

The County considered a range of land use alternatives during preparation of the 2008 Draft General Plan, both for the county area at large and within each of four special study areas: Collinsville, Old Town Cordelia, Middle Green Valley, and Suisun Valley. This process touched on many environmental issues, although social and economic issues were also involved. The previous public discussion of 2008 Draft General Plan alternatives is distinct from the alternatives analysis presented in this EIR, although there may be overlap with certain concepts presented earlier.

Alternatives for each of five geographic areas within the county (Rio Vista/southeast county area, North Vacaville area, Dixon area, South Vacaville/Fairfield/Suisun City area, and Vallejo/Benicia area) were developed and reviewed. The alternatives, to varying degrees, reflected the vision statement and preliminary policies developed by the Citizens’ Advisory Committee (CAC) and the wider community. In addition, the alternatives incorporated various combinations of requests by property owners for land use designations, land use changes recommended by County staff members, and additional commercial and industrial sites recommended within the Local Economy Background Report prepared for the 2008 Draft EIR (Solano County 2006).

In each area, two alternative land use scenarios were proposed in addition to an alternative in which existing General Plan land use designations would remain.

- ▶ Alternative 1 maintained the existing General Plan’s land use designations. Under this alternative, any new growth would have been accommodated in currently designated residential, commercial, or industrial areas. Furthermore, the County would have maintained the existing General Plan’s level of protection of natural resources.

- ▶ The primary concept of Alternative 2 was to maintain the existing General Plan’s land use designations in most locations, but to incorporate requests by property owners for changes to land use designations, land use changes recommended by County staff members, and additional commercial and industrial sites recommended within the Local Economy Background Report that were deemed by the County to be consistent with the vision statement and preliminary policies. In most cases, Alternative 2 deferred to the general plans of the cities within Solano County in determining the land use designations within each city’s sphere of influence.
- ▶ Alternative 3 for each area generally incorporated the recommendations of Alternative 2, while also seeking to implement existing and proposed County policies regarding public safety, conservation, and the protection of open space and agricultural lands. Alternative 3 for each area proposed that the Resource Conservation Overlay and Agricultural Resource Overlay designations be used to provide for conservation of natural habitat areas and agricultural lands, respectively.

Within each of the four special study areas, numerous community meetings were held between May and August 2007 to identify key community issues, develop and refine land use alternatives, and select a community-preferred land use alternative for each area. Alternatives presented to the community in each of these areas responded to unique priorities expressed by and constraints and opportunities present within each of the communities.

The CAC reviewed land use alternatives at seven public meetings held between July 9 and October 15, 2007. At each meeting, the CAC discussed the merits of each alternative, reviewed each General Plan designation change proposed by the alternatives, and determined a preferred General Plan land use diagram for each countywide geographic area and special study area. At a public meeting on November 19, 2007, the CAC reviewed the entirety of the preliminary General Plan land use diagram.

At a public workshop on November 29, 2007, the County Planning Commission reviewed and modified the preliminary General Plan land use diagram. At a public workshop on December 15, 2007, the County Board of Supervisors further reviewed and modified the preliminary General Plan land use diagram and recommended a preferred alternative. The Preferred Alternative was refined as a part of the draft General Plan land use diagram.

For detailed information pertaining to the alternatives considered during the course of the 2008 Draft General Plan, please refer to the 2008 Draft General Plan Web site: <www.solanocountygeneralplan.net>. The alternatives reports are also on file with the County Department of Resource Management.

5.2.2 GENERAL PLAN EIR ALTERNATIVES

As mentioned, the previous General Plan alternatives discussion involved environmental and other issues. The focus for alternatives analysis in this EIR is distinct from the earlier General Plan alternatives process. For this EIR, the County elected to examine the impacts of four alternatives to compare with the 2008 Draft General Plan:

- ▶ **Alternative 1. No Project: Buildout of the Existing General Plan.** This alternative assumes that the 2008 Draft General Plan would not be implemented and that the County would build out as indicated by the existing (pre-update) General Plan (see Exhibit 5-1).
- ▶ **Alternative 2. Improved Environmental Sustainability.** Relative to the 2008 Draft General Plan, this alternative assumes reduced amounts of development of land designated Rural Residential, Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established municipal service areas (MSAs), and increased amounts of land within the proposed Agricultural Reserve Overlay and Resource Conservation Overlay. These assumptions are presented in the land use diagram for Alternative 2 (see Exhibit 5-2). This alternative further assumes certain limits on agricultural processing on lands designated Agriculture, and would place limitations on proposed policies

enabling centralized sewer treatment facilities. At buildout, Alternative 2 would have a lower level of development and a higher level of conservation than would be allowed under the 2008 Draft General Plan.

- ▶ **Alternative 3. Reduced Commercial and Industrial Development.** Relative to the 2008 Draft General Plan, this alternative assumes designation of less land as Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs. These assumptions are presented in the land use diagram for Alternative 3 (see Exhibit 5-3). This alternative also places limitations on the policies enabling centralized sewer treatment facilities. At buildout, this alternative would result in a lower level of development than the 2008 Draft General Plan.
- ▶ **Alternative 4. Reduced Rural Residential.** Relative to the 2008 Draft General Plan, this alternative assumes designation of less land as Rural Residential. This assumption is presented in the land use diagram for Alternative 4 (see Exhibit 5-4). This alternative also places limitations on the policies enabling centralized sewer treatment facilities. At buildout, Alternative 4 would result in a lower level of development than the 2008 Draft General Plan.

5.3 ALTERNATIVES REJECTED FOR FURTHER EVALUATION

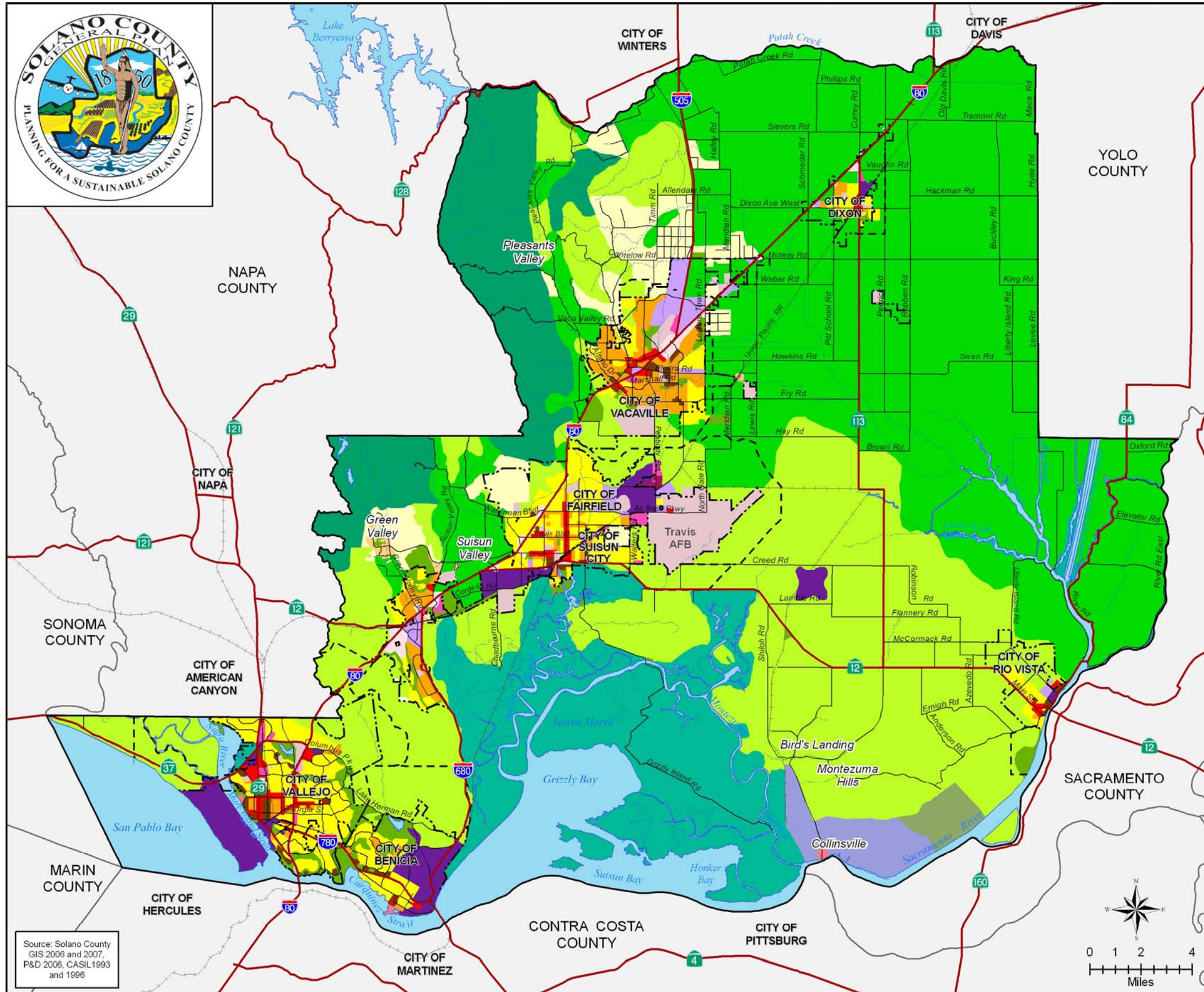
The County considered approximately 15 different land use and circulation alternatives (three alternatives each in five geographic areas) as a part of the General Plan update process. These alternatives featured varying overall development footprints and varying levels of habitat and agricultural conservation. Although there may be similarities between the previously considered alternatives and those presented in this chapter, the alternatives were specifically reconstituted for the purposes of this EIR analysis. The County determined that a simple repeat of the earlier range of alternatives would not serve the decision makers or public as well as the present range. For example, alternatives previously considered in some instances featured greater levels of Rural Residential, Commercial, and Industrial development than the 2008 Draft General Plan. This is not helpful for comparison in an EIR because the purpose of an alternatives analysis is to reduce potentially significant environmental impacts compared to the impacts of the proposed project. Many of the previous alternatives would have increased environmental impacts relative to the 2008 Draft General Plan.

5.4 ALTERNATIVE 1. NO PROJECT: BUILDOUT OF THE EXISTING GENERAL PLAN

5.4.1 DESCRIPTION

The No Project Alternative assumes that the 2008 Draft General Plan would not be implemented, and that the County would build out as indicated by the existing (pre-update) General Plan. The objectives of the existing General Plan are to create orderly growth in the unincorporated areas of the county, maintain environmental quality and natural resources, provide satisfactory housing options for residents, establish a vibrant and diversified economy, provide effective public facilities and services, and maintain a safe, economical, and efficient circulation and transportation system.

The land use pattern of the existing General Plan allocates most of the land in the unincorporated county to agricultural and open space uses. Commercial, residential, and industrial uses occupy much smaller areas. Commercial land uses exist in places where they can serve rural residential areas and at locations with good accessibility for highway travelers. Residential designations conform generally to existing development patterns. Additional lands designated as residential exist as logical extensions of existing residential areas and have been purposely located not to displace valuable farmland. Industrial lands are designated where industries already exist and where physical characteristics favor the location of certain specialized uses while avoiding better agricultural soils.



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Exhibit 5-1

Land Use Diagram - Alternative 1 (No Project Buildout of the Existing General Plan)

Legend

General Plan Land Use Designations

- Watershed
- Marsh
- Park & Recreation
- Water Bodies & Courses
- Intensive Agriculture
- Extensive Agriculture
- Rural (2.5 to 10 acres per unit)
- Suburban (1 to 4 units per acre)
- Low (2 to 7 units per acre)
- Medium (8 to 15 units per acre)
- High (16 to 25 units per acre)
- Neighborhood Commercial
- Community Commercial
- Commercial Service
- Commercial Service-Light Industrial
- Business & Administrative Office
- Highway Commercial
- Commercial Recreation
- Limited Industrial
- General Industrial
- Water Dependent Industrial
- Water Dependent Industrial Reserve
- Public
- Incorporated Cities
- City Spheres of Influence



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL1993 and 1996

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"Planning for a Sustainable Solano County"



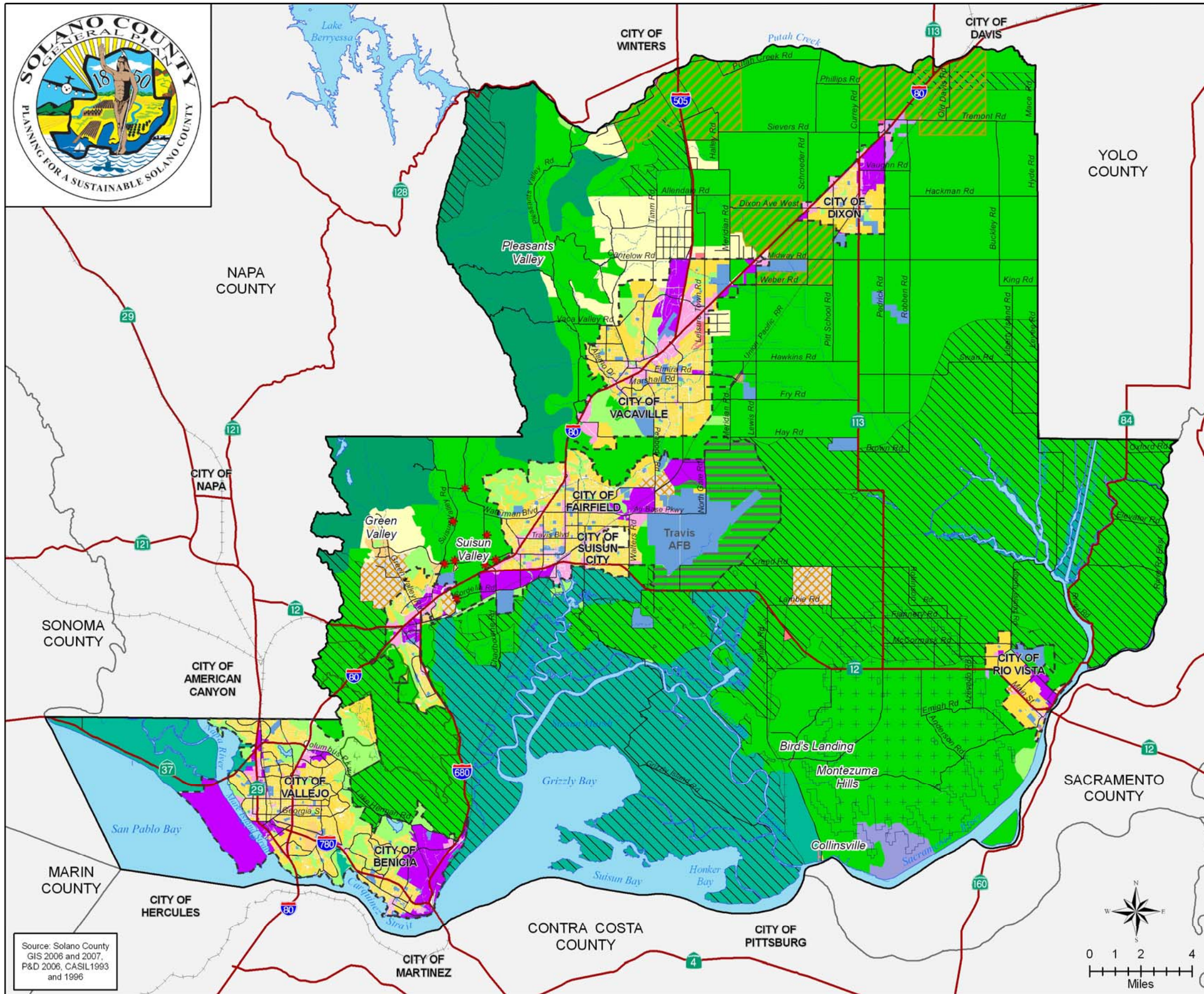
Solano County General Plan EIR

Exhibit 5-2

Land Use Diagram - Alternative 2 (Improved Environmental Sustainability)

Legend

- Municipal Service Areas (Alt 2)
- Land Use Designations
- Natural Resource Designations
 - Water Bodies and Courses
 - Park and Recreation
 - Marsh
- Agricultural Designations
 - Watershed
 - Agriculture
- Public Designations
 - Public/Quasi-Public
- Residential Designations
 - Rural Residential
 - Traditional Community - Residential
 - Traditional Community - Mixed Use
 - Urban Residential; Urban Residential
- Commercial Designations
 - Neighborhood Commercial
 - Neighborhood Agricultural/Tourist Center
 - Commercial Recreation
 - Service Commercial
 - Highway Commercial
 - Urban Commercial
- Industrial Designations
 - General Industrial
 - Limited Industrial
 - Water Dependant Industrial
 - Urban Industrial
- Special Purpose Areas
 - Specific Project Areas
- Overlays
 - Travis Reserve Area
 - Wind Energy Resource Overlay
 - Agricultural Reserve Overlay
 - Tri-City/County Cooperative Planning Area
 - Resource Conservation Overlay



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL1993 and 1996



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"Planning for a Sustainable Solano County"



Solano County General Plan EIR

Exhibit 5-3

Land Use Diagram - Alternative 3 (Reduced Commercial and Industrial Development)

Legend

--- Municipal Service Areas (MSAs)

Land Use Designations

Natural Resource Designations

Water Bodies and Courses

Park and Recreation

Marsh

Agricultural Designations

Watershed

Agriculture

Public Designations

Public/Quasi-Public

Residential Designations

Rural Residential

Traditional Community - Residential

Traditional Community - Mixed Use

Urban Residential

Commercial Designations

Neighborhood Commercial

Commercial Recreation

Service Commercial

Highway Commercial

Urban Commercial

Industrial Designations

General Industrial

Limited Industrial

Water Dependant Industrial

Urban Industrial

Special Purpose Areas

Specific Project Areas

Overlays

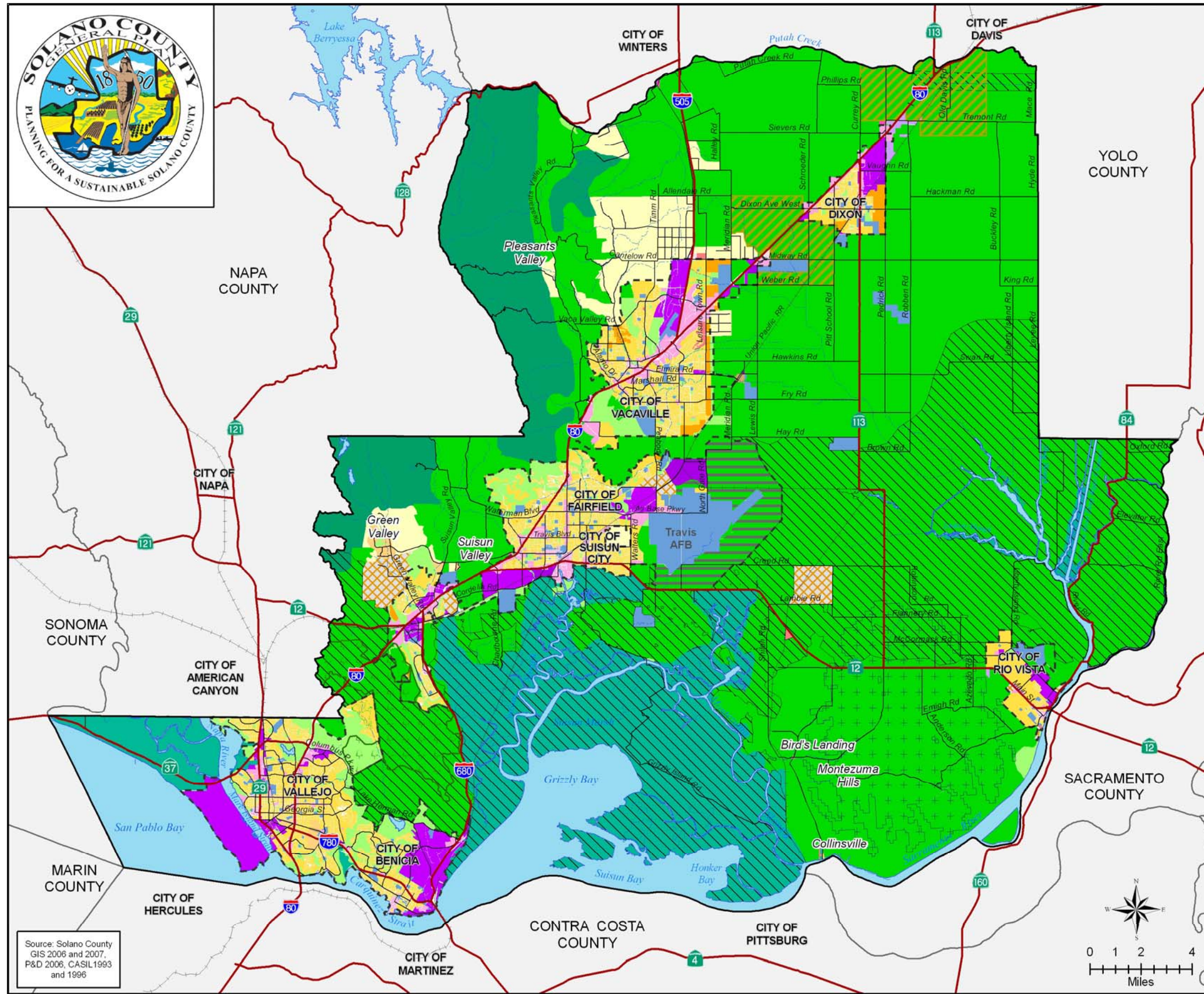
Travis Reserve Area

Wind Energy Resource Overlay

Agicultural Reserve Overlay

Tri-City/County Cooperative Planning Area

Resource Conservation Overlay



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL1993 and 1996

023 4/15/08

"Planning for a Sustainable Solano County"



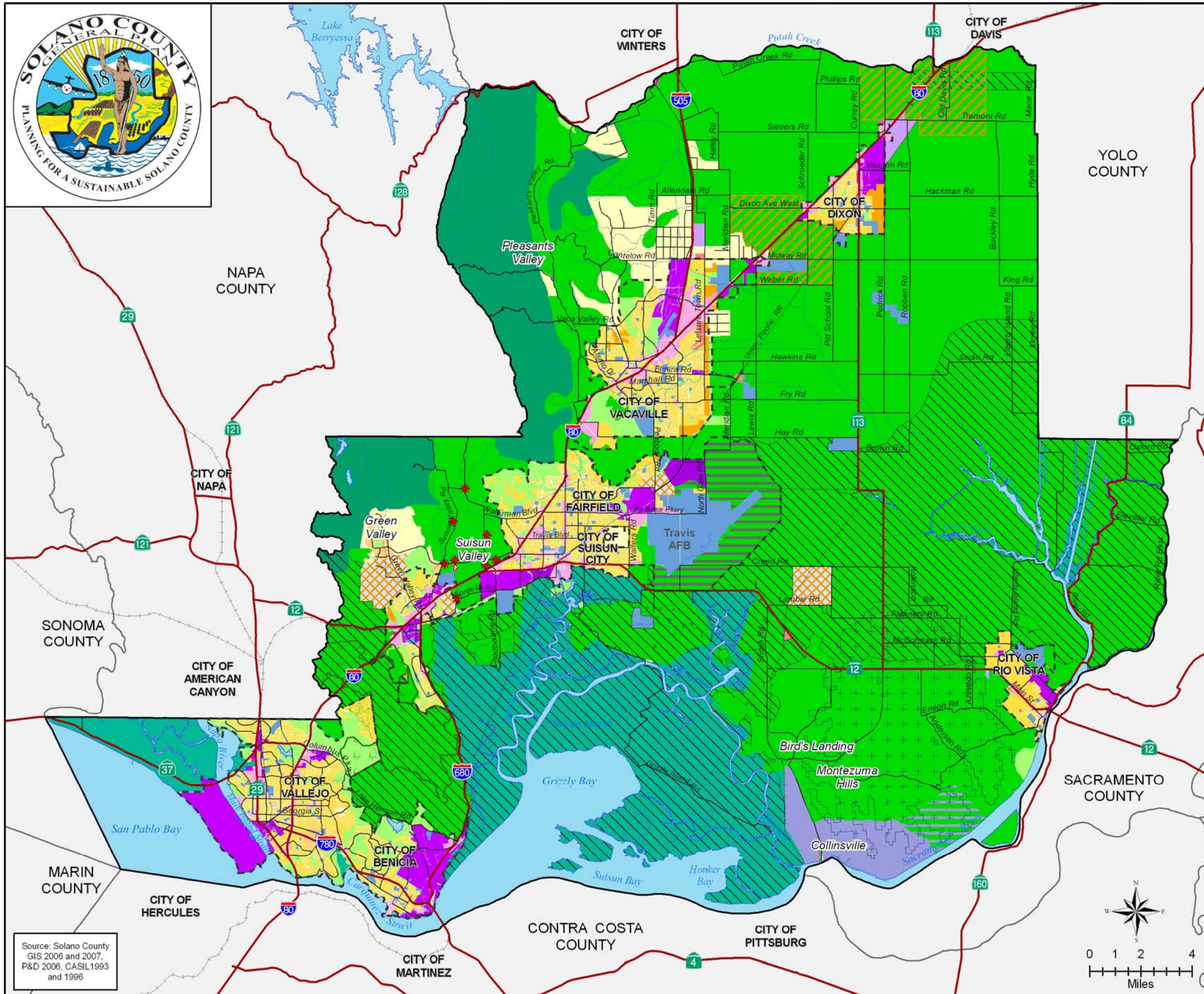
Solano County General Plan EIR

Exhibit 5-4

Land Use Diagram - Alternative 4 (Reduced Rural Residential Development)

Legend

- [- - -] Municipal Service Areas (MSAs)
- Land Use Designations
- Natural Resource Designations
 - Water Bodies and Courses
 - Park and Recreation
 - Marsh
- Agricultural Designations
 - Watershed
 - Agriculture
- Public Designations
 - Public/Quasi-Public
- Residential Designations
 - Rural Residential
 - Traditional Community - Residential
 - Traditional Community - Mixed Use
 - Urban Residential
- Commercial Designations
 - Neighborhood Commercial
 - Neighborhood Agricultural/Tourist Center
 - Commercial Recreation
 - Service Commercial
 - Highway Commercial
 - Urban Commercial
- Industrial Designations
 - General Industrial
 - Limited Industrial
 - Water Dependant Industrial
 - Urban Industrial
- Special Purpose Areas
 - Specific Project Areas
- Overlays
 - Water Dependant Industrial - Reserve
 - Travis Reserve Area
 - Wind Energy Resource Overlay
 - Agricultural Reserve Overlay
 - Tri-City/County Cooperative Planning Area
 - Resource Conservation Overlay



Source: Solano County GIS 2006 and 2007, P&D 2006, CASIL1993 and 1996

024 4/15/08

"Planning for a Sustainable Solano County"

The No Project Alternative would contain less land designated as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan. The alternative contains 1,778 fewer acres of residential land, 349 fewer acres of commercial land, and 891 fewer acres of industrial land. A total of 15,072 fewer acres of agricultural lands would be converted to nonagricultural uses under the No Project Alternative than under the 2008 Draft General Plan. The No Project Alternative would not, however, contain the Resource Conservation Overlay or Agricultural Reserve Overlay designations contained in the 2008 Draft General Plan. Table 5-1 on page 5-15 provides further analysis of the projected development capacity of Alternative 1 relative to that of the Preferred Plan.

5.4.2 ENVIRONMENTAL EFFECTS

IMPACTS ON LAND USE

Buildout of the existing General Plan under Alternative 1 could result in the division of established communities. Division of communities could occur in areas south of Fairfield and near Collinsville where the plan designates existing farmland as commercial or industrial uses. Although division could occur, the existing plan is much less likely to create such divisions than is the proposed 2008 Draft General Plan. The existing plan contains less land designated for commercial and industrial uses than the 2008 Draft General Plan. In the existing General Plan 670 acres are designated as commercial and 8,105 acres are designated as industrial. In comparison, the 2008 Draft General Plan contains 1,036 acres of commercial land and 8,996 acres of industrial lands. The existing plan also has fewer commercial and industrial sites than the 2008 Draft General Plan. Fewer sites provide less potential for the division of existing communities.

Similarly, Alternative 1 is likely to result in fewer land use conflicts. As stated above, there is less commercial and industrial acreage in the existing General Plan. The existing plan also contains less acreage designated for rural, suburban, and urban residential uses. The location of the rural residential designations conforms closely to the locations of existing rural residences, whereas the 2008 Draft General Plan places rural residential in purely agricultural areas. Alternative 1 also limits the location of suburban and urban uses to a few small pockets adjacent to cities. In the 2008 Draft General Plan, Urban Residential designations are used extensively in the unincorporated areas of the MSAs in Dixon and Vacaville. Even with the establishment of buffers, the designation of large amounts of Urban Residential in these areas could create with significant use conflicts with existing agriculture. Under Alternative 1 (the existing General Plan), there would be fewer possibilities for such conflicts.

Alternative 1 could potentially result in more conflicts with adopted local, regional, and state plans. The existing General Plan has fewer policies directed toward compliance with regional and state plans and programs. The 2008 Draft General Plan contains a variety of policies and programs to accommodate plans from agencies such as the San Francisco Bay Conservation and Development Commission (BCDC) and U.S. Fish and Wildlife Service (USFWS). Although the existing General Plan contains some policies and programs, the 2008 Draft General Plan contains additional and updated policies and programs.

Alternative 1 would be less likely to induce population growth than the 2008 Draft General Plan. The existing General Plan is estimated to generate a population of 19,980 in 2030. Projections by the Association of Bay Area Governments (ABAG) estimate a population of 26,000 and the 2008 Draft General Plan is forecasted to generate a population of 39,455 in the same year. Although the 2008 Draft General Plan exceeds ABAG projections and is therefore determined to be growth inducing, the existing General Plan is estimated to result in a population less than ABAG projections. Alternative 1 is therefore not growth inducing.

Neither Alternative 1 nor the 2008 Draft General Plan is expected to displace substantial numbers of people or housing units. Neither the existing General Plan nor the 2008 Draft General Plan contains redevelopment districts, and displacement of homes would be limited to isolated instances when an existing farmhouse is removed as existing agricultural uses are converted to higher intensity uses. In both plans, the impact of such displacement would not be significant.

IMPACTS ON AIR QUALITY

Alternative 1 would result in designation of less land as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan. This would result in fewer vehicle miles traveled and fewer emissions sources overall. However, Alternative 1 would not have policies regarding air quality similar to those of the 2008 Draft General Plan. The policies in the 2008 Draft General Plan, however, are insufficient to overcome the additional development that would occur. Therefore, Alternative 1 would result in fewer emissions of criteria air pollutants, toxic air contaminants, and odors from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

IMPACTS RELATED TO NOISE

Under this alternative, the county would build out as indicated by the existing (pre-update) General Plan. Because development under Alternative 1 would result in considerably fewer dwelling units, and therefore lower population, than the 2008 Draft General Plan, the potential for adverse noise impacts at noise-sensitive areas would be reduced. Development under Alternative 1 would also result in fewer potentially noise-producing land uses than the 2008 Draft General Plan because there would be less commercial and industrial development. As a result, there is reduced potential for adverse noise impacts with development under Alternative 1 than with development under the 2008 Draft General Plan.

As with the 2008 Draft General Plan, however, development of noise-sensitive land uses within noise-impacted areas, or the development of noise-producing land uses in the vicinity of existing noise-sensitive areas, would result in significant noise impacts. As with the 2008 General Plan, application of the County's General Plan policies for noise would mitigate such impacts to less-than-significant levels by requiring noise mitigation measures to ensure compliance with the applicable land use compatibility criteria with respect to noise.

IMPACTS ON TRANSPORTATION AND CIRCULATION

Under Alternative 1, buildout of the existing General Plan and forecasted growth within cities in Solano County and adjacent counties would cause significant increases in traffic above existing conditions and cause numerous roadway segments to degrade to Level of Service (LOS) D, LOS E, or LOS F. Alternative 1 would generate slightly fewer total daily trips than the 2008 Draft General Plan under the Preferred Plan. Alternative 1 and the 2008 Draft General Plan under the Preferred Plan would cause degradation in levels of service at the same number of intersections from acceptable levels of service (LOS A–C) to unacceptable levels of service (LOS D–F).

Total Number of Trips

Aggregate growth in the number of daily trip ends within Solano County under the existing General Plan, combined with anticipated growth inside the various jurisdictions, is anticipated to result in a 41.0% increase in total daily trips (Table 5-2 on page 5-16).

**Table 5-1
General Plan Development Capacity under Alternative 1 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions
Water Bodies and Courses	51,092	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Park and Recreation	2,219	86	1,428	NA	NA	NA	NA	NA	NA	NA	NA	NA
Marsh	58,348	-6,375	-6,383	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Natural Resource Designations	111,659	-6,289	-4,956	NA	NA	NA	NA	NA	NA	NA	NA	NA
Watershed	36,633	58	58	80	0	*	210	0	*	NA	NA	NA
Agriculture	322,119	15,014	-6,957	934	-866	*	2,454	-2,275	*	2,503,167	1,312,348	*
Subtotal Agricultural Designations	358,752	15,072	-6,899	1,014	-866	202	2,664	-2,275	395	2,503,167	1,312,348	*
Public/Quasi-Public	319	-1,553	-1,198	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Public Designations	319	-1,553	-1,198	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Residential	13,269	-451	7,405	2,654	-90	*	6,972	-237	*	NA	NA	NA
Traditional Community—Residential	0	-402	*	0	-654	*	0	-1,718	*	NA	NA	NA
Traditional Community—Mixed Use	0		*	0		*	0		*	0	-393,548	*
Suburban Residential I	685		*	1,370		*	3,600		*	NA	NA	NA
Urban Residential ¹	965	-925	679	3,800	-1,874	*	9,984	-4,924	*	NA	NA	NA
Subtotal Residential Designations	14,920	-1,778	8,042	7,824	-2,618	1,256	20,556	-6,879	2,837	NA	-393,548	NA
Neighborhood Commercial	19	12	*	NA	NA	NA	NA	NA	NA	98,154	65,210	*
Neighborhood Agricultural/Tourist Center	0	-75	*	NA	NA	NA	NA	NA	NA	0	-392,040	*
Commercial Recreation	134	-21	*	NA	NA	NA	NA	NA	NA	46,732	-7,410	*
Service Commercial	207	131	*	NA	NA	NA	NA	NA	NA	1,079,662	685,441	*
Highway Commercial	57	-79	*	NA	NA	NA	NA	NA	NA	298,091	-414,159	*
Commercial Community ²	94	-489	*	NA	NA	NA	NA	NA	NA	491,760	-2,553,712	*
Commercial Business Administration	5		*	NA	NA	NA	NA	NA	NA	26,708		*
Urban Commercial	0		*	NA	NA	NA	NA	NA	NA	0		*
Subtotal Commercial Designations	516	-520	-124	NA	NA	NA	NA	NA	NA	2,041,107	-2,616,671	1,941,131
General Industrial	1,197	1,190	*	NA	NA	NA	NA	NA	NA	1,825,376	1,813,792	*
Limited Industrial	200	-598	*	NA	NA	NA	NA	NA	NA	304,406	-278,704	*
Commercial Service—Light Industrial ³	171		*	NA	NA	NA	NA	NA	NA	893,650		*

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 1	Compared to 2008 Draft GP	Compared to Existing Conditions
Water Dependent Industrial	6,709	-58	*	NA	NA	NA	NA	NA	NA	2,922,229	-25,133	*
Urban Industrial	0	-1,254	*	NA	NA	NA	NA	NA	NA	0	-1,911,425	*
Subtotal Industrial Designations	8,276	-720	6,151	NA	NA	NA	NA	NA	NA	5,945,662	-401,470	5,600,461
Specific Project Areas	0	-4,208	NA	0	-2600	0	0	-7,081	0	0	-1,787,579	0
Subtotal Special Purpose Areas	0	-4,208	NA	0	-2600	0	0	-7,081	0	0	-1,787,579	0
TOTAL Unincorporated Area	494,437	0	0	8,838	-6,085	1,458	23,221	-9,154	10,313	10,489,936	-3,886,920	7,541,592
Water Dependent Industrial—Reserve	0	-2,870	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Travis Reserve Area	0	-7,890	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wind Energy Resource Overlay	0	-31,737	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Agricultural Reserve Overlay	0	-14,428	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tri-City Cooperative Planning Area	0	-9,968	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Resource Conservation Overlay	0	-210,576	0	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
 GP = General Plan; NA = not applicable
^[1] Suburban Residential is compared to Traditional Community.
^[2] Commercial Community and Commercial Business Administration are compared to Urban Commercial.
^[3] Commercial Service—Light Industrial and Limited Industrial are compared to Limited Industrial.
 * More detail not available for these designations.
 Source: Data provided by EDAW in 2008

Scenarios	Total Daily Trips	Change from Existing Conditions	
		Total Trips	Percent
Existing Conditions (2007)	2,094,228	–	–
Alternative 1 (No Project—Buildout of the Existing General Plan)	2,953,391	859,163	41.0%
2008 Draft General Plan (Preferred Plan)	3,012,014	917,786	43.8%

Source: Solano-Napa Phase 2 Model

Vehicle Miles Traveled and Vehicle Hours Traveled

As expected, the increase in total trips would result in an increase in both vehicle miles traveled and vehicle hours traveled for roadways that are in Solano County. The results are shown in Table 5-3. These results are reported for a combined a.m. and p.m. peak hour, the times when congestion is the heaviest and impacts on air quality would be most likely to occur.

Table 5-3 Vehicle Miles Traveled and Vehicle Hours Traveled (Alternative 1) Relative to the 2008 Draft General Plan under the Preferred Plan				
Scenario	Combined a.m. and p.m. Peak Hour			
	Vehicle Miles Traveled		Vehicle Hours Traveled	
	Whole County	Congested Area	Whole County	Congested Area
Existing Conditions	2,022,198	206,343	56,364	11,990
Alternative 1 (No Project—Buildout of the Existing General Plan)	2,890,171	481,810	97,728	33,671
2008 Draft General Plan (Preferred Plan)	2,914,306	463,573	97,533	32,423
Change from Existing Conditions to Alternative 1	867,973	275,467	41,364	21,681
	43%	133%	73%	181%
Change from Alternative 1 to 2008 Draft General Plan (Preferred Plan)	24,135	-18,237	-195	-1,248
	0.8%	-3.8%	-0.2%	-3.7%
Source: Modeling conducted by DKS Associates in 2008				

Table 5-3 indicates that growth resulting from the implementation of the existing General Plan and concurrent growth occurring in other relevant jurisdictions (i.e., the incorporated cities and adjacent communities) would result in a 43% increase in vehicle miles traveled above existing conditions. The increase in vehicle miles traveled on congested facilities is expected to be much greater at 133%. This is a result of higher anticipated congestion on roadways in general across Solano County by 2030. Although the overall number of vehicle miles traveled is lower, the number of vehicle miles traveled on congested roadways is higher than under the 2008 Draft General Plan (Preferred Plan). This forecast condition occurs because Solano County has more working residents than jobs, so the additional job sites proposed under the 2008 Draft General Plan would result in fewer persons leaving the county for work on the most congested corridors.

The increased congestion is also a significant factor in why the existing General Plan would result in virtually the same quantity of vehicle hours traveled as would the 2008 Draft General Plan under the Preferred Plan, even though the number of vehicle miles traveled would be lower. Similarly, in Alternative 1 the vehicle hours traveled on congested facilities would grow to 181% beyond the current vehicle hours traveled on congested facilities estimated today. Again, although the number of overall vehicle miles traveled is lower, the vehicle hours traveled on congested roadways would be higher than under the 2008 Draft General Plan (Preferred Plan).

Forecasted Levels of Service

According to County policy, significance occurs when the level of service would degrade to LOS C or lower. Under Alternative 1, 44 roadway segments would degrade to below LOS C. The 2008 Draft General Plan under the Preferred Plan would result in the same number of degraded segments. The only difference between the plans would be the extent of the degradation for two of the roadway segments (see Section 4.4, “Transportation and Circulation”).

IMPACTS ON HYDROLOGY AND WATER RESOURCES

Alternative 1 would designate less land for residential, commercial, and industrial uses and, at buildout, would have a lower level of development than the 2008 Draft General Plan. However, Alternative 1 would not result in the implementation of additional policies to protect water quality, as would the 2008 Draft General Plan. Therefore, Alternative 1 would result in a similar level of violation of water quality standards as the 2008 Draft General Plan.

Alternative 1 also would not result in the implementation of additional policies designed to minimize or eliminate on-site and downstream erosion and sedimentation, as would the 2008 Draft General Plan. Solano County cities are each responsible for their own storm drainage and flood control, and this would not change under Alternative 1. County flood control efforts to address erosion and sedimentation—the Ulatis Flood Control Project, the *Flood Control Master Plan* approved by the Solano County Water Agency (SCWA), and the Suisun Marsh Policy Addendum certified by BCDC—would not change under this alternative. Therefore, impacts of Alternative 1 with regard to on-site and downstream erosion and sedimentation would be similar to those of the 2008 Draft General Plan.

The 2008 Draft General Plan would result in more construction from the additional development than Alternative 1, and could result in increased erosion and sedimentation. However, the impact on water quality resulting from construction under Alternative 1 would be similar to that under the 2008 Draft General Plan, given the adequacy of existing National Pollutant Discharge Elimination System (NPDES) requirements and storm water pollution prevention plans (SWPPPs) for lots greater than 1 acre in size; the effectiveness of best management practices (BMPs) used in such situations; and the County’s current grading, erosion, and flood control regulations, which would remain unchanged under this alternative.

The additional development of land designated for residential, commercial, and industrial uses under the 2008 Draft General Plan would result in more impervious surfaces than under Alternative 1; however, additional policies to protect, monitor, restore, and enhance the quality and quantity of groundwater resources would not be implemented under Alternative 1. Therefore, this alternative would have impacts on groundwater recharge similar to those of the 2008 Draft General Plan.

Alternative 1 would result in a lesser degree of buildout in floodplains than the 2008 Draft General Plan. However, the cities in Solano County are each responsible for their flood control projects, and SCWA is responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Sacramento–San Joaquin Delta (Delta) (from precipitation and tides) rely on levees, as discussed in Impact 4.5-6 in Section 4.5, “Hydrology and Water Resources.” Also, the implementation of additional policies to address flooding and flood hazards would not be implemented under Alternative 1. Therefore, the impacts of Alternative 1 would be similar to those of the 2008 Draft General Plan in this regard.

Like the 2008 Draft General Plan, Alternative 1 would result in a significant and unavoidable impact from the potential for flooding as a result of local levee failure. Both Alternative 1 and the 2008 Draft General Plan would result in a less-than-significant impact from the potential for flooding as a result of dam failure because Dam Inundation Mapping Procedures (Title 19, Section 2575 of the California Code of Regulations [19 CCR Section 2575]) are required by the Governor’s Office of Emergency Services (OES) for all dams where human life is potentially endangered by dam flooding inundation, and this requirement would be unchanged. Therefore, Alternative 1 would have impacts similar to those of the 2008 Draft General Plan with regard to flooding threats from levee or dam failure.

IMPACTS ON BIOLOGICAL RESOURCES

Alternative 1 would result in conversion of less land (15,072 acres) from agricultural uses than would occur under the 2008 Draft General Plan. In addition, less land (3,018 acres) would be designated as new commercial, industrial, or residential uses under Alternative 1 than under the 2008 Draft General Plan. The net result would be that less land (18,090 acres) could potentially be converted from agriculture or open space to development, resulting in fewer significant impacts on biological resources under Alternative 1 than under the 2008 Draft General Plan. For example, loss of less agricultural land would leave more land suitable as foraging habitat for raptors and special-status birds such as burrowing owl and tricolored blackbird. The potential for loss of other special-status species habitat would also be less under Alternative 1 than under the 2008 Draft General Plan, as would potential for losses of sensitive riparian, wetland, vernal pool grassland, and oak woodland habitat.

The lack of Agricultural Reserve and Resource Conservation Overlays under Alternative 1 would likely increase the potential for impacts on biological resources because controls on development from those overlays would not apply. It is, however, unclear how much acreage of biological resources would be preserved by these overlays and how effective the overlays would be in reducing impacts under the 2008 Draft General Plan as compared to Alternative 1.

Alternative 1 would not implement several policies designed to minimize or eliminate impacts on biological resources, as would the 2008 Draft General Plan. The lack of implementation of these policies under Alternative 1 would increase the level of impacts compared with those under the 2008 Draft General Plan. However, because 18,092 fewer acres could potentially be converted to development, Alternative 1 would result in a less significant impact on biological resources than the 2008 Draft General Plan.

IMPACTS ON GEOLOGY AND SOILS

Under Alternative 1, 18,090 fewer acres would be converted from agricultural uses or designated as new commercial, industrial, or residential uses than under the 2008 Draft General Plan. Based on these numbers, fewer impacts from soil conditions or geologic hazards would occur under Alternative 1. For these reasons, Alternative 1 would result in fewer impacts on geology and soils than the 2008 Draft General Plan.

IMPACTS ON AGRICULTURAL RESOURCES

The land use pattern of the existing General Plan allocates a majority of land in Solano County to agricultural and open space uses. Therefore, fewer commercial, residential, and industrial land uses would be developed under Alternative 1 than under the 2008 Draft General Plan, and this alternative would result in development of fewer acres for urban uses.

Specifically, under the existing General Plan commercial land uses are located in areas to serve rural residential areas and at locations with good accessibility for highway travelers. Residential land use designations conform generally to existing development patterns and envisioned future residential development is located as a logical extension of existing residential areas. In addition, future residential development is located to minimize conversion of valuable farmland. Future industrial land uses are envisioned to develop near or adjacent to existing industrialized areas and where physical characteristics favor the location of certain specialized uses while avoiding important agricultural lands. Therefore, Alternative 1 would develop less land designated for residential, commercial, and industrial uses and, at buildout, would result in a lower level of development than the 2008 Draft General Plan. Alternative 1 would result in the conversion of 15,072 fewer acres of agricultural land to urban uses than the 2008 Draft General Plan.

Although fewer acres of agricultural land, including Important Farmland, would be converted to urban land uses under Alternative 1 than under the 2008 Draft General Plan, implementation of Alternative 1 would continue to result in the loss of approximately 17,655 acres of agricultural land, of which a certain portion would be

designated as Important Farmland. Because Alternative 1 would continue to result in the loss of Important Farmland from development of urban uses, this impact would be significant.

Of the 17,655 acres that would be converted from agriculture, it is assumed that a certain percentage is protected under a Williamson Act contract. The Williamson Act is an agricultural conservation tool that allows local governments in California to enter into contracts with private-property owners to protect land for agricultural and open-space purposes. This voluntary program offers tax breaks by assessing lands based on actual use (agricultural or open space) as opposed to their potential full market value, creating a financial incentive to maintain farmland and open space, as opposed to allowing conversion to other uses.

Although the County's Williamson Act program would still apply under Alternative 1, urban land uses envisioned in the existing General Plan would continue to result in the removal of a certain percentage of acres of existing agricultural land currently under a Williamson Act contract. This impact would be less than that created by the 2008 Draft General Plan, but it would remain significant.

IMPACTS ON PUBLIC SERVICES AND UTILITIES

Buildout of the existing General Plan under Alternative 1 would result in lower development intensity than buildout of the 2008 Draft General Plan. The existing General Plan would continue to allow new development, and services and utilities would expand accordingly. Policies would continue to support individual wells and septic systems outside of municipal planning areas, and existing infrastructure would still be utilized within service planning areas. Furthermore, the existing General Plan calls for less development density and would likely result in fewer adverse impacts on provision of fire protection, sheriff's protection, schools, libraries, medical facilities, wastewater, and solid-waste service. New development would continue to be subject to review and mitigation for service-capacity needs under existing regulations. Therefore, potential adverse impacts on public services and utilities from the existing General Plan under Alternative 1 would be less than those of the 2008 Draft General Plan.

IMPACTS ON CULTURAL AND PALEONTOLOGICAL RESOURCES

A total of 18,090 fewer acres would be converted from agricultural uses or designated as new commercial, industrial, or residential uses under Alternative 1 than under the 2008 Draft General Plan. Based on these numbers, it appears that fewer impacts on archaeological deposits and paleontological resources that may be significant under CEQA would occur. The potential for the disturbance of human remains from development-related construction would also be lower. Similarly, fewer historical built-environment resources (e.g., rural ranch houses, barns) would be subject to destruction or alteration because of the difference in acreage that would be converted.

The lack of the Agricultural Reserve under Alternative 1 would appear to increase the potential for impacts on rural historic landscapes because the controls on development implemented by the overlay would not apply. However, the requirements of the Agricultural Reserve Overlay would be strictly voluntary for landowners, and there would be no guarantee that land within this overlay would be secured from development that may adversely affect the settings of potential rural historic landscapes.

Because a significantly lower amount of acreage would be affected, it appears that Alternative 1 would result in fewer potentially significant impacts on cultural and paleontological resources than the 2008 Draft General Plan.

IMPACTS ON AESTHETIC RESOURCES

Implementation of the existing General Plan under Alternative 1 would continue to result in construction of urban land uses adjacent to and surrounding segments of Interstate 80 (I-80), I-505, I-680, and State Route (SR) 37, which are popular travel routes in Solano County. Urban development could include large and tall buildings, soundwalls, berms, and other infrastructure (e.g., roadways, overpasses) that could partially or wholly block

views of the Coast Range from specific areas in Solano County. Depending on the height of buildings constructed, development under Alternative 1 could obscure views of the Coast Range from highways and freeways in Solano County.

Although the existing General Plan provides guidelines for design of urban development projects, it does not specifically identify the design elements that should be implemented (e.g., landscape earthforms, building architecture, façade treatments, lighting fixtures) or the effectiveness of the design elements in reducing the visual impacts of the development. Policies in the existing General Plan require urban development to implement features that would reduce the potential impacts on views of the Coast Range (a countywide scenic vista); however, urban development would continue to permanently alter views, partially or wholly, of the Coastal Range. Alternative 1 would result in an impact on unique views similar to that of the 2008 Draft General Plan.

Both the existing General Plan and the 2008 Draft General Plan identify the wind energy resources that exist in the Montezuma Hills area near Rio Vista and allow for the development of wind turbines. Construction of wind turbines in the area could adversely affect existing views of agricultural lands near Rio Vista and views from SR 160, a state scenic highway. Therefore, the existing General Plan and the 2008 Draft General Plan would result in a similar level of impact on existing agricultural views and scenic resources within a state scenic highway.

With continued implementation of the existing General Plan under Alternative 1, visual conditions of new urban development in Solano County would be similar to existing views of suburban settings found throughout the county (e.g., Dixon, Vacaville, the development corridor along I-80). Further, implementation of urban development envisioned in the existing General Plan would extend the existing urban development boundaries farther outward. Open space, especially in an urbanizing setting, is valued for its visual quality. In Solano County, agricultural lands are equally valued for their visual quality. The existing General Plan incorporates policies aimed at retaining important natural features, agricultural lands, and open spaces for their visual qualities. Although such policies would reduce visual impacts of future urban development, the loss of existing visual resources (e.g., agricultural lands, open spaces) would continue to occur with development of urban land uses throughout Solano County. Alternative 1 would therefore result in an impact on existing visual conditions similar to that of the 2008 Draft General Plan.

A substantial increase in the amount of nighttime light and glare would result from development of urban land uses throughout Solano County under Alternative 1, potentially obscuring views of stars and other features of the night sky. In addition, nighttime lighting in areas of future urban development, or the presence of reflective surfaces on buildings in these areas (e.g., reflective window glazing), could cause light and glare to shine onto motorists traveling along highways and roadways in daytime and nighttime conditions. Policies of the existing General Plan focus on reducing impacts that could result from lighting sources. However, urban development envisioned in the existing General Plan would continue to require substantial new lighting, and buildings could be constructed with reflective surfaces that could cast glare to motorists on local roadways. Like the 2008 Draft General Plan, the existing General Plan identifies an area for development of General Industrial uses located in an agricultural area void of substantial lighting sources. Development of urban land uses under Alternative 1 would introduce substantial new light sources adjacent to existing urban communities and in a rural portion of Solano County, which would cause light trespass into the night sky and create a new source of skyglow and could obscure views of stars and other features of the night sky. Alternative 1 would result in an impact on unique views similar to that of the 2008 Draft General Plan.

IMPACTS ON ENERGY

Solano County would continue to promote development of alternative energy sources under Alternative 1, such as wind, biomass, gas, and solar, subject to guidelines protecting visual resources. However, the policies in the existing General Plan would not be as aggressive in promoting energy conservation and alternative energy sources as those in the 2008 Draft General Plan. Therefore, Alternative 1 would result in a greater impact on energy resources.

IMPACTS RELATED TO HAZARDS AND HAZARDOUS MATERIALS

The current General Plan goals and policies would continue to address hazardous materials. Existing policies would continue to minimize exposure of the public to hazardous materials from stationary and mobile sources, primarily through the review of proposed developments and siting of sensitive development. Regulations would continue to address health and safety regarding transport, storage, disposal, and use of hazardous materials. Therefore, Alternative 1 would have impacts similar to those of the 2008 Draft General Plan.

IMPACTS ON RECREATION

Objective 2 of the existing Parks and Recreation Element requires a park provision standard of 10 acres of parkland for every 1,000 persons living in Solano County. The buildout of the existing General Plan is projected to result in a population of 19,980 by 2030. If the County maintained its existing amount of parkland at 213 acres, it would be able to provide 10.7 acres of parkland per 1,000 residents. This would conform to the County's park provision standards. In contrast, the 2008 Draft General Plan would provide only 5.4 acres per 1,000 residents. Alternative 1 would therefore result in a lesser impact on parks and other recreational facilities than the 2008 Draft General Plan. Mitigation Measure 4.14-1a, as described in Section 4.14, "Recreation," would not be necessary in this context.

IMPACTS RELATED TO CLIMATE CHANGE

Impacts of the 2008 Draft General Plan related to climate change are described in Section 6.2, "Effects related to Climate Change," in Chapter 6, "Other CEQA Sections." Alternative 1 would result in designation of less land as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan; this would result in fewer vehicle miles traveled and fewer sources in general. However, Alternative 1 would not have policies regarding climate change similar to those of the 2008 Draft General Plan. The policies in the 2008 Draft General Plan, however, would not account for the difference. Therefore, Alternative 1 would result in fewer emissions of greenhouse gases from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

5.5 ALTERNATIVE 2. IMPROVED ENVIRONMENTAL SUSTAINABILITY

5.5.1 DESCRIPTION

As expressed in Chapter 3, "Project Description," of this EIR and Chapter 1, "Introduction," of the 2008 Draft General Plan, sustainability—meaning that current generations can meet their needs without compromising the ability of future generations to do so—is an underlying principle of the 2008 Draft General Plan. The concept of sustainability is further expressed in three dimensions within the vision of the 2008 Draft General Plan: environmental sustainability, economic sustainability, and social equity.

The public process of developing the 2008 Draft General Plan sought to increase sustainability within Solano County with regard to the economy, the environment, and social equity to the greatest extent feasible, with a recognition that there may be trade-offs among the three sustainability goals. For example, greater economic sustainability may require more land devoted to economic activities that could cause environmental impacts, notwithstanding the County's efforts to decrease those impacts. Therefore, certain proposals and recommendations are incorporated within the project (e.g., increased amounts of land designated Limited Industrial in unincorporated areas of the county) that are meant to achieve economic or social-equity sustainability objectives (e.g., providing additional employment and/or much-needed processing facilities to support agriculture), which have certain environmental impacts.

The Improved Environmental Sustainability Alternative (Alternative 2) seeks to maximize environmental sustainability by modifying the land use diagram, certain land use designations, and certain policies and programs

proposed within the 2008 Draft General Plan that are designed to achieve primarily economic or social-equity objectives. The intent of the Improved Environmental Sustainability Alternative is to achieve a lower level of overall development and an increased level of conservation than the 2008 Draft General Plan.

Relative to the 2008 Draft General Plan, Alternative 2 assumes designation of less land as Rural Residential, Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs, and in the land use diagram it identifies increased amounts of land within the proposed Agricultural Reserve Overlays and Resource Conservation Overlays.

LAND USE DIAGRAM

The following changes to the General Plan land use diagram are assumed within Alternative 2:

- ▶ **Limited Industrial area northeast of Dixon**—The area proposed for Limited Industrial use northeast of Dixon would be reduced from 689 acres to 240 acres. This area would be designated as Agriculture—Dixon Ridge Region.
- ▶ **Agricultural Reserve Overlay south of Winters**—The Agricultural Reserve Overlay located northeast of Dixon would be extended westward to encompass the entirety of the Winters agricultural region, excluding portions of the region designated Service Commercial, and southward along I-505 to McCune Road. This would result in an additional 7,338 acres of Agricultural Reserve Overlay area in the county.
- ▶ **Limited Industrial area north of Vacaville**—Approximately 266 acres proposed for Limited Industrial use north of Vacaville and east of I-505 would be designated Agriculture—Dixon Ridge Region.
- ▶ **Rural Residential area north of Vacaville**—Approximately 300 acres proposed for Rural Residential use north of Vacaville and west of I-505 would be designated Agriculture—Western Hills Region. Additionally, approximately 190 acres proposed for Rural Residential use north of the Pleasants Hills Ranch subdivision in Pleasants Valley would be designated Agriculture—Pleasants, Vaca, and Lagoon Valleys Region.
- ▶ **Resource Conservation Overlay north of Vacaville**—Approximately 6,652 acres of additional Resource Conservation Overlay would be added north of Vacaville to assist in protection of the North Vacaville wildlife corridor and the Vacaville vernal pool complex. The vernal pool community is located west of I-505 and north of Allendale Road and Rolling Hills Lane, southeast of Olive School Lane. The North Vacaville wildlife corridor is an area of intact habitat that connects the Vaca Mountains to the vernal pool community.
- ▶ **Highway Commercial area at I-80/Cherry Glen Road**—Approximately 30 acres proposed for Highway Commercial use at the northeast corner of the interchange at I-80 and Cherry Glen Road west of Vacaville would be placed within the City of Vacaville’s MSA and designated Urban Commercial. These changes would reflect an assumption that any future services supporting urban development at that location would be provided or coordinated by the City of Vacaville.
- ▶ **Suisun Valley Neighborhood Agricultural/Tourist Centers**—The amount of land assumed to be placed within the proposed Neighborhood Agricultural/Tourist Centers in Suisun Valley would be reduced from 75 total acres among eight centers to 40 acres among eight centers. The remaining 35 acres would be designated Agriculture—Suisun Valley Region.
- ▶ **Water Dependent Industrial area east of Collinsville**—Approximately 4,190 acres proposed for Water Dependent Industrial use east of Collinsville would be designated Agriculture—Montezuma Hills Region.

The resulting General Plan land use diagram for Alternative 2 is provided as Exhibit 5-2.

DEVELOPMENT CAPACITY

A comparison of the development capacities of Alternative 2 and the 2008 Draft General Plan is provided in Table 5-4.

POLICIES AND PROGRAMS

The following additional changes to General Plan policies and programs are assumed within Alternative 2:

- ▶ **Agricultural Processing and Services**—Under Alternative 2, numerous policies in the Land Use and Agriculture chapters of the General Plan would be modified to limit agricultural processing facilities on lands designated Agriculture to serve agricultural operations located in Solano County and adjacent counties. This is in contrast to the 2008 Draft General Plan, which does not include proximity restrictions for agricultural processing and services. Specifically, the following policies and programs would be modified (changes are shown in ~~strikeout~~ and underline):

***SS.P-13 (Suisun Valley):** Allow farms and vineyards to process, store, bottle, can, package, and sell products produced both on-site and off-site within Solano, Yolo, Sacramento, Contra Costa, Marin, Sonoma, or Napa Counties.*

***SS.I-3 (Suisun Valley):** Use zoning and development standards to ensure that future development fits the scale of the Valley's rural and agricultural context. Update the County Zoning Ordinance to incorporate and codify the desired uses. Enact zoning and development standards allowing farms and vineyards to process, store, bottle, can, package, and sell products produced both on-site and off-site within Solano, Yolo, Sacramento, Contra Costa, Marin, Sonoma, or Napa Counties. Develop design guidelines to promote community character and facilitate tourism within neighborhood agricultural centers.*

***AG.P-15:** Permit limited agricultural service uses that support local agricultural activities and are not harmful to the long-term agricultural use in the surrounding area. These support services should be located in areas designated Limited Industrial and Agriculture as depicted on the Land Use Diagram. Support services in areas designated Agriculture may only provide services to support agriculture in Solano, Yolo, Sacramento, Contra Costa, Marin, Sonoma, or Napa Counties.*

***AG.P-20:** Protect, encourage, and provide incentives to agricultural processors that serve ~~local/regional~~ markets in Solano, Yolo, Sacramento, Contra Costa, Marin, Sonoma, or Napa Counties.*

***AG.I-3:** Revise the agricultural zoning districts and other relevant sections of the County codes to facilitate agricultural processing facilities and uses serving adjacent counties by region. Establish an incentive program to encourage development of local processing capacity to serve ~~local and regional markets~~ adjacent counties. The zoning ordinance and other relevant sections of the County code shall permit the establishment of limited agricultural support services in areas designated as Limited Industrial and Agriculture. In Agriculture designated areas, such uses shall only support agriculture in Solano, Yolo, Sacramento, Contra Costa, Marin, Sonoma, or Napa Counties. Remove barriers to agricultural development by streamlining the permitting process for agriculture-supporting uses, including, but not limited to, barns, farm stands, and agricultural processing plants. Consider creating a separate permitting fee structure for these types of projects to promote investment in agricultural improvements. The updated Zoning Ordinance shall include provisions for incidental recreational use of lands designated for agriculture.*

- ▶ **Sewer Servicing Policy**—Under Alternative 2, sewer servicing policies for new development would be modified to limit the use of centralized sewage treatment systems to commercial and industrial uses, or rural residential uses consisting of 200 or more units. This is in contrast to the 2008 Draft General Plan, which does

**Table 5-4
General Plan Development Capacity under Alternative 2 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions
Water Bodies and Courses	51,092	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Park and Recreation	2,132	0	1,341	NA	NA	NA	NA	NA	NA	NA	NA	NA
Marsh	66,576	1,853	1,845	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Natural Resource Designations	119,801	1,853	3,186	NA	NA	NA	NA	NA	NA	NA	NA	NA
Watershed	36,575	0	0	80	0	*	210	0	*	NA	NA	NA
Agriculture	307,105	3,280	-18,690	1,822	22	*	4,787	58	*	1,196,793	5,975	1,196,793
Subtotal Agricultural Designations	347,016	3,280	-18,690	1,902	22	1,090	4,997	58	2,728	1,196,793	5,975	1,196,793
Public/Quasi-Public	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Public Designations	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Residential	13,252	-413	7,444	2,662	-82	*	6,993	-217	*	NA	NA	NA
Traditional Community—Residential	980	0	980	1,960	0	*	5,148	0	*	NA	NA	NA
Traditional Community—Mixed Use	108	0	108	65	0	*	170	0	*	393,550	0	393,550
Urban Residential	1,890	0	1,604	5,674	0	*	14,908	0	*	NA	NA	NA
Subtotal Residential Designations	16,285	-413	9,407	10,360	-82	3,792	27,219	-217	9,500	393,550	0	393,550
Neighborhood Commercial	6	0	*	NA	NA	NA	NA	NA	NA	32,944	0	*
Neighborhood Agricultural/Tourist Center	40	-35	*	NA	NA	NA	NA	NA	NA	209,088	-182,952	*
Commercial Recreation	155	0	*	NA	NA	NA	NA	NA	NA	54,142	0	*
Service Commercial	75	0	*	NA	NA	NA	NA	NA	NA	394,223	0	*
Highway Commercial	110	-27	*	NA	NA	NA	NA	NA	NA	572,868	-139,383	*
Urban Commercial	615	27	*	NA	NA	NA	NA	NA	NA	3,212,952	140,772	*
Subtotal Commercial Designations	1,001	-35	361	NA	NA	NA	NA	NA	NA	4,476,217	-181,561	4,376,241
General Industrial	8	0	*	NA	NA	NA	NA	NA	NA	11,584	0	*
Limited Industrial	441	-528	*	NA	NA	NA	NA	NA	NA	672,461	-804,299	*
Water Dependent Industrial	2,609	-4,158	*	NA	NA	NA	NA	NA	NA	1,136,349	-1,811,013	*
Urban Industrial	1,254	0	*	NA	NA	NA	NA	NA	NA	1,911,588	162	*
Subtotal Industrial Designations	4,311	-4,685	2,186	NA	NA	NA	NA	NA	NA	3,731,982	-2,615,150	3,386,781
Specific Project Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
Subtotal Special Purpose Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
TOTAL Unincorporated Area	494,437	0	0	14,862	-60	7,482	39,297	-159	19,309	11,586,121	-2,790,735	11,140,944
Overlays (Not Counted in Total)												
Water Dependent Industrial—Reserve	2,870	0	2,870	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Table 5-4
General Plan Development Capacity under Alternative 2 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 2	Compared to 2008 Draft GP	Compared to Existing Conditions
Travis Reserve Area	7,890	0	7,890	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wind Energy Resource Overlay	31,737	0	31,737	NA	NA	NA	NA	NA	NA	NA	NA	NA
Agricultural Reserve Overlay	21,765	7,338	21,765	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tri-City Cooperative Planning Area	9,968	0	9,968	NA	NA	NA	NA	NA	NA	NA	NA	NA
Resource Conservation Overlay	218,915	8,340	218,915	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
 GP = General Plan; NA = not applicable
 * More detail not available for these designations.
 Source: Data provided by EDAW in 2008

not include such use restrictions for centralized sewage treatment systems. Specifically, the following policy and program would be modified (changes are shown in ~~strikeout~~ and underline):

***PF.P-21:** Sewer services for development within the unincorporated area may be provided through private individual on-site sewage disposal systems, or centralized sewage treatment systems permitted and managed by a public agency utilizing the best systems available that meet tertiary treatment or higher standards. Use of such centralized sewage treatment systems shall be limited to (1) commercial or industrial uses, or (2) rural residential uses consisting of 200 or more units.*

***PF.I-22:** On-site sewage disposal systems for individual lots and subdivisions may be operated by private property owners. A public agency shall permit and manage centralized community sewage disposal systems. If lands proposed for community sewage disposal systems are not within the boundaries of an existing public sewage treatment agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the sewer service, which may be contracted to a private entity with oversight by the public entity. Sewer treatment facilities shall be designed to provide sewer service to developed areas and areas designated for future commercial, industrial, or rural residential development consisting of 200 or more units within the General Plan.*

Beyond the changes described within this section, all other components of the 2008 Draft General Plan would remain unchanged under Alternative 2. At buildout, this alternative would have a lower level of development and an higher level of conservation than the 2008 Draft General Plan.

5.5.2 ENVIRONMENTAL EFFECTS

IMPACTS ON LAND USE

Alternative 2 has less potential to divide established communities than the 2008 Draft General Plan. Although Alternative 2 contains much of the same land designated for commercial and industrial uses as the 2008 Draft General Plan, there are notable differences. Alternative 2 substantially reduces the size of the industrial area near Collinsville and eliminates the industrial area east of I-505 and north of Midway Road near Vacaville. This reduces the risk of dividing existing communities. In other areas the risk would remain similar to that of the 2008 Draft General Plan.

Alternative 2 would most likely result in a small reduction of land use conflicts when compared to the 2008 Draft General Plan. As documented in Table 5-4, less residential, commercial, and industrial acreage is designated under Alternative 2. The reduction in industrial areas described above would result in fewer conflicts between industrial uses and rural residential and agricultural uses. Additionally, less land would be converted from agriculture to higher intensity uses. The reduction in the amount of land converted would reduce the occurrence of conflicts between agricultural and nonagricultural uses. It would also reduce the extent of indirect effects, such as those from residential traffic, on agricultural operations. Conflicts between agriculture and other uses would be also reduced because Alternative 2 assumes certain limits on agricultural processing on lands designated Agriculture and places limitations on proposed policies enabling centralized sewer treatment facilities. One possible caveat is that Alternative 2 would create an island of agriculture and an island of rural residential in the north Vacaville area. These islands may result in increased land use conflicts between residential and agricultural uses.

Alternative 2 would contain policies similar to those of the 2008 Draft General Plan and therefore would result in few conflicts with adopted state, regional, and local plans. The 2008 Draft General Plan contains a variety of policies and programs to accommodate plans from agencies such as BCDC and USFWS. Alternative 2 would maintain the same policies. One difference is the reduction in the size of the area designated Water Dependent Industrial near Collinsville. This reduction would remove the industrial designation from marshland in that area and conform more closely to federal and state agency habitat protection programs in Suisun Marsh.

Alternative 2 and the 2008 Draft General Plan have the same potential to induce population growth. Alternative 2 is estimated to generate a population of 39,297 in 2030 and the 2008 Draft General Plan is forecasted to generate a population of 39,455 in the same year. Both Alternative 2 and the 2008 Draft General Plan significantly exceed ABAG's population projection of 26,000 in 2030; therefore, both would be growth inducing.

Neither Alternative 2 nor the 2008 Draft General Plan is expected to displace substantial numbers of people or housing units. Neither plan contains redevelopment districts. Displacement of homes or people would be limited to isolated instances when existing agriculture-related housing would be removed as existing agricultural uses are converted to higher intensity uses. In both plans, such displacement would not be considered significant.

IMPACTS ON AIR QUALITY

Alternative 2 would result in designation of less land as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan. This would result in fewer vehicle miles traveled and fewer sources overall. Additionally, Alternative 2 would have policies regarding air quality similar to those of the 2008 Draft General Plan. Therefore, Alternative 2 would result in fewer emissions of criteria air pollutants, toxic air containments, and odorous sources from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

IMPACTS RELATED TO NOISE

As noted in the description of alternatives, the intent of Alternative 2 is to achieve a lower level of overall development and an increased level of conservation relative to the 2008 Draft General Plan, thus maximizing environmental sustainability. Specifically, this alternative would reduce acreage for industrial, commercial, and residential uses. Because development under Alternative 2 would result in fewer dwelling units, and therefore lower population, than the 2008 Draft General Plan, the potential for adverse noise impacts at noise-sensitive areas would be reduced. Development under Alternative 2 would also result in fewer potentially noise-producing land uses than the 2008 Draft General Plan because there would be less commercial and industrial development. As a result, there is reduced potential for adverse noise impacts to occur with development under Alternative 2 relative to development under the 2008 Draft General Plan.

As with the 2008 Draft General Plan, however, development of noise-sensitive land uses within noise-impacted areas, or the development of noise-producing land uses in the vicinity of existing noise-sensitive areas, would result in significant noise impacts. As with the 2008 General Plan, application of the County's General Plan policies for noise would mitigate such impacts to less-than-significant levels by requiring noise mitigation measures to ensure compliance with the applicable land use compatibility criteria with respect to noise.

IMPACTS ON TRANSPORTATION AND CIRCULATION

This alternative contains land use assumptions that reallocate land uses, but do not substantively change the projections of housing or employment locations. There is an estimated reduction of 71 dwelling units and 3,500 jobs from the 2008 Draft General Plan, which translates to a reduction of less than 0.04% in total units in Solano County in 2030, and a reduction of less than 1.7% of the total jobs. These locations are what govern the demand in the travel model in a future year. Because of their similarities, the resulting impacts of this alternative would be substantively similar to those of the 2008 Draft General Plan. As a result, the mitigation measures for impacts of this alternative would also be reasonably similar to those for the 2008 Draft General Plan.

IMPACTS ON HYDROLOGY AND WATER RESOURCES

Alternative 2 would designate less land as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan, and it would have policies regarding hydrology and

water resources similar to those of the 2008 Draft General Plan. Therefore, Alternative 2 would result in fewer violations of water quality standards than would occur under the 2008 Draft General Plan.

Like the 2008 Draft General Plan, Alternative 2 would have policies designed to minimize or eliminate on-site and downstream erosion and sedimentation. Solano County's cities are each responsible for their own storm drainage and flood control, and this would not change under Alternative 2. County flood control efforts to address erosion and sedimentation—the Ulatis Flood Control Project, the *Flood Control Master Plan* approved by SCWA, and the Suisun Marsh Policy Addendum certified by BCDC—would not change under this alternative. Therefore, Alternative 2 would have impacts similar to those of the 2008 Draft General Plan with regard to on-site and downstream erosion and sedimentation.

The 2008 Draft General Plan would result in more construction from the additional development than Alternative 2, and it could result in increased erosion and sedimentation. However, the impact of Alternative 2 on water quality resulting from construction would be similar to that of the 2008 Draft General Plan, given the adequacy of existing NPDES requirements and SWPPPs for lots greater than 1 acre in size; the effectiveness of BMPs used in such situations; and the County's current grading, erosion, and flood control regulations, which would remain unchanged under this alternative.

Alternative 2 would have policies similar to those of the 2008 Draft General Plan to protect, monitor, restore, and enhance the quality and quantity of groundwater resources. The additional development of land designated as residential, commercial, and industrial under the 2008 Draft General Plan would result in more impervious surfaces than under Alternative 2. Therefore, Alternative 2 would result in fewer impacts on groundwater recharge than would occur under the 2008 Draft General Plan.

Alternative 2 would result in a lesser degree of buildout in floodplains than the 2008 Draft General Plan. However, the cities in Solano County are each responsible for their flood control projects, and SCWA is responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Delta (from precipitation and tides) rely on levees, as addressed in Impact 4.5-6 in Section 4.5, "Hydrology and Water Resources." Therefore, the impacts of Alternative 2 would be similar to those of the 2008 Draft General Plan in this regard.

Alternative 2 would result in a significant and unavoidable impact from flooding as a result of the potential for local levee failure. Both Alternative 2 and the 2008 Draft General Plan would result in a less-than-significant impact from flooding as a result of dam failure because Dam Inundation Mapping Procedures (19 CCR Section 2575) are required by OES for all dams where human life is potentially endangered by dam flooding inundation, and this requirement would be unchanged. Therefore, Alternative 2 would have impacts similar to those of the 2008 Draft General Plan with regard to flooding threats from levee or dam failure.

IMPACTS ON BIOLOGICAL RESOURCES

Alternative 2 would result in conversion of less land (3,280 acres) from agricultural uses than would occur under the 2008 Draft General Plan. In addition, less land (5,133 acres) would be designated as new commercial, industrial, or residential uses under Alternative 2 than under the 2008 Draft General Plan. The net result would be that less land (8,413 acres) could potentially be converted from agriculture or open space to development, resulting in fewer significant impacts on biological resources under Alternative 2 than under the 2008 Draft General Plan. In addition, this alternative puts limits on agricultural processing facilities on lands designated Agriculture, resulting in further reductions in significant impacts on biological resources.

The greater extent of the Agricultural Reserve and Resource Conservation Overlays under Alternative 2 would likely further decrease the potential for impacts on biological resources because a larger area would be subject to controls on development. However, it is unclear how much acreage of biological resources would be preserved by these overlays and how effective the overlays would be in reducing impacts under Alternative 2. Alternative 2

would implement policies designed to promote environmental sustainability, but it is unknown how much these policies could further reduce impacts on biological resources.

Because 8,403 fewer acres could potentially be converted to development from agriculture or open space, and because agricultural processing plants would be limited on land designated Agriculture, Alternative 2 would result in fewer significant impacts on biological resources than the 2008 Draft General Plan.

IMPACTS ON GEOLOGY AND SOILS

Under Alternative 2, 8,413 fewer acres would be converted from agricultural uses or designated as commercial, industrial, or residential uses than under the 2008 Draft General Plan. For this reason, this alternative would result in fewer impacts on geology and soils than the 2008 Draft General Plan. However, impacts on development from soils or geological hazards, and impacts on mineral resources would be less than significant under the 2008 Draft General Plan.

IMPACTS ON AGRICULTURAL RESOURCES

The land use pattern under Alternative 2 allocates a majority of land in Solano County for agricultural and open space uses. Fewer commercial, residential, and industrial land uses would be developed than under the 2008 Draft General Plan, and fewer acres would be developed for urban uses.

Specifically, under Alternative 2 commercial land uses are located in areas to serve rural residential areas and at locations with good accessibility for highway travelers. Residential land use designations conform generally to existing development patterns, and envisioned future residential development is located as a logical extension of existing residential areas. In addition, future residential development is located to minimize conversion of valuable farmland. Future industrial land uses are envisioned to develop near or adjacent to existing industrialized areas and where physical characteristics favor the location of certain specialized uses while avoiding important agricultural lands. Overall, Alternative 2 would develop less land designated as residential, commercial, and industrial and, at buildout, would result in a lower level of development than the 2008 Draft General Plan. Specific to agricultural lands, Alternative 2 would result in conversion of 3,280 fewer acres of agricultural land to urban uses than the 2008 Draft General Plan.

Although fewer acres of agricultural land, including Important Farmland, would be converted to urban land uses under Alternative 2, implementation of this alternative would continue to result in the loss of approximately 18,690 acres of agricultural land, of which a certain portion would be designated as Important Farmland. Because Alternative 2 would continue to result in the loss of Important Farmland from development of urban uses, this impact would be significant.

Of the 18,690 acres that would be converted from agriculture, it is assumed that a certain percentage is protected under a Williamson Act contract. Although the County's Williamson Act program would still apply under Alternative 2, new residential, commercial, and industrial land use designations would result in the removal of a certain percentage of acres of existing agricultural land currently under a Williamson Act contract. This impact would be less than that under the 2008 Draft General Plan, but it would be significant.

IMPACTS ON PUBLIC SERVICES AND UTILITIES

Relative to the 2008 Draft General Plan, Alternative 2 assumes designation of reduced amounts of land as Rural Residential, Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs, and identification in the land use diagram of increased amounts of land within the proposed Agricultural Reserve Overlay and Resource Conservation Overlay. This alternative further assumes certain limits on agricultural processing on lands designated Agriculture and places limitations on proposed policies enabling centralized sewer treatment facilities. Alternative 2 would require

fewer public services and utilities improvements in currently undeveloped areas than the 2008 Draft General Plan because it would place new developments in areas where existing services and utilities can be utilized. Upgrades or extensions would not be required as frequently as under the 2008 Draft General Plan. Therefore, Alternative 2 would have a lesser impact on public services and utilities than the 2008 Draft General Plan.

IMPACTS ON CULTURAL AND PALEONTOLOGICAL RESOURCES

Under Alternative 2, 8,413 fewer acres would be converted from agricultural uses or designated for commercial, industrial, or residential uses than under the 2008 Draft General Plan. Based on these numbers, it appears that fewer impacts on archaeological deposits and paleontological resources that may be significant under CEQA would occur. The potential for the disturbance of human remains from development-related construction would also be lower. Similarly, fewer historical built-environment resources (e.g., rural farmhouses, barns) would be subject to destruction or alteration because of the difference in acreage that would be converted.

For the reasons stated above, it appears that Alternative 2 would result in fewer potentially significant impacts on cultural and paleontological resources than the 2008 Draft General Plan. Based on a quantitative comparison, it appears that Alternative 2 would also result in fewer impacts on cultural and paleontological resources than Alternative 1.

IMPACTS ON AESTHETIC RESOURCES

Implementation of Alternative 2 would continue to result in construction of urban land uses adjacent to and surrounding segments of I-80, I-505, I-680, and SR 37, which are popular travel routes in Solano County. Urban development could include large and tall buildings, soundwalls, berms, and other infrastructure (e.g., roadways, overpasses) that could partially or wholly block views of the Coast Range from specific areas in Solano County. Depending on the height of buildings constructed, development under Alternative 2 could obscure views of the Coast Range from highways and freeways in Solano County.

Although proposed policies that would be included as part of Alternative 2 provide general guidelines for design of future urban development projects, these guidelines do not specifically identify the design elements that would be implemented (e.g., landscape earthforms, building architecture, façade treatments, lighting fixtures) or the effectiveness of the design elements in reducing the visual impacts of development. These policies require urban development to implement features that would reduce the potential impacts on views of the Coast Range (a countywide scenic vista), but urban development that would occur under Alternative 2 would permanently alter views, partially or wholly, of the Coast Range. However, this alternative would reduce the overall amount of urban development relative to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 2 would result in fewer impacts on unique views than the 2008 Draft General Plan.

Under Alternative 2, existing agricultural lands surrounding the city of Rio Vista would continue and a Wind Energy Resource Overlay would be implemented to increase resource conservation in Solano County. Specifically, promoting the development of electricity-generating wind-powered facilities in the southernmost portion of Solano County would assist in conserving nonrenewable resources for the generation of electricity. Because the Wind Energy Resource Overlay would promote construction of wind turbines, scenic views of the area south of Rio Vista and viewable from SR 160, a state scenic highway, could be significantly altered from existing conditions. The 2008 Draft General Plan would also establish a Wind Energy Resource Overlay; therefore, Alternative 2 would result in similar impacts on scenic resources within a state scenic highway.

With implementation of Alternative 2, visual conditions of new urban development in the county would be similar to existing views of suburban settings found throughout the county (e.g., Dixon, Vallejo, the development corridor along I-80). Further, implementation of urban development under Alternative 2 would extend the existing urban development boundaries farther outward. Open space, especially in an urbanizing setting, is valued for its visual quality. In Solano County, agricultural lands are equally valued for their visual quality.

Alternative 2 would include policies aimed at retaining important natural features (e.g., creeks, oak woodlands) and agricultural lands for their visual qualities and maintaining views from highways. Further, implementation of an Agricultural Overlay Zone, intended to assist in preserving valued agricultural landscapes, would occur under Alternative 2. Although these policies would reduce visual impacts of future urban development, the loss of existing visual resources (e.g., agricultural lands, open spaces, oak woodlands) would continue to occur with development of urban land uses throughout Solano County. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 2 would result in fewer impacts on existing visual conditions than the 2008 Draft General Plan.

A substantial increase in the amount of nighttime light and glare would result from development of urban land uses throughout Solano County, as identified in Alternative 2, potentially obscuring views of stars and other features of the night sky. In addition, nighttime lighting in areas of future urban development, or the presence of reflective surfaces on buildings in these areas (e.g., reflective window glazing), could result in light and glare shining onto motorists traveling along highways and roadways in daytime and nighttime conditions.

Proposed policies of the 2008 Draft General Plan that would be included as part of Alternative 2 focus on reducing impacts that could result from lighting sources. However, urban development identified in Alternative 2 would continue to require substantial new lighting, and buildings could be constructed with reflective surfaces that could cast glare to motorists on local roadways. Alternative 2 identifies an area for development of General Industrial uses in an agricultural area void of substantial lighting sources. Development of urban land uses as part of Alternative 2 would introduce substantial new light sources adjacent to existing urban communities and in a rural portion of Solano County, which would cause light trespass into the night sky and would create a new source of skyglow and could obscure views of stars and other features of the night sky. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 2 would result in fewer nighttime light and glare impacts than the 2008 Draft General Plan.

IMPACTS ON ENERGY

Land uses proposed under Alternative 2 would generate fewer traffic trips than the 2008 Draft General Plan. For this reason, it is possible that Alternative 2 would result in less impact to energy supplies than the 2008 Draft General Plan.

IMPACTS RELATED TO HAZARDS AND HAZARDOUS MATERIALS

Alternative 2 would result in a lower level of buildout than the 2008 Draft General Plan. Policies and existing regulations concerning emergency response and the use and transport of hazardous materials would be the same as those under the 2008 Draft General Plan. Therefore, Alternative 2 would have impacts on hazards and hazardous materials similar to those of the 2008 Draft General Plan.

IMPACTS ON RECREATION

Buildout of Alternative 2 would result in only 159 fewer residents than the 2008 Draft General Plan. Alternative 2 is projected to have a population of 39,297 in 2030 and the 2008 Draft General Plan is expected to generate a population of 39,448. Both plans would result in a park provision ratio of 5.4 acres per 1,000 residents, which could lead to overuse and physical deterioration of the resource. Both plans would result in significant impacts on parks and recreational facilities. Application of Mitigation Measure 4.14-1a, as described in Section 4.14, "Recreation," would be necessary to reduce the extent of such impacts.

IMPACTS RELATED TO CLIMATE CHANGE

Impacts of the 2008 Draft General Plan related to climate change are described in Section 6.2, “Effects related to Climate Change,” in Chapter 6, “Other CEQA Considerations.” Alternative 2 would result in designation of less land as residential, commercial, and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan. This would result in fewer vehicle miles traveled and fewer sources in general. Additionally, Alternative 2 would have policies regarding climate change similar to those of the 2008 Draft General Plan. Therefore, Alternative 2 would result in fewer emissions of greenhouse gases from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

5.6 ALTERNATIVE 3. REDUCED COMMERCIAL AND INDUSTRIAL DEVELOPMENT

5.6.1 DESCRIPTION

The Reduced Commercial and Industrial Development Alternative (Alternative 3) modifies the land use diagram, land use designations, and certain policies and programs proposed within the 2008 Draft General Plan that would expand areas designated for commercial and industrial uses relative to the current General Plan. The intent of Alternative 3 is to achieve a lower level of commercial and industrial development and reduce associated impacts.

Relative to the 2008 Draft General Plan, Alternative 3 assumes designation of less land as Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs. This alternative also places limitations on the policies enabling centralized sewer treatment facilities.

LAND USE DIAGRAM

The following changes to the General Plan land use diagram are assumed within Alternative 3:

- ▶ **Limited Industrial area northeast of Dixon**—The area proposed for Limited Industrial use northeast of Dixon would be reduced from 689 acres to 240 acres. This area would be designated as Agriculture—Dixon Ridge Region.
- ▶ **Limited Industrial area north of Vacaville**—Approximately 266 acres proposed for Limited Industrial use north of Vacaville and east of I-505 would be designated Agriculture—Dixon Ridge Region.
- ▶ **Highway Commercial area at I-80/Cherry Glen Road**—Approximately 30 acres proposed for Highway Commercial use at the northeast corner of the interchange at I-80 and Cherry Glen Road west of Vacaville would be designated Agriculture—Pleasants, Vaca, and Lagoon Valleys Region.
- ▶ **Highway Commercial area at I-80 and Midway Road** – Under Alternative 3, approximately 45 acres proposed for Highway Commercial use at the northeast corner of the interchange at I-80 and Midway Road would be designated Agriculture—Dixon Region.
- ▶ **Suisun Valley Neighborhood Agricultural/Tourist Centers**—The amount of land assumed to be placed within the proposed Neighborhood Agricultural/Tourist Centers in Suisun Valley would be reduced from 75 total acres among eight centers to 40 acres among eight centers. The remaining 35 acres would be designated Agriculture—Suisun Valley Region.
- ▶ **Water Dependent Industrial area east of Collinsville**—Approximately 8,996 acres proposed for Water Dependent Industrial use east of Collinsville would be designated Agriculture—Montezuma Hills Region.

The resulting General Plan land use diagram for Alternative 3 is provided as Exhibit 5-3.

DEVELOPMENT CAPACITY

A comparison of the development capacities of Alternative 3 and the 2008 Draft General Plan is provided in Table 5-5.

POLICIES AND PROGRAMS

The following changes to General Plan policies and programs are assumed within Alternative 3:

- ▶ **Sewer Servicing Policy**—Under Alternative 3, sewer servicing policies for new development would be modified to limit the use of centralized sewage treatment systems to rural residential uses consisting of 200 or more units. Centralized sewage treatment systems would not be permitted to support commercial or industrial uses located within the unincorporated county. This is in contrast to the 2008 Draft General Plan, which does not include such use restrictions for centralized sewage treatment systems. Specifically, the following policy and program would be modified (changes are shown in ~~strikeout~~ and underline):

***PF.P-21:** Sewer services for development within the unincorporated area may be provided through private individual on-site sewage disposal systems, or centralized sewage treatment systems permitted and managed by a public agency utilizing the best systems available that meet tertiary treatment or higher standards. Use of such centralized sewage treatment systems shall be limited to rural residential uses consisting of 200 or more units.*

***PF.I-22:** On-site sewage disposal systems for individual lots and subdivisions may be operated by private property owners. A public agency shall permit and manage centralized community sewage disposal systems. If lands proposed for community sewage disposal systems are not within the boundaries of an existing public sewage treatment agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the sewer service, which may be contracted to a private entity with oversight by the public entity. Sewer treatment facilities shall be designed to provide sewer service to developed areas and areas designated for rural residential development consisting of 200 or more units within the General Plan. Sewer treatment facilities designed to serve areas designated for commercial or industrial use shall not be permitted.*

Beyond the changes described within this section, all other components of the 2008 Draft General Plan would remain unchanged under Alternative 3. At buildout, this alternative would have a lower level of development than the 2008 Draft General Plan.

5.6.2 ENVIRONMENTAL EFFECTS

IMPACTS ON LAND USE

Alternative 3 has less potential to divide established communities than the 2008 Draft General Plan. Although Alternative 3 contains much of the same land designated for commercial and industrial uses, there are notable differences. Alternative 3 substantially reduces the size of or eliminates some industrial and commercial areas. This reduces the risk of dividing existing communities. In other areas not affected by changes in the land use diagram, the risk would remain similar to that of the 2008 Draft General Plan.

Alternative 3 would most likely result in a small reduction of land use conflicts when compared to the 2008 Draft General Plan. As documented in Table 5-5, less commercial and industrial acreage is designated under Alternative 3. The reduction in industrial areas described above would result in fewer conflicts between industrial uses and rural residential and agricultural uses. Additionally, less land would be converted from agriculture to higher

intensity uses. The reduction in the amount of land converted would reduce the occurrence of conflicts between agricultural and nonagricultural uses. It would also reduce the extent of indirect effects, such as those from residential traffic, on agricultural operations. Conflicts between agriculture and other uses would also be reduced because Alternative 3 places limitations on proposed policies enabling centralized sewer treatment facilities.

Alternative 3 would contain the same policies as the 2008 Draft General Plan and therefore would result in few conflicts with adopted state, regional, and local plans. The 2008 Draft General Plan contains a variety of policies and programs to accommodate plans from agencies such as BCDC and USFWS. Alternative 3 would maintain the same policies. One difference is the reduction in the size of the area designated Limited Industrial near Collinsville. This reduction would remove the industrial designation from marshland in that area and conform more closely to federal and state agency habitat protection programs in Suisun Marsh.

Alternative 3 and the 2008 Draft General Plan have the same potential to induce population growth. Alternative 3 is estimated to generate a population of 39,511 in 2030, and the 2008 Draft General Plan is forecasted to generate a population of 39,455 in the same year. Both Alternative 3 and the 2008 Draft General Plan significantly exceed ABAG's population projection of 26,000 in 2030; therefore, both would be growth inducing.

Neither Alternative 3 nor the 2008 Draft General Plan is expected to displace substantial numbers of people or housing units. Neither plan contains redevelopment districts. Displacement of homes or people would be limited to isolated instances when existing agriculture-related housing would be removed as existing agricultural uses are converted to higher intensity uses. In both plans, the impact of such displacement would not be significant.

IMPACTS ON AIR QUALITY

Alternative 3 would result in designation of less land as commercial and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan, which would result in fewer vehicle miles traveled and fewer sources overall. Additionally, Alternative 3 would have policies regarding air quality similar to those of the 2008 Draft General Plan. Therefore, Alternative 3 would result in fewer emissions of criteria air pollutants, toxic air contaminants, and odors from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

IMPACTS RELATED TO NOISE

As noted in the description of alternatives, the intent of Alternative 3 is to reduce the amount of commercial and industrial development relative to the 2008 Draft General Plan. Specifically, this alternative would reduce acreage for industrial and commercial uses. Development under Alternative 3 would result in fewer potentially noise-producing land uses than the 2008 Draft General Plan because there would be less commercial and industrial development. As a result, there is reduced potential for adverse noise impacts to occur with development under Alternative 3 than with development under the 2008 Draft General Plan.

As with the Preferred Plan, however, development of noise-sensitive land uses within noise-impacted areas, or the development of noise-producing land uses in the vicinity of existing noise-sensitive areas, would result in significant noise impacts. As with the 2008 Draft General Plan, application of the City's General Plan policies for noise would mitigate such impacts to less-than-significant levels by requiring noise mitigation measures to ensure compliance with the applicable land use compatibility criteria with respect to noise.

IMPACTS ON TRANSPORTATION AND CIRCULATION

Alternative 3 contains land use assumptions that reduce development of certain industrial areas. This slightly reduces the overall total of anticipated jobs. The number of projected jobs under this scenario would decrease by about 5,100 as compared to the 2008 Draft General Plan. Because this reduction is less than 2.4% of the total number of jobs projected countywide and the estimated number of dwelling units is essentially the same, the

resulting impacts of this alternative would be similar to those of the 2008 Draft General Plan. As a result, mitigation measures for impacts of this alternative would also be reasonably similar to those of the 2008 Draft General Plan.

IMPACTS ON HYDROLOGY AND WATER RESOURCES

Alternative 3 would designate less land as commercial and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan, and it would have policies regarding hydrology and water resources similar to those of the 2008 Draft General Plan. Therefore, Alternative 3 would result in fewer violations of water quality standards than would occur under the 2008 Draft General Plan.

Like the 2008 Draft General Plan, Alternative 3 would have policies designed to minimize or eliminate on-site and downstream erosion and sedimentation. Solano County's cities are each responsible for their own storm drainage and flood control, and this would not change under Alternative 3. County flood control efforts to address erosion and sedimentation—the Ulatis Flood Control Project, the *Flood Control Master Plan* approved by SCWA, and the Suisun Marsh Policy Addendum certified by BCDC—would not change under this alternative. Therefore, Alternative 3 would have impacts similar to those of the 2008 Draft General Plan with regard to on-site and downstream erosion and sedimentation.

The 2008 Draft General Plan would result in more construction from additional development than Alternative 3, and it could result in increased erosion and sedimentation. However, the impact on water quality resulting from construction would be similar to that of the 2008 Draft General Plan, given the adequacy of existing NPDES requirements and SWPPPs for lots greater than 1 acre in size; the effectiveness of BMPs used in such situations; and the County's current grading, erosion, and flood control regulations, which would remain unchanged under this alternative.

Alternative 3 would have policies similar to those of the 2008 Draft General Plan to protect, monitor, restore, and enhance the quality and quantity of groundwater resources. The additional development of land designated as commercial and industrial under the 2008 Draft General Plan would result in more impervious surfaces than under Alternative 3. Therefore, Alternative 3 would result in fewer impacts on groundwater recharge than would occur under the 2008 Draft General Plan.

Alternative 3 would result in a lesser degree of buildout in floodplains than the 2008 Draft General Plan. However, the cities in Solano County are each responsible for their flood control projects, and SCWA is responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Delta (from precipitation and tides) rely on levees, as addressed in Impact 4.5-6 in Section 4.5, "Hydrology and Water Resources." Therefore, the impacts of Alternative 3 would be similar to those of the 2008 Draft General Plan in this regard.

Alternative 3 would result in a significant and unavoidable impact from flooding as a result of the potential for local levee failure. Both Alternative 3 and the 2008 Draft General Plan would result in a less-than-significant impact from flooding as a result of dam failure because Dam Inundation Mapping Procedures (19 CCR Section 2575) are required by OES for all dams where human life is potentially endangered by dam flooding inundation, and this requirement would be unchanged. Therefore, Alternative 3 would have impacts similar to those of the 2008 Draft General Plan with regard to flooding threats from levee or dam failure.

IMPACTS ON BIOLOGICAL RESOURCES

Alternative 3 would result in conversion of less land (8,413 acres) from agricultural uses or designated as commercial or industrial uses than would occur under the 2008 Draft General Plan. Based on these numbers, it is likely that fewer significant impacts on biological resources would occur under Alternative 3 than under the 2008 Draft General Plan.

**Table 5-5
General Plan Development Capacity under Alternative 3 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions
Water Bodies and Courses	51,092	0		NA	NA	NA	NA	NA	NA	NA	NA	NA
Park and Recreation	2,132	0	1,341	NA	NA	NA	NA	NA	NA	NA	NA	NA
Marsh	64,723	0	-8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Natural Resource Designations	117,948	0	1,333	NA	NA	NA	NA	NA	NA	NA	NA	NA
Watershed	36,575	0	0	80	0	*	210	0	*	NA	NA	NA
Agriculture	314,701	7,591	-14,380	1,821	21	*	4,785	56	*	1,197,287	6,469	1,197,287
Subtotal Agricultural Designations	351,276	7,591	-14,380	1,901	21	1,090	4,995	56	2,726	1,197,287	6,469	1,197,287
Public/Quasi-Public	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Public Designations	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Residential	13,721	0	7,856	2,744	0	*	7,210	0	*	NA	NA	NA
Traditional Community—Residential	980	0	980	1,960	0	*	5,148	0	*	NA	NA	NA
Traditional Community—Mixed Use	108	0	108	65	0	*	170	0	*	393,548	0	393,548
Urban Residential	1,890	0	1,604	5,674	0	*	14,908	0	*	NA	NA	NA
Subtotal Residential Designations	16,698	0	9,820	10,442	0	3,874	27,435	0	9,716	393,548	0	393,548
Neighborhood Commercial	6	0	*	NA	NA	NA	NA	NA	NA	32,943	0	*
Neighborhood Agricultural/Tourist Center	40	-35	*	NA	NA	NA	NA	NA	NA	209,088	-182,952	*
Commercial Recreation	155	0	*	NA	NA	NA	NA	NA	NA	54,142	0	*
Service Commercial	75	0	*	NA	NA	NA	NA	NA	NA	394,221	0	*
Highway Commercial	61	-75	*	NA	NA	NA	NA	NA	NA	320,211	-392,040	*
Urban Commercial	588	0	*	NA	NA	NA	NA	NA	NA	3,072,180	0	*
Subtotal Commercial Designations	926	-110	286	NA	NA	NA	NA	NA	NA	4,082,786	-574,992	3,982,810
General Industrial	8	0	*	NA	NA	NA	NA	NA	NA	11,584	0	*
Limited Industrial	254	-715	*	NA	NA	NA	NA	NA	NA	386,671	-1,090,089	*
Water Dependent Industrial	0	-6,766	*	NA	NA	NA	NA	NA	NA	0	-2,947,362	*
Urban Industrial	1,254	0	*	NA	NA	NA	NA	NA	NA	1,911,425	0	*
Subtotal Industrial Designations	1,515	-7,481	-610	NA	NA	NA	NA	NA	NA	2,309,681	-4,037,451	1,964,480
Specific Project Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
Subtotal Special Purpose Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
TOTAL Unincorporated Area	494,437	0	0	14,944	21	7,564	39,511	56	19,523	9,770,881	-4,605,974	9,325,704
Overlays (Not Counted in Total)												
Water Dependent Industrial—Reserve	2,870	0	2,870	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Table 5-5
General Plan Development Capacity under Alternative 3 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 3	Compared to 2008 Draft GP	Compared to Existing Conditions
Travis Reserve Area	7,890	0	7,890	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wind Energy Resource Overlay	31,737	0	31,737	NA	NA	NA	NA	NA	NA	NA	NA	NA
Agricultural Reserve Overlay	14,428	0	14,428	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tri-City Cooperative Planning Area	9,968	0	9,968	NA	NA	NA	NA	NA	NA	NA	NA	NA
Resource Conservation Overlay	210,576	0	210,576	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
 GP = General Plan; NA = not applicable
 * More detail not available for these designations.
 Source: Data provided by EDAW in 2008

IMPACTS ON GEOLOGY AND SOILS

Under Alternative 3, 7,591 fewer acres would be converted from agricultural uses or designated as commercial or industrial uses than under the 2008 Draft General Plan. For this reason, this alternative would result in fewer impacts on geology and soils than the 2008 Draft General Plan. However, impacts on development from soils or geological hazards, and impacts on mineral resources would be less than significant under the 2008 Draft General Plan.

IMPACTS ON AGRICULTURAL RESOURCES

The land use pattern under Alternative 3 allocates a majority of land in Solano County for agricultural and open-space uses. Fewer commercial and industrial land uses would be developed than under the 2008 Draft General Plan, and fewer acres would be developed for urban uses.

Specifically, under Alternative 3 commercial land uses are located in areas to serve rural residential areas and at locations with good accessibility for highway travelers. Future industrial land uses are envisioned to develop near or adjacent to existing industrialized areas and where physical characteristics favor the location of certain specialized uses while avoiding important agricultural lands. Overall, Alternative 3 would develop less land designated as commercial or industrial and, at buildout, would result in a lower level of development than the 2008 Draft General Plan. Specific to agricultural lands, Alternative 3 would result in conversion of 1,830 fewer acres of agricultural land to urban uses than the 2008 Draft General Plan.

Although fewer acres of agricultural land, including Important Farmland, would be converted to urban land uses under Alternative 3, implementation of this alternative would continue to result in the loss of approximately 14,380 acres of agricultural land, of which a certain portion would be designated as Important Farmland. Because Alternative 3 would continue to result in the loss of Important Farmland from development of urban uses, this impact would be significant.

Of the 14,380 acres that would be converted from agriculture, it is assumed that a certain percentage is protected under a Williamson Act contract. Although the County's Williamson Act program would still apply under Alternative 3, new commercial and industrial land use designations would result in the removal of a certain percentage of acres of existing agricultural land currently under a Williamson Act contract. This impact would be less than that under the 2008 Draft General Plan, but it would be significant.

IMPACTS ON PUBLIC SERVICES AND UTILITIES

Relative to the 2008 Draft General Plan, Alternative 3 assumes reduced amounts of land designated Limited Industrial, Water-Dependent Industrial, Service Commercial, Highway Commercial, and Agricultural Tourist Center in areas outside of established MSAs, and identification in the land use diagram of increased amounts of land within the proposed Agricultural Reserve Overlay and Resource Conservation Overlay. This alternative further assumes certain limits on agricultural processing on lands designated Agriculture and places limitations on proposed policies enabling centralized sewer treatment facilities. Alternative 3 would require fewer public services and utilities improvements in currently undeveloped areas than the 2008 Draft General Plan because it would place new developments in areas where existing services and utilities can be utilized. Upgrades or extensions would not be required as frequently as under the 2008 Draft General Plan. Therefore, this impact would have a lesser impact on public services and utilities than the 2008 Draft General Plan.

IMPACTS ON CULTURAL AND PALEONTOLOGICAL RESOURCES

Under Alternative 3, 7,591 fewer acres would be converted from agricultural uses or designated as commercial or industrial uses than under the 2008 Draft General Plan. Based on these numbers, it appears that fewer impacts on archaeological deposits and paleontological resources that may be significant under CEQA would occur. The

potential for the disturbance of human remains from development-related construction would also be lower. Similarly, fewer historical built-environment resources (e.g., rural farmhouses, barns) would be subject to destruction or alteration because of the difference in acreage that would be converted. For these reasons, it Alternative 3 would result in fewer potentially significant impacts on cultural and paleontological resources than the 2008 Draft General Plan.

IMPACTS ON AESTHETIC RESOURCES

Implementation of Alternative 3 would continue to result in construction of urban land uses adjacent to and surrounding segments of I-80, I-505, I-680, and SR 37, which are popular travel routes in Solano County. Urban development could include large and tall buildings, soundwalls, berms, and other infrastructure (e.g., roadways, overpasses) that could partially or wholly block views of the Coast Range from specific areas in Solano County. Depending on the height of buildings constructed, development under Alternative 3 could obscure views of the Coast Range from highways and freeways in Solano County.

Although proposed policies that would be included as part of Alternative 3 provide general guidelines for design of future urban development projects, these guidelines do not specifically identify the design elements that would be implemented (e.g., landscape earthforms, building architecture, façade treatments, lighting fixtures) or the effectiveness of the design elements in reducing the visual impacts of development. These policies require urban development to implement features that would reduce the potential impacts on views of the Coast Range (a countywide scenic vista), but urban development that would occur under Alternative 3 would permanently alter views, partially or wholly, of the Coast Range. However, this alternative would reduce the overall amount of urban development relative to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 3 would result in fewer impacts on unique views than the 2008 Draft General Plan.

Under Alternative 3, existing agricultural lands surrounding the city of Rio Vista would continue and a Wind Energy Resource Overlay would be implemented to increase resource conservation in Solano County. Specifically, promoting the development of electricity-generating wind-powered facilities in the southernmost portion of Solano County would assist in conserving nonrenewable resources for the generation of electricity. Because the Wind Energy Resource Overlay would promote construction of wind turbines, scenic views of the area south of Rio Vista and viewable from SR 160, a state scenic highway, could be significantly altered from existing conditions. The 2008 Draft General Plan would also establish a Wind Energy Resource Overlay; therefore, Alternative 3 would result in similar impacts on scenic resources within a state scenic highway.

With implementation of Alternative 3, visual conditions of new urban development in the county would be similar to existing views of suburban settings found throughout the county (e.g., Dixon, Vallejo, the development corridor along I-80). Further, implementation of urban development under Alternative 3 would extend the existing urban development boundaries farther outward. Open space, especially in an urbanizing setting, is valued for its visual quality. In Solano County, agricultural lands are equally valued for their visual quality.

Alternative 3 would include policies aimed at retaining important natural features (e.g., creeks, oak woodlands) and agricultural lands for their visual qualities and maintaining views from highways. Further, implementation of an Agricultural Overlay Zone, intended to assist in preserving valued agricultural landscapes, would occur under Alternative 3. Although these policies would reduce visual impacts of future urban development, the loss of existing visual resources (e.g., agricultural lands, open spaces, oak woodlands) would continue to occur with development of urban land uses throughout Solano County. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 3 would result in fewer impacts on existing visual conditions than the 2008 Draft General Plan.

A substantial increase in the amount of nighttime light and glare would result from development of urban land uses throughout Solano County, as identified in Alternative 3, potentially obscuring views of stars and other

features of the night sky. In addition, nighttime lighting in areas of future urban development, or the presence of reflective surfaces on buildings in these areas (e.g., reflective window glazing), could result in light and glare shining onto motorists traveling along highways and roadways in daytime and nighttime conditions.

Proposed policies of the 2008 Draft General Plan that would be included as part of Alternative 3 focus on reducing impacts that could result from lighting sources. However, urban development identified in Alternative 3 would continue to require substantial new lighting, and buildings could be constructed with reflective surfaces that could cast glare to motorists on local roadways. Alternative 3 identifies an area for development of General Industrial uses in an agricultural area void of substantial lighting sources. Development of urban land uses as part of Alternative 3 would introduce substantial new light sources adjacent to existing urban communities and in a rural portion of Solano County, which would cause light trespass into the night sky and create a new source of skyglow, and could obscure views of stars and other features of the night sky. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 3 would result in fewer nighttime light and glare impacts than the 2008 Draft General Plan.

IMPACTS ON ENERGY

The development densities and proposed land uses under Alternative 3 would result in more dense and clustered developments near existing infrastructure and services, thereby reducing energy requirements. Land uses proposed under Alternative 3 would generate fewer traffic trips and promote the increased use of renewable energy supplies and reliance on alternative transportation. Therefore, Alternative 3 would result in a lesser impact on energy supply than the 2008 Draft General Plan.

IMPACTS RELATED TO HAZARDS AND HAZARDOUS MATERIALS

Alternative 3 would result in a lower level of buildout than the 2008 Draft General Plan. Policies and existing regulations concerning emergency response and the use and transport of hazardous materials would be the same as those under the 2008 Draft General Plan. Therefore, Alternative 3 would have impacts on hazards and hazardous materials similar to those of the 2008 Draft General Plan.

IMPACTS ON RECREATION

Buildout of Alternative 3 would result in only 56 fewer residents than the 2008 Draft General Plan. Alternative 3 is projected to have a population of 39,511 in 2030 and the 2008 Draft General Plan is expected to generate a population of 39,448. Both plans would result in a park provision ratio of 5.4 acres per 1,000 residents, which could lead to overuse and physical deterioration of the resource. Both plans would result in significant impacts on parks and recreational facilities. Application of Mitigation Measure 4.14-1a, as described in Section 4.14, "Recreation," would be necessary to reduce the extent of such impacts.

IMPACTS RELATED TO CLIMATE CHANGE

Impacts of the 2008 Draft General Plan related to climate change are described in Section 6.2, "Effects related to Climate Change," in Chapter 6, "Other CEQA Considerations." Alternative 3 would result in designation of less land as commercial and industrial and, at buildout, would have a lower level of development than the 2008 Draft General Plan, this would result in fewer vehicle miles traveled and fewer sources in general. Additionally, Alternative 3 would have policies regarding climate change similar to those of the 2008 Draft General Plan. Therefore, Alternative 3 would result in fewer emissions of greenhouse gases from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

5.7 ALTERNATIVE 4. REDUCED RURAL RESIDENTIAL DEVELOPMENT

5.7.1 DESCRIPTION

The Reduced Rural Residential Development Alternative (Alternative 4) modifies the land use diagram, land use designations, and certain policies and programs proposed within the 2008 Draft General Plan that would expand areas designated for rural residential use relative to the current General Plan. The intent of Alternative 4 is to achieve a lower level of rural residential development and reduce associated impacts.

Alternative 4 assumes designation of less land as Rural Residential than under the 2008 Draft General Plan. This alternative also places limitations on the policies enabling centralized sewer treatment facilities.

LAND USE DIAGRAM

Under Alternative 4, approximately 1,830 acres proposed for Rural Residential use within the unincorporated county area would be designated Agriculture. This includes the following changes to the land use diagram:

- ▶ **Rural Residential areas north of Vacaville**—Approximately 1,586 acres proposed for Rural Residential use north of Vacaville and west of I-505 would be designated Agriculture—Western Hills Region.
- ▶ **Rural Residential areas in Pleasants Valley**—Approximately 190 acres proposed for Rural Residential use north of the Pleasants Hills Ranch subdivision in Pleasants Valley would be designated Agriculture—Pleasants, Vaca, and Lagoon Valleys Region.
- ▶ **Rural Residential area in Suisun Valley**—Approximately 54 acres proposed for Rural Residential use located west of the existing Willotta Oaks subdivision in Suisun Valley would be designated Agriculture—Suisun Valley Region.

The resulting General Plan land use diagram for Alternative 4 is provided as Exhibit 5-4.

DEVELOPMENT CAPACITY

A comparison of the development capacities of Alternative 4 and the 2008 Draft General Plan is provided in Table 5-6.

POLICIES AND PROGRAMS

The following changes to General Plan policies and programs are assumed within Alternative 4:

- ▶ **Sewer Servicing Policy**—Sewer servicing policies for new development would be modified to limit the use of centralized sewage treatment systems to commercial and industrial uses, or rural residential uses consisting of 200 or more units located within the Middle Green Valley Special Study Area. This is in contrast to the 2008 Draft General Plan, which does not include such use restrictions for centralized sewage treatment systems. Specifically, the following policy and program would be modified (changes are shown in ~~strikeout~~ and underline):

***PF.P-21:** Sewer services for development within the unincorporated area may be provided through private individual on-site sewage disposal systems, or centralized sewage treatment systems permitted and managed by a public agency utilizing the best systems available that meet tertiary treatment or higher standards. Use of such centralized sewage treatment systems shall be limited to (1) commercial or industrial uses, or (2) rural residential uses consisting of 200 or more units located within the Middle Green Valley Special Study Area.*

***PF.I-22:** On-site sewage disposal systems for individual lots and subdivisions may be operated by private property owners. A public agency shall permit and manage centralized community sewage disposal systems. If lands proposed for community sewage disposal systems are not within the boundaries of an existing public sewage treatment agency, the Board of Supervisors shall, as a condition of development, designate a public agency to provide and manage the sewer service, which may be contracted to a private entity with oversight by the public entity. Sewer treatment facilities shall be designed to provide sewer service to developed areas and areas designated for future commercial, industrial, or rural residential development consisting of 200 or more units located within the Middle Green Valley Special Study Area identified within the General Plan.*

Beyond the changes described within this section, all other components of the 2008 Draft General Plan would remain unchanged under Alternative 4. At buildout, this alternative would have a lower level of development than the 2008 Draft General Plan.

5.7.2 ENVIRONMENTAL EFFECTS

IMPACTS ON LAND USE

Alternative 4 has less potential to divide established communities than the 2008 Draft General Plan. Although Alternative 4 contains the same land designated for commercial and industrial uses, the amount of land designated for residential uses would be reduced. This reduces the risk of dividing existing communities compared to that of the 2008 Draft General Plan.

Alternative 4 would most likely result in a small reduction of land use conflicts when compared to the 2008 Draft General Plan. As documented in Table 5-6, less residential acreage is designated under Alternative 4. The reduction in rural residential areas described above would result in fewer conflicts between industrial uses and rural residential and agricultural uses. Additionally, less land would be converted from agriculture to residential uses. The reduction in the amount of land converted would reduce the occurrence of conflicts between agricultural and nonagricultural uses. It would also reduce the extent of indirect effects, such as residential traffic, on agricultural operations. Conflicts between agriculture and other uses would be also reduced because Alternative 4 places limitations on proposed policies enabling centralized sewer treatment facilities.

Alternative 4 would contain the same policies as the 2008 Draft General Plan and therefore would result in few conflicts with adopted state, regional, and local plans. The 2008 Draft General Plan contains a variety of policies and programs to accommodate plans from agencies such as BCDC and USFWS. Alternative 4 would maintain the same policies.

Alternative 4 and the 2008 Draft General Plan have the same potential to induce population growth. Alternative 4 is estimated to generate a population of 38,509 in 2030, and the 2008 Draft General Plan is forecasted to generate a population of 39,455 in the same year. Both Alternative 4 and the 2008 Draft General Plan significantly exceed ABAG's population projection of 26,000 in 2030; therefore, both would be growth inducing.

Neither Alternative 4 nor the 2008 Draft General Plan is expected to displace substantial numbers of people or housing units. Neither plan contains redevelopment districts. Displacement of homes or people would be limited to isolated instances when existing agriculture-related housing would be removed as existing agricultural uses are converted to higher intensity uses. In both plans, the impact of such displacement would not be significant.

IMPACTS ON AIR QUALITY

Alternative 4 would result in designation of less land as rural residential and, at buildout, would have a lower level of development than the 2008 Draft General Plan, which would result in fewer vehicle miles traveled and fewer sources overall. Additionally, Alternative 4 would have policies regarding air quality similar to those of the

2008 Draft General Plan. Therefore, Alternative 4 would result in fewer emissions of criteria air pollutants, toxic air contaminants, and odors from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

IMPACTS RELATED TO NOISE

As noted in the description of alternatives, the intent of Alternative 4 is to reduce the amount of rural residential development than the 2008 Draft General Plan. Specifically, this alternative would reduce acreage for rural residential uses. Because development under Alternative 4 would result in fewer dwelling units, and therefore lower population, than the 2008 Draft General Plan, the potential for adverse noise impacts at noise-sensitive areas would be reduced. As a result, there is reduced potential for adverse noise impacts to occur with development under Alternative 4 relative to development under the 2008 Draft General Plan.

As with the Preferred Plan, however, development of noise-sensitive land uses within noise-impacted areas, or the development of noise-producing land uses in the vicinity of existing noise-sensitive areas, would result in significant noise impacts. As with the 2008 Draft General Plan, application of the City's General Plan policies for noise would mitigate such impacts to less-than-significant levels by requiring noise mitigation measures to ensure compliance with the applicable land use compatibility criteria with respect to noise.

IMPACTS ON TRANSPORTATION AND CIRCULATION

Alternative 4 contains land use assumptions that reduce development of certain residential development in some areas. This slightly reduces the overall total of anticipated employed households. The estimated number of dwelling units is 459 less than that estimated for the 2008 Draft General Plan. The estimated total number of jobs is not projected to change in this alternative. Because this reduction is less than 0.03% of the total number of households projected countywide and the number of jobs is not expected to change, the resulting impacts of this alternative are considered similar to those of the 2008 Draft General Plan. As a result, the mitigation measures for impacts of this alternative would also be reasonably similar to those of the 2008 Draft General Plan.

IMPACTS ON HYDROLOGY AND WATER RESOURCES

Alternative 4 would result in designation of less land as rural residential and, at buildout, would have a lower level of development than the 2008 Draft General Plan, and it would have policies regarding hydrology and water resources similar to those of the 2008 Draft General Plan. Therefore, Alternative 4 would result in fewer violations of water quality standards than would occur under the 2008 Draft General Plan.

Like the 2008 Draft General Plan, Alternative 4 would have policies designed to minimize or eliminate on-site and downstream erosion and sedimentation. Solano County's cities are each responsible for their own storm drainage and flood control, and this would not change under Alternative 4. County flood control efforts to address erosion and sedimentation—the Ulatis Flood Control Project, the *Flood Control Master Plan* approved by SCWA, and the Suisun Marsh Policy Addendum certified by BCDC—would not change under this alternative. Therefore, Alternative 4 would have impacts similar to those of the 2008 Draft General Plan with regard to on-site and downstream erosion and sedimentation.

The 2008 Draft General Plan would result in more construction from additional development than Alternative 4, and it could result in increased erosion and sedimentation. However, the impact on water quality resulting from construction would be similar to that of the 2008 Draft General Plan, given the adequacy of existing NPDES requirements and SWPPPs for lots greater than 1 acre in size; the effectiveness of BMPs used in such situations; and the County's current grading, erosion, and flood control regulations, which would remain unchanged under this alternative.

**Table 5-6
General Plan Development Capacity under Alternative 4 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions
Water Bodies and Courses	51,092	0		NA	NA	NA	NA	NA	NA	NA	NA	NA
Park and Recreation	2,132	0	1,341	NA	NA	NA	NA	NA	NA	NA	NA	NA
Marsh	64,723	0	-8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Natural Resource Designations	117,948	0	1,333	NA	NA	NA	NA	NA	NA	NA	NA	NA
Watershed	36,575	0	0	80	0	*	210	0	*	NA	NA	NA
Agriculture	308,935	1,830	-20,141	1,806	6	*	4,744	15	*	1,192,732	1,913	1,192,732
Subtotal Agricultural Designations	345,510	1,830	-20,141	1,886	6	1,074	4,955	15	2,686	1,192,732	1,913	1,192,732
Public/Quasi-Public	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Subtotal Public Designations	1,871	0	354	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rural Residential	11,891	-1,830	6,026	2,378	-366	*	6,248	-962	*	NA	NA	NA
Traditional Community—Residential	980	0	980	1,960	0	*	5,148	0	*	NA	NA	NA
Traditional Community—Mixed Use	108	0	108	65	0	*	170	0	*	393,548	0	393,548
Urban Residential	1,890	0	1,604	5,674	0	*	14,908	0	*	NA	NA	NA
Subtotal Residential Designations	14,868	-1,830	7,990	10,076	-366	3,508	26,474	-962	8,755	393,548	0	393,548
Neighborhood Commercial	6	0	*	NA	NA	NA	NA	NA	NA	32,943	0	*
Neighborhood Agricultural/Tourist Center	75	0	*	NA	NA	NA	NA	NA	NA	392,040	0	*
Commercial Recreation	155	0	*	NA	NA	NA	NA	NA	NA	54,142	0	*
Service Commercial	75	0	*	NA	NA	NA	NA	NA	NA	394,221	0	*
Highway Commercial	136	0	*	NA	NA	NA	NA	NA	NA	712,251	0	*
Urban Commercial	588	0	*	NA	NA	NA	NA	NA	NA	3,072,180	0	*
Subtotal Commercial Designations	1,036	0	396	NA	NA	NA	NA	NA	NA	4,657,778	0	4,557,802
General Industrial	8	0	*	NA	NA	NA	NA	NA	NA	11,584	0	*
Limited Industrial	969	0	*	NA	NA	NA	NA	NA	NA	1,476,760	0	*
Water Dependent Industrial	6,766	0	*	NA	NA	NA	NA	NA	NA	2,947,362	0	*
Urban Industrial	1,254	0	*	NA	NA	NA	NA	NA	NA	1,911,425	0	*
Subtotal Industrial Designations	8,996	0	6,871	NA	NA	NA	NA	NA	NA	6,347,132	0	6,001,931
Specific Project Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
Subtotal Special Purpose Areas	4,208	0	4,208	2,600	0	2,600	7,081	0	7,081	1,787,579	0	1,787,579
TOTAL Unincorporated Area	494,437	0	0	14,944	-360	7,182	38,509	947	18,521	14,378,769	1,913	13,933,592
Overlays (Not Counted in Total)												
Water Dependent Industrial—Reserve	2,870	0	2,870	NA	NA	NA	NA	NA	NA	NA	NA	NA
Travis Reserve Area	7,890	0	7,890	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Table 5-6
General Plan Development Capacity under Alternative 4 (Estimated)**

General Plan Designations	Acres			Dwelling Units			Population			Nonresidential Square Feet		
	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions	Alt. 4	Compared to 2008 Draft GP	Compared to Existing Conditions
Wind Energy Resource Overlay	31,737	0	31,737	NA	NA	NA	NA	NA	NA	NA	NA	NA
Agricultural Reserve Overlay	14,428	0	14,428	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tri-City Cooperative Planning Area	9,968	0	9,968	NA	NA	NA	NA	NA	NA	NA	NA	NA
Resource Conservation Overlay	210,576	0	210,576	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
 GP = General Plan; NA = not applicable
 * More detail not available for these designations.
 Source: Data provided by EDAW in 2008

Alternative 4 would have policies similar to those of the 2008 Draft General Plan to protect, monitor, restore, and enhance the quality and quantity of groundwater resources. The additional development of land designated as rural residential under the 2008 Draft General Plan would result in more impervious surfaces than under Alternative 4. Therefore, Alternative 4 would result in fewer impacts on groundwater recharge than would occur under the 2008 Draft General Plan.

Alternative 4 would result in a lesser degree of buildout in floodplains than the 2008 Draft General Plan. However, the cities in Solano County are each responsible for their flood control projects, and SCWA is responsible for operations and maintenance of the Ulatis Flood Control Project and the Green Valley Flood Control Project. Flood control functions for the Delta (from precipitation and tides) rely on levees, as addressed in Impact 4.5-6 in Section 4.5, "Hydrology and Water Resources." Therefore, the impacts of Alternative 4 would be similar to those of the 2008 Draft General Plan in this regard.

Alternative 4 would result in a significant and unavoidable impact from flooding as a result of the potential for local levee failure. Both Alternative 4 and the 2008 Draft General Plan would result in a less-than-significant impact from flooding as a result of dam failure because Dam Inundation Mapping Procedures (19 CCR Section 2575) are required by OES for all dams where human life is potentially endangered by dam flooding inundation, and this requirement would be unchanged. Therefore, Alternative 4 would have impacts similar to those of the 2008 Draft General Plan with regard to flooding threats from levee or dam failure.

IMPACTS ON BIOLOGICAL RESOURCES

Alternative 4 would result in conversion of less land (8,413 acres) from agricultural uses or designated as rural residential than would occur under the 2008 Draft General Plan. Based on these numbers, it is likely that fewer significant impacts on biological resources would occur under Alternative 4 than under the 2008 Draft General Plan.

IMPACTS ON GEOLOGY AND SOILS

Under Alternative 4, 1,830 fewer acres would be converted from agricultural uses or designated as rural residential uses than under the 2008 Draft General Plan. For this reason, this alternative would result in fewer impacts on geology and soils than the 2008 Draft General Plan. However, impacts on development from soils or geological hazards, and impacts on mineral resources would be less than significant under the 2008 Draft General Plan.

IMPACTS ON AGRICULTURAL RESOURCES

The land use pattern under Alternative 4 allocates a majority of land in Solano County for agricultural and open-space uses. Fewer rural residential land uses would be developed than under the 2008 Draft General Plan, and fewer acres would be developed for urban uses.

Specifically, under Alternative 4 rural residential land use designations conform generally to existing development patterns and envisioned future residential development is located as a logical extension of existing residential areas. In addition, future residential development is located to minimize conversion of valuable farmland. Overall, Alternative 4 would develop less land designated as rural residential and, at buildout, would result in a lower level of development than the 2008 Draft General Plan. Specific to agricultural lands, Alternative 4 would result in conversion of 1,830 fewer acres of agricultural land to nonagricultural uses than the 2008 Draft General Plan.

Although fewer acres of agricultural land, including Important Farmland, would be converted to urban land uses under Alternative 4, implementation of this alternative would continue to result in the loss of approximately 20,141 acres of agricultural land, of which a certain portion would be designated as Important Farmland. Because

Alternative 4 would continue to result in the loss of Important Farmland from development of urban uses, this impact would be significant.

Of the 20,141 acres that would be converted from agriculture, it is assumed that a certain percentage is protected under a Williamson Act contract. Although the County's Williamson Act program would still apply under Alternative 4, new rural residential land use designations would result in the removal of a certain percentage of acres of existing agricultural land currently under a Williamson Act contract. This impact would be less than that under the 2008 Draft General Plan, but it would be significant.

IMPACTS ON PUBLIC SERVICES AND UTILITIES

Relative to the 2008 Draft General Plan, Alternative 4 assumes reduced amounts of land designated Rural Residential in areas outside of established MSAs, and identification in the land use diagram of increased amounts of land within the proposed Agricultural Reserve Overlay and Resource Conservation Overlay. This alternative further assumes certain limits on agricultural processing on lands designated Agriculture and places limitations on proposed policies enabling centralized sewer treatment facilities. Alternative 4 would require fewer public services and utilities improvements in currently undeveloped areas than the 2008 Draft General Plan because it would place new developments in areas where existing services and utilities can be utilized. Upgrades or extensions would not be required as frequently as under the 2008 Draft General Plan. Therefore, this impact would have a lesser impact on public services and utilities than the 2008 Draft General Plan.

IMPACTS ON CULTURAL AND PALEONTOLOGICAL RESOURCES

Under Alternative 4, 1,830 fewer acres would be converted from agricultural uses or designated as rural residential uses than under the 2008 Draft General Plan. Based on these numbers, it appears that fewer impacts on archaeological deposits and paleontological resources that may be significant under CEQA would occur. The potential for the disturbance of human remains from development-related construction would also be lower. Similarly, fewer historical built-environment resources (e.g., rural farmhouses, barns) would be subject to destruction or alteration because of the difference in acreage that would be converted. For these reasons, it appears that Alternative 4 would result in fewer potentially significant impacts on cultural and paleontological resources than the 2008 Draft General Plan.

IMPACTS ON AESTHETIC RESOURCES

Implementation of Alternative 4 would continue to result in construction of urban land uses adjacent to and surrounding segments of I-80, I-505, I-680, and SR 37, which are popular travel routes in Solano County. Urban development could include large and tall buildings, soundwalls, berms, and other infrastructure (e.g., roadways, overpasses) that could partially or wholly block views of the Coast Range from specific areas in Solano County. Depending on the height of buildings constructed, development under Alternative 4 could obscure views of the Coast Range from highways and freeways in Solano County.

Although proposed policies that would be included as part of Alternative 4 provide general guidelines for design of future urban development projects, these guidelines do not specifically identify the design elements that would be implemented (e.g., landscape earthforms, building architecture, façade treatments, lighting fixtures) or the effectiveness of the design elements in reducing the visual impacts of development. These policies require urban development to implement features that would reduce the potential impacts on views of the Coast Range (a countywide scenic vista), but urban development that would occur under Alternative 4 would permanently alter views, partially or wholly, of the Coast Range. However, this alternative would reduce the overall amount of urban development relative to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 4 would result in fewer impacts on unique views than the 2008 Draft General Plan.

Under Alternative 4, existing agricultural lands surrounding the city of Rio Vista would continue and a Wind Energy Resource Overlay would be implemented to increase resource conservation in Solano County. Specifically, promoting the development of electricity-generating wind-powered facilities in the southernmost portion of Solano County would assist in conserving nonrenewable resources for the generation of electricity. Because the Wind Energy Resource Overlay would promote construction of wind turbines, scenic views of the area south of Rio Vista and viewable from SR 160, a state scenic highway, could be significantly altered from existing conditions. The 2008 Draft General Plan would also establish a Wind Energy Resource Overlay; therefore, Alternative 4 would result in similar impacts on scenic resources within a state scenic highway.

With implementation of Alternative 4, visual conditions of new urban development in the county would be similar to existing views of suburban settings found throughout the county (e.g., Dixon, Vallejo, the development corridor along I-80). Further, implementation of urban development under Alternative 4 would extend the existing urban development boundaries farther outward. Open space, especially in an urbanizing setting, is valued for its visual quality. In Solano County, agricultural lands are equally valued for their visual quality.

Alternative 4 would include policies aimed at retaining important natural features (e.g., creeks, oak woodlands) and agricultural lands for their visual qualities and maintaining views from highways. Further, implementation of an Agricultural Overlay Zone, intended to assist in preserving valued agricultural landscapes, would occur under Alternative 4. Although these policies would reduce visual impacts of future urban development, the loss of existing visual resources (e.g., agricultural lands, open spaces, oak woodlands) would continue to occur with development of urban land uses throughout Solano County. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 4 would result in fewer impacts on existing visual conditions than the 2008 Draft General Plan.

Although Alternative 4 would reduce the amount of land developed for rural residential uses, a substantial increase in the amount of nighttime light and glare would result from development of commercial and industrial uses throughout Solano County, potentially obscuring views of stars and other features of the night sky. In addition, nighttime lighting in areas of future urban development, or the presence of reflective surfaces on buildings in these areas (e.g., reflective window glazing), could result in light and glare shining onto motorists traveling along highways and roadways in daytime and nighttime conditions.

Proposed policies of the 2008 Draft General Plan that would be included as part of Alternative 4 focus on reducing impacts that could result from lighting sources. However, urban development identified in Alternative 4 would continue to require substantial new lighting, and buildings could be constructed with reflective surfaces that could cast glare to motorists on local roadways. Alternative 4 identifies an area for development of General Industrial uses in an agricultural area void of substantial lighting sources. Development of urban land uses as part of Alternative 4 would introduce substantial new light sources adjacent to existing urban communities and in a rural portion of Solano County, which would cause light trespass into the night sky and create a new source of skyglow, and could obscure views of stars and other features of the night sky. However, this alternative would reduce the overall amount of urban development compared to the 2008 Draft General Plan. With an overall reduction in urban development, Alternative 4 would result in fewer nighttime light and glare impacts than the 2008 Draft General Plan.

IMPACTS ON ENERGY

The development densities and proposed land uses under Alternative 4 would result in more dense and clustered developments near existing infrastructure and services, thereby reducing energy requirements. Reduced rural residential land uses proposed under Alternative 4 would generate fewer traffic trips and promote the increased use of renewable energy supplies and reliance on alternative transportation. Therefore, Alternative 4 would result in a lesser impact on energy supply than the 2008 Draft General Plan.

IMPACTS RELATED TO HAZARDS AND HAZARDOUS MATERIALS

Alternative 4 would result in a lower level of buildout than the 2008 Draft General Plan. Policies and existing regulations concerning emergency response and the use and transport of hazardous materials would be the same as those under the 2008 Draft General Plan. Therefore, Alternative 4 would have impacts on hazards and hazardous materials similar to those of the 2008 Draft General Plan.

IMPACTS ON RECREATION

Buildout of Alternative 4 would result in 947 fewer residents than the 2008 Draft General Plan. Alternative 4 is projected to have a population of 38,509 in 2030 and the 2008 Draft General Plan is expected to generate a population of 39,448. Both plans would result in a park provision ratio of 5.4 acres per 1,000 residents, which could lead to overuse and physical deterioration of the resource. Both plans would result in significant impacts on parks and recreational facilities. Application of Mitigation Measure 4.14-1a, as described in Section 4.14, “Recreation,” would be necessary to reduce the extent of such impacts.

IMPACTS RELATED TO CLIMATE CHANGE

Impacts of the 2008 Draft General Plan related to climate change are described in Section 6.2, “Effects related to Climate Change,” in Chapter 6, “Other CEQA Considerations.” Alternative 4 would result in designation of less land as rural residential and, at buildout, would have a lower level of development than the 2008 Draft General Plan. This would result in fewer vehicle miles traveled and fewer sources in general. Additionally, Alternative 4 would have policies regarding climate change similar to those of the 2008 Draft General Plan. Therefore, Alternative 4 would result in fewer emissions of greenhouse gases from vehicles and stationary sources than would occur under the 2008 Draft General Plan.

5.8 SUMMARY OF COMPARATIVE EFFECTS OF THE ALTERNATIVES

Table 5-7 provides a summary comparison of the environmental impacts of the alternatives, as presented in the environmental analysis above, to the environmental impacts of the 2008 Draft General Plan (the proposed project). The environmental impacts of the 2008 Draft General Plan are addressed in detail throughout this EIR.

Environmental Topic	Alternative 1. No Project: Existing General Plan	Alternative 2. Improved Environmental Sustainability	Alternative 3. Reduced Commercial and Industrial Development	Alternative 4. Reduced Rural Residential Development
Land Use	Similar	Less	Less	Less
Air Quality	Similar	Less	Less	Less
Noise	Similar	Similar	Similar	Similar
Transportation and Circulation	Less	Less	Less	Less
Hydrology and Water Resources	Similar	Similar	Similar	Similar
Biological Resources	Less	Less	Less	Less
Geology and Soils	Less	Less	Less	Less
Agricultural Resources	Less	Less	Less	Less

**Table 5-7
Comparison of Environmental Impacts of Alternatives to the 2008 Draft General Plan**

Environmental Topic	Alternative 1. No Project: Existing General Plan	Alternative 2. Improved Environmental Sustainability	Alternative 3. Reduced Commercial and Industrial Development	Alternative 4. Reduced Rural Residential Development
Public Services and Utilities	Less	Less	Less	Less
Cultural and Paleontological Resources	Less	Less	Less	Less
Aesthetic Resources	Less	Similar	Less	Less
Energy	More	Less	Less	Less
Hazards and Hazardous Materials	Similar	Similar	Similar	Similar
Recreation	Less	Similar	Similar	Similar
Climate Change	Less	Less	Less	Less

Source: Data provided by EDAW in 2008

Please see Section 3.3 in Chapter 3, “Project Description,” for the objectives of the update to the *Solano County General Plan*. Table 5-8 provides a comparison of the degree to which the alternatives described above meet the project objectives listed in Chapter 3; specifically, the larger the number of asterisks under a particular alternative for a specific project objective, the greater the degree to which that alternative meets that project objective.

**Table 5-8
Comparison of the Degree to Which the Alternatives to the 2008 Draft General Plan
Meet the Project Objectives**

Project Objective	Alternative 1. No Project: Existing General Plan	Alternative 2. Improved Environmental Sustainability	Alternative 3. Reduced Commercial and Industrial Development	Alternative 4. Reduced Rural Residential Development
Maintain city-centered urban growth	***	**	**	**
Retain function of the Orderly Growth Initiative	***	**	**	**
Protect and support agriculture	***	**	**	**
Sustain and enhance the natural environment	**	**	**	**
Continue distinct and identifiable cities/ communities	***	**	***	**
Encourage economic development	*	***	**	***
Ensure adequate stock of developable land	*	***	**	***

Source: Data provided by EDAW in 2008

5.9 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

In addition to the discussion and comparison of impacts of the alternatives to the 2008 Draft General Plan, CEQA requires that an “environmentally superior” alternative among the alternatives considered be selected and that the reasons for such selection be disclosed. In general, the environmentally superior alternative is the alternative that would generate the fewest or least severe adverse impacts.

For the purposes of this EIR, Alternative 2 is environmentally superior because it would reduce impacts in the greatest number of topic areas compared to the 2008 Draft General Plan.

The project objectives, for the purposes of this EIR, are contained in Chapter 3, “Project Description.” It is assumed that any of the alternatives described in this chapter could be designed to achieve the majority of the community’s goals, as expressed throughout the 2008 Draft General Plan.

6 OTHER CEQA CONSIDERATIONS

6.1 CUMULATIVE EFFECTS

Section 15130 of the State CEQA Guidelines requires the analysis of all cumulatively considerable impacts resulting from a proposed project. Section 15355 defines a cumulative impact as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” This chapter identifies cumulative impacts that could be created as a result of implementation of the 2008 Draft General Plan.

Cumulative impacts can originate from one project or from separate projects. Cumulative impacts result when two or more impacts of a project combine and increase the severity or significance of either impact. Cumulative impacts can also be created when impacts from separate projects combine to make a compound impact that is more severe than the impacts would have been had the projects occurred in isolation. This chapter examines the cumulative effects of the 2008 Draft General Plan—that is, the impacts of the 2008 Draft General Plan when combined with impacts resulting from buildout of Solano County’s incorporated cities and other projects in the region.

6.1.1 METHODS OF ANALYSIS

For the purposes of evaluating cumulative impacts, the State CEQA Guidelines allow the use of two alternative methods to determine the scope of projects to be considered:

- ▶ **List method**—A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.
- ▶ **Regional growth projections method**—A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, that described or evaluated regional or areawide conditions contributing to the cumulative impact.

This analysis uses both methods. The first part of the analysis examines population, housing, and employment growth projections for the individual cities in Solano County and the unincorporated county. The projections are based on two sources of information: projections through 2030 made by the Association of Bay Area Governments (ABAG) in 2005, and buildout assumptions under the County’s 2008 Draft General Plan. The second portion of the analysis contains a list of major projects in the unincorporated county and cities that could produce significant impacts relevant to the cumulative analysis. The projects included on the list represent recent or proposed general plan amendments or projects of a scale that warrant special attention.

6.1.2 GEOGRAPHIC SCOPE

The geographic scope for the analysis of cumulative effects includes the unincorporated areas of Solano County and the seven incorporated cities within the county. Because of the regional context of traffic, air quality, and climate change issues, analysis of these topics also includes potential impacts from projects occurring in the surrounding counties. Noise is also considered at this regional scale because it is closely related to traffic.

6.1.3 ANALYSIS OF REGIONAL GROWTH PROJECTIONS

Table 6-1 lists the estimated population, number of households, and number of jobs in the incorporated cities and the unincorporated county in 2005 and the projections for the same in 2030. Data for the cities are based on 2005 ABAG projections. Data for the unincorporated county are derived from the 2008 Draft General Plan. ABAG data

were not used for the unincorporated county’s growth projections because they do not include the additional growth that would result from the adoption and buildout of the 2008 Draft General Plan.

Table 6-1 Estimated and Projected Population, Housing, and Employment Levels—2005 and 2030						
Jurisdiction	Population		Households		Jobs	
	2005	2030	2005	2030	2005	2030
Incorporated Cities						
Benicia	26,900	31,100	10,420	11,890	15,280	19,180
Dixon	16,500	26,600	5,210	8,290	5,630	7,170
Fairfield	105,700	145,100	34,180	47,060	49,160	73,000
Rio Vista	7,200	22,500	2,940	8,840	2,390	5,520
Suisun City	27,900	37,900	8,580	11,560	3,760	6,520
Vacaville	96,600	125,100	31,010	40,660	28,880	44,110
Vallejo	122,100	167,500	41,660	56,800	34,120	51,550
Subtotal—Incorporated Cities	402,900	555,800	134,000	185,100	139,220	207,050
Unincorporated Solano County	19,990	39,460	7,380	14,920	3,038	6,644
Total	422,890	595,260	141,380	200,020	142,258	213,694
Sources: ABAG 2005 (incorporated areas), Solano County 2008 (unincorporated areas)						

As shown in Table 6-1, projections based on 2005 ABAG data and 2008 Draft General Plan land use data estimate the following:

- ▶ The number of households in Solano County, including incorporated cities, will increase from 141,380 in 2005 to 200,020 in 2030; the population will increase from 422,890 people to 595,260, and employment is expected to grow from 142,258 jobs in 2005 to 213,694 jobs in 2030.
- ▶ Within the incorporated cities, the number of households will increase from 134,000 in 2005 to 185,100 in 2030; the population will increase from 402,900 to 555,800, and employment is projected to increase by 48%, from 139,220 jobs in 2005 to 207,050 in 2030.
- ▶ Within the unincorporated county, the number of households will increase from 7,380 in 2005 to 14,920 in 2030; the population will increase from 19,990 to 39,460, and employment is expected to more than double, from 3,039 jobs in 2005 to 6,644 jobs in 2030.

6.1.4 RELEVANT PROJECTS

To provide a more comprehensive analysis of cumulative effects, major projects occurring in or adjacent to incorporated cities are described below. Two types of projects are described: projects that require general plan amendments and projects whose impacts may exceed the level previously assumed within the city’s general plan. All major projects proposed in the unincorporated county have been included within the land use changes in the 2008 Draft General Plan and therefore are not described here.

- ▶ **Wal-Mart Supercenter (Fairfield)**—A Wal-Mart Supercenter is proposed on the approximately 18-acre site of the former Mission Village Shopping Center, on the west side of North Texas Street between Atlantic

Avenue and Hawthorne Drive in Fairfield. The project would involve demolition of most of the existing center and construction of an approximately 185,000-square-foot retail building and 16,000-square-foot outdoor garden center at the north end of the site. In addition to space for general retail sales, the Wal-Mart Supercenter building would include a full grocery store. Approximately 48,000 square feet of the original center would be retained at the south end of the site.

- ▶ **Villages at Fairfield (Fairfield)**—This project consists of amendments to the *City of Fairfield General Plan* and Fairfield’s zoning ordinance. It would result in development of approximately 440 acres north of Air Base Parkway between Clay Bank Road and Peabody Road. Approximately 2,400 housing units would be constructed along with an elementary school, two neighborhood parks, and a neighborhood shopping center of approximately 111,000 square feet.
- ▶ **Gentry-Suisun Development (Suisun City)**—This project includes an amendment to the *Suisun City General Plan*, rezoning, subdivision approval, and annexation of the project area into the Suisun City limits. The project site is located south of State Route (SR) 12 and east and west of Pennsylvania Avenue within Suisun City’s sphere of influence. The project would result in a mixed-use development with 359 residential units, 719,839 square feet of retail space, and 15,682 square feet of business and industrial uses.
- ▶ **Walters Road West Development (Suisun City)**—This project proposes a Wal-Mart Supercenter, restaurant, and service station with a market and car wash. The proposed site is located north of SR 12 and west of Walters Drive inside the Suisun City limits. The project would contain 175,000 square feet of retail space on 20.86 acres.
- ▶ **Waterfront/Downtown Project (Vallejo)**—The proposed Waterfront/Downtown Project area comprises 110 acres along the Mare Island Strait between the Mare Island Causeway to the north and Solano Avenue to the south. Thirty-five acres would be dedicated to public use, including a public parking garage to consolidate ferry parking and a bus transfer station. Upon project completion, parks, open spaces, plazas, and promenades would make up 28 acres of the project. An estimated 562,000 square feet of retail/commercial/office space is planned, along with 1,080 residential units.
- ▶ **Triad Downtown Development Project (Vallejo)**—The proposed Triad Downtown Development Project consists of a 12-square-block area in downtown Vallejo, generally bordered by Sonoma Boulevard, Maine Street, Santa Clara Street, and Capitol Street. The site consists of seven parking lots owned by the City of Vallejo Redevelopment Agency. The project would consist of mixed commercial and residential uses. The number of proposed units and nonresidential square feet was not available at the time of preparation of this EIR.
- ▶ **Northgate Project (Vallejo)**—The Northgate Project is located near Vallejo’s northeastern border, just east of the intersection of Interstate 80 (I-80) and SR 37, and encompasses approximately 110 acres. It is bordered by Columbus Parkway to the north, single-family residences to the east, Turner Parkway to the south, and the Gateway Plaza retail center to the west. The site is separated into an approximate 105-acre business park and an approximate 5-acre office park. All planning entitlements have been completed. The project would consist of approximately 4.6 acres for professional office space, 24.7 acres for auto sales, 27 acres for small-lot single-family residences, 10.9 acres for neighborhood retail, 13.9 acres for senior housing/assisted living/congregate care facility, 2.6 acres for extended-stay lodging, and 10 acres for Solano Community College. The number of proposed units and nonresidential square feet was not available at the time of preparation of this EIR.
- ▶ **Mare Island Eastern Early Transfer Development Project (Vallejo)**—The Mare Island Eastern Early Transfer Parcel is a 653-acre parcel located in the center of Mare Island running from the south side of G Street to (and including) Touro University on the south. The Napa River borders the site to the east and the wetlands of the San Pablo Bay Wildlife Refuge border the site to the west. Planned development would

consist of 729 single-family and multifamily residential units in addition to office and retail uses. The proposed number of nonresidential square feet was not available at the time of preparation of this EIR. The planned development area includes several parcels that currently belong or will belong to the U.S. government or the City of Vallejo.

- ▶ **Mare Island Dredge Ponds Development Project (Vallejo)**—The Mare Island dredge ponds are located along the western edge of Mare Island’s developed areas. The 10 dredge ponds, which range in size from 31 acres to 80 acres, were last used in late 1995 and encompass a total of 510 acres. The seven southernmost ponds encompass approximately 347 acres of land. The project would allow for reuse of the seven ponds as a commercial dredge disposal facility. The property is owned by the State of California and leased to the City of Vallejo for maintenance. In October 2002, Vallejo entered into a memorandum of understanding with Weston Solutions whereby, upon the state’s approval, Weston would operate the dredge ponds as an active regional dredge disposal site.
- ▶ **Mare Island Reuse Area 1A Development Project (Vallejo)**—Reuse Area 1A, also known as the North Light Industrial Area, consists of approximately 195 acres of land, of which approximately 155 acres are developable. The property is currently zoned for employment-generating uses in the *Mare Island Specific Plan*. It is located north of G Street and south of the North Gate of Mare Island (entrance from SR 37). The property is bordered on the east by the Napa River.
- ▶ **Dixon Gateway Project (Dixon)**—The proposed Dixon Gateway Project would be located adjacent to I-80 at the intersection of West A Street and Batavia Road. The 59-acre site would contain 511,000 square feet of light industrial and professional office uses and 57,000 square feet of commercial retail uses. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Dorset Retail Center Project (Dixon)**—The proposed Dorset Retail Center would be located on Dorset Court. The project would be constructed on a 16.64-acre site and would contain 197,192 square feet of retail uses including a Home Depot store, two fast-food drive-thru restaurants, and other retail buildings. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Flying J Travel Plaza Project (Dixon)**—The proposed Flying J Travel Plaza Project would be located adjacent to I-80 at Pedrick Road. Twenty-seven acres of a 60-acre parcel would be developed as a travel plaza truck stop and restaurant. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Genentech Research Support Facility (Dixon)**—The Genentech Research Support Facility is located on Fitzgerald Drive. The project is being constructed on a 6.5-acre site and will contain a 140,000-square-foot, two-story research support building. The project is currently under construction.
- ▶ **Milk Farm Partners Project (Dixon)**—The proposed Milk Farm Partners Project would be located at the intersection of Milk Farm and Currey Roads. The 30-acre site would contain highway commercial and research facilities. No description of the size of the proposed structures was available. The project’s EIR was certified by the Dixon City Council in November 2005.
- ▶ **Brookfield Residential Project (Dixon)**—The proposed Brookfield Residential Project would be located at the intersection of South First Street and East Parkway Boulevard. The 94-acre site would contain 400 single-family homes and a 120-unit senior complex. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Orchard Estates Project (Dixon)**—The proposed Orchard Estates Garcia Property Project would be located at 1875 West A Street. The project proposes 57 single-family homes on the 20-acre Garcia property and 89 single-family homes on the 30-acre Sanders property. The project is currently under review by the City of Dixon Planning Department.

- ▶ **Weyand Ranch Project (Dixon)**—The proposed Weyand Ranch Project would be located at 450 South Lincoln Street. The project proposes 230 single-family homes on 80.9 acres. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Sandalwood Project (Dixon)**—The proposed Sandalwood Project would be located at 450 South Lincoln Street. The project proposes a tentative map for 216 single-family homes on 60 acres. The project is currently under review by the City of Dixon Planning Department.
- ▶ **Valley Glen Project (Dixon)**—The Valley Glen Project is located at the intersection of SR 113 and Valley Glen Drive. The project will contain 676 single-family residences, 161 multifamily units, and 4 acres of commercial development and involve the construction of a park and a grade-separated railroad crossing. The project is in various stages of completion. Phases 1 and 2 have been approved and are under construction including 277 single-family homes built in 2003, 21 single-family homes built in 2004, 17 single-family homes built in 2005, and 45 single-family homes built in 2006. Final approval was obtained for 102 apartment units in 2006. Fifty-nine condominium units were approved by the Planning Commission in July 2007.
- ▶ **North Village Apartments Project (Vacaville)**—The proposed North Village Apartments Project would be located at the intersection of North Village Parkway and Crescent Drive. The project proposes a 228-unit senior living center on 9.9 acres. The project is currently under review by the City of Vacaville Planning Department.
- ▶ **Lagoon Valley Project (Vacaville)**—The proposed Lagoon Valley Project would be located east of I-80 and south of Lagoon Valley Road. The project proposes 1,025 single-family homes on 412 acres. The project has obtained approval of a tentative map.

6.1.5 CUMULATIVE EFFECTS OF THE 2008 DRAFT GENERAL PLAN

IMPACTS ON LAND USE

Buildout of the 2008 Draft General Plan and the city general plans would involve changes to land use type, density, and scale in areas with existing agricultural uses and in areas adjacent to incorporated and unincorporated communities. These changes would increase land use conflicts between urban, rural residential, commercial, industrial, and agricultural uses. Development in both the cities and the unincorporated county would cumulatively increase impacts on agricultural resources in Solano County. As development occurs, more land use conflicts between the higher intensity uses and agriculture would emerge. This would have a negative impact on farming and ranching operations in the county. Additionally, commercial and industrial development in the cities and in the unincorporated county could combine to create substantial land use conflicts with neighboring urban and rural residential uses. The contribution of the 2008 Draft General Plan in this regard would be significant and cumulatively considerable.

As shown in Table 6-1, the 2008 Draft General Plan has been projected to facilitate a population increase within the unincorporated county from 19,990 in 2005 to 39,460 in 2030. ABAG projects that growth in the incorporated cities is expected to increase the total population of the cities from 402,900 in 2005 to 555,800 in 2030. Combined, the 2030 population is expected to be 595,260. As discussed in Section 4.1, “Land Use,” of this EIR, the level of growth allowed in the unincorporated county through the implementation of the 2008 Draft General Plan would be significant. When development under the 2008 Draft General Plan is combined with the potential development permitted by the cities, a significant cumulative impact related to a population increase would result. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON AIR QUALITY

Solano County is in a geographically unique situation because of its orientation across two air basins. Air quality considerations for these two portions of the county fall under the purview of two local air quality management agencies. The northeastern portion of Solano County lies within the Sacramento Valley Air Basin (SVAB). The SVAB also comprises all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties and the western portion of Placer County. The southwestern portion of Solano County is located in the San Francisco Bay Area Air Basin (SFBAAB), which also comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties and the southern portion of Sonoma County.

Emissions of ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NO_x) have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, peak 1-hour and 8-hour ozone concentrations in the SVAB and SFBAAB have declined overall by about 14% and 26%, respectively, during the last 20 years. Peak ozone values in the SVAB have not declined as rapidly over the last several years as they have in other urban areas. This can be attributed to an influx of pollutants into the SVAB from other urbanized areas, making the region both a transport contributor and a receptor of pollutants (ARB 2007).

Direct emissions of both particulate matter less than or equal to 10 microns in diameter and less than or equal to 2.5 microns in diameter (PM₁₀ and PM_{2.5}) increased slightly in the SVAB and SFBAAB between 1975 and 2005 and are projected to increase through 2020. These emissions are dominated by areawide sources, primarily because of development. Direct emissions of particulate matter from mobile and stationary sources have remained relatively steady (ARB 2007).

Sources of criteria air pollutant emissions in Solano County include stationary, area, and mobile sources. According to the 2006 emissions inventory for the County, the majority of ROG and NO_x emissions are attributable to mobile sources, while areawide sources are the greatest contributor of particulate matter emissions (ARB 2008).

Solano County is in nonattainment for ozone and particulate matter (both PM₁₀ and PM_{2.5}). Future urban development would add to this air quality problem by adding vehicle trips and accommodating construction, and through other means, resulting in a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

Given that compliance with applicable rules and regulations would be required for the control of stationary-source emissions of toxic air contaminants (TACs), both on-site and off-site, the contribution of the 2008 Draft General Plan to long-term cumulative increases in stationary-source TAC concentrations would be less than cumulatively considerable. Background concentrations of diesel PM in Solano County are not considered relatively high, nor are any major nonpermitted sources of TAC emissions proposed. Exposure to TAC emissions from mobile sources, specifically diesel exhaust PM, is of growing concern within Solano County, and no restrictions on where sensitive receptors will be located relative to major roadways are currently in place. For this reason, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

As described under Impact 4.2-4, implementation of the 2008 Draft General Plan would result in significant air quality impacts related to carbon monoxide emissions from local mobile sources. Because the model used in the traffic analysis is a regional transportation model that includes development forecasted in Solano County through 2030, this is representative of the cumulative condition. Thus, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON NOISE

Future development projects within Solano County will invariably affect the future (cumulative) ambient noise environment. It is difficult to project exactly how the ambient noise conditions within the county will change after buildout of the 2008 Draft General Plan and the city general plans; however, it is known that traffic noise levels will increase as a result of the additional traffic generated by buildout of various land use designations. The primary factor for a cumulative noise impact analysis is the consideration of future traffic volumes. Railroad noise, nontransportation noise, and construction noise impacts are anticipated to be project-specific and not significantly contribute to cumulative noise impacts.

Implementation of the 2008 Draft General Plan, along with regional growth and traffic conditions, would cause changes in traffic noise levels ranging from a decrease of 2 A-weighted decibels (dBA) day/night average sound level (L_{dn}) to an increase of 12 dBA L_{dn} over existing traffic noise levels, as indicated in Table 4.3-8 in Section 4.3, "Noise." A traffic noise level increase of 3 dBA L_{dn} is considered significant when no-project noise levels exceed 60 dBA L_{dn} . The 2008 Draft General Plan would result in significant impacts on several roadway sections. Although more roadway sections would experience significant noise level increases under the Maximum Development Scenario than under the Preferred Plan, this cumulative impact nonetheless would be significant. The 2008 Draft General Plan would make a cumulatively considerable contribution to the impact.

IMPACTS ON TRANSPORTATION AND CIRCULATION

The analysis of transportation and circulation provided in Section 4.4 of this EIR was performed as a cumulative analysis. The analysis is considered cumulative because the standard tool for analysis, provided as the Solano-Napa Travel Model, contains market-based assumptions about employment and housing growth for Solano County and adjacent counties as part of the baseline definition of the tool. Such assumptions are essential because the trip ends of land uses in Solano County must link to other potential trip destinations, so that these destinations must be carefully balanced to land use growth within Solano County and adjacent counties to properly estimate background traffic growth, as well as trip lengths and routes of traffic associated with the scenarios studied in the EIR.

Further, under Government Code Section 65089(c), the baseline Solano Transportation Authority travel model chosen for the analysis must be consistent with the regional model that contains the specific rules governing travel forecasting within congestion management agencies. The regional model, maintained by the Metropolitan Transportation Commission, already assumes a level of growth in local jurisdictions that is considered reasonable according to demographic projections and trends as analyzed by ABAG, which is a primary source of the data used for both the Metropolitan Transportation Commission and Solano Transportation Authority models. The overall forecasts are controlled by expectations of employment and housing growth in the marketplace and in relation to each other, rather than to an arbitrary buildout of land uses in all local jurisdictions. In sum, all project scenarios studied in Section 4.4, "Transportation and Circulation," of this EIR are considered cumulative by nature because anticipated land use forecasts for other areas are already included in the travel model.

As described in Section 4.4, the 2008 Draft General Plan would result in a significant and unavoidable impact related to degradation of roadway levels of service. This would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON HYDROLOGY AND WATER RESOURCES

Land uses and development consistent with the 2008 Draft General Plan, together with development within the county's eight cities, would result in cumulative impacts on hydrology and water resources. As discussed in Section 4.5, "Hydrology and Water Resources," land uses and development consistent with the 2008 Draft General Plan would result in hydrology and water quality impacts related to drainage and flooding. Solano County cities are each responsible for their own storm drainage and flood control, although the County sometimes

assists the cities in addressing upstream and downstream impacts. Like the County, the cities are required to address and mitigate hydrology and water quality impacts related to drainage and flooding caused by land use changes. With adoption and implementation of the proposed goals, policies, and programs in the 2008 Draft General Plan, combined with current land use, stormwater, grading, and erosion control regulations of the County and eight cities, the cumulative impacts of drainage and flooding on hydrology and water quality would be addressed both in the municipal service areas and in unincorporated areas of the county. Although the potential for these cumulative impacts would be greater under the Maximum Development Scenario than under the Preferred Plan because more development would be permitted, the proposed policies and programs in the 2008 Draft General Plan would be adopted and implemented under this scenario as well, and would be combined with current grading, erosion, and flood control regulations of the County and cities. Therefore, cumulative hydrology and water quality impacts related to drainage and flooding would be less than significant.

Cumulative development in the unincorporated area of the county plus the eight cities would increase demand on groundwater and surface-water supplies, potentially adversely affecting supplies of groundwater and surface water. Solano County Water Agency is the major provider of water for both the County and the eight cities, and County ordinance requires areas of urban development in the unincorporated county (i.e., the coverage area for the 2008 Draft General Plan) to be annexed to a city, so cumulative development in the county would affect the cities as well. Section 4.5, "Hydrology and Water Resources," identifies additional policies and mitigation measures that would further reduce the impacts of the 2008 Draft General Plan related to water supply and demand. However, these measures would not reduce cumulative impacts to a less-than-significant level. These cumulative impacts would be greater under the Maximum Development Scenario than under the Preferred Plan because these alternatives would result in more rural and/or urban land uses and development than would occur under the Preferred Plan. This would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON BIOLOGICAL RESOURCES

Implementation of the 2008 Draft General Plan, in combination with potential future projects in Solano County, would convert 21,971 acres of agricultural and natural open-space land into urban uses. This would include loss of sensitive wildlife habitat: grassland, vernal pool, oak woodland and savanna, marsh, and riparian woodland. Loss of agricultural land would cause a significant impact on foraging habitat for Swainson's hawk and burrowing owl. Loss of grassland, vernal pool, oak woodland/savanna, marsh, and riparian habitat would result in significant impacts on other listed and special-status plant and animal species.

The 2008 Draft General Plan includes numerous policies intended to protect biological resources and mitigate their loss. With implementation of these policies and the mitigation measures for biological resources recommended in Section 4.6 of this EIR, impacts of plan adoption would be less than significant. However, because mitigation requirements for major development projects in and adjacent to the incorporated cities listed above are unknown, and the *Solano Multi-Species Habitat Conservation Plan* has not yet been adopted, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON GEOLOGY AND SOILS

Cumulative impacts on geology and soils would be less than significant based on the application of extensive goals, policies, and implementation programs incorporated in various chapters of the 2008 Draft General Plan.

Cumulative gains in population, households, and jobs would require a commensurate increase in infrastructure, capital facilities, services, housing, and commercial uses. Each of these increases carries with it a corresponding increase in the amount of ground disturbance resulting from the construction of new buildings and structures and other site development activities. Impacts on mineral resources and soils and related to geological hazards would occur given the gains in population, jobs, and housing and the expansion of the built environment; however, this

would be a less-than-significant cumulative impact based on the application of best management practices and engineering measures required by policies and programs in the 2008 Draft General Plan, as well as other federal, state, and local regulations.

IMPACTS ON AGRICULTURAL RESOURCES

Implementation of the 2008 Draft General Plan, in combination with potential future projects in Solano County and development in the incorporated cities, would convert more than 21,000 acres of agricultural land to urban land uses. Specifically, 21,971 acres of existing agricultural land uses would be converted to an urban land use, approximately a 10% reduction of agricultural land uses in Solano County. This conversion would include 4,131 acres of Important Farmland (as defined by the California Department of Conservation and the County) in Solano County.

The 2008 Draft General Plan includes numerous policies intended to protect future productivity of agricultural land uses in Solano County and to mitigate their loss (i.e., through use of an Agricultural Reserve Overlay). However, the 2008 Draft General Plan also has the potential to exacerbate the loss of agricultural land to wind energy production, to park and recreation uses, to industrial land uses, and residential land uses. Implementation of land uses envisioned in the 2008 Draft General Plan would result in the overall loss of agricultural land uses, including Important Farmland, to urban development.

Similarly, cumulative projects would also result in the conversion of Important Farmland, the impacts of which could not be mitigated to a less-than-significant level. Overall, implementation of land uses envisioned in the 2008 Draft General Plan would continue to add to the cumulative loss of farmlands associated with other cumulative projects in Solano County and the surrounding counties and in the Central Valley as a whole. This would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON PUBLIC SERVICES AND UTILITIES

Buildout of the 2008 Draft General Plan and the city general plans would involve changes to land use type, density, and scale throughout incorporated and unincorporated communities, which would increase demands on public services and utilities. The cumulative impacts on water supply services, wastewater management services, solid waste management and recycling, public education services, fire protection and emergency services, criminal justice services, and library services are described below.

Water Supply Services

Development of future water supply in Solano County depends on several variable factors such as surface water availability and groundwater recharge, and it is affected by other variable factors such as land use density and land use type. Future growth in the unincorporated county and cities could cumulatively lead to potential future water shortages and depletion of existing water supplies. The 2008 Draft General Plan contains policies with requirements to maintain the county's water resources, and existing regulations require future development to prove that adequate water supply is available before development may occur. Although multiple water sources exist in Solano County, water sources in a large portion of the unincorporated county cannot currently be quantified. Furthermore, available water supplies to incorporated areas and portions of unincorporated areas would be insufficient to accommodate projected future growth in the county (SCWA 2005). Therefore, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

Wastewater Management Services

Buildout of the 2008 Draft General Plan would result in greater demand for wastewater collection and treatment and could create a demand for new wastewater facilities, either individual on-site systems or centralized systems, in the unincorporated county. Growth in Solano County's cities would also contribute to additional demands for wastewater collection and treatment, leading to a need for additional wastewater facilities in the future. Policies in the 2008 Draft General Plan would require that adequate wastewater facilities be provided for future development before it occurs, to ensure that sufficient wastewater capacity is available in areas where future growth would occur. Therefore, cumulative impacts would be less than significant.

Solid Waste Management and Recycling

Buildout of the 2008 Draft General Plan would include new development that would increase the generation of solid waste in the unincorporated county. Additional growth in the cities would increase the generation of solid waste, affecting available capacity in unincorporated areas. However, landfills in Solano County are projected to have adequate capacity to accommodate solid waste from buildout of the 2008 Draft General Plan. Therefore, cumulative impacts would be less than significant.

Public Education Services

Growth anticipated with buildout of the 2008 Draft General Plan would result in an increased student population, contributing to an increased demand for additional public schools. Growth in the cities would result in additional demands for public education, creating a need for new schools in Solano County. As described in Section 4.9, "Public Services," of this EIR, the Public Services and Facilities chapter of the 2008 Draft General Plan contains policies intended to ensure that school facilities are provided concurrently with future development and existing regulations also ensure that new developments contribute funds to new or expanded public schools. Therefore, cumulative impacts would be less than significant.

Fire Protection and Emergency Services

Buildout of the 2008 Draft General Plan would include the construction of new structures during development of residential, commercial, and industrial land uses, which would lead to an increased risk of fire hazards in the unincorporated county. Additionally, growth in the cities and in planned growth areas could add demands for increased fire protection, creating a need for new fire facilities in unincorporated areas. As described in Section 4.9 of this EIR, the Public Services and Facilities chapter of the 2008 Draft General Plan contains a goal and policies that would require additional facilities and services to accommodate projected growth in the plan, which would ensure that cumulative impacts would be less than significant.

Criminal Justice Services

Buildout of the 2008 Draft General Plan would create greater demands for protection by the County Sheriff's Department and would lead to additional needs for sheriff's department facilities in the unincorporated county. Additional growth in incorporated areas and in municipal service areas could increase demands for Sheriff's protection by the County Sheriff's Department and create a need for new department facilities. As described in Section 4.9 of this EIR, the Public Services and Facilities chapter of the 2008 Draft General Plan contains a goal and policies that would require additional public services to accommodate projected growth in the 2008 Draft General Plan, including sheriff's department services, which would ensure that cumulative impacts would be less than significant.

Library Services

Buildout of the 2008 Draft General Plan would increase demand for library services, resulting in a need for new or expanded facilities in the unincorporated county. Additional growth in the cities and in planned growth areas

could add demands for increased library services and would create a need for new libraries. As described in Section 4.9 of this EIR, the Public Services and Facilities chapter of the 2008 Draft General Plan includes policies to ensure adequate public facilities and library services are provided concurrent with future developments. Therefore, cumulative impacts would be less than significant.

IMPACTS ON CULTURAL AND PALEONTOLOGICAL RESOURCES

Cumulative impacts on cultural resources, with the exception of the removal of historical built-environment resources, can be reduced to a less-than-significant level by applying extensive goals, policies, and implementation programs in the 2008 Draft General Plan, as well as recommended mitigation measures. The impacts on historical built-environment resources would remain significant and unavoidable.

Cumulative gains in population, households, and jobs would require a commensurate increase in infrastructure, capital facilities, services, housing, and commercial uses. Each of these increases carries with it a corresponding increase in the magnitude of ground disturbance and the construction of new buildings and structures and other site development activities. The impact on archaeological deposits, human remains, and paleontological resources would be substantial given the gains in population, jobs, and housing; however, it is likely that the greatest degree of impact on cultural resources—especially historical built-environment resources within the densely developed and historical downtown Vallejo, as well as Mare Island—would result from expansion of the built environment. These impacts on the historical built environment, even with mitigation applied, would still result in significant, unavoidable impacts on a project-by-project basis. Although data generated by this analysis cannot confirm this, it is also possible that, because of the scope and range of activities that would be undertaken, the 2008 Draft General Plan may result in the loss of a class of archaeological sites unique to the paleoenvironmental context of Solano County. This would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON AESTHETIC RESOURCES

Implementation of the 2008 Draft General Plan would substantially alter the visual character of Solano County by converting agricultural lands and open space to developed urban uses, resulting in a significant impact related to degradation of existing visual character. Because of the location of future urban development envisioned in the 2008 Draft General Plan, no feasible mitigation is available to address impacts on aesthetic resources associated with the conversion of agricultural land and open space to urban development and impacts on views of scenic vistas. Standards for design, architecture, development, and landscaping would be included as part of future development projects and would help to ensure that future urban development remains within aesthetic guidelines established in policies of the 2008 Draft General Plan; however, there is no mechanism to allow implementation of development projects while avoiding the conversion of the local viewsheds from agricultural land uses and open spaces to urban development. Related cumulative projects in Solano County would also transform the visual environment from open space and agricultural areas to urban development. These projects would also be expected to comply with adopted community design and aesthetic standards, but it is likely that these projects would also result in significant and unavoidable aesthetic impacts because of the magnitude of the development proposed. Cumulative visual impacts within Solano County would be significant. The 2008 Draft General Plan would make a cumulatively considerable contribution to these significant cumulative impacts.

IMPACTS ON ENERGY

Land uses and development consistent with the 2008 Draft General Plan would lead to an increased demand for energy and consumption of energy resources. Future land use patterns, new construction and building renovations, and commuting patterns would increase demand for energy in the Solano County. As discussed in Section 4.12, “Energy,” of this EIR, the 2008 Draft General Plan contains policies that encourage the development of renewable-energy supplies that would offset a portion of the energy demands created from future development. Regardless, cumulative development throughout the county and cumulative planned projects would result in a

significant cumulative increase in the demand for energy. Therefore, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON HAZARDS AND HAZARDOUS MATERIALS

Buildout of the 2008 Draft General Plan would increase the intensity of development in unincorporated Solano County. This could lead to increased exposure of residents to natural hazards and hazardous waste, whether through transport or potential spill. While this potential exists, required compliance with federal, state, and local regulations regarding development in hazard prone areas and the storage and handling of hazardous materials would reduce the potential for significant impacts on public health and safety. Therefore, buildout of the 2008 Draft General Plan, combined with future development in surrounding communities, would result in a less-than-significant cumulative impact.

IMPACTS ON RECREATION

As demonstrated in Table 6-1, the 2008 Draft General Plan would facilitate population growth in the unincorporated county, from a population of 19,900 in 2005 to 39,460 in 2030. In the same time period, the population in the cities is projected to increase from 402,900 to 555,800. Combined, this would result in a population of 595,260 within Solano County. As discussed in Section 4.14, "Recreation," population growth in the unincorporated county would result in a level of park provision much lower than the County's mandated standard. Mitigation Measure 4.14-1a for the Preferred Plan and Mitigation Measure 4.14-1b for the Maximum Development Scenario would ensure adequate provision of parklands and recreation facilities and ensure that supply kept up with population growth in the unincorporated county. This would reduce the impact of the 2008 Draft General Plan on County parks to a less-than-significant level.

Potential impacts on County facilities resulting from increased city populations and potential impacts on city facilities resulting from growth in the unincorporated county, however, are not addressed through policies or mitigation measures. Population growth in the incorporated cities could create additional pressure on County parks. Each of the cities provides park facilities for its own residents, but the County provides park facilities such as boat launches, campgrounds, and open-space trail networks that are not available in all the cities. The increase in urban population may create additional impacts on these County parks. Furthermore, because the County does not provide recreation programs for its residents, the increased growth in the unincorporated county could increase impacts on city programs. For these reasons, this would be a significant cumulative impact. The 2008 Draft General Plan would make a cumulatively considerable contribution to this significant cumulative impact.

IMPACTS ON CLIMATE CHANGE

Effects related to climate change are inherently cumulative in nature. A detailed discussion of effects of the 2008 Draft General Plan on climate change, as well as climate change effects that could occur with implementation of the plan, is presented in Section 6.2 below. In this discussion, it is demonstrated that the 2008 Draft General Plan would make a cumulatively considerable contribution to the significant cumulative impacts associated with climate change.

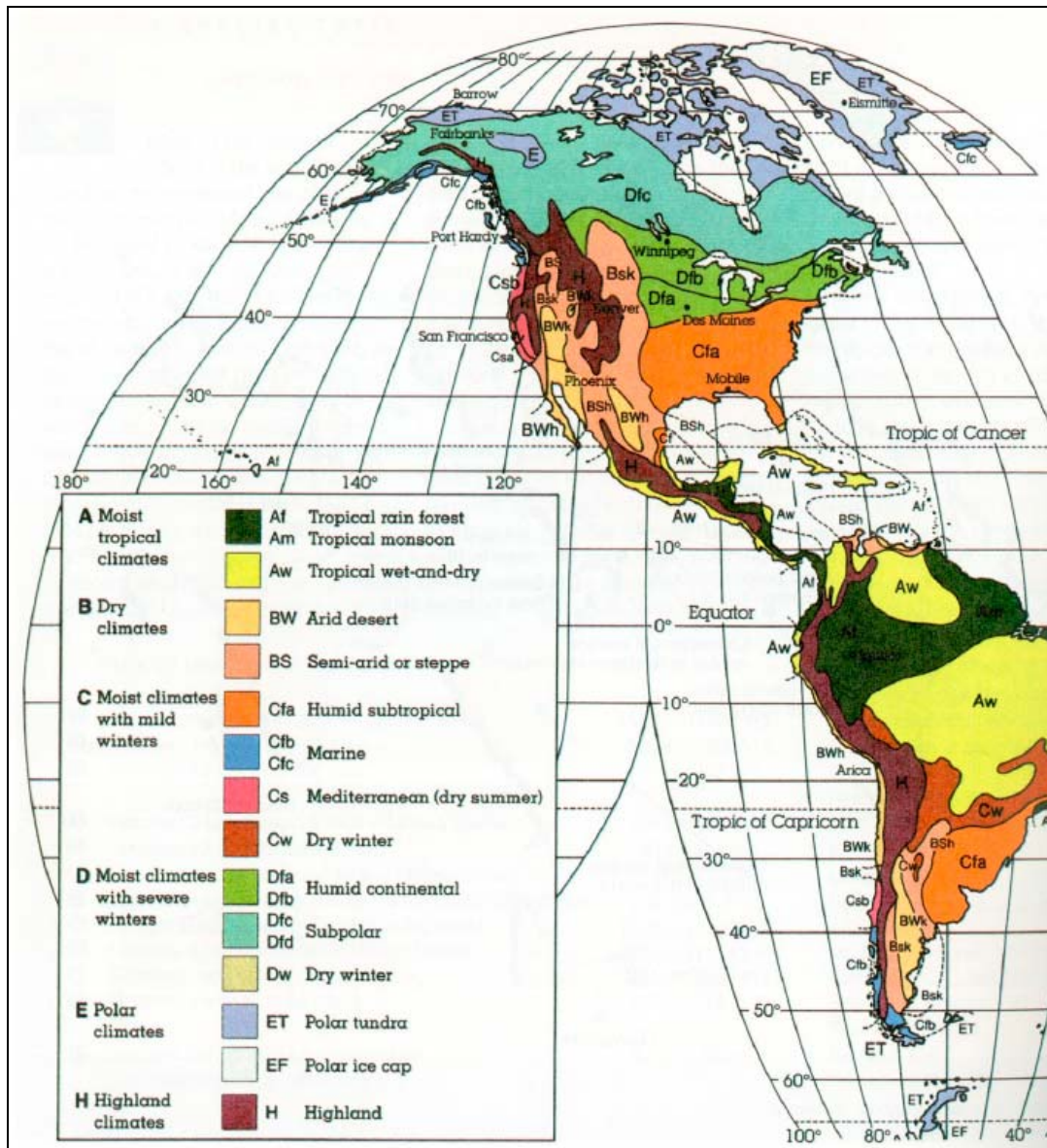
6.2 EFFECTS RELATED TO CLIMATE CHANGE

This section includes a discussion of existing climate conditions, climate change, and greenhouse gas (GHG) emissions sources in California and Solano County; a summary of applicable regulations; and a description of potential impacts of the 2008 Draft General Plan related to climate change.

6.2.1 EXISTING CONDITIONS

CLIMATE

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). Solano County is located in a climatic zone characterized as dry-summer subtropical or Mediterranean in the Köppen climate classification system. The Köppen system’s classifications are based primarily on annual and monthly averages of temperature and precipitation (see Exhibit 6-1 for a global map of climate classifications).



Source: Ahrens 2003

The Köppen Climate Classification System

Exhibit 6-1

The SVAB, which includes the eastern portion of Solano County, is relatively flat, bordered by mountains to the east, west, and north. The climate is characterized by hot, dry summers and cool, rainy winters. Periods of dense

and persistent low-level fog that are most prevalent between storms are characteristic of winter weather in the SVAB. The extreme summer aridity of the Mediterranean climate is caused by sinking air of subtropical high-pressure regions. The ocean has less influence in the SVAB than in the coastal areas, giving the interior Mediterranean climate more seasonal temperature variation (Ahrens 2003).

By contrast, the SFBAAB, which includes the western portion of Solano County, experiences a coastal Mediterranean climate. Where the direction of surface-level wind parallels the coast, upwelling of cold water acts to keep the water itself and the air above it cool during the summer. The coastal climates often experience fog and low-level clouds (Ahrens 2003).

Most precipitation in the area results from air masses that move in from the Pacific Ocean during the winter months. These storms usually move from the west or northwest. More than half the total annual precipitation falls during the winter rainy season (November–February); the average winter temperature is a moderate 49 degrees Fahrenheit (°F). During the summer, daily temperatures range from 50°F to more than 100°F.

ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GASES

Certain gases in Earth’s atmosphere, classified as GHGs, play a critical role in determining surface temperatures. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth’s surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth, not as high-frequency solar radiation, but as lower-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. Earth has a much lower temperature than the sun; therefore, it emits lower-frequency (longer-wavelength) radiation. Most solar radiation passes through GHGs; however, GHGs have strong absorption properties in wavelength bands along the electromagnetic spectrum, whereas the atmosphere, in its natural composition, does not. This range of absorption spectra (from wavelengths of 8–13 micrometers) is known as the “infrared atmospheric window” region of the electromagnetic spectrum, where infrared radiation is selectively absorbed by GHGs. As a result, radiation that otherwise would have escaped back into space is instead “trapped,” resulting in a warming of the atmosphere. This phenomenon, known as the “greenhouse effect,” is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), ozone, nitrous oxide (N₂O), and fluorinated compounds. Climate change is defined as a change in the climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and that is in addition to natural climate variability observed over comparable time periods. Human-caused emissions of these GHGs exceeding natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of Earth’s climate, known as global climate change (UNFCCC 2008). It is extremely unlikely that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007a).

IMPACTS OF CLIMATE CHANGE

Overview

According to overwhelming scientific consensus on the subject, climate change is already under way. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (discussed in Section 4.2, “Air Quality,” of this EIR), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule depends on multiple variables and cannot be pinpointed, it is understood that more CO₂ is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Approximately 54% of the total annual human-caused CO₂ emissions are

sequestered within a year through ocean uptake, uptake by forest regrowth in the Northern Hemisphere, and other terrestrial sinks; the remaining 46% of human-caused CO₂ emissions remain stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and toxic air contaminants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say that the quantity is enormous and that no single project would be expected to measurably contribute to a noticeable incremental change in the global average temperature, or to global or local climate or microclimate.

Global average ambient concentrations of CO₂ have increased dramatically since preindustrial times, from approximately 280 parts per million (ppm) to approximately 353 ppm in 1990 and approximately 380 ppm in 2000. Global average temperature has risen approximately 0.76 degree Celsius (°C) since 1850; if global CO₂ emissions were to be curbed today, it would continue to rise an additional 0.5°C by the end of this century. This phenomenon is caused by the inertia of the climate system and time scale of the main sequestration mechanism in the carbon cycle—the ocean. In other words, global climate is committed to an additional 0.5°C of warming associated with human activities that have already occurred. Because GHG emissions associated with fossil fuel combustion, population growth, technological advances, and current standards of living will continue to occur, a more likely range of scenarios for global average temperature rise would be 1.8–4.0°C by the end of the century, depending on the global emissions scenario that ultimately occurs. (For example, the Intergovernmental Panel on Climate Change’s B1 scenario—low population growth, clean technologies, and low emissions—is the best-case scenario; its A2 scenario—high population growth, fossil-fuel dependence, and high emissions—is the worst-case scenario; and its A1B scenario is a moderate scenario.)

Impacts associated with the incremental increase in global temperature have already begun to occur. Such impacts are projected to occur in numerous forms: sea level rise, reduction in the extent of polar and sea ice, changes to ecosystems, changes in precipitation patterns, reduced snowpack, agricultural disruption, increased intensity and frequency of storms and temperature extremes, increased risk of floods and wildfires, increased frequency and severity of drought, effects on human health from vectorborne disease, species extinction, and acidification of the ocean.

It is accepted that some level of climate change impacts will occur as a result of human-caused climate change. However, international treaties on the subject of climate change attempt to avoid “dangerous” climate change—in other words, to manage the risk of foreseeable impacts to a “tolerable” level of climate change that would avoid most catastrophic impacts. For this to occur, CO₂ concentrations should be stabilized at 350–400 ppm, with an associated global average temperature increase of no more than 2°C–2.4°C above preindustrial times. Timing is also a key issue, because of the very long lifetimes of GHGs. To avoid “dangerous” climate change, global CO₂ emissions would be required to peak during the 2000–2015 period (IPCC 2007a, 2007b).

Impacts on California and Solano County

Variability in Regional Modeling of Climate Change

Much of the available trend data, modeling, and projections related to climate change are on a global scale. Projecting impacts of climate change often relies on general circulation models (GCMs), which develop large-scale scenarios of changing climate parameters, usually comparing scenarios with different concentrations of GHGs in the atmosphere. This information is typically at too coarse a scale to make accurate regional assessments. As a result, more effort has recently been put into reducing the scale and increasing the resolution of climate models through various techniques such as “downscaling” or integrating regional models into the global models (Kiparsky and Gleick 2005, Roos 2005, DWR 2006). However, the level of uncertainty related to regional climate change is generally higher than that related to global projections because downscaling and similar activities add uncertainty.

Variability in the results of climate change modeling is based in large part on which global climate model is used, what inputs are selected for the model (world population increases and GHG emissions), and how the model is downscaled to provide region-specific data. For example, in DWR's report *Progress on Incorporating Climate Change into Management of California's Water Resources, Technical Memorandum Report* (DWR 2006), four scenarios projecting regional climate change were selected, consisting of combinations of two different global climate models and two different emissions scenarios. These four scenarios provide temperature results ranging from weak warming to relatively strong warming, and precipitation results ranging from modest reductions to weak increases (DWR 2006).

It should be remembered that results of climate change modeling, particularly for regional models, are too coarse to be precise, quantified predictions. There is a significant amount of uncertainty about the magnitude of climate change that will occur during this century. It is unlikely that this level of uncertainty will diminish significantly in the foreseeable future (Dettinger 2005a). Therefore, effects on the environment anticipated under various climate change models should be considered as general projections of potential future conditions, with actual environmental effects likely falling within the range of results provided by a variety of model outputs.

Temperature

Status and Trends

The Earth's climate has had numerous periods of cooling and warming in the past. Significant periods of cooling have been marked by massive accumulations of sea- and land-based ice extending from the Earth's poles to as far as the middle latitudes. Periods of cooling have also been marked by lower sea levels because of the accumulation of water as ice and the cooling and contraction of the Earth's oceans. Periods of warming caused recession of the ice toward the poles, warming and thermal expansion of the Earth's oceans, and rise in sea levels (DWR 2006, IPCC 2007a).

The potential for human-induced changes in the Earth's temperature has been tied to increased concentrations of greenhouse gases in the atmosphere, caused primarily by the production and burning of fossil fuels. The primary gases of concern are carbon dioxide, methane, and nitrous oxide (IPCC 2001a, 2001b, 2007). Average temperatures in the Northern Hemisphere appear to have been relatively stable from about the year 1000 to the mid-1800s based on temperature proxy records from tree rings, corals, ice cores, and historical observations (IPCC 2001a). However, there is a significant amount of uncertainty related to proxy temperature records, especially those extending far back into the past.

The IPCC stated that the Earth's climate has warmed since the preindustrial era and that it is very likely that at least some of this change is attributable to the activities of humans (IPCC 2007a). Global average near-surface air temperatures and ocean surface temperatures increased by $0.74^{\circ}\text{C} \pm 0.18^{\circ}\text{C}$ ($1.33^{\circ}\text{F} \pm 0.32^{\circ}\text{F}$) during the 20th century (IPCC 2007a).

Temperature measurements, apparent trends in reduced snowpack and earlier runoff, and other evidence such as changes in the timing of blooming plants indicate that temperatures in California and elsewhere in the western United States have increased during the past century (NWS 2005, Mote et al. 2005, Cayan et al. 2001).

Projections

Modeling results from GCMs are consistent in predicting increases in temperatures globally with increasing concentrations of atmospheric GHGs resulting from human activity. As discussed above, climate change projections can be developed on a regional basis using techniques to downscale from the results of global models (although increased uncertainty results from the downscaling). One relatively large group of model projections for California that was recently examined provides a temperature rise of about 2.5°C to 9°C (4.5°F to 16.2°F) for Northern California by 2100. An analysis of the distribution of the projections generally showed a central tendency at about 3°C (5.4°F) of rise for 2050, and about 5°C (9°F) for 2100 (Dettinger 2005b).

Work by Snyder et al. (2002) has produced the finest-scale temperature and precipitation estimates to date. Resulting temperature increases for a scenario of doubled CO₂ concentrations are 1.4°C to 3.8°C (2.5°F to 6.8°F) throughout California. This is consistent with the global increases predicted by the IPCC (2001b, 2007). In a regional model of the western United States, Kim et al. (2002) projected a climate warming of around 3°C to 4°C (5.4°F to 7.2°F). Of note in both studies is the projection of uneven distribution of temperature increases. For example, regional climate models show that the warming effects are greatest in the Sierra Nevada, with implications for snowpack and snowmelt (Kim et al. 2002, Snyder et al. 2002).

Precipitation

Climate change can affect precipitation in a variety of ways, such as by changing the following:

- ▶ overall amount of precipitation,
- ▶ type of precipitation (rain vs. snow), and
- ▶ timing and intensity of precipitation events.

Each of these issue areas is discussed below.

Amount of Precipitation

Status and Trends

Worldwide precipitation is reported to have increased about 2% since 1900. Although global average precipitation has been observed to increase, changes in precipitation over the past century vary in different parts of the world. Some areas have experienced increased precipitation while other areas have experienced a decline (IPCC 2001b, 2007; NOAA 2005). An analysis of trends in total annual precipitation in the western United States by the National Weather Service's Climate Prediction Center provides evidence that annual precipitation has increased in much of California, the Colorado River Basin, and elsewhere in the West since the mid-1960s (DWR 2006). In another study evaluating trends in annual November-through-March precipitation for the western United States and southwest Canada, the data indicate that for most of California and the Southwest there was increasing precipitation during the periods of 1930–1997 and 1950–1997 (Mote et al. 2005).

Former State Climatologist James Goodridge compiled an extensive collection of longer-term precipitation records from throughout California. These data sets were used to evaluate whether there has been a changing trend in precipitation in the state over the past century (DWR 2006). Long-term runoff records in selected watersheds in the state were also examined. Based on a linear regression of the data, the long-term historical trend for statewide average annual precipitation appears to be relatively flat (no increase or decrease) over the entire record. However, it appears that there might be an upward trend in precipitation toward the latter portion of the record.

When these same precipitation data are sorted into three regions—Northern, Central, and Southern California—trends show that precipitation in the northern portion of the state appears to have increased slightly from 1890 to 2002, and precipitation in the central and southern portions of the state show slightly decreasing trends. All changes were in the range of 1–3 inches annually (DWR 2006).

Although existing data indicate some level of change in precipitation trends in California, more analysis is likely needed to determine whether changes in California's regional annual precipitation totals have occurred as the result of climate change or other factors (DWR 2006).

Projections

The IPCC predicts that increasing global surface temperatures are very likely to result in changes in precipitation. Global average precipitation is expected to increase during the 21st century as the result of climate change, based

on global climate models for a wide range of GHG emission scenarios. However, global climate models are generally not well suited for predicting regional changes in precipitation because of their coarse level of outputs compared to the scale of regionally important factors that affect precipitation (e.g., maritime influences, effects of mountain ranges) (IPCC 2001a, 2007).

Therefore, while increasing precipitation on a global scale is generally an expected result of climate change, significant regional differences in precipitation trends can be expected. Some recent regional modeling efforts conducted for the western United States indicate that overall precipitation will increase (Kim et al. 2002, Snyder et al. 2002), but considerable uncertainty remains because of differences among larger-scale GCMs. Where precipitation is projected to increase in California, the increases are centered in Northern California (Kim et al. 2002, Snyder et al. 2002) and in the winter months.

However, various California climate models provide mixed results regarding changes in total annual precipitation in the state through the end of this century. Models predicting the greatest amount of warming generally predict moderate decreases in precipitation; on the other hand, models projecting smaller increases in temperature tend to predict moderate increases in precipitation (Dettinger 2005b). In addition, an IPCC review of multiple global GCMs identifies much of California as an area where less than 66% of the models evaluated agree on whether annual precipitation would increase or decrease; therefore, no conclusion on an increase or decrease can be provided (IPCC 2007a), and California climate could be either warmer-wetter or warmer-drier. Considerable uncertainties about the precise effects of climate change on California (and more specifically San Francisco Bay/Sacramento–San Joaquin Delta [Bay-Delta]) hydrology and water resources will remain until there is more precise and consistent information about how precipitation patterns, timing, and intensity will change (Kiparsky and Gleick 2005, DWR 2006).

Variability, Storms, and Extreme Events

Status and Trends

Variability and extreme weather events are a natural part of any climatic system. The extent of climatic stability or variability is dependent in large part on the time frame examined. Various climatic conditions may be characterized as relatively stable over periods of hundreds or thousands of years, but within that time frame there may be severe droughts or flood events that are at the extremes of the overall average condition. Paleoclimatic evidence from tree rings, buried stumps, and lakebed sediment cores suggests that in California the past 200 years have been relatively wet and relatively constant when compared with longer records (DWR 2006). These longer records reveal greater variability than the historical record, in particular in the form of severe and prolonged droughts. Most identified climatic averages and extremes for California are based on the historical climate record since 1900, which should not be considered fully representative of past or future conditions (DWR 2006).

Extreme weather events are expected to be one of the more important effects of climate change. Phenomena such as the El Niño/Southern Oscillation, which is the strongest natural interannual climate fluctuation, affect the entire global climate system and the economies and societies of many regions and nations, including California and the rest of the United States. It is unclear how increases in global average temperatures associated with global warming might affect the El Niño cycles. However, the strong El Niños of 1982-83 and 1997-98 and associated flood events, along with the more frequent occurrences of El Niños in the past few decades, have forced researchers to try to better understand how human-induced climate change may affect interannual climate variability (Trenberth and Hoar 1996, Timmermann et al. 1999).

In addition to possible long-term changes in precipitation trends, increased variability of annual precipitation is a possible outcome of climate change. Based on a statistical analysis of California precipitation records, there appears to be an upward trend in the variability of precipitation over the 20th century, with variability values at the end of the century about 75% larger than at the beginning of the century. This indicates that there tended to be more extreme wet and dry years at the end of the century than there were at the beginning of the century (DWR

2006). However, as stated above, paleoclimatic evidence suggests that weather patterns in California have been relatively constant over the last 200 years, which could make variability toward the latter part of this period appear more pronounced. As identified previously in the “Amount of Precipitation” discussion, there has been little change in the average amount of annual precipitation in California over the last 100 years. Therefore, the increased variability between wet and dry years in recent decades appears to oscillate around the same annual average established over a longer time frame.

Projections

Although variability is not well modeled in large-scale GCMs, some modeling studies suggest that the variability of the hydrologic cycle increases when mean precipitation increases, possibly accompanied by more intense local storms and changes in runoff patterns (DWR 2006). However, the results of another long-standing model point to an increase in incidents of drought, resulting from a combination of increased temperature and evaporation along with decreased precipitation (DWR 2006). Based on the first model mentioned, this decrease in precipitation would lead to reduced variability in hydrologic cycles.

A study that analyzed 20 GCMs currently in use worldwide suggests that the West Coast may be less affected by extreme droughts than other areas, instead having increased average annual rainfall (Meehl et al. 2000). A separate study that reviewed several GCM scenarios showed increased risk of large storms and flood events for California (Miller et al. 1999). Conflicting conclusions about climatic variability and the nature of extreme weather events (e.g., droughts, severe storms, or both) support the need for additional studies with models featuring higher spatial resolution (Kiparsky and Gleick 2005, DWR 2006).

Runoff

Status and Trends

Runoff is directly affected by changes in precipitation and snowpack. Changes in both the amount of runoff and the seasonality of the hydrologic cycle have the potential to greatly affect the heavily managed water systems of the western United States. Although data from 1906–2005 indicate that total annual runoff amounts have not changed for Sacramento Valley rivers, runoff volume for April–July has declined from approximately 43% of total water year runoff to approximately 34% of total water year runoff (roughly a 9% decline) (DWR 2006). These data indicate that although overall precipitation volumes (represented by runoff amounts) showed no change, more runoff occurred as a result of rain during the winter months, and less runoff could be attributed to the melting of accumulated snowpack during the spring and early summer.

These studies correct for the detention of runoff in reservoirs managed by the State Water Project (SWP), Central Valley Project (CVP), and other agencies. How reservoirs in California are managed often has a greater influence on the timing and volume of runoff entering the Delta than precipitation and snowpack. Melting snowpack that enters the Central Valley is estimated to contribute an average of about 14 million acre-feet (maf) of runoff each year. In comparison, total reservoir capacity in the Central Valley is about 24.5 maf in watersheds with significant annual accumulations of snow (DWR 2005b). Depending on reservoir release and storage regimes, a significant amount of snowpack runoff could be held in reservoirs for weeks to months before reaching Delta waterways.

Projections

Detailed estimates of changes in runoff as a result of climate change have been produced for California using regional hydrologic models. By using anticipated, hypothetical, and/or historical changes in temperature and precipitation and models that include realistic small-scale hydrology, modelers have consistently seen substantial changes in the timing and magnitude of runoff resulting from projected changes in climatic variables (Kiparsky and Gleick 2005). Model results indicate that a declining proportion of total precipitation falls as snow as temperatures rise, more winter runoff occurs, and remaining snow melts sooner and faster in spring (Miller et al. 1999, Knowles and Cayan 2002). In some basins, spring peak runoff may increase; in others, runoff volumes may shift to earlier in

the spring and winter months (Kiparsky and Gleick 2005, DWR 2006). If snowpack declines, it is also possible that the incidence or severity of flood events resulting from “rain on snow” conditions could also decline.

As indicated above, hydrology in the Bay-Delta is highly dependent on the interaction between Sierra Nevada snowpack, runoff, and management of reservoirs. Potential changes made to the amount of reservoir space retained for flood storage, retained annual carryover volumes, and other reservoir management factors in response to altered Sierra runoff patterns could substantially alter how those runoff patterns are experienced in the Delta. It is also possible that as climate change continues to progress over the next 50–100 years, new water storage projects (e.g., on-stream or off-stream storage reservoirs, expanding capacity at existing reservoirs) may be put in place to capture additional Sierra runoff. Additional storage capacity could assist in buffering runoff patterns in the Delta from altered flow regimes in higher elevations. Although changed runoff patterns related to decreasing snowpack are reasonably foreseeable, significant uncertainties remain regarding how those changes may affect flow patterns in the Delta. Runoff patterns in the Delta depend not just on how climatic conditions might change, but also on a wide range of human actions and management decisions.

Sea Level

Status and Trends

One of the major areas of concern related to global climate change is rising sea level. Worldwide average sea level appears to have risen about 0.4 to 0.7 foot over the past century based on data collected from tide gauges around the globe, coupled with satellite measurements taken over approximately the last 15 years (IPCC 2007a). Various gauge stations along the coast of California show an increase similar to the global trends. Data specific to the San Francisco tide gauge near the Golden Gate Bridge shows that the 19-year mean tide level (the mean tide level based on 19-year data sets) has increased by approximately 0.5 foot over the past 100 years. Rising average sea level over the past century has been attributed primarily to warming of the world’s oceans and the related thermal expansion of ocean waters, and the addition of water to the world’s oceans from the melting of land-based polar ice. Some researchers have attributed most of the worldwide rise to thermal expansion of water, although there is some uncertainty about the relative contributions of each cause (Munk 2002).

Projections

Various global climate change models have projected a rise in worldwide average sea level of 0.3–2.9 feet by 2100 (IPCC 2001a). Updated model results provided by the IPCC in 2007 put the range at 0.6–1.9 feet by 2099 (IPCC 2007a). The ranges are narrower than in the Third Assessment Report (IPCC 2001a) mainly because of improved information about some uncertainties in the projected contributors to sea level rise (IPCC 2007a).

Although these projections are on a global scale, the rate of relative sea level rise experienced at many locations along California’s coast is relatively consistent with the worldwide average rate of rise observed over the past century. Therefore, it is reasonable to expect that changes in worldwide average sea level through this century will also be experienced by California’s coast (DWR 2006).

With respect to Solano County, certain low-lying areas are already expected to be affected by reasonably foreseeable sea level rise. 2007 projections from the International Panel on Climate Change indicate that sea level could increase by 7–23 inches by 2100 (IPCC 2007a). Both moderate and high projections are expected to result in sea levels that will affect the Bay-Delta area by increasing the frequency, duration, and magnitude of extreme-water-level events. Extreme-water-level events are created by a combination of high tides, Pacific climate disturbances such as El Niño, low-pressure systems, and associated storm surges. Extreme-water-level events are expected to increase substantially with elevated sea levels. Given a 1-foot rise in sea level, as predicted in low-end sea level rise projections, the frequency of a 100-year event would increase tenfold. Additionally, elevated sea levels and increased extreme-water-level events may exacerbate flooding in Solano County and significantly expand the county’s floodplains.

For California's water supply, the largest effect of sea level rise would likely be in the Delta (DWR 2005). Increased intrusion of salt water from the ocean to the Delta could degrade the quality of the freshwater that is pumped out of the Delta for municipal, industrial, and agricultural purposes. This could lead to increased releases of water from upstream reservoirs or reduced pumping from the Delta to maintain compliance with Delta water quality standards. Salt water intrusion could also degrade groundwater aquifers (DWR 2006). The California Department of Water Resources (DWR) has prepared a preliminary assessment of potential sea level rise impacts on the Delta. There is no analysis tool currently available to determine changes in system operations required to lessen the effects of increased salt water intrusion caused by sea rise (DWR 2006). However, DWR utilized existing tools to quantify potential salt intrusion into the Delta for a 1-foot sea level rise with present system operations. According to DWR, the results do not include any operational changes that may be implemented to try to reduce the effects of salt water intrusion from sea level rise, and therefore the results by themselves are not sufficient for making management decisions (DWR 2006).

The base case and four climate change scenarios were evaluated by DWR using DSM2 (a one-dimensional model of flow, water levels, and conservative and nonconservative transport) to quantify effects on Delta water quality and water levels. Tidal water level fluctuations, river inflows, Delta exports, and irrigation withdrawals and return flows are all represented in DSM2. Without adjusting system operations to try to lessen the effects of sea level rise, chloride concentrations at Old River at Rock Slough were below the threshold of 250 milligrams per liter threshold about 90% of the time. In real time, operational adjustments will take place, so these effects will translate into water supply impacts on the SWP and CVP. According to DWR, these impacts cannot be quantified at this time (DWR 2006). Increased salt intrusion for the sea level rise scenarios leads to chloride concentrations that exceed the standard of 150 milligrams per liter during some critical and dry years. Chloride mass loadings at all of the urban intakes increased as a result of higher chloride concentrations (DWR 2006).

Water Supply

Status and Trends

Several recent studies have shown that existing water supply systems are sensitive to climate change (Wood 1997). Potential impacts of climate change on water supply and availability could directly and indirectly affect a wide range of institutional, economic, and societal factors (Gleick 1997). Much uncertainty remains, however, with respect to the overall impact of global climate change on future water supplies. For example, models that predict drier conditions (i.e., parallel climate model [PCM]) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions (i.e., HadCM2) project increased reservoir inflows and storage and increased river flows (Brekke 2004). Both projections are equally probable based on which model is chosen for the analyses (Brekke 2004). Much uncertainty also exists with respect to how climate change will affect future demand on water supply (DWR 2006). Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows (Kiparsky and Gleick 2005, Cayan et al. 2006a).

Little work has been performed on the effects of climate change on specific groundwater basins or groundwater recharge characteristics (Kiparsky and Gleick 2005). Changes in rainfall and changes in the timing of the groundwater recharge season would result in changes in recharge. Warmer temperatures could increase the period when water is on the ground by reducing soil freeze. Conversely, warmer temperatures could lead to higher evaporation or shorter rainfall seasons, which could mean that soil deficits would persist for longer time periods, shortening recharge seasons. Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. This additional winter runoff, however, would be occurring at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity. Reductions in spring runoff and higher evapotranspiration, on the other hand, could reduce the amount of water available for recharge. However, the specific extent to which various meteorological conditions will change and the impact of that change on groundwater are both unknown. A reduced snowpack, coupled with increased rainfall, could require a

change in the operating procedures for California's existing dams and conveyance facilities (Kiparsky and Gleick 2005).

Projections

DWR's 2006 report focused on climate change impacts on SWP and CVP operations and on the Delta. The results of that analysis suggest several climate change impacts on overall SWP and CVP operations and deliveries. In three of the four climate scenarios simulated, CVP reservoirs north of the Delta experienced shortages during droughts. DWR (2006) recommends that future studies examine operational changes that could avoid these shortages. At present, DWR concludes, it is not clear whether such operational changes would be insignificant or substantial.

Tanaka et al. (2006) explored the ability of California's water supply system to adapt to long-term climatic and demographic changes using the California Value Integrated Network (CALVIN), a statewide economic-engineering optimization model of water supply management. The results show that agricultural water users in the Central Valley are the most sensitive to climate change, particularly under the driest and warmest scenario (i.e., PCM 2100), predicting a 37% reduction of Central Valley agricultural water deliveries and a rise in Central Valley water scarcity costs by \$1.7 billion. Although the results of the study are only preliminary, they suggest that California's water supply system appears "physically capable of adapting to significant changes in climate and population, albeit at a significant cost." Such adaptation would entail changes in California's groundwater storage capacity, water transfers, and adoption of new technology.

VanRheenen et al. (2004) studied the potential effects of climate change on the hydrology and water resources of the Sacramento–San Joaquin River Basin using five PCM scenarios. The study concluded that most mitigation alternatives examined satisfied only 87% to 96% of environmental targets in the Sacramento system, and less than 80% in the San Joaquin system. Therefore, modifications and improvements to system infrastructure could be necessary to accommodate the volumetric and temporal shifts in flows predicted to occur with future climates in the Sacramento–San Joaquin River basins.

Zhu et al. (2005) studied climate warming impacts on water availability derived from modeled climate and warming streamflow estimates for six index California basins and distributed statewide temperature shift and precipitation changes for 12 climate scenarios. The index basins provide broad information for spatial estimates of the overall response of California's water supply and the potential range of impacts. The results identify a statewide trend of increased winter and spring runoff and decreased summer runoff. Approximate changes in water availability are estimated for each scenario, though without operations modeling. Even most scenarios with increased precipitation result in a decrease in available water. This result is due to the inability of current storage systems to catch increased winter streamflow to offset reduced summer runoff.

Medellin et al. (2006) used the CALVIN model under a high-emissions "worst-case" scenario, called a dry-warming scenario. The study found that climate change would reduce water deliveries by 17% in 2050. The reduction in deliveries, however, was not equally distributed between urban and agricultural areas. Agricultural areas would see their water deliveries drop by 24% while urban areas would see a reduction of only 1%. There was also a geographic difference: urban scarcity was almost absent outside of Southern California.

In 2003, CEC's Public Interest Energy Research (PIER) program established the California Climate Change Center (CCCC) to conduct climate change research relevant to the state. Executive Order S-3-05 called on the California Environmental Protection Agency (Cal/EPA) to prepare biennial science reports on the potential impact of continued climate change on certain sectors of California's economy. Cal/EPA entrusted PIER and its CCCC to lead this effort. The climate change analysis contained in its first biennial science report concluded that major changes in water management and allocation systems could be required to adapt to the change. As less winter precipitation falls as snow, and more as rain, water managers would have to balance the need to construct

reservoirs for water supply with the need to maintain reservoir storage for winter flood control. Additional storage could be developed, but at high environmental and economic costs.

Lund et al. (2003) examined the effects of a range of climate warming estimates on the long-term performance and management of California's water system. The study estimated changes in California's water availability, including effects of forecasted changes in 2100 urban and agricultural water demands using a modified version of the CALVIN model. The main conclusions are summarized as follows:

- Methodologically, it is useful and realistic to include a wide range of hydrologic effects, changes in population and water demands, and changes in system operations in climate change studies.
- A broad range of climate warming scenarios show significant increase in wet-season flows and significant decreases in spring snowmelt. The magnitude of climate change effects on water supplies is comparable to water demand increases from population growth in 21st century.
- California's water system would be able to adapt to the severe population growth and climate change modeled. This adaptation would be costly, but it would not threaten the fundamental prosperity of the state, although it could have major impacts on the agricultural sector. The water management costs represent only a small proportion of California's current economy.
- Under the driest climate warming scenarios, Central Valley agricultural users could be quite vulnerable to climate change. Wetter hydrologies could increase water availability for these users. The agricultural community would not be compensated for much of its loss under the dry scenario. The balance of climate change effects on agricultural yield and water use is unclear. Although higher temperatures could increase evapotranspiration, longer growing seasons and higher CO₂ concentrations could increase crop yield.
- Under some wet-warming climate scenarios, flooding problems could be substantial. In certain cases, major expansions of downstream floodways and alterations in floodplain land use could become desirable.
- California's water system could economically adapt to all the climate warming scenarios examined in the study. New technologies for water supply, treatment, and water use efficiency, implementation of water transfers and conjunctive use, coordinated operation of reservoirs, improved flow forecasting, and the cooperation of local, regional, state, and federal governments can help California adapt to population growth and global climate change. Even if these strategies are implemented, however, the costs of water management are expected to be high and there is likely to be less "slack" in the system than under current operations and expectations.

Water Quality

Status and Trends

Water quality depends on a wide range of interacting variables such as water temperatures, flows, runoff rates and timing, waste discharge loads, and the ability of watersheds to assimilate wastes and pollutants. The water quality of the Delta has experienced substantial adverse affects from human activities, including contaminant inputs from urban, industrial, and agricultural sources; salt water intrusion attributable to altered flow patterns; and increased temperature from removal of shading vegetation. Various water bodies in the Delta are considered impaired in their ability to provide beneficial uses (ecological habitat, recreation, irrigation, drinking water) because of the presence of a variety of pollutants and stressors. Existing water quality problems in the Delta may generally be placed in the categories of toxic materials, suspended sediments and turbidity, dissolved oxygen fluctuations and low dissolved oxygen levels, salinity, and bacteria.

Projections

Climate change could alter numerous water quality parameters in a variety of ways. Higher winter flows could reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers (DWR 2006). Increases in water flows can also decrease chemical reactions in streams and lakes, reduce the flushing time for contaminants, and increase export of pollutants to coastal areas (Jacoby 1990, Mulholland et al. 1997, Schindler 1997). Decreased flows can exacerbate temperature increases, increase the concentration of pollutants, increase flushing times, and increase salinity (Schindler 1997, Mulholland et al. 1997). Decreased surface-water flows can also reduce nonpoint-source runoff (Mulholland et al. 1997). Increased water temperatures can enhance the toxicity of metals in aquatic ecosystems (Moore et al. 1997). Increases in water temperature alone are often likely to lead to adverse changes in water quality, even in the absence of changes in precipitation (Kiparsky and Gleick 2005).

A review of potential impacts of climate change on water quality concludes that significant changes in water quality are known to occur as a direct result of short-term changes in climate (Murdoch et al. 2000). The review notes that water quality in ecological transition zones and areas of natural climate extremes is vulnerable to climate changes that increase temperatures or change the variability of precipitation. However, it is also argued that changes in land and resource use will have impacts on water quality comparable to or even greater than those from changes in temperature and precipitation. A separate study concluded that changes in land use resulting from climatic changes, together with technical and regulatory actions to protect water quality, can be critical to future water conditions (Kiparsky and Gleick 2005). The net effect on water quality for rivers, lakes, and groundwater in the future is dependent not just on how climatic conditions might change, but also on a wide range of other human actions and management decisions.

Agriculture

Status and Trends

Numerous studies indicate that climate change may have a profound effect on agriculture in California. Many of the climate change forecasting models utilized in the studies predict a variety of direct and indirect effects on the sector's agronomic and economic conditions (Tanaka et al. 2006, Howitt 2003). The degree to which climate change will affect agriculture depends on a variety of factors. Although there remains uncertainty about what form of climate change will occur in California, the majority of research on the subject has focused on the likelihood that a climate warming pattern will occur (DWR 2006, Lund 2003). Although both dry-warm or wet-warm forms of climate warming would affect California agriculture, dry-warm climate scenarios are expected to be the most problematic (Tanaka et al. 2006). Dry-warm climate scenarios are expected to affect agriculture at both statewide and regional scales, with the most pronounced effects occurring in the Central Valley (Zhu 2006).

Potential effects include reductions in water supply and water supply reliability, increased evapotranspiration, changes in growing season, and altered crop choices (DWR 2006). As discussed in the previous sections, substantial changes may occur in terms of water supply. As a primary consumer of surface water and groundwater, the agricultural sector will be faced with significant challenges in the event of supply reductions. Higher levels of evapotranspiration would result from the increased temperatures and decreased humidity of a dry-warm climate scenario (Hidalgo 2005). In turn, evapotranspiration would cause increases in water demand, salt accumulation on plants, soil salinity, and additional water use for reducing saline soils (DWR 2006). Such effects could reduce productivity and create adverse economic repercussions for farmers and ranchers in the state (DWR 2006). Changes to the growing season and altered crop choices may negatively or positively affect productivity, water supply, and profitability, depending on the adaptations farmers choose (Tanaka et al. 2006).

Projections

Tanaka et al. (2006) demonstrate that agricultural water supplies in the Central Valley are expected to be affected by climate change. In the driest-warmest climate scenario (PCM2100), Central Valley water users would be

adversely affected and agricultural water deliveries could be expected to decrease by approximately 24% and water scarcity costs would be \$1.7 billion (Tanaka et al. 2006).

A 15% increase in land fallowing is expected to occur under a dry and warm climate scenario. Land fallowing would reduce agricultural productivity and affect the agricultural economy as well as the rural support economies. Financial implications for individual farm owners would depend on whether compensation was provided for land becoming fallow (Howitt 2003, Tanaka et al. 2006).

Most year-2100 models indicate increased market water transfers from agriculture to urban users (Tanaka et al. 2006). Sector productivity could be maintained if water transfers were balanced with irrigation efficiency improvements.

Although a dry-warm climate scenario would reduce agricultural water deliveries (24% statewide), models demonstrate that agricultural income will be reduced by only 6% and irrigated lands will be reduced by only 15%. It is expected that farmers will adopt changes in crop mix, cropping systems, and irrigation technology. These adaptations are likely to reduce the effect of reduced water deliveries on agriculture (Tanaka et al. 2006).

Increased evapotranspiration rates could have a considerable effect on agricultural water demand in the state (DWR 2006). The Intergovernmental Panel on Climate Change expects a 3°C increase in temperature over the next century (IPCC 2007a). Research demonstrates that such an increase in temperature will likely result in a 5% increase in plant transpiration, assuming no change in solar radiation (cloudiness) levels and other related variables (wind, humidity, and minimum temperature) (Hidalgo 2005). Therefore, evapotranspiration alone could create a 5% increase in agricultural water consumption over the next 100 years, or a 0.5% increase per decade. Projected increases in CO₂ concentrations are expected to increase plant growth by up to 20% and in turn lead to increased evapotranspiration (Long 2004). A caveat to this is that increased atmospheric CO₂ concentrations may work to decrease plant stomatal transpiration rates and thus reduce overall evapotranspiration rates (Long 2004). More research is needed to understand this relationship.

Greenhouse Gas Emissions Sources and Inventory

California

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (CEC 2006a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CEC 2006a). Emissions of CO₂ are byproducts of fossil-fuel combustion. CH₄, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) largely associated with agricultural practices and landfills. CO₂ sinks, or reservoirs, include vegetation and the ocean, which respectively absorb CO₂ through photosynthesis and dissolution, two of the most common processes of CO₂ sequestration.

California is the 12th to 16th largest emitter of CO₂ in the world (CEC 2006a). California produced 484 million gross metric tons of CO₂ equivalent (CO₂e) in 2004. CO₂e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, depends on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the *General Reporting Protocol* of the California Climate Action Registry (CCAR) (2007), 1 ton of CH₄ has the same contribution to the greenhouse effect as approximately 23 tons of CO₂. Therefore, CH₄ is a much more potent GHG than CO₂. Expressing emissions in CO₂e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted.

Combustion of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 41% of total GHG emissions in the state (CEC 2006a). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (22%) and the industrial sector (21%) (CEC 2006a).

San Francisco Bay Area Air Basin Portion of Solano County

According to the source inventory of GHG emissions for the SFBAAB, 85.4 million tons of CO₂e were emitted in the SFBAAB in 2002 (BAAQMD 2006). With respect to GHG emissions per sector, transportation sources (e.g., fossil-fuel combustion) were associated with 50% of the total emissions, industrial/commercial 26%, domestic 11%, power plants 7%, and oil refining 6%. The portion of Solano County located in the SFBAAB constituted 3.5 million tons of CO₂e (4.1% of the SFBAAB's total GHG emissions inventory) in 2002.

Sacramento Valley Air Basin Portion of Solano County

No GHG emissions inventory has been conducted for the SVAB portion of Solano County.

6.2.2 REGULATORY BACKGROUND

GREENHOUSE GAS EMISSIONS

Federal Plans, Policies, Regulations, and Laws

As of this writing, there are no adopted federal plans, policies, regulations or laws mandating reductions in GHG emissions that cause addressing global warming. According to the U.S. Environmental Protection Agency (EPA), "the United States government has established a comprehensive policy to address climate change" that includes slowing the growth of emissions; strengthening science, technology and institutions; and enhancing international cooperation. To implement this policy, "the Federal government is using voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science." The federal government's goal is to reduce the GHG intensity (a measurement of GHG emissions per unit of economic activity) of the American economy by 18% over the 10-year period from 2002 to 2012. In addition, EPA administers multiple programs that encourage voluntary GHG reductions, including ENERGY STAR, Climate Leaders, and Methane Voluntary Programs (EPA 2007).

With respect to GHGs, the U.S. Supreme Court ruled on April 2, 2007, that CO₂ is an air pollutant as defined under the Clean Air Act (CAA), and that EPA has the authority to regulate emissions of GHGs.

State Plans, Policies, Regulations, and Laws

Various statewide and local initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is under way, and that there is a real potential for severe adverse environmental, social, and economic effects in the long term. Because every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Relevant Statutes

Senate Bill 1771 (2000)—California Climate Action Registry

The CCAR was established in 2000 by Senate Bill (SB) 1771 (Chapter 1018, Statutes of 2000) and modified in 2001 by SB 527 (Chapter 769, Statutes of 2001) as a nonprofit voluntary registry for GHG emissions. (SB 1771 enacted Sections 42800–42870 of the California Health and Safety Code and Public Resources Code Section 25730; SB 527 amended Sections 42810, 42821–42824, 42840–42843, 42860, and 42870 of the Health and Safety Code.) The purpose of the CCAR is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emissions reduction requirements may be applied. The CCAR has developed a general protocol and additional industry-specific protocols that provide guidance on how to inventory GHG emissions for participation in the registry.

Assembly Bill 1493 (2002)

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493 (Chapter 200, Statutes of 2002), which amended Section 42823 of the California Health and Safety Code and added Section 43018.5 to the code. AB 1493 required that the California Air Resources Board (ARB) develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California’s existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (i.e., 13 CCR Sections 1900 and 1961), and adoption of Section 1961.1 (13 CCR Section 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds [lb] that is designed primarily for the transportation of persons), beginning with the 2009 model year. Emissions limits are reduced further in each model year through 2016. Emissions requirements adopted as part of 13 CCR Section 1961.1 are shown in Table 6-2. For passenger cars and light-duty trucks with a loaded-vehicle weight (LVW) of 3,750 lb or less, the GHG emission limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with a LVW of 3,751 lb to a gross vehicle weight of 8,500 lb, as well as medium-duty passenger vehicles, GHG emissions are reduced approximately 24% between 2009 and 2016.

Vehicle Model Year	Fleet-Average Greenhouse Gas Emissions (CO ₂ e in grams per mile)	
	Passenger Cars and Light-Duty Trucks (0–3,750 lb LVW)	Medium-Duty Passenger Vehicles and Light-Duty Trucks (3,751 lb LVW to 8,500 lb GVW) ²
2009	323	439
2010	301	420
2011	267	390
2012	233	361
2013	227	355
2014	222	350
2015	213	341
2016	205	332

Notes:
CO₂e = carbon dioxide equivalent; GVW = gross vehicle weight; lb = pounds; LVW = loaded-vehicle weight

Table 6-2 Limits on Fleet-Average Greenhouse Gas Exhaust Emissions ¹		
Vehicle Model Year	Fleet-Average Greenhouse Gas Emissions (CO ₂ e in grams per mile)	
	Passenger Cars and Light-Duty Trucks (0–3,750 lb LVW)	Medium-Duty Passenger Vehicles and Light-Duty Trucks (3,751 lb LVW to 8,500 lb GVW) ²
¹ Refers to limits included in Title 13, Section 1961.1 of the California Code of Regulations (i.e., 13 CCR Section 1961.1). ² Specific characteristics of passenger cars, light-duty trucks, and medium-duty passenger vehicles are provided in 13 CCR Section 1900, as amended to comply with Assembly Bill 1493 (Chapter 200, Statutes of 2002). Source: Title 13, Section 1961.1 of the California Code of Regulations		

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep, Inc., et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Officer of the California Air Resources Board, et al.* [456 F. Supp. 2d 1150, 1172 (E.D. Cal. 2006)]. The suit in the U.S. District Court for the Eastern District of California contended that California’s implementation of regulations that in effect regulate vehicle fuel economy violates various federal laws, regulations, and policies.

In January 2007, the judge hearing the case accepted a request from the California Attorney General’s office that the trial be postponed until a decision is reached by the U.S. Supreme Court on a separate case addressing GHGs. In the Supreme Court case, *Massachusetts, et al., v. Environmental Protection Agency, et al.*, the primary issue in question was whether the CAA provides authority for EPA to regulate CO₂ emissions. EPA contended that the CAA does not authorize regulation of CO₂ emissions, whereas Massachusetts and 10 other states, including California, sued EPA to begin regulating CO₂. As mentioned above, the U.S. Supreme Court ruled on April 2, 2007, that GHGs are “air pollutants” as defined under the CAA and that EPA is granted authority to regulate CO₂ (*Massachusetts v. U.S. Environmental Protection Agency* [2007] 549 U.S. 05-1120).

On December 12, 2007, the U.S. District Court rejected the automakers’ claim and ruled that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), these regulations would not be consistent with federal law. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209(b) waiver in 2005. Since that time, EPA has failed to act in granting California authorization to implement the standards. Governor Arnold Schwarzenegger and Attorney General Edmund G. Brown Jr. filed suit against EPA for the delay. EPA denied California’s request for the waiver to implement AB 1493 in late December 2007. The State of California has filed suit against EPA for its decision to deny the CAA waiver.

Assembly Bill 32 (2006), California Climate Solutions Act

In September 2006, Governor Schwarzenegger signed AB 32 (Chapter 488, Statutes of 2006), the California Climate Solutions Act of 2006, which enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires reduction of statewide GHG emissions to 1990 levels by 2020 (an approximately 25% reduction in existing statewide GHG emissions). This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control GHG emissions from vehicles under the authorization of AB 32.

AB 32 requires ARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 107 (2006)

SB 107 (Chapter 464, Statutes of 2006) requires investor-owned utilities in the state such as Pacific Gas and Electric Company to increase their total procurement of eligible renewable energy resources by at least an additional 1% of retail sales per year so that 20% of retail electricity sales come from renewable-energy sources by December 31, 2010. Previously, state law required achievement of this 20% requirement by 2017.

Senate Bill 1368 (2006)

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a GHG emission performance standard for base-load generation from investor-owned utilities by February 1, 2007. Similarly, the California Energy Commission (CEC) was tasked with establishing a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a base-load, combined-cycle natural-gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, be generated from plants that meet the standards set by CPUC and CEC. In January 2007, CPUC adopted an interim GHG Emissions Performance Standard, which requires that all new long-term commitments for base-load generation entered into by investor-owned utilities have emissions no greater than a combined-cycle gas turbine plant (i.e., 1,100 lb of CO₂ per megawatt-hour). A “new long-term commitment” refers to new plant investments (new construction), new or renewal contracts with a term of 5 years or more, or major investments by the utility in its existing base-load power plants. In May 2007, CEC approved regulations that prohibit the state’s publicly owned utilities from entering into long-term financial commitments with plants that exceed the standard adopted by CPUC of 1,100 lb of CO₂ per megawatt-hour.

Senate Bill 1505 (2006)

SB 1505 (Chapter 877, Statutes of 2006) establishes environmental performance standards for the production and use of hydrogen fuel for transportation purposes in the state. In general, SB 1505 specifically requires the following:

- ▶ Hydrogen-fueled vehicles must reduce GHG emissions by at least 30% compared to emissions from new gasoline vehicles.
- ▶ At least one-third of the hydrogen produced or dispensed for transportation purposes in the state must be made from renewable sources of electricity.
- ▶ Well-to-tank emissions of smog-forming pollutants from hydrogen fuel dispensed in the state must be reduced by at least 50% when compared to gasoline.
- ▶ Emissions of toxic contaminants must be reduced to the maximum extent feasible compared to gasoline on a site-specific basis.

Senate Bill 97 (2007)

SB 97, signed in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the Governor’s Office of Planning and Research to prepare, develop, and transmit to the

California Resources Agency by July 1, 2009, guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA. The California Resources Agency is required to certify and adopt those guidelines by January 1, 2010. This bill also removes, both retroactively and prospectively, as legitimate causes of action in litigation any claim of inadequate CEQA analysis of effects of GHG emissions associated with environmental review for projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 (Proposition 1B) or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E). This provision will be repealed by operation of law on January 1, 2010; at that time such projects, if any remain unapproved, will no longer enjoy protection against litigation claims based on failure to adequately address issues related to climate change. This bill would protect only a handful of public agencies from CEQA challenges on certain types of projects for a few years' time.

Executive Orders

Executive Order S-20-04 (2004)—The California Green Building Initiative

Governor Schwarzenegger signed Executive Order S-20-04, the California Green Building Initiative, on December 14, 2004, establishing the state's priority for energy and resource-efficient high-performance buildings. The executive order sets a goal of reducing energy use in state-owned and private commercial buildings by 20% in 2015, using nonresidential Title 20 and Title 24 standards adopted in 2003 as the baseline. The California Green Building Initiative also encourages retrofitting, construction, and operation of private commercial buildings in compliance with the state's Green Building Action Plan.

Executive Order S-3-05 (2005)

Executive Order S-3-05, which was signed by Governor Schwarzenegger on June 1, 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for total GHG emissions. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The executive order directed the secretary of the California Environmental Protection Agency to coordinate a multiagency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and legislature describing progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the Secretary of the California Environmental Protection Agency created the California Climate Action Team, made up of members of various state agencies and commissions. The California Climate Action Team released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses and actions by local governments and communities, as well as through state incentive and regulatory programs.

California Solar Initiative

As part of the California Solar Initiative, the state has set a goal to create 3,000 megawatts of new solar-produced electricity by 2017 through the provision of approximately \$3.3 billion in incentives to existing residential customers and all nonresidential customers by CPUC and to new residential customers by CEC.

Regional and Local Plans, Policies, Regulations, and Ordinances

There are currently no regional or local policies, regulations, or laws specifically pertaining to GHG emissions.

It is worth noting that the Bay Area Air Quality Management District (BAAQMD), which has purview over air quality considerations in the western portion of Solano County, has established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the Bay Area. Measures to

promote energy efficiency, reduce vehicle miles traveled (VMT), and develop alternative sources of energy can reduce emissions of GHGs and also reduce air pollutants affecting the health of Bay Area residents. BAAQMD seeks to support current climate protection programs in the region and stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders (BAAQMD 2008).

6.2.3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

METHODOLOGY

There is no available adopted or widely accepted methodology for evaluating GHG emissions from new development. In the case of the 2008 Draft General Plan, CO₂ emissions associated construction and operations were modeled using URBEMIS 2007, Version 9.2.4. CO₂ emissions were used as a proxy for all GHG emissions associated with the 2008 Draft General Plan.

CO₂ emissions associated with VMT are the best indicator of GHGs associated with a land development project. However, it is important to note that other GHGs have a higher GWP than CO₂. For example, 1 lb of CH₄ associated with off-site waste disposal or wastewater treatment processes consistent with the 2008 Draft General Plan has an equivalent GWP of 23 lb of CO₂ (CCAR 2007). In other words, as a GHG, methane is 23 times as efficient as CO₂. Nonetheless, emissions of other GHGs would be low relative to CO₂ emissions. It is important to note that CO₂ emissions consistent with buildout of the 2008 Draft General Plan may not necessarily be considered “new” emissions, given that the plan itself does not create “new” emitters (people) of GHGs. In other words, the 2008 Draft General Plan does not create people, but facilitates their movement from one location to another. Therefore, the 2008 Draft General Plan would need to accommodate population in a way that allows for a lower rate of GHG generation to achieve the state’s goals for greenhouse gas emissions, as described in the California Climate Solutions Act of 2006. The required rates are described below.

THRESHOLDS OF SIGNIFICANCE

An impact related to global climate change is considered significant if the proposed project would:

- ▶ conflict with or obstruct state or local policies or ordinances established for the purpose of reducing GHG emissions,
- ▶ result in a considerable net increase in GHGs, or
- ▶ cumulatively increase the potential for adverse environmental effects associated with global climate change on natural resources.

With regard to emissions of GHGs, no air district in California, including BAAQMD or the Yolo/Solano Air Quality Management District, had identified a significance threshold for analyzing project-generated emissions or a methodology for analyzing air quality impacts related to global warming as of the writing of this document. However, by adopting AB 32, the California Legislature has indicated that global climate change is a serious environmental issue and has identified GHG reduction goals.

To meet the goals of AB 32, California would need to generate fewer GHGs than current levels. It is recognized, however, that for most development projects there is no simple metric available to determine whether the individual project would substantially increase or decrease overall emission levels of GHGs.

Although AB 32 focuses on stationary sources of emissions, the primary objective of AB 32 is to reduce California’s contribution to global warming by reducing California’s total annual production emissions. The

impact that emissions of GHGs have on global climate change does not depend on whether they were generated by stationary, mobile, or area sources or whether they were generated in one region or another.

Emissions of GHGs are dispersed worldwide throughout the atmosphere, and the effects of climate change are borne globally, unlike emissions of criteria air pollutants, which have regional and/or local impacts on air quality. The extent to which emissions of GHGs attributable to the 2008 Draft General Plan can be treated as “a net increase” is uncertain. For example, if a proposed dwelling unit in Solano County becomes occupied by a family that relocates from the city of Berkeley, and the residents’ employers remain located in Berkeley, it is probable that a net increase in GHGs could be attributed to this family’s decision to move to the county. Alternatively, if a proposed dwelling unit becomes occupied by a family moving to California from Wyoming (CO₂ emissions per capita are approximately 138 tons per year [TPY] per person in Wyoming compared to approximately 12 TPY per person in California [CEC 2006b]), it is likely that this household would experience a net decrease in emissions of GHGs.

The legislation dealing with climate change in California (as well as international treaties and agreements on the subject) identifies goals for the rate of emissions of GHGs, relative to specific benchmark years. In the case of California, AB 32 requires 1990 GHG emission levels to be achieved by the year 2020, or about a 25% reduction from current emissions levels (ARB 2006). Neither state legislation nor executive order suggests that California intends to limit population growth to reduce the state’s GHG emission levels. Therefore, the intent is to accommodate population growth in California, but achieve a lower rate of GHGs despite this larger population.

The current statewide average per-capita rate of GHGs (12 TPY of CO₂ per person per year in California) would need to be reduced substantially to comply with the targets established by AB 32. Generally, the level of mass emissions of GHGs generated by any single project is nominal when compared to the global inventory, or even the state inventory of emissions of GHGs. If a project would be very large and would have a comparatively high magnitude of associated emissions of GHGs emissions by mass, but would generate a low per-capita rate, the project would help California achieve its GHG emission reduction goals. On the other hand, many small projects that exceed 1990 per-capita GHG emissions rates would collectively impede California’s efforts to address climate change. To reiterate, plans and projects that substantially reduce VMT per population or per employment compared to current normalized levels would assist the state in meeting its legislative mandates, while projects and plans that continue current GHG emissions rates would inhibit state mandates. Please refer to the impact analysis presented below for more information.

IMPACT ANALYSIS

IMPACT 6.2-1a **Increases in Greenhouse Gas Emissions – Preferred Plan.** *Per-capita rates of CO₂ emissions would not meet the levels required to meet the goals of AB 32 (9 TPY per capita). Emissions would increase considerably compared with existing levels. This impact would be significant.*

Effects of the 2008 Draft General Plan on Greenhouse Gas Emissions

Long-term growth anticipated under the 2008 Draft General Plan would generate emissions of GHGs from area and mobile sources.

Mobile-source emissions of GHGs would include vehicle trips associated with employee commutes, errands, recreation, and other trips in passenger vehicles of future residents of and visitors to the county. Such emissions would also include commercial trucking activity associated with moving goods to and from proposed commercial and industrial uses.

Area-source emissions would be associated with activities such as landscaping and maintenance of proposed land uses, distribution of natural gas to heat homes and water, and waste disposal. Increases in stationary-source emissions could occur at off-site utility providers that would supply energy to the proposed uses within the county.

GHG emissions would be predominantly in the form of CO₂. CO₂ emissions persist in the atmosphere for a much longer period of time than emissions of criteria air pollutants such as ozone and particulate matter less than or equal to 10 microns in diameter. Although emissions of other GHGs, such as methane (CH₄), are important with respect to global climate change, emissions levels of other GHGs are less dependent on the land use and circulation patterns associated with the 2008 Draft General Plan than are levels of CO₂.

Because the 2008 Draft General Plan mostly addresses physical development patterns throughout the county, mobile sources (vehicle trips) would be the primary source of GHG emissions associated with the plan. Transportation is also the largest source of GHG emissions in California, representing approximately 60% of annual CO₂ emissions generated in the state (CEC 2006b).

VMT is the most direct indicator of CO₂ emissions for most land use plans and development projects, and the 2008 Draft General Plan is no exception. CO₂ emissions are the best indicator of total GHG emissions. Buildout of the 2008 Draft General Plan is estimated to add approximately 952,000 new vehicle trips per day to the county, and such trips would be the primary source of GHG emissions associated with plan implementation.

Implementation of the 2008 Draft General Plan would generate 321,083 tons (0.3 megaton [Mt]) of CO₂ emissions annually for the lifetime of the plan (Table 6-3). New growth anticipated under the 2008 Draft General Plan would generate a finite quantity of approximately 652,460 tons (0.7 Mt) of CO₂ for the duration of construction activities (Table 6-3). Construction activities consistent with the 2008 Draft General Plan would contribute emissions of GHGs to a much lesser extent than operational activities under the plan.

Table 6-3 Summary of Modeled Project-Generated, Construction- and Operation-Related Emissions of Greenhouse Gases (Carbon Dioxide)	
Source	Emissions (CO ₂) ¹
Construction-Related Emissions (to occur over a 20-year buildout period)	32,623 TPY
Total Unmitigated	652,460 tons
2030—Buildout of the 2008 Draft General Plan (to occur over lifetime of the plan)	
Area Source ²	53,556 TPY
Mobile Source ³	267,526 TPY
Total Unmitigated	321,083 TPY
Notes: CO ₂ = carbon dioxide; TPY = tons per year ¹ Emissions modeled using the URBEMIS 2007 (Version 9.2.4) computer model, based on trip generation rates obtained from the analysis prepared for the 2008 Draft General Plan; proposed land uses identified in Chapter 3, "Project Description," and Section 4.4, "Transportation and Circulation," of this EIR; recommendations from the Bay Area Air Quality Management District and Yolo/Solano Air Quality Management District for URBEMIS model inputs; and default model assumptions where detailed information was not available. ² For this estimate, default model assumptions were used for the number of residences that would contain hearth features. ³ Trip generation rates were obtained from the traffic analysis for the respective land uses (data provided by DKS Associates in 2008). Refer to Appendix F for detailed assumptions and modeling output files. Source: Data modeled by EDAW in 2008	

The 2008 Draft General Plan would enable Solano County to accommodate 19,467 new residents in unincorporated areas. If the operational CO₂ emissions were distributed evenly on a per-capita basis, the proposed new population of Solano County would generate CO₂ at an average rate of approximately 16.5 tons of CO₂ per person per year. As explained further below, the land use designations and policies in the 2008 Draft General Plan would accommodate a larger share of nonvehicular trips for future and existing residents of the county. Various land use, community design, air quality, and circulation policies noted below would reduce per-capita GHG contributions. The precise effect of these policies was unknown as of the writing of this document.

According to the California Energy Commission's *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*, the statewide average CO₂ emissions associated with combustion of fossil fuels are approximately 12 tons of CO₂ per person per year (CEC 2006a). To achieve the goal stated in AB 32 of 1990 emission levels by the year 2020 while accounting for population growth between now and 2020, Californians would need to reduce emissions by about 25%. In other words, the per-capita rate of emissions needed to be consistent with AB 32 goals is approximately 9 tons of CO₂ per person per year. Therefore, the average GHG emissions rate for Solano County residents with implementation of the 2008 Draft General Plan is anticipated to be nearly double AB 32 goals.

Stationary- and Mobile-Source Measures and Regulations

Although transportation is the most important source of GHG emissions in California, emissions from other sectors (e.g., energy, industry, agriculture) should not be entirely overlooked. Stationary- and mobile-source measures and regulations on the horizon would assist in further lowering GHG emissions under the 2008 Draft General Plan. It is not known at this time what reductions are achievable from other emission sources through state regulatory measures such as the AB 32 Early Action Measures (adopted in July 2007). Also not known at this time is whether additional GHG reductions for mobile sources might be available through legislation such as AB 1493, which would create more stringent vehicle emission standards for GHGs. It is not yet clear what the net GHG emissions would actually be under the buildout scenario of the 2008 Draft General Plan, given the uncertainty of future legislative and regulatory actions. Finally, market factors could affect the density of land uses actually constructed under the buildout scenario, which are unknown at this time. Therefore, actual CO₂ emission rates as computed on a project-by-project basis could vary. Many factors that would be used to calculate the net change in GHG emissions attributable to individual projects within the 2008 Draft General Plan are either unknown at this time or outside the control of the County.

Relevant Goals, Policies, and Programs of the 2008 Draft General Plan

The 2008 Draft General Plan includes a variety of goals, policies, and implementation programs aimed at addressing the threat of climate change. Table 6-4 summarizes the climate change related policies and programs contained in the 2008 Draft General Plan. The table categorizes the policies and programs by topic area. Full text of these policies and programs is provided following the table.

Issues	Topic	Policies or Programs
Community Form	Compact development	LU.P-1
		LU.I-13
		PF.P-6
		PF.P-7
	Commercial use locations	LU.P-19
		ED.P-3
		ED.I-1
	Industrial use locations	LU.P-24
		LU.P-25
		ED.P-3
		ED.I-1
	Live-work uses	LU.P-37
	Access to employment centers	TC.P-2
	Floodplain and open space management	HS.P-9
HS.P-10		
HS.I-3		
HS.I-7		

**Table 6-4
Climate Change–Related Policies and Programs**

Issues	Topic	Policies or Programs
Community Form (cont'd)	Wildfire safety	HS.P-20
		HS.P-22
		HS.P-23
		HS.I-26
	Satellite office centers	ED.P-14
County Operations	Economic adaptation to climate change	ED.P-15
	Solano County as model	RS.P-50
	Alternative fuel County vehicles	RS.I-42
Ecosystems	Wildlife migration	TC.I-1
		SS.P-3
		RS.P-5
	Habitat management	RS.I-9
		RS.P-2
	Tree protection and planting	RS.P-12
		RS.P-6
		RS.I-3
		RS.I-5
		RS.I-8
Energy Efficiency	Energy efficient technology	RS.P-48
Green Building	Exceed Title 24 requirements	RS.I-38
	LEED certification standards	RS.I-49
	Public education	RS.I-50
	Energy efficient appliances	RS.I-45
	Construction materials	RS.I-46
	Efficient infrastructure systems	PF.P-3
	Renewable Energy	Incentives and requirements
RS.P-52		
RS.I-44		
Reduced fossil fuel reliance		RS.P-53
Public education		RS.P-55
Municipal use		RS.I-40
Solar streetlights		RS.I-53
Protecting renewable resources		RS.I-54
Transit		Adequate transit to employment centers
	Systems along major corridors	TC.P-14
	Expanded passenger rail service	TC.P-16
		TC.I-19
		TC.I-12
		TC.I-13
	Non-motorized transportation	TC.P-24
		TC.P-26
		TC.I-17
		TC.I-18
		TC.I-19
Transit-supporting facilities	TC.I-9	
	TC.I-10	
Transportation	Shorten travel distances	TC.P-3
	Technical solutions	TC.P-6
	Roadway maintenance and design	TC.P-12

Table 6-4 Climate Change–Related Policies and Programs		
Issues	Topic	Policies or Programs
Agricultural Practices	Incentives and BMPs to improve habitat and air quality	AG.P-19
		AG.I-20
	Health and safety	HS.P-45
		HS.I-64
	Carbon sequestration and sustainable farming methods	AG.P-21
Air Quality	Off-road vehicles	RS.I-47
	Reduce vehicle emissions	HS.P-43
		HS.I-54
	GHG emission reduction strategies	HS.P-47
		HS.I-58
		HS.I-59
		HS.I-60
Climate action plan	HS.I-73	
Water Management	Water use efficiency and reduced consumption	PF.P-10
		PF.P-11
		PF.P-20
		PF.I-14
		PF.I-15
		PF.I-16
		PF.I-8
Waste Reduction	Waste management and recycling	PF.P-27
		PF.I-26
		PF.I-27
	Solid waste reuse	PF.P-28
Adaptation to Climate Change	Sea level rise	HS.I-1
	Climate change adaptation	HS.I-53
Notes: BMP = best management practice; GHG = greenhouse gas		
Source: Data compiled by EDAW in 2008		

Land Use Chapter

- ▶ **Policy LU.P-1:** Collaborate with cities to guide development to the county’s urban centers and promote sustainable development patterns.
- ▶ **Policy LU.P-19:** Locate commercial development in locations that provide maximum access to the primary consumers of such services and where necessary services and facilities can be provided.
- ▶ **Policy LU.P-24:** Encourage the location of industrial development in cities that have available labor and necessary facilities and services to support industry.
- ▶ **Policy LU.P-25:** Promote industrial development in the unincorporated county in cases where locating such development near urban areas is not appropriate because of the potential for air pollution, odors, or noise; because such development is related to agriculture; or because the development has other specific unique site requirements that are not feasible or available in cities.
- ▶ **Policy LU.P-37:** Promote live-work uses for professionals, artists, craftspeople and other low impact employment opportunities in Traditional Community areas as long as such uses are compatible with existing community character.

Agriculture Chapter

- ▶ **Policy AG.P-19:** Require agricultural practices to be conducted in a manner that minimizes harmful effects on soils, air and water quality, and marsh and wildlife habitat.
- ▶ **Policy AG.P-21:** Promote natural carbon sequestration to offset carbon emissions by supporting sustainable farming methods (such as no-till farming, crop rotation, cover cropping, and residue farming), encouraging the use of appropriate vegetation within urban-agricultural buffer areas, and protecting grasslands from conversion to non-agricultural uses.
- ▶ **Program AG.I-22:** Promote sustainable agricultural activities and practices that support and enhance the natural environment. These activities should minimize impacts on soil quality and erosion potential, water quantity and quality, energy use, air quality, and natural habitats. Sustainable agricultural practices should be addressed in the County's proposed Climate Action Plan to address climate change effects.

Resources Chapter

- ▶ **Policy RS.P-48:** Ensure energy conservation and reduced energy demand in the county through required use of energy-efficient technology and practices.
- ▶ **Policy RS.P-49:** Provide incentives for city and county residents and businesses to produce and use renewable sources of energy.
- ▶ **Policy RS.P-50:** Promote Solano County as a model for energy efficiency and green building.
- ▶ **Policy RS.P-52:** Enable renewable energy sources to be produced from resources available in Solano County, such as solar, water, wind, and biofuels to reduce the reliance on energy resources from outside the county.
- ▶ **Policy RS.P-53:** Reduce Solano County's reliance on fossil fuels for private transportation and energy production.
- ▶ **Policy RS.P-55:** Provide information, marketing, training, and education to support reduced energy consumption, the use of alternative and renewable energy sources, and green building practices.
- ▶ **Program RS.I-8:** Require the planting of shade and roadside trees in development projects for aesthetic, air quality, and other associated benefits. Encourage the use of native tree species, especially native oaks. Create development standards to ensure appropriate placement, care, and maintenance.
- ▶ **Program RS.I-38:** Develop and implement financially and technically feasible green building standards, including standards that exceed Title 24 state energy-efficiency requirements for residential and commercial buildings by at least 20 percent, and comply with the guidelines for the California Energy Star Homes Program. Adopt energy efficiency standards for new and remodeled residential, commercial, and industrial buildings that exceed the state's minimum standards, including requiring all new commercial, industrial and institutional buildings to use energy-efficient lighting that reduces electricity use by 20% more than Title 24 requirements.
- ▶ **Program RS.I-40:** Require all County operations to use renewable energy for 50% or more of their energy needs.
- ▶ **Program RS.I-42:** Replace existing County vehicles with alternative fuel vehicles such as electric, hybrids, natural gas, and fuel cell powered vehicles. New County vehicles must be alternative fuel vehicles.

- ▶ **Program RS.I-44:** Require residential development of more than six units to participate in the California Energy Commission’s New Solar Homes Partnership. Require new construction or major renovation of commercial and industrial buildings over 10,000 square feet in size to incorporate renewable energy generation to provide the maximum feasible amount of the project’s energy needs.
- ▶ **Program RS.I-45:** Require all new residences to use energy star rated appliances and the most energy-efficient water heaters and air conditioning systems that are feasible.
- ▶ **Program RS.I-46:** Require all commercial, institutional, and industrial development to reduce potential urban heat island effect by using US EPA - Energy Star rated roofing materials and light colored paint, light colored paving materials for internal roads and parking, and use shade trees to shade south and west sides of new or renovated buildings and to achieve a minimum of 50% shading for all parking lots surfaces. Amend the County zoning ordinance to encompass these requirements.
- ▶ **Program RS.I-47:** Require all off-road diesel powered vehicles used for construction to be newer model, low-emission vehicles, or use retrofit emission control devices, such as diesel oxidation catalyst and diesel particulate filters verified by the California Air Resources Board.
- ▶ **Program RS.I-49:** Promote green building by adopting and supporting LEED principles in construction of public and private buildings and providing incentives for private property owners seeking LEED certification. Require all new and remodeled commercial and office buildings located outside city MSAs over 10,000 square feet in size to meet LEED certification standards. Defer to City building and energy efficiency standards for areas located within city MSAs. Amend the County zoning ordinance to encompass these green building requirements.
- ▶ **Program RS.I-50:** Require the use of landscaping and site design techniques in development projects that minimize energy use. This may include designing landscaping to shield or expose structures to maximize energy conservation or acquisition and taking advantage of orientation, sun-shade patterns, prevailing winds, landscaping, and sunscreens.
- ▶ **Program RS.I-53:** Investigate the feasibility of using solar (photovoltaic) streetlights instead of conventional streetlights.
- ▶ **Program RS.I-54:** Protect the viability of renewable energy generation within the county by protecting resources such as solar access on buildings and high value wind energy sites. Facilitate the development of renewable energy generation in the county through the provision of streamlined permitting processes.

Health and Safety Chapter

- ▶ **Policy HS.P-20:** Require that structures be built in fire defensible spaces and minimize the construction of public facilities in areas of high or very high wildfire risk.
- ▶ **Policy HS.P-22:** Require new developments in areas of high and very high wildfire risk to incorporate fire-safe building methods and site planning techniques into the development.
- ▶ **Policy HS.P-23:** Work with fire districts or other agencies and property owners to coordinate efforts to prevent wildfires and grassfires through fire protection measures such as consolidation of efforts to abate fuel buildup, access to firefighting equipment, and provision of water service.
- ▶ **Policy HS.P-43:** Promote the establishment of farmer’s markets using locally grown produce. Revise the County zoning ordinance to allow licensed farmer’s markets in unincorporated locations and fruit stands in agricultural areas. Remove barriers to siting of farmer’s markets.

- ▶ **Policy HS.P-45:** Promote consistency and cooperation in air quality planning efforts.
- ▶ **Policy HS.P-47:** Promote GHG emission reductions by supporting carbon-efficient farming methods (e.g. methane capture systems, no-till farming, crop rotation, cover cropping, residue farming); installation of renewable energy technologies; protection of grasslands, open space, and farmlands from conversion to other uses; and encouraging development of energy-efficient structures.
- ▶ **Program HS.I-3:** Revise the County zoning ordinance to:
 - limit activities that contribute to increased rates of surface water runoff, such as overgrazing by livestock, clearing, and burning, which can reduce natural vegetative cover;
 - promote recreational, open space, and agricultural uses of upstream watershed areas, where appropriate;
 - limit the construction of extensive impermeable surfaces and promote the use of permeable materials for surfaces such as driveways, streets, parking lots, and sidewalks;
 - require development in upstream watershed areas to follow best management practices for stormwater management, including on-site detention and retention basins, appropriate landscaping, and minimal use of impervious surfaces; and
 - designate resource areas for preservation, including agriculture, wetlands, floodplains, recharge areas, riparian zones, open space, and native habitats.
- ▶ **Program HS.I-54:** Consider a trip reduction ordinance and incentives to encourage employers to increase telecommuting, provide bicycle facilities, and access to public transit for employees, including County employees.
- ▶ **Program HS.I-56:** Develop a greenhouse gas emissions inventory according to the most recently established methodologies of the California Climate Action Registry or California Air Resources Board. [Note: At the time of writing, the most recently established methodology was the CCAR's *General Reporting Protocol*, Version 2.2 (CCAR 2007).]
- ▶ **Program HS.I-57:** Develop a GHG emission reduction plan for Solano County and explore membership in the California Climate Action Registry.
- ▶ **Program HS.I-58:** Comply with all federal and/or state GHG emission reduction targets to reduce the County's contribution to global climate change. The plan should include strategies to reduce vehicle miles traveled, energy consumption, and other sources of GHGs within the county. This should be done in conjunction with the County's Climate Action Plan found in HS.I-73.
- ▶ **Program HS.I-59:** Encourage agricultural best management practices regarding herbicide and pesticide use, odor control, fugitive dust control, and agricultural equipment emissions to minimize air quality impacts.
- ▶ **Program HS.I-60:** Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.
- ▶ **Program HS.I-64:** Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.

Economic Development Chapter

- ▶ **Policy ED.P-3:** Work with cities and regional agencies to locate new commercial and industrial development on appropriate sites based on considerations of efficiency, circulation, compatibility with nearby uses, availability of services, safety, impact on habitat resources, and proximity to residents and workers.
- ▶ **Policy ED.P-14:** Encourage businesses in the Bay Area and Sacramento region to establish satellite work centers near housing concentrations in cities to enable employees of out of county companies to reduce their commutes.
- ▶ **Program ED.I-1:** Identify locations within the county where commercial and/or industrial development is desirable and appropriate. Collaborate with cities and update public works programs to ensure that infrastructure improvements required for desired commercial or industrial development are feasible. Use cost-benefit analyses to determine feasibility.

Transportation and Circulation Chapter

- ▶ **Goal TC.G-3:** Encourage land use patterns which maximize mobility options for commuting and other types of trips, and minimize traffic congestion and carbon footprints.
- ▶ **Goal TC.G-4:** Promote alternative forms of transportation such as walking and bicycling to encourage these modes when making short-distance trips, and when pursuing recreational opportunities.
- ▶ **Policy TC.P-2:** Together with other agencies and cities, continue to plan land uses and transportation systems that concentrate major employment and activity centers near major circulation systems and in proximity to residential areas.
- ▶ **Policy TC.P-3:** Establish land use patterns to facilitate shorter travel distances and non-auto modes of travel.
- ▶ **Policy TC.P-6:** Participate in transportation programs that promote technological solutions resulting in more efficient use of energy resources, reduced greenhouse gas emissions and noise, and improved air quality.
- ▶ **Policy TC.P-12:** Maintain and improve the design of the current roadway system to serve areas where growth is desired and anticipated as identified in the General Plan land use diagram, while minimizing conversion of agricultural and open space areas.
- ▶ **Policy TC.P-14:** Encourage the development of transit facilities and operations along major corridors to connect the county with surrounding activity centers and regional destinations.
- ▶ **Policy TC.P-16:** Ensure that major retail centers and commercial and industrial centers with high levels of employment are served with adequate public transportation opportunities.
- ▶ **Policy TC.P-17:** Ensure that major retail centers and commercial and industrial centers with high levels of employment are served with adequate public transportation opportunities.
- ▶ **Policy TC.P-18:** Encourage the expansion of Capitol Corridor passenger rail service through additional trains, new stations, and faster speeds to connect the county with other Bay Area and Sacramento area communities.
- ▶ **Policy TC.P-24:** In collaboration with other agencies and cities, continue to plan, design, and create additional bikeways and bikeway connections to provide intercity and intercounty access and incorporate system needs when approving adjacent developments.

- ▶ **Policy TC.P-26:** Promote consistency and cooperation in air quality planning efforts.
- ▶ **Program TC.I-1:** Support proposals by County departments and agencies to sponsor alternative-fuel vehicles.
- ▶ **Program TC.I-9:** Support development of transit facilities in strategic locations such as at interchanges and in areas of concentrated activity.
- ▶ **Program TC.I-10:** Respond to transit operators' efforts when they propose changes to bus stop locations to improve rider safety or convenience, or to improve bus travel speeds or to improve paratransit services.
- ▶ **Program TC.I-12:** Support responsible improvements to track capacity so that both passenger and freight rail, including transportation of hazardous materials. can be operated without delays through Solano County.
- ▶ **Program TC.I-13:** Support continued development of new train stations at Vacaville/Fairfield, Dixon, and Benicia to improve local access to regional rail service.
- ▶ **Program TC.I-17:** Design, construct, and maintain bicycle routes to ensure that adequate signs and pavement markings are provided.
- ▶ **Program TC.I-18:** Pursue roadway-improvement project funding to complete bicycle path linkages between Solano County communities.
- ▶ **Program TC.I-19:** Support applications to fund new bicycle and pedestrian facilities that close gaps in the system.

Public Facilities and Services Chapter

- ▶ **Policy PF.P-3:** Increase efficiency of water, wastewater, stormwater, and energy use through integrated and cost-effective design and technology standards for new development and redevelopment.
- ▶ **Policy PF.P-6:** Guide development requiring urban services to locations within and adjacent to cities.
- ▶ **Policy PF.P-7:** Coordinate with the cities to strongly encourage compact urban development within city urban growth areas to avoid unnecessary extension or reconstruction of roads, water mains, and services and to reduce the need for increased school, police, fire, and other public facilities and services..
- ▶ **Policy PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.
- ▶ **Policy PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
- ▶ **Policy PF.P-20:** Minimize the consumption of water in all new development.
- ▶ **Policy PF.P-27:** Require responsible waste management practices, including recycling and composting. Coordinate with service providers to compost green waste and encourage local farmers to use this.
- ▶ **Program PF.I-8:** Require the use of water-efficient landscaping, water-conserving appliances and plumbing fixtures.

- ▶ **Program PF.I-14:** Work with local partners and water agencies to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public can take to reduce water use. Encourage water purveyors to provide incentives for customers that use water more efficiently.
- ▶ **Program PF.I-15:** Assess water use in County-operated facilities and implement programs for efficient water use and wastewater reuse. Implement water conservation programs as defined by state law and develop new measures in response to community input and changing technology.
- ▶ **Program PF.I-16:** Encourage and assist water agencies in providing incentives to encourage water conservation or reuse.
- ▶ **Program PF.I-26:** Require that demolition projects submit a plan to maximize reuse of building materials at the time of permit application.
- ▶ **Program PF.I-27:** Expand waste minimization efforts including household recycling, business paper recycling, and construction and demolition recycling.
- ▶ **Policy PF.P-28:** Promote technologies that allow the use and reuse of solid waste, including biomass or biofuel as an alternative energy source.

Conclusion

Implementation of 2008 Draft General Plan policies and Mitigation Measure 4.2-3a, “Require Implementation of YSAQMD [Yolo/Solano Air Quality Management District] Design Recommendations for Development Projects” (described in Section 4.2, “Air Quality”), which require design and operational measures to reduce operational emissions of criteria air pollutants, would further reduce CO₂ emissions from the plan’s operation. However, because of the large amount of development and potential for simultaneous construction of multiple sites, taken together with modeled emissions (presented in Table 6-3) in excess of 9 TPY per capita, implementation of the 2008 Draft General Plan could result in or substantially contribute to GHG levels. As a result, this impact would be significant.

Mitigation Measure

Implementation of the 2008 Draft General Plan goals, policies, and programs described above would reduce emissions of GHGs, but the degree of future impacts and applicability, feasibility, and success of future mitigation measures cannot be adequately known for each specific future project at this program level of analysis. Therefore, it cannot be determined whether these measures would reduce GHG levels to a less-than-significant level. As such, Impact 6-2a must be conservatively assumed to result in a considerable net increase in GHGs, and thus operational and construction-related emissions of GHGs could conflict with an existing or projected policy established to reduce GHG emissions. This impact would remain **significant and unavoidable**.

IMPACT 6.2-1b **Increases in Greenhouse Gas Emissions – Maximum Development Scenario.** *Per-capita rates of CO₂ emissions would not meet the levels required to meet the goals of AB 32 (9 TPY per capita). Emissions would increase considerably compared with existing levels. This impact would be significant.*

This impact is the same as Impact 6.2-1a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure

Implementation of the 2008 Draft General Plan goals, policies, and programs described above would reduce emissions of GHGs, but no existing plans or mitigation would reduce GHG levels to a less-than-significant level. As such, Impact 6.2-1b could result in a considerable net increase in GHGs, and thus operational and construction-related emissions of GHGs could conflict with an existing or projected policy established to reduce GHG emissions. This impact would remain **significant and unavoidable**.

IMPACT 6.2-2a **Impacts of Climate Change on Solano County – Preferred Plan.** *Climate change is expected to result in a variety of effects on Solano County: reduced agricultural production, changes to terrestrial and aquatic ecosystems, reduced hydroelectric energy production, increased energy demand, decreased water supply, increased risk of flooding and landslide, increased frequency and intensity of wildfire, and the inundation of low-lying areas caused by rising sea levels. Substantial negative effects on the county's residents, resources, structures, and the economy could result. This impact would be **significant**.*

Effects of the 2008 Draft General Plan on Greenhouse Gas Emissions

As discussed previously in this section, human-induced increases in GHG concentrations in the atmosphere have led to increased global average temperatures (global warming) through the intensification of the greenhouse effect, and associated changes in local, regional, and global average climatic conditions.

Although there is a strong scientific consensus that global climate change is occurring and is influenced by human activity, there is less certainty as to the timing, severity, and potential consequences of the climate phenomena. Scientists have identified several ways in which global climate change could alter the physical environment in California (IPCC 2007a, CEC 2006b, DWR 2006). These include:

- ▶ increased average temperatures;
- ▶ modifications to the timing, amount, and form (rain vs. snow) of precipitation;
- ▶ changes in the timing and amount of runoff;
- ▶ reduced water supply;
- ▶ deterioration of water quality; and
- ▶ elevated sea level.

The changes listed above may translate into a variety of issues and concerns that may affect Solano County, including but not limited to:

- ▶ reduced agricultural production as a result of changing temperatures and precipitation patterns;
- ▶ changes in the composition, health, and distribution of terrestrial and aquatic ecosystems, particularly associated with increased saltwater intrusion into the Delta;
- ▶ reduced production of hydroelectric energy caused by changes in the timing and volume of runoff;
- ▶ increased energy demand associated with increased temperatures;
- ▶ increased air pollution and related effects on human health;
- ▶ decreased water supply, reliability, and quality;

- ▶ increased risk of flooding and landslide associated with changes to precipitation patterns;
- ▶ increased frequency and intensity of wildfire as result of changing precipitation patterns and temperatures; and
- ▶ inundation of low-lying areas associated with rising sea levels.

Although some uncertainty exists as to the precise levels of these impacts, there is consensus regarding the range that can be expected. For detailed discussions of these potential impacts see Section 6.2.1, “Existing Conditions,” above.

Although climate change is an issue of global scale and the impacts described above are likely to occur whether or not the 2008 Draft General Plan is adopted, implementation of the plan would influence the degree to which climate change affects the county’s residents, ecosystems, and economy. Development associated with buildout of the 2008 Draft General Plan could subject an increased number of persons and structures to potential hazards, such as flood, wildfire, and sea level rise. Additionally, environmental impacts resulting from implementation of the plan (as identified in Sections 4.1 through 4.14 of this EIR) could combine with climate change–associated impacts to intensify such impacts and exacerbate hardships for the county.

Although the 2008 Draft General Plan is likely to increase Solano County’s exposure to such risks and hardships, the plan also includes a variety of policies and programs that would assist the county in avoiding, adapting to, and being resilient in the face of climate change–associated impacts.

Relevant Policies and Programs of the 2008 Draft General Plan

Table 6-4, contained in the discussion of Impact 6.2-1a above, summarizes all of the climate change–related policies and programs contained in the 2008 Draft General Plan. Policies and programs that address the County’s strategies for adapting to climate change are described below. As described in the following sections, Policies RS.P-5, RS.I-9, and SS.P-3 in the Resources and Land Use Chapters direct the County to protect and enhance wildlife movement corridors. As climate change affects Solano County, numerous habitat types will be affected. Protecting viable wildlife corridors could help populations of some species move from an affected habitat area to a more suitable habitat area. Without such corridors, movement would not be feasible and a local population could become extinct. Policy RS.P-2 directs the County to protect valuable habitat areas. Protection of sizable areas of habitat could provide some resilience in the face of climate change impacts. Policy RS.P-12 calls for the protection of upland and cultivated areas surrounding the critical habitats of Suisun Marsh. As sea levels rise, these upland areas could become valuable for habitat restoration and adaptation purposes.

Resources Chapter

- ▶ **Policy RS.P-2:** Manage the habitat found in natural areas and ensure its ecological health and ability to sustain diverse flora and fauna.
- ▶ **Policy RS.P-5:** Protect and enhance wildlife movement corridors to ensure the health and long-term survival of local animal and plant populations. Preserve contiguous habitat areas to increase habitat value and to lower land management costs.
- ▶ **Policy RS.P-12:** Existing uses should continue in the upland grasslands and cultivated areas surrounding the critical habitats of the Suisun Marsh in order to protect the Marsh and preserve valuable marsh-related wildlife habitats. Where feasible, the value of the upland grasslands and cultivated lands as habitat for marsh-related wildlife should be enhanced.
- ▶ **Program RS.I-9:** Together with DFG, USFWS, Solano Water Agency, and other agencies, determine and map critical wildlife movement and habitat corridors and riparian buffer areas. Ensure that the areas are

sufficient in size to maintain landscape ecological functions and viable populations. Add the mapped critical corridors to the Resource Conservation Overlay.

Land Use Chapter

- ▶ **Policy SS.P-3:** Allow for the migration and movement of wildlife.

Health and Safety Chapter

The Health and Safety chapter contains policies that aim to protect the county's residents, structures, and infrastructure from hazards such as flooding, wildfire, and sea level rise. As described below, Programs HS.I-1, HS.I-53, and HS.I-73 call on the County to address adaptation to climate change. Program HS.I-1 specifically directs the county to create a Sea Level Rise Strategic Program to address climate change-induced inundation of low-lying areas of the county. Policies HS.P-9 and HS.P-10 require the County to address flooding hazards. These policies could help alleviate the potential impacts of increased flooding caused by climate change.

- ▶ **Policy HS.P-9:** Preserve open space and agricultural areas that are subject to natural flooding and are not designated for future urban growth; prohibit permanent structures in a designated floodway where such structures could increase risks to human life or restrict the carrying capacity of the floodway.
- ▶ **Policy HS.P-10:** Ensure that flood management policies that minimize loss of life and property also balance with environmental health considerations of the floodplain and therefore do not cause further erosion, sedimentation, or water quality problems in the floodplain area.
- ▶ **Policy HS.P-20:** Require that structures be built in fire defensible spaces and minimize the construction of public facilities in areas of high or very high wildfire risk.
- ▶ **Policy HS.P-22:** Require new developments in areas of high and very high wildfire risk to incorporate fire-safe building methods and site planning techniques into the development.
- ▶ **Policy HS.P-23:** Work with fire districts or other agencies and property owners to coordinate efforts to prevent wildfires and grassfires through fire protection measures such as consolidation of efforts to abate fuel buildup, access to firefighting equipment, and provision of water service.
- ▶ **Program HS.I-1:** Develop and adopt a Sea Level Rise Strategic Program for Solano County. The Sea Level Rise Strategic Program (SLRSP) will have three primary objectives. These include (1) investigate the potential effects of sea level rise on Solano County, (2) identify properties and resources susceptible to SLR in order to prioritize management strategies, and (3) develop protection and adaptation strategies to meet the county's and region's goals. The Program will encompass all areas identified within a Sea Level Rise Planning Area.

Preparation of an effective SLRSP is necessary to protect the county's safety and economic well being. Due to the complexity and regional implications of sea level rise, preparation of the program should be coordinated with BCDC, Bay Delta Authority, and other relevant agencies. The SLRSP will contain the following components:

SLR Area Identification—The County, with the help of state and federal agencies, will need to investigate the effects of SLR with respect to the specific hydrological characteristics of the Bay-Delta area. The Intergovernmental Panel on Climate Change and the 2006 California Climate Action Team Report project increases between 12 and 36 inches by the year 2100. While uncertainty exists regarding the projected height of sea level rise, both moderate and high projections are expected to result in sea levels that will affect the Bay-Delta area both directly and by increasing the frequency, duration, and magnitude of extreme water level events. Extreme water level events are coastal area floods created by a combination of high tides, Pacific

climate disturbances such as El Niño, low-pressure systems, and associated storm surges. Extreme water level events are expected to increase substantially with elevated sea levels. Given a 1-foot rise in sea level, as predicted in low-end SLR projections, the frequency of a 100-year event would increase tenfold. Additionally, elevated sea levels and increased extreme water level events are expected to exacerbate flooding and saltwater intrusion in the county. The SLRSP will need to investigate these issues further to protect infrastructure, property, resources, and lives.

Prioritization—As a second step, the County will identify areas susceptible to SLR in order to prioritize management strategies. This step should be coordinated with the Association of Bay Area Governments' cost-benefit analysis and with BCDC's regional prioritization process. Areas to be identified include the following:

- Properties that contain high-value development and warrant protection.
- Areas where it may be more cost-effective to remove existing development than to protect low-value structures.
- Sites where hazardous substances exist and could be released into the environment due to sea level increases. These sites will need to be remediated prior to SLR inundation.
- Properties that are designated for future development, but have not yet been built. It may be better to remove development potential from such areas in order to reduce the public's exposure to the risk associated with SLR.
- Valuable ecosystems such as marshlands and delta riparian areas that may become flooded as sea level rises.

Prioritization—The third component of the plan will require the development of management strategies to meet the county's and region's protection, adaptation, and resource enhancement goals. Management strategies will include, but are not limited to, the following:

- Create a sea level rise protection program that identifies the levees, seawalls, and other infrastructure and activities that will have to be constructed or carried out to safeguard high-value areas from inundation.
 - Produce a relocation and resource enhancement program that identifies: (1) the activities that will have to be carried out to remove or relocate facilities from those areas that are identified as being inappropriate for protection; and (2) the activities and programs that will have to be carried out to achieve environmental protection and enhancement in areas that the county and regional, state and federal agencies identify as being most suitable for these purposes.
 - Update land use designations and development regulations in order to protect public safety, welfare, and health.
 - Coordinate SLRSP strategies with strategies developed in the overarching county Climate Action Plan.
- **Program HS.I-7:** During project review, encourage the use of stormwater management techniques in developed upstream watershed areas that protect low-lying areas from flooding and incorporate appropriate measures into the development review process to mitigate flooding and prevent erosion in and around County ditches.
- **Program HS.I-26:** Update the zoning ordinance to limit development in areas of extreme, very high, and high wildfire risk. Development within the extreme risk area will be limited to farm-related development served by private roads. Land divisions within the very high and high risk areas will be restricted, unless the availability of adequate water supply can be demonstrated and guaranteed; more than one access point for

firefighting equipment can be provided; defensible space is permanently maintained around any buildings; and fire-resistant materials are used in construction.

- ▶ **Program HS.I-53:** Evaluate the potential effects of climate change on Solano County’s human and natural systems and prepare strategies that allow the County to appropriately respond and adapt.
- ▶ **Program HS.I-73:** Develop and adopt a climate action plan for Solano County. The Climate Action Plan [CAP] will have two primary objectives, which include: (a) reduce total greenhouse gas emissions in the county to 20 percent below 1990 levels by 2020, (b) create adaptation strategies to address the impacts of climate change on the county such as sea level rise, increased risk of flooding, diminished water supplies, public health, and local agricultural-based economy. The CAP will contain the following chapters:

Climate Change and Solano County—The first chapter of the CAP will outline the County’s rationale and motivation for taking a leadership role in addressing climate change and developing and implementing the CAP. The chapter will provide a brief overview of the science behind climate change, describe the potential impacts climate change may create in Solano County, and outline state policy mandates to reduce GHG emissions.

Baseline GHG Emissions Inventory and Forecast—In this chapter the County will calculate GHG emissions for the base year 1990, forecast emissions in 2020 under a business-as-usual scenario, and will describe the GHG reductions necessary to achieve the County’s adopted target. The chapter will identify GHG emissions and target levels per sector. Sectors to be described in the inventory will include municipal operations, residential, commercial, industrial buildings, motor vehicles, agriculture, and waste. This inventory and forecast provide a benchmark for planning and monitoring progress in government operations and the community. The GHG inventory will be conducted using a methodology consistent with that used by other local governments.

GHG Emissions Policies and Measures—This chapter will describe the policies and measures that are necessary to reduce GHG emissions in the county and achieve the reduction target. Policies and measures will be created with public input from all stakeholders. Each measure will include a timeline, describe financing mechanisms, and assign responsibility to relevant agencies and departments. In addition to direct GHG reduction measures, the chapter will incorporate public education efforts to raise awareness on the importance of minimizing GHG emissions and methods for reducing emissions from individual’s lifestyles. Policies and programs relevant to climate change contained in the 2008 General Plan will be included within the CAP. Policies, benchmarks, and measures will be reevaluated according to current State law and guidance each time the general plan is updated.

Protection and Adaptation Strategies—The fourth chapter of the CAP will describe strategies, policies, and measures that will be used to protect the county from and facilitate adaptation to the potential effects of climate change. Potential effects to be evaluated include but are not limited to sea level rise, increased frequency and magnitude of flooding, diminished water supply, habitat loss, and possible impacts to public health and the local economy, including agriculture. Each measure will include a timeline, describe financing mechanisms, and assign responsibility to relevant agencies and departments.

County and state concerns regarding sea level rise and its associated impacts led to the development of an SLRSP. The SLRSP has been included as an implementation measure in the 2008 General Plan (see Program HS.I-1). The SLRSP is to be contained within the CAP after the CAP is adopted.

Benchmarks and Next Steps—In conclusion, the CAP will identify benchmarks, monitoring procedures, and other steps needed to ensure the county achieves its GHG reduction, protection, and adaptation goals. Monitoring and verifying progress on the GHG emissions reduction measures will be conducted on an ongoing basis. Monitoring will provide important feedback that can be used to demonstrate overall progress toward emissions reduction targets and improve measures over time. Benchmarks will be established to serve

as intermediate goals and to motivate compliance with county and sector level reduction targets. While additional benchmarks will be created during CAP development, the following emissions reductions benchmarks will be included:

- Overall emissions reductions of at least 10 percent below 1990 levels by 2015.
- Overall emissions reductions of at least 20 percent below 1990 levels by 2020.
- Reductions of total countywide energy consumption of at least 2 percent per year to achieve a minimum 20 percent reduction by 2020.

Benchmarks for strategic responses to climate change impacts should be based on the expected timescale of the specific impact and will be established during the development of individual strategic plans.

As the CAP is to be implemented over a period of several years, it is likely that knowledge surrounding climate change and implementation measures will evolve. The CAP will contain provisions to evaluate measures in order to ensure successful GHG emissions reduction and protection of the county.

Economic Development Chapter

As described below, Policy ED.P-15 calls on the County to evaluate the impacts that climate change could have on Solano County's economy. The policy directs the County to create adaptation and protection policies and programs that could help reduce to severity of climate change impacts on agriculture and other industries within the county.

- ▶ **Policy ED.P-15:** Evaluate the potential for economic impacts of climate change on existing industry in Solano County, and plan for the foreseeable effects on those industries. Sustain the local economy and enable resilience by allowing sufficient time to adapt to foreseeable changes in climate.

Public Facilities and Services Chapter

The Public Facilities and Services chapter contains numerous policies and programs that focus on water conservation. These policies and programs could assist the County in adapting to climate change exacerbated by water supply deficiencies.

- ▶ **Policy PF.P-3:** Increase efficiency of water, wastewater, stormwater, and energy use through integrated and cost-effective design and technology standards for new development and redevelopment.
- ▶ **Policy PF.P-10:** Maintain an adequate water supply by promoting water conservation and development of additional cost-effective water sources that do not result in environmental damage.
- ▶ **Policy PF.P-11:** Promote and model practices to improve the efficiency of water use, including the use of water-efficient landscaping, beneficial reuse of treated wastewater, rainwater harvesting, and water-conserving appliances and plumbing fixtures.
- ▶ **Policy PF.P-20:** Minimize the consumption of water in all new development.
- ▶ **Program PF.I-8:** Require the use of water-efficient landscaping, water-conserving appliances and plumbing fixtures.
- ▶ **Program PF.I-14:** Work with local partners and water agencies to educate the public about water conservation options, including landscaping, irrigation, low-water appliances, and other measures the public

can take to reduce water use. Encourage water purveyors to provide incentives for customers that use water more efficiently.

- ▶ **Program PF.I-15:** Assess water use in County-operated facilities and implement programs for efficient water use and wastewater reuse. Implement water conservation programs as defined by state law and develop new measures in response to community input and changing technology.
- ▶ **Program PF.I-16:** Encourage and assist water agencies in providing incentives to encourage water conservation or reuse.

Conclusion

Implementation of the policies and programs proposed in the 2008 Draft General Plan would reduce the extent and severity of climate change–associated impacts on Solano County, but the effectiveness of these policies and programs at mitigating these impacts is uncertain. As a result, and in the absence of a quantifiable threshold of significance, this impact would be significant.

Mitigation Measure

Implementation of the 2008 Draft General Plan policies and programs described above would serve to reduce the impacts of climate change on Solano County. However, the efficacy of such policies and programs is uncertain. No other feasible mitigation measures exist to reduce the impact to a less-than-significant level. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 6.2-2b **Impacts of Climate Change on Solano County – Maximum Development Scenario.** *Climate change is expected to result in a variety of effects on Solano County: reduced agricultural production, changes to terrestrial and aquatic ecosystems, reduced hydroelectric energy production, increased energy demand, decreased water supply, increased risk of flooding and landslide, increased frequency and intensity of wildfire, and the inundation of low-lying areas caused by rising sea levels. Substantial negative effects on the county's residents, resources, structures, and the economy could result. This impact would be significant.*

This impact is the same as Impact 6.2-2a for the Preferred Plan. For the same reasons as described above, this impact would be significant.

Mitigation Measure

Implementation of the 2008 Draft General Plan policies and programs described above would serve to reduce the impacts of climate change on Solano County. However, the efficacy of such policies and programs is uncertain. No other feasible mitigation measures exist to reduce the impact to a less-than-significant level. This impact would remain **significant and unavoidable**.

6.2.4 RESIDUAL SIGNIFICANT IMPACTS

For the reasons described above, Impacts 6.2-1a, 6.2-1b, 6.2-2a, and 6.2-2b would remain **significant and unavoidable**.

6.3 GROWTH-INDUCING EFFECTS

The State CEQA Guidelines (Section 15126.2[d]) require that an EIR evaluate the growth-inducing effects of a proposed project. Specifically, an EIR must discuss the ways in which a proposed project could foster population growth or the construction of additional housing near the project and how that growth would, in turn, affect the surrounding environment. Growth can be induced either by eliminating obstacles to growth or by stimulating

economic activity within the region. For a general plan, the project is a long-term comprehensive plan to balance projected growth of population, housing, and employment with necessary public services and infrastructure. Under CEQA, growth is not considered necessarily detrimental or beneficial.

Based on Section 65300 of the Government Code, the 2008 Draft General Plan is required to serve as a comprehensive, long-term plan for the physical development of Solano County. By definition, the 2008 Draft General Plan intends to provide for and address future growth in the unincorporated portions of the county. Even though the 2008 Draft General Plan does not propose any specific development projects, it could still have growth-inducing impacts. Indirect growth-inducing impacts would also occur because the proposed land use designations and their locations, along with goals, policies, and programs of the 2008 Draft General Plan, are designed to provide a framework for future growth and development in unincorporated Solano County. Projected growth is described in Chapter 3, "Project Description," and the environmental consequences related to the potential growth are fully analyzed in Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures."

Land uses and future development consistent with the 2008 Draft General Plan would result in additional housing; development of agriculture-related, commercial, and industrial land uses; and development of public services and infrastructure within the unincorporated area. For example, development consistent with the 2008 Draft General Plan, under the Preferred Plan, would result in approximately 14,923 additional housing units and 13,931,679 square feet of nonresidential square feet in the unincorporated county above existing conditions (both inside and outside MSAs). Implementation of the proposed goals, policies, and programs of the 2008 Draft General Plan would manage this growth to protect the environment and quality of life in Solano County.

Implementation of the 2008 Draft General Plan would also result in increased economic activity and population growth in Solano County. Although anticipated growth would be indirect because the 2008 Draft General Plan does not propose any specific development projects, the definition of growth under CEQA includes indirect growth as well as direct growth. The 2008 Draft General Plan provides the framework for development planning and implementation to proceed.

The proposed locations for future urban development and many of the policies identified in the 2008 Draft General Plan are intended to protect existing agricultural land uses in the county by focusing urban development toward existing urban communities. As an example, Policy PF.P-16 in the Public Facilities and Services chapter would limit the construction of public water infrastructure to developed areas or those designated for future development to prevent growth-inducing impacts on adjoining agricultural lands or open space. Policy LU.P-5 in the Land Use chapter would require the County to coordinate land development within municipal service areas with the relevant city. The County intends to locate urban development adjacent to existing urbanized areas because these locations are best equipped to provide efficient water, sewer, police, and fire protection services.

The 2008 Draft General Plan expresses a primary desire to ensure the long-term protection of existing agricultural land uses and opportunities for economic, environmental, and social-equity benefits. For this reason, the policies and programs in the 2008 Draft General Plan provide incentives and conservation techniques (e.g., transfer of development rights, agricultural buffers, agricultural reserve overlay) to protect and maintain agricultural lands in Solano County. Along with policies and programs protecting agricultural lands in the county, the 2008 Draft General Plan identifies new urban development primarily adjacent to existing urban communities. The identified location for new urban development and policies and programs for protecting agriculture in the 2008 Draft General Plan would direct major construction activity toward existing urban centers and within incorporated cities and towns.

Overall, the 2008 Draft General Plan would result in growth that would lead to significant unavoidable adverse impacts on certain resources. Implementation of the goals, policies, and programs of the 2008 Draft General Plan would incrementally increase the demand and/or require new facilities for public services and utilities (water supply, wastewater treatment, fire protection and other emergency services, schools, and parks and recreation facilities) to serve new urban development. Therefore, the 2008 Draft General Plan would be growth inducing.

Physical environmental impacts and mitigation measures associated with the growth anticipated with implementation of the 2008 Draft General Plan are analyzed in the appropriate sections of this EIR.

6.4 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA requires that significant irreversible environmental changes caused by a plan be addressed in an EIR. Specifically, the EIR must consider whether “uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely” (State CEQA Guidelines Section 15126.2[c]). Nonrenewable resources, as used in this discussion, refer to the physical features of the natural environment: land, air, and waterways.

The land use designations proposed by the 2008 Draft General Plan would result in commitment of allowable land uses to these areas for the foreseeable future. In addition, proposed changes to land use designations would allow the development of differing uses that may not have been previously anticipated by the existing *Solano County General Plan*. As discussed in Section 4.1, “Land Use,” of this EIR, the proposed amendments would result in significant changes to land use designations from the existing plan.

Irreversible changes would likely occur as a result of future excavation, grading, and construction activities associated with development of land uses envisioned in the 2008 Draft General Plan. Although these changes can generally be addressed by mitigation measures, the potential for disturbance would represent an irreversible change. The 2008 Draft General Plan would also result in irreversible changes by increasing land use densities and introducing development onto the sites that are designated for a specific land use, but that are presently undeveloped.

Land uses and development consistent with the 2008 Draft General Plan would result in changes to traffic and circulation and therefore would increase emissions of air pollutants and generation of noise. Other irreversible changes associated with the 2008 Draft General Plan would be the future use of nonrenewable resources for urban development (concrete, glass, plastic, and petroleum products). Similarly, operation of future urban development would also consume energy and water.

Land uses and development consistent with the 2008 Draft General Plan would result in the conversion of agricultural lands to nonagricultural uses. Although the 2008 Draft General Plan includes policies and programs aimed at protecting existing agricultural land uses and promoting continuation of agricultural operations, any conversion of agricultural lands would be a significant irreversible environmental change.

The 2008 Draft General Plan would generate GHG emissions as described in Section 6.2, “Effects Related to Climate Change.” Such emissions would represent a significant irreversible change to the environment.

6.5 SIGNIFICANT AND UNAVOIDABLE EFFECTS

According to Sections 15126.2(a) and 15126.2(b) of the State CEQA Guidelines, an EIR shall identify and focus on the significant environmental effects of the proposed project, including effects that cannot be avoided if the proposed project were implemented.

This section describes significant environmental impacts, including impacts that are mitigated but would not be reduced to a less-than-significant level. With implementation of the 2008 Draft General Plan, significant effects related to land use, air quality, noise, transportation and circulation, hydrology and water resources, agricultural resources, public services and utilities, cultural and paleontological resources, and aesthetic resources cannot be avoided. Individual impacts are discussed below.

IMPACT 4.1-4: INCOMPATIBILITY WITH ESTABLISHED LAND USES

Implementation of the 2008 Draft General Plan would result in changes in land use type, density, and scale in existing agricultural areas and in areas adjacent to incorporated cities and unincorporated communities. These changes would result in land use conflicts and incompatibilities. Although the 2008 Draft General Plan contains policies and programs to reduce incompatibilities, the impacts would not be fully mitigated.

To mitigate the impacts of new nonagricultural uses on adjacent and neighboring agricultural operations, Mitigation Measure 4.1-4a for the Preferred Plan and Mitigation Measure 4.1-4b for the Maximum Development Scenario would increase the minimum farmland conversion mitigation ratio to 1.5:1 or higher. Although the mitigation measure may work to reduce some portion of the impact associated with agricultural and nonagricultural use conflicts, it would not reduce these impacts to below a level of significance. For this reason, the impact would remain **significant and unavoidable**.

IMPACT 4.1-5: INDUCEMENT OF POPULATION GROWTH

The 2008 Draft General Plan would accommodate a substantially higher population than is projected in the ABAG regional population forecast. If implemented, the 2008 Draft General Plan would be considered growth inducing. Therefore, this impact would be significant. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.2-1: GENERATION OF SHORT-TERM CONSTRUCTION-RELATED EMISSIONS OF CRITERIA AIR POLLUTANTS AND PRECURSORS

Buildout of the 2008 Draft General Plan would result in emissions of ROG and NO_x that would exceed BAAQMD's significance threshold of 80 pounds per day [lb/day] and YSAQMD's significance threshold of 10 TPY for ROG and NO_x and 80 lb/day for PM₁₀. In addition, control measures recommended by BAAQMD and YSAQMD for construction-related emissions of PM₁₀ are not currently required, nor are they projected to be required. Thus, construction-related emissions of criteria air pollutants and precursors could violate an ambient air quality standard, contribute substantially to an existing or predicted air quality violation, and/or expose sensitive receptors to substantial pollutants.

Mitigation Measure 4.2-1a(1) for the Preferred Plan and Mitigation Measure 4.2-1b(1) for the Maximum Development Scenario would require each project applicant, as a condition of project approval, to implement measures to further reduce exhaust emissions from construction-related equipment. Mitigation Measure 4.2-1a(2) for the Preferred Plan and Mitigation Measure 4.2-1b(2) for the Maximum Development Scenario would require each project applicant, as a condition of project approval, to implement enhanced and additional control measures recommended by BAAQMD and YSAQMD to further reduce fugitive PM₁₀ dust emissions. Implementation of the mitigation measures would reduce short-term, construction-related emissions, but not to a less-than-significant level. Construction-related emissions of criteria air pollutants and precursors would still exceed significance thresholds; for this reason, and because of the large size of Solano County, such emissions could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be **significant and unavoidable**.

IMPACT 4.2-2: CONSISTENCY WITH AIR QUALITY PLANNING EFFORTS

Future development in Solano County would generate emissions of criteria air pollutants (PM₁₀) and ozone precursors, both of which affect regional air quality. The population and development resulting from buildout of the 2008 Draft General Plan could lead to operational (mobile-source and area-source) emissions that exceed thresholds. The plan includes policies that seek to reduce air pollution and minimize the air quality impacts of new development and intend to reduce per-capita VMT and accommodate more sustainable travel options.

Additionally, the plan includes a wide range of land use, community design, transportation, conservation, and other policies that would directly or indirectly address air quality. Mitigation Measure 4.2-2a for the Preferred Plan and Mitigation Measure 4.2-2b for the Maximum Development Scenario would require the county to coordinate with BAAQMD and YSAQMD at the earliest opportunity to ensure that all new assumptions from new air quality plan updates are implemented as part of the 2008 Draft General Plan.

Although the mitigation measure and the various 2008 Draft General Plan policies and programs would reduce air pollutant emissions that affect both Solano County and the region, the plan would still result in operational emissions in excess of threshold assumptions used by BAAQMD and YSAQMD for relevant clean air plans. Buildout of the 2008 Draft General Plan would continue to conflict with current air quality planning efforts. Therefore, this impact would be **significant and unavoidable**.

IMPACT 4.2-3: GENERATION OF LONG-TERM OPERATIONAL, REGIONAL EMISSIONS OF CRITERIA AIR POLLUTANTS AND PRECURSORS

Long-term operational activities consistent with the 2008 Draft General Plan would result in emissions of ROG, NO_x, and PM₁₀ that exceed BAAQMD's and YSAQMD's significance thresholds of 80 lb/day and 10 TPY. Thus, operational emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation and/or expose sensitive receptors to substantial pollutant concentrations. As noted in Section 4.2, "Air Quality," of this EIR, the 2008 Draft General Plan includes a variety of goals, policies, and programs designed to minimize adverse effects related to long-term operational emissions that would be implemented as specific development projects and plans are proposed and considered by the County. Even with the implementation of relevant policies and implementation programs from the 2008 Draft General Plan, operational emissions from the proposed new growth under the plan would still exceed the districts' thresholds. Mitigation Measure 4.2-3a for the Preferred Plan and Mitigation Measure 4.2-3b for the Maximum Development Scenario would require each project applicant, as a condition of project approval, to implement air quality best management practices recommended by YSAQMD.

Implementation of the above mitigation measures, in addition to compliance with the above 2008 Draft General Plan policies and implementation programs and existing regulations, would reduce operational emissions of ROG, NO_x, and PM₁₀, but not to a less-than-significant level. This impact would remain **significant and unavoidable**.

IMPACT 4.2-4: GENERATION OF LONG-TERM, OPERATIONAL, LOCAL MOBILE-SOURCE EMISSIONS OF CARBON MONOXIDE

Based on BAAQMD's and YSAQMD's screening criteria, implementation of the 2008 Draft General Plan could result in a reduction in level of service (LOS) to LOS E or LOS F at some county intersections, resulting in long-term operational, local mobile-source emissions of carbon monoxide (CO) that substantially contribute to emissions concentrations or exceed the 1-hour ambient air quality standard of 20 parts per million (ppm) or the 8-hour standard of 9 ppm.

Policy CI.P-1 in the Transportation and Circulation chapter of the 2008 Draft General Plan calls on the County to monitor and maintain the existing transportation system to remedy safety and congestion issues and establish specific actions to address these issues when they occur. However, according to the traffic analysis prepared for the 2008 Draft General Plan, roadway segments and intersections could be reduced to LOS E or LOS F from LOS A–D under plan buildout (2030) conditions. Mitigation Measure 4.2-4a for the Preferred Plan and Mitigation Measure 4.2-4b for the Maximum Development Scenario require evaluation of intersections affected by individual projects for violations of CO concentration thresholds; they also require development review to focus on upgrading roads to County standards if the new development significantly contributes to the need to upgrade these roads. Implementation of these mitigation measures may reduce operational emissions of CO. However,

because the extent and locations of CO emissions are unknown at this time, this impact would remain **significant and unavoidable**.

IMPACT 4.2-5: EXPOSURE OF SENSITIVE RECEPTORS TO EMISSIONS OF TOXIC AIR CONTAMINANTS

With implementation of the 2008 Draft General Plan, new or modified sources of TACs could be placed near existing sensitive receptors, and new sensitive receptors could be developed near existing sources of TACs. As a result, sensitive receptors could be exposed to substantial concentrations of TACs. The 2008 Draft General Plan contains policies and implementation programs designed to reduce exposure of sensitive receptors to concentrations of TACs. Additionally, Mitigation Measure 4.2-5a for the Preferred Plan and Mitigation Measure 4.2-5b for the Maximum Development Scenario would require each project applicant to implement best management practices as a condition of project approval.

Implementation of these policies and programs and the mitigation measures would reduce the potential for exposure to TACs. However, the only measure available to completely mitigate the impact—completely separating emissions sources (diesel vehicles associated with commercial trucking activities at commercial and industrial land uses, rail operations, stationary sources) by 1–2 miles from all sensitive receptors—is not feasible. Therefore, no feasible mitigation is available to reduce the potential impacts of operational emissions to a less-than-significant level. For this reason, the impact would remain **significant and unavoidable**.

IMPACT 4.2-6: EXPOSURE OF SENSITIVE RECEPTORS TO EMISSIONS OF ODORS

Buildout of the 2008 Draft General Plan could result in the exposure of sensitive receptors to emissions of objectionable odors. The plan does not contain any policies or programs that address emissions of objectionable odors. Mitigation Measure 4.2-6a for the Preferred Plan and Mitigation Measure 4.2-6b for the Maximum Development Scenario require the incorporation of odor reduction measures and public notification as a condition of project approval. Although implementation of the mitigation measures would reduce the exposure of sensitive receptors to odorous emissions, this would not reduce the potential for impacts to a less-than-significant level. Full physical mitigation of potential odor impacts would require the implementation of odor control measures, and neither the County nor future project applicants have the direct ability to impose such controls. Whether BAAQMD, YSAQMD, or the County, reacting to complaints, sees fit in the future to order modifications to operations of major odor sources is uncertain. Any predictions about future enforcement actions are beyond the scope of this EIR. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.3-3: TRAFFIC NOISE LEVEL INCREASES CAUSED BY DEVELOPMENT CONSISTENT WITH THE 2008 DRAFT GENERAL PLAN

Implementation of the 2008 Draft General Plan would result in greater traffic volumes on county roadways than currently exists. The greater traffic volumes would result in changes in traffic noise levels on county roadways generally ranging from a decrease of 2 dBA to an increase of 5 dBA relative to existing traffic noise levels, with a 12-dBA increase projected on one roadway segment. Because a traffic noise level increase of 1.5 dBA to 5 dBA L_{dn} is commonly considered the threshold of significance, depending on existing levels without the project, the project thresholds of significance would be exceeded.

Mitigation Measure 4.3-4a for the Preferred Plan and Mitigation Measure 4.3-4b for the Maximum Development Scenario would require the County to adopt a countywide noise reduction program to reduce traffic and other noise levels countywide. The program would include a variety of noise abatement elements. Despite the implementation of such a noise abatement program, it is infeasible to ensure that existing residential uses will not be exposed to future traffic noise levels exceeding the County's noise standards or significantly exceeding levels they are exposed to today. As a result, this impact would remain **significant and unavoidable**.

IMPACT 4.4-1: DEGRADATION OF ROADWAY LEVELS OF SERVICE

With implementation of the 2008 Draft General Plan, operation of numerous roadways currently operating at LOS C or better would degrade to LOS D, LOS E, or LOS F. Additionally, numerous roadways currently operating at LOS D, LOS E, and LOS F would degrade further.

The 2008 Draft General Plan contains several policies regarding traffic operations, including traffic LOS. The ability of these policies to maintain or improve roadway LOS is unlikely. Mitigating traffic impacts to the level of performance under existing (2007) conditions would require substantial investment in new bridges, freeway lanes, and arterial roadway lanes across Solano County and/or substantial reductions in VMT through general plan policies for bus, rail, and nonmotorized travel. Although implementation of Policy TC.P-3 could reduce vehicle travel, it would be speculative to conclude that implementing this policy would reduce VMT, and thus LOS, to acceptable levels. The estimated costs of these projects would be in the billions of dollars. Additionally, no feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.5-6: POTENTIAL FOR FAILURE OF A LEVEE

Implementation of the 2008 Draft General Plan could result in the exposure of people and structures to inundation from levee failure. Death, injury, or loss of property could result. Adoption and implementation of the proposed policies in the 2008 Draft General Plan, combined with other relevant state and local regulations, would reduce the potential for effects on Solano County from levee failure. However, even with implementation of these policies and regulations the potential for failure of a Delta levee would remain. Furthermore, no feasible mitigation is available to reduce this impact. For these reasons, the impact would remain **significant and unavoidable**.

IMPACT 4.8-1: LOSS OF IMPORTANT FARMLAND

Buildout of the 2008 Draft General Plan would result in the conversion of 4,131 acres of Important Farmland to nonagricultural uses. Although the 2008 Draft General Plan contains numerous policies and programs intended to protect the future productivity of agricultural lands, the plan would continue to result in a net loss of farmland, including Important Farmland. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.8-2: CONFLICT WITH WILLIAMSON ACT CONTRACTS

Buildout of the 2008 Draft General Plan would result in the development of lands under a Williamson Act contract. Approximately 1,682 acres of land under a Williamson Act contract could be converted to nonagricultural uses. Although the plan includes policies to encourage property owners to participate in the County's Williamson Act program, the policies would only encourage, and not require, property owners to continue agricultural operations of their property. No feasible mitigation is available to reduce this impact. This impact would remain **significant and unavoidable**.

IMPACT 4.9-1: INSUFFICIENT WATER SUPPLIES TO MEET THE FUTURE WATER DEMAND IN UNINCORPORATED AREAS SERVED BY THE COUNTY

Land uses and development consistent with the 2008 Draft General Plan would increase the demand for water in Solano County. At buildout, available water sources would be insufficient to serve some of the unincorporated areas of the county. The 2008 Draft General Plan contains goals, policies, and implementation programs that attempt to ensure that the county will have a sufficient water supply. The effectiveness of these policies is unknown and no other mitigation measures are available. For these reasons, the impact would remain **significant and unavoidable**.

IMPACT 4.9-2: NEW OR EXPANDED WATER SUPPLY FACILITIES

Expansion and extension of water supply and distribution facilities is required for buildout of the 2008 Draft General Plan. Although goals and policies have been identified to reduce impacts, construction of these facilities could result in significant effects on the environment. The site-specific impacts of these facilities cannot be determined until such facilities are proposed and subjected to environmental review. Typical impacts would likely be construction-related noise, dust, and grading, or impacts on fish and wildlife, erosion, and streamflow. No mitigation is available beyond the 2008 Draft General Plan policies. The impact would therefore remain **significant and unavoidable**.

IMPACT 4.9-9: INCREASED DEMAND FOR LIBRARY FACILITIES

Solano County's library facilities do not currently meet existing service standards. Implementation of the 2008 Draft General Plan would result in increased demand for new or expanded County Library facilities to maintain acceptable service levels. Policies and programs in the proposed 2008 Draft General Plan would address the provision of library services by requiring new development to assess potential impacts on existing services and to pay fair-share fees. However, because the County already does not meet any of the existing service standards and new development cannot be asked to fill the existing deficit in service provision, the impact would be significant. Additionally, no mitigation is available beyond the policies contained in the 2008 Draft General Plan. For these reasons, the impact would remain **significant and unavoidable**.

IMPACT 4.10-1: REMOVAL OF HISTORICAL BUILT-ENVIRONMENT RESOURCES

Buildout of the 2008 Draft General Plan could result in the removal of or significant adverse impacts on historical built-environment resources. It is anticipated that conflicts would occur between land development and the preservation of significant buildings or structures, resulting in instances where historical resources would be removed to accommodate development. Until historic-preservation review guidelines have been developed pursuant to proposed Program RS.I-29, Mitigation Measure 4.10-1a for the Preferred Plan and Mitigation Measure 4.10-1b for the Maximum Development Scenario would require the County to determine whether a building or structure being removed meets the definition of a historical resource under Title 14, Section 15064.5(a) of the California Code of Regulations. Because the possibility remains that a historic building could be removed, this impact would remain **significant and unavoidable**.

IMPACT 4.11-1: ADVERSE IMPACTS ON SCENIC VISTAS

Views of the Coast Range and nearby hills are considered a scenic vista in Solano County. Other important views include the foreground and middle ground views from vehicles traveling along I-80, I-505, SR 37, and I-680. Buildout of the 2008 Draft General Plan would convert areas from existing open space to urban land uses. Implementation of policies in the 2008 Draft General Plan would ensure that subsequent projects are designed with design concepts and elements that would lessen significant impacts associated with preserving scenic views in the county. However, development of urban land uses would permanently change views throughout Solano County and countywide scenic vistas. No feasible mitigation measures or policies are available that could fully preserve the existing visual qualities of Solano County while allowing development of urban land uses. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-2: DAMAGE TO SCENIC RESOURCES WITHIN A STATE SCENIC HIGHWAY

Buildout of the 2008 Draft General Plan, specifically the area surrounding the city of Rio Vista, would be visible from SR 160, which is a state-designated scenic highway in Sacramento County. The current *Solano County General Plan* identifies extensive agricultural land uses surrounding the existing urban development in Rio Vista. The California Department of Transportation has identified agricultural areas and small towns viewable from SR

160 as scenic resources. The 2008 Draft General Plan identifies continuation of existing agricultural land uses surrounding existing urban development in Rio Vista. However, the 2008 Draft General Plan also promotes development of electricity-generating wind-powered facilities that would be viewable from SR 160.

Implementation of Mitigation Measures 4.11-2a(1) and 4.11-2a(2) for the Preferred Plan and Mitigation Measures 4.11-2b(1) and 4.11-2b(2) for the Maximum Development Scenario would ensure that future project applicants would implement all feasible design measures to minimize significant impacts on views of scenic resources from SR 160. However, future development projects would permanently alter views of scenic resources from SR 160, and no other feasible mitigation is available that would be able to protect views of existing scenic resources while at the same time allowing urban development. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-3: DEGRADATION OF VISUAL CHARACTER

Implementation of the 2008 Draft General Plan would substantially alter the visual character of Solano County through conversion of agricultural and open-space lands to developed urban uses. Individuals may consider the conversion of agricultural land uses and open spaces to urban and wind energy development as a loss of an aesthetically pleasing and valuable resource. Policies within the 2008 Draft General Plan would require project applicants to prepare comprehensive design guidelines and landscaping standards as conditions of approval for development projects that convert agricultural and open-space land uses to urban and wind energy development.

Although such design guidelines and standards would be included as part of future development projects, there is no mechanism that would allow development projects while avoiding the conversion of the local agricultural lands and open spaces to urban and wind energy development. Therefore, this impact would remain **significant and unavoidable**.

IMPACT 4.11-4: INCREASE IN NIGHTTIME LIGHTING AND DAYTIME GLARE

Buildout of the 2008 Draft General Plan would require nighttime lighting and could construct facilities with reflective surfaces that could inadvertently cast light and glare toward motorists on area highways and roadways under day and nighttime conditions. The degree of darkness and views of the night sky would not be substantially diminished in rural portions of Solano County as a result of implementing the 2008 Draft General Plan. The exception to this is the Special Study Areas of Collinsville, Suisun Valley, and Green Valley, where development could cause a new source of nighttime lighting in rural areas.

Implementation of policies in the 2008 Draft General Plan, together with implementation of Mitigation Measures 4.11-4a(1) and 4.11-4a(2) for the Preferred Plan or Mitigation Measures 4.11-4b(1) and 4.11-4b(2) for the Maximum Development Scenario, would minimize potential light and glare impacts of future development projects to the maximum extent practicable. Although these policies would reduce impacts related to light and glare, new development envisioned in the plan would permanently add nighttime lighting into a rural area. No other mitigation measures are feasible that would fully preserve existing nighttime views while at the same time allowing the development. Therefore, this impact would be **significant and unavoidable**.

IMPACT 6.2-1: INCREASES IN GREENHOUSE GAS EMISSIONS

Implementation of the 2008 Draft General Plan could generate per-capita rates of CO₂ emissions that would not meet the levels required by AB 32, the California Climate Solutions Act of 2006 (9 TPY per capita). Emissions would increase considerably compared with existing levels. Although implementation of the 2008 Draft General Plan goals, policies, and programs would reduce CO₂ emissions from the plan's operation, the degree of future impacts and the feasibility and success of future mitigation measures cannot be adequately examined at this program level of analysis. As such, it must be conservatively assumed that the 2008 Draft General Plan would result in a considerable net increase in GHGs, and thus operational and construction-related emissions of GHGs

could conflict with an existing or projected policy established to reduce GHG emissions. This impact would remain **significant and unavoidable**.

IMPACT 6.2-2: IMPACTS OF CLIMATE CHANGE ON SOLANO COUNTY

Climate change is expected to result in a variety of effects on Solano County: reduced agricultural production, changes to terrestrial and aquatic ecosystems, reduced hydroelectric energy production, increased energy demand, decreased water supply, increased risk of flooding and landslide, increased frequency and intensity of wildfire, and the inundation of low-lying areas caused by rising sea levels. Substantial negative effects on the county's residents, resources, structures, and the economy could result. Implementation of the 2008 Draft General Plan policies and programs described above would serve to reduce the impacts of climate change on Solano County. However, the efficacy of such policies and programs the impact is uncertain. No other feasible mitigation measures exist to reduce the impact to a less-than-significant level. Therefore, this impact would remain **significant and unavoidable**.

7 REPORT PREPARATION

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None.

CHAPTER 2, “EXECUTIVE SUMMARY”

None.

CHAPTER 3, “PROJECT DESCRIPTION”

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