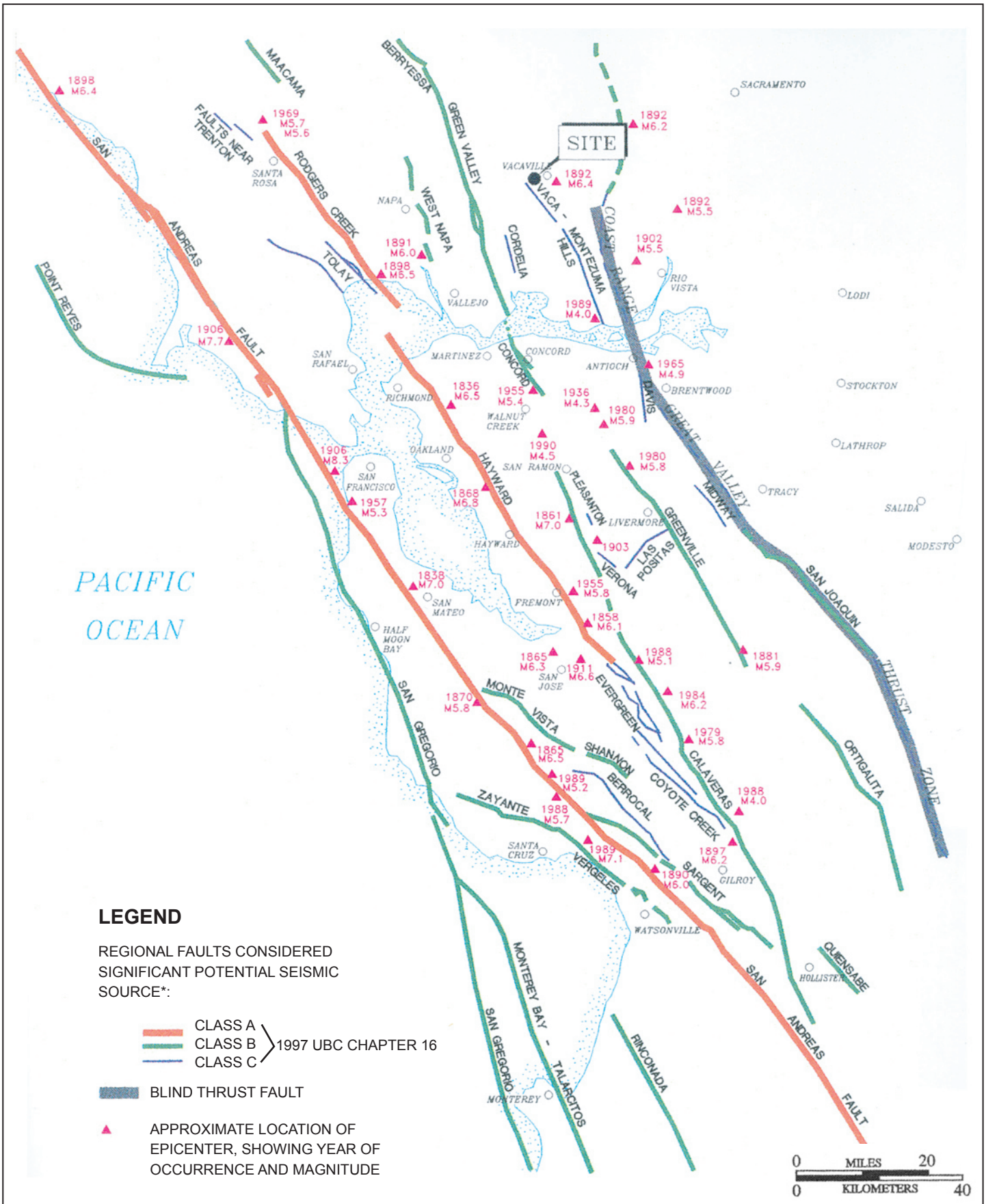

LEGEND

REGIONAL FAULTS CONSIDERED SIGNIFICANT POTENTIAL SEISMIC SOURCE*:

CLASS A
CLASS B
CLASS C
} 1997 UBC CHAPTER 16

BLIND THRUST FAULT

▲ APPROXIMATE LOCATION OF EPICENTER, SHOWING YEAR OF OCCURRENCE AND MAGNITUDE

FIGURE **4.12-2**

Regional Faults and Seismicity

***Source*:** ENGEO, Inc.

City of Vacaville

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TABLE 4.12-1

ESTIMATED MAXIMUM PARAMETERS FOR MAJOR KNOWN FAULTS AFFECTING THE PROPOSED PROJECT

Fault	Rodgers Creek	San Andreas	Hayward	Green Valley
Moment Magnitude[1]	7.1	7.9	7.1	6.9
Duration of Strong Shaking (seconds)[2]	18-30	30-60	30-60	20
Maximum Intensity (MMI)[3]	VIII-IX	VII	VII	VIII
Peak Horizontal Accelerations in Rock and Stiff Soil (Gravity)[4]	>0.6	0.2 - 0.3	0.3 – 0.4	0.50
Approximate Distance and Direction from Site to Fault (Miles)	30 W	50 SW	30 SW	10 W

Notes:
1. For the purposes of describing the size of the design (or scenario) earthquake of a particular fault segment, **moment magnitude** (M_w) of the characteristic earthquake for that segment has replaced the concept of a maximum credible earthquake of a particular Richter magnitude. This has become necessary because the Richter Scale "saturates" at the higher magnitudes; that is, the Richter scale has difficulty differentiating the size of earthquakes above magnitude 7.5. The M_w scale is proportional to the area of the fault surface that has slipped, and thus, is directly related to the length of the fault segment. Although the numbers appear lower than the traditional Richter magnitudes, they convey more precise (and more useable) information to geologic and structural engineers.
2. Duration of ground motion at 0.5g within 10 miles of the fault. Estimates based on relationships developed by Bolt, 1973.
3. Estimated Modified Mercalli Intensity damage level based on relationships developed by Perkins and Boatwright, 1995, or Richter, 1958 (San Andreas fault only).
4. Estimates based on relationships developed by Seed and Idriss, 1972, Joyner and Boore, 1981, Campbell and Sadigh, 1983.

Source: compiled by EIP Associates from sources listed below.

to the Coastal thrust belt or the Coast Range thrust. They were active tens of millions of years ago, but have shown no evidence of activity during the last 1.6 million years.[10]

Since the mid-nineteenth century, about 150 local earthquakes have been felt in Solano County. The greatest historical amount of groundshaking in the region occurred in April 1892 when two earthquakes, M 6.7 and M 6.5, occurred in the vicinity of Vacaville and Winters. Damage in adjacent Sacramento County was limited to falling statuary and chimney cracks. The 1906 earthquake on the San Andreas fault generated moderate groundshaking in the region.[11]

More recently, the M_W 6.9 (M7.1) Loma Prieta earthquake of October 1989 on the San Andreas fault, caused severe damage throughout the Bay Area, but not extensively in Solano County. On the basis of research conducted since the 1989 Loma Prieta earthquake, the United States Geological Survey (USGS) and scientists in other agencies, such as the Working Group on California Earthquake Probabilities (WGEP), conclude that there is about a 70 percent probability of at least one M_w 6.7 or greater earthquake, capable of causing widespread damage, striking the San Francisco Bay region before 2030.[12] Earthquakes of this magnitude are sufficient to create ground accelerations in bedrock and in stiff unconsolidated sediments severe enough to cause major damage to structures and foundations not designed specifically to resist the lateral forces generated by earthquakes, and to underground utility lines not designed with sufficient flexibility to accommodate expected seismic ground motion.[13]

Specific Plan Area

The Specific Plan area is not within a State of California Alquist-Priolo Earthquake Fault Hazard Zone (formerly known as Special-Studies Zone).[14] However, the City's General Plan Safety Element specifically identifies the Lagoon Valley fault that runs through the Specific Plan area as a potential source of seismic activity that must be taken into consideration during the planning of development in the City. The Lagoon Valley fault is generally a north-south-trending inferred fault that was mapped in 1973 and 2002 as traversing the central portion of the Specific Plan area. To the south and southeast of the site, it is mapped as two subparallel traces, as

shown in Figure 4.12-3. The western trace, which is mapped as extending beyond the northern and southern boundaries of the Specific Plan area, is concealed by alluvium within the Specific Plan area. As illustrated in Figures 4.12-1 and 4.12-3, the trace passes through the western part of the Lagoon Valley Regional Park, under a portion of the southwestern corner of the lake, and south through the project. The eastern trace is within an open space area in the southeast part of the Specific Plan area and does not extend into the residential portion of the project site.

In 1991, a geotechnical report prepared by Anderson Geotechnical Consultants, Inc. concluded that there was no evidence of active regional faulting in the Lagoon Valley fault.[15] As part of this EIR, a seismic refraction survey was performed in June 2003 by a geophysicist to quantitatively evaluate subsurface conditions to determine whether there is an indication of active or potentially active fault traces at the Specific Plan area. Results of the 2003 seismic refraction survey confirmed that the Lagoon Valley fault is an inactive fault.[16] Based on these findings, the preliminary geotechnical report prepared for the Proposed Project concluded that the potential for fault rupture at the Specific Plan area is low.[17] These results do not, however, preclude the Specific Plan area from future, potential groundshaking events produced from other nearby active faults, as described below.

The nearest active fault is the Great Valley fault within the Coast Range thrust zone, approximately five miles east of the Specific Plan area (see Figure 4.12-2). The Concord-Green Valley fault, approximately 10 miles west, is more active and presents a greater seismic risk to the Proposed Project than the Great Valley fault, however. The WGEP calculated a 30-year probability of 6 percent for the Concord-Green Valley fault.[18]

Earthquake scenario maps developed for the Bay Area by the Association of Bay Area Governments (ABAG) depict the general risk within Vacaville due to earthquakes in nearby active faults, such as the Concord-Green Valley fault. These maps predict that groundshaking intensity in the vicinity would be moderate to very strong, based on the MMI classification. The highest intensity groundshaking was predicted for an earthquake of M_w6.7 in the Concord-Green Valley fault.[19]

The preliminary geotechnical reports prepared for this EIR concluded that moderate to strong groundshaking at the Specific Plan area could be expected during the lifetime of the Proposed Project.[20] The degree of groundshaking at the Specific Plan area would depend on the magnitude of the seismic event, the distance from its epicenter, and the type of rock or sediment the seismic waves move through. Generally, groundshaking would be more intense the closer the epicenter is to the Specific Plan area. Further, subsurface conditions beneath a site are important in determining the risk of groundshaking. The preliminary geotechnical exploration found that the substrate underlying the Specific Plan area, alluvium and colluvium, is more susceptible to ground shaking compared to locations with underlying bedrock formations.[21]

Other Seismic Hazards

<u>Liquefaction</u>

Liquefaction is a soil phenomenon in which a uniformly fine-grained, water-saturated, cohesionless soil temporarily loses its strength when subjected to dynamic forces such as intense and prolonged groundshaking. Association of Bay Area Governments has produced a map rating liquefaction susceptibility for seismically active areas of the Bay Area, which shows Vacaville in an area of low to moderate susceptibility to liquefaction in the event of a high-intensity earthquake.[22] The preliminary geotechnical report indicated that the soil materials

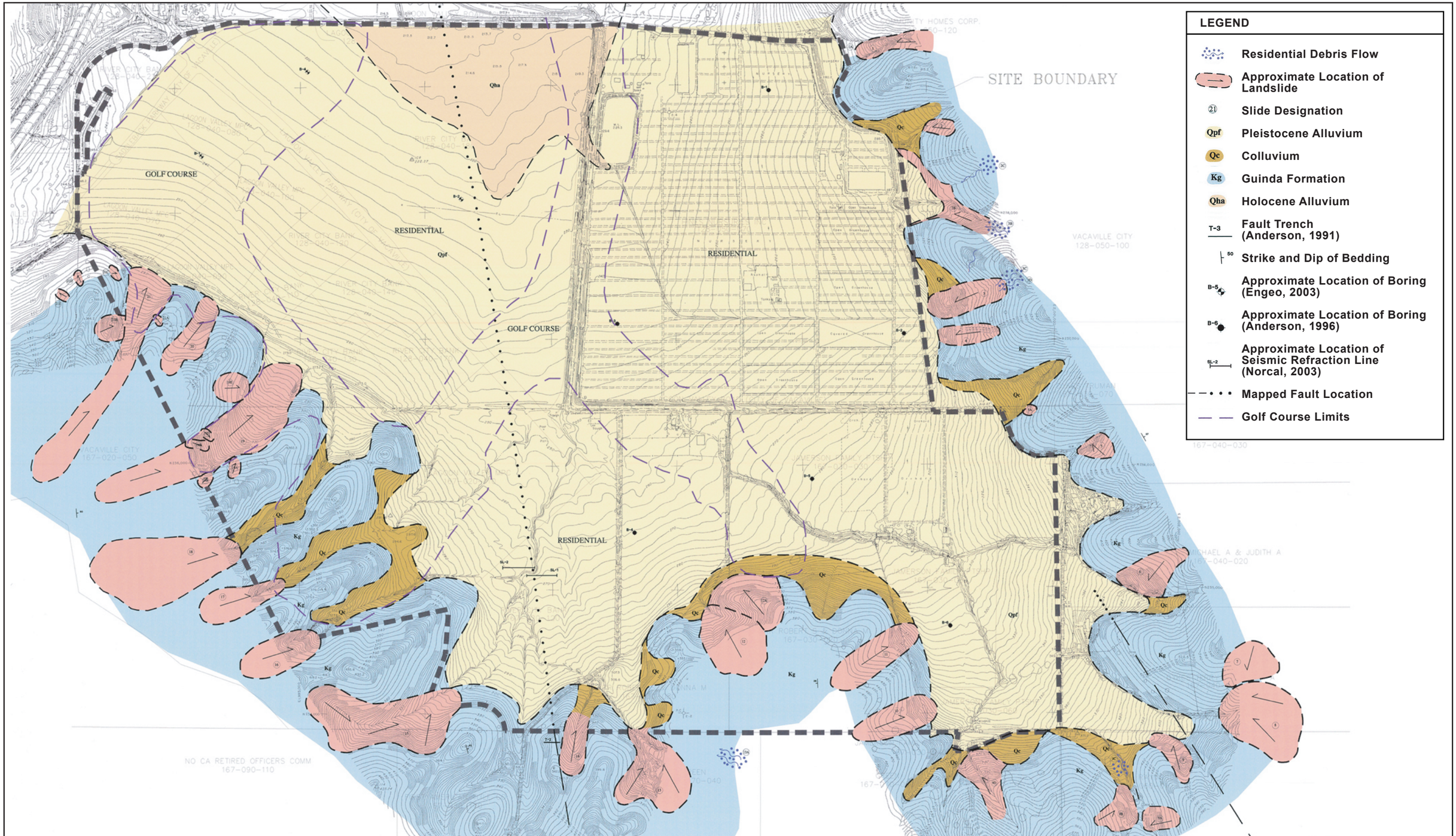

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FIGURE **4.12-3**

Landslide Areas in the Specific Plan Area

Source: ENGEO, Inc.

City of Vacaville

Not to Scale

EIP ASSOCIATES

encountered during the geotechnical exploration generally consist of stiff silty clays that are not susceptible to liquefaction.[23] Irrespective of the low liquefaction potential of the surface soils, liquefaction can occur at depth if the water table is within about 50 feet below the ground surface in pockets of fine-grained, uniformly sized sand, such as can exist in alluvial deposits. Liquefaction needs to be addressed at each construction site because conditions such as depth to water table, uniformity of grain size and mix of grain size can vary dramatically within alluvial deposits. In general, areas underlain by poorly sorted older alluvium are less liquefaction-prone than those underlain by the younger fine sand deposits.

Lateral Spreading

Lateral spreading is a failure within weaker soil material that causes the soil mass to move towards a free face or down a gentle slope. Lateral spreading often is associated with underlying liquefiable soils. The preliminary geotechnical report concluded that lateral spreading is unlikely to occur on the Specific Plan area because liquefiable soils were not encountered at the project site and the Proposed Project would remove surface soils during site grading and excavation.[24]

Seiche

Earthquake-induced seiches are periodic oscillations of water levels in enclosed bodies of water, such as lakes, reservoirs, basins, etc. The amplitude, or height, of a seiche can range from a few inches to several feet. The period of a seiche can range from a few minutes to a few hours, depending on the size and shape of the basin of water. In Lagoon Valley Lake, water elevation in the lake is approximately +212 feet msl and the dam crest elevation at +217.6 feet msl. In March of 1986, the reservoir water level rose to within 1.5 feet of the dam crest. Although there are no historical records of a seiche occurring in or adjacent to the Specific Plan area, it does not preclude the possibility of one occurring in Lagoon Valley Lake.[25] The primary effect of seiche activity is flooding of nearby properties, which is addressed in more detail in Impact 4.11-6 in Section 4.11, Hydrology, Drainage, and Water Quality.

Earthquake-Induced Landslides

Hillslopes surrounding the Specific Plan area have unstable surface soils overlying claystone and bedrock, and the potential for landslides is high in those areas, as discussed in greater detail under “Other Geotechnical Hazards,” below. The preliminary geotechnical exploration report concluded that seismically induced landslides could occur in the Specific Plan area.[26]

Soils

Soils in the Specific Plan area have been classified by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) and are described in the *Soil Survey of Solano County, California*. Soils are classified based on several properties that define soil behavior, which include:

- Erosion, which describes the susceptibility of a soil to be transported via water or wind;
- Permeability, which describes a soil’s capacity to transmit air or water; and
- Shrink-swell potential, which describes whether a soil would change in volume based on moisture content. If a soil’s shrink-well potential is rated moderate to high, there can be potentially adverse effects on buildings, roads, and other structures that are constructed on them.

The soil types in the project area and their characteristics, pertinent to development capability, are listed in Table 4.12-2. The soils tend to be loams to silty-clay loams, relatively permeable, moderately to highly expansive, moderately to highly corrosive to untreated steel and concrete, prone to settlement, but not prone to liquefaction. In their undisturbed state, erosion hazard is low because of the low slopes and fine texture. However, soils with low erosion potential in their natural condition can become erosion-prone when disrupted unless specific measures are taken to control erosion. Because the major adverse effect of potential erosion is sedimentation in drainage ways, this issue is discussed in greater detail Section 4.11, Hydrology, Drainage, and Water Quality, of this EIR. Furthermore, soils in the Specific Plan area have been classified based on their suitability for use as topsoil (the upper most layer of soil, which is the most favorable for plant growth) on lawns, gardens, and roadbanks. The NCRS classifies topsoil as "good," "fair," and "poor" based on soil characteristics and suitability for these uses.[27] Impacts to agricultural resources, including the loss of topsoil, is discussed in Section 4.2, Land Use. Soil in the Specific Plan area has been rated by NCRS as having a low to high erosion potential.

TABLE 4.12-2

SOIL CHARACTERISTICS IN THE PROPOSED PROJECT

Soil Type[1]	Percolating Rate[2]	Expansion Potential[3]	Erosion Hazard[3]	Topsoil[4]	Soil Strength[4]	Corrosion Hazard[3]	Agricultural Capability Class[5]
Brentwood clay	MS	H	VL	F	P	H	I
Capay silty clay loam	S	H	VL	P	P	H	II
Clear Lake clay	S	H	VL	P	P	H	II
Dibble – Los Osos clay loam	S	M-H	M-H	P	P-F	M-H	IV, VI
Pescadero clay loam	S	M-H	VL	P	P	H	IV
Rincon clay loam	S	H	VL	F	P-F	H	II
San Ysidro sandy loam	VS	L-H	VL-M	F	P-F	L-H	III, IV

Notes:

[1] See Figure 4.12-1 for distribution of soil unit

[2] VR = Very Rapid
R = Rapid
MR = Moderately Rapid
M = Moderate
MS = Moderate Slow
S = Slow
VS = Very Slow

[3] VH = Very High
H = High
M = Moderate
L = Low
VL = Very Low

[4] G = Good
F = Fair
P = Poor

[5] I = Few Limitations
II = Moderate Limitations
III = Severe Limitations
IV = Very Severe Limitations
V = Impractical to Cultivate
VI = Severe Limitation; Unsuitable for Cultivation
VII = Very Severe Limitations; Unsuitable for Cultivation
VIII = Preclude from Use for Commercial Planning

Source: USDA – NRCS, 1977

Existing Fill Materials

The Specific Plan area is primarily undeveloped, and soils are in their undisturbed state at most locations. However, there are locations where small deposits of undocumented fill associated with existing roadways and stock ponds are present. These fills can be expected to consist of compressible mixtures of soil and rock fragments.[28]

Residual Soil and Colluvium

The site bedrock is typically covered with a minimum of four feet of residual soil formed from weathering and decomposition of underlying bedrock, which produces a fine-grained soil

containing expansive clays. Slopewash, sloughing/shallow sliding, and soil creep have formed deposits of clay soil identified as colluvium, which likely occur in most swales and at the bases of many slopes at the site. The colluvium typically consists of expansive silty clay with rock fragments, but varies with the composition of the underlying bedrock. The colluvial soils may be unstable because such deposits often contain shear planes, even when there is no visible evidence of recent slope movement.[29]

Other Geotechnical Hazards

Landslides

The geotechnical exploration identified earth flows and debris flows as two different kinds of landslides that could affect the Specific Plan area, including portions where residential development and utility improvements would occur.[30] Landslide deposits are present generally along the southern and eastern edges of the Specific Plan area where the adjacent hillsides are located. A total of 21 landslide sites were identified by the geotechnical report. Five of these were located along the southwest edge of the Specific Plan area, where the proposed golf course would be located. The remaining 17 landslide sites were identified along edges of the Specific Plan area where residences are proposed. The locations of mapped slides are shown in Figure 4.12-3.

Earth flows are a type of landslide that is characterized by mobilization as a viscous, slow-moving mass. Earth flows commonly move by a combination of semi-fluid flow and sliding along weak clay slip planes. Earth flows typically form when cohesive, clayey soils or weak bedrock become saturated during intense rains. Due to their high clay content, they tend to move relatively slowly, and movements usually persist for some time following peak rainfalls. Essentially all of the landslides mapped in the preliminary geotechnical exploration report can be categorized as earth flows.[31]

Debris flows are a type of landslide that can form during major rainfall events when colluvial deposits become saturated and fail, forming a fluid, mobile soil mass. Formation and mobilization of debris flows generally is considered most likely on slopes that are inclined at 2:1 (horizontal:vertical) or steeper. The mobility of debris flows and the potential distance that a flow can travel from the source area is related to the clay content of the colluvium at the source; flows generated from soils with high clay contents typically are less mobile than flows originating from relatively sandy soils. The preliminary geotechnical report concluded that, because of the sandy nature of the site bedrock, debris flows could occur on the steep slopes of the Specific Plan area, especially at the margins of existing landslides.[32]

Mineral Resources

The California Geological Survey (CGS, formerly Division of Mines and Geology) is responsible under the California Surface Mining and Reclamation Act of 1975 (SMARA) for the classification and designation of areas that contain (or could contain) significant mineral resources. The purpose of the identification of these areas is to provide a context for land use decisions by local governments in which mineral resource availability is one of the pertinent factors being balanced along with other considerations. Aggregate resources are classified as one of several different mineral resource zone (MRZ) categories (MRZ-1, MRZ-2a, MRZ-2b, MRZ-3, MRZ-3a, and MRZ-4). These classifications are generally based upon the relative knowledge about the resource's presence and the quality of the material.

The Specific Plan area is not zoned by the County of Solano as a mineral resource zone. The hill areas of the Vaca Mountains that nearly surround the Specific Plan area are in MRZ-3, defined as an area containing mineral deposits the significance of which cannot be evaluated from available data. Lower Lagoon Valley and the I-80 corridor through the Vaca Mountains to central Vacaville are recent alluvial fan deposits containing unsorted clay- to boulder-sized material. These areas appear to be extensions of the MRZ-1 area that includes the rest of Vacaville. MRZ-1 is defined as an area where there is adequate information to indicate that no significant mineral deposits are present. The closest Mineral Resource Sectors identified by the MRZ mapping are approximately 15 miles west of the site in the Napa Valley area.[33,34]

The USGS classifies the vicinity of the Specific Plan area as "effectively concealed by post-accretionary rocks or surficial deposits," which means no metals are known to be mined in the area. According to the California Department of Conservation, Division of Oil, Gas and Geothermal Resources, the project vicinity is not a recognized methane problem area. Implementation of the project would not involve quarrying, mining, or extraction of any known regionally or locally important mineral, oil, or gas resources on-site, nor would it deplete any nonrenewable natural resource or reduce access to a locally-important mineral resource site.[35] Consequently, implementation of the project is expected to have no impact on mineral resources, and this issue is not further evaluated in this EIR.

4.12.3 REGULATORY SETTING

Regulations related to geology and soils in the project area are included in the State and local regulations to protect public safety and environmental quality.

Federal

There are no applicable federal regulations pertaining to seismic hazards.

State

The major State regulations protecting the public from geo-seismic hazards, other than surface faulting, are contained in California Code of Regulations, Title 24, Part 2, the *California Building Code* and California Public Resources Code, Division 2, Chapter 7.8, the *Seismic Hazards Mapping Act*. Both these regulations apply to public buildings and a large percentage of private buildings intended for human occupancy. The California Building Code (CBC) is based on the Uniform Building Code (UBC), which is used widely throughout United States (adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous more detailed and/or more stringent regulations.

The State Earthquake Protection Law (California Health and Safety Code 19100 *et seq*.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC requires a site-specific geotechnical study to address seismic issues and identifies seismic factors that must be considered in structural design. Because the Specific Plan area is not located within an Alquist-Priolo Earthquake Fault Zone, as noted above, no associated provisions would be required for project development related to fault rupture. However, the Specific Plan area is located in Seismic Zone 4, as delineated in the CBC, and it would be required to adhere to design criteria for that zone.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and Appendix Chapter 33 regulates grading activities, including drainage and erosion control, and construction on expansive soils. Construction activities are subject to occupational safety standards for excavation, shoring, and trenching as specified in Cal-OSHA regulations (Title 8 of the CCR) and in Section A33 of the CBC.

Installation of underground utility lines must comply with industry standards specific to the type of utility (e.g., National Clay Pipe Institute for sewers and American Water Works Association for water lines). These standards contain specifications for installation and design to reflect site-specific geologic and soils conditions.

Erosion Control

State regulations pertaining to the management of erosion and sedimentation are described in Section 4.11, Hydrology, Drainage and Water Quality. Although the primary purpose of these regulations and standards is the protection of surface water resources from the effects of land development (such as turbidity caused by sedimentation), measures included in such regulations and standards also reduce the potential for erosion and soil loss. Such regulations include, but are not limited to, the National Pollutant Discharge Elimination System (NPDES) program for management of construction and municipal stormwater runoff, which is part of the federal Clean Water Act and is implemented at the State and local level through issuance of permits and preparation of site-specific pollution protection plans. Sections 1600 through 1607 of the California Department of Fish and Game Code regulates activities that would alter stream characteristics, including sedimentation caused by erosion.

Local

City of Vacaville

The City of Vacaville requires erosion control measures and a grading permit for development projects such as the Proposed Project. Chapter 14.19.244 of the Vacaville Municipal Code identifies specific requirements for owner/developers in order to reduce erosion during construction and grading of new projects. The City of Vacaville has also adopted the CBC, which specifies types of materials, engineering, and design for structures built in the City limits.

Before construction would be permitted, the City Building Code requires a site-specific soils report that identifies any potentially unsuitable soil condition (such as expansive soils) and contains appropriate recommendations for road foundation type and design criteria including provisions to reduce the effects of expansive soils. The recommendations made in the soils report for ground preparation and earthwork are required to be incorporated in the construction design. The soils evaluations must be conducted by registered soil professionals, and the measures to eliminate inappropriate soil conditions must be applied. The design for soil support of foundations must conform to the analysis and implementation criteria described in the City Building Code, Municipal Code, Chapter 14. Because expansive soils are common throughout the City of Vacaville, contractors and soil testing firms are familiar with procedures to identify and eliminate the potential problems involved.

General Plan

Consistency of the Proposed Project with relevant City of Vacaville General Plan goals and policies is presented in Appendix C. As shown in Appendix C, the Proposed Project is consistent with applicable geology and soils goals and policies.

4.12.4 IMPACTS AND MITIGATION MEASURES

Method of Analysis

The analysis of potential geologic, soils, and seismic impacts throughout the Specific Plan area is based on site-specific preliminary geotechnical report and other available technical reports, as well as published information describing the Specific Plan area and the region's geologic characteristics. The site-specific information sources cited in this section include the following: *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, July 25, 2003, and *Preliminary Geotechnical Exploration, Commercial Development, Lagoon Valley, Vacaville, California*, August 14, 2003, both prepared by ENGEO Incorporated. The reports are available for review at City of Vacaville, Community Development Department, Planning Division, 650 Merchant Street, Vacaville, California.

The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section. In addition to reviewing available reports, a site reconnaissance of the Specific Plan area was conducted to visually confirm landforms, slopes, and general soils characteristics. In determining the level of significance, the analysis assumes that the Proposed Project would comply with relevant federal, State, and local ordinances and regulations.

Review of the site-investigation requirements that must be met to comply with the City and State building codes and City policies and standards indicates that concerns related to seismic groundshaking and soil stability (including collapse, liquefaction, and expansion) are required to be addresses by the project applicant's geotechnical team during the permitting process. Information from the reports of those investigations is required to be incorporated in the project Plans and Specifications.

Standards of Significance

For purposes of this EIR, impacts would be 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 groundshaking; seismic-related ground failure, including liquefaction; and landslides;
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geological or soil unit 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 UBC, creating substantial risks to life or property; or

- 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.

Effects Determined to Have No Impact

The following discussion describes impacts that would not occur as a result of the Proposed Project.

The Specific Plan area is not in a State of California Earthquake Fault Hazard Zone, and no known active earthquake faults have been mapped on the site.[36] As discussed previously in the Environmental Setting, the Lagoon Valley fault is not considered an active or a potentially active fault. Based on these findings, the potential for fault rupture at the Specific Plan area is considered low.[37] There would be no impact related to major faulting and/or surface rupture conditions because these conditions do not exist in the Specific Plan area.

The Proposed Project does not include construction or installation of septic tanks or alternative forms of wastewater disposal requiring stable soil conditions. The Proposed Project wastewater utilities include the installation of sewer lines that would be connected to a City sewage treatment plant. Therefore, impacts associated with the installation of septic systems would not occur.

Project Impacts and Mitigation Measures

4.12-1 Implementation of the Proposed Project could expose people or structures to potential risks caused by earthquake activity, including strong seismic groundshaking and seismic-related ground failures such as liquefaction and earthquake-induced landslides.

Based on the historic seismicity of the region and proximity to regional faults, it is probable that the Specific Plan area would be affected by at least one moderate to large earthquake during the lifetime of the Proposed Project, irrespective of whether the Proposed Project was implemented. The preliminary geotechnical report concluded that because of the soils types at the Specific Plan area, there is a low potential for liquefaction, ground lurching, and lateral spreading, although such effects cannot be entirely precluded. A moderate to major earthquake near the Specific Plan area could produce groundshaking and earthquake-induced landslides. Earthquake-induced groundshaking at the Specific Plan area could result in loss of life or damage to property including damage to, or failure of, structural and non-structural building and road components. Utility service could be disrupted resulting in unsanitary or unhealthful conditions (e.g. broken water supply or sewer lines), or possible fires or explosions from damaged natural gas lines.

To reduce and avoid the risks associated with seismically induced groundshaking, the Proposed Project would take the location and type of subsurface materials into consideration when designing foundations and structures for the site. As stated in the City of Vacaville General Plan Policies 9.1-I2 through 9.1-I4, residential buildings and their associated infrastructure are required to reduce the exposure to potentially damaging seismic vibrations through seismic-resistant design, consistent with the CBC. Project design would be required to include the application of CBC Seismic Zone 4 Standards as the minimum seismic-resistant design for all proposed facilities; additional seismic-resistant earthwork and construction design criteria, based on the site-specific recommendations of a California Certified Engineering Geologist in

cooperation with the project's California-registered geotechnical and structural engineers; engineering analyses that demonstrate satisfactory performance of any unsupported cut or fill slopes, and of colluvium and/or fill where they form part or all of the support for structures, foundations and underground utilities; and an analysis of soil expansion potential and appropriate remediation (compaction, removal-and-replacement, etc.) prior to using any expansive soils for foundation support. To mitigate for potential landslides, the preliminary geotechnical report indicated that feasible mitigation could include removal of landslide debris, replacing landslides with engineered fill, and providing tow buttresses, debris benches, and setback areas. However, because site-specific geotechnical studies have not been conducted for the Proposed Project uses (e.g., residential subdivision, business village, and underground utilities), that include specific recommendations for design criteria to limit potential impacts associated with seismic activity, this is considered a ***potentially significant impact.***

Mitigation Measures

Implementation of the following mitigation measure would reduce impacts related to seismic groundshaking to a *less-than-significant level*.

4.12-1 (a) *Prior to issuance of Grading or Building Permits, the applicant shall provide the City with site-specific geotechnical report(s) for the residential subdivision/golf course, business village, and utility areas as a condition of grading or building permit approval. The site-specific geotechnical report(s) shall include detailed design for foundations, structures, roadways, infrastructure, and related facilities that conform to: (1) current standards for development in Seismic Zone 4 in accordance with the CBC; (2) current standards for development in areas near mapped and/or likely landslide areas or unstable slopes in accordance with the CBC; and (3) recommendations in the preliminary geotechnical report prepared for the residential subdivision/golf course ("Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California" dated July 2003) and business village ("Preliminary Geotechnical Exploration, Commercial Development, Lagoon Valley, Vacaville, California" dated August 2003). Project developers shall implement the recommendations of these reports and site-specific geotechnical reports.*

(b) *Implement Mitigation Measure 4.12-3 (Mitigate Landslide Hazards) and 4.12-4 (Water Storage Tank Siting).*

The preliminary geotechnical report noted that while conformance with current building code recommendations does not guarantee that significant damage would not occur in the event of a maximum magnitude earthquake, it is reasonable to expect that a well-designed and well-constructed structure would not collapse in a major earthquake and, therefore, would not expose persons or structures to significant risks or hazards.[38] Implementation of Mitigation Measure 4.12-1(a) and (b) would ensure that project design incorporates all required design and construction features appropriate for site-specific geologic conditions, which would reduce the potential for substantial adverse effects, including risk of loss, injury, or death due to strong groundshaking. Implementation of these Mitigation Measures along with Mitigation Measures 4.12-3 and 4.12-4, which address landslide hazard, in combination with Mitigation Measures 4.12-1(a), would mitigate this impact to a less-than-significant level.

4.12-2 Implementation of the Proposed Project could result in short-term soil erosion.

The following analysis focuses on the potential for short-term erosion related to geologic changes from project excavation and construction.

Natural forces, both chemical and physical, are continually at work breaking down soils. Erosion poses two hazards: (1) it removes soils, thereby undermining roads and buildings and producing unstable slopes, and (2) it deposits eroded soil in reservoirs, lakes, drainage structures, and on roads as mudslides. Natural erosion frequently is accelerated by human activities such as site preparation for construction and alteration of topographic features.

Development of the Proposed Project would alter the topography of the Specific Plan area permanently through site preparation (e.g., grading) and the construction of project features. While the amount of surface alteration necessary to accommodate the Proposed Project is not considered a significant geologic change in itself, the alteration of topographic features may lead to increased erosion by creating unstable rock or soil surfaces, by changing the permeability or runoff characteristics of the soil, or by modifying or creating new pathways for drainage.

Although the Specific Plan area is not completely level, it is underlain by soils that exhibit minimal erosion hazard, and because there would be no substantial modification of any significant above-ground topographic features (other than that required to stabilize known or potential landslide areas [see Impact 4.12-4, below]), there would be minimal, long-term geotechnical effects related to erosion. In the more level areas of the Specific Plan area, there would be structures, roadways, and landscaping that, in the long term, would cover any soils exposed during construction, which would reduce erosion hazard. Long-term impacts would not be considered significant.

However, short-term erosional effects could occur as a result of Proposed Project construction activities including excavation and trenching for foundations and grading to remove soil for use in the proposed landscape berm.

Excavation and Trenching

For project features that would involve construction of subsurface components, including trenching and installation of a sewer line under I-80 if the gravity sewer option is selected and under Butcher Road trail if the force main is selected, side slopes created in excavations and trenches could be eroded by natural forces if proper slope angles are not maintained. In addition, improperly shored slopes can also create hazards to construction workers.

Before allowing construction at the Specific Plan area, the City would require a completed report of the investigation of the soil conditions, including evaluations of potential erosion conditions. Coordination with the California Department of Transportation (Caltrans) would also be required for the gravity sewer option to ensure compliance with Caltrans specifications. The evaluations must be conducted by registered professionals, and measures to reduce or eliminate erosion be applied, depending on the soil conditions. The recommendations of the investigation reports are required to be incorporated in the construction plans for the design of the project. Appropriate measures to control grading and protect excavations from erosion would need to be identified in site-specific geotechnical studies completed in conjunction with project approvals, as discussed above. The site-specific geotechnical reports would identify any necessary site preparation and/or project design specifications needed to provide erosion control and to ensure

excavation and trenching safety. The applicant is required to ensure grading permits are obtained and erosion control measures are used and monitored for effectiveness. Applicable OSHA requirements for shoring and stabilizing open excavations and trenches would be incorporated into construction contract specifications.

Grading and Excavation for Landscape Berm Construction

A landscape berm is proposed to be constructed along the southwestern part of the Specific Plan area. The berm would be constructed from soil obtained from grading the proposed residential/golf course area of the Specific Plan area. According to Section 9 of Specific Plan, and project applicant's engineer, it is anticipated that large areas of the residential/golf course area would be graded and excavated at one time to obtain a sufficient volume of soil to create the berm so that it is completed during the first phase of project development. As a result, there would be several hundred acres of exposed soil in the Specific Plan area prior to buildout because the number of units that could be developed in one year would be limited under the terms of the Development Agreement. This would, in turn, limit the amount of impervious or landscaped surfaces developed in a given year that would help minimize erosion. The remaining exposed soils could be exposed to erosion, primarily from wind and/or water.

For a discussion of potential effects on water quality caused by erosion and sedimentation caused by construction activities, urban runoff, and sediment loading from upstream drainages please see Impacts 4.11-3 and 4.11-4 in Section 4.11, Hydrology, Drainage and Water Quality. Further, for a discussion of potential effects on air quality caused by wind erosion and dust caused during construction activities, please see Impact 4.6-1 in Section 4.6, Air Quality.

At this time, only preliminary geotechnical investigations have been performed. There are no site-specific geotechnical reports for soil conditions or site-specific excavation and construction plans. Therefore, there is no specific information on erosion impacts, and this would be considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.12-2 (a) *Implement Mitigation Measure 4.11-3.*

(b) *Implement Mitigation Measures 4.12-1(a) and 4.12-3.*

(c) *If the gravity sewer line option is selected, the project developer shall comply with Caltrans recommendations, prior to final Building Permit, to ensure that the location, design, and construction methods for the segment passing under I-80 and within Caltrans right-of-way conform to Caltrans specifications.*

(d) *All soil areas remaining exposed after grading and excavation for building sites, utility corridors, or for obtaining fill material for the landscape berm and not developed with project features shall be immediately stabilized through hydroseeding, geotextiles, or other equally effective measures as identified in site-specific geotechnical reports.*

(e) *Implement Mitigation Measure 4.6-1 (a).*

Implementation of Mitigation Measures 4.12-2(a) through (e) would ensure that appropriate construction techniques are employed to minimize short-term erosion effects and reduce impacts to *less-than-significant levels*.

4.12-3 Development of residential and golf course uses along the eastern, southern, and western boundaries of the Specific Plan area would occur at or adjacent to locations where unstable soils and/or landslide hazards are known or may exist.

Most of the areas proposed for development are flat-lying and are stable in their undisturbed state. However, as discussed in the Environmental Setting, deposits of colluvium are likely present in most swales and ravines and at the bases on many slopes around the proposed residential component of the Specific Plan area. The colluvial soils are considered potentially unstable, even though there is no visible evidence of recent slope movement. The preliminary geotechnical study prepared for the Proposed Project identified 21 potential landslide areas along the boundary of the Specific Plan area on the east, south, and west. As illustrated in Figure 4.12-3, five of the areas are located along the southwest edge of the Specific Plan area, where the proposed golf course would be located. The remaining 17 landslide sites are along edges of the Specific Plan area where residences would be located. All of the mapped landslides are considered earthflows, which tend to move slowly and usually persist for some time following intense rainfall. Debris flows, which can also form during periods of peak rainfall events and may be more mobile than earthflows, could occur on steeper (generally 2:1 or greater) slopes, especially at the margins of existing landslides.

Development of the proposed residential uses and golf course along the project perimeter where unstable slopes have been mapped or are presumed to exist would increase the number of people and structures that could be subject to increased risk as a result of slope failure(s). The actual extent of damage would depend on the type of downslope movement and the intensity and/or type of development at a particular location at the base of the slopes. Based on the information from the preliminary geotechnical reports, potential landslide hazards at the Specific Plan area do not appear to pose any significant constraints that cannot be overcome through the application of standard engineering practices, compliance with the CBC and City of Vacaville General Plan Policies (see 9.1-I4, 9.1-I5, and 9.1-I9 through 9.1-I11), and building permit requirements. The preliminary geotechnical report identified conceptual remedial measures to address unstable slopes that could affect property developed close to the base of the slopes (see Figure 4.12-3).

Because the mitigation measures are conceptual and not based on a site-specific geotechnical report, and because portions of the Proposed Project would be located on a geological or soil unit that is unstable, the Proposed Project could expose people and structures to potential hazards. This is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.12-3 (a) *Implement Mitigation Measure 4.12-1(a).*

(b) *Prior to Grading and Building Permits, when the locations of individual lots, building pads, roadways, and related facilities are more fully known, for each*

location that could be affected by landslide hazard, the results of a design-level geotechnical investigation shall be used to identify the specific landslide hazard reduction method(s) that shall be used to protect project features. Mitigation for landslides could include, but would not be limited to: complete removal of slide debris; reconstructing the slide area with drained, engineered fill; buttressing the slide areas; designing the Proposed Project in areas away from landslides; or equally effective measures. Landslide risk reduction methods shall be implemented during grading activities and prior to construction of improvements.

(c) *Prior to occupancy of residential units that could be affected by unstable slopes, a landslide hazard monitoring plan shall be developed by a registered engineer to be implemented during the life of the project. The plan shall, at a minimum: identify methods for routine investigation of slopes surrounding the Specific Plan area to inspect the effectiveness of controls installed; describe procedures for identifying new hazards and implementing appropriate controls and/or corrective actions; annual report to City staff and applicants and a documentation and reporting mechanism to City staff and applicants.*

Implementation of Mitigation Measures 4.12-3 (a) through (c) would reduce this impact to a less-than-significant level by ensuring project design and construction includes features appropriate for site-specific geologic/soils conditions, as well as landslide hazard at potentially affected locations, which would reduce the risk to people and property. It would also ensure that controls are effective and upgraded or corrected, as necessary, that potential new hazards are identified and managed, and that City staff and the project developer are notified of potential concerns.

4.12-4 Development of potable water storage tanks and associated infrastructure to serve the southern portion of the Proposed Project could occur at or adjacent to locations where unstable soils and/or landslide hazards are known or may exist.

The water supply infrastructure analysis for the Proposed Project (see Section 4.8, Public Utilities) indicates that one water storage tank would be constructed in Zone 2, and a second tank could be placed in Zone 3 above the anticipated residential service areas in the southern part of the Specific Plan area. The Zone 2 tank (2.8 million gallons) would be southwest of the proposed Village III. The Zone 3 tank (0.25 million gallons), if constructed, would be generally located in the southeast residential portion of Village III. Alternatively, Zone 3 could be served by a hydropneumatic pump station at lower elevation in Village III. Infrastructure (pipelines and pumping systems) to connect the tank(s) to the project distribution network would also be installed. The general locations and elevations of the tanks have been identified for purposes of preliminary hydraulic modeling to determine pipe sizes and flow ratings. Based on these preliminary project maps, it is possible that one or both of the tanks, and associated infrastructure, could be situated in mapped or suspected landslide areas. The proximity to unstable slopes, if not mitigated, would increase the potential for tank or transmission system damage or failure, if slope failure were to occur. This could result in a slow or catastrophic release of over a million gallons of water, which could causing flooding in the flat-lying portions of the Specific Plan area. Potable water service could also be disrupted. The potential to reduce potable water supply or result in property damage and risk to occupants is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level.*

4.12-4 (a) *Prior to final tank site selection, the results of a site-specific geotechnical study shall be used to identify specific tank site and infrastructure locations to serve Zones 2 and 3 that would be unlikely to be subject to unstable slopes. If alternative tank site(s) and/or pipeline routing to avoid known or potentially unstable slope areas cannot be identified, the recommendations for mitigating potential slope hazards identified in the geotechnical report prepared for the residential subdivision/golf course ("Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California" dated July 2003) shall be implemented prior to construction of the tanks and the pipelines. Tanks and pipelines shall be designed and constructed in accordance with applicable professional standards, as determined by the City.*

(b) *Implement Mitigation Measure 4.12-3(c).*

As discussed for Impact 4.12-3, the preliminary geotechnical report identified conceptual remedial measures to address unstable slopes at the Specific Plan area. For the mapped landslide areas in the general vicinity of the proposed tank locations, the recommended measure for mitigating potential hazards consists of constructing shear keyways near the toe of the slide and buttress/catchment areas for the remaining upslope portion. Implementation of Mitigation Measures 4.12-4 would ensure project design and construction includes features appropriate for site-specific geologic/soils conditions and professional standards for public water supply systems, which would reduce the risk to people and property. It would also ensure that controls are effective and upgraded or corrected, as necessary, that potential new hazards are identified and managed, and that City staff is notified of potential concerns.

4.12-5 Implementation of the Proposed Project would result in the development of structures and roadways that could be affected by subsurface geologic and soils characteristics.

The preliminary geotechnical report prepared for the Proposed Project identified expansive soils and bedrock materials and the swell/settlement potential of proposed fills as the main soils geotechnical concerns. Alkali soils at the site could also affect foundations.[39] These conditions would result in ***potentially significant impacts***, and are described below.

<u>Expansive Soils</u>

As discussed in the Environmental Setting, native subsurface soils at the Specific Plan area are characterized by high shrink-swell potential. The physical forces resulting from the shrink-swell processes of the soils can exert pressure on foundations and infrastructure lines which, in turn, could cause pipeline and foundation damage, resulting in potential human health and/or environmental hazards. This is considered a potentially significant impact.

Construction of the Proposed Project would involve grading activities to produce the desired engineered and landscaped residential, business, and open space uses. Grading of the Specific Plan area would use heavy equipment to loosen the soil, so it could be moved and graded to engineering specifications. Soils that have been moved and regarded would be

susceptible to settlement if they were not recompacted to appropriate foundation support specifications.

Settlement/Differential Compaction

Fine-grained soils are subject to seismic settlement and some differential compaction. The extent of settlement or compaction may range from a few inches to several feet, depending on the initial density of the soil, its moisture content, and the loads placed upon it. The potential for differential compaction is highest during large earthquakes when vertical and lateral forces are applied to the soils. Given the nature of the soils at the site (e.g. undocumented fill associated with existing roadways and stock ponds and colluvium) and the potential for strong groundshaking during an earthquake, some compaction and settlement would be expected at the site. The amounts would be calculated during the design-level geotechnical investigation for the project and appropriate mitigation measures would be included in the plans and specifications at that time. These mitigation measures could include such methods as higher compaction specifications for areas where deeper backfill has been placed, moisture conditioning of clayey fill materials to above-optimum moisture content, placing part or all of the structures on pile-supported foundations (driven, drilled, or cast-in-place), hardening the supporting soils with lime treatment, installing geo-fabrics to isolate the structures from the weak soils, or excavating the weak soils and replacing them with engineered fill.

Land subsidence is similar to the process of settlement in that it lowers the land surface. Subsidence can be caused by continued compaction, consolidation or settlement of young sediments, such as fine-grained colluvium, particularly under filled land. Several factors contribute to the potential for destabilization and sinking (subsidence) of ground. These include ground composition (rock, soil, fill, etc.), degree of saturation (high groundwater, dewatered, etc.), level of vibration (digging, pile driving, seismicity, etc.), and protection methods used to prevent subsidence (excavation support, soil grouting, compaction, etc.). Subsidence is of concern because structures (buildings, roads, utility lines) founded on ground that subsides would be subject to displacement and damage. The combination of loose or poorly compacted soils and fill, and high groundwater conditions that lead to the need for sheet pile driving (vibration) and dewatering of an excavation exist in such deposits as dune sand, young alluvium, colluvium, and undocumented fill. Some vibration from digging equipment, whether trenching for utilities or excavating for foundation, would occur throughout the Specific Plan area.

The effects of subsidence would be prevented by using methods adapted to the site-specific conditions where subsidence may occur. Trenches or foundation excavations in loose soil or fill would be supported using the methods previously described to prevent slumping, thereby preventing ground movement under adjacent road surfaces, utility lines or structures. Other techniques that could be used, as appropriate, to augment or replace sheet pile driving include various types of soil grouting and compaction. Grouting creates an artificial cementation of the soil or fill material making it more rock-like and stable prior to excavation. Compaction makes the soil or fill more dense, allowing for easier excavation and better trench-wall stability. Dewatering of a given construction site could be necessary if there were a shallow groundwater table in the area, but should be limited to the immediate vicinity of the excavation to avoid subsidence of surrounding soils by causing them to densify during drying. Grouting prevents groundwater from draining out of the surrounding formations, thereby avoiding potential densification through drying. Vibration from trench or foundation excavation should be reduced through the choice of equipment and methods that limit vibrations to non-damaging levels.

Based on available information, soil conditions at the Specific Plan area do not appear to pose any significant constraints that cannot be overcome through the application of standard engineering practices and compliance with the CBC and City of Vacaville General Plan Policies (see Regulatory Setting) and building permit requirements. Successful construction on expansive soils requires special attention during construction. Building damage due to volume changes associated with expansive soils can be reduced through proper grading and foundation design. For example, the preliminary geotechnical report indicated that keeping exposed soils moist by watering for several days before concrete placement would help reduce the need to remoisturize clayey soils through excavation, moisture conditioning, and recompaction. For foundations, rigid structural mat systems such as post-tensioned foundations or structural mats would be suitable to support residential structures. Design-level studies would be needed to supplement the recommendations of the preliminary geotechnical report to identify specific foundation stiffening requirements to reduce differential movements from heaving to a value compatible with the type of structure. These general recommendations, along with others addressing secondary slab-on-grade construction and pavement design for expansive soils, would also be addressed in the Building Permit. However, without the implementation of these recommendations, these conditions would result in potentially significant impacts.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.12-5 *Implement Mitigation Measure 4.12-1.*

A site-specific geotechnical evaluation prepared by the applicant and required as part of the building permit process in the City of Vacaville, would identify locations where special construction and design methods would be needed and would include specific technical recommendations for alleviating constraints due to high shrink-swell potential or other soil constraints. The applicant would be required to comply with the recommendations set forth in the geotechnical evaluation, per the City's building permit process.

4.12-6 Construction of a landscape berm adjacent to the golf course and residential development in the southwestern part of the Specific Plan area could result in exposure of people and property to unstable slopes.

The Proposed Project includes construction of a landscaped berm along the southwestern part of the Specific Plan area. The berm would be used to partially obscure views of the golf course and the northern portion of the residential subdivision from a major view corridor along I-80 (see Section 4.4, Visual Resources). It would be constructed to its anticipated maximum height and size by the time the golf course and the first phase of residential units are completed to minimize disruption of the golf course. As currently proposed, the berm would be approximately 35 to 50 feet above ground surface at its highest point and would connect with existing topography and would be contoured to resemble an extension of the natural landform to the south. When completed, the berm would be stabilized with native materials and plantings similar to existing species (e.g., native grasses) and would be designated as City open space.

The project applicant's engineer has developed a preliminary grading plan for the Specific Plan area that shows the approximate finished grade for the berm. Soils removed during grading and site preparation for the residential and golf course components would be used to create the berm, minimizing the need for imported material. Soils that would be obtained from the golf

course and residential areas that would be used to construct the berm have varying physical properties that, if not accounted for in project design, could become unstable if not properly conditioned, compacted, or otherwise stabilized. The geotechnical design for the berm that would include specific features to ensure slope stability has not yet been completed (although it would be required as part of the City's grading permit review process.) Nevertheless, land uses adjacent to the slope could be exposed to increased landslide risk resulting in injury and/or property damage. This is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of Mitigation Measures 4.12-6(a) through (b) would reduce this impact to a *less-than-significant level.*

4.12-6 (a) *Prior to construction of the berm, the results of a geotechnical design evaluation prepared by a registered professional engineer or engineering geologist shall be used to identify specific construction methods to be used to create the landscape berm, taking into account local climate, geologic, and seismic conditions. The design shall be submitted to the City Engineer for review and approval. Contract specifications shall incorporate the approved engineering design.*

(b) *Prior to occupancy of the first residential unit, or golf course use, whichever comes first, the City shall develop a plan that identifies City inspection and maintenance procedures to evaluate berm stability. The plan shall also address procedures to correct deficiencies and identify funding mechanism(s) to ensure long-term maintenance.*

(c) *Implement Mitigation Measure 4.12-2(d).*

Specific features identified through the design-level study, which would be incorporated into contract specifications, and a plan for long-term inspection and maintenance would ensure that the landscape berm would not create a substantial slope instability hazard to site occupants and visitors.

ENDNOTES

1. Jennings, C.W., *An Explanatory Text to Accompany the 1:750,000 Scale Fault and Geologic Maps of California*, California Department of Conservation, Division of Mines and Geology (now the California Geological Survey), Bulletin 201, 1985.

2. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, pp. 3 and 7.

3. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p.10.

4. A logarithmic scale developed in 1935 to 1936 by Dr. Charles F. Richter and Dr. Beno Gutenberg to measure earthquake magnitude (M) by the amount of energy released, as opposed to earthquake intensity as determined by local effects on people, structures, and earth materials (for which, see Modified Mercalli Intensity Scale). Each whole number on the Richter scale represents a 10-fold increase in amplitude of the waves recorded on a seismogram and about a 31-fold increase in the amount of energy released by the earthquake. Because the Richter scale tends to saturate above about M7.5, it is being replaced in modern seismologic investigations by the moment magnitude (MW) scale (see above).

5. A logarithmic scale used by modern seismologists to measure the amount of energy released by an earthquake. For the purposes of describing this energy release (i.e. the "size" of the earthquake on a particular fault segment for which seismic-resistant construction must be designed) the moment magnitude (M_W) of the characteristic earthquake for that segment has replaced the concept of a maximum credible earthquake of a particular Richter magnitude. This has become necessary because the Richter scale "saturates" at the higher magnitudes; that is, the Richter scale has difficulty differentiating the size of earthquakes above M7.5. The M_W scale is proportional to the area of the fault surface that shifts (slips) during an earthquake, and, thus, is directly related to the length of the rupture. It reflects the amount of "work" (in the sense of classical physics) done by the earthquake. Although the numbers of the M_W scale may appear lower than those of the traditional Richter magnitudes, they convey more precise (and more useable) information to geologists and structural engineers.

6. A 12-point scale of earthquake intensity based on local effects experienced by people, structures, and earth materials. Each succeeding step on the scale describes a progressively greater amount of damage at a given point of observation. Effects range from those which are detectable only by seismicity recording instruments (I) to total destruction (XII). Most people will feel Intensity IV ground motion indoors and Intensity V outside. Intensity VII frightens most people, and Intensity IX causes alarm approaching panic. The scale was developed in 1902 by Giuseppi Mercalli for European conditions, adapted in 1931 by American seismologists Harry Wood and Frank Neumann for conditions in North America, and modified in 1958 by Dr. Charles F. Richter to accommodate modern structural design features.

7. a) Jennings, C.W., *Fault Activity Map of California and Adjacent areas, with locations and ages of Recent Volcanic Eruptions*, Geologic Data Map No. 6, California Geological Survey, 1994, scale 1:750,000, accompanied by 92 pages of explanatory text.

b) Association of Bay Area Governments, *The San Francisco Bay Area On Shaky Ground*, Publication Number P95001EQK, April 1995, 56 pages, 13 maps, scale 1:1,000,000.

8. Wallace, R.E., "General Features", in Wallace, R.E., ed. *The San Andreas Fault System, California*, U.S. Geological Survey Professional Paper 1515, January 1990, pages 3-12.

9. Bortugno, E.J., *Map Showing Recency of Faulting*, Santa Rosa Quadrangle, California Geological Survey (formerly the Division of Mines and Geology), Regional Geologic Map Series, No. 2A, Sheet 5, scale 1:250,000.

10. Jennings, C.W., *Fault Activity Map of California and Adjacent areas, with locations and ages of Recent Volcanic Eruptions*, Geologic Data Map No. 6, California Geological Survey, 1994, scale 1:750,000, accompanied by 92 pages of explanatory text.

11. Environmental Science Associates, *Nut Tree Ranch Development Project, Draft Environmental Impact Report*, March 2002, p. 4.6-4.

12. Working Group on California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 - A Summary of Findings,* United States Geological Survey Open File Report 99-517, Online Version 1.0, 1999.

13. a) D. Borderdt, *et al.*, *Maximum Earthquake Intensity Predicted on a Regional Scale*, United States Geological Survey, Miscellaneous Field Investigations Map MF-09, 1975, scale 1:125,000.

b) Steinbrugge, K.V., J.H. Bennett, H.J. Lagorio, J.F. Davis, G.A. Bordardt and T.R. Toppozada, *Earthquake Planning Scenario for a Magnitude 7.5 Earthquake on the Hayward Fault in the San Francisco Bay Area*, California Geological Survey, Special Publication 78, 1987, 243 pages, 12 scenario maps, scale 1:200,000, see maps and accompanying text on adjacent page.

14. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 18.

15. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 11.

16. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 11.

17. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 19.

18. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 3.

19. Association of Bay Area Governments, Earthquake Hazard Map for Vacaville Scenario: Concord-Green Valley Fault, website http://www.abag.ca.gov, accessed on August 20, 2003.

20. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 19 and ENGEO Incorporated, *Preliminary Geotechnical Exploration, Commercial Development, Lagoon Valley, Vacaville, California*, 2003, p. 8.

21. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 20.

22. Association of Bay Area Governments, Liquefaction Map for Bay Area, website http://www.abag.ca.gov, accessed on August 13, 2003.

23. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 20.

24. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 20.

25. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 20.

26. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 8.

27. U.S. Department of Agriculture, NCRS, *Soil Survey of Solano County, California* May 1977, pp. 81 through 94.

28. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, pp. 12 and 20.

29. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, pp. 7 through 8.

30. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 8.

31. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 8.

32. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 9.

33. Stinson, M.C., M.W. Manson, and J.J. Plappert*, Mineral Land Classification: Aggregate Materials in the San Francisco — Monterey Bay Area, Part III: Classification of Aggregate Resource Areas, North San Francisco Bay Production — Consumption Region*, California Geological Survey, Special Report 146, Part III, 1983, Plate 3.2 (scale 1:125,000).

34. D.L. Dupras, J. Lloyd, S.L. Kohler, and P.A. Lowry, *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento – Fairfield Production —*

Consumption Region, California Geological Survey, Special Report 156, 1988, Plates 31 and 32 (scale 1:48,000).

35. Albers, J.P., and Fraticelli, L.A., *Preliminary Mineral Resource Assessment Map of California*, United States Geological Survey, Mineral Investigations Resource Map MR-88, 1984, scale 1:1,000,000.

36. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 18.

37. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 19.

38. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Commercial Development Lagoon Valley, Vacaville, California*, 2003, p. 9.

39. ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, 2003, p. 12.

4.13 HAZARDS AND HUMAN HEALTH

4.13 HAZARDS AND HUMAN HEALTH

4.13.1 INTRODUCTION

This section describes the potential adverse impacts on human health due to exposure to hazards that could result from the Proposed Project. Hazards evaluated include those associated with existing identified or suspected contaminated sites, potential exposure to hazardous materials used, generated, stored, or transported in or immediately adjacent to the Lower Lagoon Valley Specific Plan area (Specific Plan area), and potential hazards associated with previous contamination of soil and groundwater. Included in the discussion is a summary of applicable hazardous materials laws and regulations and agencies responsible for their implementation. Potential hazards and associated impacts related to toxic air contaminant emissions are discussed in Section 4.6, Air Quality, of this EIR. Issues related to proximity to airport safety zones are addressed in Section 4.2, Land Use and Agricultural Resources.

Sources of information to describe existing conditions and for the analysis are identified in the endnotes. These sources include a variety of City planning documents, agency and provider correspondence (e.g. the Specific Plan), consultation with City staff, and published technical information available through various websites. Primary sources reviewed during preparation of this section include ENGEO's P*hase One [I] Environmental Site Assessment Phase, Lagoon Valley, (hereafter referred to as Residential Portion)* and P*hase One [I] Environmental Site Assessment Phase, Lagoon Valley Commercial and Utility Corridors, (hereafter referred to as Business Portion)* (September 30, 2003) for the Proposed Project. Both documents are included as Appendix K of this EIR.

Information referenced in the endnotes in this section is available for review at the City of Vacaville, Community Development Department, Planning Division, 650 Merchant Street, Vacaville, California.

Comments received in response to the NOP (see Appendix B) for this project expressed concern about the potential anthrax contamination associated with previous domestic farm animal operations (carcasses and/or soil contamination) at the Specific Plan area. Other comments were directed at potential wildland fire hazard. All of these issues are addressed in this section.

4.13.2 ENVIRONMENTAL SETTING

The presence of hazardous materials or other safety hazards is a part of everyday urban life that could affect residents, workers, and visitors within and adjacent to the Proposed Project. Some of these activities can pose a risk of exposure to people or the environment due to accidental releases, such as spills, or as a result of soil or groundwater contamination related to past uses of properties within and adjacent to the Specific Plan area. Transportation of hazardous materials through or near the Specific Plan area could also present hazards.

The following section discusses existing and Proposed Project land uses that have the potential to result in accidental releases of hazardous materials or present other health risks and

identifies existing and proposed hazardous materials management programs applicable to the Proposed Project. For purposes of this EIR, the term "hazardous materials" refers to both hazardous substances and hazardous wastes.[1]

Specific Plan Area

Existing and past uses of the Specific Plan area, including Hines Nursery, an automobile wrecking yard, and former gliderport, could have resulted in the use and storage of hazardous materials and/or wastes, which could have resulted in the release of hazardous compounds into the soil or groundwater.

Phase I Environmental Site Assessments (ESAs) are used to assess whether potentially hazardous materials are located on a property. Standards for Phase I ESAs have been developed by the American Society for Testing and Materials (ASTM) and are used routinely to determine the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products, onto the surface or into the ground, groundwater or surface water of the property. If a Phase I ESA finds that hazardous materials found on the property may have been released, then a Phase II ESA is usually recommended. A Phase II investigation typically includes collection and analysis of soil and water samples. Based on the results, the Phase II ESA may recommend additional testing, remediation, or other controls to address contamination. Two Phase I ESAs were completed for the Specific Plan area (see Appendix K) and are discussed in detail below.

Results of Phase I Environmental Site Assessments

Two Phase I ESAs were completed for the Specific Plan area by ENGEO Incorporated in September 2003; one for the residential and golf club portions of the Proposed Project; the other for the business village portion. These Phase I ESAs included historical information, an environmental database search, aerial photography, topographic maps, and a site visit to determine the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products, onto the surface or into the ground, groundwater or surface water of the property. Neither Phase I ESA found that the Specific Plan area was listed on the Cortese list, or list of hazardous sites, pursuant to California Government Code Section 65962.5.

Specific Plan Area

The following summarizes information from the ESA for the Specific Plan area.

Hines Nursery Property

Hines Nursery occupies approximately 168 acres of land in the central eastern portion of the Specific Plan area and is currently used for nursery operations. Hines Nursery has been in operation in this location since approximately 1977, and since that time has been using a wide variety of pesticides and fertilizers in its routine operations. The western portion of the Hines Nursery parcel has been used in the past for limited dry land farming and cattle grazing. The western half of the Hines Nursery property is currently fallow farmland and a few cattle were observed grazing along the southern boundary of the nursery property. Former homestead sites were once located in Solano County Assessors' Parcel Numbers (APNs) 167-020-120,

167-020-110, and 128-040-180.[2] The Hines Nursery was identified in several of the state and local environmental databases for the presence of active or inactive underground storage tanks (USTs) and as a California Water Resources Control Board Waste Discharge System (WDS) facility.

Several above ground storage tanks (ASTs) were observed on the property, including one 5,000-gallon AST, with a partition, that holds diesel and gasoline, and two ASTs that contained, separately, liquid ammonium nitrate and liquid potassium nitrate. These ASTs were located adjacent to the Hines Nursery maintenance and operation buildings. The ground surface and soil directly beneath or surrounding these tanks was observed to have staining, indicating past spills and/or leaks from these tanks. In the case of the liquid fertilizers, the staining was observed as "heavily stained."[3] No further ground or soil staining was observed in the Hines Nursery property.[4] Four USTs on the property were removed between 1997 and 1998: one 12,000-gallon diesel fuel UST; one 12,000-gallon gasoline UST; one 250-gallon waste oil UST; and one 8,000-gallon pesticide rinsate UST.[5] This latter UST was used to store the liquid from rinsing of equipment used to fertilize plants at the nursery.

After removal of the fuel USTs, a letter from the Solano County Department of Environmental Management (SCDEM) regarding the removal of the tanks showed that there were no " 'significant contamination…found in the tank excavation' " pit or soil around them. The letter also stated that there was no further action required for these USTs. In addition, the SCDEM authorized the closure of groundwater monitoring wells that were used for monitoring leaks from the USTs.[6]

Potential areas for groundwater contamination were investigated by the ESA. Two previous ESAs for the Hines Nursery property were reviewed and both previous ESAs identified elevated levels of nitrates in the groundwater and on the property. One previous ESA recommended that groundwater monitoring wells be installed to investigate the magnitude of the nitrate contamination. The extent of the contamination was not indicated in the ESA or the previous ESAs.

The Deputy Commissioner of the Solano County Agricultural Commissioners Office reported that it was likely that pesticide usage, most likely methyl parathion, would have been limited to the historical walnut orchards, located on the eastern portion of the Hines property and that it was unlikely that pesticides were used on the rest of the property.[7] The pesticide methyl parathion has a half-life ranging from 1 to 30 days and belongs to a family of pesticides called organophosphates.[8] Half-life is the term used to describe the amount of time it takes for a compound, in this case methyl parathion, to be reduced in concentration by half.

<u>Harr Property</u>

The Harr Property (APNs 167-030-080 and 167-030-020) is currently used for grazing land, a single dwelling, one maintenance shop, one barn, and two corrals, and, according to the ESA, is consistent with past historical use.[9] Three empty ASTs are located on the property with no indication of leaks on the ground surrounding the tanks. These ASTs, located on APN 167-030-080, and were used to store diesel and gasoline, but are no longer used. A total of 25 empty 55-gallon drums were stored throughout the buildings on the property, however no indication of staining from these drums was observed.

The Jamerson Property

The Jamerson parcels (APNs 167-030-050, 167-030-060, 167-030-030, and 167-030-040) are currently an unkempt walnut orchard with two single-family dwellings, one garage, and two sheds, and that these uses are consistent with historical uses on the property.[10] Evidence of oil staining on the ground around the waste oil storage area was observed in the barn.

Business Village Property

The business village portion of the Specific Plan area encompasses approximately 81 to 88 acres of dry seasonal grasses, which has been used in the past for sheep and cattle grazing, walnut orchards, and an airstrip. This portion of the Proposed Project includes APNs 128-020-040, 128-020-110, 128-020-050, 128-020-120, 128-010-080, 128-010-090, 128-010-070, 128-010-060, 128-030-130, 128-030-120, 128-030-100, 128-030-110, 127-020-040, 17-030-080, 127-030-090, 127-030-070, 128-030-020, and 128-030-050.

The business village portion of the Proposed Project, the parcels that comprise this portion of the Specific Plan area are currently unoccupied and contain no structures. However, concrete foundations (or slabs) and debris were observed within the southeastern portion of this area. The debris consisted of corrugated metal sheeting, automobile tires, household appliances, wood waste, and paper waste. More debris containing broken concrete, loose pipes, and paper and wood waste was observed in the northern portion of this area. No staining of soil was observed throughout all parcels. The Solano County Agricultural Commissioners Office reported that it was likely that pesticide usage, most likely methyl parathion, would have been limited to the historical walnut orchards. The ESA concluded that there was no evidence to suggest a previous release of hazardous materials.

Transmission Lines

Polychlorinated biphenyl oils (PCBs) are associated with older transmission lines and can be found on pole-mounted electrical transformers. PCBs are considered hazardous materials due to their toxicity and their tendency to accumulate in animal tissues. The Toxic Substance Control Act of 1976 banned the manufacture, processing, distribution and use of PCBs in totally enclosed systems. Sixteen pole-mounted transformers were observed on the Specific Plan area, and no staining was observed around them. Pacific Gas and Electric (PG&E) confirmed that these pole-mounted transformers contain no PCBs.[11,12]

In addition, structures on the Specific Plan area observed on the Harr and Jamerson properties appear to have been built at a time when construction could have used asbestos containing building material (ACBM) and/or lead-based paint. The ESA concluded that without proper testing and analysis, there could be no conclusion on the status of these hazardous materials.

Landscape Buffer Area

Three small parcels (APN's 128-010-030, 128-010-040, and 128-010-050) situated between Rivera Road and I-80, immediately northeast of the Cherry Glen Road/Lagoon Valley Road entrance to the Specific Plan area, are proposed to be developed as a landscaped buffer or incorporated into the Business Village area. One of the parcels is an automobile repair business. An ESA has not been prepared for these parcels, so it is uncertain if there is the potential for past and current uses to have adversely affected soil or groundwater at this location.

Other Potential Hazards

One comment letter received in response to the NOP included an anecdotal reference to the potential for anthrax to be present in the area proposed for residential and golf course development. The commentor noted that the reports of an "anthrax outbreak" that resulted in cattle having to be destroyed "years ago" were unconfirmed.[13] The ESA incorporated documentation previously developed in response to this issue. According to the California Department of Health Services, there have been no reports in the United States of anthrax transmission to humans or pets in communities or parks that have been developed on land previously inhabited by grazing animals such as cattle, or where outbreaks of anthrax in animals had occurred.[14] Furthermore, current government information on anthrax indicates that the number of human anthrax cases in the U.S. contracted through soil exposure is nonexistent, and that total number of cases of anthrax in the U.S. was at most two per year prior to the deliberate exposure of people to weaponized anthrax.[15,16,17]

Off-Site Utility Line Option Alignments

The alignments for the off-site extensions of sewer options 1 and 2, and other utilities, pass through commercial, rural residential, and regional park land uses, including the Peña Adobe historic site. There is the potential for historic and unidentified USTs, septic systems, and old wells to be present in those locations, which could contain hazardous materials.

Transportation of Hazardous Materials

The transportation of hazardous materials in and adjacent to the Proposed Project could result in potential harm to construction workers and occupants on the Specific Plan area. The Proposed Project land uses do not include light industrial or industrial use. The land use in the Specific Plan area is limited to open space, residential, and business village, which are land use types that do not use large quantities of industrial strength hazardous materials. At most, these land use types would require the use of household cleaning and maintenance supplies and fertilizers and pesticides for landscaping. Therefore, traffic in the Specific Plan area would not include large deliveries of hazardous materials. However, I-80 is a large corridor for traffic between the Bay Area and Sacramento. The segment of I-80 adjacent to the Specific Plan area is not listed in either ESA as being listed on any of the environmental databases for hazardous materials spills.

Wildland Fires

Fire hazard zones have been delineated in the Vacaville General Plan to plan for the potential impact of fires from the dry grasslands that are part of the natural environment within the City and from those wildlands bordering the City. The Proposed Project is located within areas designated by the Vacaville General Plan as moderate to extreme fire hazard zone.[18]

4.13.3 REGULATORY SETTING

The following discussion summarizes federal, State, and local regulations pertaining to hazardous materials management and fire hazards.

Federal

Several federal agencies regulate hazardous materials. These include the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Department of -Transportation (DOT). Federal regulations which regulate the handling (including transportation), storage, work-place safety, and disposal of hazardous materials and wastes are contained primarily in Titles 10, 29, 40, and 49 of the Code of Federal Regulations (CFR).

State

The California Environmental Protection Agency (Cal/EPA) and the Office of Emergency Services (OES) establish regulations governing the use of hazardous materials in the State. The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) are the enforcement agencies for hazardous materials transportation regulations. Hazardous materials and waste transporters are responsible for complying with all applicable packaging, labeling, and shipping regulations.

Within Cal/EPA, the Department of Toxic Substance Control (DTSC) has primary regulatory responsibility for hazardous waste management. Enforcement of regulations has been delegated to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law. State regulations applicable to hazardous materials are contained in Title 22 of the California Code of Regulations (CCR). Title 26 of the CCR is a compilation of those sections or titles of the CCR that are applicable to hazardous materials management.

In January 1996, Cal/EPA adopted regulations implementing a “Unified Hazardous Waste and Hazardous Materials Management Regulatory Program” (Unified Program). The six program elements of the Unified Program are hazardous waste generators and hazardous waste on-site treatment, underground storage tanks, above-ground storage tanks, hazardous material release response plans and inventories, risk management and prevention program, and Uniform Fire Code hazardous materials management plans and inventories. The program is implemented at the local level by a local agency – the Certified Unified Program Agency (CUPA). The CUPA that serves the Proposed Project is the SCDEM. The SCDEM is responsible for consolidating the administration of the six program elements within its jurisdiction.

School Siting

Contaminated Sites

The California Education Code (Section 17210 et seq.) outlines the requirements of siting school facilities near or on known or suspected hazardous materials sites, or near facilities that emit hazardous air emissions, handle hazardous or acutely hazardous materials, substances, or waste. The code requires that, prior to commencing the acquisition of property with State Funds for a new school site, an environmental site investigation be completed to determine the health and safety risks (if any) associated with a site. Recent legislation and changes to the Education Code identify DTSC’s role in the assessment, investigation, and cleanup of proposed schoolsites. All proposed schoolsites that will receive State funding for acquisition and/or construction must go through a comprehensive investigation and/or cleanup process under DTSC oversight. DTSC is required to be involved in the environmental review process to ensure that selected properties are free of contamination, or if the property is contaminated, that

it is cleaned up to a level that is protective of students and faculty who will occupy the new school. All proposed schoolsites must be suitable for residential land use, which is DTSC's most protective standard for children.

Prior to acquiring a schoolsite or engaging in a construction project, school districts must contract for the preparation of a Phase I ESA, which must be reviewed by DTSC according to established timelines. The Phase I ESA, which must be prepared by a qualified professional, can be used to support a conclusion that no recognized environmental conditions are present, or a Preliminary Endangerment Assessment (PEA) is necessary. Although the methodology for conducting Phase I ESAs is the ASTM Industry Standard E-1527 (previously described), DTSC has developed regulations that supplement the ASTM E-1527 standard that more specifically addresses schoolsites.[19]

If the Phase I concludes, or DTSC determines, that a PEA be conducted, the school district can either proceed with the PEA or drop the schoolsite from further consideration. If the district chooses to proceed with a PEA, it will be required to enter into an Environmental Oversight Agreement with DTSC to oversee preparation of the PEA, which must be submitted to DTSC for review and approval. If the approved PEA concludes the property would not pose a threat, DTSC will issue a "No Further Action" determination and will not require additional investigation or cleanup. If the PEA concludes the property is contaminated, the district must clean up the site, or it can choose not to proceed with development of the school project. When all necessary cleanup activities are completed according to DTSC-approved plans, DTSC will certify the site cleanup is complete.[20]

If a previous Phase I ESA has been conducted for the proposed schoolsite and is more than 180 days old, DTSC recommends an addendum be prepared to verify the site conditions or describe changes in site conditions.[21]

In conjunction with the Phase I and PEA process, DTSC has also developed specific sampling guidance for schools proposed on land historically used for agriculture where pesticides have been routinely applied ("Interim Guidance for Sampling Agricultural Fields for School Sites," August 2002). DTSC recommends that school districts and their hazardous materials consultant coordinate with DTSC to determine the applicability of the Interim Guidance to a specific location and the need for testing.[22]

Location Relative to Source of Hazardous Emissions

In addition to an evaluation of potential site contamination issues, Public Resources Code Sections 21151.4, 21151.8, and 21151.2 require that no EIR be approved for a project involving the construction or alteration of a facility that might reasonably be anticipated to result in hazardous air emissions within one-quarter mile of a school unless the lead agency has consulted with the school district having jurisdiction regarding the potential impact of the project on the school, or the school has been given written notification of the project not less than 30 days prior to approval of the EIR. Section 4.6 (Air Quality) includes additional information about hazardous emissions.

Local

Solano County

The SCDEM is the CUPA for all cities and unincorporated areas within Solano County. The SCDEM issues permits to and conducts inspections of businesses that use, store, or handle quantities of hazardous materials and/or waste greater than or equal to 55 gallons, 500 pounds, or 200 cubic feet of a compressed gas at any time. The SCDEM also implements the Hazardous Material Management Plans (Business Plans) that include an inventory of hazardous materials used, handled, or stored at any business in the County. The SCDEM also permits and inspects businesses that handle acutely hazardous materials, such as those used in R&D facilities, that require a Risk Management and Prevention Program. The SCDEM also helps local fire departments respond to emergencies involving hazardous materials.

Furthermore, regulated activities (e.g., businesses) are managed by the SCDEM in accordance with applicable regulations such as Hazardous Materials Release Response Plans and Inventories (Business Plans), the California Accidental Release Prevention (CalARP) Program, and the California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements.

City of Vacaville

The City regulates hazardous materials in coordination with other State and local agencies (e.g. DTSC and SCDEM). The City enforces Title 26, Division 6, of the CCR to reduce impacts associated with accidental release from transportation of hazardous materials on roads in the City and the potential for an increased demand for incident emergency response.

In addition, the City Fire Department, in coordination with the SCDEM, enforces workplace regulations addressing the use, storage, and disposal of flammable and hazardous materials, pursuant to Title 8 of the CCR, which apply to businesses and public facilities. The Vacaville Fire Department is also responsible for oversight on all fire safety regulations as they pertain to fire safety hazards to people and structures in the City, including fire sprinkler installation, flammable materials storage, emergency response and evacuation procedures, and other fire prevention measures.

General Plan

Consistency of the Proposed Project with relevant City of Vacaville General Plan goals and policies is presented in Appendix C. As shown in Appendix C, the Proposed Project is consistent with applicable parks and recreation goals and policies.

City Ordinances

The City of Vacaville has adopted ordinances that govern health and safety through the management of hazardous waste. These ordinances, which are included in Chapter 8.08 of the Municipal Code, address proper hazardous waste disposal and transportation and mechanisms for ensuring compliance.

4.13.4 IMPACTS AND MITIGATION MEASURES

Method of Analysis

The analysis of the potential hazardous materials-related impacts and impacts from wildland fires is based on the following: *Phase I Environmental Site Assessment, Residential Portion* and *Phase I Environmental Site Assessment, Office/Commercial Portion*, ENGEO Inc. (August 15, 2003) (see Appendix K); and documents and information provided to EIP by the City of Vacaville. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects at a qualitative level, based on the standards of significance presented in this section.

The general types of businesses and the range and types of uses that would be located in the Specific Plan area are identified in the Specific Plan. Because the specific uses that could occur in the Business Village portion of the Proposed Project are unknown at this time, this analysis assumes and evaluates a broad range of potential uses that could generate or handle hazardous materials in the Proposed Project. Allowable uses in the Business Village could include biotechnology companies, R&D, and laboratories, all of which have the potential to use, store, transport, and generate hazardous materials and/or wastes, which would all be subject to applicable federal, State, an local laws.

In determining the level of significance, the analysis assumes that development in the Proposed Project would comply with relevant federal, State, and local ordinances and regulations. In most cases, the laws and regulations pertaining to hazardous materials management and public safety are sufficient to ensure worker, public, and environmental health and safety. The discussion below identifies areas where impacts related to wildland fires and hazardous materials could, nonetheless, be significant or potentially significant because the enforcement of existing laws and regulations alone does not necessarily ensure that health and safety would be adequately protected.

Standards of Significance

For the purposes of this EIR, a significant impact would occur 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, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emission 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 which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result create a significant hazard to the public or environment;
- Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan

- Create an increased risk of adverse health effects to the public or cause increased environmental hazard resulting from known or unidentified soil or groundwater contamination that could be encountered during construction or be present during occupancy of the project; or
- Expose people of structures to a significant risk of loss, injury, or death involving wildland fires.

Effects Determined to Have No Impact

The following discussion describes impacts that would not occur as a result of project implementation.

As stated in the Environmental Setting in this Chapter, the Specific Plan area is not located on a site listed as a hazardous materials site, as compiled pursuant to Government Code Section 65962.5.

The Specific Plan area is located in the Travis Airport Land Use Compatibility Plan (ALUCP), an airport land use plan, but is not within two miles of an airport. In addition, the Specific Plan area is not in the vicinity of a private airstrip. See Chapter 4.2, Land Use for analysis of land use compatibility of the project and the Travis ALUCP.

The proposed Specific Plan would not interfere with adopted emergency response plan or emergency evacuation plan. Please refer to Section 4.9, Public Services for further discussion of police and fire protection services.

Project Impacts and Mitigation Measures

4.13-1 Construction and occupancy of the Proposed Project would result in the routine transport, use, or disposal of hazardous materials.

Hazardous materials would be used in varying amounts during construction and occupancy of the Proposed Project. Products and materials typically used during construction that could contain hazardous substances include paints, solvents, cements, glues, and fuels. Exposure of construction workers or site occupants to hazardous materials would occur in the following manner: improper handling or use of hazardous materials or hazardous wastes during construction or occupancy of the Proposed Project, particularly by untrained personnel; transportation accident; environmentally unsound disposal methods; or fire, explosion or other emergencies.

Construction workers and future site residents would be exposed to hazards associated with accidental releases of hazardous materials, which would result in adverse health effects. Hazardous materials that could be present during occupancy of the residential, open space (e.g. golf course) and business village areas in the Specific Plan area are expected to include, for example, household-type and maintenance products (e.g., paints, solvents, pool chemicals, pesticides/herbicides). R&D and biotechnology activities that could occur in the Business Village would likely use the largest amounts and types of hazardous materials, which could include, but would not be limited to, inorganic and organic chemicals, radioactive materials, and biohazardous substances. Office and commercial activities could use a variety of products such as cleaning agents, solvents, paints, materials used in printing, pesticides, and chemicals for landscaping. The types and amounts of hazardous materials would vary according to the location and nature of the activity. However, all allowable uses would be subject to code

requirements, as necessary, which would ensure compliance with applicable permits and inspections.

During the first phases (approximately 3 years) of the Proposed Project development, the Hines nursery would continue to operate in conjunction with residential occupation, as described in Section 4.2, Land Use and Agricultural Resources. This could expose workers and occupants adjacent to the nursery to pesticides, fertilizers, and other hazardous materials used, transported, and stored at the nursery. However, the SCDEM and City would be responsible for ensuring the nursery complies with all applicable health and safety measures through permitting and inspection.

Hazardous materials regulations, which are codified in Titles 8, 22, and 26 of the CCR, and their enabling legislation set forth in Chapter 6.95 of the California Health and Safety Code, were established at the State level to ensure compliance with federal regulations to reduce the risk to human health and the environment from the routine use of hazardous substances. These regulations must be implemented by employers/businesses, as appropriate, and are monitored by the State (e.g., Cal OSHA in the workplace or DTSC for hazardous waste) and/or local jurisdictions (e.g., the Vacaville Fire Department and SCDEM).

By ensuring that businesses in or adjacent to the Specific Plan area comply with the Unified Program, the City would reduce impacts associated with the potential for accidental release of hazardous materials during occupancy of the Proposed Project that would result in increased risk of exposure to accidental release of hazardous materials, and the potential for an increased demand for incident emergency response. This would be accomplished by ensuring that regulated activities (e.g., businesses) are managed in accordance with applicable regulations such as Hazardous Materials Release Response Plans and Inventories (Business Plans), the California Accidental Release Prevention (CalARP) Program, and the California Uniform Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements. Off-site activities (e.g., utility corridor construction and operations) would also be required to comply with these regulations.

Compliance with Title 26, Division 6, of the CCR, which would be monitored by the City, would reduce impacts associated with potential for accidental release during construction or occupancy in the Specific Plan area and the potential for an increased demand for incident emergency response. Compliance with this regulation would ensure that businesses and public facilities where hazardous materials are used or stored near well sites (e.g., groundwater) adhere to regulations designed to prevent leakage and spills of material in transit and provide detailed information to clean-up crews in the event of an accident.

Workplace regulations addressing the use, storage, and disposal of hazardous materials in Title 8 of the CCR would apply to businesses and public facilities in and adjacent to the Specific Plan area. Compliance with these regulations would be monitored by the Vacaville Fire Department and the SCDEM when they perform inspections for flammable and hazardous materials storage. Other mechanisms in place to enforce the Title 8 regulations include compliance audits and reporting to local and State agencies. Implementation of the workplace regulations would further reduce the potential for hazardous materials releases.

Implementation of Title 49, Parts 171-180, of the Code of Federal Regulations would reduce any impacts associated with the potential for accidental release during construction or occupancy of the Proposed Project or by transporters delivering hazardous materials to the Specific Plan area

or picking up hazardous waste. These regulations establish standards by which hazardous materials will be transported, within and adjacent to the Proposed Project.

Implementation of existing General Plan Policy 9.4-G1 and -G2, which addresses hazardous materials disclosure, and compliance with applicable federal and State laws and regulations that are administered and enforced by the CUPA (SCDEM), and Vacaville Fire Department standards (the local agency that implements applicable hazardous materials-related sections of the Uniform Fire Code and Uniform Building Code) would reduce impacts associated with the routine use, storage, and transportation of hazardous materials in the Proposed Project to a ***less-than-significant level***.

Mitigation Measures

4.13-1 *None required*.

4.13-2 Implementation of the Proposed Project would result in the use, transportation, storage, and disposal of hazardous materials within ¼ mile from a proposed school site.

Implementation of the Proposed Project may place new industrial and commercial uses, that use, store, and dispose of hazardous materials within ¼-mile of school sites. Schools are considered sensitive receptors. The exact use, intensity, or nature of development of the Proposed Project is not certain at this time. Implementation of the Proposed Project would include the construction of a new school within the Specific Plan area, at approximately 600 to 900 feet from the proposed Business Village area. Proposed uses of the Business Village include biotechnology research and development, which would involve the storage, use, and disposal of acutely hazardous materials. Section 15186 of the CEQA Guidelines establishes requirements for school projects, as well as projects near schools, to ensure that potential health impacts resulting from exposure to hazardous materials, wastes, and substances are examined and disclosed in an environmental document. Section 15186 of the CEQA Guidelines states that hazardous materials that must be considered a risk are those which may impose a health or safety hazard to persons who would attend or would be employed at the school.

Specifically, when a project located within ¼-mile of a school involves the construction or alteration of a facility that might reasonably be anticipated to emit hazardous materials or a mixture containing acutely hazardous materials in a quantity equal to or greater than that specified in Section 25534 of the California Health and Safety Code, the Lead Agency must: (1) consult with the affected school district regarding the potential impact of the project when circulating the environmental document; and (2) notify the affected school district in writing prior to approval and certification of the environmental document. The proposed school would be located on the south side of Lagoon Valley Road, and across the street from the proposed Fire Station. As such, educational structures (classrooms and teaching facilities) would be located within ¼-mile of the Business Village. The one-fourth mile criterion for notification and consultation is required by CEQA and relates to any source of hazardous materials.

Due to the use, transport, storage, and disposal of potentially hazardous materials at new proposed research and commercial business village land uses, adjacent sensitive receptors would be exposed to greater risk of exposure to hazardous materials, waste, or emissions. Accidental release or combustion of hazardous materials at developments would endanger students in the surrounding community. Given that the location of the proposed school site is

within ¼-mile from the Business Village, the potential exists for the schools to be located near hazardous materials.

The applicant has discussed the proposed school location with local school districts and has agreed to notify the districts in writing in the form of this EIR prior to approval and certification of the environmental document.

Although hazardous materials used and waste generated from new developments may pose a health risk to sensitive land uses nearby, all businesses that handle or have on-site transportation of hazardous materials would be required to comply with the provisions of applicable federal, State, and local regulations. However, as specific project impacts are currently unknown, it cannot be confirmed that applicable regulations would reduce potential impacts from hazardous materials to a less-than-significant level. Thus, impacts would be ***significant and unavoidable***.

Mitigation Measures

4.13-2 *None available*.

4.13-3 Construction and occupancy of the Proposed Project could create a health hazard to workers, the public and the environment due to previously unidentified contaminated soil and groundwater.

The Specific Plan area has historically been used for agricultural purposes, including walnut orchards, a nursery, sheep and cattle grazing, dry land farming, operations and maintenance shops, rural residences, barns, and an airstrip. Therefore, there is the potential that soil and groundwater in the Proposed Project area has been contaminated by the on-site storage of fuels, the ongoing application of pesticides, herbicides and other agricultural chemicals, or illicit debris disposal. The Phase I ESAs reported several areas where there were debris piles and stained soils, indicating potential contamination of soil in those areas (see Environmental Setting, above). According to the ESAs, the debris found on the Specific Plan area contained a variety of wastes, including pipes, concrete blocks, paper and wood waste, and other wastes associated with previous historical use of the site. One of the ESAs observed areas of heavily stained soil, which could indicate soil and/or groundwater contamination. These areas were found on the parcel where the Hines Nursery is located.[23] In addition, the ESA reported that groundwater beneath the Hines Nursery has elevated levels of nitrates and recommended that this contamination be further investigated.[24] The ESAs found no evidence of PCBs, sewage treatment facilities, waste management facilities, or Superfund sites on or within 1 mile of the Specific Plan area.[25] In addition, as described in the Environmental Setting section, a report of cattle destroyed on-site as a result of an anthrax outbreak is unconfirmed. In addition, current government information on anthrax indicates that the number of human anthrax cases in the U.S. contracted through soil contamination is nonexistent.

However, as of publication of this EIR, there have been no soil or groundwater samples collected for the Specific Plan area that have been analyzed for hazardous constituents, other than groundwater sampling done on the Hines Nursery property. There are no plans to use groundwater for the Proposed Project. Based on the information presented in the ESAs, some locations could contain elevated levels of contaminants in soil or groundwater. Depending on the concentration and extent, soil or groundwater contaminated with hazardous substances would present a human health risk during construction activities. Further, it is possible that not all septic tanks, wells, or other underground storage devices or conveyance systems have been

identified, because these would have been installed prior to permitting requirements, or additional information would have become available in agency files prior to the construction of the Specific Plan area.

In addition, several areas within the Specific Plan were not investigated for potential soil and groundwater contamination from previous uses. These areas include the Lagoon Valley Regional Park, the proposed landscape buffer just north of the Cherry Glen Road/Lagoon Valley Road, and the proposed utility corridors east and north of I-80.

Soil-disturbing activities could expose construction workers and residents to contaminated debris, elevated levels of chemicals that would be hazardous, or hazardous substances that would be inadvertently spread, resulting in a greater aerial extent of contamination. Soil or groundwater containing elevated levels of contaminants, if left unmanaged, would pose a health risk to site workers and occupants. Implementation of applicable regulations in the CCR and Title 40 of the CFR by the Applicant, under the oversight of the City, RWQCB, and/or DTSC would ensure that soil and/or groundwater contamination as a result of past uses, if any, is remediated according to established protocols. However, because the extent, if any, of soil or groundwater contamination is unknown, there is the potential that construction workers or occupants of the site could be exposed, and this is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.13-3 (a) *Prior to, or concomitantly with construction activities to implement the Specific Plan, the project Applicant shall implement all recommendations from the two ESAs completed by ENGEO Inc. on August 15, 2003. Specifically, the Proposed Project shall:*

- *Conduct further evaluations of soil and groundwater impacts at the Hines Nursery facility through a Phase II ESA and remediate, as necessary, to all federal, State, and local standards;*
- *Collect and dispose of identified stained soil according to federal, state, and local laws;*
- *Collect and dispose of all abandoned tanks according to federal, state, and local laws;*
- *Conduct a survey for lead-based paints and ABCM prior to demolition and remediate, as necessary, to all applicable federal, State, and local standards;*
- *Collect and dispose of all abandoned pesticide containers according to federal, state, and local laws;*
- *Demolish all observed equipment wash pads and collect and dispose of any stained soil according to federal, state, and local laws;*
- *Collect and dispose of all abandoned farm equipment, debris and machinery according to federal, state, and local laws; and,*
- *Abandon all agriculture and domestic water wells, and septic systems under permit by the SCDEM.*

(b) *If, during site preparation and construction activities, evidence of hazardous materials contamination is observed or suspected through either obvious or*

implied measures (i.e., stained or odorous soil, or oily or discolored water), construction activities shall cease and an environmental professional shall assess the situation. If necessary, the environmental professional shall prepare a sampling plan to collect soil and/or groundwater samples to determine whether or not the site has been adversely affected by past activities. The samples shall be analyzed for the contaminants determined to be a potential health concern by the environmental professional. Depending on the nature of the contamination (if any), the SCDEM, or the current designated CUPA, shall be contacted for further direction, which could include further investigation or remediation to all applicable federal, State, and local levels.

(c) *If any required remediation has not yet been completed for contaminated soils or groundwater identified during construction, the project applicant shall perform a human health risk assessment, in accordance with the guidelines from USEPA and DTSC, to determine health risks to construction workers and future site occupants. The results of the human health risk assessment may indicate that added protection for construction workers and/or requirements for vapor barriers in structures would be required to prevent adverse effects on indoor air quality. The human health risk assessment shall be submitted to the SCDEM for review and approval, and engineering controls, if required to reduce health risks to acceptable levels for future site users, shall be incorporated into the project design.*

(d) *If remediation of soil and/or groundwater has not been completed by the time site development occurs, the remediation systems shall be designed so that the systems can be effectively installed, operated, and removed without substantial conflict with planned land uses. The design of project improvements in the areas of the know soil and/or groundwater contamination locations shall be submitted to the SCDEM for concurrence prior to building permit issuance.*

And

(e) *Prior to any ground-disturbing activities on either Lagoon Valley Regional Park or the proposed utility corridor north of I-80, or any other off-site utility corridor, the Applicant shall conduct a Phase I ESA for each of these sites and follow the recommendation(s) within each Phase I ESA, as well as Mitigation Measures 4.13-3(b) through (d).*

Mitigation Measures 4.13-3(a) through (e) would ensure that previously unidentified, residual or potential hazards are remediated and an evaluation of locations not previously investigated is prepared.

4.13-4 Construction and occupancy of the proposed elementary school could create a health hazard to school children and school workers due to previously unidentified contaminated soils.

A Phase 1 ESA was conducted for the Proposed Project, which included an assessment of the APNs where the proposed school site would be located. The ESA did not observe evidence of a potential release of hazardous materials from past uses on the Proposed Project site. The site where the school would be located was used as pastureland and/or dry farming but was never developed with urban uses. Although it is unlikely that residual contaminants from past

uses remain, the California Education Code mandates a process for identifying hazards associated with historic agricultural uses at proposed school sites for which State funding is used. It is currently unknown whether the school would be a publicly or privately funded facility. While the process is specifically intended to address State-funded school site development for a public school district, the process would be appropriate for a privately funded school site. Privately funded schools typically conduct the same process due to potential liabilities. This process includes obtaining approval from the DTSC that a proposed school site is free of contaminants and hazardous materials that would pose a risk to students and faculty. Although an ESA has been completed for the APNs where the school would be located, all the DTSC requirements for siting public schools has not been met. If the school site were developed with a private school, the Education Code requirements would not be prescriptive. Therefore, under either scenario, it is conservatively assumed potential impacts from exposure to unidentified contaminated soils or hazardous materials at the proposed school site would be ***potentially significant***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.13-4 (a) *Prior to the construction of the proposed school site, the project applicant shall conduct a Preliminary Endangerment Assessment (PEA) of the proposed school site, pursuant to Title 22 of the CCR, Chapter 51.5, Section 69107(c), where the PEA shall include sampling to determine one or more of the following:*

- *If a release of hazardous material has occurred and, if so, the extent of the release;*
- *If there is the threat of a release of hazardous materials; and*
- *If a naturally occurring hazardous material is present.*

(b) *Implementation of Mitigation Measures 4.13-2(a) through (d).*

Mitigation Measures 4.13-4(a) and (b) would ensure that previously unidentified or potential hazards are investigated and/or remediated prior to building the school. Mitigation Measure 4.13-4(a) is highly recommended, but not necessary if the school is privately funded.

4.13-5 Implementation of the Proposed Project could expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

The Proposed Project would construct residences within areas identified by the Vacaville General Plan as moderate to extreme fire hazard zones. Currently, a major portion of the site is grassland, which is a natural fuel for wildland fires. The Proposed Project would construct residences on a large portion of the existing grassland areas, thus reducing on-site natural fuel for fires. However, the areas surrounding the Specific Plan area are mostly comprised of dry grassland and oak woodlands, and are classified as high to extreme fire zones. Wildland fires can be initiated by natural phenomena, such as lightning or from extremely dry and hot conditions. However, wildland fires can also be started by human activities, such as smoking, use of highly flammable fuels, and malfunctioning electrical equipment.

Because the Specific Plan area is located in a high-risk fire zone and there would be an increase in the population in this area, people and structures could be exposed to a significant

risk of loss, injury, or death as a result of wildland fires. The City of Vacaville General Plan Policies 9.3-G1, -G2, -I1, -I2, -I3, and –I4 are used by the City to provide a safe environment for residents of the City, decrease the risk from fires (including wildland fires), and to provide a level of service sufficient for emergency response times. The City enforces the Uniform Building Code (UBC) and Uniform Fire Code (UFC) through the issuance of building permits and conditions of approval. Further, prior to the construction of any structures or communities, the City reviews project plans for conformance with the UBC and UFC to reduce risk of fires originating from within the City. As described in Section 4.9, Public Services, the Proposed Project includes a requirement to develop Permanent Fire Protection Standards with the Master Tentative Map approval to minimize the risk of exposure to wildland fires. The standards are incorporated into the Specific Plan and would be in compliance with the City's fire Code, the 2003 Standards of Coverage Study, and the City Council's Performance Standards for the Fire Department, as determined by the Fire Chief. Standards shall include, at a minimum: (1) emergency vehicle ingress/egress routes and procedures; (2) use of non-combustible construction materials for structures adjoining the open space areas; (3) setback requirements for structures adjoining the open space areas; (4) fire break standards, including managed vegetation buffer zones with fire resistive landscaping between the developed and open space areas, and (5) long-term maintenance programs for the developed/open space interface. In addition, certain perimeter residential units and all structures over 5,000 sf would be required to install sprinklers. During construction activities, all developers would be required to consult with the City of Vacaville Fire Department in order to implement fire prevention measures at sites adjacent to natural areas. All of these measures would be directed by the Fire Chief and in compliance with City of Vacaville Land Use and Development Code, Chapter 14.20. Furthermore, the Proposed Project would construct a new fire station on the Specific Plan area in order to serve the entire Specific Plan area and adjacent properties in the event of fires and other emergencies. Section 4.9 Public Services describes in detail impacts of project development on fire protection levels of service. Therefore, impacts from wildland fires would be ***less than significant***.

Mitigation Measures

4.13-5 *None required.*

ENDNOTES

1. This EIR uses the definition stated in the California Health and Safety Code (CHSC) §25501: "A hazardous material is any material that, because of its quantity, concentration, or physical, chemical characteristics poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. 'Hazardous materials' include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment."

2. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.17.

3. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.17.

4. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.18.

5. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.21.

6. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.23.

7. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.19.

8. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.19.

9. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.18.

10. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p.18.

11. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003, p. 26.

12. ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Business Portion*, September 30, 2003, p. 17.

13. Tom Reyes, "Comments Regarding Scope of EIR Lower Lagoon Valley Development," letter to Fred Buderi, City of Vacaville, April 10, 2003.

14. California Department of Health Services, Disease Control Section, Infectious Disease Branch, Letter from Dr. Ronald, M. Roberto, Chief, to Dr. Thomas L. Charron, Health Officer, Solano County Health Department, dated July 11, 1991.

15. "Clinical and Epidemiological Principals of Anthrax," Theodore J. Cieslak and Edward M. Eitzen, Jr., *Emerging Infectious Diseases*, Vol.5, No. 4, July-August 1999, pages 552-555.

16. United States Department of Agriculture, Fact Sheet on Anthrax, http://www.usda.gov/homelandsecurity/anthraxfs.htm, Accessed on October 01, 2003.

17. United States Center for Disease Control (CDC), Disease Information on Anthrax, http://www.cdc.gov/ncidod/dbmd/diseaseinfo/anthrax_t.htm, Accessed on October 1, 2003.

18. City of Vacaville, *Vacaville General Plan, Volume One: Plan Policies*, November 1999, Chapter 9, Figure 9-4, p. 14.

19. California Environmental Protection Agency, Department of Toxic Substances Control, California Code of Regulations, Title 22, Division 4.5, Chapter 51.5 Phase I Environmental Site Assessments (Schools), Effective February 10, 2003.

20. California Environmental Protection Agency, Department of Toxic Substances Control, School Property Evaluation and Cleanup Division, *Fact Sheet: New Environmental Requirements for Proposed Schoolsites (Assembly Bill 387 and Senate Bill 162),* April 2001.

21. California Environmental Protection Agency, Department of Toxic Substances Control, California Code of Regulations, Title 22, Division 4.5, Chapter 51.5 Phase I Environmental Site Assessments (Schools), Effective February 10, 2003.

22. California Environmental Protection Agency, Department of Toxic Substances Control, "interim Guidance for Sampling Agricultural Fields for School Sites, 2nd Revision, August 26, 2002.

23. ENGEO Inc., *Phase I Environmental Site Assessment, Residential Portion*, August 15, 2003, pages 17 to 18.

24. ENGEO Inc., *Phase I Environmental Site Assessment, Residential Portion*, August 15, 2003, pages 21 to 22 and 23 to 24.

25. ENGEO Inc., *Phase I Environmental Site Assessment, Residential Portion*, August 15, 2003, pages 11 through 25, and *Phase I Environmental Site Assessment, Office/Commercial Portion*, August 15, 2003, pages 10 through 17.

4.14 CULTURAL RESOURCES

4.14 CULTURAL RESOURCES

4.14.1 INTRODUCTION

This section describes the cultural (historical, archaeological, and paleontological) resources present or potentially present in the Specific Plan area, identifies the significance of these resources, and evaluates the potential effects of implementation of the Proposed Project on those resources. Cultural resources that may be present on the project site include structures that may be eligible for listing on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR); significant archaeological resources, including the potential presence of human burials; and potential paleontological resources.

Two technical studies were prepared as part of this EIR to identify potential prehistoric, historic-era archaeological, and historical resources at the Specific Plan area and at off-site sewer alignments to determine potential impacts: *Archaeological Survey for the Lower Lagoon Valley Project, Vacaville, Solano County, California* (Far Western Anthropological Research Group, Inc., September 2003) and *Historic Resources Evaluation Report: Lagoon Valley Project, Vacaville, Solano County, California* (JRP Historical Consulting Services, October 2003). These reports are available for review at the City of Vacaville, Community Development Department, Planning Division, 650 Merchant Street, Vacaville, California.

Comments received in response to the NOP (included in Appendix B) for this project expressed concern about the potential for Native American artifacts and human remains to be present in the Specific Plan area. As noted above, archaeological and historic resource evaluations were prepared to address this issue, and the results of these studies are presented and evaluated in this section.

4.14.2 ENVIRONMENTAL SETTING

Archaeological Resources

Archaeological Context — Central California Archaeology

Lagoon Valley is located in western Solano County and lies at the very southern end of the North Coast Ranges, located between two of the most studied archaeological districts in central California: San Francisco Bay and the Sacramento-San Joaquin Delta (Bay-Delta). Many of the earliest and most influential studies in central California archaeology occurred in these neighboring regions. Although the record of prehistoric human occupation in Lagoon Valley is not well understood, at least two important excavations have occurred in the valley.

The following summary focuses on cultural assemblages from a sequence of five time periods in Solano and neighboring counties to the south. These time periods range from the Lower Archaic, beginning 10,000 years before present (BP), to the Emergent Period (200 BP). A brief summary of the cultural history of the region surrounding Suisun Bay is provided for context to aid in the discussion of the proposed Specific Plan area.

The Lower Archaic period (10,000 to 6,000 BP) is the oldest archeological component found so far in the Bay-Delta region of central California and derives from the Los Vaqueros Reservoir area in eastern Contra Costa County, south of Solano County. Extensive early Initial Middle Archaic period deposits (6,000 to 4,500 BP) were not encountered in the Bay-Delta region until 1996 when they were identified during the Los Vaqueros Reservoir project. The site deposit discovered was contained in a buried soil and included a diverse assortment of habitation debris, several human burials, and residential and processing features. A number of buried sites in Contra Costa and Solano counties date to the Terminal Middle Archaic period (4,500 to 2,500 BP), including sites at Los Vaqueros Reservoir, in the San Ramon Valley, and in Green Valley, several miles west of Lagoon Valley. All of the Terminal Middle Archaic sites in Solano and Contra Costa counties 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. The Upper Archaic (2,500 to 1,300 BP) deposits are found throughout the lowland valleys of the Coast Ranges and along the shores of San Francisco and Suisun bays. Upper Archaic sites are typically composed of well-developed midden deposits containing hundreds of human burials and residential features, reflecting long-term residential villages. Emergent Period (1,300 to 200 BP) 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. Typically these sites are 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. Portable mortars and pestles continued to be used, although smaller specimens were preferred.

Ethnography

Several ethnohistorical and ethnographic accounts provide descriptions of the native inhabitants of the southern Sacramento Valley. When Europeans first entered central California, the area west of the Sacramento River and north of Suisun Bay (including the entire valley as far north as Princeton, Colusa County) was occupied by a series of linguistically and culturally related tribelets. These groups had no common name, collective identity, or political unity, 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 are Wintuan speakers, along with their neighbors, the Nomlaki and Wintu. The Wintuan language is part of the larger Penutian language family, which also includes Miwok, Maidu, Coastanoan, and Yokuts.

Lagoon Valley was under control of the *Malacas* tribelet, whose principal village may have been located at the present site of the Peña Adobe, recorded as archaeological site CA-SOL-30/H (see below). Mission register data show that *Malaca* natives were baptized at Mission San Francisco de Asis (San Francisco) in 1815-1821, at Mission San Francisco Solano (Sonoma) in 1823-1824, and at Mission San Jose in 1826-1832. Mission records show the *Malaca* were intermarried with the *Ululato* of Ulatis Creek, the *Tolenas* of upper Suisun Valley, and the *Suisun* who dwelt along Suisun Bay, which were all closely related southern Patwin tribelets speaking similar dialects.

Archaeological Context – Lagoon Valley

Records Search Results

An archaeological records search was conducted at the Northwest Information Center of the California Historical Resources Information System in May 2003. No sacred sites or other traditional cultural properties were identified.

Sixteen archaeological studies have occurred within Lagoon Valley. These include 11 inventories ranging in size from less than one acre to more than 2,000 acres, four test excavations, and two substantial data recovery excavations. As a result of this work, a total of 26 archaeological sites have been identified within Lagoon Valley, including 21 prehistoric sites (81 percent), 2 historical sites (8 percent), and 3 sites with both prehistoric and historical components (11 percent). Of the prehistoric sites, the most common are isolated bedrock mortar outcrops lacking associated archaeological deposits. Habitation middens are the next most frequent prehistoric site type, with and without associated bedrock mortars. One isolated human burial, a petroglyph panel, and a lithic scatter with associated bedrock mortar, make up the remainder of the prehistoric sites.

The three sites with historical and prehistoric materials include an isolated bedrock mortar associated with historical structures and debris (CA-SOL-326/H), a lithic scatter also associated with historical structures and debris (CA-SOL-331/H), and the site of Juan Peña's Adobe (CA-SOL-30/H), which includes a prehistoric habitation midden and associated bedrock mortar outcrop. The only historical sites identified in the records search include an abandoned National Guard shooting range (P-422) and structural remains associated with a small domestic dump (P-423), both located on the slopes east of the valley.

In addition, the remains of two nineteenth century adobes likely occur in or adjacent to the project area. The site of Manuel Peña's residence is thought to lie just north of I-80 and Laguna Creek, while the site of Demetrio Peña's adobe is in the general vicinity of the modern Ranchotel.[1]

Previous Archaeological Investigations

Virtually the entire Lagoon Valley has been previously studied. Much of the southern half of Lagoon Valley was investigated in 1977 by a University of California, Davis (UC Davis) graduate student. Although no survey report was prepared for this work, site records and a map of the survey area are on file at the Northwest Information Center. In addition, in conjunction with the then-proposed 1990 Policy Plan, Lower Lagoon Valley south and east of I-80, encompassing almost the entire proposed residential and business village use areas, as well as most of the area crossed by the current sewer and utility corridors, was surveyed.

These studies identified six prehistoric sites, and one prehistoric and one historical site, the Peña Adobe (CA-SOL-30/H). No archaeological sites were recorded in the Specific Plan area, but the proposed sewer and utility corridors encroach or are adjacent to several archaeological sites. These include prehistoric sites: CA-SOL-270 and SOL-324 near I-80, the historic and prehistoric site of CA-SOL-30/H, and an additional prehistoric occupation site, CA-SOL-43, recorded on a low knoll along the eastern shore of Lagoon Reservoir. In addition, three bedrock milling stations (CA-SOL-39, CA-SOL-40, and CA-SOL-42) are recorded at the base of the hill, north of the Lagoon Valley reservoir, and east of Peña Adobe Park.[2] The following describes the prehistoric sites identified as being located in or adjacent to the Specific Plan area.

CA-SOL-30/H

Site CA-SOL-30/H is the site of the standing Peña Adobe and also includes a substantial Late Prehistoric occupation midden. Sewer option 2 crosses through the eastern side of the recorded site boundary. I-80 lies immediately northwest of the adobe, while the area to the south and east is covered in lawn and a paved parking area.

The northern portion of the prehistoric midden at CA-SOL-30/H was investigated in 1963-64, prior to widening of then-Highway 40 (now I-80). This portion was either destroyed or remains partially intact beneath the roadway. The work was conducted by members of the Central California Archaeological Foundation (CCAF), in cooperation with the state Division of Highways and the State Division of Beaches and Parks. A total of 29 five-foot-by-five-foot units were excavated. The main prehistoric deposit was originally a low, two- to three-foot-high-mound located just southeast of the Adobe. The excavations however, focused on an area to the northwest, now under I-80. No human remains were discovered at CA-SOL-30/H, but four residential features, extensive dietary remains, and a rich artifact assemblage was identified. A brief reconnaissance of the park revealed obsidian debitage, burnt bone, and a small comer-notched, obsidian arrowpoint in a planter just north of the Adobe. A large sandstone boulder with two mortar cups is located in the lawn area in front of the adobe (apparently moved from another location) and a small garden on the grounds of the park incorporates several bowl mortars and mortar fragments, as well as other groundstone pieces. Materials recovered from these excavations suggest CA-SOL-30/H dates predominantly to the Emergent Period, Phase 2, or post-AD 1600. It has been suggested that the site may be the location of the ethnographic village of Malacas. Although a portion of this site has previously been investigated, no attempt has yet been made to identify the full extent of the prehistoric deposit.[3]

A series of other test excavations have also taken place in the vicinity of CA-SOL-30/H and CA-SOL-270. As a follow-up to pedestrian survey, a series of hand- and power-auger borings along then-proposed utility and sewer corridors (some of which follow the same routes proposed for the current project) that passed near the recorded boundaries of these sites were excavated in the early 1990s. Auger borings placed along the southern edge of CA-SOL-30/H identified prehistoric and historical material, while borings placed along the eastern edge of this site revealed no cultural debris. These latter auger holes follow the same corridor as the currently proposed route of sewer option 2. Although augering east of the CA-SOL-30/H boundary revealed no prehistoric cultural debris, an auger hole drilled in the lawn south of Peña Adobe produced cultural materials to a depth of three feet, but the investigators concluded the material was likely redeposited.[4]

During restoration activities at the Peña Adobe, archaeological excavations took place to document the Peña occupation. Artifacts recovered during this work included alcoholic beverage containers, toys, clothing fasteners, kitchen goods (tablewares, cooking implements and containers, condiment bottles), medicinal and cosmetic products, and leisure activity items such as a jew's harp and tobacco pipes. These artifacts are housed on site in a museum adjacent to the adobe. The location of the excavations is unknown, but likely was centered very close to the adobe.[5]

CA-SOL-270

The Cook site, CA-SOL-270, was also excavated in 1963 and 1964 by CCAF and UC Davis, in anticipation of highway widening. The site is north of I-80 and south of Laguna Creek, but

originally extended into the route of the modern highway. Much of the site appears to be naturally capped by a thin stratum of recent alluvium, disguising the full extent of the site deposit at the surface. More than 40 five-foot-by-five-foot units were excavated at CA-SOL-270, most of them in Locus A, east of a tributary to Laguna Creek. In contrast to CA-SOL-30/H, numerous human burials were excavated from CA-SOL-270, as well as a variety of residential features, dietary debris, and an abundance of other artifacts, inducting over 1,400 shell beads. Temporally diagnostic artifacts from the site indicate CA-SOL-270 was used at least sporadically over the last 2,000 years. Four radiocarbon dates recently obtained from Olivella shell beads collected in 1964 indicate that most of the human graves are relatively old, dating between 100 BC and AD 185.

A series of additional auger holes were also excavated on the west side of I-80 directly opposite to CA-SOL-30/H and along the western edge of CA-SOL-270, west of Laguna Creek. The borings adjacent to CA-SOL-30/H were negative, but those placed west of CA-SOL-270 encountered a significant amount of prehistoric material buried from one to six feet below the modern surface. The auger holes indicate CA-SOL-270 extends well beyond the recorded boundary and continues an undetermined distance to the west, encompassing a portion of the site referred to as Locus B. This portion of CA-SOL-270 would be bisected by the proposed route of project sewer option 2.[6]

CA-SOL-324

Site CA-SOL-324 is located south of I-80, just east of a prominent hill that forms the eastern boundary of CA-SOL-30/H-1 and the Peña Adobe Community Park. Prior to highway construction, Laguna Creek ran adjacent to or bisected the site. CA-SOL-324 was recorded in 1965 when human remains and other prehistoric materials were discovered in a bulldozer cut on the west side of an unnamed seasonal creek. Recently, a portion of the site was excavated prior to construction of a floodwater detention basin for the City of Vacaville. As with CA-SOL-270, CA-SOL-324 is buried beneath approximately six feet of culturally sterile alluvium and lacked any surface indication. Extensive backhoe trenching and one hand-excavated control unit revealed a thin occupation midden (about one foot thick), with human remains, flaked and ground stone tools, and dietary debris. Obsidian hydration measurements suggest the site dates to the Emergent Period, post-AD 1000. Previous work at the site identified the eastern and northern boundaries of the deposit, but the western boundary remains undefined. CA-SOL-324 was recommended eligible for listing on the NRHP in 2001.[7]

Archaeological Sites Within the Specific Plan Area

The results of the records search and a field inventory of the Specific Plan area, conducted in May and June 2003, were used to identify archaeological sites within the project site. Methods used to conduct the research are summarized in “Method of Analysis,” below. The results of the evaluation of Specific Plan area and off-site utility alignment resources is presented in this section.

Five archaeological sites and one isolated find were recorded in the proposed residential and business village use areas. Four of these sites are historical, while the fifth is an isolated boulder milling feature. Five other previously recorded prehistoric sites and one prehistoric and historical site lie on or adjacent to utility or sewer corridors. In addition, the remains of two additional nineteenth-century Peña family adobes may occur within the business village use area and one of the proposed sewer corridors, as discussed in more detail under “Historical

Resources," below. No evidence of these resources, however were observed during the field survey.[8]

Residential Subdivision, Golf Course, and Business Village Areas

Historic Archaeological Sites

Three historical archaeological sites and one prehistoric isolate were identified in the residential use area, including sites LV-3H, -LV-4H, LV-7, and Isolate 1. In the business village use area, the current survey identified two historical sites, including LV-12H and LV-13H. Based on historical research, it is also possible that remains of the Demetrio Peña Adobe and ranch complex exists within the northern portion of the business village. This area of archaeological sensitivity is discussed below as part of the resources associated with sewer and utility corridors.

LV-3H

Site LV-3H is located in the north-central portion of the residential use area. This site was part of Juan Peña's 287 acres of the Rancho Los Putos through the second half of the nineteenth century. By 1909, it was owned by the Lawrences - Lagoon Valley fruit farmers and neighbors of the Peña's. William Lawrence died in 1915, leaving the property to his wife. When she died in 1924, her estate was left to her daughters. One of the daughters, Mabel L. Killingsworth, built a home on the land that includes site LV-3H and continued to operate the family fruit farm with her sister, Elsie Chandler. It is unknown when the Killingsworths moved away and sold the property.

A review of the historical maps and photographs of the project indicates that this site represents the Killingsworth residence and was likely built in the mid-1920s. It is not depicted on the 1915 USGS map. A 1937 aerial photograph indicates that two structures were present at that time. USGS maps from the 1940s show four structures at this location. By 1951, the site contained two residences and a barn (USGS 1951), a configuration that continued into the 1970s.

Today there are few physical reminders on site of the Killingsworth homestead. One concrete slab foundation, rocks and concrete fragments, and a large depression were noted during the field visit. The slab foundation is only 12 feet square and may have been associated with a windmill or outbuilding. The aerial photographs dated 1937 and 1952 indicate a driveway leading to the complex, mature trees, and cultivated garden area next to the house, a barn, and several buildings; however, no evidence of these features remain on the ground. The land between the features and surrounding the site appears to have been disced and is disturbed. No artifacts were found on the surface.

LV-4H

Site LV-4H is located in the central area of the residential use area, west of an abrupt bend of Lagoon Valley Road. This property was held by the Hartleys, a prominent fruit farming family, until at least 1915. Clement Hartley, president and manager of the Vacaville Fruit Company, owned many large parcels in Lagoon and Vaca valleys, planted with orchards that were crucial for the operation of their fruit company. Based on United States Census records, he did not live on the property.

Archaeologically, the site is represented by two loci. Locus I consists of the remains of four structures. Two foundations are made of tile, shell, and concrete, and the other two are comprised of evenly spaced concrete and wood footings. These foundations correspond to three metal-roofed structures depicted in this location on the 1937 and 1952 aerial photographs. The buildings are not visible on the 1957 aerial photograph and appear to have been removed by that time. Based on the photographs and archaeological remains, these were likely farm-related structures (barns or packing sheds?) rather than residential dwellings. The structures were built on the north edge of a large fruit orchard and were most likely associated with the Vacaville Fruit Company venture.

Locus 2 is depicted on the aerials as a small compound with several outbuildings to the east and at least one mature tree. It is likely that this locus represents the remnants of a dwelling and associated outbuildings. Feature 1 of Locus 2 is a subterranean concrete feature with steps leading down into it. This feature is most likely a root cellar that was under a portion of the house. Based on the tanks contained insides the feature, it was last used for water storage.

LV-7

Site LV-7 is an isolated prehistoric boulder mortar in a small, flat-bottomed canyon along the southwestern margin of the subdivision area. The mortar cup is situated in a pre-existing solution cup, and is only slightly worn by grinding, dearly reflecting limited use. Oak trees are uncommon in the site vicinity, suggesting that seeds of the surrounding grassland community may have been processed in addition to or instead of acorns.

LV-12H

Site LV-12H is located along Rivera Road in the northwestern comer of the business village use area. In the early 1880s, Eliza Buckingham purchased this parcel, part of the Lagunita Rancho's 377-acre fruit farm, from the Peña family. Buckingham died in 1915 and left the land to her son, Thomas. Thomas, followed by his son, Walter, lived on a portion of the ranch into the 1940s, continuing the family fruit farming business. By the late 1940s, the property included a cafe and playground to accommodate the tourists traveling down the highway. The 1948 As-Built plan for the adjacent highway depicts the site as containing a eucalyptus windbreak, with three large structures north of the windbreak and three to the south. The three northern structures included a stucco cafe building, chicken house, and probable shed with scattered walnuts. The southern structures consisted of a fruit packing facility and two probable sheds, surrounded by a pear orchard. The Buckinghams appear to have sold the land in the early 1950s.

By 1952, the property was part of the Shady Grove Airport, a private field. By 1962, it was included in the Aircraft Owners and Pilots Association (AOPA) Airport Directory as the Vacaville Airport, fisted as operated by George Kotsotas with a single, paved 2,000-foot-long runway. The airport appears on the 1967 Sacramento Sectional Chart with a 2,100-foot-long runway.

In 1971, David Williams began using the site for gliders under the name Vacaville Soaring. By 1980, the runway had lengthened to 2,700 ft and the site also had a small hangar at the west end of the northern runway. In 1982, the glider association became known as Vacaville Aeronautics, or Vac-Aero. A 1983 photograph of the Vacaville Gliderport, as it came to be known, showed at least 19 gliders and single-engine planes on the field. In 1984, the field was taken over by Dr. Mayes and renamed Lagoon Valley Soaring. The popularity of gliding at the site reached its high in the 1980s with 11,000 tows, or gliding trips, per year taking off from the

site. Dr. Mayes died in a bi-plane accident at the site in 1988, leaving his son, Rex Mayes, to operate the port. In 1991, Rex moved the operation to Williams, where it operates now under Valley Soaring Association. By 2000, the runway had deteriorated and no buildings remained at the site.

Today the most obvious remnant of the pre-airport site is the row of eucalyptus trees. No evidence remains of the fruit packing facility south of the trees. Several depressions, mature plum, walnut, rose and oleander plants, and a sparse scatter of artifacts mark the locations around the removed stucco cafe building. An asphalt area east of the mature trees likely represents the north end of the paved landing strip that was a feature of the site for nearly 40 years.

LV-13H

Site LV-13H is located at the northeast corner of Rivera and Lagoon Valley roads. Until 1912, this site was part of a larger 50-acre tract of land owned by Charles H. and Anna Steinmetz. Charles passed away in 1901 and Anna remarried. After her death in 1912, the parcel was divided into three equal shares between Anna's second husband, William Richardson, and her two grown sons. The site is located on the parcel left to William Richardson. Richardson sold his land by 1925, and it remained planted in orchards until the mid-twentieth century. It appears to have become part of the Shady Grove Airport by 1952 (see discussion for LV-12H). Today, the site is characterized by a clothesline, several depressions, an old driveway, and landscaped plants including roses, agaves, and an apple tree.

Isolate I

Isolate 1 is located along the north side of Lagoon Valley Road, in imported gravel along the road shoulder. It is a chert biface margin. It is clearly out of archaeological context, and may have been brought in with gravel from Cache Creek.[9]

<u>Sewer and Utility Corridors</u>

Six prehistoric sites and one prehistoric and historical site have been previously recorded along the route of proposed utility and sewer corridors. No new sites were identified as part of the current study. Four sites were originally recorded in 1977 and appeared to be on or adjacent to utility or sewer corridors, including CA-SOL-39, CA-SOL-40, CA-SOL-42, and CA-SOL-43. Three of these sites were relocated and re-recorded as part of the current survey (i.e., CA-SOL-40, CA-SOL-42, CA-SOL-43); CA-SOL-39 could not be found in its mapped location. In addition, the Juan Peña Adobe and prehistoric occupation site, CA-SOL-30/H, occurs along a proposed sewer corridor, as do prehistoric sites CA-SOL-270 and CA-SOL-324. As noted above, one of the sewer options also passes near or through the location of the mid-nineteenth century adobe complex associated with Manuel Peña. Although no remains of this adobe were observed during the survey, it is possible that buried structural remains or other related features could occur within the proposed sewer corridor.[10]

CA-SOL-30/H and CA-SOL-270

The route of proposed sewer option 2 crosses through the eastern side of the recorded site boundary of CA-SOL-30/H and bisects the western edge of CA-SOL-270. As noted above, although a portion of CA-SOL-30/H has been investigated, the full extent of the prehistoric deposit is unknown. Site CA-SOL-270 includes a substantial prehistoric midden deposit

containing numerous human graves and other residential features. The boundaries of CA-SOL-270 have not been defined. Information obtained during the auger test indicates the archaeological deposit continues an undetermined distance west, beyond the recorded site boundary.

CA-SOL-324

As currently proposed, sewer option 1 would cross the western edge of this site. As noted above, the site contains a variety of prehistoric habitation debris and human remains. Previous work at the site identified the eastern and northern boundaries of the deposit, but the western boundary remains undefined.

CA-SOL-40

Site CA-SOL-40 was recorded as a bedrock milling station composed of 11 mortar cups. The site is located on a gentle slope, uphill and 30 meters east of a paved bicycle trail and rock-lined ephemeral drainage, about 325 feet northeast of two large City of Vacaville water tanks. The trail and drainage run north along the east side of the large hill east of the Peña Adobe. Current examination of the 130-foot sandstone outcrop could only locate 10 mortar cups. Three separate examinations, including the current one, failed to identify any additional cultural material at this site. The proposed route of sewer option 2 passes just west of the outcrop.

CA-SOL-42

Sewer option 2 is located just to the east of this site. Site CA-SOL-42 was recorded as a single mortar cupule in a bedrock outcrop. It is located about 163 feet southeast of the City water tanks and about 65 feet west of the bicycle trail. The mortar cupule is situated on a small sandstone boulder, shows little wear, and was probably used for a short time. Like CA-SOL-40, several site visits over the last 25 years have revealed no artifactual remains at this site, and no additional cultural materials were observed during the current study.

CA-SOL-43

Site CA-SOL-43 was recorded as an occupation site on a knoll on the east edge of Lagoon Valley Reservoir. Obsidian debitage, faunal bone, and possible hammerstones were noted in previous studies. The site is part of developed City of Vacaville park facilities, including a frisbee golf course and tree plantings. Ground surface visibility was poor, but obsidian debitage was noted during the current survey. The recorded boundaries of the site are confined to the knoll-top, which lies approximately 65 to 98 feet west of the paved access road and utility corridor for the Proposed Project. The boundaries of this site however, are poorly defined.

CA-SOL-39

Site CA-SOL-39 was recorded as a boulder mortar, with three cups, 450 feet northeast of the Peña Adobe. As with previous studies, this site could not be relocated during the field investigation for the Proposed Project. A previous researcher speculated the boulder had been moved in front of the Peña Adobe. However, only two mortar cups are present on the boulder that currently sits on the lawn east of the adobe.

Peña Family Adobes

Two areas that may contain remains of former Peña family Ranch complexes. These include the locations Jose Demetrio Peña's Adobe at or near the present location of the Ranchotel and Manuel Peña's Adobe north of 1-80. Undiscovered features associated with these complexes may be found in two zones of archaeological sensitivity, one in the northern portion of the business village parcel and the other along the proposed route of sewer option 2. No evidence of these two adobes was observed during the current investigation. The area of concern for these resources is indicated as archaeologically sensitive.[11]

Evaluation of Archaeological Resources

For private projects approved by public agencies, CEQA requires that the lead agency (in this case, the City of Vacaville) assess the effects on cultural resources. CEQA requires evaluation of project impacts only if the resource is considered significant. Historically significant resources must be listed on or eligible for listing on the CRHR. Eligibility of a resource to the CRHR is determined with reference to one or more established criteria. These criteria are identified in the Regulatory Setting, below.

The following describes the significance of prehistoric and historic archaeological resources in the Specific Plan area and off-site utility corridors.

<u>Prehistoric Archaeological Sites</u>

Four prehistoric archaeological sites located within or immediately adjacent to project utility corridors have been determined eligible or appear eligible for listing in the CRHR, including the prehistoric component at CA-SOL-30/H, CA-SOL-43, CA-SOL-270, and CA-SOL-324. Four other prehistoric sites (LV-7, CA-SOL-39, CA-SOL-40, CA-SOL-42) and one isolate (Isolate 1) do not appear to be eligible for listing in the CRHR.

The following prehistoric archeological sites: CA-SOL-30/H, CA-SOL-270, and CA-SOL-324 are all eligible for listing on the CRHR. Site CA-SOL-43 is considered potentially eligible for listing on the CRHR. Please see below for a summary of each site.

Eligible Sites - CA-SOL-30/H, CA-SOL-270, CA-SOL-324

Previous test excavations at CA-SOL-324 resulted in the site being recommended eligible to the NRHP under criterion D (see Regulatory Setting, below), and hence would also be recommended eligible to the CRHR, a finding consistent with its capacity to yield information important to the prehistory of Solano County and California. Similarly, previous excavations at sites CA-SOL-30/H and CA-SOL-270 have shown each to be substantial prehistoric residential deposits with a rich assemblage of artifacts, ecofacts, features, and in the case of CA-SOL-270, human remains. Both have clearly yielded and can continue to yield information important in local and state prehistory, and are likely eligible to the CRHR.

Potentially Eligible Site – CA-SOL-43

Very little is known about the nature of CA-SOL-43 along the eastern shore of Lagoon Valley Reservoir, but this site also appears to include a residential deposit containing stone artifacts, stone working debris, and dietary remains. The presence of diverse archaeological materials

suggests the site has the potential to yield important information in Solano County and California prehistory, and thus, may be eligible to the CRHR.

Not Eligible Sites – CA-SOL-39, CA-SOL-40, CA-SOL-42, and LV-7

The four bedrock milling stations (LV-7, CA-SOL-39, CA-SOL-40, CA-SOL-42) and the biface, Isolate 1 do not meet the criteria for the CRHR or would not be affected by the Proposed Project. CA-SOL-39 could not be relocated and does not appear to be within the current study area. Sites LV-7, CA-SOL-40, and CA-SOL-42 are isolated bedrock mortar outcrops. Lacking any associated prehistoric cultural material, these three sites have very little potential to contribute to an understanding of local or state prehistory (beyond that obtained as part of the current recording) and are not considered eligible for the CRHR. Similarly, Isolate 1 was found in imported gravel roadbase and thus appears to be out of its original archaeological context. Further, in the absence of associated cultural deposit, the isolated biface adds little to the understanding of local or state prehistory. Consequently, Isolate 1 is not considered eligible for the CRHR.[12]

Historical Archaeological Sites

The following historical archeological site: CA-SOL-30/H is considered eligible for listing on the CRHR. The Peña Adobe at CA-SOL-30/H is considered potentially eligible for listing on the CRHR. Please see below for a summary of each site.

Eligible Site – CA-SOL-30/H

One historical archaeological site located along sewer option 2 is likely eligible for the CRHR (CA-SOL-30/H, the Peña Adobe). Historical research also suggests other potentially eligible historical features associated with two other Peña family adobes may be present within the business village parcel and sewer option 2. Four other historical archaeological sites located within the proposed subdivision and business village are considered not eligible for the CRHR (LV-3H, LV-4H, LV-12H, and LV-13H).

Potentially Eligible Sites - Juan Peña Adobe (CA-SOL-30/H) and Other Peña Family Residences

The Peña Adobe at CA-SOL-30/H is a significant historical resource, listed on the NRHP (in 1972) and designated a State Historical Landmark (No. 543). Additional information on this resource is provided under “Historic Resources,” below. As such, the adobe is clearly eligible to the CRHR.

The subsurface foundations of buildings (if present) would offer limited information regarding construction details, layout and design of the Peña complex, or architectural details to add to the existing database of mid-nineteenth century ranch life by the Californios and would likely not qualify for inclusion in the National or California Registers.

Intact trash deposits contained in hollow fill features (wells, privies, etc.) or as sheet refuse could be present anywhere in the area surrounding the adobe and its outbuildings. These deposits could have great potential to address ongoing research domains regarding pre- and post-gold rush ranch life in California, interaction of the Californios with Euro-American populations in the region, self-sufficiency of the isolated pioneer family, use of Native Americans in the early ranching operations, and other topics. Given the early age and cultural association

of the ranch, it is likely that undisturbed subsurface trash deposits would qualify under Criterion D for the NRHP and under Criterion 4 of the CRHR and would be considered significant resources for the purposes of CEQA.

In addition to features associated with the Peña Adobe, there exists the possibility that unidentified archaeological resources associated with two other Peña family adobes and associated ranch complexes exist within the business village parcel or along the corridor for sewer option 2. If foundations or undisturbed subsurface trash deposits associated with these complexes are discovered in the project area they also have the potential to contribute important information on a poorly documented era in California history, and thus, would likely be eligible for the CRHR.

Not Eligible Sites - LV-3H, LV-4H, LV-12H, and LV-13H

Site LV-3H is the location of the Killingsworth ranch. The Killingsworth family was one of many local orchardists and ranchers involved in the regions' vast fruit industry during the first half of the twentieth century. The ranch, built in the 1920s, was one of many constructed in the first few decades of the twentieth century during a time when many large land holdings and estates were being subdivided into smaller parcels and developed as small ranchettes. As such, this site does not represent a unique or outstanding trend in local history, nor was the Killingsworth family exceptionally important to the development of the Vaca or Lagoon valleys. There are no intact architectural features. As such, this site does not meet criteria 1, 2, or 3 of the CRHR.

Site LV-4H appears to be the remains of outbuildings associated with the Hartley orchards. Mr. Hartley owned many parcels used by the Vacaville Fruit Company in Lagoon and Vaca valleys and likely had packing sheds, equipment storage facilities, and irrigation-related structures in strategic locations around the fruit orchards. The remnant fruit trees, aerials, historic maps depicting large non-residential structures on site, and foundation remains are consistent with the use of Locus 1 for fruit-related purposes. There is no record of the residences of Locus 2; however, it is probable that a foreman, fruit ranch manager, or employee of Mr. Hartley's lived near the vast orchards, perhaps at this location.

While associated with the local fruit industry, this site does not represent a unique or outstanding trend in local history. Mr. Hartley raised fruit on many parcels in the region and did not live at this location. There are no architectural features on site that retain the intended architectural design of the structures. As such, this site does not criteria 1, 2, or 3 of the CRHR.

The houses, trees, outbuildings and associated features that once characterized this site were removed and no associated trash features were identified, severely limiting the archaeological research potential of the site. The integrity of the site has been compromised by the removal of the buildings and related features, cattle grazing, discing, and agricultural practices. Therefore, it does not appear to meet criterion 4 of the CRHR and does not qualify as an historic property for the purposes of CEQA.

Sites LV-12H and LV-13H appear to be related to the airport operations, dating from around 1950 to circa 1991, although LV-12H had a cafe on site in the 1940s and perhaps as early as 1915. Both sites have terracotta sewer pipe and electrical conduit, indicating they were plumbed and well lit. A bathtub on LV-13H and toilet tank fragments at LV-12H also supports this assumption. Observed artifacts (glass, ceramics, linoleum flooring, plastic, rubber) are consistent with a mid-twentieth century occupation. The clothesline, household-related items, and driveway indicate that LV-13H may have served as a residence. LV-12H was the airport

headquarters and included a cafe, hanger buildings, office, and playground. Remnants of the airstrip are present on this site.

The airport facility in lagoon Valley served the Vacaville region for over 40 years as a private airstrip. In later years the glider operation provided a tourist attraction and brought business into the area, contributing to the economic development and expansion of post World War II Vacaville. The glider operation still exists and company records, photographs of the Lagoon Valley site, and oral history information are available, decreasing the importance of the archaeological record to interpret the air history context of the region.

Both sites have been damaged extensively by bulldozing and recent discing. The recent activity has disturbed up to 12 inches of soil, removed all weedy vegetation, and scattered fragments of glass, ceramic and other artifacts across a wide area. The ground disturbance has compromised the integrity of both sites and they do not appear to meet CRHR criteria, nor are they considered significant resources for the purposes of CEQA.[13]

Edwin Markham and the Dyke Property at Lagoon Valley

Edwin Markham was born in 1852 and came to the Vacaville area as a small child with his mother in the mid-1850s. They settled on about 160-acres of land along the foothills of the southeastern corner of the Lagoon Valley, just within the architectural APE for the Lagoon Valley project. Edwin Markham grew up on the property, eventually receiving a teacher's credential from a college in Vacaville before continuing his studies in San Jose and Santa Rosa. In 1872 he began his teaching career in San Luis Obispo County at Los Berros. Over the next fifteen years, he became a school administrator and principal while at the same time working to establish himself as a poet. As early as 1880 some of his poetry was published, but it was not until he wrote the poem "The Man with the Hoe" which was published in the *San Francisco Examiner* in January 1899, that he gained popularity and importance as a poet. Over the next forty years, he wrote and published his poetry, essays and nonfiction, and lectured, until his death in 1940 in New York. Markham's mother sold their Lagoon Valley property in 1875 to the Radcliff family and their descendants (the Dyke family) still retain the land, although it was subdivided into three legal parcels the twentieth century. Access to these parcels was not obtained at the time of recordation, so it is unclear if any buildings or structures from the Markham period (about 1856-1875) remain, however it appears that at least one residence was constructed on one of these parcels during the last thirty years.

In terms of historical significance, if the Markham residence (or other Markham-era buildings) remains on this site *and* retain its integrity, under Criterion B of the National Register of Historic Places (NRHP), the property would not meet eligibility nor would it be eligible under Criterion 2 (California Register of Historical Resources), which is based on Criterion B of the NRHP. To meet eligibility requirements under Criterion B or (2) as a property associated with “the lives of persons significant in our past (those whose activities are demonstrably important within a local, State, or national historic context)” the person must be associated with that specific resource during the period he achieved significance. According to *National Register Bulletin: Guidelines for Evaluating and Nominating Properties Associated with Significant Persons*, under Criterion B, "Eligible properties generally are those associated with the productive life of the individual in the field in which (s)he achieved significance. Associations with an individual should have occurred during the period of time when the person was engaged in the activities for which (s)he is considered significant. Birthplaces, childhood homes, schools attended as children, retirement homes that are not associated with an individual's significant contributions, graves, and

cemeteries generally are not considered eligible for the National Register on the basis of associations with that person." [Emphasis added]

In the case of Edwin Markham, Markham left Lagoon Valley around 1871 to begin his teaching career and by the late 1890s, he was residing in Oakland. He did not gain importance in the literary field until January 1899, when his most famous poem was published. Therefore, any resources that may be extant on the Dyke property would fall into the category of “childhood homes” and would pre-date Markham’s most productive period (1899-1920s) as a poet.

Summary of Potential Archaeological Resources Sites

No significant archaeological sites are present in the proposed residential use area and golf course area. However, there are six significant or potentially significant archaeological resources in the business village use area and along off-site utility corridors. These sites are: three prehistoric sites (CA-SOL-43, CA-SOL-270, and CA-SOL-324), one prehistoric and historical site (CA-SOL-30/H, the Juan Peña Adobe); and two historical sites (Manuel Peña and Demetrio Peña adobes). The proposed alignment for sewer option 1 (force main) crosses the western edge of prehistoric site CA-SOL-324. One historical archaeological site located along sewer option 2 is likely eligible for the CRHR (CA-SOL-30/H, the Peña Adobe). Historical research also suggests other potentially eligible historical features associated with two other Peña family adobes may be present within the business village use area and sewer option 2.

The route of proposed sewer option 2 (gravity line) crosses through the eastern side of the recorded site boundary of CA-SOL-30/H and bisects the western edge of CA-SOL-270. As noted above, although a portion of CA-SOL-30/H has been investigated, the full extent of the prehistoric deposit is unknown. Site CA-SOL-270 includes a substantial prehistoric midden deposit containing numerous human graves and other residential features. The boundaries of CA-SOL-270 have not been defined.

Historical Resources

Historic Context

As discussed previously, the first inhabitants between the Suisun Bay and Putah Creek were the Patwin Indians, the southern branch of the larger Wintu sect. Divided into villages, the Malacas lived in the Lagoon Valley region, while the Ululatos and Tolenas dominated in the Vacaville and Upper Suisun Valley regions, respectively. By 1850, disease and forced Christianization, which led to the removal of the vast majority of the Native American population to mission lands, drained the remaining population in the area. Although Lagoon Valley was one of the first European-settled regions in Solano County, its history is intimately linked with the development of the adjacent Vaca Valley and Vacaville, and is generally dominated by the Peña and Vaca families.

The initial settlement of the Lagoon and Vaca valleys, and what was later to become Solano County, began in the early 1840s led by families coming in from New Mexico. In this region they found ideal living conditions; fertile soil, ample water from the adjacent creeks, and vast grazing lands. The earliest pioneer was Jose Armijo, who obtained a 13,316-acre land grant in the northeastern Suisun Valley, south of the study area. By 1842, Manuel Vaca, Juan Felipe Peña and their families arrived to the area. Both families set up temporary dwellings near the center of the small Lagoon valley, near Laguna Creek, while they constructed permanent residences. Within a year, Vaca constructed a permanent adobe home nestled in the foothills of

the Vaca Mountains, along what would become a primary route to the Sacramento Valley, near present day Cherry Glen Road. Peña built his small adobe residence approximately one-third mile southwest of Vaca.

The oldest trail in the region was one that led from the Sonoma Mission to Sutter's Fort along the Sacramento River. It ran through Suisun Valley, entering Lagoon Valley from the south over the old Peña Pass (the most direct southern route into the valley) in the southern corner of Lagoon Valley (just east of the Tolenas Pass where present day I-80 runs). The trail ran north past the lagoon and through the Lagoon Pass (between Lagoon and Vaca valleys) and on to the Sacramento Valley. By the mid-nineteenth century, the old trail became the Vacaville Road, one of two main transportation routes through Lagoon Valley. These roadways were formed early in the settlement of the valley, then further established during the Gold Rush era as people traveled through Solano County on their way to the mountains east of Sacramento in early 1850s. By the 1870s these routes had become permanent wagon roads.

The fruit industry around Vacaville started as early as the late 1850s. The fruit boom did not fully arrive in Lagoon Valley, particularly Lower Lagoon Valley, until just before the turn of the century. The most successful farm in the lower Lagoon Valley was on the former lands of Demetrio Peña. San Francisco resident Eliza P. Buckingham purchased the nearly 400-acre farm located along the east side of Vacaville Road (bounded on the west side by present day Cherry Glen Road and to the south by Lagoon Valley Road), in the early 1880s. Renamed Lagunita Rancho, Buckingham selected Lagoon Valley for its temperate climate, which she felt was ideal for fruit orchards. Along with the acreage Demetrio Peña had planted in grapes, pears, English walnut and fig trees in the early 1850s, Buckingham established additional orchards in apricot and peaches. The north part of Lagoon Valley (north of I-80 along Pleasants Valley and Cherry Glen roads) became known for its cherry orchards.

The Vacaville region, including Lagoon Valley, continued to grow and ship fruit to all parts of the country into the early twentieth century. However, World War I overproduction for the war effort and rising competition led to a slump in the Vacaville fruit district, which was exacerbated by soil depletion and ground erosion.

The farmland in Lagoon Valley was sparsely populated in the 1940s and 1950s, and only a handful of small farms were extant in the lower portion of the valley south of I-80. As was often typical of small farming regions in the early twentieth century, the old families who settled in the valley before the turn of the century, like the Peñas, Swims, and Buckinghams, slowly subdivided and sold their land after the 1920s. Although farming remained the little valley's main commercial venture through the 1950s, a few businesses were built along the highway. Del Berg constructed the Ranchotel just south of the Peña Adobe in 1953, and Shady Grove Airport was built about 1955 along the north side of Lagoon Valley Road. Even though the northern valley retained much of its fruit orchards, by 1952, most of the land south of I-80, which once was covered by fruit and nut trees, reverted back to pastureland.

The drive to preserve the Lagoon Valley first began in the 1930s when Frank Douglas moved to the Vacaville area and sponsored preliminary studies on the valley's soil and its suitability as a future city park. It was not until the early 1960s when he was appointed director of the Ulatis Flood Control District that a plan for a park took shape. Seeing the lagoon in terms of flood control and as a possible alternative water supply, Vacaville Mayor Roy Cobble and City Manager Bob Meyer backed Douglas' plan. In 1961, the one and a half-acre site on which the Peña Adobe is located was donated to the City of Vacaville. Over the subsequent years, more than 400 acres were acquired by Solano County for the project. In 1980 the natural, intermittent

lagoon was drained and a new 60-acre lake was constructed by the County, along with bike paths around the lake. In 1991, Vacaville annexed Lower Lagoon Valley into its boundaries.

Evaluation of Historical Resources

The historic period resources within the study area consist of a mixture of residential, commercial, and educational/recreational properties, all constructed between the early-1840s and 1953. Two resources date to the nineteenth century, four were constructed after the turn of the century. Regardless of their age, many of these properties contain a mixture of buildings constructed in both the historic and modern periods. Generally, these resources are modest buildings that first and foremost serve their primary functions. Many of the resources, be they houses, farm buildings or commercial buildings, have undergone modest alterations that include small additions to buildings, replacement of original siding and windows, or addition of modern buildings to historic complexes. Generally, the condition of the buildings and structures are generally fair; and most retain a reasonable amount of historic materials.

The six historic resources that make up the survey population were evaluated for historic significance. One is listed on the NRHP and, therefore, appears to be a historic resource for the purposes of CEQA. The remaining five resources were found to ineligible for inclusion to the NRHP and do not appear to be an historic resource under CEQA guidelines. Additional information on these resources is presented below.

Only two resources date to the nineteenth century, the Peña Adobe property and the Salvador Lopez farm at 5956 Cherry Glenn Road. The Peña Adobe property contains the Juan Peña Adobe, constructed in the early 1840s, a later 1880s wood frame addition and multiple outbuildings mostly built after 1965. The adobe was restored in 1965, is listed on the NRHP and is a California Historical Landmark (California Historical Landmark # 534). The Lopez farm, located northeast of the Peña Adobe, includes circa 1890s residences and multiple outbuildings likely constructed in the later part of the twentieth century.

The remaining historic-era properties consist of both commercial and residential buildings. The residential properties were constructed as part of a small farm complex on land mostly subdivided in the first few decades of the 20th century and typical of most small agricultural parcels in semi-urban settings, they contain a mixture of buildings constructed in both the historic and modern periods. Once example of this type is Harr farm located at 3954 Lagoon Valley Road, which consists of a modest 1920s Craftsman Bungalow residence, detached garage and a barn constructed in the 1980s. Similarly, the two commercial properties, the Hines Nursery and the Ranchotel and Horse Center consist of a mixture of historic and modern-era buildings.

Only one resource, the Peña Adobe, was previously determined eligible for the NRHP, and was listed on the NRHP in January 1972 and subsequently documented by the Historic American Building Survey in July 1983. Additionally, the site was determined a California Historical Landmark in 1955. The Peña Adobe, also known as the Vaca-Peña Adobe, was found significant for the NRHP under Criterion B, for its association with Solano County pioneer Juan Felipe Peña. JRP inventoried the adobe property; however, because the adobe was previously determined eligible and consequently listed on the NRHP, it did not require evaluation. Additionally, the project Area of Potential Effect (APE) included four parcels that may contain buildings over 50 years old, however, these parcels were not inventoried or evaluated for this report because access to the properties could not be obtained.

None of the remaining resources within the APE appear to be associated with significant events (National Register Criterion A or California Register Criterion 1), instead they are common examples of buildings constructed during the late nineteenth and mid twentieth century development of the Vacaville region. Likewise, research does not indicate that the people associated with these resources were significant under National Register Criterion B or California Register Criterion 2 and would warrant listing in the National Register or California Register. While some were descended from the region's earliest settlers, they do not appear to have attained the same level of significance as their ancestors. In terms of Criterion C or 2, all of the resources are relatively modest examples of their functional type, and common to the period in which they were constructed. Finally, the property types present within the APE have been otherwise documented and do not appear to be important sources of important information regarding construction materials or techniques (Criterion D).[14]

Paleontological Resources

As discussed in greater detail in Section 4.12, Geology and Soils, bedrock at the project site is interbedded claystone and siltstone of the Cretaceous Guinda Formation. It has been encountered at depths ranging from 15 to 40 feet below the ground surface. The bedrock is covered with a minimum of four feet of residual soil formed from weathering and decomposition of the underlying bedrock. The majority of the flat-lying portion of the project site is Quaternary alluvium consisting primarily of interlayered silty clay, silts, clayey sand and clayey gravel, with minor lenses of sand.

There are no reported vertebrate fossils in the Guinda Formation. Invertebrate fossils identified in the Guinda Formation include radioloarians and foramifera. Although other occurrences of mammalian fossils have been reported from Pleistocene-age deposits in other locations in Solano County, no vertebrate fossils have been recorded in the types of alluvial materials mapped at the project site.[15] However, this does not preclude the possibility that paleontological resources could be discovered during site preparation activities.

4.14.3 REGULATORY SETTING

Cultural resources, also termed "historical resources" or "historic properties," consist of remains and sites associated with past human activities. These include prehistoric and protohistoric Native American archaeological sites, historic archaeological sites, and historic sites, buildings, structures, or objects. Another category of cultural resources includes traditional cultural properties. These are areas that have been, and often continue to be, of economic and/or religious significance to peoples today. Traditional cultural properties may include Native American sacred areas where religious ceremonies are practiced, or landscapes, which are central to their origins or history as a people. Some historical resource sites may also be of cultural significance to contemporary Native Americans or other ethnic groups because they contain objects or elements important to their cultural heritage.

Significant historical resources and traditional cultural properties are afforded protection under existing federal, State and local laws. These laws and regulations were designed to protect significant cultural resources that may be affected by actions that they undertake or regulate. The National Environmental Policy Act (NEPA), NHPA and CEQA are the basic federal and state laws governing preservation of historic and archaeological resources of national, regional, State and local significance.

Federal

Federal laws for cultural resources are governed primarily by Section 106 of the NHPA of 1966 (amended 1999). The Code of Federal Regulations (CFR) includes specific information on the protection of historic resources. A historic property is defined to mean any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the national Register criteria. The term eligible for inclusion in the National Register includes both properties formally determined as such in accordance with regulations of the Secretary of the Interior and all other properties that meet the National Register criteria (36 CFR 800.16).

Section 106 of NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and affords the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The Council's implementing regulations, “Protection of Historic Properties” are found in 36 Code of Federal Regulations (CFR) Part 800. The goal of the Section 106 review process is to offer a measure of protection to sites which are determined eligible for listing on the NRHP. National Register criteria define an important cultural resource as one that is associated with important persons or events, or that embodies high artistic or architectural values, or that has scientific value (36 CFR 60.6). Amendments to the Act (1986 and 1992) and subsequent revisions to the implementing regulations have, among other things, strengthened the provisions for Native American consultation and participation in the Section 106 review process. For the proposed new CVP water service contracts, compliance with the NHPA will occur through the Bureau’s coordination with the Advisory Council on Historic Preservation.

State

Historical Resources

State historic preservation regulations affecting this project include the statutes and guidelines contained in CEQA (CEQA; Public Resources Code sections 21083.2 and 21084.1 and section 15064.5 of the CEQA guidelines). CEQA requires lead agencies to carefully consider the potential effects of a project on historical resources.

The CEQA Guidelines (section 15064.5[a] of the Title 14 of the CCR) identifies the following four categories of historical resources that lead agencies must consider in determining the significance of impacts on historical and unique archaeological resources:

1. *A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historic Places.*

2. *A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.*

3. *Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency’s*

determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Places, including the following:

A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
B. Is associated with the lives of persons important in our past.
C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
D. Has yielded, or may be likely to yield, information important in prehistory or history (PRC section 5024.1; 36 CFR 60.4).

4. *The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code, or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1*.

Lead agencies must treat historical resources within the first three categories as protected by statute on either an unqualified or a presumptive basis. The first category is considered mandatory under statute. For the second category, this definition indicates that although any resource included in, or eligible for inclusion in, the State register must be treated as an historical resource. A resource included in a local register, but not in the State register, is only presumed to be an historical resource. Under the third category, the resources are presumed to be historically or culturally significant. The fourth category extends only to those resources that an agency chooses to consider "historical."

Archaeological Resources

The California Public Resources Code section 21083.2 defines a "unique archaeological resource" as follows:

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 the following criteria:

1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

A "nonunique archaeological resource" is one that does not meet the criteria for being "unique" (Public Resources Code section 21083.2[h]). Public Resources Code section 21083.2 provides that CEQA generally gives protection only to those "archaeological resources" that are "unique." An EIR is not required to address the issue of nonunique archaeological resources.

However, although an archaeological resource may not be "unique" for purposes of section 21083.2, it may nevertheless qualify as an "historical resource" under section 21084.1. That is, some resources are "historical resources" because they are "archaeologically significant." Section 15064.5(e) of the Title 14 CCR requires that the lead agency must first determine whether the archaeological site is an historical resource.

Paleontological Resources

Paleontological remains are recognized as nonrenewable resources significant to our culture, and as such are protected under provisions of the Antiquities Act of 1906 and subsequent related legislation, policies, and enacting responsibilities. The January 1, 1979, "Clean Water Grant Program for the Protection and Preservation of Cultural Resources" (California State Water Resources Control Board, Rev. 6-11), for example, defines cultural resources to include paleontological values and elucidates guidelines for preservation, summarizing some of the applicable legislation.

Significant paleontological resources are fossils or assemblages of fossils that are unique, unusual, rare, uncommon or important, and those that add to an existing body of knowledge in specific areas. They include fossil remains of large to very small water and land vertebrates, remains of plants and animals previously not represented in certain portions of the time scale, and assemblages of fossils that might aid chronological correlations, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, paleoclimatology, and the relationships of water and land species.

According to a memorandum from Grissold E. Petty, Acting Associate Director of the Bureau of Land Management (1978: emphasis added):

> *There is no universally accepted definition for a significant scientific paleontological resource. A definite determination can only be made by a qualified, trained paleontologist. Using the following guidelines, a paleontological resource is of significant scientific and educational value if it:*
> 1. *Provides important information of the evolutionary trends among organisms, relating living inhabitants of the earth to extinct organisms.*
> 2. *Provides important information regarding development of biological communities or interaction between botanical and zoological biotas.*
> 3. *Demonstrates unusual or spectacular circumstances in the history of life.*
> 4. *Is in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and is not found in other geographic locations.*
>
> *All vertebrate fossils have been categorized as being of significant scientific value.*

Native American Burials

California law protects Native American burials, skeletal remains and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code section 7050.5, California Public Resources Code sections 5097.94 *et seq*.). Section 7050.5(b) of the California Health and Safety code specifies protocol when human remains are discovered. The code states:

> In the event of discovery or recognition of any human remains 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 remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

Local

City of Vacaville

General Plan

Consistency of the Proposed Project with relevant City of Vacaville General Plan goals and policies is presented in Appendix C. As shown in Appendix C, the Proposed Project is consistent with applicable cultural resource goals and policies.

4.14.4 IMPACTS AND MITIGATION MEASURES

Method of Analysis

Consistent with General Plan Implementing Policy 8.5-I1, two technical studies were prepared as part of this EIR to identify potential prehistoric, historic-era archaeological, and historical resources at the project site and at off-site sewer alignments to determine potential impacts. The conclusions and recommendations provided in reports documenting the results of the technical studies form the basis of the following impact analysis. Methodologies for each study are summarized below.

Archaeological Resources

An investigation was conducted by Far Western Anthropological Research Group, Inc., (Far Western) to address both prehistoric and historic-era archaeological resources contained within the project area. Primary work tasks associated with this investigation included a complete archival review of previous archaeological studies in Lagoon Valley, record search of the Northwest Information Center of the California Historical Resources Information System, and field inventory of the Specific Plan area. Fieldwork associated with this study was conducted in May and June 2003.

The records search was inclusive of the entire Lagoon Valley, extending from the valley bottom to the crest of the surrounding hill slopes. The location of all archaeological studies and recorded archaeological sites were transferred to a portion of the Fairfield North and Elmira 7.5' topographic quadrangles and copies of all associated records and reports were obtained. In addition, the Native American Heritage Commission was also contacted and requested to search the Sacred Lands files for any information on the Specific Plan area.

As a result of previous surveys conducted in the project area, as discussed in the Environmental Setting, current reconnaissance of the Specific Plan area and proposed off-site sewer alignment options was carried-out at a relatively wide transect interval. Approximately 842 acres comprising the proposed residential area was surveyed by walking parallel transects, spaced at no more than 195-foot intervals. The Hines Nursery portion, which comprises over 160 acres, was not examined due to extensive disturbance and inadequate surface visibility. Proposed off-site utility and sewer corridors were surveyed using 32-foot transects. The portion of sewer option 2 north of I-80 was not surveyed due to inaccessibility.

Results of the investigation were documented in *Archaeological Survey for the Lower Lagoon Valley Project, Vacaville, Solano County, California* (Far Western Anthropological Research Group, Inc. 2003), which is available for review at the City of Vacaville, Community Development Department, Planning Division, 650 Merchant Street, Vacaville, California.

Historical Resources

JRP Historical Consulting Services prepared an Historical Resources Evaluation Report (HRER) to evaluate historic buildings, structures, and objects within the APE for the Proposed Project. The purpose of the report was to examine the potential eligibility of these resources for listing in the NRHP, as well as to consider their potential eligibility as historical resources for the purposes of CEQA. The historic resources were evaluated in accordance with section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria outlined in section 5024.1 of the California Public Resources Code.

The APE for the architectural survey for the Proposed Project was developed in May 2003 by JRP. Consistent with general cultural resource practices, the architectural APE included the area directly impacted by construction (development area) as well as a buffer zone on all sides immediately adjacent to the proposed development area. Only those resources located within the architectural APE were included the survey. Once the APE was defined, JRP staff conducted a reconnaissance survey of the area to account in the field for all the buildings, structures and objects found within the APE. This field reconnaissance helped to determine which buildings appeared to be more than 50 years of age and would therefore be studied. Additional background research was done through First American Real Estate Solutions commercial database, review of historic and current USGS topographic maps, and other documents to confirm dates of construction.

Within the APE for this project, six parcels contained buildings or features built in 1953 or before, and constituted the survey population. Four parcels that contained buildings over 50 years old were not inventoried or evaluated for the study because access could not be obtained to those properties. The remaining parcels in the survey area were either vacant or contained buildings, structures or objects constructed in or after 1954. Those resources less than 50 years old are non-historic and did not require survey or recordation. None of the non-historic resources appeared to meet the demanding threshold of significance for properties less than 50 years old.

The investigation of historic-era properties included research regarding their historical context, as well as resource-specific research conducted in both archival and published records. Research for this project was conducted at the California State Library, the Solano County Assessor's and Recorder's offices, Vacaville Public Library, Solano County Archives, Vacaville Heritage Council, the California Department of Transportation Library (Headquarters in Sacramento), Caltrans District 4 Maps and Plans Office, Shields Library at UC Davis, and through personal interviews.

Results of the investigation were documented in *Historic Resources Evaluation Report: Lagoon Valley Project, Vacaville, Solano County, California* (JRP Historical Consulting Services, 2003). The report is available for review at the City of Vacaville, Community Development Department, Planning Division, 650 Merchant Street, Vacaville, California.

<u>Standards of Significance</u>

For the purpose of this EIR, impacts on cultural resources are considered significant if the Proposed Project would:

- Cause a substantial adverse change in the significance of a historical resources as defined in section 15064.5 of the CEQA Guidelines;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to section 15064.5 of the CEQA Guidelines;
- Directly or indirectly destroy a unique paleontological resources of site or unique geologic feature; or
- Disturb any human remains, including those interred outside of formal cemeteries.

Project Impacts and Mitigation Measures

4.14-1 Construction of sewer line option 1 or sewer line option 2 could affect prehistoric sites CA-SOL-324, CA-SOL-270, or CA-SOL-30/H or historic archaeological features associated with the Peña family adobes (sewer option 2 and northern portion of Business Village).

Sewer Option 1 (Force Main)

As currently proposed, sewer option 1 would cross the western edge of Site CA-SOL-324, a buried prehistoric site that contains a variety of prehistoric habitation debris and human remains and was determined in 2001 to be eligible for listing on the NRHP. Previous work at the site identified the eastern and northern boundaries of the deposit, but the western boundary remains undefined. The deposit is buried by approximately 180 centimeters of alluvium, and no surface evidence is present.

Sewer Option 2 (Gravity Line)

The route of proposed sewer option 2 bisects the western edge of CA-SOL-270, which includes a substantial prehistoric midden deposit containing numerous human graves and other residential features. The boundaries of this site have not been defined.

Sewer option 2 would also require excavation of trenches along the eastern side of site CA-SOL-30/H, which is the location of the standing Peña Adobe and includes a substantial Late Prehistoric midden. This corridor has been previously tested with auger borings, and intact prehistoric deposits were not encountered. Nevertheless, there is a distinct possibility that features associated with the Peña Adobe complex occur along the proposed utility route. There is also a slight possibility that intact prehistoric features exist along this corridor. Because no surface indication of such features exist, and large sections of the proposed sewer route are currently paved, it would be logistically difficult to determine if significant features are present prior to excavation of the sewer trenches.

The pipe would pass through an area where a building once stood and will pass very close to another building location. Neither building is standing nor do foundation remnants or other archaeological features on the surface indicate the exact locations of the buildings within the adobe property.

Business Village

Historical research indicates that the remains of two other Peña family adobe residences may be located somewhere within the northern portion of the business village use area or along the northern stretch of sewer option 2. The areas thought to contain these resources are prohibitively large, and no evidence of these adobe buildings is currently visible at the surface.

Summary of Potential Impacts

Construction of either proposed sewer line option and other various utilities would cross through either prehistoric site CA-SOL-324 (force main option 1) or CA-SOL-270 (gravity option 2) and could also encounter materials associated with CA-SOL-30/H and historic features associated with the Peña family adobes (sewer option 2 and northern portion of Business Village). Because construction activities in the proposed business village use area of the project and along other various utility corridors may cause substantial adverse change to the significance of cultural resources through damage or destruction, the effect of the project on these resources would, under section 15064.5 of the CEQA Guidelines, constitute an adverse effect on the environment and result in a ***significant impact***.

Impacts on significant cultural resources require several management approaches to mitigate these effects to ensure consistency with General Plan Guiding Policy 8.5-G1 and Implementing Policy 8.5-I2. These approaches include: resource monitoring in suspected areas of archaeological sensitivity, test excavations to confirm site boundaries; and mechanical pre-trenching and limited archaeological test excavations of project utility/sewer corridors located within or near significant or potentially significant archaeological sites. Both sites (CA-SOL-270 and CA-SOL-324) are known to contain human remains and both are buried by recent, culturally sterile alluvium and lack surface indicators of the extent or significance of deposits that would be affected.

Potential mitigation for this impact could include relocation of the sewer alignments to avoid archaeological sites; however, identification of the boundaries of CA-SOL-270 or CA-SOL-324 could require extensive excavation that could result in greater disturbance of these sites than either of the potential sewer alignments. Consequently, depending on the sewer line option that is ultimately chosen, either CA-SOL-270 or CA-SOL-324 would likely require data recovery prior to project implementation.

Implementation of the following mitigation measures would reduce the impact of the project on these archaeological sites to a less-than-significant level by identifying, prior to construction, known resources that would be affected by project implementation and requiring appropriate treatment and recovery. Mitigation measures would also require monitoring of earth-disturbing activities in sensitive areas and include provisional measures that require scientific recovery and evaluation of resources that are encountered.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.14-1 (a) *If CA-SOL-270 or CA-SOL-324 cannot be avoided by altering the proposed sewer and other utility alignments, the trench for the selected alignment shall be pre-excavated with a backhoe under the direction of a qualified archaeologist to identify residential features, human graves, and other intact cultural deposits. Prior to any excavation, the qualified archaeologist shall prepare a research design conforming to the requirements of section 15126.4(b)(3)(C) of the CEQA Guidelines.*

(b) *If human burials or cultural features are encountered during pre-excavation, trenching shall stop, and the burial or feature should be excavated in a controlled manner and thoroughly recorded consistent with current archaeological standards. Non-feature site deposits shall also be sampled through the hand excavation of columns retrieved from trench sidewalls and/or from control units placed in the trench bottom. All hand-excavated sediments and soils shall be processed through 1/8-in mesh screen, with a minimum of 10 cubic meters of site deposit sampled in this manner. Flotation samples excavated from trench sidewalls shall also be obtained to recover fine-grained faunal and floral remains. The location of the utility trenches and any features or burials encountered during excavation shall be mapped using GPS technology. Trench side walls shall be thoroughly examined and recorded by a qualified geoarchaeologist and a site map shall be prepared. All recovered materials shall be analyzed, including radiocarbon and obsidian hydration dating, and a thorough research report prepared documenting the results of the investigation. This report shall, at a minimum, follow guidelines set forth in* Archaeological Resource Management Reports Recommended Content and Format *(Office of Historic Preservation [OHP], 1990).*

(c) *During construction, all ground-disturbing activities within sites CA-SOL-30/H, CA-SOL-270, CA-SOL-324 or other archaeologically sensitive zones (e.g., Peña family adobes) shall be monitored by a qualified archaeologist (listed on the Registry of Professional Archaeologists [ROPA]).*

(d) *Should an intact deposit or feature be uncovered during monitoring at CA-SOL-30/H, CA-SOL-270, CA-SOL-324 or in archaeologically sensitive zones, work in the immediate vicinity shall stop and the find assessed as to its legal significance by a qualified archaeologist. Any significant historical features or other deposits shall be hand excavated and sampled using accepted archaeological standards. Any foundation remnants shall be mapped, photo documented, and recorded prior to removal. The location of all finds shall be recorded on project plans and documented using GPS technology.*

Implementation of this mitigation measure would ensure that significant elements of prehistoric sites CA-SOL-324, and CA-SOL-270, which are eligible for listing on the CRHR, and potentially eligible historic sites CA-SOL-30/H and Peña family residences, would be subject to scientific recovery and evaluation, pursuant to CEQA. This would ensure that important scientific information that could be provided by these resources regarding history or prehistory is not lost.

4.14-2 Construction along utility corridors east of Lagoon Valley Lake could encounter a potentially significant prehistoric deposit at CA-SOL-43.

Development of the Proposed Project would result in the installation of a water line following the park roadway alignment on the east side of Lagoon Valley Lake. Based on surface observations, the boundaries of site CA-SOL-43 are thought to be located approximately 65 to 98 feet from the proposed utility corridor. However, because the boundaries of this site are based on surface observations, a strong possibility exists that subsurface deposits extend into the proposed utility corridor. Earth-disturbing activities associated with installation of utility lines along the proposed route—such as trenching—could damage or destroy resources that may be present within the utility alignment. This is considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.14-2 (a) *Prior to construction, a qualified archaeologist shall implement a testing program to determine whether significant deposits associated with CA-SOL-43 lie within the proposed utilities alignment. Prior to any excavation, the archaeologist shall prepare a research design conforming to the requirements of Section 15126.4(b)(3)(C) of the CEQA Guidelines. The research design shall include procedures for finds that are determined not to be significant, as well as finds that are potentially significant.*

(b) *A qualified archaeologist shall hand-excavate surface transect units between the recorded site boundary and the utility corridor to determine if intact cultural deposits associates with CA-SOL-43 are present. If such deposits exist in the proposed corridor, a 1-x-2-m control unit shall be excavated under the direction of a qualified archaeologist and the material evaluated to determine if the deposit represents a significant resource under CEQA.*

(c) *If the site deposit does not appear significant, no further management is required.*

(d) *If a significant deposit is encountered, the project applicant shall, in consultation with the lead agency, evaluate alternative alignments for the proposed utilities to avoid the deposits associated with CA-SOL-43.*

(e) *If the utilities alignment cannot feasibly be moved, data recovery excavations shall be conducted under the direction of a qualified archaeologist immediately following conclusion of the test excavation. This work shall include the excavation of additional 1-x-2-m control units (up to 6 cubic meters) and collection of column samples for flotation processing to recover plant macrofossils and small faunal remains. The site shall be mapped, unit profiles described, and the location of all control units recorded using GPS technology. All materials recovered during the test and data recovery excavations shall be analyzed and a research report prepared following guidelines set forth in* Archaeological Resource Management Reports: Recommended Content and Format *(OHP 1990).*

Implementation of the mitigation measure would ensure that significant elements of CA-SOL-43, a potentially significant prehistoric archaeological site, would be subject to identification, and avoidance or scientific recovery and evaluation, as appropriate, pursuant to CEQA and the CEQA Guidelines. This would ensure that important scientific information that could be provided by these resources regarding history or prehistory is not lost.

4.14-3 Earth-disturbing activities associated with implementation of the Proposed Project could result in the disturbance of previously unidentified prehistoric or historic archaeological resources.

Investigations have detected six archaeological sites that could be encountered within the off-site utility alignment corridors and in the business village use area, but the extent of these sites have not been fully determined. In addition, previously unidentified archaeological sites can

also be present without providing surface indications (e.g., at the Demetrio Peña Adobe in the northern part of the proposed Business Village). Because the Specific Plan area and vicinity are known to be archaeologically sensitive, the potential exists for additional, unanticipated finds of archaeological resources during ground-disturbing activities associated with project implementation. Prior to evaluation of these deposits, any deposits encountered must be presumed significant under the criterion specified in section 15064.5(a)(3)(D) of the CEQA Guidelines (may be likely to yield information important in prehistory or history). Therefore, the potential for damage to or destruction of these cultural resources as a result of project construction would be considered a ***potentially significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.14-3 (a) *In the event that such historical resources are discovered during project construction, construction work in the vicinity of the find shall cease until the find has been evaluated by a qualified archaeologist and a course of action decided upon, as described in (b), below. A physical barrier (e.g., exclusionary fencing) shall be erected to prohibit potentially destructive activities from occurring and/or visitation and potential vandalism by unauthorized personnel. Project-related activities and access to the location shall be prohibited until the City of Vacaville is notified otherwise.*

(b) *A qualified archaeologist shall be notified to make a preliminary assessment of the discovered resource. Following this assessment, the City of Vacaville and the applicant shall be provided written notice to alert them of the situation. In coordination with the City and the applicant, the archaeologist shall evaluate the potential significance of the find and recommend what treatment measures, if any, are appropriate.*

The qualified archaeologist shall conduct the evaluation of the discovered resource following these considerations:

- *CRHR criteria for evaluation should be applied to determine if the resource is significant.*
- *The evaluation should be conducted in following a research design consistent with that found in* Guidelines for Archaeological Research Designs *(Office of Historic Preservation [OHP], 1991).*
- *The City and the applicant (or at their request, the qualified archaeologist) shall consult with the appropriate Native American tribal groups during the evaluation and treatment phases.*

(c) *To expedite the review process after fieldwork is completed, the qualified archaeologist shall prepare a brief management summary report for the City and the applicant that describes and assesses the significance of the discovered resource, including a discussion of the methods and criteria used to determine significance. If the resource is deemed eligible for inclusion in the CRHP, the report shall detail avoidance and/or treatment recommendations.*

(d) *A comprehensive research report, detailing the results of any archaeological evaluation and/or data recovery treatment activities associated with the unanticipated discovery, shall be prepared by the qualified archaeologist, and submitted to the City and the applicant no later than 360 days after the completion of any field studies associated with this effort. The comprehensive research report shall follow guidelines set forth in* Archaeological Resource Management Reports: Recommended Content and Format *(OHP, 1990).*

Section 15064.5 of the CEQA Guidelines requires lead agencies to make provision for accidental, unanticipated discovery of historical resources, including those determined eligible for listing on the CRHR, during construction. CEQA requires that these provisions include an immediate evaluation of the find by a qualified archaeologist, and, if the find is determined to be a significant cultural resource, the lead agency make available contingency funding and a time allotment sufficient to allow for avoidance or appropriate mitigation measures.

Implementation of this mitigation measure would ensure that unanticipated archaeological resources, if discovered during construction activities, would be subject to scientific recovery and evaluation, pursuant to CEQA. This would ensure that important scientific information that could be provided by these resources regarding history or prehistory is not lost.

4.14-4 Trenching for sewer line option 2 in the vicinity of the Peña Adobe could subject the structure to vibration, which could affect the building structure or non-structural elements.

As noted in the Environmental Setting, the Peña Adobe is listed on the NRHP for its significance at the local level under Criterion B for its direct association with Solano County pioneer Juan Felipe Peña. If sewer line option 2 (gravity line) is selected, trenching, placement of the line, backfill, and recompaction to install the sewer line could occur east of the adobe in the access road, parking lot, and through the lawn north of the site. While no long-term impacts regarding the historical context of the adobe or direct impacts to the structure itself are expected to occur, short-term vibration from heavy equipment and installation activities could affect the building structure, façade, or its contents. The potential to damage the adobe, a listed resource, is therefore considered a ***potentially significant impact.***

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.14-4 (a) *Prior to utility trenching adjacent to the Peña Adobe, an engineering analysis on the adobe shall be made by an engineer qualified in acoustic/vibration analysis to determine the level (if any) of vibrational effects that could occur during construction. If such effects could occur and could result in damage, appropriate equipment selection and construction methods shall be specified in construction contracts to avoid the potential for damage.*

(b) *A monitoring program shall be developed and implemented during construction under the direction of a qualified professional to monitor vibration levels and to evaluate the effectiveness of controls. In the event of adverse effects, work shall stop immediately and corrective action taken.*

Implementation of this mitigation measure would ensure that no substantial adverse impact occurs to historic structures as a result of vibration from site preparation and construction activities, by requiring the use of appropriate equipment and implementation of appropriate measures to minimize vibration, as well as monitoring to identify and halt or prevent potential vibration-related effects, if such effects are observed during construction.

4.14-5 Earth-disturbing activities associated with implementation of the Proposed Project could result in the disturbance of previously unidentified human remains, including those interred outside of formal cemeteries.

No formal cemeteries are known to have occupied the project site, so any human remains, if encountered, would likely come from archaeological or historical archaeological contexts. As described above in the Environmental Setting, archaeological materials, including human burials, have been discovered in archaeological contexts in the vicinity of the project site, and a substantial potential therefore exists for such resources to be present and for trenching during utility installation or excavation activities to potentially disturb any human remains.

Human burials, in addition to being potential archaeological resources, have specific provisions for treatment in section 5097 of the California Public Resources Code and under section 7050.5 of the California Health and Safety Code. Section 7050.5(b) of the California Health and Safety Code requires that if human remains are found in any location other than a dedicated cemetery, excavation is to halt in the immediate area, and the county coroner is to be notified. Within 48 hours of notification, the coroner is required to examine the remains and make an assessment of their origin.

Disturbing human remains could violate the Health Code, as well as destroy the resource. This impact is, therefore, considered to be ***potentially significant***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.14-5 (a) *In the event that human skeletal remains or material thought to be human remains are encountered during project construction, work shall be halted in the general vicinity of the finds and the City and the applicant immediately notified. If possible, all finds will be preserved in place and protective measures implemented to safeguard the remains from further disturbance or vandalism. Following protection of the finds, the following steps will be implemented:*

The City and the applicant shall immediately retain a qualified cultural resources specialist to assess the remains and determine whether they are human. If the find is determined to be non-human and nonarchaeological, then no further consideration is necessary and construction may resume. If the find is determined to be non-human, but archaeological, then the procedures described in Mitigation Measure 4.14-2 (a) through (e) shall be followed.

(b) *If the find is determined to be human, the Solano County Coroner and representatives of the City of Vacaville and the applicant shall be simultaneously notified. The cultural resources specialist or physical anthropologist shall work*

with the Coroner to determine whether the remains are prehistoric Native American or are of more recent origin. If the remains are found to be of recent origin, then the discovery becomes a police issue. If the remains are determined to be Native American, the following shall be implemented:

i. The NAHC shall be notified by the Coroner within 24 hours of identification. Although it is the Coroner's responsibility to notify the NAHC, a representative of the City shall also contact the NAHC and verify that the notification was made. The NAHC shall immediately notify the person it believes to be the Most Likely Descendant (MLD) for purposes of consultation.

ii. Following notification, City shall consult with the selected MLD and provide the opportunity within 24 hours for the MLD to visit the site of discovery, provided permission from the legal landowner can be obtained. The City shall work with the MLD to arrive at a satisfactory plan for treatment and final disposition of the remains. The preferred resolution shall be to preserve the remains in place and to avoid further project-related impacts. If preservation in-place is not a viable option, in consultation with the MLD, the City shall develop an appropriate plan for the recovery and documentation of the remains and any associated grave goods. This plan shall be implemented along with an Unanticipated Historic Properties evaluation to determine the CRHR significance of the discovery and any associated archaeological deposit.

iii. It is the policy of the State of California that any Native American remains and/or grave goods not immediately reburied will be repatriated. Final disposition of the remains, however, may include re-interment or placement within a state approved curation facility if requested by the MLD.

iv. If a satisfactory agreement for the final disposition of the remains cannot be reached, either of the parties may request mediation by the NAHC. In the event that mediation fails, with appropriate dignity, the landowner or their representative must re-inter the remains and any associated items on the property in a location not subject to further disturbance.

Implementation of this mitigation measure would ensure the appropriate treatment of and previously unidentified human remains under State law.

4.14-6 Ground-disturbing activities associated with implementation of the Proposed Project could encounter previously unidentified paleontological resources.

No unique geological feature is known to exist on the project site, and as described above in Environmental Setting, no fossils have been documented at the surface or in underlying alluvium or rock units on or adjacent to the project site. Although unlikely, this does not preclude the possibility that such resources would not be encountered during trenching or excavation activities. Therefore, if fossiliferous material is discovered, it could be considered a unique resource due to the potential to yield information important in history or prehistory (Criteria 4 of the NRHP and D of the CRHR). Until an evaluation is made of the find, any construction-related, earth-disturbing activities resulting from implementation of the Proposed Project that damages or destroys fossils is considered ***potentially significant***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.14-6 (a) *The project applicant shall retain a qualified paleontologist to prepare a paleontological resources impact mitigation plan. The plan shall include, but not be limited to, the following elements and requirements:*

- *Resource identification training procedures for construction personnel*
- *Procedures for reporting discoveries and their geologic context*

(b) *If subsurface paleontological resources are encountered, excavation shall halt in the vicinity of the resources and a qualified paleontologist shall evaluate the resource and its stratigraphic context. The monitor shall be empowered to temporarily halt or redirect construction activities to ensure avoidance of adverse impacts to paleontological resources.*

- *During monitoring, if potentially significant paleontological resources are found, "standard" samples shall be collected and processed by a qualified paleontologist to recover micro vertebrate fossils*
- *If significant fossils are found and collected during the Project, they shall be prepared to a reasonable point of identification. Excess sediment or matrix shall be removed from the specimens to reduce the bulk and cost of storage. Itemized catalogs of material collected and identified shall be provided to the museum repository with the specimens*
- *Significant fossils collected during this work, along with the itemized inventory of these specimens, shall be deposited in a museum repository for permanent curation and storage*
- *A report documenting the results of the monitoring and salvage activities, and the significance of the fossils, if any, shall be prepared. The report and inventory, when submitted to the lead agency, signifies the completion of the program to mitigate impacts to paleontological resources*
- *As necessary, the qualified vertebrate paleontologist shall revise the paleontological resources impact mitigation program for the remaining excavation*

Implementation of this mitigation measure would require an instructional program to assist construction personnel in identifying paleontological resources and requiring the scientific recovery and evaluation of any paleontological resources or unique geologic features that could be encountered, which would ensure that important scientific information that could be provided by these resources regarding history or prehistory is not lost.

ENDNOTES

1. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p.12.

2. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p. 14.

3. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.8 and 20.

4. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.14 and 20.

5. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p. 20.

6. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p.14.

7. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.9 and 21.

8. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p.16.

9. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.18 through 20.

10. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, p.20.

11. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.21 through 22.

12. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.22 through 23.

13. Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003, pp.23.through 25.

14. JRP Historical Consulting Services, *Historic Resource Evaluation Report, Lagoon Valley Project*, Vacaville, Solano County, California, October 2003, pp. 16 through 21.

15. University of California, Berkeley, Museum of Paleontology, UCMP Online Database search, August 2003. (http://elib.cs.berkeley.edu/ucmp/index.shtml); R.W. Graymer, D.L. Jones and E.E. Brabb, Geologic Map and Map Database of Northeastern San Francisco Bay Region, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-2403, 2002.

4.15 BIOLOGICAL RESOURCES

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4.15.1 INTRODUCTION

This section describes plant and animal resources within the proposed Specific Plan area, including off-site infrastructure, and presents potential impacts of the Proposed Project on these resources.

Comments received on the NOP (see Appendix B) raised concerns regarding impacts to: special-status species and their habitat; general wildlife habitats; rare native plant communities; impacts from invasive plants, biological resources associated with Lagoon Valley Lake; wetlands and riparian habitat; impacts subject to regulation by the CDFG under section 1600 et seq. of the Fish and Game Code; vernal pools; and wildlife corridors. These issues are addressed in this section of the EIR.

4.15.2 ENVIRONMENTAL SETTING

Specific Plan Area

Elevations in the Specific Plan area range from 210 ft msl (NGVD 1929) near Lagoon Valley Lake and I-80 to over 900 ft msl (NGVD 1929) at the perimeter of the Specific Plan area. Several creeks drain the Specific Plan area, generally from south to north, eventually emptying into Lagoon Valley Lake or the bypass channel. Surrounded by steep hills to the south and east, the Peña Adobe to the north, and I-80 to the west, the development area is predominantly disturbed, non-native annual grassland. Much of this grassland is currently used for grazing and has been subject to grading and cultivation in the past. Additionally, the Specific Plan area contains orchards, the Hines Nursery, open land, and scattered residences.

Off-site improvements associated with the Proposed Project, including wastewater collection lines, would be installed north of the Specific Plan area near Peña Adobe, immediately north of Lagoon Valley Lake and other utility corridors in existing streets and rights-of-way both in and out of the Specific Plan area. Annual grassland, oak woodland, riparian woodland, and wetland habitats in this area are similar to those found in the Specific Plan area. Additionally, an off-site stormwater detention basin is proposed for Area 7A, west of the development area and south of Lagoon Valley Road. Habitat in this area consists of disturbed grassland, riparian and coyote brush scrub.

Six different vegetation communities occur within the Specific Plan area (Figure 4.15-1), including annual grassland, coyote brush scrub, oak woodland/savanna, riparian woodland, orchard/agricultural, and wetland (including emergent wetland, alkali wetland, seasonal wetland, and stock pond). Within each of these general habitat types, subtle differences in abiotic factors such as soil type, moisture availability, aspect, and topography produce microhabitats. For example, within the annual grassland community, seasonal wetlands may form within impermeable depressions where seasonal precipitation collects. A wetland delineation of the site was performed by LSA Associates on July 17 2003 and August 5, 14, 21 and 26 2003.[1] This delineation has been submitted to the Corps, but has not been verified to date.

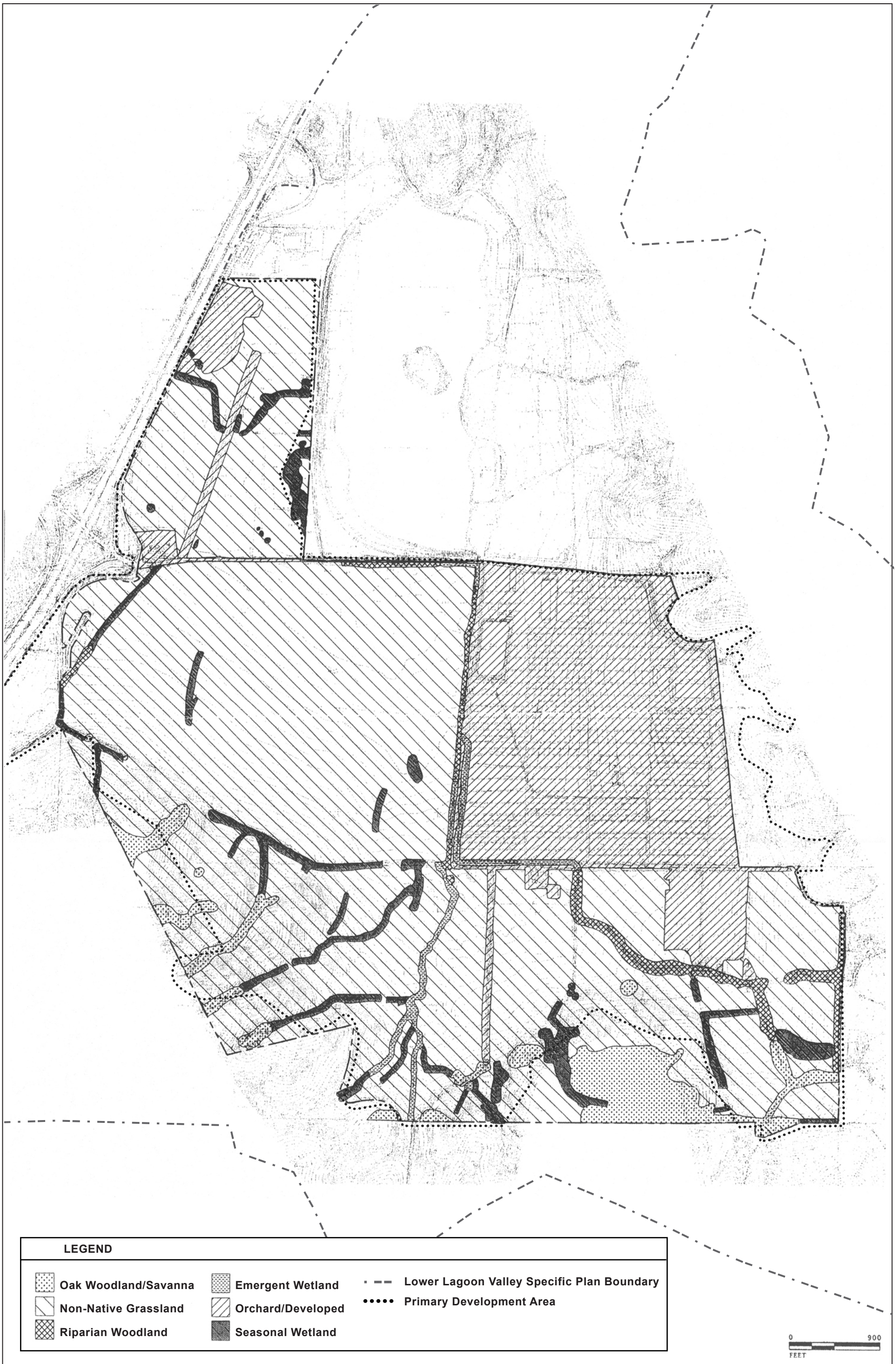

FIGURE **4.15-1**

Development Area Vegetation Communities

Source: LSA Associates, 2003

City of Vacaville

10794-00

EIP ASSOCIATES

Project Site Habitats

Annual Grassland

Annual grasslands in the open fields, pastures, and the ridges and hillsides on the edges of the project site have replaced the once-native grassland, which was primarily dominated by perennial bunch grasses. The annual grassland now occurs either as a distinct vegetation community, or as an understory to oak and riparian woodlands or orchard. There are approximately 599 acres of annual grassland within the development area.[2]

Plant species that typically occur in annual grasslands in the region include medusahead grass (*Taeniatherum caput-medusae*), wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceous*), hairgrass (*Aira caryophylla)*, Italian ryegrass (*Lolium multiflorum*) and Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*). Common forbs that were either observed, or could be expected to occur in the annual grasslands in the Specific Plan area include yellow star-thistle (*Centaurea solstitialis*), purple star-thistle (*Centaurea calcitrapa*), milk thistle (*Silybum marianum*), rose clover (*Trifolium hirtum*), vetch (*Vicia* sp.), fluelin (*Kickxia spuria*), field bindweed (*Convolvulus arvensis*), fiddle dock (*Rumex pulcher*), wild radish (*Raphanus sativus*), wild teasel (*Dipsacus sativus*), Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), slender madia (*Madia gracilis*), and hayfield tarweed (*Hemizonia congesta*). No extensive native grasslands remain within the project site, though one small stand of creeping wild rye (*Leymnus triticoides*) is associated with a ditch near an unnamed creek in the southern part of the site.

The annual grasslands in the Specific Plan area are capable of supporting a wide variety of both resident and transient wildlife species. Those wildlife species that could be expected to occur within the specific Plan Boundaries include small rodents, such as deer mice (*Peromyscus maniculatus*) and California vole (*Microtus californicus*), that feed on the abundance of grass seeds provided by this habitat, as well as cottontail (*Sylvilagus audubonii*), blacktail hare (*Lepus californicus*), and California ground squirrel (*Spermophilus beecheyi*). These small mammals in turn provide food for a variety of predators common to the region, including mammals such as coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and opossum (*Didelphis virginiana*) and birds such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), and barn owl (*Tyto alba*). The abundant insects in these fields provide food for many common birds in the region such as killdeer (*Charadrius vociferous*), American crow (*Corvus brachyrhyncos*), European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoenicus*), Brewer's black bird (*Euphagus cyanocephalus*), western meadowlark (*Sturnella neglecta*) and barn swallow (*Hirundo rustica*). Other bird species that are likely to occur in annual grasslands in the region include scrub jay (*Aphelocoma coerulescens*) and western bluebird (*Sialia mexicana*). Reptile species frequently found in annual grasslands include northern Pacific rattlesnake (*Crotalus viridis oreganus*), Pacific gopher snake (*Pituophis melanoleucus catenifer*), California kingsnake (*Lampropeltis getulus californiae*), garter snakes (*Thamnophis* spp, western fence lizards (*Sceloporus occidentalis*), southern alligator lizards (*Gerrhonotus multicarinatus*) and Gilbert's skink (*Eumeces gilberti*). Grasslands adjacent to wetlands or other sources of moisture could also support Pacific tree frog *(Hyla regilla)* and western toad *(Bufo boreas)*.

Oak Woodland/Savanna

Oak woodland/savanna is typically found along the ridges and sheltered hillsides of the Specific Plan area and varies from savanna-like to more forest-like stands with higher tree densities and partially closed canopies growing in valley soils along natural drainages. This community intergrades with annual grassland along the bases of the hills. There are approximately 40 acres of oak woodland/savanna within the proposed development area.[3]

While valley oak *(Quercus lobata)* is the dominant canopy species in this habitat, California buckeye *(Aesculus californica)* and interior live oak *(Quercus wislizenii)* also occur. Associated shrub species commonly include California buckeye and poison oak *(Toxicodendron diversilobum)*, although the shrub layer is not well developed due to grazing. The understory typically consists of an herbaceous ground cover of mixed annual grasses and forbs found in the annual grassland community.

Oak woodlands provide food (e.g., acorns), shelter, and nesting opportunities for a wide variety of wildlife species. Bird species typically found in this habitat include Acorn woodpecker *(Melanerpes formicivorous)*, Nuttall's woodpecker *(Picoides nuttallii)*, northern flicker *(Colaptes auratus)*, white breasted nuthatch *(Sitta carolinensis)* and house wren *(Troglodytes aedon)*. Other birds occurring in woodland communities include sharp-shinned hawk *(Accipiter striatus)*, Cooper's hawk *(Accipiter cooperii)*, red-tailed hawk (*Buteo jamaicensis*), and great horned owl *(Bubo virginianus)*. Common mammals in this community include bobcat, coyote, gray fox, striped skunk, western gray squirrel *(Sciurus griseus)*, deer mice (*Peromyscus* sp.), dusky woodrat *(Neotoma fucipes)*, and mule deer *(Odocoileus hemionus)*.

Coyote Brush Scrub

Coyote brush scrub is a low (3 to 6 foot tall) scrubby vegetation community dominated by coyote brush (*Baccharis pilularis*). This habitat typically occurs in dense stands with scattered grassy openings that occur on windy, exposed hillsides that receive coastal moisture where orographic effects are present or on sites adjacent to watercourses. The only occurrence of coyote brush scrub within the specific plan area occurs in area 7A as identified in the Lower Lagoon Valley Land Use Plan. This area appears to be subject to periodic disturbance through vehicular access and illegal dumping. Other plant species in this habitat that were observed during the site visit include wild oat, ripgut brome, Italian ryegrass, yellow star thistle and poison hemlock (*Conium maculatum*).

Coyote brush scrub typically supports a similar assemblage of wildlife species that occur in the surrounding grassland or woodland habitats. However, due to the density of the vegetation, scrub communities can provide greater nesting and sheltering opportunities for a number of smaller bird and mammal species that may also occur in other adjacent habitats such as blacktail hare, deer mice, California vole, striped skunk and opossum. Bird species expected to utilize this habitat include scrub jay, spotted towhee (*Pipilo maculatus*), California thrasher (*Toxostoma redivivum*), Bewick's wren (*Thryomanes bewickii*), lesser goldfinch (*Carduelis psaltria*) and golden crowned sparrow (*Zonotrichia atricapilla*).

Riparian Woodland

Riparian woodlands are generally associated with the creeks and drainages located in the Specific Plan area, including the unnamed creek draining Lagoon Valley Lake. A dry riparian woodland follows this seasonal, northwest-flowing, unnamed creek in the southeast portion of

the site, while a wet riparian woodland is associated with Lagoon Lake Creek west of Lagoon Valley Road, as well as in the ditches north and south of Lagoon Valley Road in the central area of the property, and along the unnamed creek draining Lagoon Valley Lake. There are approximately 16 acres of riparian woodlands within the development area.[4]

The vegetation of the riparian woodland habitat is varied and structurally diverse. Tree species that were observed in the Specific Plan area include valley oak (*Quercus lobata*), interior live oak (*Quercus wislizenii*), Fremont cottonwood (*Populus fremontii*), willow (*Salix* spp.), English walnut (*Juglans regia*), and California black walnut (*Juglans californica* var. *hindsii*). Additionally, a number of non-native tree species such as almond (*Prunus dulcis*), edible fig (*Ficus carica*), and cherry plum (*Prunus cerasifera*) are present as well. Typical sub-canopy species include California buckeye, Himalayan blackberry (*Rubus discolor*), poison oak (*Toxicodendron diversilobum*), and toyon (*Heteromeles arbutifolia*). However, non-native species such as oleander (*Nerium oleander*) and pyracantha (*Pyracantha angustifloia*) were also observed at the site. The herbaceous understory of the onsite riparian woodlands include English ivy (*Hedera helix*), rabbit's foot grass (*Polypogon monspeliensis*), fennel (*Foeniculum vulgare*), mugwort (*Artemesia douglasiana*), western ragweed (*Ambrosia psilostachya*), and, in the wetter areas, alkali bulrush (*Scirpus acutus* var. *occidentalis*), saltgrass (D*istichlis spicata*), broad-leaved cattail (*Typha latifolia*), spikerush (*Eleocharis macrostachya*), and pampas grass (*Cortaderia selloana*).

Riparian woodlands provide abundant food, cover, and breeding sites for wildlife in close proximity to water. These factors and the structural diversity of riparian woodland are largely responsible for the high productivity of this habitat. Characteristic bird species in this habitat include California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), Nuttall's woodpecker, black phoebe (*Sayornis nigricans*), western wood-pewee (*Contopus sordidulus*), California towhee (*Pipilo crissalis*) and song sparrow (*Melospiza melodia*). A number of these species nest or roost in riparian woodland and feed in adjacent annual grasslands and agricultural fields. Riparian woodlands also provide important feeding, resting, and nesting habitat for neotropical migrant songbirds such as warblers, vireos, grosbeaks, and flycatchers.

Mammals that are typically found within riparian woodland habitat may include opossum (*Didelphis virginianus*), raccoon, deer mouse, broad-footed mole (*Scapanus latimanus*), striped skunk, and gray fox. Amphibians and reptiles likely to occur in this community include western toad (*Bufo boreas*), Pacific tree frog (*Hyla regilla*), California king snake, valley garter snake (*Thamnophis sirtalis fitchii*), and Gilbert's skink. Riparian woodlands also provide nesting and foraging habitat for a variety of special-status wildlife species including western pond turtle (*Clemmys marmorata*), Swainson's hawk (*Buteo swainsoni*), tricolor blackbird (*Agelaius tricolor*), and white-tailed kite (*Elanus leucurus*).

In addition to providing high value wildlife habitat, riparian corridors provide local movement corridors between fragmented habitat patches, and necessary habitat for migrant wildlife species such as neotropical migrant songbirds. Due to the value and scarcity of riparian woodlands, on both a state and region-wide scale, they are considered a sensitive habitat type and monitored closely by the California Department of Fish and Game.

<u>Emergent Wetland</u>

Emergent wetlands are characterized by erect, rooted herbaceous hydrophytes and are flooded frequently enough to create an anaerobic environment in the root zone. These characteristics occur at several locations throughout the Specific Plan area, including Lagoon Valley Lake, the

Lagoon Lake Creek channel adjacent to Lagoon Valley Road and within the drainage ditch adjacent to Hines Nurseries. Additional description of these waterways are provided below under Wetlands. Common plant species that were observed include broad-leaved cattail (*Typha latifolia*), hyssop loosestrife (*Lythrum hyssopifolia*), toad rush (*Juncus bufonius*), spike rush, tall manna grass (*Glyceria elata*), and tule, along with narrow-leaved cattail (*Typha angustifloia*), umbrella sedge (*Cyperus eragrostis*), brown head sedge (*Juncus phaeocephalis*), cocklebur (*Xanthium strumarium*), perennial pepperweed (*Lepidium latifolium*), and lamb's quarters (*Chenopodium album*). Hairy willow-herb (*Epilobium ciliatum*), fireweed (*Epilobium angustifoilum*), bird's-foot trefoil (*Lotus corniculatus*), scarlet pimpernel (*Anagallis arvensis*), and curly dock (*Rumex crispus*) occur in the transition area between wetland and upland).

Emergent wetlands are productive wildlife habitats, providing food, cover, and water for numerous species, including red-winged blackbird (*Agelaius phoenicus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), bullfrog (*Rana catesbeiana*), Pacific tree frog (*Hyla regilla*), muskrat (*Ondatra zibethicus*), and mosquitofish (*Gambusia affinis*).

Wetlands

Waters of the U.S.

A delineation of wetlands and "other waters" of the United States was conducted for the Proposed Project development area by LSA Associates in July and August of 2003.[5] Although this delineation is still awaiting verification by the Corps, a total of 12.12 acres of jurisdictional waters was delineated within the development area. These jurisdictional waters include 7.74 acres of stream and ditch segments, 2.22 acres of seasonal wetlands, 1.88 acres of alkali wetlands and 0.27 acres of stock ponds. Additional wetlands and "other waters" of the U.S. occur outside the development area, but within the Specific Plan area. These waters have not been delineated to date, but include Lagoon Valley Lake, additional stream and ditch segments and potentially additional seasonal wetlands. These jurisdictional waters are further discussed below.

Streams and Ditches

Streams and ditches in the Specific Plan area include a series of mostly ephemeral drainages that generally flow from the hills to the south and east of the Specific Plan area towards Lagoon Valley Lake. One exception includes what appears to be a perennial stream that flows from the northwest, adjacent to the Peña Adobe Community Park to Lagoon Valley Lake. Although this stream is outside of the Specific Plan area, the off-site infrastructure associated with the Specific Plan will cross this drainage near the entrance to the Pena Adobe Community Park. This drainage supports a narrow, but well developed corridor of riparian vegetation.

The drainages that originate from the south, east and west of the Specific Plan area carry high volumes of water during the rainy season, but are generally dry much of the rest of the year. The largest of these drainages originates in the hills to the southeast of the Specific Plan area and travels in a generally west/northwest direction towards the lake. This drainage is referred to as Tributary G in the wetland delineation for the development area.[6] Much of this segment supports well developed riparian vegetation, consisting primarily of mature valley oak (*Quercus lobata*) and California black walnut (*Juglans californica* var. *hindsii*). This drainage eventually feeds into an excavated ditch that runs parallel with the western boundary of the Hines Nursery property, and then turns west and follows Lagoon Valley Road until it reaches the lake. Riparian vegetation is also present along the drainage originating from the southwest of the site

that flows towards Lagoon Valley Lake (Tributary D in the Wetland Delineation).[7] The remainder of the drainages that pass through the Specific Plan area are too ephemeral to support any significant riparian vegetation.

Alkali Wetlands

An alkali wetland occurs in the fields to the west of Lagoon Valley Lake. This wetland is a shallow depression that appears to have been created as the result of historic grading and the creation of berms associated with the bypass channel that runs adjacent to the west side of Lagoon Valley Lake. Vegetation in this wetland is primarily composed of salt grass (*Distichlis spicata*) and pickleweed (*Salicornia virginica*), but also includes other plant species that favor alkali soils including San Joaquin saltbush (*Atriplex joaquiniana*). Other areas that support alkali wetland vegetation (primarily salt grass) occur both to the south and west of Lagoon Valley Lake, but do not exhibit wetland characteristics. These alkali areas occur outside of the development area, but are within the Specific Plan boundaries. These lands are owned by the City of Vacaville (Lagoon Valley Regional Park), and would not be subject to disturbance related to this project.

Seasonal Wetlands

Seasonal wetlands are supported by accumulated seasonal runoff in low-lying areas. Swales are linear features with no distinct pooling, but which convey water (often to or from seasonal wetlands). There are a total of 26 individual seasonal wetlands and swales, totaling 2.22 acres in the development area.[8] Many of these wetlands are small basins distributed throughout various locations on the valley floor. These basins originated primarily as the incidental result of historic grading and leveling related to past agriculture in the Valley.[9] Seasonal wetlands also occur in basins along artificial ditches and natural drainages where water remains long enough, either as surface water or soil saturation, such that persistent jurisdictional characteristics are present. These wetlands do not appear to pool water for more that a few day at a time, if at all. Most appear to be maintained as the result of soil saturation or the movement of moisture within filled streambeds.

Seasonal wetlands also occur along the foot slopes south of the Hines Nursery property. These wetlands are fed and maintained by the near-surface flow of percolating rainwater. These wetlands demonstrate strong hydric soil characteristics, but do not support very distinct wetland plant communities. These communities are dominated by Italian ryegrass (*Lolium multiflorum*), and fiddle-dock (*Rumex pulcher*), which are not typically reliable wetland indicator species, clearly contrast with the upland grass species such as medusa-head grass (*Taeniatherum caput-medusae*) in the surrounding areas.

Stock Pond

Two stock ponds occur in the southern portion of the Specific Plan area. These ponds were created by the construction of earthen dams in ephemeral drainages to provide water for livestock, and will hold water well into the dry season. Pond A is located near the southwest border of the development area. This stock pond appears to be perennial, and is vegetated primarily with rabbit's foot grass (*Polypogon monspeliensis*) along its margins. Pond B is located near the center of the southern border of the development area. Vegetation around this pond includes prickle grass (*Crypsis vaginiflora*) and doveweed (*Eremocarpus setigerus*).

Lagoon Valley Lake

Lagoon Valley Lake was historically a natural seasonal lake and wetland. The present lake was created in the 1970's by construction of an earthen dam during the creation of the Lagoon Valley Regional Park. The lake has a surface area of approximately 106-acres and ranges in depth from 5.9 feet to 9.02 feet.[10] Portions of the lake perimeter support emergent marsh habitat vegetated primarily by cattails, while the interior of the lake provides open water/pelagic habitat for fish and other aquatic species. Lagoon Valley Lake is known to support a number of native fish species including Sacramento blackfish (*Orthodon microlepidotus*) and Sacramento perch (*Archoplites interruptus*), the latter of which is a California Species of Special Concern.

Orchard/Agricultural

Agricultural lands within the Specific Plan area include orchards and the Hines Nurseries site. The nursery site has been graded and topped with gravel. Due to the level of ground-disturbing activities associated with the nursery, few plant or animal species native to the region occur in this area.

A small orchard between Lagoon Valley Road and an unnamed creek is no longer under active cultivation, but the understory of annual grassland species does provide foraging habitat and/or cover for similar wildlife species as the annual grasslands including deer mouse, California vole, California ground squirrel, and cottontail. These species in turn provide food for raptors such as red-tailed hawk, red-shouldered hawk, American kestrel, and barn owl, and mammals such as coyote, raccoon, striped skunk, and opossum.

Special-status Species

The potential occurrence of special-status plant and animal species within and in the vicinity of the Specific Plan area has been determined through habitat information collected during field surveys of the Specific Plan area and a review of the California Natural Diversity Data Base (CNDDB) and United States Fish and Wildlife Service (USFWS) species list in a letter dated December 15, 2003 (1-1-04-SP-386).

For the purposes of this section, special-status species include:

- species listed, proposed, or candidate species for listing as Threatened or Endangered by the USFWS pursuant to the Federal Endangered Species Act (FESA) of 1969, as amended;

- species designated as Species of Concern by the USFWS (note: although this status designation does not itself trigger any FESA requirements, many of the species that have this designation meet the definition of rare, threatened or endangered under CEQA);

- species listed as Rare, Threatened, or Endangered by the California Department of Fish and Game (CDFG) pursuant to the California Endangered Species Act (CESA) of 1970, as amended;

- species designated as Fully Protected under Sections 3511 (birds), 4700 (mammals), and 5050 (reptiles and amphibians) of the California Fish and Game Code;

- species designated by the CDFG as California Species of Concern;
- plant species listed as Category 1B and 2 by the California Native Plant Society (CNPS); and
- species not currently protected by statute or regulation, but considered rare, threatened or endangered under CEQA (Section 15380).

According to the CNDDB and the December 15, 2003 USFWS letter (1-1-04-SP-386), a total of 24 special-status species and two sensitive natural communities have the potential or are known to occur in the vicinity of the Proposed Project. This includes six invertebrates, two amphibians, one reptile, five birds, one fish, and nine plants. Reconnaissance-level biological surveys performed on July 24, 2003 and September 17, 2003 by EIP Associates, along with the results of biological surveys performed by LSA Associates on July 17, August 5, and August 14, 2003, determined habitat types present within and adjacent to the Specific Plan area and assessed their suitability for native plant and animal species. Reconnaissance surveys conducted by EIP Associates consisted of walking transects through representative habitats that occur within the development area and assessing the habitat for its suitability to support those species that were identified through the earlier literature review. Particular attention was given to areas that appeared to provide the most suitable habitat for the special-status species that are expected to occur in the region (e.g. riparian, drainages, stock ponds, woodlands). Using the information gathered during these site visits, the species list derived from the background research was refined to determine which species were in fact likely to occur within and around the Specific Plan area.

Based upon this work, Table 4.15-1 lists the special-status species known or with the potential to occur in the Specific Plan area and indicates the species' current regulatory status, habitat association, and potential for occurrence within the proposed Specific Plan area. Species that have been observed in the proposed Specific Plan area were given a rating of "known" under probability of occurrence. A "high" probability of occurrence was assigned to species not observed, but where sufficient information is available to indicate suitable habitat and conditions to warrant a high probability of occurrence. A "moderate" probability of occurrence was assigned to species that could use suitable habitat on-site and do occur in the vicinity of the proposed Specific Plan area, but for which the likelihood of occurrence in the proposed Specific Plan area is difficult to assess. A "low" probability of occurrence indicates that the species was not found during biological surveys and should not be expected to occur, given the species' known regional distribution or the quality of habitats located.

Table 4.15-2 lists special-status species and habitats that appeared on the CDFG or USFWS lists, but which have no potential to occur within the vicinity of the Specific Plan area. These species have been removed from further consideration and will not be analyzed in this document.

Life histories of species determined to have a "moderate" or better potential to occur in the project vicinity are discussed below.

Special-status Plants

Review of the CNDDB and the December 15, 2003 USFWS letter (1-1-04-SP-386), revealed 32 special-status plant species with the potential to occur in the vicinity. Of these, only nine

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Invertebrates						
Branchinecta conservatio	Conservancy fairy shrimp	FE	None	None	General: Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Micro: Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	Occurs approximately 11 miles southeast of the project site at the Jepson Prairie preserve. Occurrence at the project site unlikely due to the lack of large playa type pools that this species prefers.
Branchinecta lynchi	Vernal pool fairy shrimp	FT	None	None	General: Endemic to the grasslands of the Central Valley, central Coast Mountains, and south Coast Mountains, in astatic rain-filled pools. Micro: Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Low: Several recorded localities for this species approximately 5 miles east and southeast of the project site. However; no potential habitat (i.e., vernal pools) exist on-site.
Branchinecta mesovallensis	Midvalley fairy shrimp	FSC*	None	None	General: Vernal pools in the Central Valley	Low: Several recorded localities for this species approximately 10 miles east and southeast of the project site. However; no potential habitat (i.e., vernal pools) exist on-site.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT	None	None	General: Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Micro: Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries. Elderberry shrubs (*Sambucus mexicana*) typically associated with riparian forests, riparian woodlands, elderberry savannas, and other Central Valley habitats. Occurs only in the Central Valley of California. Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	High. A single elderberry shrub was observed near the end of Lagoon Valley Road adjacent to the orchard. This shrub had a number of oval bore holes characteristic of VELB. Additional elderberry shrubs may be present on-site.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	None	None	General: Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Micro: Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	Low: Several recorded localities for this species approximately 5 miles south and east of the project site. However; no potential habitat (i.e., vernal pools) exist on-site.

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Linderiella occidentalis	California linderiella	FSC*	None	None	General: Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Micro: Water in the pools has very low alkalinity, conductivity, and total dissolved solids.	Low: Several recorded localities for this species approximately 10 miles south and east of the project site. However; no potential habitat (i.e., vernal pools) exist on-site.
Amphibians						
Ambystoma californiense	California tiger salamander	FE	CSC	None	General: Federal listing refers to populations in Santa Barbara and Sonoma counties only. Micro: Need underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding.	Low: No records for this species in the vicinity of the project site.
Rana aurora draytonii	California red-legged frog	FT	CSC	None	General: Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Micro: Requires 11-20 weeks of permanent water for larval development. Must have access to aestivation habitat.	Low. Suitable habitat for this species is extremely limited and occupied by bullfrogs and non-native predatory fish.
Reptiles						
Clemmys marmorata	Western pond turtle	FSC*	CSC	None	General: A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Micro: Need basking sites and suitable (sandy or grassy open fields) upland habitat for egg-laying. Associated with permanent or nearly permanent water in a wide variety of habitat types, including lakes, ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Typical sites have adjacent woodland habitat. Need basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks, and suitable (sandy banks or grassy open fields) upland habitat for nesting and hibernation.	Known. A single individual was observed during the reconnaissance biological survey performed by EIP. This observation occurred along the unnamed creek draining from Lagoon Valley Lake to Laguna Creek.

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Birds						
Athene cunicularia	Burrowing owl	FSC*	CSC	None	General: (Burrow sites) Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation Micro: Subterranean nester, dependant upon burrowing animals, most notably, the California ground squirrel. Nests in small mammal burrows that are in or adjacent to open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependant upon burrowing mammals, most notably, the California ground squirrel.	Moderate. Open grasslands with ground squirrel burrows occur at the project site.
Buteo swainsoni	Swainson's hawk	FSC*	CT	None	General: (Nesting) Breeds in stands with few trees in juniper-sage flats, riparian areas and in oak savannah. Micro: Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations. Breeds in stands with few trees. Nests in large oaks, cottonwoods or eucalyptus, usually within or adjacent to riparian woodlands, juniper-sage flats, and oak savannah. Also require extensive tracts of open grassland or agricultural land for foraging.	High; Observed at site. Suitable nesting habitat exists in the riparian woodland adjacent to the project site. Suitable foraging habitat exists within the project site. Numerous known nesting sites have been documented from within 10 miles of the project site.
Elanus leucurus	White-tailed kite	FSC*	CFP	None	General: (Nesting) Rolling foothills/valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Micro: Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching. Rolling foothills/valley margins with scattered oaks, river bottomlands, riparian woodlands, partially cleared or cultivated fields, or marshes next to deciduous woodland. Open grasslands, meadows, or marshes required for foraging close to isolated, dense-topped trees for nesting and perching. Nests placed near tops of dense oak, willow or other tree stands.	High; Observed at site. Suitable nesting habitat adjacent to site. Suitable foraging habitat adjacent to and within project site.

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Icteria virens	Yellow-breasted chat	None	CSC	None	General: (Nesting) Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Micro: Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forage and nest within 3 m of ground.	Low: Riparian vegetation is very limited at the project site.
Lanius ludovicianus	Loggerhead shrike	SC	None	None	General: Forages in open grasslands adjacent to oak woodlands. Micro: Nests in dense shrubs and trees in wooded areas that are adjacent to foraging habitat	Moderate: Grasslands and adjacent woodlands at the project site provide suitable habitat for this species. This species has not been observed at the site to date.
Plants						
Astagalus tener var. *tener*	Alkali milk-vetch	FSC*	None	CNPS 1B	General: Alkali playa, valley and foothill grassland, vernal pools. Micro: Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 1-170m	Moderate; appropriate habitat for this species exists in the alkali seep west of Lagoon Valley Lake. No known recorded occurrences near project site.
Atriplex cordulata	Heartscale	FSC*	None	CNPS 1B	General: Chonopod scrub, valley and foothill grassland, meadows. Micro: Alkaline flats and scalds in the Central Valley, sandy soils. 1-150 m.	Moderate; appropriate habitat for this species exists in the alkali seep west of Lagoon Valley Lake. No known recorded occurrences near project site.
Atriplex depressa	Brittlescale	FSC*	None	CNPS 1B	General: Chenopod scrub, meadows, playas, valley and foothill grassland, vernal pools. Micro: Usually in alkali scalds or alkali clay in meadows or annual grassland; rarely associated with riparian, marshes, or vernal pools. 1-320 m.	Moderate; appropriate habitat for this species exists in the alkali seep west of Lagoon Valley Lake. No known recorded occurrences near project site.
Atriplex joaquiniana	San Joaquin saltbush	FSC*	None	CNPS 1B	General: Chenopod scrub, alkali meadow, valley and foothill grassland. Micro: In seasonal alkali wetlands or alkali sink scrub with *Distichlis spicata*, *Frankenia*. 1-250 m.	Known; population observed during reconnaissance biological surveys performed by EIP. Historic occurrence from southeast side of Lagoon Valley Lake.
Balsamorhiza macrolepis var. *macrolepis*	Big-scale balsamroot	FSC*	None	CNPS 1B	General: Valley and foothill grassland, cismontane woodland. Micro: Sometimes on serpentine. 35-1000 m.	Moderate; appropriate habitat for this species exists among the dry slopes and grasslands.

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Cordylanthus mollis ssp. *hispidus*	Hispid bird's-beak	FSC*	None	CNPS 1B	General: Meadows, playas, valley and foothill grassland. Micro: In damp alkaline soils, especially in alkaline meadows and alkali sinks with *Distichlis spicata.* 10-155m.	Moderate; appropriate habitat for this species exists in the alkali seep west of Lagoon Valley Lake. No known recorded occurrences near project site.
Delphinium recurvatum	Recurved larkspur	FSC*	None	CNPS 1B	General: Chenopod scrub, valley and foothill grassland, cismontane woodland. Many historical and degraded sites. Micro: On alkaline soils; often in valley saltbush or valley chenopod scrub. 3-685 m.	Moderate; appropriate habitat for this species exists on the edges of the alkali seep west of Lagoon Valley Lake.
Downingia pusilla	Dwarf downingia	None	None	CNPS 2	Valley and foothill grassland (mesic sites), vernal pools. Micro: Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 1-485 m.	Low; potential habitat (i.e., vernal pools) exist on-site.
Isocoma arguta	Carquinez goldenbush	FSC*	None	CNPS 1B	General: Valley and foothill grassland. Known only from Contra Costa and Solano counties. Micro: Alkaline soils, flats, lower hills. On low benches near drainages and on tops and sides of mounds in swale habitat. 1-20 m.	Moderate; appropriate habitat for this species exists on the edges of the alkali seep west of Lagoon Valley Lake.
Lasthenia conjugens	Contra Costa goldfields	FE	None	CNPS 1B	General: Valley and foothill grassland, vernal pools, cismontane woodland. Extirpated from most of its range. Micro: Vernal pools, swales, low depressions, in open grassy areas. 1-445 m.	Low; potential habitat (i.e., vernal pools) exist on-site.
Legenere limosa	Legenere	FSC*	None	CNPS 1B	General: Vernal pools. Many historical occurrences are extirpated. Micro: In beds of vernal pools. 1-880 m.	Low; potential habitat (i.e., vernal pools) exist on-site.
Plagiobothrys hystriculus	Bearded popcorn-flower	FSC*	None	CNPS 1A	General: Vernal pools, valley and foothill grassland. Known only from a historical collection in Solano County. Micro: Wet sites. 10-50 m.	Low; potential habitat (i.e., vernal pools) exist on-site.
Trifolium amoenum	Showy Indian clover	FE	None	CNPS 1B	General: Valley and foothill grassland, coastal bluff scrub. Micro: Sometimes on serpentine soil, open sunny sites, swales. Most recently sited on roadside and eroding cliff face. 5-560 m.	Low; although potential habitat exists on-site (swales), this species is believed to be extirpated from Solano County.

TABLE 4.15-1

SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE LOWER LAGOON VALLEY PROJECT VICINITY

Scientific Name	Common Name	Status			Habitat	Potential to Occur within Proposed Project site/Comments
		Federal	State	Other		
Trifolium depauperatum var. *hydrophilum*	Saline clover	FSC*	None	CNPS 1B	General: Marshes and swamps, valley and foothill grassland, vernal pools. Micro: Mesic, alkaline sites. 0-300 m.	High; appropriate habitat for this species exists in the alkali seep west of Lagoon Valley Lake. Historical (1960) occurrence from border of Lagoon Valley Lake.
Communities						
Northern claypan vernal pool						
Valley needlegrass grassland						

Federal status:
FE = Listed as endangered under the federal Endangered Species Act.
FT = Listed as threatened under the federal Endangered Species Act.
D = Delisted. Status to be monitored for 5 years.
FC = Candidate for listing under the federal Endangered Species Act.
FSC = Federal species of concern.
SLC = Species of local or regional concern or conservation significance.
* = Although this status does not trigger any FESA requirements, species with this designation qualify as rare, threatened ort endangered under CEQA.

State status:
CE = Listed as endangered under the state Endangered Species Act.
CT = Listed as threatened under the state Endangered Species Act.
CSC= Designated by CDFG as California species of special concern.

CNPS status:
1B = Rare or Endangered in California and elsewhere.
2 = Rare or Endangered in California, more common elsewhere.

Likelihood of occurrence evaluations
A rating of "known" indicates that the species has been observed on the site.
A rating of "high" indicates that the species has not been observed, but sufficient information is available to indicate suitable habitat and conditions are present on-site and the species is expected to occur on-site.
A rating of "moderate" indicates that it is not known if the species is present, but suitable habitat exists on-site.
A rating of "low" indicates that species was not found during biological surveys conducted to date on the site and may not be expected given the species' known regional distribution or the quality of habitats located on the site.
A rating of "not likely" indicates that the taxa would not be expected to occur on the project site because the site does not include the known range or does not support suitable habitat.

Source: California Department of Fish and Game, *California Natural Diversity Database*, 2002

TABLE 4.15-2

SPECIAL-STATUS SPECIES AND HABITATS REMOVED FROM FURTHER CONSIDERATION

Common Name	Scientific Name
Invertebrates	
California freshwater shrimp	*Syncharis pacifica*
Fish	
Green sturgeon	*Acipenser medirostris*
Delta smelt	*Hypomesus transpacificus*
River lamprey	*Lampetra ayresi*
Pacific lamprey	*Lampetra tridentata*
Central Valley steelhead	*Oncorhynchus mykiss*
Central Valley fall/late fall-run Chinook salmon	*Oncorhynchus tshawytscha*
Winter-run Chinook salmon	*Oncorhynchus tshawytscha*
Sacramento splittail	*Pogonichthys macrolepidotus*
Longfin smelt	*Spirinchus thaleichthys*
Amphibians	
Foothill yellow-legged frog	*Rana boylii*
Reptiles	
Giant garter snake	*Thamnophis gigas*
Birds	
Tricolored blackbird	*Agelaius tricolor*
Golden eagle	*Aquila chrysaetos*
Short-eared owl	*Asio flammeus*
Ferruginous hawk	*Buteo regalis*
Vaux's swift	*Chaetura vauxi*
Mountain plover	*Charadrius montanus*
Little willow flycatcher	*Empidonac traillii brewsteri*
American peregrine falcon	*Falco peregrinus anatum*
Greater sandhill crane	*Grus Canadensis tabida*
Bald eagle	*Haliaeetus leucocephalus*
California black rail	*Laterallus jamaicensis coturniculus*
Lewis' woodpecker	*Melanerpes lewis*
Suisun song sparrow	*Melospiza melodia maxillaris*
Long-billed curlew	*Numenius americanus*
California clapper rail	*Rallus longirostris obsoletus*
Bank swallow	*Riparia riparia*
California least tern	*Sterna antillarum browni*
Northern spotted owl	*Strix occidentalis caurina*
Rufous hummingbird	*Selasphorus rufus*
Allen's hummingbird	*Selasphorus sasin*
California thrasher	*Toxostoma redivivum*
Mammals	
Pacific western big-eared bat	*Corynorhinus townsendii townsendii*
Greater western mastiff-bat	*Eumops perotis californicus*
Small-footed myotis bat	*Myotis ciliolabrum*
Long-eared myotis bat	*Myotis evotis*
Fringed myotis bat	*Myotis thysanodes*
Long-legged myotis bat	*Myotis volans*
Yuma myotis bat	*Myotis yumanensis*
Riparian woodrat	*Neotoma fuscipes riparia*
San Joaquin pocket mouse	*Perognathus inornatus*

TABLE 4.15-2

SPECIAL-STATUS SPECIES AND HABITATS REMOVED FROM FURTHER CONSIDERATION

Common Name	Scientific Name
Salt-marsh harvest mouse	*Reithrodontomys raviventris*
Suisun shrew	*Sorex ornatus sinuosus*
Plants	
Suisun marsh aster	*Aster lentus*
Narrow-anthered California brodiaea	*Brodiaea californica* var. *leptandra*
Tiburon Indian paintbrush	*Castilleja affinis* ssp. *neglecta*
Holly-leaved ceanothus	*Ceanothus purpureus*
Suisun thistle	*Cirsium hydrophilum* var. *hydrophilum*
Soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*
Serpentine cryptantha	*Cryptantha clevelandii* var. *dissita*
Adobe lily	*Fritillaria pluriflora*
Two-carpellate western flax	*Hesperolinon bicarpellatum*
Brewer's western flax	*Hesperolinon breweri*
Napa western flax	*Hesperolinon serpentinum*
Northern California black walnut	*Juglans hindsii*
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*
Mason's lilaeopsis	*Lilaeopsis masonii*
Robust monardella	*Monardella villosa* ssp. *globosa*
Few-flowered navarretia	*Navarretia leucocephala* ssp. *pauciflora*
Marin checkerbloom	*Sidalcea hickmanii* ssp. *Viridis*
Oval-leaved viburnum	*Viburnum ellipticum*
Habitats	
Coastal brackish marsh	
Serpentine bunchgrass	

special-status plant species were determined to have the potential to occur within the Specific Plan area and could be affected by the Proposed Project (Table 4.15-1). Information on range, habitat requirements, and specific occurrences of these species in Solano County was evaluated to determine the likelihood of occurrence of each within the Specific Plan area. No special-status plant species were observed during the biological surveys performed by LSA in July and August, 2003 and only one special-status plant, the San Joaquin saltbush (*Atriplex joaquiniana*), was observed during the reconnaissance survey performed by EIP Associates in September, 2003. However, this small population occurs just outside of the development area boundaries, adjacent to Lagoon Valley Lake in the Lagoon Valley Regional Park.

Listed Plant Species

No federally or State-listed plant species are likely to occur within the Specific Plan area.

Other Special-Status Plants

The following species are not listed as threatened or endangered species by the federal or State governments, but require analysis because they are either fully-protected under State or federal law or regulation, or because they meet the definition of rare in Section 15380 of the CEQA Guidelines.

Alkali milk-vetch

Alkali milk-vetch is an inconspicuous annual herbaceous member of the legume family (Fabaceae) that blooms from March through June.[11] The upright plants reach 30 centimeters (cm) in height and their stems are smooth or covered with stiff, straight hairs. Each pinnately-compound leaf has 7 to 17 well-separated, oval leaflets with notched tips. The pea-like flowers occur in dense clusters of 3 to 12 and are pink to purple (sometimes fading to white). Fruits are straight to slightly-curved pods with round bases that produce smooth seeds. The pods fade to a straw-color or sometimes black as the plant matures. It is distinguished from Ferris's milk-vetch (*A. t.* var. *ferrisiae*), another rare plant, primarily by its fruits (legumes), which are up to 2.5 cm long on a round base, whereas those of Ferris's milk-vetch are 2.7 to 5 cm long on a short, stalk-like base.[12]

Alkali milk-vetch occurs on adobe clay playas, vernal flats, and moist grasslands with alkali or heavy clay soils in the Central Valley elevations less than 60 m.[13] It was previously known from 13 California counties comprising the northern San Joaquin Valley, the southern Sacramento Valley, and the eastern San Francisco Bay area; however it has been extirpated from much of its former range and is now known only from Alameda, Merced, Napa, Solano, and Yolo Counties.[14]

Alkali milk-vetch is a federal Species of Concern and CNPS List 1B species. Populations are widely distributed in Solano County, however, most of the populations are centered around Dozier and the Jepson Prairie Preserve. Other populations have been found on Travis Air Force Base, in the eastern Fairfield/Tolenas area, south of Davis, and at the western edge of the Montezuma Hills. Most occurrences were last seen in the 1990's, but the current status of some of these populations is not known. Where reported, population sizes range from 15 to 650 plants and has been found in association with other special-status species: Contra Costa goldfields (*Lasthenia conjugens*), San Joaquin spearscale (*Atriplex joaquiniana*), dwarf downingia (*Downingia pusilla*), and legenere (*Legenere limosa*).[15] There are no occurrences of alkali milk-vetch near the project site.

Heartscale

Heartscale (*Atriplex cordulata*) is a member of the goosefoot family (Chenopodiaceae) and blooms from April to October.[16] This annual herb grows from 10 to 50 cm from the base of one to few erect, rigid stems that are gray-scaly with tips covered with densely interwoven, generally matted hairs. The oval, entire leaves are also gray-scaly, with blades 6 to 15 millimeters long. The inconspicuous flowers are covered by oval to round, mostly smooth, deeply toothed bracts. Flowers are either male (staminate) or female (pistillate). Fruits contain one reddish-brown seed. Because the flowers are inconspicuous, the plant is most easily identified after flowering, when in fruit.[17]

Heartscale is associated with alkaline or saline soils in chenopod scrub, meadows, and seeps and in valley grassland at elevations less than 375 m[18] throughout the Central Valley, from Glenn and Butte counties in the north to Kern and San Luis Obispo counties in the south.

Heartscale is a federal Species of Concern and a CNPS List 1B species. Six populations of heartscale - four of which were last seen in 1994, and one from 2001 - are reported from Solano County: southwest of Dozier, the Calhoun Cut Ecological Reserve, the Jepson Prairie Preserve, near the Travis Air Force Base runway, and southeast of Travis Air Force Base. The sixth occurrence is a historical record (1887) from south of Vacaville - the nearest occurrence to the Specific Plan area – and has probably since been extirpated. Population sizes vary from 12

plants reported at the Dozier site to 300 plants at the Travis site. Other populations have 100 to 200 plants.[19]

Brittlescale

Brittlescale is a member of the goosefoot family (Chenopodiaceae) and blooms from May to October.[20] This annual herb has prostrate, white, brittle, scaly stems that grow to less than 20 cm. The oval, entire leaves are also white and scaly, with blades 4 to 8 mm long. The tiny flowers of brittlescale have no sepals or petals and are covered by white, scaly diamond-shaped bracts. Flowers are either male (staminate) or female (pistillate). Fruits contain one reddish seed. Because the flowers are inconspicuous, the plant is most easily identified after flowering, *i.e.*, when in fruit.[21]

Brittlescale is associated with alkaline or clay soils in semi-barren areas of chenopod scrub, playas, meadows, vernal pools, or seeps and in valley grassland at elevations less than 320 m. It is occasionally also found in riparian marshes.[22,23] Brittlescale is currently known throughout the Central Valley from Glenn and Butte counties in the northern Sacramento Valley to Kern County in the southern San Joaquin Valley.[24]

Brittlescale is a federal Species of Concern and a CNPS List 1B species. Five populations of brittlescale are reported from Solano County - at Olcott Lake in the Jepson Prairie Preserve (CNDDB most recent record is from 1958), between Bird's Landing and Montezuma Slough (300 plants in 1991), along Creed Road southeast of Denverton, south-southeast of Cement Hill near Fairfield (24 individuals in 2002), and in the mitigation area for the access to the Potrero Hills Landfill (213 plants in 1996).[25] The Cement Hill population is approximately three miles southeast of the Specific Plan area.

San Joaquin Saltbush

San Joaquin saltbush (*Atriplex joaquiniana*) is an annual, herbaceous member of the goosefoot family (Chenopodiaceae) that blooms from April to October.[26] This 10 to 100 cm tall plant is upright with finely ridged, sparsely-scaled stems. Leaves of the species are gray or green and sparsely-scaly with irregularly-toothed edges. The tiny flowers of San Joaquin saltbush have no sepals or petals and are covered by ribbed, green bracts. Flowers are either male (staminate) or female (pistillate). The flowers are arranged in a dense cluster at the ends of the flowering stalks. Fruits contain one dark brown seed.[27]

San Joaquin saltbush grows in seasonal, alkali wetlands and alkali sinks in chenopod scrub, meadows, playas, and valley and foothill grassland from 1 to 320 m asl elevation.[28] San Joaquin saltbush occurs in the southern Sacramento Valley, San Joaquin Valley, and the eastern interior slopes of the South Coast Ranges[29] and has been found in Alameda, Contra Costa, Colusa, Glenn, Merced, Monterey, Napa, Sacramento, San Benito, Solano, and Yolo counties. It is believed to be extirpated from Santa Clara, San Joaquin, and Tulare counties.[30]

San Joaquin saltbush is a federal Species of Concern and a CNPS List 1B species. Eight populations of San Joaquin saltbush are reported in the CNDDB for Solano County: near Rio Vista, on Main Prairie, near Montezuma (100 plants in 1991), one mile southwest of the Travis AFB runway (100 to 200 plants in 1994), north of Peltier Slough, on the southeast shore of Lagoon Valley Lake, near Center School, and in the vernal pools/ south of Highway 12 and north of the Potrero Hills (including he mitigation wetland along the access road to the Potrero Hills Landfill). The Potrero Hills population had 100 to 200 plants in 1994, and the Potrero

Landfill access road population had 33 plants in 1996. The Rio Vista and Maine Prairie reports are from historic museum records and were last seen at the end of the 19th century.[31] The Lagoon Valley Lake population is just outside the development area boundaries along the southeastern shore of Lagoon Valley Lake. In addition, this species was observed growing in an alkali seep along the southwestern edge of Lagoon Valley Lake on Lagoon Valley Regional Park property.

Big-Scale Balsamroot

Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*) is a perennial herb in the sunflower tribe (Heliantheae) of the sunflower family (Asteraceae). Several 20 to 40 cm long, pinnately divided green to grayish leaves arise from a fleshy taproot. Each 20 to 60 cm tall stem bears a single, large flower head with bright yellow ray- and disk flowers (2 to 3 cm). The lanceolate (wider at the tip), minutely glandular phyllaries (bracts subtending the flower heads) are 13 to 40 mm long and 6 to10 mm wide.[32]

Big-scale balsamroot grows on dry slopes in cismontane woodland and valley and foothill grasslands on a variety of soil types, including sandstone and serpentinite. It blooms from March through June[33,34] and is widely distributed:

- in the Sacramento Valley in Colusa, Butte, and Solano counties;
- from the San Francisco Bay area, in Alameda and Santa Clara counties;
- from the north coast ranges, in Sonoma, Napa, Lake, and Tehama counties, and
- from the Sierra Nevada foothills, in Mariposa and Placer counties.[35]

Big-scale balsamroot is a Species of Local Concern (USFWS) and a CNPS List 1B species. Two populations are recorded from Solano County - near the intersection of I-80 and American Canyon Road (last seen in 1988) and in the vicinity of Green Valley, eight miles west of Fairfield (last seen in 1933). No population sizes of big-scale balsamroot are recorded.[36]

Hispid bird's-beak

Hispid bird's-beak (*Cordylanthus mollis* ssp. *hispidus*) is a hemiparasitic, annual herb in the figwort family (Scrophulariaceae) that blooms from June to September.[37] It is 10 to 40 cm tall, bristly glandular-hairy, with upright branches from the base. The plant is generally gray-green and often tinged purple. Leaves are 10 to 25 mm long and more or less oblong in shape, sometimes with minor lobes. Dense flower-spikes with white flowers that are nearly hidden by leafy bracts cover the last 2 to 15 cm of each branch.[38]

Hispid bird's-beak grows in saline or alkaline soils in meadows, marshes, flats, sinks, playas, and valley and foothill grassland at elevations ranging from 1 to 155 meters asl.[39] Currently known from the central and southern Central Valley in Alameda, Kern, Merced, Placer, and Solano counties,[40] it has apparently been extirpated from much of the lower San Joaquin Valley.[41]

Hispid bird's-beak is a federal Species of Concern and a CNPS List 1B species. Only one population of hispid bird's-beak is recorded from Solano County - along the margin of a "vernal marsh" at the "Dozier Vernal Pools", northeast of the Jepson Prairie Preserve. Population size varies at this site from a "few hundred" to more than 2,000 plants in 1993.[42]

Recurved Larkspur

Recurved larkspur (*Delphinium recurvatum*) is a 20 to 85 cm tall, perennial herb in the buttercup family (Ranunculaceae) that blooms from March to May,[43] The basal leaves are much larger than the stem leaves and have from 3 to 11 dentate lobes. Usually one flower-bearing stem (raceme) is produced each year. The light blue sepals are reflexed from the white petals when the flower is fully open. The upper two sepals form a nectar-containing spur, 10 to 18 mm long, opposite the petals.[44]

Recurved larkspur is associated with fine, alkaline soils in chenopod scrub, cismontane woodland, and valley and foothill grassland, at elevations ranging from 3 to 750 meters.[45] It occurs throughout the Central Valley - from Butte and Glenn counties in the north to Kern and San Luis Obispo counties in the south – and in the Salinas Valley in eastern Monterey County. Many of the CNDDB occurrences are historical and unlikely to still be viable populations, including the populations in the northern Central Valley.[46]

Recurved larkspur is a Federal Species of Concern and a CNPS List 1B species. Only one occurrence of the species is recorded from "near Vacaville" in Solano County (in 1902), but no information on population size is available.[47]

Carquinez Goldenbush

Carquinez goldenbush (*Isocoma arguta*) is a small (50 cm tall and 50 cm wide) shrub in the sunflower family (Asteraceae). Its light gray-green leaves are less than two cm long. The small, 2.5 to 5 mm wide flower heads have only disk flowers, which are yellow.[48] It blooms August through December.[49,50,51]

Carquinez goldenbush 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. Carquinez goldenbush is restricted to Solano County and potentially to Contra Costa County, along the Carquinez Straits and Suisun Bay.[52,53]

Carquinez goldenbush is a federal Species of Concern and a CNPS List 1B species. Twelve occurrences of Carquinez goldenbush are recorded from the Bird's Landing area (760 plants in 1992), the Dozier-Dixon (two populations of 35 and 85 plants in the late 1990's)[54] and Denverton areas, in the Montezuma Hills (1933; exact location unknown), and from the Vanden area, just north of Travis Air Force Base (1929; exact location unknown). Carquinez goldenbush was reported growing in association with heartscale (*Atriplex cordulata*), another special-status species, along the Rio-Dixon Road (Hwy 113), just south of Creed Road junction in 1992.[55]

Saline Clover

Saline clover (*Trifolium depauperatum* var. *hydrophilum*) is an annual herb in the pea family (Fabaceae). The small, often fleshy plant has typical "clover-leaves"; each of the three leaflets is 0.5 to 2 cm long. The stipules of the upper leaves are tipped with bristles. The white-tipped, pink-purple flowers are 6.5 to 9 mm long and clustered in small heads that are 0.5 to 1.5 cm in diameter. The banner, or upper petal, becomes inflated and encloses the 2 to 3 mm long fruit (legume) as it ripens.[56]

Saline clover grows in salt marshes and swamps as well as in alkaline soils in moist valley and foothill grasslands and vernal pools. It flowers April through June.[57][58] It is found in all central coast counties - from San Luis Obispo to Sonoma County, but not in San Francisco County. Solano and Colusa counties are the only inland counties with reported occurrences of this species.[59]

Saline clover is a federal Species of Concern and a CNPS List 1B species. Two populations are reported from Solano County: west-southwest of Vanden Station (500 plants in 1995), and on the borders of Lagoon Valley Lake (1960).[60]

Special-status Wildlife

Special-status wildlife species identified by the CNDDB and USFWS as historically occurring, or with the potential to occur in the vicinity of the proposed Specific Plan, were initially evaluated to determine if the Specific Plan area is within the species' known range and distribution and if suitable habitat exists on-site. Species not expected to occur or be negatively impacted by the project implementation were eliminated from further evaluation (Table 4.4-2). Additional information on range, habitat requirements, seasonal distribution, and recorded occurrences of the remaining special-status species, was evaluated to determine the likelihood of their occurrence in the Specific Plan area.

From this analysis and field surveys performed in 2003 by EIP Associates and LSA Associates, a total of 14 special-status wildlife species were determined to have a low to high potential to exist within or in the vicinity of the Specific Plan and could potentially be adversely affected by the Proposed Project (see Table 4.15-1).

<u>Listed Animal Species</u>

Vernal Pool Crustaceans

Vernal pool crustaceans occurring in the vicinity of the Specific Plan area include vernal pool fairy shrimp *(Branchinecta lynchi*), Midvalley fairy shrimp (*Branchinecta mesovallensis*), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool tadpole shrimp (*Lepidurus packardi*) and California linderiella (*Linderiella occidentalis*). These small crustaceans, adapted to survive the annual flooding and drying of vernal pools and other seasonal wetlands in valley or foothill grasslands, hatch from encysted eggs embedded in the soil in the bottom of the pools when the pools fill with rainwater. After reaching maturity, they breed, lay their eggs on the silty bottom of the pool, and die as the vernal pool dries up. The dormant eggs are protected by thick outer coverings that resist cold, heat, and from completely drying out. Vernal pool fairy shrimp were listed as threatened under the FESA in September 19, 1994 (59 FR 48136).

The CNDDB contains five records for Conservancy fairy shrimp, 14 records for vernal pool fairy shrimp, eight records for Midvalley fairy shrimp, 15 records for vernal pool tadpole shrimp and 12 records for California linderiella from within 12 miles of the project site. There are 2.22 acres of seasonal wetlands that have been delineated in the development area.[61] However, these wetlands are shallow do not appear to hold water for a long enough period to provide suitable habitat for these species.[62] Additionally, no suitable habitat for vernal pool crustaceans is present in any of the alternative off-site infrastructure alignments. However, it is possible that seasonal wetlands that retain water for a long enough period to support vernal pool crustaceans could be present in the open space areas or regional park lands, but these area will not be disturbed as a part of the Specific Plan.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) occurs throughout the year in riparian woodlands and other Central Valley habitats containing elderberry shrubs (*Sambucus* spp.), upon which the VELB are completely dependent for all stages of their life cycle. The females lay their eggs in crevices in the bark. After hatching, the larvae burrow into the stems of the tree where they will feed on the interior wood for the next one to two years. The larvae then form pupae from which the adults emerge. The adults then bore their way out of the stems, leaving a distinctive oval shaped hole. As the larvae and adults are rarely seen, these borer holes are often the only evidence of this species' presence. After emergence from the stems, the adults remain in association with the elderberries, where they will feed on the elderberry foliage and eventually reproduce. All elderberry shrubs within the known range of the VELB, which have one or more stems with diameters of one inch or greater at ground level, are considered potential habitat for this species. Although typically associated with the Central Valley, the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*[63] recommend surveys for this species in all or portions of 31 counties in California (including Solano County).

VELB is listed as Threatened under the Federal Endangered Species Act. The CNDDB includes three records for VELB within an five mile radius of the Proposed Project. Additionally, one elderberry shrub with borer exit holes was observed along Lagoon Valley Road, adjacent to the orchard within the development area during EIP's 2003 field survey.

Swainson's Hawk

The Swainson's hawk (*Buteo swainsoni*) is found throughout the Central Valley where suitable nesting and foraging habitat is available. Swainson's hawks often nest within or peripheral to riparian areas adjacent to suitable foraging habitat as well as in single or stands of trees in agricultural fields. They are open country birds that forage in large, open grasslands and agricultural fields, especially after the fields have been disked or harvested. Swainson's hawks can forage as much as 20 miles from the nest, and species observations in the project vicinity are not uncommon.

The Swainson's hawk is listed as Threatened by the State of California and is a USFWS Federal Species of Concern. The CNDDB includes 41 recorded occurrences for Swainson's hawk within a 10-mile radius of the Specific Plan area, including one occurrence approximately 0.8 miles west of the site. Although the Specific Plan Area is not within the Solano County core Swainson's hawk foraging area, limited potential nesting and foraging habitat for Swainson's hawk is present in the riparian woodland and adjacent open agricultural fields within the project site. One Swainson's hawk was observed soaring over the project site during LSA Associates August 5, 2003 visit to the site.

California Red-legged Frog

The California red-legged frog (*Rana aurora draytonii*) is a large brown to reddish-brown frog that historically occurred over much of the State from the Sierra Nevada foothills to the Coast. California red-legged frog (CRLF) inhabits ponds, slow moving creeks, and streams with deep pools that are lined with dense emergent marsh or shrubby riparian vegetation. Submerged root masses and undercut banks are important habitat features for this species. However, this species is capable of inhabiting a wide variety of perennial aquatic habitats as long as there is

sufficient cover, and that bullfrogs or non-native predatory fish are not present. California red-legged frog is known to survive in ephemeral streams, although only if deep pools with vegetative cover persist through the dry season.[64,65,66] Factors that have contributed to the decline of CRLF include destruction of riparian habitat due to development, agriculture, or flood control practices, and the introduction of exotic predators such as bullfrogs, crayfish, and a variety of non-native fishes.[67]

California red-legged frog is listed as Threatened by the U.S. Fish and Wildlife Service, and is designated as a Species of Special Concern by the California Department of Fish and Game. The nearest record for CRLF is 13 miles west of the project site along McGary Road, just west of its intersection with Lynch Road in Solano County. This occurrence is considered to be a part of the American Canyon population. An additional record was recorded along Wragg Canyon Creek at its intersection with Highway 128 in Napa County, approximately 10 miles north of the project site. Marginally suitable habitat for this species is present in the freshwater emergent wetlands along the streams and channels that traverse the Lagoon Valley project site, and the Specific Plan area is within the historic range for this species. However, no CRLF have ever been recorded in this area. Focused surveys have been conducted for the Lagoon Valley Lake watershed in February of 2001 and no CRLF were found.[68] Based upon these surveys, it was determined that CRLF do not occur in the Specific Plan area.[69] The USFWS reviewed the report, and expressed no concerns or comments in response to these findings.[70]

Other Special-Status Animals

The following species are not listed as threatened or endangered by the federal or State governments, but require analysis because they are either fully-protected species under State or federal law or regulation, or because these species could meet the definition of “rare” in Section 15380 of the CEQA Guidelines. These species are also included because they could be elevated to State or federal endangered or threatened status prior to completion of the development of the Proposed Project.

Burrowing Owl

Burrowing owls (*Athene cunicularia*) are yearlong residents in generally flat, open dry grasslands, pastures, deserts, and shrub lands, and in grass, forbs and open shrub stages of pinyon-juniper and ponderosa pine habitats. They utilize communal ground squirrel and other small mammal burrow colonies for nesting and cover, as well as artificial structures such as roadside embankments, levees, and berms. They prefer open, dry, nearly level grassland or prairie habitat and can exhibit high site fidelity, often reusing burrows year after year.

Occupancy of suitable burrowing owl habitat can be verified at a site by observation of a pair of burrowing owls during their breeding season (March to August) or, alternatively, by the presence of molted feathers, cast pellets, prey remains (rodents, small reptiles, and large insects), eggshell fragments, or excrement (guano or must), near or at a burrow.

The burrowing owl is a Federal and California Species of Concern. Additionally, a petition has been submitted to the State of California listing the burrowing owl as threatened. This petition was rejected by the CDFG. The CNDDB includes 17 recorded occurrences for burrowing owl within a 10 mile radius of the Specific Plan area. Ground squirrel burrows, which represent potential nesting habitat for this species, were observed in the grasslands in the western and southwestern portion of the development area that could serve as burrowing owl nest sites and additional ground squirrel burrows may be located in the remainder of the Specific Plan area.

White-tailed kite

The white-tailed Kite (*Elanus leucurus*; aka black-shouldered kite) breeds between February and October and feeds on rodents, small reptiles, and large insects in fresh emergent wetlands, annual grasslands, pastures, and ruderal vegetation. Unlike other raptors, kites often roost and occasionally nest communally; therefore, disturbance of a relatively small roost or nesting area could affect a large number of birds. The CNDDB contains three records for white-tailed kite from the vicinity of the project site. The species has not been reported in field surveys conducted for this project, though suitable foraging and nesting habitat occurs in the Specific Plan area.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) occurs in woodland and chaparral habitats throughout California. They feed primarily on insects or small rodents in grasslands adjacent to woodland areas. The shrike is also called "butcher bird" for its habit of impaling its prey on cactus thorns or barbed wire fences. Although there are no CNDDB records for this species in the vicinity of the project, it is within the known range for this species. The species has not been reported in field surveys conducted for this project, though suitable foraging and nesting habitat occurs in the Specific Plan area.

Northwestern Pond Turtle

The northwestern pond turtle (*Clemmys marmorata marmorata*) is an aquatic turtle that ranges throughout much of the state - from the Sierra Nevada foothills to the coast, and in coastal drainages north of the San Francisco Bay Area.[71] It inhabits ponds, slow moving streams and rivers, irrigation ditches, and reservoirs that have abundant emergent and/or riparian vegetation. The turtle requires adjacent (i.e. within 200-400 meters of water) uplands for nesting and egg-laying - typically in soils with high clay or silt component on unshaded, south-facing slopes. In colder climates they may spend the winters hibernating in these upland habitats.

The northwestern pond turtle is a federal and California Species of Concern. The CNDDB includes six records for the species within a 10-mile radius of the project site. One juvenile western pond turtle was observed in the creek that feeds into Laguna Creek from Lagoon Valley Lake from the northwest during the July 24, 2003 survey conducted by EIP Associates.

4.15.3 REGULATORY SETTING

Federal

Endangered Species Act

Projects that would result in adverse effects on federally listed threatened or endangered species are required to consult with, and mitigate through consultation with, the USFWS. The objective of consultation is to determine whether the project would impact a protected species or designated critical habitat, and to identify mitigation measures that would be required to avoid or reduce impacts to the species. Mitigation for project related impacts to federally listed species can be accomplished through either a Section 7 consultation or a Section10 permit pursuant to the FESA. Section 7 consultation is required when a federal agency is involved in project approval, funding, or permitting. Section 10 permit is required when no federal agencies are involved with the project (HCP).

The FESA of 1973 provides legal protection for plant and animal species in danger of extinction, and requires definitions of critical habitat and development of recovery plans for specific species. Section 7 of the FESA requires federal agencies to make a finding on the potential to jeopardize the continued existence of any listed species potentially impacted by proposed federal action, including the approval of a public or private action, such as the issuance of a permit pursuant to Sections 10 and 404 of the CWA. Section 9 of the FESA prohibits the take of any member of an endangered species. Take is defined by the FESA as "...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has further defined the terms harass and harm. Harass is defined as an act that:

> "…creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering."

Harm is defined to include the following:

> "...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."

Section 10(a) of the FESA (HCP's) permits the incidental take of listed species if the take is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Section 3 of the FESA defines an endangered species as "any species, including subspecies, in danger of extinction throughout all or a significant portion of its range." This section defines threatened species as any species "likely to become endangered within the foreseeable future throughout all or a significant portion of its range." Federally listed or "listed" indicates that a species has been designated as endangered or threatened through publication of a final rule in the *Federal Register*. Designated endangered and threatened species, listed under Section 4 of the FESA, receive the full protection of the FESA. Proposed endangered and threatened species are those for which a proposed regulation, but not a final rule, has been published in the *Federal Register*. Proposed species are granted limited protection, while candidate species and species of special concern are afforded no protection under the FESA.

Federal Clean Water Act

<u>Section 404</u>

The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Section 301 prohibits the discharge of any pollutant into the Nation's waters without a permit, and Section 402 establishes the permit program. Section 404 of the CWA regulates activities that result in discharge of dredged or fill material into waters of the United States. The United States Army Corps of Engineers (Corps) is responsible for permitting certain types of activities affecting wetlands and "other" waters of the United States. Under Section 404 of the CWA, the Corps has the authority to regulate activity that discharge fill or dredge material into wetlands or other waters of the U.S. The Corps implements the federal policy embodied in Executive Order 11990, which is intended to result in no net loss of wetland values or acres.

Section 401

The State Water Resources Control Board (SWRCB) has authority over wetlands through Section 401 of the CWA, as well as the Porter-Cologne Act, California Code of Regulations Section 3831(k), and California Wetlands Conservation Policy.

The CWA requires that an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) 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 certification or waive the requirement for permits is delegated by the SWRCB to the nine regional boards. The Central Valley Regional Water Quality Control Board (CVRWQCB) is the appointed authority for Section 401 compliance in the Specific Plan area. A request for certification or waiver is submitted to the regional board at the same time that an application is filed with the Corps. The regional board has 60 days to review the application and act on it. Because no Corps permit is valid under the CWA unless "certified" by the state, these boards may effectively veto or add conditions to any Corps permit.

State

California Endangered Species Act (CESA)

The CDFG administers a number of laws and programs designed to protect fish and wildlife resources. Principal of these is the California Endangered Species Act of 1984 (CESA - Fish and Game Code Section 2050), which regulates the listing and take of state-endangered and state-threatened species. CESA declares that deserving species will be given protection by the state because they are of ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of the state. CESA established that it is state policy to conserve, protect, restore, and enhance endangered species and their habitats.

Species listed under CESA cannot be taken without adequate mitigation and compensation. Take under CESA does not include indirect harm by way of habitat modification. Typically, the CDFG implements endangered species protection and take determinations by entering into management agreements (Section 2081 Management Agreements), Incidental Take Permits or Natural Community Conservation Plans (NCCP) with project applicants.

CDFG maintains lists for Candidate-Endangered Species and Candidate-Threatened Species. California candidate species are given equal protection of the law as listed species have. CDFG also lists Species of Special Concern based on limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. Species of special concern do not receive protection under the CESA or any section of the California Fish and Game Code, and do not necessarily meet CEQA Guidelines Section 15380 criteria as rare, threatened, endangered, or of other public concern. Like federal species of concern, the determination of significance for California species of special concern must be made on a case-by-case basis. Designation of Species of Special Concern is intended by CDFG to be used as a management tool for consideration in future land use decisions.

Fish and Game Code - Sections 3503, 3503.5, 3513

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Fish and Game Code Section 3503.5 protects all birds-of-

prey (raptors) and their eggs and nests. Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act. These regulations could require that elements of the Proposed Project (particularly vegetation removal or construction near nest trees) be reduced or eliminated during critical phases of the nesting cycle unless surveys by a qualified biologist demonstrate that nests, eggs, or nesting birds will not be disturbed, subject to approval by CDFG and/or USFWS.

Fish and Game Code B Sections 3511, 4700, 5050, and 5515

Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code designate certain species as "fully protected." Fully protected species, or parts thereof, may not be taken or possessed at any time, and no provision of the California Fish and Game Code or any other law may be construed to authorize the issuance of permits of licenses to take any fully protected species. No such permits or licenses heretofore issued may have any force or effect for any such purpose, except that the California Fish and Game Commission may authorize the collecting of such species for necessary scientific research. Legally imported and fully protected species or parts thereof may be possessed under a permit issued by CDFG.

CDFG Streambed Alteration Agreements

Under sections 1600-1607 of the California Fish and Game Code, the CDFG regulates activities that would alter the flow, bed, channel, or bank of streams and lakes. The limits of CDFG's jurisdiction are defined in the code as the . . . "bed, channel or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit..." (Section 1601).

This broad definition gives the CDFG great flexibility in deciding what constitutes a river, stream, or lake. The CDFG defines streams under the jurisdictions of sections 1600-1607 as follows:

1. The term "stream" can include intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (United States Geological Survey [USGS] maps), and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife.

2. Biological components of any stream may include aquatic and riparian vegetation, all aquatic animals including fish, amphibians, reptiles, invertebrates, and terrestrial species that derive benefits from the stream system.

3. As a physical system, a stream not only includes water (at least on an intermittent or ephemeral basis), but also a bed or channel, a bank and/or levee, in-stream features such as logs or snags, and various floodplains depending on the return frequency of the flood event being considered.

4. The lateral extent of a stream can be measured in several ways depending on a particular situation and the type of fish or wildlife resource at risk. The following criteria are present in order from the most inclusive to the least inclusive:

a. The floodplain of a stream can be the broadcast measurement of a stream's lateral extent depending on the return frequency of the flood event used. For most flood control purposes, the 100-year flood event is the standard measurement. However, because it may include significant amounts of upland or urban habitat, in many cases the 100-year floodplain may not be appropriate.

b. The outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats and is therefore a reasonable and identifiable boundary for the lateral extent of a stream. In most cases, the use of this criterion should result in protecting the fish and wildlife resources at risk.

c. Most streams have a natural bank which confines flows to the bed or channel except during flooding. In some instances, particularly on smaller streams or dry washes with little or no riparian habitat, the bank should be used to mark the lateral extent of a stream.

d. A levee or other artificial stream bank could also be used to mark the lateral extent of a stream. However, in many instances, there can be extensive areas of valuable riparian habitat located behind a levee.

In practice, the CDFG usually marks its jurisdictional limit at the top of the stream or bank, or at the outer edge of the riparian vegetation, whichever is wider.

CDFG Wetlands Protection Regulations

The CDFG derives its authority to oversee activities that affect wetlands from a number of pieces of legislation. This authority includes Sections 1600-1607 of the Fish and Game Code (stream and lakebed alteration agreements), Section 30411 of the California Coastal Act (CDFG becomes the lead agency for the study and identification of degraded wetlands within the Coastal Zone), CESA (protection of state listed species and their habitats - which may include wetlands), and the Keene-Nejedly California Wetlands Preservation Act of 1976 (states a need for an affirmative and sustained public policy program directed at wetlands preservation, restoration, and enhancement).

In general, the CDFG asserts authority over wetlands within the state either through review and comment on Corps Section 404 permits, review and comment on CEQA documents, preservation of state listed species, or through stream and lakebed alteration agreements.

California Wetlands Conservation Policy

The California Wetlands Conservation Policy (1993 - Senate Concurrent Resolution No. 28) created an interagency task force headed by the State Resources Agency and California EPA to: (1) ensure no overall net loss, and a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values; (2) reduce procedural complexity in the administration of state and federal wetlands conservation programs; and (3) encourage partnerships that make restoration, landowner incentives, and cooperative planning the primary focus of wetlands conservation.

This resolution directed the CDFG to prepare and submit to the legislature a plan identifying means to protect existing wetlands and restore former wetlands. This includes identification of sufficient potential wetlands sites to increase the amount of wetlands in California by 50 percent by the year 2000, and a program for the public and private acquisition of such lands. While the resolution does not have the force and effect of law, CDFG and other California state agencies frequently point to it as an expression of state policy.

Porter-Cologne Act

Pursuant to the Porter-Cologne Act, each of California's nine regional boards must prepare and periodically update basin plans that set forth water quality standards for surface and groundwater, as well as actions to control point and non-point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to achieve wetlands protection through enforcement of water quality standards.

California Environmental Quality Act (CEQA)

Although threatened and endangered species are protected by specific federal and State statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after definitions in the FESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals. Section 15380(b) requires public agencies to undertake reviews to determine if projects would result in significant effects on species that are not listed by either the USFWS or CDFG (i.e., candidate species). Thus, CEQA provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

<u>Local</u>

Solano County

Solano County and other participating agencies are in the process of preparing a Habitat Conservation Plan (HCP) with the goal of protecting special-status plants and wildlife and their habitats, while allowing for planned growth in the County. This protection would be accomplished through identification of important habitats and habitat features to aid in the development of protection areas, establishing funding mechanisms through which developers can provide replacement habitat while enabling them to meet their no net loss of habitat value goals. However, until the County-wide HCP is completed, the project applicant shall be required to determine if potential habitat for these species is in fact present in these areas, and if so, consult with the USFWS to determine the significance of potential impacts on special-status plant and wildlife, and to develop appropriate mitigation measures.

City of Vacaville

<u>Vacaville City Code</u>

Section 14.09.131 of the Vacaville City Code also sets forth criteria for the preservation of Native species, healthy trees, large specimens, and visually prominent trees. Impacts to any tree greater than 31 inches in circumference at 4.5 feet above the ground surface would require a city permit and mitigation. In summary, Section 14.09.131 requires that applicants: retain a

certified arborist to prepare an arborist report for all trees within a project boundaries, and that the report include information for each tree that meets the criteria; develop a site specific tree protection plan prior to construction to protect avoided tress from damage; avoid trees that meet the criteria; monitor compliance with established restrictions; obtain a tree removal permit for any tree(s) to be remover; and place and maintain replacement trees at a ratio of 2:1 for non-native and 3:1 for native trees.

Creek Protection

Section 14.12.174.050 of the Vacaville City Code sets forth criteria for the designation of development setbacks for creeks with a minimum setback standard of 40 feet from the top of the stable bank, as determined by the City Engineer.

General Plan

Consistency of the Proposed Project with relevant City of Vacaville General Plan goals and policies is presented in Appendix C. As shown in Appendix C, the Proposed Project is consistent with applicable biological resource management goals and policies.

4.15.4 IMPACTS AND MITIGATION MEASURES

Determination of Affected Resources

The plant and animal species and natural vegetation communities affected by the implementation of the Proposed Project were derived from a search of the CDFG's CNDDB, a species list from the USFWS *Quad Species Lists* website,[72] a review of environmental documents prepared for this and related projects and 2003 reconnaissance-level field surveys. Available documents include the *Notice of Preparation: Environmental Impact Report for the Lower Lagoon Valley Project,* March 13, 2003, *Biological Resources, Lagoon Valley Property*, Solano County by LSA Associates, September 23, 2003, *City of Vacaville Proposed Lagoon Valley Lake Management Plan*, October 13, 1999, *Mitigated Negative Declaration for the Lagoon Valley Park Improvements*, May 2, 2002, *City of Vacaville – Easterly WWTP Expansion Project Draft EIR*, ESA Associates, October 1997, *Nut Tree Ranch Development Project Draft EIR*, ESA Associates, March 2002, and the *Delineation of Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, October 7, 2003 LSA Associates.

Standards of Significance

For the purposes of this EIR, impacts to biological resources are considered significant if the Proposed Project would:

- 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service;

- 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service;

- Have a substantial adverse effect on federally protected wetlands 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 by 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 native wildlife nursery sites;

- Conflict with the provisions of an approved local, regional or state policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

Project Impacts and Mitigation Measures

4.15-1 Construction of the Proposed Project could result in the loss of approximately 7.65-acres of wetlands or other waters of the United States.

A total of 12.12 acres of jurisdictional waters within the development area. These jurisdictional waters include 7.74 acres of stream and ditch segments, 2.22 acres of seasonal wetlands, 1.88 acres of alkali wetlands and 0.27 acres of stock ponds. Additional wetlands and "other waters" of the U.S. occur outside the development area, but within the Specific Plan boundaries. Although these waters have not been delineated to date, they include Lagoon Valley Lake, additional stream and ditch segments and potentially additional seasonal wetlands. Most of these potential wetlands occur in either Lagoon Valley Regional Park or in the open space area and are not likely to be affected by the proposed Specific Plan. However, proposed future improvements to the lake and park facilities could result in the loss of wetlands but these cannot be quantified at this time. To the extent that these impacts do occur, the City would commit to the following mitigation measures as part of these activities.

Implementation of the Proposed Project is likely to result in the loss or fill (i.e., any ground disturbance within jurisdictional wetland or channel boundaries) of approximately 7.65 acres of jurisdictional wetlands. This acreage figure includes 5.16 acres of drainage, 2.22 acres of seasonal wetlands and 0.27 acres of stock ponds. The upper portion of Tributary G (approximately 2.58 acres) will be completely avoided, as will the 1.88 acres of alkali seasonal wetland. Fill of the seasonal wetlands and stock ponds would occur as the result of grading in preparation for the construction of site development and facilities. Fill of the drainage channels would occur as the result of bank and channel improvements that would be conducted during the construction of the golf course, stormwater drainage systems, road crossings and other improvements related to the development. The proposed Specific Plan includes replacement of affected wetland habitats (including drainages, seasonal wetlands and stock ponds) either on or off site at a 2:1 ratio, and the acquisition of required Corps, RWQCB and CDFG permits prior to construction. In order to ensure implementation, measures addressing the loss of jurisdictional wetlands would be required. Fill of wetlands and "other waters" of the United States is prohibited without first obtaining a permit from the ACOE. Therefore, this is considered to be a ***significant impact***.

Mitigation Measures

Implementation of the following mitigation measure would reduce this impact to a *less-than-significant level*.

4.15-1 (a) *All wetlands and waters of the U.S. in the Specific Plan Area shall be avoided to the extent feasible. Avoidance shall be accomplished through the following steps:*

(i) *Wetlands and drainages within the Specific Plan Area, including the off-site infrastructure improvements area, but outside the development area shall be identified prior to submittal of final project designs to the City. A jurisdictional wetland delineation shall be submitted to the Corps and verified prior to the commencement of construction (a wetland delineation has already been submitted to the Corps for the development area, but it has not yet been verified).*

(ii) *The project applicant shall design the final project to retain the maximum amount of existing wetlands and establish minimum 25 to 50 foot buffers around all sides of these features. In addition, the final project design shall not cause significant changes to the pre-project hydrology, water quality or water quantity in any wetland that is to be retained on site. This shall be accomplished by avoiding or repairing any disturbance to the hydrologic conditions supporting these wetlands, as verified through wetland protection plans.*

(b) *Where avoidance of existing wetlands and drainages is not feasible, then mitigation measures shall be implemented for the project related loss of any existing wetlands on site, such that there is no-net loss of wetland acreage or habitat value. Wetland habitat acreage can be greater than the acreage of wetlands that fall under the jurisdiction of the Corps.*

Wetland mitigation shall be developed as a part of the Section 404 CWA permitting process. Mitigation is to be provided prior to construction related impacts on the existing wetlands. The exact mitigation ratio is variable, based on the type and value of the wetlands affected by the project, but will be a minimum of 1:1 for preservation and 1:1 for construction of new wetlands. In addition, a wetland mitigation and monitoring plan shall be developed that includes the following:

- *Descriptions of the wetland types, and their expected functions and values;*
- *Performance standards and monitoring protocol to ensure the success of the mitigation wetlands over a period of five to ten years;*
- *Engineering plans showing the location, size and configuration of wetlands to be created or restored;*

- *An implementation schedule showing that construction of mitigation areas will commence prior to or concurrently with the initiation of construction; and*

- *A description of legal protection measures for the preserved wetlands (i.e., dedication of fee title, conservation easement, and/or an endowment held by an approved conservation organization, government agency or mitigation bank).*

(c) *The project applicant or their agent shall acquire all appropriate wetland permits prior to construction of the project. These permits include a Section 404 Wetlands Fill Permit from the U.S. Army Corp of Engineers, a Section 401 Water Quality Certification from the Regional Water Quality Control Board, and A Section 1601 Streambed Alteration Agreement from the California Department of Fish and Game.*

(d) *The permits required above shall be obtained prior to the issuance of grading permits by the City.*

Mitigation measure 4.15-1(a) through 4.15-2(d) would allow the project to achieve the goal of no net loss of wetlands or other waters that are subject to the jurisdiction of the Corps under Section 404 of the CWA.

4.15-2 Construction of the Proposed Project could result in the loss of vernal pool crustacean habitat.

The wetlands delineation of the development area that was conducted by LSA Associates indicates that the seasonal wetlands in the development area are too shallow and/or do not pool water for a long enough period to support vernal pool crustaceans. Therefore, wetlands in the development area do not represent suitable habitat for these species. Additionally, no seasonal wetlands capable of supporting vernal pool crustaceans were observed during the survey of the off-site infrastructure alignments that were conducted by EIP Associates on July 24, 2003.

No wetland delineation has been conducted in the grassland areas within the Specific Plan area boundaries, but outside of the development area. Based upon a reconnaissance level survey that was conducted in those areas, it does not appear that any suitable habitat for vernal pool crustaceans occurs there. However, it is possible that seasonal wetlands capable of supporting vernal pool crustaceans could occur there, but were not detected during the survey of that portion of the Specific Plan Area. Due to the fact that there are several records in the CNDDB for federally listed vernal pool crustaceans in the region, it is possible that any potential habitat that may be present in the area, could be occupied by these species. If this potential habitat occurs on or within 250 feet of any proposed development or other project related ground disturbance within the Specific Plan area (but outside the development area), implementation of the proposed development could result in effects to those pools.

These effects could occur as a result of direct fill or disturbance, changes to hydrological conditions such that precipitation runoff supplies are interrupted and prevent the pools from filling properly, or erosion of adjacent uplands that causes siltation of the pools. Additionally, after project construction, vernal pool crustacean habitat could be subject to further indirect impacts resulting from urban runoff, increased human access (i.e., proximity to development, etc.), vandalism or other human disturbances, and an increase in exotic weed species. These

impacts would degrade vernal pool crustacean habitat. Loss of potential habitat for vernal pool crustaceans federally listed as threatened or endangered would constitute "take" under to the Federal Endangered Species Act, and would therefore be considered a ***significant impact***.

Mitigation Measures

Mitigation for impacts on vernal pool crustaceans shall include the preparation of a Project-specific plan to provide for the replacement of habitat, or alternatively, to participate in a County-wide effort to establish a program for the conservation and management of threatened and endangered species that occur in Solano County. However, until such time the County-wide HCP is adopted the following mitigation measures that would reduce this impact to a *less-than-significant level.*

4.15-2 (a) *Prior to development or construction activities in the park, open space, or utility corridors, the project applicant shall conduct a survey of all grasslands affected by construction within the Specific Plan boundaries to determine if suitable habitat for vernal pool crustaceans is present. If no suitable habitat for these species is present, then no further mitigation would be required.*

If suitable habitat for vernal pool crustaceans is present within the Specific Plan boundaries or construction zones, and within 250 feet of proposed development, then the following mitigation measures shall apply.

(b) *The project applicant may assume presence of listed vernal pool crustaceans and fully mitigate for any project related effects to that habitat, or they may have a qualified biologist survey the potential habitat following USFWS protocol to determine presence or absence of these species. If, through the surveys, it is determined that vernal pool crustaceans do not occupy the habitat, then no further mitigation would be required.*

(c) *If it is either determined that vernal pool crustaceans occupy the habitat, or presence is assumed, then to the extent feasible, buffer areas shall be established such that any proposed development shall be at least 250 feet from the vernal pool crustacean habitat. Such areas shall be flagged, and encircled with an exclusionary fence. These areas shall be preserved in a conservation easement or other acceptable agreement with a USFWS approved agency (e.g., CDFG or a conservation organization such as the Solano Land Trust). Any such agreements shall be conducted in coordination with the USFWS.*

(d) *If impacts on vernal pool crustaceans or their habitat are unavoidable, then formal consultation with the USFWS pursuant to Section 7 of FESA would be required. Specific mitigation measures would be developed as a part of the Section 7 Consultation, but may be accomplished through either onsite preservation and creation of vernal pool crustacean habitat, or payment into an off-site mitigation bank.*

4.15-3 Construction of the Proposed Project could result in the loss of Swainson's hawk individuals (eggs, nestlings or juveniles), and other nesting raptors (birds-of-prey).

The Specific Plan area, with its abundance of mature trees and adjacent grasslands and agricultural fields provide suitable nesting and foraging habitat for the state-listed as threatened Swainson's hawk, other special-status raptors such as Cooper's hawk (*Accipiter cooperii*) and sharp shinned hawk (*Accipiter striatus*), or other raptors protected under the California Fish & Game Code and MBTA. There are approximately 41 active nest records for Swainson's hawk and three records for white-tailed kite from within 10 miles of the project site. Although none of these known nest sites are within one mile of the Specific Plan area, it is possible that nests for this and other species are currently present and have yet to be documented, or new nests could be established in the Specific Plan area prior to construction of the Proposed Project. Construction activities could result in the loss of these nests if the potential nest trees are removed or if construction-related disturbance in the vicinity of an active nest causes nest abandonment. The proposed Specific Plan includes nest avoidance measures for active Swainson's hawk and other raptor nests and replacement of affected foraging habitat for these species off site at a ratio consistent with regional requirements. In order to ensure implementation, measures addressing the disturbance of nesting Swainson's hawk and other raptors and loss of suitable Swainson's hawk foraging habitat would be required. Project related loss of a Swainson's hawk or other raptor nests would be considered a ***significant impact***.

Mitigation Measures

Mitigation for impacts on Swainson's hawk and other legally protected raptors shall include the preparation of a Project-specific plan to provide for the replacement of habitat, or alternatively, to participate in a County-wide effort to establish a program for the conservation and management of threatened and endangered species that occur in Solano County. However, until such time the County-wide HCP is adopted, the following mitigation measures would reduce this impact to a *less-than-significant level.*

4.15-3 (a) *Project related disturbance to any active nest shall be avoided during the nesting season (March 1 through August 15). The project applicant shall retain a qualified biologist to conduct a pre-construction survey for nesting Swainson's hawk and other raptors within 0.5 mile of the development area. Surveys shall be conducted no more than 30 days prior to the commencement of construction related activities within the breeding season. If construction activities are to begin and end outside the breeding season for this species, then the pre-construction surveys shall not be required. If active Swainson's hawk or other raptor nests are discovered during the survey, then the project applicant shall consult with the City and CDFG, to develop appropriate avoidance and protection measures for the identified nest, including appropriate setbacks during the nesting season.*

(b) *In addition to the preconstruction surveys, routine monitoring of any known active nest sites within 0.5 miles of the development area shall be conducted by a qualified biologist throughout the nesting season, or until construction activities have ceased. The purpose of this monitoring is to document nesting activity and any signs of disturbance. The biologist shall submit to the City and CDFG a report of the findings that includes a summary of observations, nesting success and any protective measures that were implemented. If any known or suspected disturbance to nesting raptors is observed, then the biologist shall report the observation to the City/CDFG immediately and the parties shall take appropriate remedial steps, including temporary cessation of construction activities in the*

areas surrounding the nest. In addition, the project applicant shall have a qualified biologist conduct an environmental awareness training program for all construction personnel to inform them of their responsibilities regarding the protection of sensitive biological resources, including Swainson's hawk.

(c.1) *To address potential losses of Swainson's hawk foraging habitat, prior to the first residential building permit within the project, the project applicant shall pay to the city a mitigation fee to fund the acquisition of a conservation easement or easements covering lands suitable for foraging by Swainson's hawk.*

(c.2) *Based upon the distance of the project site from known active Swainson's hawk nests, and the amount of open space already preserved around the project site, the amount of this fee shall be sufficient to fund the acquisition of easements covering mitigation lands at a ratio of approximately 0.5 acre for every acre of suitable foraging area within the planning area converted to other uses, together with an appropriate endowment for monitoring purposes, subject to consultation as described in Mitigation Measure 4.15-3(c.3).*

(c.3) *The precise amount and location of mitigation lands shall be determined in consultation between the developer, the City and the department of fish and game. If mitigation lands (or a conservation easement covering the same) have not been acquired by the time of the first building permit, the city shall hold the project applicant's contribution in a separate, interest-bearing account until such time as the appropriate lands are identified through the consultation with CDFG and City and acquired by the City or preserved through other methods such as a suitable mitigation bank.*

(c.4) *In the alternative, these amounts may be paid by the City into the Solano County HCP effort if and when it becomes approved.*

4.15-4 Construction of the Proposed Project could result in the loss of burrowing owl individuals (eggs, nestlings or juveniles).

Annual grasslands in the Specific Plan area provide suitable nesting and foraging habitat for the burrowing owl. Burrowing owls have not been recorded on the site to date. There are, however, approximately 17 records in the CNDDB within 10 miles of Specific Plan area boundaries, and the Specific Plan area contains: (1) numerous ground squirrel burrows that could provide suitable nesting habitat; and (2) adjacent low grasslands that are ideal foraging habitat for this species. Even if individuals do not currently occupy the site, they could readily establish nests prior to project implementation and construction activities could therefore lead to a loss of nest burrows and adjacent foraging habitat through grading and other ground disturbance related to project development. The proposed Specific Plan includes active burrow avoidance measures and replacement of affected foraging habitat off site at a ratio consistent with regional requirements by requiring avoidance of essential habitat for special-status species. In order to ensure implementation, measures addressing the disturbance of nesting burrowing owls and loss of suitable burrowing owl foraging habitat would be required. Although none have been detected to date, it would be appropriate to conduct burrowing owl surveys prior to construction. This potential loss of a burrowing owls or their habitat would be considered a ***significant impact***.

Mitigation Measures

Mitigation for impacts on burrowing owls shall include the preparation of pre-construction surveys to provide for the replacement of nesting habitat, or alternatively, to participate in a County-wide effort to establish a program for the conservation and management of threatened and endangered species that occur in Solano County. However, until such time the County-wide HCP is adopted, the following mitigation measures would reduce this impact to a *less-than-significant level.*

4.15-4 (a) *The project applicant shall hire a qualified biologist to conduct both nesting and wintering season surveys for burrowing owl to determine if the site is used by this species. The timing and methodology for the surveys are based on the CDFG/Burrowing Owl Consortium Survey Guidelines and are detailed below. CDFG may require that these surveys be repeated annually if project construction is expected to span over two or more years.*

<u>Winter Season (December 1 through January 31)</u>

- *Four site visits on separate days, 2 hours before to 1 hour after sunset or 1 hour before to 2 hours after sunrise.*

<u>Nesting Season (February 1 to August 31)</u>

- *Four site visits on separate days, 2 hours before to 1 hour after sunset or 1 hour before to 2 hours after sunrise. At least two of the surveys shall be conducted during the peak nesting season between April 15 and July 15.*

(b) *In addition to the wintering and nesting season surveys, pre-construction surveys shall be conducted by an experienced biologist within 30-days prior to the start of work activities where land conversions are planned in known or suitable habitat areas. If construction activities are delayed for more than 30 days after the preconstruction surveys, then a new preconstruction survey will be required. All surveys shall be conducted in accordance with the CDFG/Burrowing Owl Consortium survey protocols (Burrowing Owl Consortium, 1993).*

(c) *If burrowing owls are discovered in the Specific Plan area, the project applicant shall notify the City and CDFG. A qualified biologist shall implement a routine monitoring program and establish a fenced exclusion zone around each occupied burrow. No construction activities shall be allowed within the exclusion zone until such time that the burrows are determined to be unoccupied. The buffer zones shall be a minimum of 150 feet from an occupied burrow during the non-breeding season (September 1 through January 31), and a minimum of 250 feet from an occupied burrow during the breeding season (February 1 through August 31).*

(d) *The project applicant shall provide appropriate mitigation for project related effects on burrowing owl in consultation with CDFG. Mitigation can be conducted either onsite, or at an off-site location that is approved by the CDFG. Preference is for onsite within open space areas, if possible.*

(e) *The CDFG shall be consulted regarding the implementation of avoidance or passive relocation methods. All activities that will result in a disturbance to burrows shall be approved by CDFG prior to implementation.*

4.15-5 Construction of the Proposed Project could result in loss of Valley elderberry longhorn beetles and their habitat.

One elderberry shrub was observed during reconnaissance field surveys along Lagoon Valley Road, adjacent to the orchard. This isolated shrub is large and has approximately 20 stems greater than one inch in diameter at their base, a number of which contained larval VELB exit holes. This shrub could be adversely affected by project implementation, though specific impacts cannot be evaluated until final project design. In addition, other elderberry shrubs could exist the specific plan area.

VELB is listed as threatened under FESA and take of this species or its habitat is prohibited. Implementation of the Proposed Project may result in damage to, or loss of the isolated elderberry shrubs located on the project site through root damage, removal of the shrub or trampling resulting from construction related activities. The proposed Specific Plan includes a survey for additional elderberry shrubs that may be on-site and the preparation of a mitigation plan which implements USFWS guidelines for mitigation for this species. In order to ensure implementation, measures addressing the loss of VELB and their habitat would be required. Loss of individual VELB or their habitat (elderberry shrubs) would be considered a ***significant impact***.

Mitigation Measures

Mitigation for impacts on VELB shall include the preparation of a pre-construction survey to identify need for the replacement of habitat, or alternatively, to participate in a County-wide effort to establish a program for the conservation and management of threatened and endangered species that occur in Solano County. However, until such time the County-wide HCP is adopted, the following mitigation measures would reduce this impact to a *less-than-significant level.*

4.15-5 (a) *Prior to the approval of the Proposed Project, the project proponents shall conduct a project-specific survey for potential VELB habitat (elderberry shrubs).*

(b) *Any ground disturbing activities within 30 m of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level shall conform to the following minimum avoidance measures:*

1) Applicants shall provide a minimum setback of at least 6 m from the drip line of each elderberry plant containing stems measuring 1.0 inch or greater in diameter at ground level. The setbacks shall be fenced and flagged to identify equipment and materials encroachment into the setback zone. Fire fuel breaks (disked land) may not be included within the 6 m set back. Where encroachment within the 20 m setback zone is unavoidable, the applicant shall provide compensatory mitigation at a 50 percent ratio of the standard requirements identified in Table 4.15-3.

TABLE 4.15-3

ELDERBERRY MITIGATION RATIOS

Location/Stem Size*	Exit Holes**	Elderberry Seedling Ratio September 1 to February 14***	Elderberry Seedling Ratio March 15 to February 15 (2 x normal ratio)	Elderberry Seedling Ratio June 15 to August 31 (2.5 x normal ratio)	Associated Native Plant Ratio
Stems ≥1" & < 3"	*No*	*2:1*	*4:1*	*5:1*	*1:1*
	Yes	*4:1*	*8:1*	*10:1*	*2:1*
Stems ≥3"& <5"	*No*	*3:1*	*6:1*	*8:1*	*1:1*
	Yes	*6:1*	*12:1*	*15:1*	*2:1*
Stems ≥ 5"	*No*	*4:1*	*8:1*	*10:1*	*1:1*
	Yes	*8:1*	*16:1*	*20:1*	*2:1*

* *Ratios are shown for elderberry occurring in existing or historic riparian situations. Ratios for elderberry in non-riparian situations are 50 percent of the standard ratio.*

** *The presence of exit holes in a stem, bush, or contiguous clump applies to the entire site*

*** *No removal of elderberry is allowed between March 15 and June 15, except in cases of isolated bushes greater than 0.5 mile removed from other suitable valley elderberry longhorn beetle habitat and there is no sign of use (exit holes).*

2) Construction contractors will be briefed on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

3) Work crews will be instructed about the status of the beetle and the need to protect its elderberry host plant.

4) No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas, or within 30 m of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

5) Mowing of grasses/ground cover will only occur from July through April to reduce fire hazard. No mowing should occur within 1.5 m of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., avoid stripping away bark through careless use of mowing/trimming equipment).

6) Trimming of elderberry stems less than 1 inch in diameter may occur between September 1 and March 14. The recommended period for trimming is between November through the first two weeks in February when the plants are dormant and after they have lost their leaves.

(c) *In cases where removal of elderberry shrubs or their stems measuring 1-inch or greater (removal or trimming) is unavoidable, these impacts shall be compensated for through mitigation. Mitigation shall include salvaging and planting the effected elderberry shrubs and planting additional elderberry shrubs and associated native riparian plants according to the ratios specified in the following table. 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.*

Mitigation Measure 4.15-5 would allow for identification of all potentially impacted elderberry shrubs on or adjacent to the Proposed Project site and would provide for no net loss of VELB habitat.

4.15-6 Construction of the Proposed Project could result in the loss of western pond turtles or their habitat.

Lagoon Valley Lake and the associated perennial stream that drains from it from the northeast provide suitable habitat for the western pond turtle, while adjacent grasslands and oak woodlands provide important nesting and hibernation habitat. There are six CNDDB records of western pond turtles within 10 miles of the project site, including one record for Lagoon Valley Lake. One juvenile (approximately 8 cm long) was also observed on July 24, 2003 in the stream northeast of Lagoon Valley Lake, near the eastern entrance to the Lagoon Valley Regional Park. This observation is significant, because it confirms the presence of the species and the current reproductive viability of the population.

Implementation of the proposed off-site infrastructure improvements could result in disturbance to or loss of perennial aquatic habitat or individual turtles during construction of stream crossings or other facilities in or near aquatic habitat. The western pond turtle is both a state and federal Species of Concern, and is considered fully protected under the California Fish and Game Code. The proposed Specific Plan includes a pre-construction survey for western pond turtle for all drainages affected by construction and provisions for the removal of any western pond turtles that are found in those drainages to Lagoon Valley Lake. In order to ensure implementation, measures addressing the disturbance of western pond turtles and their habitat would be required. Loss of individual western pond turtles or their habitat as a result of construction activities would therefore be considered a ***significant impact***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level.*

4.15-6 (a) *Implement Mitigation Measure 4.15-1(a).*

(b) *If disturbance would occur within a perennial stream or other water body, a qualified biologist shall be retained to monitor the presence of western pond turtle in the active construction area. If individual western pond turtles are observed that may be in harms way, then construction activities shall cease until the biologist can move the turtle to a safe location.*

(c) *Buffer zones shall be established along areas of potential habitat for western pond turtle (i.e., perennial drainages) at a minimum of 50 feet from the top of stable bank pursuant to guidance contained in the City's General Plan and wetland mitigation guidelines. Mitigation measures that have been proposed for addressing effects to wetlands, drainages and riparian corridors will concurrently facilitate the avoidance and/or minimization of effects on western pond turtle.*

4.15-7 Construction of the Proposed Project could result in the loss and degradation of rare plant populations.

The development area has been subject to extensive disturbance due to grading activities related to past agricultural uses, and is therefore highly disturbed. However, there is still a low to moderate potential for special-status plants to occur in the area. Initial surveys have determined that potential habitat for eight special-status plant species (including big-scale balsamroot, San Joaquin salt bush, alkali milk-vetch, heartscale, brittlescale, hispid bird's-beak, recurved larkspur, Carquinez goldenbush, and saline clover) occurs within the development area. Of these species, only San Joaquin saltbush has been observed. These plants were growing in the alkali seasonal wetland southwest of Lagoon Valley Lake. Although this habitat feature is also potentially suitable for alkali milk-vetch, heartscale, brittlescale, hispid bird's-beak, recurved larkspur, Carquinez goldenbush, and saline clover, it occurs entirely on City of Vacaville property as parts of Lagoon Valley Regional Park, and would not be affected by the implementation of the Specific Plan. Big-scale balsamroot is associated with grasslands and dry slopes and often found on serpentine soils. While no serpentine soils are known to exist within project are, there is a low potential for this species to occur in the grassland habitat in the development area.

Although no other special-status plant species were observed during surveys of the development area or the remainder of the Specific Plan area, those surveys were conducted only at the reconnaissance level, and were not conducted during the blooming season for these species. It is therefore possible that special-status plants could occur elsewhere in the development area, but were simply not detected. If any of the special-status plant species do occur within the development area, then those individuals or populations could be lost as a result of grading or other ground disturbance related to development of the Specific Plan. Loss of individual special-status plants or their habitat as a result of project development would constitute a ***significant impact***.

Mitigation Measures

Mitigation for impacts on special-status plants shall include the preparation of a Project-specific plan to provide for the replacement of habitat, or alternatively, to participate in a County-wide effort to establish a program for the conservation and management of threatened and endangered species that occur in Solano County. However, until such time the County-wide HCP is adopted, the following mitigation measures would reduce this impact to a *less-than-significant level.*

4.15-7 (a) *The project applicant shall retain a qualified biologist to conduct focused preconstruction surveys within the project site and off-site areas proposed for infrastructure development for special status plant species that could potentially occur in the Specific Plan area during the appropriate time of year (March through May). If none of these species are located during the surveys, no further mitigation would be required.*

(b) *If any special-status plants are found to be present in the Specific Plan area, those plants shall be avoided to the greatest extent feasible. Habitats that support special-status plants that can be avoided shall be flagged and encircled with orange construction fencing to protect them from disturbance during construction of the project. These areas shall be preserved in perpetuity through conservation easements with an appropriate agency, and shall have appropriate buffer zones between their boundaries and areas of development. These buffers shall be a minimum of 250 feet if development is down slope of the special-status plant population and 500 feet if development is upslope of the plant population.*

(c) *If the special-status plant population cannot be avoided, then the project applicant shall provide mitigation fore the loss of the population in consultation with either CDFG or USFWS as appropriate. Mitigation could be accomplished through the acquisition of off-site habitat that supports the affected species, or through purchase of mitigation credits at an established mitigation bank that has appropriate habitat for the species. Selection of mitigation sites shall be conducted in consultation with the City, CDFG, CNPS and/or USFWS. Selection of the mitigation site will be subject to the approval of the above agencies. The ratio for off-site mitigation shall be at 2:1 for each acre affected.*

As a part of either off-site mitigation option, the project applicant shall retain a qualified biologist to collect seed directly from the plants (during the appropriate season), or from the soil containing the seed bank and transplanting of existing plants. Additionally, a Rare Plant Mitigation and Monitoring Plan shall be developed. If mitigation is to occur at an established mitigation bank, seed collection, transplanting and development of the Mitigation and Monitoring Plan typically becomes the responsibility of the mitigation bank as a part of the agreement that the project applicant enters into with the mitigation bank.

4.15-8 Construction of the Proposed Project could result in the loss of oak woodland/savannah, individual oak trees, and other protected trees.

Oak trees are a highly important biological resource because they support a diverse community of insects and wildlife in both their overstory (branches and leaves) and understory (grasses, brush, and limbs on the ground under the tree). Oak woodlands have been reduced in California to an extent that the loss of any oak trees must be considered a substantial loss of habitat for a number of native wildlife species. Because oak trees take a relatively long time to reach a large size (>100 years) it is nearly impossible to replace the biological habitat value of a mature oak tree by planting numerous small, young oak saplings. An old oak tree provides much better habitat than an equivalent (by trunk diameter) number of young oaks.

Oak woodland/savannah occurs in the southern and southeastern portion of the project site as well as north of Lagoon Valley Lake, in the area proposed for off-site infrastructure. Individual oak trees and other protected trees are found throughout the project site and in the area proposed for off-site infrastructure. Arborist surveys to identify the number and locations of native oak and other protected trees have not yet been performed for the project, but construction of the Proposed Project, and related infrastructure in these areas of the project site is likely to result in the loss of oak woodland/savannah and/or individual trees. Although subdivision of the southern portion of the Specific Plan area into larger residential lots could allow for avoidance of individual trees, it is difficult to quantify the actual number of trees that would be lost due to project construction without specific grading plans and an arborist report. Similarly, because plans for off-site infrastructure north of Lagoon Valley Lake are not finalized at this time, it is not possible to determine accurate impacts to oak woodland/savannah or individual tree resources from project implementation. It is assumed some woodland/savannah and individual trees would be lost.

The City of Vacaville has recognized the importance of preserving and enhancing oak woodlands/savannah and individual trees by implementing policies protecting these resources. As detailed in the Regulatory Setting section of this document, Policy 8.2-I2, Policy 8.2-I3 and Policy 8.2-I4 all pertain to the protection of existing trees. Additionally, Section 14.09.131 of the

Vacaville City Code sets forth criteria for the preservation of Native species, healthy trees, large specimens, and visually prominent trees. Impacts to any tree greater than 79 cm in circumference at 135 cm above the ground surface will require a city permit and mitigation.

Project designs include plans for the construction of a large berm that will shield the view of the proposed development from the eastbound I-80 traffic. The design of this berm calls for the planting of native trees and shrubs along the slope facing I-80. Upon approval by the City Landscape Architect and/or Community Development Director this area could be used as part of the mitigation area for tree replacement.

The Proposed Project would implement mitigation measures from the City of Vacaville Municipal Code (including Policy 8.2-I2, Policy 8.2-I3 and Policy 8.2-I4 and Section 14.09.131). The mitigation measures described therein would identify all potentially impacted oak woodlands/savannah and individual trees on or adjacent to the Proposed Project site, provide for no net loss of oak woodland/savannah habitat and individual trees. Additionally, the proposed specific plan includes the preservation of all oak woodland areas identified in the LSA report with the possible exception of trees that will need to be removed for slide repair, and the replacement of all trees removed for the project to be replaced at a 5:1 ratio for native oaks and 3:1 for all other tree species, consistent with to the City of Vacaville's Tree Preservation ordinance. This impact is therefore considered to be ***less-than-significant*.**

Mitigation Measures

4.15-8 *None required.*

4.15-9 Construction of the Proposed Project could result in the loss of Riparian habitat.

Riparian habitat occurs in the development area along Tributary G and a portion of Tributary D. Additionally, riparian vegetation is present in the Specific Plan area along the perennial stream that drains from Lagoon Valley Lake from the northeast. The riparian habitat on a portion of Tributary D, the portion of Tributary G that is upstream of Lagoon Valley Road and the riparian vegetation along the perennial stream northeast of the Lake are fairly narrow but well developed with a diverse assemblage of tree and shrub species including mature valley oaks and black walnut. The vegetation along the remainder of Tributaries G and D is much less well developed and consists primarily of young willows and cottonwoods. The riparian vegetation along the upper portion of Tributary G will be avoided and preserved as a natural area. The Proposed Project will preserve the natural riparian woodlands and incorporate them into residential and golf course areas with 100-foot setbacks to residential development and 50 foot setbacks to any golf course improvements (edge of rough, edge of tees). The roadside drainages will be re-aligned through the golf course area with a more natural alignment and planted with native riparian species. These re-aligned riparian zones will also have 100-foot setbacks to the residential development and 50 feet to any golf course improvements.

Additionally, the riparian vegetation along the perennial stream northeast of the Lake in unlikely affected by project activities as the planned infrastructure crossing of that creek will by bore-and-jack under the stream channel. The Specific Plan will preserve the approximately 15 acres of riparian habitat that occurs in Village III. However, the lower quality riparian vegetation along the remainder of Tributary G and the riparian vegetation along Tributary D may be subject to disturbance or removal as a result of channel and bank improvements during development of the site. Riparian vegetation is considered a sensitive habitat by the CDFG and the Corps. The proposed Specific Plan would preserve the natural riparian woodlands and incorporate them

into residential and golf course areas with 100-foot setbacks to residential development and 50 foot setbacks to any golf course improvements (edge of rough, edge of tees). Additionally, roadside drainages will be re-aligned through the golf course area with a more natural alignment and planted with native riparian species. These re-aligned riparian zones will also have 100-foot setbacks to the residential development and 50 feet to any golf course improvements. In order to ensure implementation, measures addressing the loss of riparian vegetation would be required. Removal of riparian vegetation could result in the loss of vegetation diversity and loss of important wildlife habitat. Therefore, this would be considered a ***significant impact***.

Mitigation Measures

The following mitigation measures would reduce this impact to a *less-than-significant level*.

4.15-9 (a) *The project shall be designed to avoid disturbance to riparian habitat and the drainages that support the habitat. CDFG guidelines call for minimum 100 foot buffers from edge of riparian vegetation, however, smaller buffers can be allowed on a case by case basis.*

(b) *If disturbance to riparian vegetation is unavoidable, the project applicant shall retain a qualified habitat restoration specialist to develop and implement a Riparian Habitat Mitigation Plan. The goal of the plan is to offset the loss of existing riparian vegetation by establishing replacement riparian vegetation at a ratio of at least 1:1. This compensatory habitat is intended to replace wildlife habitat and hydrologic values either onsite or at an off-site location as approved by the agencies. The details of the Riparian Habitat Mitigation Plan shall be the result of negotiations with the City and the CDFG, but will likely include planting of oaks, walnut, willows and cottonwoods as well as a number of understory species common to the region. It may also include measures to reconfigure channelized drainages such that they have a more naturally meandering pattern. Monitoring of the mitigation habitat shall be conducted by a qualified biologist twice a year for at least five years. A draft of the plan shall be submitted to the Corps, CDFG, RWQCB and the City for review and approval prior to implementation.*

4.15-10 Construction of the Proposed Project could result in the loss of nesting loggerhead shrike and white-tailed kite that are protected by the CDFG.

Trees and shrubs and open grasslands that occur in the Specific plan area provide nesting and foraging habitat for loggerhead shrike and for a variety of raptors, including white-tailed kite. Disturbance to active nests related to ground disturbance and construction activities may cause nest abandonment and result in the loss of eggs or young of these species. The removal of trees or shrubs that contain active nests for these species is prohibited by CDFG code. Therefore, this would be considered a ***significant impact***.

Mitigation Measures

Implementation of the following mitigation measures would reduce this impact to a *less-than-significant level*.

4.15-10 (a) *Prior to construction, the applicant shall retain a qualified biologist to conduct a nesting survey for loggerhead shrike and protected raptors throughout the*

development area. If necessary, this survey will be repeated during the construction period. Locations of any active nests shall be mapped and reported to CDFG and the City.

(b) *The project applicant shall develop, in consultation with CDFG, appropriate protection measures to ensure that all identified active nests are protected. These measures shall include monitoring by a qualified biologist through the nesting season or until construction ends (whichever comes first). Additionally, protective measures may include establishment of clearly marked avoidance areas around active nests, prevention of removal of shrubs/trees containing nests during the nesting season.*

(c) *The project applicant shall retain a qualified biologist to conduct an environmental awareness training session for all construction personnel to inform them of their responsibilities regarding the protection of sensitive resources. This training program shall include specific information to enable them to avoid disturbance to loggerhead shrike and protected raptors.*

ENDNOTES

1. LSA, 2003. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003

2. LSA, 2003a. *Biological Resources, Lagoon Valley Property*, Solano County. LSA Associates, September 23, 2003.

3. LSA, 2003a. *Biological Resources, Lagoon Valley Property*, Solano County. LSA Associates, September 23, 2003.

4. LSA, 2003a. *Biological Resources, Lagoon Valley Property*, Solano County. LSA Associates, September 23, 2003.

5. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003.

6. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003.

7. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003.

8. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003.

9. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003.

10. LSA. 1999. *City of Vacaville Proposed Lagoon Valley Lake Management Plan*. October 13, 1999.

11. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

12. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

13. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

14. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

15. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

16. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

17. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

18. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

19. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

20. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

21. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

22. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

23. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

24. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

25. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

26. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

27. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

28. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

29. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

30. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

31. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

32. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

33. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

34. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

35. California Native Plant Society. 2003. *Electronic Inventory of Rare and Endangered Vascular Plants of California*.

36. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

37. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

38. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

39. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

40. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

41. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

42. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

43. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

44. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

45. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California*.

46. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

47. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

48. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

49. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

50. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

51. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

52. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

53. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

54. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

55. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

56. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

57. Hickman, J.C., Ed. 1993. *The Jepson Manual – Higher Plants of California*.

58. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

59. Tibor, D.P., Ed. 2001. *California Native Plant Society's Inventory of Rare and Endangered Plants of California.*

60. California Department of Fish and Game. 2003. *California Natural Diversity Database*.

61. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003

62. LSA, 2003b. *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California. LSA Associates, October 7, 2003

63. USFWS, 1999. Conservation guidelines for the valley elderberry longhorn beetle. July 9, 1999. Sacramento, CA.

64. Personal observation, Sam Bacchini, Wildlife Biologist, EIP Associates.

65. Jennings and Hayes, 1994. Jennings, Mark R. and Marc P. Hayes. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Natural Heritage Division, 1994.

66. Stebbins, 1985. Stebbins, Robert C. *A Field Guide to Western Reptiles and Amphibians*, Second Edition, Revised. Houghton Mifflin Company, 1985.

67. Jennings and Hayes, 1994. Jennings, Mark R. and Marc P. Hayes. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Natural Heritage Division, 1994.

68. *Biological Resources, Lagoon Valley Property*, Solano County by LSA Associates, September 23, 2003.

69. *Biological Resources, Lagoon Valley Property*, Solano County by LSA Associates, September 23, 2003.

70. *Biological Resources, Lagoon Valley Property*, Solano County by LSA Associates, September 23, 2003.

71. Stebbins, 1985. Stebbins, Robert C. *A Field Guide to Western Reptiles and Amphibians*, Second Edition, Revised. Houghton Mifflin Company, 1985.

72. USFWS Sacramento Fish and Wildlife Quad Species Lists Website http://sacramento.fws.gov/es/spp_lists/QuadName_Search.cfm

5.1 CUMULATIVE IMPACTS

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CEQA requires that an EIR discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable (CEQA Guidelines section 15130). Cumulatively considerable means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current and probable future projects (CEQA Guidelines section 15065(c)). As defined in CEQA Guidelines section 15355, a cumulative impact is an impact that is created as a result of the combination of the project evaluated together with other projects causing related impacts.

PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

The following elements are necessary to an adequate discussion of significant cumulative impacts (CEQA Guidelines section 15130(b)(1):

(A) 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, or
(B) A summary of projections contained in a adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact….

For the purpose of the Lower Lagoon Valley Specific Plan EIR analysis, the cumulative impacts analysis assumes buildout of the adopted City of Vacaville General Plan and the currently proposed Southtown and Rice/McMurtry projects.

The context of the cumulative analysis varies by technical area. For example, air quality impacts are evaluated against conditions in the Sacramento air basin. Similarly, the hydrology and water quality cumulative analysis considers the Ulatis Creek Watershed that receives runoff from the Specific Plan area. The cumulative context for public services would be the local service provider. Other cumulative analyses, such as biology, consider the potential loss of resources in a broader, more regional context.

CUMULATIVE IMPACT ASSESSMENT

Land Use and Planning

The Land Use Section generally does not address cumulative impacts separately, because for land use, there is no cumulative context to assess land use consistency and compatibility issues; land use effects are localized and would not combine with similar effects in other locations. Cumulative impacts with respect to TAFB Land Use Compatibility Plan would not differ from those identified for the project. Please see Impact 4.2-3 in Section 4.2, Land Use and Planning. The loss of Important Farmland, as designated by the CDC, is a growing problem in California. Development as well as the economic climate has resulted in the shrinking agricultural landscape. The CDC tracks the loss of Important Farmland by County.

There are four classifications of farmland that fall under the Important Farmland designation; Prime farmland: Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Solano County had a net loss of 2,837 acres of Important Farmland according to the CDC's 1998-2000 Land Use Conversion Table. Total inventoried Important Farmland in the County totals 172,576 acres as of 2000.

5.1-1 Cumulative development, including the Proposed Project, would result in the conversion of Important Farmland (Prime and Unique) to developed uses.

Buildout of the General Plan would result in the conversion of Important Farmland (Prime and Unique Farmland). Once buildings or paved areas are constructed, the underlying class I or II soils are no longer available for agricultural activities. The only approach available to mitigate this impact to a less-than-significant level would be to replace the lost agricultural land. Theoretically, this could be accomplished by removing existing development from prime farmland. But feasibility and expanse could preclude this approach. The City's General Plan included the adoption of the ASA which is intended to mitigate impacts on Prime Farmland within the City's 100 square mile planning area by providing a definite geographic limit to urbanization. Nevertheless, the conversion of Prime and Unique Farmland would be considered a ***significant cumulative impact***. The conversion of these two types of Important Farmland to developed uses could also result in cumulative impacts related to the loss of biological resources and other environmental effects as well as loss of agricultural land. Cumulative impacts related to these issue areas and others are discussed in their respective sections in this EIR.

Approximately 244 acres of Important Farmland are located within the boundaries of the Specific Plan of which approximately 170 acres could be replaced elsewhere. With a total of 172,576 acres of Inventoried Important Farmland in Solano County, as of 2000, the loss of 244 acres as a result of this project would represents a loss less than one percent of the Important Farmland in the County. While this does not represent a significant loss when compared to the whole inventory, because development of the Proposed Project would result in a permanent conversion of Prime and Unique Farmland, the projects contribution to this cumulative impact would be ***considerable***.

Mitigation Measure

Mitigation measures are not available for the loss of Prime and Unique Farmland; therefore, the project's contribution to this cumulative impact remains *considerable.*

5.1-1 *None available.*

<u>Parks and Recreation</u>

5.1-2 Cumulative development, including the Proposed Project, would contribute to the increased demand for parks and recreational facilities.

As Vacaville continues to grow there will be a greater need to create parkland and open space areas within the City to meet increased demand. The City's General Plan requires the dedication if 4.5 acres per 1,000 residents. The City's General Plan Policy falls within the parameters set forth by the State's Quimby Act. New development would be required to either provide the required park facilities as part of the project and/or pay into the City's Park and Recreational Development Fees program. Specific designs, including number and placement,

for future parks are unknown at this time. However, because future development would be required to comply with General Plan goals and policies and would either dedicate park sites and/or pay into the fee program, this cumulative impact is considered ***less than significant***.

Mitigation Measure

5.1-2 *None required.*

Visual Resources

Those effects that are not increased by additional development in the project vicinity are not considered cumulative impacts. For example, spillover lighting on adjacent property is of concern only where parcels border one another. Lighting for new development discontinuous from the Proposed Project would have no effect on spillover lighting within or adjacent to the project site. Similarly, glare is not considered a cumulative effect. Views of the project site from I-80 are also not considered a cumulative effect.

No cumulative impact would occur associated with the view corridor from I-80 to the regional park since no development is to take place on the rolling hills and ridgelines surrounding the Proposed Project to the north, east, and south (note that I-80 lies to the west of the project site).

5.1-3 The Proposed Project would contribute to a cumulative alteration of aesthetic characteristics of the Lower Lagoon Valley region of Vacaville by increasing urban development in existing rural and undeveloped natural areas.

The Proposed Project would convert a primarily rural, undeveloped landscape to a developed environment permanently altering the visual character of the area, both during daylight and nighttime. Development within the City of Vacaville and within the surrounding area of the Proposed Project is anticipated to continue. The Lower Lagoon Valley area is currently designated for urban development in the City's General Plan. However, the Proposed Project, in combination with other proposed development within the City of Vacaville and the area in the immediate project vicinity, would result in a substantial change in the existing visual character of the area. Therefore, the project would result in a ***significant cumulative impact***.

A total of approximately 826 acres of the Specific Plan area is slated for development. The area is proposed to be developed with a variety of uses including residences, schools, a business village, and a golf course. Due to the size of the area, relative to other development proposed within the City of Vacaville and in the surrounding vicinity, the change in the visual character is anticipated to be cumulatively considerable. There are no mitigation measures available to reduce the project's overall contribution to the cumulative loss of visual character. Therefore, the project's contribution would be *cumulatively* ***considerable***.

Mitigation Measure

There are no feasible mitigation measures available to mitigate the alteration of aesthetic characteristics; therefore, the project's contribution remains *considerable*.

5.1-3 *None available.*

5.1-4 Cumulative development, including the Proposed Project, could contribute to an increase in nightlighting and overall light in this area of the City.

As mentioned previously, the Proposed Project would convert an area that is presently very rural and undeveloped to a developed environment. The project would introduce street lights, building lights, and vehicle lights into an area that presently does not contain many roads or buildings. The contribution of additional lighting within the plan area would substantially increase light and alter nighttime views of the Specific Plan area. This would be considered a ***significant cumulative impact***.

Due to the size of the proposed development and the amount of light anticipated to be produced by project uses, the Specific Plan could contribute a significant amount of light into the night sky and the project's contribution to this cumulative impact would be ***considerable***.

Mitigation Measure

Implementation of Mitigation Measures 4.4-3(a) through 4.4-3(c) would help offset new light sources; however, due to the increase in lighting over current site conditions, the project's contribution to this significant impact would remain *considerable*.

5.1-4 *Implement Mitigation Measures 4.4-3(a) through 4.4-3(c).*

<u>Transportation and Circulation</u>

Traffic generated by the Proposed Project would contribute to already unacceptable LOS E or F conditions that would occur in 2025 with future growth. If that contribution would result in a change to the volume-to-capacity ratio of 0.02 or greater, the project would result in a considerable contribution to significant cumulative impacts and would be considered to have significant environmental impacts. The impacts are shown in Tables 4.5-10 through 4.5-13, and are presented above in Impacts 4.5-2 through 4.5-5 of Section 4.5, transportation and Circulation. The impacts are related to locations that are identified as operating at LOS E or F under 2025 baseline conditions, and are summarized in Table 5.1-1.

5.1-5 Cumulative traffic, including the Proposed Project, would result in further reductions in volume-to-capacity ratios at the Alamo Drive and Merchant Street intersection in the AM peak hour and at the North Texas Street/Manuel Campos Parkway intersection in 2025 in the AM and PM peak hours.

As shown in Section 4.5, Table 4.5-10, the intersection of Alamo Drive and Merchant Street would operate at an unacceptable LOS E, and the intersection of North Texas Street and Manuel Campos Parkway would operate at LOS F under 2025 baseline conditions with reasonably foreseeable future growth. Both are considered ***significant cumulative impacts***. Traffic generated by the project, in combination with future growth, would result in a V/C ratio of 0.96 at the intersection of Alamo Drive and Merchant Street in the AM peak hour, an increase of 0.03 compared with a V/C of 0.93 with growth under the future 2025 baseline conditions. At the intersection of North Texas Street and Manuel Campos Parkway, traffic generated by the project would result in a V/C ratio of 1.21, an increase of 0.02 compared to the 2025 future baseline V/C of 1.19 in the AM peak hour, and a V/C ratio of 1.40, an increase of 0.03 compared to the 2025 future baseline V/C of 1.37 in the PM peak hour. These would be considered a ***considerable contribution*** to significant cumulative impacts. The intersection of North Texas Street and the I-80 eastbound ramps would operate at LOS F in the future with and without the Proposed Project; however, the project would not result in an increase in the V/C

TABLE 5.1-1

SUMMARY OF CUMULATIVE TRAFFIC IMPACTS

Location	Peak Hour	Future Baseline	Future Baseline with Project
		LOS (V/C ratio)	
Intersections			
Alamo Drive/Merchant St	AM	**E (0.93)**	**E (0.96)**
North Texas St/ Manuel Campos Parkway	AM	**F (1.19)**	**F (1.21)**
	PM	**F (1.37)**	**F (1.40)**
Freeway Segments			
Alamo Drive Overcrossing -Cherry Glen/Pena Adobe Overcrossing EB	PM	**F (1.11)**	**F (1.19)**
Freeway Ramps			
Alamo/Merchant Eastbound Off Ramp	AM	**F (1.11)**	**F (1.26)**
	PM	**F (2.26)**	**F (2.40)**
Alamo/Merchant Westbound On Ramp	AM	**F (1.52)**	**F (1.57)**
	PM	**F (1.12)**	**F (1.26)**
Freeway Merge/Diverge			
Alamo/Merchant Eastbound Off (Diverge)	PM	**F 53**	**F 57**

Note: LOS E or F shown in bold.
Source: Korve Engineering, January 2004.

ratio and therefore would not have a considerable contribution to this future significant cumulative impact.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *considerable.*

5.1-5 (a) *Construct the new intersection at North Texas Street and Manuel Campos Parkway with an additional northbound right-turn lane, two westbound left-turn lanes and a shared left-through lane, and one eastbound shared through-right-turn lane and one exclusive right-turn lane. Signalize the intersection.*

This intersection is planned in the City of Fairfield, and has not yet been constructed. As planned, it would not have sufficient capacity for the volume of traffic forecast in 2025. Level of service would improve from LOS F to LOS D (V/C 0.81) in the AM peak hour and LOS D (V/C 0.85) in the PM peak hour with this mitigation measure to redesign the intersection. The project would contribute about one percent of total traffic to this intersection in the future.

This impact would be significant and unavoidable because the planned new intersection of North Texas Street and Manuel Campos Parkway will be located in Fairfield; implementation of the mitigation measure is outside the jurisdiction of Vacaville, the Lead Agency for the proposed Lower Lagoon Valley Specific Plan.

(b) *Construct the California Drive overcrossing over I-80, connecting Marshall Road with Cherry Glen Road, as called for in the Vacaville General Plan.*

Implementation of this measure would improve the LOS at the intersection of Alamo Drive and Merchant Street from LOS E, with a V/C ratio of 0.93 to LOS D with a V/C ratio of 0.84 in 2025 with traffic *generated* by the Proposed Project. Construction of the California Drive overcrossing would have other significant impacts, as discussed below under "Variant with California Drive Overcrossing."

Without the California Drive overcrossing, mitigation of the significant impact at the Alamo Drive and Merchant Street intersection would require construction of triple left turn lanes that would involve acquisition of private property and demolition of existing structures that contain operating businesses. Therefore, mitigation at the intersection would be infeasible, and the cumulative impact would be significant and unavoidable.

5.1-6 Cumulative traffic, including the Proposed Project, would result in further reductions in V/C ratios on the eastbound I-80 freeway segment between the Alamo Drive overcrossing and the Cherry Glen/Peña Adobe overcrossing in the PM peak hour in 2025.

As shown in Section 4.5, Table 4.5-11 and as summarized in Table 5.1-1, the eastbound freeway segment between the Alamo Drive overcrossing and the Cherry Glen/Peña Adobe overcrossing would operate at LOS F in the future without the Proposed Project; the V/C would worsen with traffic from the Proposed Project, from 1.11 to 1.19, a change of 0.08. Thus, the project would contribute to a ***significant cumulative impact*** and the contribution would be considered ***cumulatively considerable***. Table 4.5-11 in Section 4.5 also shows that the eastbound segments between Cherry Glen/Peña Adobe and Lagoon Valley and between Lagoon Valley and North Texas would operate at LOS F in the future, both with and without the Proposed Project; however in both cases the V/C ratio with the Proposed Project would be approximately the same as that of the 2025 future baseline or would be slightly improved based on traffic reassignments occurring in the City's Model. Therefore, the project would not have a cumulatively considerable contribution to future significant impacts at these freeway segments, and no mitigation is needed.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *considerable.*

5.1-6 *Widen eastbound I-80 between the Alamo Drive overcrossing and the Cherry Glen / Peña Adobe Road overcrossing by 12 feet, by adding an auxiliary lane in the existing shoulder area and relocating the shoulder into the adjacent right-of-way. Construct a retaining wall as part of relocating the shoulder.*

This measure would create a fifth traffic lane along I-80 eastbound, and improve the level of service on this freeway segment from LOS F to LOS D (V/C of 0.81) in the PM peak hour. A retaining wall is included in the measure to address cuts into the hillside adjacent to the freeway to create the new shoulder. The project would contribute about seven percent to total traffic volumes on this freeway segment.

Implementation of this mitigation measure would be under the jurisdiction of the California Department of Transportation. Because the City of Vacaville does not have jurisdiction to

implement this mitigation measure, or require that the project sponsor implement the measure, the cumulative impact would remain significant and unavoidable.

5.1-7 Cumulative traffic, including the Proposed Project, would result in further reductions in V/C ratios on the Alamo Drive / Merchant Street ramps to I-80 in the AM and PM peak hours.

The eastbound off-ramp and westbound on-ramp at Alamo Drive and Merchant Street would operate at LOS F in the morning and afternoon in 2025 without the Proposed Project; this would be a ***significant cumulative impact***. With traffic generated by the Proposed Project, V/C ratios would increase substantially; this would be considered a ***cumulatively considerable*** contribution. As summarized in Table 5.1-1, volume-to-capacity ratios would increase from 1.11 to 1.26 with project-generated traffic on the eastbound off-ramp in the AM and from 2.26 to 2.40 in the PM. V/C ratios would increase from 1.52 to 1.57 with project-generated traffic on the westbound on-ramp in the AM and from 1.12 to 1.26 in the PM. The project would contribute about 3 to 12 percent of the total traffic to these ramps.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *considerable.*

5.1-7 (a) *Implement Mitigation Measure 5.1-6 to add an eastbound lane to I-80 between the Cherry Glen / Peña Adobe overcrossing and the Alamo Drive overcrossing, and, in addition, widen the Alamo Drive / Merchant Street eastbound off-ramp by 12 feet to two lanes and add a new lane at the ramp intersection with Alamo Drive and Merchant Street to accommodate the new ramp lane.*

Implementation of all features of this mitigation measure would widen the freeway and the off-ramp in the eastbound direction and would result in improved V/C ratios in the morning and afternoon peak hours on the eastbound ramps, and would result in an acceptable LOS A in the morning peak hour and LOS F with an improved V/C of 1.13 in the PM peak hour. Implementing only Mitigation Measure 5.1-6 would improve V/C in the AM peak hour from 1.26 to 1.05 and in the PM peak hour from 2.4 to 2.9 but LOS would remain F in both peak hours.

As explained above, Mitigation Measure 5.1-6 to widen the freeway is under the jurisdiction of Caltrans and could not be implemented by the City. The freeway ramp is also under Caltrans jurisdiction and could not be widened by the City alone. Adding a separate lane at the intersection at the end of the ramp could be carried out at the direction of the City but alone would not reduce the cumulative significant impacts to less-than-significant levels. Thus, this significant cumulative impact at the eastbound freeway ramp would remain significant and unavoidable.

(b) *Implement Mitigation Measure 4.5-3(b) to widen the I-80 freeway to add a westbound lane between Alamo Drive and North Cherry Glen Road, and construct a retaining wall adjacent to the freeway. In addition, widen the westbound on-ramp at Alamo Drive/Merchant Street to two traffic lanes.*

Implementation of all features of this mitigation measure would result in acceptable LOS of C in the AM peak hour and A in the PM peak hour. With implementation of only Measure 4.5-3(b),

the on-ramp would continue to operate at LOS F, with a slightly improved V/C ratio from 1.57 to 1.31 in the AM peak hour and from 1.26 to 1.05 in the PM peak hour. As explained above for measure 4.5-3(b), this measure is outside the jurisdiction of the City of Vacaville; therefore the cumulative impact remains significant and unavoidable.

5.1-8 Cumulative traffic, including the Proposed Project, would further reduce the V/C ratio at the diverge from I-80 to the Alamo Drive / Merchant Street off-ramp.

Future development would result in LOS F, with a passenger car/mile/lane density of 53, a ***significant cumulative impact***. Traffic from the Proposed Project would increase the density to 57, resulting in a ***considerable contribution*** to cumulative significant impact. The diverge and merge locations at the I-80 interchange with the proposed Manuel Campos Parkway at the eastbound off-ramp and at the eastbound on-ramp in the PM peak hour would operate at LOS E both with and without the project; the project would not have a considerable contribution to this significant cumulative impact because the project would not result in an increase in the pc/mi/l density at these diverge and merge points.

Mitigation Measures

Implementation of the following mitigation measures would reduce project impacts to less-than-significant levels. However, because implementation of these measures is not within the jurisdiction of the City of Vacaville, this impact would remain *considerable.*

5.1-8 *Implement Mitigation Measure 5.1-6 to add an eastbound lane on I-80 between Alamo Drive and Cherry Glen/Peña Adobe Road.*

This mitigation measure would create a fifth eastbound traffic lane, eliminating merge/diverge conflicts. The freeway is outside the jurisdiction of the City of Vacaville; therefore this cumulative impact would remain significant and unavoidable.

<u>Air Quality</u>

5.1-9 Cumulative development, including the Proposed Project, could generate increased air pollutant emissions that could impair implementation of the Clean Air Plan.

The cumulative context for this project is defined as build-out of the Proposed Project as it compares to the emissions anticipated for the site if developed under the existing land use designations.

As discussed in Section 4.6 under Impact 4.6-4, the adopted land use plan for Lower Lagoon Valley would result in a much larger development than what is currently proposed for the site. The change in land use from the current agricultural farmland/residential to the proposed residential/commercial would create a substantial change in emissions associated with the site and result in a ***significant*** air quality impact. However, even though the Proposed Project would result in an increase in the daily emissions associated with the area over existing conditions, it would result in far fewer emissions than what has already been accommodated for under Clean Air Plan growth projections. As previously discussed, the Clean Air Plan is based on land use designations. Therefore, because the Proposed Project would result in fewer daily emissions for the entire project site than what is assumed in the General Plan, the cumulative development of the Proposed Project site and surrounding projects sites, the adoption of the

Specific Plan and associated General Plan amendments would reduce the City's cumulative contribution to air pollution and would not impair implementation of the Clean Air Plan. As such, the contribution of the Proposed Project would ***not be cumulatively considerable***.

Mitigation Measure

5.1-9 *None required*.

5.1-10 Cumulative development, including the Proposed Project, would include new sources of toxic air contaminants.

Cumulative development in the Vacaville Planning Area is expected to mainly consist of residential, commercial, office, residential, recreational, and light industrial uses, which generally do not result in toxic emission levels that can be considered substantial. The regulation and laws relating to TACs will also protect sensitive receptors throughout the Planning Area from substantial concentrations. Any source of emissions that could generate substantial concentrations of TACs would be subject to the permitting procedures of the YSAQMD to ensure that sensitive receptors are not exposed to levels above adopted standards. Therefore, this impact would be ***less than significant***.

Mitigation Measure

5.1-10 *None required*.

<u>Noise</u>

5.1-11 Cumulative development, including the Proposed Project, would increase vehicle trips and would result in increased noise levels.

Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to the specific plan and other projects within the study area. Therefore, cumulative traffic-generated noise impacts have been assessed based on the contribution of the specific plan to the future cumulative base traffic volumes in the project vicinity. The noise levels associated with existing traffic volumes, cumulative base traffic volumes without the project, and cumulative base traffic volumes with the project are identified in Table 5.1-2 along with the contribution of traffic noise generated by the specific plan.

As shown in Table 5.1-2, cumulative development along with the specific plan would result in noise level increases of 0.6 to 4.2 dBA L_{dn} along the studied roadways. Because noise levels along some roadways would increase by more than 3$L_{dn,}$ this is considered a ***significant cumulative impact***. The 4.2 dBA L_{dn} increase along Cherry Glen Road between Lyon Road and Pleasant Valley Road, and the 3.9 dBA L_{dn} increase along Pleasant Valley Road north of Cherry Glen Road would be considered substantial and significant. The increase in noise levels along the other study-area roadways would be less than 3.0 dBA L_{dn} and, therefore, would not be significant. The future noise levels along two roadway segments would be reduced as a result of changes in local circulation attributable to the Specific Plan.

The project contribution to the cumulative traffic noise impacts are also shown in Table 5.1-2. As shown, the Proposed Project development would contribute from 0.1 dBA to 0.4 dBA L_{dn} to future ambient noise levels. Future noise levels along four roadway segments would be lower than existing noise levels with implementation of the Specific Plan and cumulative development

TABLE 5.1-2

CUMULATIVE PROJECT ROADWAY TRAFFIC NOISE IMPACTS

Roadway Segment	Noise Levels in dBA L_{dn}					
	Existing Traffic Volumes	Cumulative Base Traffic	Cumulative + Project Traffic	Cumulative Increase[1]	Project Contribution[2]	Significance Threshold
Interstate 80, east of Alamo	75.9	76.7	76.5	0.6	-0.2	3.0
Interstate 80, Pena Adobe Rd. to Alamo	76.4	77.9	77.8	1.4	-0.1	3.0
Interstate 80, Lagoon Valley Rd. to Pena Adobe Rd.	65.6	66.7	66.5	0.9	-0.2	3.0
Interstate 80, N. Texas to Lagoon Valley Rd.	76.4	77.4	77.5	1.1	0.1	3.0
Interstate 80, Cherry Glen Rd. to Alamo/Merchant Rd.	75.5	77.2	77.0	1.5	-0.2	3.0
Cherry Glen Rd., Lyon Rd. to WB I-80 Ramps	55.0	51.3	51.7	-3.3	0.4	3.0
Cherry Glen Rd., Lyon Rd. to Pleasant Valley Rd.	55.3	62.4	59.5	4.2	-2.9	3.0
Cherry Glen Rd., Pleasant Valley Rd. to EB I-80 Ramps	46.9	54.2	46.4	-0.5	-7.8	3.0
Pleasant Valley Rd., North of Cherry Glen Rd.	53.0	60.6	56.9	3.9	-3.7	3.0
Alamo Dr., Merchant St. to EB I-80 Ramps	64.7	67.4	67.1	2.4	-0.3	3.0

1. Difference between Existing Traffic Volumes and Cumulative + Project Traffic Volumes.
2. Difference between Cumulative Base Traffic and Cumulative + Project Traffic Volumes.

Source: EIP Associates 2004. Calculation data and results are provided in Appendix C.

due to roadway reconfiguration and a redistribution of vehicle trips. Future noise levels along eight roadway segments would also be reduced by traffic redistribution provided by the specific plan. Based on this analysis, the 0.1 dBA to 0.4 dBA contribution of the Proposed Project development to future roadway noise levels would not exceed the identified thresholds of significance and, therefore, would ***not be cumulatively considerable***.

Mitigation Measures

5.1-11 *None required.*

<u>Public Utilities</u>

The project area is located at the upstream end of the wastewater collection system. Cumulative impacts would occur only in existing wastewater facilities downstream of the project area. Therefore, there is no discussion of impacts specific to new facilities in the vicinity of the project site.

5.1-12 Cumulative development, including the Proposed Project, would contribute to increased flows throughout many areas of the wastewater collection system that could result in required improvements to existing wastewater collection system facilities.

The Proposed Project would contribute to increased flows in a number of existing sewers that are expected to receive flows from other projects. The City collects development impact fees for the purpose of funding trunk sewer improvements with citywide benefit, including those affected by anticipated cumulative impacts. Specific improvements are identified and scheduled by the City through periodic master planning and design activities.

Funding mechanisms for collection system improvements with citywide benefit have been established. Therefore, the production of additional wastewater flow and the need for improvements to the existing downstream collection system is considered a ***less-than-significant impact***.

Mitigation Measure

5.1-12 *None required.*

5.1-13 Cumulative Development, including the Proposed Project, would increase flow to the Easterly Wastewater Treatment Plant.

Completion of the Easterly Wastewater Treatment Plant expansion is anticipated prior to occupancy of the Proposed Project. The expansion is sized to accommodate cumulative growth throughout the City of Vacaville, including the project area, through 2012 or later.[1] The City collects development impact fees for the purpose of funding treatment plant improvements needed to accommodate cumulative growth. Specific improvements are identified and scheduled by the City through periodic master planning and design activities. This is considered a ***less-than-significant impact***.

Mitigation Measure

5.1-13 *None required.*

5.1-14 Cumulative Development, including the Proposed Project, would result in an increased demand for electrical and natural gas supplies and distribution infrastructure.

The ability of PG&E to provide its services concurrently with each project is evaluated during the development review process. The input facilitates a detailed review of all projects by service purveyors to assess the potential demands for utility services on a project-by-project basis. Developers are required to obtain approval from PG&E for the construction of the needed infrastructure. Consistent with PG& E requirements, the City and project applicants are required to work with PG&E to locate utility line corridors to distribute electricity and natural gas to proposed development from distribution mains. Consistent with General Plan Policy 5.1-I 11, utility distribution lines would be constructed underground adjacent to new residential and/or commercial development projects as a condition of approval.

Because the provision of adequate electricity and natural gas would be required prior to project approval, and because distribution infrastructure would be constructed consistent with PG&E requirements and City General Plan policies, cumulative impacts attributed to electricity and natural gas demand would be considered ***less than significant***.

Mitigation Measure

5.1-14 *None required*.

5.1-15 Cumulative development, including the Proposed Project, would increase the demand for cable television service and could result in the need for additional distribution infrastructure.

Development in the City of Vacaville in the Comcast Cable service area would result in the need for additional distribution infrastructure.

Service connections would be provided by Comcast Cable and would be funded through developer fees and future customer billings. The cable service distribution lines would be constructed underground within street and trail right-of-ways. Because the installation of cable service distribution infrastructure to meet cumulative demand would be achieved consistent with City requirements, cumulative impacts to cable service would be ***less than significant***.

Mitigation Measures

5.1-15 *None required*.

<u>Public Services</u>

5.1-16 Cumulative development, including the Proposed Project, would require the need for additional police personnel to maintain the standard level of police protection services.

Cumulative growth in the City of Vacaville, including the Proposed Project would increase the demand on police protection services. Development in the City is required to contribute funding to ensure that police protection service goals are met. In addition, the City Police Department has plans to construct a new facility that is scheduled to begin construction in 2004. Because there is a mechanism in place to fund equipment and staff to achieve established service goals, this cumulative impact is considered ***less than significant***.

Mitigation Measure

5.1-16 *None required.*

5.1-17 Cumulative development, including the Proposed Project, would require the need for additional fire services to maintain the current level of services.

Similar to police services, fire services are provided based on established service standards and goals. Cumulative development within the City would be subject to these standards. New development would place additional demand on the City's Fire Department to provide adequate fire services. Additional fire facilities are recommended to serve other development areas of the City.[2] Development in the City is required to contribute funding to ensure that fire protection service goals are met. Because there is a mechanism in place to fund equipment and staff to achieve established service goals, this cumulative impact is considered ***less than significant***.

Mitigation Measure

5.1-17 *None required*.

5.1-18 Cumulative development, including the Proposed Project, would increase the amount of solid waste disposed of at B&J Landfill and could decrease capacity at the landfill.

Currently, the B & J Landfill is anticipated to be able to accept waste until 2070. However, the final closure date would be affected by several factors, including regional growth rates, economic conditions, and the efficiency of waste recovery. Depending on these factors, waste from the Proposed Project, in combination with other cumulative development, could shorten the lifespan of the landfill. The City of Vacaville currently employs an aggressive source reduction program and reported a diversion rate of 56 percent in 2000.

Therefore, it is anticipated that adequate capacity is available at the landfill to meet demand of cumulative development. Therefore, the impact is considered ***less than significant.***

Mitigation Measure

5.1-18 *None required*.

<u>Water Supply</u>

The project is located at the perimeter of the existing water distribution system. Cumulative impacts would occur only in existing water distribution system facilities within the main zone or one of the upper pressure zones. Therefore, there is no discussion of impacts specific to new improvements in the vicinity of the project site.

5.1-19 Cumulative development, including the Proposed Project, would contribute to increased water demands throughout many areas of the existing water distribution system that could result in required improvements to existing water distribution system facilities.

The Proposed Project would contribute to an increase in the water demand citywide. The City collects development impact fees for the purpose of funding water distribution system improvements with citywide impact, including those affected by anticipated cumulative impacts. Specific improvements are identified and scheduled by the City through periodic master planning and design activities.

Funding mechanisms for water distribution system improvements with city-wide benefit have been established. The Proposed Project will participate in established City funding mechanisms and will incorporate maintenance district mechanisms to ensure funding of operation and maintenance of these systems. Therefore, the generation of additional water demand and the need for improvements to the existing water distribution system is considered a ***less-than-significant impact.***

Mitigation Measure

5.1-19 *None required*.

5.1-20 Cumulative development, including the Proposed Project, would increase the total water demand city-wide.

The City of Vacaville is projecting an average day water demand for the Year 2025 of approximately 31,331 ac-ft/yr (including the Proposed Project). The water supply assessment conducted recently by the City of Vacaville (SB610 Water Supply Assessment Report) concludes that there is sufficient water supply from the existing and planned sources to meet this increased water demand under a variety of delivery conditions and is considered a ***less-than-significant impact.***

Mitigation Measure

5.1-20 *None required*.

<u>Hydrology, Drainage and Water Quality</u>

The cumulative context for the analysis of cumulative hydrology, drainage, and water quality impacts is the Ulatis Creek Watershed, which includes the City of Vacaville and all cumulative growth therein, as represented by full implementation of the City of Vacaville General Plan.

The Proposed Project would increase the number of people and structures that could be exposed to potential effects related to seiche and earthen dam failure inundation. Such potentially adverse environmental effects would be site-specific and generally would not combine with similar effects that could occur with other projects in Vacaville. Implementation of the California Building Code standards pertaining to seismic safety and DOSD regulations would ensure that potential site-specific impacts would be less than significant. Therefore, no cumulative impact would occur.

The Specific Plan area has not been identified as a significant groundwater recharge area. Groundwater recharge potential would not be substantially affected because infiltration is limited under existing conditions. For a discussion of cumulative impacts related to groundwater use and supplies, please see Section 4.11, Public Utilities – Water Supply.

5.1-21 Cumulative development, including the Proposed Project, could increase runoff that could exceed the capacity of existing drainage facilities resulting in localized flooding.

Cumulative development in the City of Vacaville could include development of currently undeveloped land. Increasing the amount of impervious surface cover over existing conditions would result in an associated increase in runoff that could exceed the capacity of existing drainage facilities and contribute to localized flooding. This is considered a ***significant cumulative impact***.

As presented in Table 5.1-3, the Proposed Project, with implementation of the proposed detention basins and related drainage facilities identified in the preliminary drainage study, would decrease peak flows discharging from the Lower Lagoon Valley watershed. Although a preliminary drainage study has been completed, the project proponent is required to complete a Master Drainage Plan that identifies specific improvements consistent with City General Plan policies. Until a Master Drainage Plan is completed and approved by the City the project's contribution to this cumulative impact is ***considerable***.

TABLE 5.1-3

COMPARISON OF MODELED DISCHARGES FOR THE 100-YEAR STORM WITH ONSITE DETENTION BASINS

Location	Node Designation	Modeled Discharge[1]	
		Existing Condition	With Project Condition
Discharge into Lagoon Valley Lake[2, 3]	C (L34)	2566	1616
Discharge into Bypass Channel[2, 3]	C (L32+33)	1014	229
Combined Runoff from Area West of Bypass Channel[4]	C (L36+37)	788	587
Discharge at Downstream End of Bypass Channel[3]	C (BYPASS)	1775	811
Discharge at the I-80 Box Culvert[5]	C(ND3)	1277	1147

Notes: Subshed designations are those used in the HEC-1 model and are shown on Figure 4.11-3.
1 Discharge measured in cubic feet per second.
2 Runoff from the proposed Residential & Golf course development (located south of Lagoon Valley Lake) and the undeveloped areas surrounding the project site.
3 The Proposed Project plans to divert some of the area the currently drains to the Bypass Channel to the Lagoon Valley Lake because of the limited capacity of the Bypass Channel.
4 Runoff from the proposed Business Village Development, located west of Lagoon Valley Lake and areas west of I-80.
5 Runoff from the Lower Lagoon Valley watershed at the northern end of the valley (discharge from the Lagoon Drain).
Source: West Yost & Associates & BKF

Mitigation Measures

Preparation of a drainage master plan prior to Tentative Map approval would ensure that the Proposed Project includes sufficient detention storage to reduce the 10- and 100-year peak flows from the Lower Lagoon Valley watershed to 90 percent of existing peak flows, as required by General Plan Policy 2.3-I 14 for development in the watershed. This would reduce the risk of flooding and would ensure consistency with General Plan policies, thus reducing the project contribution to *less than considerable*.

5.1-21 *Implement Mitigation Measures 4.11-1(a) through 4.11-1(c).*

5.1-22 Increased runoff generated by cumulative development, including the Proposed Project, could result in sedimentation and increased levels of urban contaminants, which could affect receiving water quality in the Ulatis Creek Watershed.

Cumulative development in the City of Vacaville could include development of currently undeveloped land. Increasing the amount of impervious surface cover over existing conditions would result in an associated increase in runoff. Runoff could carry increased levels of sediment (as a result of construction activities) and urban contaminants (post-construction activities) that could affect receiving water quality in the Ulatis Creek Watershed. This is considered a ***significant cumulative impact***.

Any construction in the State of California on one acre or more requires preparation of a SWPPP to comply with the requirements of the SWRCB NPDES General Permit. The best management practices identified in the SWPPP would help mitigate for the impact of construction activities on storm water quality. Recent amendments to the General Permit also require water quality monitoring. Construction activities (e.g., excavation and trenching) in areas where shallow groundwater is present and groundwater extraction is necessary for construction would be subject to the RWQCB construction dewatering permit requirements, which would help minimize the potential for discharging sediment-laden groundwater into surface water drainages.

The City of Vacaville has begun developing a program to implement the Phase II NPDES requirements. At this time no specific ordinance has been passed to reflect the implementation of the Phase II stormwater regulations, but the City has informed developers that review of current development projects will be reviewed for compliance with stormwater regulations and BMPs. Post-construction measures would require the City to implement structural and non-structural BMPs that would mimic pre-development quantity and quality runoff conditions from new development and redevelopment areas.

The Proposed Project includes implementation of BMPs to manage water quality by providing on-site runoff treatment. However, because the City's SWMP has not yet been approved, and the specific BMPs that would be used to reduce pollutant loading, and their locations have not been identified, the project's contribution to this cumulative impact is ***considerable***.

Mitigation Measures

Implementation of Mitigation Measure 4.11-3(a) through (f) would ensure BMPs specific to construction activities and land uses in the Proposed Project are included in project design and are monitored for their effectiveness in reducing urban pollutants in runoff so that Basin Plan objectives and water quality standards are not violated, and to ensure consistency with NPDES Phase II requirements. This would reduce potential water quality effects from construction activities and urban runoff to a *less-than-considerable level*.

5.1-23 *Implement Mitigation Measures 4.11-3(a) through 4.11-3(f).*

<u>Geology and Soils</u>

Development of the Proposed Project would increase the number of structures that could be subject to the effects of expansive soils or other soil constraints that could affect structural integrity, roadways, or underground utilities. Implementation of the Proposed Project would increase the risk of damage to property and/or injury to people due to construction of structures adjacent to unstable slopes, such as the proposed berm or the mapped landslide and earthflow areas. Site preparation and development would also result in temporary and permanent topographic changes, such as the constructed berm, that could affect erosion rates or patterns. Potentially adverse environmental effects associated with expansive soils, landslides, slope stability, topographic alteration, and erosion, usually are site-specific and generally would not combine with similar effects that could occur with other projects in Vacaville. Consequently, impacts related to soils from the Proposed Project would not result in a cumulative impact.

5.1-22 Cumulative development, including the Proposed Project, would result in increased exposure of people or structures to potential risks caused by earthquake activity, including strong groundshaking and seismic-related ground failures such as liquefaction and earthquake-induced landslides.

Buildout of the City's General Plan, including the Proposed Project, would increase the number of people and structures that could be exposed to potential effects related to seismic hazards such as groundshaking, liquefaction, settlement, or lateral spreading. This is considered a ***significant cumulative impact***. The Proposed Project's contribution would be ***cumulatively considerable***. Implementation of the CBC and General Plan policies, would reduce the cumulative impacts and the Proposed Project's contribution to cumulative impacts; however, to

fully mitigate the project's contribution to seismic-related hazards, project-specific mitigation would be required.

Mitigation Measure

Implementation of the following mitigation measure would reduce this impact to a *less-than-considerable level*.

5.1-23 *Implement Mitigation Measure 4.12-1(a) and (b).*

<u>Hazards and Human Health</u>

5.1-24 Cumulative development, including the Proposed Project, could expose people to unidentified soil or groundwater.

For any projects in the City of Vacaville General Plan area that would involve development or redevelopment of an existing site in which soil or groundwater contamination may have occurred, the potential exists for release of hazardous materials during construction and/or remediation of those sites. For individuals not involved in construction activities, the greatest potential source of exposure to contaminants would be airborne emissions, primarily through construction-generated dust (see Section 4.6, Air Quality). Other potential pathways, such as direct contact with contaminated soils or groundwater would not pose as great a risk to the public because such exposure scenarios would typically be confined to the construction zones.

The project's contribution to exposure to unidentified contaminants in soil or ground water, in combination with other remediation projects in Vacaville, would result in a ***less-than-significant cumulative impact***. This conclusion is based on implementation of site-specific risk management controls and compliance with applicable laws and regulations pertaining to site cleanup and hazardous materials management at the other locations. Moreover, an individual who is directly outside the construction zone of one source would be unlikely to be exposed to maximum levels from another source. Such exposure would typically be site-specific and would involve accidental or inadvertent releases of soil or groundwater. Associated health and safety risks would generally be limited to those individuals working with soil or groundwater or to persons in the Specific Plan area and would not combine with similar effects elsewhere in the City's General Plan boundaries.

Nonetheless, implementation of applicable hazardous materials management laws and regulations adopted at the federal, State, and local level would ensure cumulative impacts related to development of known or potentially contaminated sites in the Proposed Project would be less than significant. These regulations include: Titles 29 of the CFR and 8 of the CCR, which address workplace safety. These regulations would be implemented through a variety of agencies including the regional OSHA office, DTSC, CalEPA, and the SCDEM.

Mitigation Measure

5.1-24 *None required.*

5.1-25 Cumulative development, including the Proposed Project, could result in cumulative impacts from increased risk related to the storage, uses, and disposal of hazardous materials.

The Proposed Project, in conjunction with cumulative development in the City of Vacaville, would include areas designated for commercial uses. Cumulative development would also include continued operation or development of new light-industrial uses or public/quasi-public facilities (e.g., sanitary sewer facilities). These types of development would increase the use of hazardous materials within the area, resulting in potential health and safety effects related to hazardous materials use. No other planning areas are directly adjacent to the Proposed Project.

Potential impacts associated with the Proposed Project would be largely confined to the golf course and the office and commercial areas. Such incidents would typically be site-specific and would involve accidental spills or inadvertent releases. Associated health and safety risks would generally be limited to those individuals using the materials or to persons in the immediate vicinity of the materials and would not combine with similar effects elsewhere in the City's General Plan boundaries. Therefore, the project's contribution would result in a ***less-than-significant cumulative impact***. (For a discussion of cumulative effects related to airborne toxic air contaminant emissions from commercial sources, please see Section 4.6, Air Quality).

Mitigation Measure

5.1-25 *None required.*

5.1-26 Cumulative development, including the Proposed Project, could result in a cumulative increase in hazardous materials transportation in the area, which could expose greater numbers of people to increased risks in the event of an inadvertent release or spill.

Development in the City of Vacaville, including the Proposed Project, would result in an increase in hazardous materials transportation in the area, which could expose greater numbers of people to increased risks in the event of an inadvertent release or spill. Stringent regulatory requirements apply to both common and special delivery carriers that would handle the deliveries and transport of hazardous materials to and from the project area. While these regulations do not eliminate the potential for truck accidents and resulting spills, it would reduce the frequency of occurrences and would limit the number of people that could be exposed. These regulations include: Titles 49 of the CFR and 26 of the CCR, which address the transportation of hazardous materials. These regulations would be implemented through a variety of agencies including the regional federal DOT office, California DOT, and the SCDEM. Implementation of applicable laws and regulations would ensure Proposed Project cumulative impacts associated with the transport of hazardous materials within the region would be ***less than significant***.

Mitigation Measure

5.1-26 *None required.*

5.1-27 Cumulative development, including the Proposed Project, would result in a cumulative increase in the number of people and structures which could be exposed to wildland fires.

Development in the City of Vacaville General Plan, including the Proposed Project, would result in an increase in the number of people and structures which could be exposed to wildland fires

along the City's borders where urban land interfaces with rural land. The City of Vacaville General Plan Policies 9.3-G1, -G2, -I1, -I2, -I3, and –I4 are used by the City to provide a safe environment for residents of the City, decrease the risk from fires (including wildland fires), and to provide a level of service sufficient for emergency response times. The City enforces the CBC and Uniform Fire Code (UFC) through the issuance of building permits and conditions of approval. Further, prior to the construction of any structures or communities, the City reviews project plans for conformance with the UBC and UFC to reduce risk of fires originating from within the City. As stated in Chapter 4.9, Public Services, the City Fire Department ensures that fire and emergency services are at levels that can provide sufficient services to reduce the risk of loss, injury, or death from wildland fires. Never the less, because buildout of the general plan would include increased development in areas susceptible to wild fire hazards, this is considered a ***significant cumulative impact***.

The Proposed Project would contribute to increased numbers of structures and people exposed to wild fire hazards. However, through implementation of the CBC, City General Plan police and Specific Plan policies, the project's contribution would ***not be considerable***.

Mitigation Measure

5.1-27 *None required.*

<u>Cultural Resources</u>

5.1-28 Cumulative development, including the Proposed Project, could result in the disturbance of previously identified or unidentified prehistoric sites or historic archaeological features, paleontological resources or previously unidentified human remains.

Development in the region (grading and excavation) could result in the damage or destruction of known prehistoric, historical and paleontological resources, as well as any existing undiscovered subsurface artifacts. The Vacaville area, including the Specific Plan area, contains both known prehistoric and historic cultural resources. The results of the records search and field investigation for the Proposed Project identified known prehistoric and historic resources that could be adversely affected, and therefore, could contribute to the loss of these resources. In combination with other development occurring within the City of Vacaville the potential loss of these resources could be considered a ***significant cumulative impact.***

Numerous laws, regulations, and statutes, on both the federal and state levels, seek to protect and target the management of cultural resources. These would apply to development under the City of Vacaville General Plan, including the Proposed Project. In addition, the City of Vacaville General Plan includes guiding and implementing policies to protect cultural resources from unnecessary impacts. These policies include inventory and evaluation processes and require consultation with qualified archaeologists in the event that previously undiscovered cultural materials are accidentally exposed.

As discussed previously in this section, grading and excavation activities could result in the damage or destruction of known prehistoric and historic, as well as paleontological resources. Due to the size of the Specific Plan area slated for development, and the limited number of prehistoric, historic, and paleontological resources the loss of these resources, relative to other development occurring within the city, would be considered ***cumulatively considerable***.

Mitigation Measures

Implementation of Mitigation Measures 4.14-1 through 4.14-3, and 4.14-6 would help to reduce the impact; however, the impact would remain *cumulatively considerable*.

5.1-28 *Implement Mitigation Measures 4.14-1, 4.14-2, 4.14-4, 4.14-6.*

Biological Resources

5.1-29 Cumulative development, including the Proposed Project, could adversely contribute to the cumulative loss of regional wildlife and habitat.

Lagoon Valley is one of a series of similar small valleys that occur in the eastern foothills of the Coast Ranges along the western side of the Central Valley, north of the Sacramento-San Joaquin Delta. A contiguous series of similar valleys extends along the foothills north of the Delta, to approximately Highway 20 in western Colusa and eastern Lake counties. These valleys provide a unique ecosystem along the eastern Coast Range foothill corridor for local and migratory wildlife as they represent interconnected islands of habitat diversity. In these islands of diversity, grasslands, oak and riparian woodlands, wetlands and open water habitats all occurring in close proximity provide a rich resource base for regional wildlife, not available in the Central Valley. It is the dispersion of these islands through the corridor that makes them valuable. They function as stepping stones of resources for wildlife traveling through the corridor. Similar habitats also occur along the foothills south of the Delta, but the relatively large expanse of low lying, flat Delta lands act as a significant barrier to many wildlife species that may travel along this corridor. Highways such as I-80, State Route 128 and State Route 20 bisect these foothills and create human access to these areas that focuses development in the population centers of Vacaville, Winters and the Capay Valley (e.g., Southtown and Reynolds Ranch). As development continues, the foothill corridor and its unique habitats become progressively fragmented, reducing their value to local wildlife species.

As development in the vicinity of the project site continues, more mobile species may be able to survive by moving to new areas, while less mobile species would be extirpated. However, with continued conversion of natural habitat to human use, the availability and accessibility of remaining natural habitats in this ecosystem would dwindle and those remaining natural areas would not be able to support additional plant or animal populations of above their current carrying capacities through increased competition for resources, displacement and development induced introduction of non-native species. Therefore, the loss of wildlife and wildlife habitat on a regional level would be a ***significant cumulative impact***.

Construction of the Proposed Project would contribute to fragmentation and loss of regional biodiversity through the incremental conversion of natural habitat to human use, and thus limit the availability and accessibility of remaining natural habitats to regional wildlife. Therefore, because the Proposed Project will involve the development of natural lands for human use in an area that is already subject to development from a number of other projects, the contribution to that loss from the Proposed Project would be ***considerable***.

Mitigation Measures

Although construction of the Proposed Project would result in a considerable contribution to the regional loss of wildlife habitat, this contribution would be reduced through mitigation. Partial mitigation for project related impacts has been accomplished through project designs to

preserve and/or enhance areas of natural habitat and retain movement corridors that will allow wildlife to pass through the site. However, even with these project design measures, some impacts would still remain and the projects contribution to the loss and fragmentation of this ecosystem would still be considerable. Therefore, implementation of the following mitigation measures would be required to reduce the magnitude of loss of wildlife, so this impact would *not be considerable*.

5.1-29 *Implement Mitigation Measures 4.15-1 through 4.15-10.*

The project design measures in combination with the above project level mitigation measures would reduce the projects contribution to the regional loss of wildlife habitat to less than considerable levels. The reduction in the levels of this impact would be accomplished through the preservation and enhancement of existing natural habitat on-site for resident wildlife, and by maintaining corridors through the site for wildlife to access and utilize resources at the site and allow for wildlife movement through the site to other areas in the region.

ENDNOTES

1. West Yost & Associates, *Project Report, Easterly Wastewater Treatment Plant Renovation & Expansion Facilities Plan,* July 7, 1998.

2. See *City of Vacaville, Standards of Response Cover Study (Volumes 1 and 2),* Draft Report, July 11, 2003.

5.2 GROWTH INDUCING IMPACTS

5.2 GROWTH INDUCING IMPACTS

To comply with CEQA, an EIR must discuss the ways in which the proposed project will affect economic and commercial growth in the vicinity of the project and how that growth will, in turn, affect the surrounding environment [CEQA Guidelines section 15126.2(d)]. Under CEQA, this growth is not to be considered necessarily detrimental, beneficial, or of significant consequence. Induced growth is considered a significant impact only if it affects (directly or indirectly) the ability of agencies to provide needed public services, or if it can be demonstrated that the potential growth, in some other way, significantly affects the environment.

Introduction to Growth Inducement Issues

Growth can be induced in a number of ways, including through the elimination of obstacles to growth, or through the stimulation of economic activity within the region. The discussion of the removal of obstacles to growth relates directly to the removal of infrastructure limitations (typically through the provision of additional capacity or supply) or the reduction or elimination of regulatory constraints on growth that could result in growth unforeseen at the time of project approval.

Elimination of Obstacles to Growth

The elimination of either physical or regulatory obstacles to growth is considered to be a growth-inducing effect. A physical obstacle to growth typically involves the lack of public service infrastructure. The extension of public service infrastructure, including roadways, water mains, and sewer lines, into areas that are not currently provided with these services would be expected to support new development. Similarly, the elimination or change to a regulatory obstacle, including existing growth and development policies, could result in new growth. In the case of the Specific Plan, all utilities extended or constructed as part of the project would be designed to serve only the Specific Plan area and any expansions of existing utilities would be only for the pro-rata incremental need of the project.

Economic Effects

<u>Increased Demand on Secondary Markets</u>

Development (residential or employment-generating uses) typically generates a secondary or indirect demand for other goods and services. The secondary or economic change can be quantified by an economic multiplier, which is an economic term used to describe inter-relationships among various sectors of the economy. One aspect of the multiplier effect is the potential catalytic force a project can have on satellite or follow-up development because it creates a demand or market to be served (e.g., neighborhood commercial development around residential development).

Increased Pressure on Land Use Intensification

Unforeseen future development can be spurred by the construction of certain projects that have the effect of creating unique and currently unmet market demands, or by creating economic incentive for future projects by substantially increasing surrounding property values. These types of impacts are most often identified for projects developed in areas that are currently lacking a full spectrum of economic activity. For example, newly developing office areas may be lacking in a full range of support commercial uses; this support commercial demand can cause increased pressure for rezones or general plan amendments aimed at providing adequate land to accommodate businesses seeking to serve the unmet demand.

Growth-Inducing Effects of the Proposed Project

Elimination of Obstacles to Growth

The construction of the proposed project would eliminate some existing obstacles to growth. The standard scenario for eliminating an obstacle to growth involves the extension or provision of utility or service to an area that was not previously served. For example, the extension of a water main into an area where growth has been prohibited because of lack of domestic water service may be considered growth inducing if there is excess capacity in the water main to serve more than planned growth. Limited utilities distribution and collection infrastructure currently exists in the Specific Plan area. Implementation of the proposed project would include the extension of new and/or additional water, electrical and natural gas distribution infrastructure, and wastewater and storm drainage collection infrastructure. Under Sewer Option 2, a sewer main would be extended across I-80 into unincorporated, private lands.

The existing City land use plan involved approval for expansion of both freeway interchanges in Lagoon Valley and the extension of major roadways to the area west of I-80. The proposed Specific Plan does not include expansion of freeway overcrossings or extension of new roadways west of I-80.

Increased Demand on Secondary Markets

The proposed project would bring new residential, business village, commercial and recreational uses to the City of Vacaville. These uses would bring residents and employees to the area and could create an economic incentive for future projects by substantially increasing surrounding property values. In general, an additional dollar spent in the county for these goods and services is re-spent on additional goods and services (due to the "multiplier" effect). Therefore, the anticipated increase in spending on secondary and support services could increase growth pressures in the region.

In 1990, the City of Vacaville approved the Lower Lagoon Valley Policy Plan (1990 Policy Plan), together with an associated rezoning and general plan amendment, to allow the development of approximately 7 million sf of office/medical/commercial space, 730 residential units, and a golf course. Implementation of the proposed project would include construction of approximately one million sf of business village/commercial uses, 1,325 residential units and a golf course. The proposed project would reduce the land designated for business village/commercial and would increase the land designated for recreation and open space. The proposed project would add approximately 3,750 residents compared to approximately 2,066. However, the project would generate substantially fewer employees. Therefore, the proposed project would have

less of an effect on secondary markets than if the project site were developed under the City General Plan.

Increased Pressure on Land Use Intensification

The proposed project would result in the construction of employment generating uses, such as retail, commercial, business village, and recreational uses on the project site. Nearby properties are not developed in established uses, and could be subject to increased development pressures as a result of the implementation of the proposed project. The majority of land surrounding the Specific Plan area is privately owned, undeveloped hillside land to the east, north, and south. It is possible that the development of this project could increase the pressure on the City of Vacaville to intensify the land use designations and zoning on adjacent or nearby properties.

Summary

The proposed project could induce growth through the extension of infrastructure (water, wastewater, electricity and natural gas, roadways, storm drainage) to an area that is has limited facilities. The proposed project would also add 3,750 new residents to the City of Vacaville.

The City of Vacaville's Planned Growth Ordinance (PGO) was established to ensure that the City's infrastructure and services are capable of serving new residential growth. On an annual basis, the City Council reviews a status report that provides a level of service analysis for infrastructure and services including sewer, water and traffic. The PGO includes a requirement that a base inventory of up to 1,000 units within approved and un-built projects be maintained on an annual basis. Units that have building permit allocations and/or are eligible to be issued permits at any time make up the 1,000-unit inventory. The allocation process provides a mechanism to maintain the 1,000 un-built unit base inventory. As the inventory falls below 1,000 units, new projects are added through the recording of a final map or through City Council approval of allocations following approval of a planned development. The Council maintains the flexibility to grant allocations over the 1,000 un-built units. The number of units (or the equivalent) to be developed under the Specific Plan was established consistent with the PGO (see Table 3-2 in Chapter 3, Project Description). Because the density of the proposed project is less that current allowable development in the City of Vacaville General Plan, and project phasing would be accomplished consistent with the PGO, growth-inducing impacts would be less-than-significant.

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL EFFECTS

5.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL EFFECTS

Under CEQA, an EIR must analyze the extent to which a project's primary and secondary effects would commit resources to uses that future generations will probably be unable to reverse [CEQA Guidelines section 15126.2(c); 15127].

Implementation of the proposed project would result in the long-term commitment of resources of the project site to urban land use. The proposed project would likely result in or contribute to the following irreversible environmental changes:

- Conversion of existing undeveloped land to urban land uses, thus precluding other alternate land uses in the future.
- Increased ambient noise.
- Conversion of existing habitat and irreversible loss of wildlife.
- Irreversible commitment of municipal resources to the provision of services and operations of infrastructure for future urban and suburban development.
- Irreversible consumption of goods and services associated with the future population.
- Increased traffic volumes on existing roadways and the establishment of roads in areas not presently provided with vehicular access.
- Degradation of air quality.
- Irreversible consumption of energy and natural resources associated with the future population.
- Possible demand for and use of goods, services, and resources for this project to the exclusion of projects in other locations.

These irreversible impacts, which are unavoidable consequences of urban growth, are discussed in Sections 4.2 through 4.15 of this Draft EIR.

5.4 SIGNIFICANT AND UNAVOIDABLE IMPACTS

5.4 SIGNIFICANT AND UNAVOIDABLE IMPACTS

The following is a summary of significant and unavoidable impacts identified in the technical sections of this EIR. For a complete discussion of each impact, please refer to Sections 4.2 through 4.15.

4.2-6 Development of the Proposed Project would convert Important Farmland to developed use.

4.3-2 Proposed project would create additional demand necessitating the construction or expansion of existing recreational facilities, which might have an adverse physical effect on the environment.

4.3-3 Proposed project could increase use of existing park facilities such that substantial physical deterioration of the facility could occur or be accelerated.

4.4-1 Implementation of the Proposed Project would alter scenic vistas and the visual character of scenic resources.

4.4-2 Implementation of the Proposed Project would alter the existing visual character of the Lower Lagoon Valley.

4.4-3 The Proposed Project would create new sources of light which could adversely affect nighttime views of the Specific Plan area.

4.5-3 Project-generated traffic would cause freeway segment LOS to degrade to unacceptable levels on Interstate 80 in 2025.

4.5-4 Project-generated traffic would cause one freeway ramp to degrade from acceptable to unacceptable LOS in 2025.

4.5-5 Traffic generated by the Proposed Project would cause LOS at diverge locations near freeway off-ramps to degrade to unacceptable levels in 2025.

4.6-1 Construction activities associated with the Proposed Project could generate substantial air pollutant emissions.

4.6-2 Daily operation of the project could generate substantial air pollutant emissions.

4.6-6 Implementation of the Proposed Project could release objectionable odors at the proposed manholes along the sewer main downstream of the pump station.

4.7-1 Construction activities associated with the Proposed Project development could generate temporary or periodic noise levels that exceed City standards.

4.7-2 Construction activities associated with the Proposed Project development could generate and expose persons to excessive groundborne vibration levels.

5.1-1 Cumulative development, including the Proposed Project, would result in the conversion of Important Farmland (Prime and Unique) to developed uses.

5.1-3 The Proposed Project would contribute to a cumulative alteration of aesthetic characteristics of the Lower Lagoon Valley region of Vacaville by increasing urban development in existing rural and undeveloped natural areas.

5.1-4 Cumulative development, including the Proposed Project, could contribute to an increase in nightlighting and overall light in this area of the City.

5.1-5 Cumulative traffic, including the Proposed Project, would result in further reductions in volume-to-capacity ratios at the Alamo Drive and Merchant Street intersection in the AM peak hour and at the North Texas Street/Manuel Campos Parkway intersection in 2025 in the AM and PM peak hours.

5.1-6 Cumulative traffic, including the Proposed Project, would result in further reductions in V/C ratios on the eastbound I-80 freeway segment between the Alamo Drive overcrossing and the Cherry Glen/Peña Adobe overcrossing in the PM peak hour in 2025.

5.1-7 Cumulative traffic, including the Proposed Project, would result in further reductions in V/C ratios on the Alamo Drive / Merchant Street ramps to I-80 in the AM and PM peak hours.

5.1-8 Cumulative traffic, including the Proposed Project, would further reduce the V/C ratio at the diverge from I-80 to the Alamo Drive / Merchant Street off-ramp.

5.1-28 Cumulative development, including the Proposed Project, could result in the disturbance of previously identified or unidentified prehistoric sites or historic archaeological features, paleontological resources or previously unidentified human remains.

6. ALTERNATIVES

6. ALTERNATIVES

6.1 INTRODUCTION

The primary intent of the alternatives evaluation in an EIR, as stated in Section 15126.6 (c) of the State CEQA Guidelines, is to ensure that "the range of potential alternatives to the Proposed Project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects." CEQA Guidelines Section 15162.6(b) states that 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 feasibility of an alternative may be determined based on a variety of factors including, but not limited to, site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and site accessibility and control (CEQA Guidelines Section 15126.6(f)(1)).

The choice of alternatives is guided primarily by the need both to reduce or eliminate project impacts and to achieve project objectives. The objectives of the project were used to identify appropriate alternatives. As stated in Chapter 3, Project Description, the City's objectives are to:

- Promote the City's Economic Development Strategy.
- Support the City's Strategic Plan goals.
- Provide land use planning policies that promote the development of a high quality development program consistent with the unique nature of the Lower Lagoon Valley area:
    - Develop a land use plan that would achieve a superior quality residential environment, including the City's stated goal of providing location(s) for "executive housing" projects and of integrating a golf course into a residential development within Lower Lagoon Valley;
    - Provide a location for high-end employment centers;
    - Provide for open space and resource preservation within the development area; and
    - Provide a land use program for Lower Lagoon Valley that addresses current land use needs within the City.
- Protect and enhance the unique physical characteristics of the Lower Lagoon Valley area within the City of Vacaville:
    - Create a land use plan that is compatible with the goals of the City's General Plan with respect to preservation of hillside open space areas, scenic views from surrounding areas and local roadways, and preservation of the recreational qualities of the existing Lagoon Valley Regional Park;

  - Promote the improvement of Lagoon Valley Regional Park and protection of the lake; and
  - Ensure public access to open space and recreational areas.

- Develop a land use program that is financially feasible without negatively affecting existing City resources or the provision of services to existing neighborhoods.

- Promote the development of diverse housing types within the City's residential development areas.

6.2 ALTERNATIVES ANALYZED

This section provides a description of the alternatives to the Proposed Project analyzed in this EIR and presents how specific impacts differ in severity from those associated with the project. For the most part, potentially significant impacts of the alternatives can be mitigated by measures identified in Chapter 4, which contains the environmental analysis of the Proposed Project.

The City of Vacaville may adopt an alternative in lieu of the Proposed Project, and this chapter is intended to assist decision-makers in their assessment of appropriate use of the project area. As such, the six alternatives that are analyzed in this EIR, in addition to fulfilling the requirements of CEQA, provide policy options for development of the project area. Alternatives evaluated in this EIR are:

- **Alternative 1: No Project/No Development Alternative** -assumes the site would remain under its current condition and that no development would occur.

- **Alternative 2: 1990 Policy Plan/No Action Alternative** - assumes that the Proposed Project area would be developed consistent with the land uses, zoning, and development intensities identified in the 1990 Lower Lagoon Valley Policy Plan.

- **Alternative 3: No Golf Course Alternative** – the 213-acre golf course and supporting facilities would not be developed as part of the project and the acreage would remain as undeveloped open space. All other project elements would remain the same.

- **Alternative 4: Decreased Residential Alternative** - assumes that fewer residential units would be developed as part of the Proposed Project. This alternative would consist of development of 730 units on 523 acres (compared to 1,325 units on 523 acres under the Proposed Project). All other project elements would remain the same.

- **Alternative 5: Increased Commercial Use Alternative** - assumes there would be 33 acres of Office/Business Village (388,500 sf) and 57 acres of Highway Commercial (661,500 sf) (as compared to approximately 90 acres of Office/Business Village (1,050,000 sf) for the Proposed Project). All other project elements would remain the same.

- **Alternative 6: Off-Site Alternative** – approximately 736 acres in the Vaca Valley/Rodgers Lane Area north of and adjacent to the City limits would be developed with residential (1,325 units on 523 acres, inclusive of the proposed school site and 10,000 sf Village Center) and golf course uses (213 acres). The 90 acres of Office/Business Village (1,050,000 sf) would be developed consistent with the Proposed

Project in the Proposed Specific Plan area. The remainder of the Specific Plan area (approximately 2,264 acres) would remain in its current condition. Any future development of the Specific Plan area would be limited to rural subdivisions and/or small-scale commercial not requiring connection to City services such as water and sewer consistent with existing zoning.

Development by land use designation for each of the alternatives is shown in Table 6-1. Each of the alternatives is described in more detail and analyzed below. The following discussion describes the impacts for the Proposed Project compared to the alternative by issue area. Table 6-2 summaries whether the impacts of the development alternatives are more or less severe than those of the Proposed Project. A discussion of the environmentally superior alternative appears at the end of this chapter.

Alternative 1: No Project/No Development Alternative

Under the No Project/No Development Alternative, the project site would remain as is. Existing scattered residences, undeveloped parcels under individual ownership, and commercial uses (e.g., Hines Nursery) would remain. A General Plan Amendment and Rezone would not be required. No off-site sewer lines would be constructed.

No money would be provided to fund improvements to the Lagoon Valley Regional Park or other City projects. Therefore, park improvements anticipated under the existing or proposed Regional Park Master Plan could occur; however, the City would need to find an alternative funding source to cover the developer-funded portion of the improvements (4 to 5 million dollars). The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process because these improvements would occur as part of a future, as of yet undefined project.

No other infrastructure improvements (roads, power, cable TV, etc.) would occur.

Land Use and Planning

Under the No Project/No Development Alternative, no development would occur, so there would be no land use incompatibilities. There would also be no conversion of prime agricultural land. Therefore, compared to the Proposed Project, no land use or planning impacts would occur.

Parks and Recreation

With implementation of the No Project/No Development Alternative, the project area would remain as is and there would be no increase in population; and therefore, no associated increase in demand for park facilities due to the project. Therefore, compared to the Proposed Project, no parks recreation impacts would occur.

While there would be no increase demand on Lagoon Valley Regional Park facilities, there would also be no developer provided funding and maintenance of improvements for the park. The City would need to find an alternative funding source to cover the planned portion of the improvements and future maintenance.

TABLE 6-1

LAND USE COMPARISON

Land Use	Proposed Project	No Project/No Development Alternative	No Project/1990 Policy Plan/No Action Alternative	No Golf Course Alternative	Decreased Residential Alternative	Increased Commercial Alternative	Off-Site Alternative
Business Village							
Acres	88	-	321	90	90	33	90
Square Feet	1,050,000[1]	-	4,200,000	1,050,000	1,050,000	388,500	1,050,000
Residential							
Acres	523[2]	-	430	523	523	523	523
Number of Units	1,325	-	730	1,325	730	1,325	1,325
Golf Course							
Acres	213	-		-	213	213	213
Square Feet	17,000[3]	-		-	17,000	17,000	17,000
LV Regional Park							
Acres	388	-	388	388	388	388	388
Square Feet	-	-		-	-	-	-
Open Space							
Acres	1,066	-	993	1,279	1,066	1,066	1,855
Square Feet	-	-	-	-	-	-	-
Buffer							
Acres	55	-		53	53	53	-
Square Feet	-	-		-	-	-	-
Highway-Related Commercial							
Acres	-	-	70	-	-	57	-
Square Feet	-	-	910,000	-	-	661,500	-

1 Includes up to 50,000 square feet of neighborhood serving commercial uses; 1-acre fire station site (5,000 sf)
2 10,000 sf Village Center; 12-acre school/park
3 10,000 sf clubhouse with

TABLE 6-2

ALTERNATIVES COMPARISON

Issue Area	No Project/No Development Alternative	1990 Policy Plan/No Action Alternative	No Golf Course Alternative	Decreased Residential Alternative	Increased Commercial Alternative	Off-Site Alternative
4.2 Land Use and Planning	NI	+	-	-	+	+
4.3 Parks and Recreation	NI	0	0	-	0	0
4.4 Visual Resources	NI	+	-	-	0	0
4.5 Transportation and Circulation	NI	+	-	-	+	+
4.6 Air Quality	NI	+	-	-	+	+
4.7 Noise	NI	+	-	-	+	+
4.8 Public Utilities	NI	+	-	-	0	+
4.9 Public Services	NI	+	-	-	0	0
4.10 Water Supply	NI	+	-	-	0	0
4.11 Hydrology, Drainage and Water Quality	NI	+	-	-	0	-
4.12 Geology and Soils	NI	+	-	-	0	-
4.13 Hazards and Human Health	NI	+	-	-	-	0
4.14 Cultural Resources	NI	0	-	0	0	0
4.15 Biological Resources	NI	+	-	0	0	0

NI No Impact Compared to the Proposed Project
"+" More severe when compared to the Proposed Project
"-" Less severe when compared to the Proposed Project
"0" No change when compared to the Proposed Project

Visual Resources

Under this alternative, the Lower Lagoon Valley Project area would remain in its current limited developed use (primarily open space and grazing land with limited residential and commercial use). The visual character of Lower Lagoon Valley area would remain unaltered, and no new sources of light and glare would be introduced. No plans to maintain a view corridor from I-80 to Lagoon Valley Park and the lake would be necessary. Therefore, compared to the Proposed Project, no visual resource impacts would occur.

Transportation and Circulation

Under the No Project/No Development Alternative, no new trips would be generated so there would be no impact on intersection, roadway segment or ramp operation LOS. In addition, there would be no increase in demand for transit services, and the need for additional emergency vehicle ingress and egress routes would not occur. Therefore, compared to the Proposed Project, no transportation and circulation impacts would occur.

Air Quality

With implementation of the No Project/No Development Alternative, the project area would remain undeveloped. Therefore, no fugitive dust or other emissions would be generated by construction activities such as grading and trenching. Furthermore, because the Specific Plan area would contain substantially less development that would not change compared to existing conditions, no stationary source or mobile source emissions would be generated because no new buildings would be built and no new vehicle trips would be generated. No new sources of toxic air contaminants would be developed, and sensitive receptors would not be exposed to TAC emissions. Therefore, compared to the Proposed Project, no air quality impacts would occur.

Noise

Because there would be no traffic generated, there would not be an increase in traffic noise under the No Project/No Development Alternative. Similarly, there would be no increase in construction noise or stationary sources of noise in the Lower Lagoon Valley area. Therefore, compared to the Proposed Project, noise impacts would occur.

Public Utilities

Under the No Project/No Development Alternative, there would be no new development and no increase in population in the Specific Plan area. Therefore, there would be no associated increase in demand for public utilities, including wastewater, electricity and natural gas, and cable TV. No new utility infrastructure, such as sanitary sewer gravity lines, or power distribution infrastructure, required to meet project demand, would be installed. Therefore, compared to the Proposed Project, no utility services impacts would occur.

Public Services

With implementation of the No Project/No Development Alternative, the project area would remain as is and there would be no increase in population. Therefore there would be no increased demand for public services, including police and fire protection, schools, and solid

waste. Therefore, compared to the Proposed Project, no public service impacts would occur. A new fire station, proposed as part of the Proposed Project to help meet local and city-wide fire service demand would not be constructed or operated as required under the Proposed Project.

Water Supply

Under the No project/No Development Alternative, there would be no new development and no increase in population. Therefore, there would be no increase in demand for water supply and distribution infrastructure. Therefore, compared to the Proposed Project, no water supply impacts would occur.

Hydrology, Drainage and Water Quality

No development would take place under the No Project/No Development Alternative that could increase rates and amount of runoff or contribute to water quality conditions. No impacts associated with peak flow runoff, drainage infrastructure capacity, exposure to flooding, changes in groundwater recharge, or construction and post-development water quality identified for the Proposed Project would occur. Therefore, compared to the Proposed Project, no hydrology and water quality impacts would occur.

Geology and Soils

With implementation of the No Project/No Development Alternative, the project area would remain undeveloped. There would be no exposure of people or structures to potential risk associated with seismic activity (groundshaking, liquefaction), and landslide hazards. Because there would be no new development, no construction activities such as grading and trenching would occur and there would be no increase in the rate of erosion. Under this alternative, the landscape berm would not be constructed and there would be no associated potential for slope instability associated with this feature. Therefore, compared to the Proposed Project, no geology and soils impacts would occur.

Hazards and Human Health

Because no development would occur under the No Project/No Development Alternative, no impacts related to the use, transport and disposal of hazardous materials would occur. The potentially significant impact related to encountering soil contamination during site development would be avoided because the property would remain undisturbed. No new structures and population would be added to Lower Lagoon Valley when compared to the Proposed Project; therefore, there would be no increased risk of exposure to wildland fires. Therefore, compared to the Proposed Project, no hazardous and human health impacts would occur.

Cultural Resources

With implementation of the No Project/No Development Alternative, the project area would remain undeveloped and no earth disturbing activities would occur. Therefore, disturbance to any prehistoric sites, archaeological or historic features associated with the Peña Adobe or any unknown cultural resources as identified in the Proposed Project would not occur. Therefore, compared to the Proposed Project, no cultural resource impacts would occur.

Biological Resources

Under the No Project/No Development Alternative, no development is proposed and there would be no need for grading or other ground disturbing activities. Additionally, there would not be an increase in human access to the site or a change from an open space area to an urban area. Therefore, compared to the Proposed Project, no biological resource impacts would occur.

Comparison to Project Objectives

Implementation of the No Project/No Development Alternative would not achieve any of the objectives that the City has adopted for Lower Lagoon Valley because it proposes no development program.

Alternative 2: 1990 Policy Plan/No Action Alternative

Under the 1990 Policy Plan/No Action Alternative, the project site would be developed consistent with the land uses, zoning, and development intensities identified and approved in the 1990 Policy Plan (see Table 6-1). This is the City's current adopted land use plan for Lower Lagoon Valley. There would be a primary view and landscape corridor to allow views into and across the valley. This alternative would include the following components:

Residential: Residential uses surrounding an 18-hole tournament-level golf course would be developed on 430 acres on the Hines Nursery site and agricultural land to the south. There would be 730 single-family residential units at 1 to 2 du/acre. An additional 10 acres would include a 12,500-square-foot private recreation club at the golf course. A school would not be developed for this alternative; instead, children would be bused or otherwise transported outside of the Specific Plan area to local schools.

Office/Business Park: Approximately 321 acres would be parcelized to serve multiple or major users for office or business park development, including a 49-acre medical complex with a hospital and medical offices. The Office/Business Park uses would occupy approximately 3.5 million square feet, and the medical complex would be approximately 700,000 square feet. Building heights would be limited to two to three stories and a 0.3 FAR.

Highway-Related Commercial: Approximately 70 acres adjacent to I-80 would include a hotel, region-serving commercial uses, and/or local-serving uses such as grocery stores and convenience stores. Approximately 910,000 square feet would be developed for these uses.

Parks and Open Space: There would be a six-acre neighborhood park. Approximately 993 acres surrounding the project site would remain as open space, and Lagoon Valley Regional Park would remain.

Hydrology: Potable water and storm drainage connections to the City system would be as described for the Proposed Project. Wastewater would be conveyed via a gravity line (Option 2 identified for the Proposed Project). Irrigation water for the golf course would be from the Solano Irrigation District.

Transportation and Circulation: Implementation of the 1990 Policy Plan/No Action Alternative would require improvements to the Lagoon Valley Road intersection, including widening the overpass at I-80 to six lanes and possibly an auxiliary lane on I-80 westbound. New Peña

Adobe Road connections to I-80 could also be required. Such improvements would occur within Caltrans ROW.

Identical to the Proposed Project, the developer would provide funds towards improvements to Lagoon Valley Regional Park. Therefore, park improvements anticipated under the existing or the proposed Regional Park Master Plan could occur. The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process because these improvements would occur as part of a future, as yet undefined project.

Land Use and Planning

Under Alternative 2, residential, office/business village, and commercial uses and a golf course would be developed consistent with existing General Plan land use policies and zoning designations. Similar to the Proposed Project, Alternative 2 would result in the construction of developed uses adjacent to existing agricultural and open space lands, and Lagoon Valley Regional Park. Identical to the Proposed Project, potential incompatibilities would be less than significant. Alternative 2 includes the construction and operation of fewer residential units but substantially more office/business village/highway commercial uses when compared to the Specific Plan. Compared to the Proposed Project, potential incompatibilities between these uses would be less than significant, but potentially more severe unless adequate buffering is provided. Because this alternative includes development consistent with current City General Plan zoning, no impact to land use would occur due to inconsistencies with existing plans, policies and regulations. Identical to the Proposed Project, this alternative would result in the conversion of Prime and Unique Farmland to developed uses.

Therefore, the 1990 Policy Plan/No Action Alternative would result in similar land use and planning impacts; however, they would be more severe when compared to the Proposed Project.

Parks and Recreation

The 1990 Policy Plan/No Action Alternative would result in a total population increase of approximately 2,066 residents (1,684 less than with the Proposed Project). Using the factor of 4.5 acres of parkland per 1,000 residents, this alternative would result in the need for 9.3 acres of parkland compared to 17 acres with the Proposed Project. Alternative 2 would result in more employees potentially using existing park facilities when compared to the Proposed Project. Therefore, this alternative would result in an increased demand for park facilities and increased use of Lagoon Valley Regional Park, (by residents and employees). Identical to the Proposed Project, neighborhood park facilities would be constructed and the developer would provide funds towards improvements to Lagoon Valley Regional Park in addition to contributing to the Park and Recreational Development Impact Fee. Identical to the Proposed Project, the construction of off site infrastructure could result in short-term disruption of recreational facilities.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in identical parks and recreation impacts.

Visual Resources

Identical to the Proposed Project, Alternative 2 would result in a significant adverse affect on the scenic vista that travelers along I-80 have into Lower Lagoon Valley. Alternative 2 would also result in a significant and unavoidable change to the existing visual character of the valley

because it would develop a currently primarily undeveloped area. However, the change in visual character would be more severe when compared to the Proposed Project because the 1990 Policy Plan/No Action Alternative retains less undeveloped open space.

The 1990 Policy Plan/No Action Alternative would allow more business professional development than the Proposed Project; therefore, it could result in more sources of light. Similar to the Proposed Project, this impact would be significant; however, it would be more severe. Mitigation measures to minimize light and glare impacts would be required (Mitigation Measure 4.4-3).

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar visual resource impacts, but they would be more severe.

Transportation and Circulation

Under the 1990 Policy Plan/No Action Alternative, fewer residential dwelling units (595) and over 3 million more sf of office/business village/commercial highway uses would be developed. Therefore, more trips would be generated under Alternative 2 when compared to the Proposed Project. As a result, intersections, roadway segments, freeway ramp capacity, and freeway merge and diverge LOS that were identified as operating at an unacceptable levels with the project would continue to operate at unacceptable levels and the impact would be more severe. Identical to the Proposed Project, mitigation measures for improvements would be required to improve operating conditions (Mitigation Measures 4.5-1 through 4.5-5). Under the approved plan, both interchanges would require substantial reconstruction.

Identical to the Proposed Project, adequate on-site emergency access would need to be provided as would adequate transit service.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar transportation and circulation impacts, but they would be more severe and would require greater construction of new roadway facilities.

Air Quality

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project. Therefore, construction-related air quality impacts would also be similar. Identical to the Proposed Project, construction-related air quality impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-1).

Alternative 2 would generate more vehicle trips. Vehicle emissions would also be greater when compared to the Proposed Project. Similar to the Proposed Project, stationary area source emissions would be generated. Identical to the Proposed Project, this impact would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-2); however, it would be more severe because more office/business village/highway commercial uses would be operated. Similarly, exposure to TAC would be less than significant but more severe. Identical to the Proposed Project, odors could be generated along wastewater collection system facilities.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar air quality impacts, but they would be more severe.

Noise

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project. Therefore, construction-related noise impacts would also be similar. Identical to the Proposed Project, construction-related noise impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.7-1 and 4.7-2).

Alternative 2 would generate more vehicle trips. Vehicle generated noise would also be greater when compared to the Proposed Project. Operation of uses under Alternative 2 could result in exposure of sensitive existing and proposed residential and other land uses to nose in excess of City standards. Under the 1990 Policy Plan/No Action Alternative, fewer residential dwelling units (595) would be occupied when compared to the Proposed Project. However, over 3 million more sf of office/business village/commercial highway uses would be developed. Because Alternative 2 would result in more vehicle trips, there would be greater associated noise levels when compared to the Proposed Project. Implementation of measures would ensure that sensitive land uses were constructed so they were not exposes to noise levels in excess of standards (Mitigation Measure 4.7-3).

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar noise impacts, but they would be more severe.

Public Utilities

Under the 1990 Policy Plan/No Action Alternative, fewer residential dwelling units (595) would be occupied when compared to the Proposed Project. However, over 3 million more sf of office/business village/commercial highway uses would be developed. Therefore, the demand for wastewater collection and treatment facilities, and electricity and natural gas supply and distribution facilities would be greater when compared to the Proposed Project. Identical to the Proposed Project, new wastewater collection facilities would need to be constructed because Lower Lagoon Valley currently has limited service.

Identical to the Proposed Project, the increased demand for electricity and natural gas could be met; however, additional distribution facilities would be required. Identical to the Proposed Project, any distribution facilities would be accomplished consistent with PG&E and City requirements. Similarly, increased demand for cable television infrastructure would be met consistent with City requirements.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar public utilities impacts, but they would be more severe.

Public Services

Implementation of Alternative 2 would result in approximately 1,684 fewer residents. However, over 3 million more sf of office/business village/commercial highway uses would be developed and, therefore, more employees would be located in Lower Lagoon Valley when compared to the project. Therefore, there would be an increased demand for police and fire protection services. The demand for police protection services would be less when compared to the Proposed Project because there would be fewer residents. However, identical to the Proposed Project, impacts would be significant unless the office/business village/commercial highway uses include the integration of features to maximize public safety (Mitigation Measure 4.9-1).

Impacts on fire protection services would be greater when compared to the Proposed Project because the 1990 Policy Plan/No Action does not include construction of a new fire station and this alternative would include construction of more structures when compared to the Proposed Project.

Solid waste demand could be met by current facilities, but because more office/business village/commercial highway uses would be constructed, the demand would be greater when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar public service impacts, but they would be more severe.

Water Supply

Under the 1990 Policy Plan/No Action Alternative, fewer residential dwelling units (595) would be occupied when compared to the Proposed Project. However, over 3 million more sf of office/business village/commercial highway uses would be developed. Therefore, the demand for water supply distribution and treatment facilities would be greater when compared to the Proposed Project. The increased demand for water generated by development of Alternative 2 would be greater, but it could be met, and similar to the Proposed Project, potable and non-potable water distribution system improvements would be required (Mitigation Measures 4.10-1 through 4.10-4).

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar water supply impacts, but they would be more severe.

Hydrology, Drainage and Water Quality

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project. Therefore, the increase in storm water run off would also be similar. Therefore, the 1990 Policy Plan/No Action Alternative would result in a similar need to develop drainage collection infrastructure and similar associated increases in sedimentation and urban contaminant water quality impacts. Identical to the Proposed Project, measures to ensure that sufficient drainage facilities are designed and constructed (Mitigation Measure 4.11-1) and measures to protect receiving water quality (Mitigation Measure 4.11-3) would be required.

Identical to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in development in the designated flood plain; however, because there would be more sf developed, this impact would be more severe. Implementation of Mitigation Measure 4.10-2 would reduce risk associated with the 100-year flood plain hazard to a less-than-significant level. Development of the 1990 Policy Plan/No Action Alternative would result in more severe potentially significant exposure to dam failure inundation and seiche activity. Mitigation Measures 4.10-5 and 4.10-6 would ensure that people and structures would be protected from flooding associated with dam failure and seiche activity.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar hydrology and water quality impacts, but they would be more severe.

Geology and Soils

Under the 1990 Policy Plan/No Action Alternative, fewer residential dwelling units (595) would be occupied when compared to the Proposed Project. However, over 3 million more sf of office/business village/commercial highway uses would be developed. Therefore, Alternative 2 would result in the exposure of more people or structures and/or infrastructure to potential risk associated with: seismic activity (groundshaking, liquefaction); landslide hazards; and/or unstable soil conditions. Implementation of Mitigation Measures 4.11-1, and 4.11-3 through 4.11-6 would ensure that project design incorporates required construction techniques to minimize risks to a less-than-significant levels.

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project and; therefore, construction activities associated with this alternative such as grading and trenching would result in a similar increased rate of erosion. Mitigation Measure 4.11-2 would minimize erosion impacts.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar geology and soils impacts, but they would be more severe.

Hazards and Human Health

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project and; therefore, the risk of exposure to previously unidentified soil contaminants would be the same. Implementation of Mitigation Measure 4.12-3 would ensure that this potentially significant impact would be reduced to a less-than-significant level by ensuring that previously unidentified hazards are identified and remediated.

Under the 1990 Policy Plan/No Action Alternative, over 3 million more sf of office/business village/commercial highway uses would be developed. Therefore, Alternative 2 would result in more transport, use or disposal of hazardous materials. Because no school would be developed, there would be no impact associated with the construction and/or operation of an elementary school. Because fewer residential dwelling units would be developed, the exposure of residents to wildland fires would be less.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar hazards and human health impacts, but they would be more severe.

Cultural Resources

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project and; therefore, the potential to disturb known prehistoric and historic archaeological features, unidentified prehistoric and/or historic resources, paleontological resources, and/or human remains would be identical to the Proposed Project. Identical to the Proposed Project, these impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.14-1, 4.14-2, 4.14-3, 4.14-5, and 4.14-6 which would ensure that cultural resources are identified and either avoided and/or subject to scientific recovery and evaluation. Identical to the Proposed Project, trenching for the proposed sewer line option 2 could result in a significant impact to the Peña Adobe due to ground vibration. Implementation of Mitigation Measure 4.14-4 would ensure that vibration impacts are reduced to a less-than-significant level.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in identical impacts to cultural resources.

Biological Resources

A similar amount of area would be developed under Alternative 2 compared to the Proposed Project and; therefore, the potential to adversely contribute to the loss of wetlands, vernal pool habitat, Swainson's hawk and other nesting raptors and their habitat, Valley elderberry and its habitat, longhorn beetles and their habitat, western pond turtles and their habitat, rare plant populations and their habitat, oak woodland/savannah and other protected trees, riparian habitat, loggerhead shrike and its habitat would be similar. Identical to the Proposed Project, the significant impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.15-1 – 4.15-11. However, Alternative 2 would not provide mitigation for wetland/riparian areas associated with the Proposed Project golf course construction.

Therefore, compared to the Proposed Project, the 1990 Policy Plan/No Action Alternative would result in similar impacts to biological resources, but they would be more severe.

Comparison to Project Objectives

Implementation of the 1990 Policy Plan/No Action Alternative would achieve most of the project objectives. Because Alternative 2 includes development of less open space, it would not fully achieve the City's objective of providing for open space and resource preservation within the development area.

Alternative 3: No Golf Course Alternative

Under the No Golf Course Alternative, the 213-acre golf course and supporting facilities (including the 10,000 sf clubhouse with offices, pro shop, restaurant and meetings rooms, and 7,000 sf maintenance facility) would not be developed. Irrigation water from the Solano Irrigation District would only be provided to Lagoon Valley Regional Park and major project landscape areas. The area that would have been developed with the golf course would remain undeveloped open space. Therefore, this alternative would have 1,279 acres of Open Space compared to 1,066 with the Proposed Project. All other project elements would be the same as the Proposed Project (see Table 6-1).

Identical to the Proposed Project, the developer would provide funds towards improvements to Lagoon Valley Regional Park. Therefore, park improvements anticipated under the existing or the proposed Regional Park Master Plan would occur. Any dredging of the lake would occur at the City's discretion. The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process because the improvements would occur as part of a future, as yet undefined project.

Land Use and Planning

Alternative 3 would result in the construction of developed uses adjacent to existing agricultural and open space lands, and Lagoon Valley Regional Park. Identical to the Proposed Project, potential incompatibilities would be less than significant. Alternative 3 does not include the construction of the golf course and associated facilities. Therefore, potential incompatibilities between residential/recreational uses and office park would be less than significant, but less severe when compared to the Proposed Project. Identical to the Proposed Project,

inconsistencies with existing plans, policies and regulations would be less than significant. Identical to the Proposed Project, this alternative would result in the conversion of Prime and Unique Farmland to developed uses.

Therefore, the No Golf Course Alternative would result in similar land use and planning impacts; however, they would be less severe when compared to the Proposed Project.

Parks and Recreation

The No Golf Course Alternative would result in the same increase in population as the Proposed Project. Therefore, this alternative would result in an identical increased demand for park facilities and increased use of Lagoon Valley Regional Park, (by residents and employees) when compared to the Proposed Project. Identical to the Proposed Project, neighborhood park facilities would be constructed and the developer would provide funds towards improvements to Lagoon Valley Regional Park in addition to contributing to the Park and Recreational Development Impact Fee. Identical to the Proposed Project, the construction of off site infrastructure could result in short-term disruption of recreational facilities. The only difference is that the golf course would not be constructed.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in identical impacts to parks and recreation.

Visual Resources

Identical to the Proposed Project, Alternative 3 would result in a significant adverse affect on the scenic vista that travelers along I-80 have into Lower Lagoon Valley. Alternative 3 would also result in a significant and unavoidable change to the existing visual character of the valley because it would develop a currently primarily undeveloped area. However, the change in visual character could be less severe when compared to the Proposed Project because the 213 acres of golf course development proposed under the Proposed Project would remain as undeveloped open space.

The No Golf Course Alternative would allow for the same amount of residential and business village uses; therefore, it would result in the same potential sources of light. Identical to the Proposed Project, this impact would be significant. Mitigation measures to minimize light and glare impacts would be required (Mitigation Measure 4.4-3).

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar visual resource impacts, but they would be less severe.

Transportation and Circulation

Under the No Golf Course Alternative, the same amount of residential and business village uses would be developed; however, the golf course would not be constructed and operated. Therefore, fewer trips would be generated under Alternative 3 when compared to the Proposed Project. As a result, intersections, roadway segments, freeway ramp capacity, and freeway merge and diverge LOS that were identified as operating at an unacceptable levels with the project would continue to operate at unacceptable levels and the impact would be slightly less severe. Identical to the Proposed Project, mitigation measures for improvements would be required to improve operating conditions (Mitigation Measures 4.5-1 through 4.5-5).

Identical to the Proposed Project, adequate on-site emergency access would be provided as would adequate transit service.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar transportation and circulation impacts, but they would be slightly less severe.

Air Quality

Because the golf course would not be developed less acreage would be graded. Therefore, construction-related air quality impacts would also be less. Identical to the Proposed Project, construction-related air quality impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-1).

Elimination of the golf course would also reduce the number of trips to and from the area because that acreage would remain in open space, instead of becoming a developed use. Therefore, vehicle emissions would also be similar, but slightly less, when compared to the Proposed Project. Similar to the Proposed Project, stationary area source emissions would be generated. Identical to the Proposed Project, this impact would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-2). Exposure to TAC would be the same under Alternative 3 compared to the Proposed Project. Also identical to the Proposed Project, odors could be generated along wastewater collection system facilities.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar air quality impacts, but they would be slightly less severe.

Noise

Because the golf course would not be developed less acreage would be graded and less construction activities would occur resulting in less construction-related noise impacts. Identical to the Proposed Project, construction-related noise impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measures 4.7-1 and 4.7-2).

Because the golf course would not be operated, fewer vehicle trips would occur and less operation noise would be generated by project uses. Under the No Golf Course Alternative the same amount of residential and business village uses would be developed; however, no golf course would be operated. Operation of uses under Alternative 3 could result in exposure of sensitive existing and proposed residential and other land uses to noise in excess of City standards. Because Alternative 3 would result in fewer vehicle trips, there would be less associated noise levels when compared to the Proposed Project. Implementation of measures would ensure that sensitive land uses were constructed so they were not exposes to noise levels in excess of standards (Mitigation Measure 4.7-3).

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar noise impacts, but they would be slightly less severe.

Public Utilities

Under the No Golf Course Alternative, the same amount of residential and business village uses would be developed. Approximately 17,000 sf less commercial uses would be developed (that

were in support of the golf course). Therefore, the demand for wastewater collection and treatment facilities, and electricity and natural gas supply and distribution facilities would be similar, but slightly less when compared to the Proposed Project. Identical to the Proposed Project, new wastewater collection facilities would need to be constructed because Lower Lagoon Valley currently has limited service.

Identical to the Proposed Project, the increased demand for electricity and natural gas could be met; however, additional distribution facilities would be required. Identical to the Proposed Project, any distribution facilities would be accomplished consistent with PG&E and City requirements. Similarly, increased demand for cable television infrastructure would be met consistent with City requirements.

Therefore, compared to the Proposed Project, the Golf Course Alternative would result in similar public utilities impacts, but they would be less severe.

Public Services

Under the No Golf Course Alternative, the same amount of residential and business village uses would be developed. Approximately 17,000 sf less commercial uses would be developed (that were in support of the golf course). Therefore, there would be an increased demand for police and fire protection services. The demand for police protection services would be slightly less when compared to the Proposed Project because there would be no golf course uses to patrol. However, identical to the Proposed Project, impacts would be significant unless the business village uses include the integration of features to maximize public safety (Mitigation Measure 4.9-1).

Impacts on fire protection services would be similar, but slightly less when compared to the Proposed Project because 17,000 sf of uses in support of the golf course would not be constructed. Identical to the Proposed Project, Alternative 3 includes construction of a new fire station.

Solid waste demand could be met by current facilities, but because less commercial uses would be constructed, the demand would be less when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar public service impacts, but they would be less severe.

Water Supply

Under the No Golf Course Alternative, the same amount of residential and business village uses would be developed. Approximately 17,000 sf less commercial uses would be developed (that were in support of the golf course). In addition, because no golf course would be developed, the demand for non-potable (irrigation water) would be less. Therefore, the demand for non-potable water supply distribution and treatment facilities would be less when compared to the Proposed Project. The increased demand for water generated by development of Alternative 3 would be less and could be met. Similar to the Proposed Project, potable and non-potable water distribution system improvements would be required (Mitigation Measures 4.10-1 through 4.10-4).

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar water supply impacts, but they would be less severe.

Hydrology, Drainage and Water Quality

With implementation of the No Golf Course Alternative, less of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, Alternative 3 would result in a similar, but less, need to develop drainage collection infrastructure and less associated increases in sedimentation and urban contaminant water quality impacts. Identical to the Proposed Project, measures to ensure that sufficient drainage facilities are designed and constructed (Mitigation Measure 4.11-1) and measures to protect receiving water quality (Mitigation Measure 4.11-3) would be required.

Identical to the Proposed Project, the No Golf Course Alternative would result in development in the designated flood plain. Implementation of Mitigation Measure 4.10-2 would reduce risk associated with the 100-year flood plain hazard to a less-than-significant level. Development of the Alternative 3 would result in identical potentially significant exposure to dam failure inundation and seiche activity. Mitigation Measures 4.10-5 and 4.10-6 would ensure that people and structures would be protected from flooding associated with dam failure and seiche activity.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar hydrology and water quality impacts, but they would be less severe.

Geology and Soils

Approximately 17,000 sf of support uses associated with the golf course would not be developed. Therefore, Alternative 3 would result in the exposure of the same number of people and fewer structures and/or infrastructure to potential risk associated with: seismic activity (groundshaking, liquefaction); landslide hazards; and/or unstable soil conditions. Implementation of Mitigation Measures 4.11-1, and 4.11-3 through 4.11-6 would ensure that project design incorporates required construction techniques to minimize risks to a less-than-significant levels.

Under Alternative 3 less of the Specific Plan area would be developed when compared to the Proposed Project; therefore, construction activities associated with this alternative such as grading and trenching would result in a similar but less increase in the rate of erosion. Mitigation Measure 4.11-2 would minimize erosion impacts.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar geology and soils impacts, but they would be less severe.

Hazards and Human Health

Under the No Golf Course Alternative, less of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the risk of exposure to previously unidentified soil contaminants would be slightly less because the golf course would not be constructed. Implementation of Mitigation Measure 4.12-3 would ensure that this potentially significant impact would be reduced to a less-than-significant level by ensuring that previously unidentified hazards are identified and remediated.

Under the No Golf Course Alternative, the same amount of residential and business village uses would be developed. Because the golf course would not be operated, there would be fewer chemicals such as pesticides and fertilizers used when compared to the Proposed Project.

Therefore, Alternative 3 would result in a similar, but slightly less amount of hazardous materials transported, used and/or stored. Identical to the Proposed Project there would be a potentially significant impact associated with the construction and/or operation of an elementary school. Implementation of Mitigation Measure 4.13-4 would ensure that previously unidentified hazards are investigated and/or remediated prior to school construction. Because the residential component under Alternative 3 would be the same, the less-than-significant impact of exposure to wildland fires would be identical to the Proposed Project.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar hazards and human health impacts, but they would be less severe.

Cultural Resources

Under the No Golf Course Alternative, less of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to disturb known prehistoric and historic archaeological features, unidentified prehistoric and/or historic resources, paleontological resources, and/or human remains would be less when compared to the Proposed Project. Identical to the Proposed Project, these impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.14-1, 4.14-2, 4.14-3, 4.14-5, and 4.14-6 which would ensure that cultural resources are identified and either avoided and/or subject to scientific recovery and evaluation. Identical to the Proposed Project, trenching for the proposed sewer line option 2 could result in a significant impact to the Peña Adobe due to ground vibration. Implementation of Mitigation Measure 4.14-4 would ensure that vibration impacts are reduced to a less-than-significant level.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar cultural resource impacts, but they would be less severe.

Biological Resources

Under the No Golf Course Alternative, less of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to adversely contribute to the loss of wetlands, vernal pool habitat, Swainson's hawk and other nesting raptors and their habitat, Valley elderberry and its habitat, longhorn beetles and their habitat, western pond turtles and their habitat, rare plant populations and their habitat, oak woodland/savannah and other protected trees, riparian habitat, loggerhead shrike and its habitat would be less when compared to the Proposed Project. Identical to the Proposed Project, the significant impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.15-1 – 4.15-11.

Therefore, compared to the Proposed Project, the No Golf Course Alternative would result in similar biological resource impacts, but they would be less severe.

Comparison to Project Objectives

Implementation of the No Golf Course Alternative would achieve most of the project objectives. Because Alternative 2 does not include the development of a golf course, it would limit the ability for the City to provide a land use plan that achieves a superior quality residential environment (executive housing). This alternative would help to protect and enhance the unique physical characteristics of Lower Lagoon Valley by creating more open space than proposed under the project.

Alternative 4: Decreased Residential Alternative

The Decreased Residential Alternative would consist of 730 units at 1 to 2 du per acre (595 less units than proposed with the project) developed on 523 acres (inclusive of the 12-acre school site). All other project elements would be the same as the Proposed Project (see Table 6-1).

Identical to the Proposed Project, the developer would provide funds towards improvements to Lagoon Valley Regional Park. However, because there would be less residential development, the amount of funding would be less. Therefore, park improvements anticipated under the proposed Regional Park Master Plan would occur but would be less. The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process because these improvements would occur as part of a future, as yet undefined project.

Land Use and Planning

Similar to the Proposed Project, Alternative 4 would result in the construction of developed uses adjacent to existing agricultural and open space lands, and Lagoon Valley Regional Park. Identical to the Proposed Project, potential incompatibilities would be less than significant. Alternative 4 includes the construction and operation of fewer residential units and identical business village and recreation uses when compared to the Specific Plan. Therefore, potential incompatibilities between residential/recreational uses and office park would be less than significant, but less severe when compared to the Proposed Project. Identical to the Proposed Project, inconsistencies with existing plans, policies and regulations would be less than significant. Identical to the Proposed Project, this alternative would result in the conversion of Prime and Unique Farmland to developed uses.

Therefore, the Decreased Residential Alternative would result in similar land use and planning impacts; however, they would be less severe when compared to the Proposed Project.

Parks and Recreation

The Decreased Residential Alternative would result in a total population increase of approximately 2,066 residents (1,684 less than with the Proposed Project). Using the factor of 4.5 acres of parkland per 1,000 residents, this alternative would result in the need for 9.3 acres of parkland compared to 17 acres with the Proposed Project. Alternative 4 would result in the same number of employees potentially using existing park facilities when compared to the Proposed Project. Therefore, this alternative would result in an increased demand for park facilities and increased use of Lagoon Valley Regional Park, (by residents and employees). Identical to the Proposed Project, neighborhood park facilities would be constructed and the developer would provide funds (although they would be less) towards improvements to Lagoon Valley Regional Park in addition to contributing to the Park and Recreational Development Impact Fee. Identical to the Proposed Project, the construction of off site infrastructure could result in short-term disruption of recreational facilities.

Therefore, the Decreased Residential Alternative would result in similar parks and recreation impacts; however, they would be less severe when compared to the Proposed Project.

Visual Resources

Identical to the Proposed Project, Alternative 4 would result in a significant adverse affect on the scenic vista that travelers along I-80 have into Lower Lagoon Valley. Alternative 4 would also result in a significant and unavoidable change to the existing visual character of the valley because it would develop a currently primarily undeveloped area.

The Decreased Residential Alternative would include less residential but the same amount of business village uses; therefore, it would result in the less potential sources of light. Identical to the Proposed Project, this impact would be significant. Mitigation measures to minimize light and glare impacts would be required (Mitigation Measure 4.4-3).

Therefore, the Decreased Residential Alternative would result in similar visual resource impacts; however, they would be less severe when compared to the Proposed Project.

Transportation and Circulation

Under the Decreased Residential Alternative, fewer residential dwelling units (595) would be developed. Therefore, fewer trips would be generated under Alternative 4 when compared to the Proposed Project. As a result, intersections, roadway segments, freeway ramp capacity, and freeway merge and diverge LOS that were identified as operating at an unacceptable levels with the project would continue to operate at unacceptable levels and the impact would be less severe. Identical to the Proposed Project, mitigation measures for improvements would be required to improve operating conditions (Mitigation Measures 4.5-1 through 4.5-5).

Identical to the Proposed Project, adequate on-site emergency access to be provided as would adequate transit service.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar transportation and circulation impacts, but they would be less severe.

Air Quality

The same amount of the Specific Plan area would be developed under Alternative 4 when compared to the Proposed Project. Therefore, construction-related air quality impacts would be identical and significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-1).

Fewer residential units would reduce the number of trips to and from the Specific Plan. Therefore, vehicle emissions would also be similar, but less, when compared to the Proposed Project. Similar to the Proposed Project, stationary area source emissions would be generated. Identical to the Proposed Project, this impact would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-2). Exposure to TAC would be the same under Alternative 4 compared to the Proposed Project. Also identical to the Proposed Project, odors could be generated along wastewater collection system facilities.

Therefore, the Decreased Residential Alternative would result in similar air quality impacts; however, they would be less severe when compared to the Proposed Project.

Noise

Even though fewer residential units would be constructed under Alternative 4, the same amount of acreage would be graded. Therefore, construction-related noise impacts would be similar but less than under the Proposed Project. Identical to the Proposed Project, construction-related noise impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.7-1 and 4.7-2).

Fewer residential units would reduce the number of trips to and from the Specific Plan. Under Alternative 4 the fewer residential units would be occupied but the same amount of business village uses would be developed. Operation of uses under Alternative 4 could result in exposure of sensitive existing and proposed residential and other land uses to noise in excess of City standards. Because Alternative 4 would result in fewer vehicle trips, there would be less associated noise levels when compared to the Proposed Project. Implementation of measures would ensure that sensitive land uses were constructed so they were not exposes to noise levels in excess of standards (Mitigation Measure 4.7-3).

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar noise impacts, but they would be less severe.

Public Utilities

Under the Decreased Residential Alternative, fewer residential units would be occupied but the same amount of business village uses would be developed. Therefore, the demand for wastewater collection and treatment facilities, and electricity and natural gas supply and distribution facilities would be similar, but slightly less when compared to the Proposed Project. Identical to the Proposed Project, new wastewater collection facilities would need to be constructed because Lower Lagoon Valley currently has limited service.

Identical to the Proposed Project, the increased demand for electricity and natural gas could be met; however, additional distribution facilities would be required. Identical to the Proposed Project, any distribution facilities would be accomplished consistent with PG&E and City requirements. Similarly, increased demand for cable television infrastructure would be met consistent with City requirements.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar public utilities impacts, but they would be less severe.

Public Services

Under the Decreased Residential Alternative, fewer residential units would be occupied but the same amount of business village uses would be developed. Therefore, there would be an increased demand for police and fire protection services. The demand for police protection services would be less when compared to the Proposed Project because there would be fewer residential units to patrol. However, identical to the Proposed Project, impacts would be significant unless the business village uses include the integration of features to maximize public safety (Mitigation Measure 4.9-1).

Impacts on fire protection services would be similar, but less when compared to the Proposed Project because fewer residential units would be constructed. Identical to the Proposed Project, Alternative 4 includes construction of a new fire station.

Solid waste demand could be met by current facilities, but because less residential units would be constructed, the demand would be less when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar public service impacts, but they would be less severe.

Water Supply

Under the Decreased Residential Alternative, fewer residential units would be occupied but the same amount of business village uses would be developed. Therefore, the demand for water supply distribution and treatment facilities would be less when compared to the Proposed Project. The increased demand for water generated by development of Alternative 4 would be less and could be met. Similar to the Proposed Project, potable and non-potable water distribution system improvements would be required (Mitigation Measures 4.10-1 through 4.10-4).

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar water supply impacts, but they would be less severe.

Hydrology, Drainage and Water Quality

With implementation of the Decreased Residential Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, Alternative 4 would result in an identical need to develop drainage collection infrastructure and identical associated increases in sedimentation and urban contaminant water quality impacts. Identical to the Proposed Project, measures to ensure that sufficient drainage facilities are designed and constructed (Mitigation Measure 4.11-1) and measures to protect receiving water quality (Mitigation Measure 4.11-3) would be required.

Identical to the Proposed Project, Alternative 4 would result in development in the designated flood plain; however, fewer residential units would be constructed. Implementation of Mitigation Measure 4.10-2 would reduce risk associated with the 100-year flood plain hazard to a less-than-significant level. Development of the Alternative 4 would result in similar potentially significant exposure to dam failure inundation and seiche activity; however, fewer residential units would be constructed. Mitigation Measures 4.10-5 and 4.10-6 would ensure that people and structures would be protected from flooding associated with dam failure and seiche activity.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar hydrology and water quality impacts, but they would be less severe.

Geology and Soils

With implementation of the Decreased Residential Alternative fewer residential units would be constructed and occupied. Therefore, Alternative 4 would result in the exposure of the fewer people and structures and/or infrastructure to potential risk associated with: seismic activity (groundshaking, liquefaction); landslide hazards; and/or unstable soil conditions. Implementation of Mitigation Measures 4.11-1, and 4.11-3 through 4.11-6 would ensure that project design incorporates required construction techniques to minimize risks to a less-than-significant levels.

Under Alternative 4 the same acreage of the Specific Plan area would be developed when compared to the Proposed Project; therefore, construction activities associated with this alternative such as grading and trenching would result in an identical increase in the rate of erosion. Mitigation Measure 4.11-2 would minimize erosion impacts.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar geology and soils impacts, but they would be less severe.

Hazards and Human Health

With implementation of the Decreased Residential Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the risk of exposure to previously unidentified soil contaminants would be identical. Implementation of Mitigation Measure 4.12-3 would ensure that this potentially significant impact would be reduced to a less-than-significant level by ensuring that previously unidentified hazards are identified and remediated.

Under the Alternative 4 fewer residential units would be occupied but the same amount of business village uses would be developed. Therefore, Alternative 4 would result in an identical amount of hazardous materials transported, used and/or stored. Identical to the Proposed Project there would be a potentially significant impact associated with the construction and/or operation of an elementary school. Implementation of Mitigation Measure 4.13-4 would ensure that previously unidentified hazards are investigated and/or remediated prior to school construction. Less residential units would be occupied under Alternative 4, the less-than-significant impact of exposure to wildland fires would be less severe when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in similar hazards and human health impacts, but they would be less severe.

Cultural Resources

Under the Decreased Residential Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to disturb known prehistoric and historic archaeological features, unidentified prehistoric and/or historic resources, paleontological resources, and/or human remains would be the same as the Proposed Project. Identical to the Proposed Project, these impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.14-1, 4.14-2, 4.14-3, 4.14-5, and 4.14-6 which would ensure that cultural resources are identified and either avoided and/or subject to scientific recovery and evaluation. Identical to the Proposed Project, trenching for the proposed sewer line option 2 could result in a significant impact to the Peña Adobe due to ground vibration. Implementation of Mitigation Measure 4.14-4 would ensure that vibration impacts are reduced to a less-than-significant level.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in identical cultural resource impacts.

Biological Resources

Under the Decreased Residential Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to adversely

contribute to the loss of wetlands, vernal pool habitat, Swainson's hawk and other nesting raptors and their habitat, Valley elderberry and its habitat, longhorn beetles and their habitat, western pond turtles and their habitat, rare plant populations and their habitat, oak woodland/savannah and other protected trees, riparian habitat, loggerhead shrike and its habitat would be the same as the Proposed Project. Identical to the Proposed Project, the significant impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.15-1 – 4.15-11.

Therefore, compared to the Proposed Project, the Decreased Residential Alternative would result in identical biological resource impacts.

Comparison to Project Objectives

Implementation of the Decreased Residential Alternative would achieve most of the project objectives. Because Alternative 3 includes the development of fewer residential units, it would not fully achieve the objective for providing a superior quality residential environment or the objective to promote the development of diverse housing types.

Alternative 5: Increased Commercial Use Alternative

Under the Increased Commercial Use Alternative, approximately 33 acres of Office/Business Village (388,500 sf) and 57 acres of Highway Commercial (661,500 sf) would be developed (as compared to approximately 90 acres of Office/Business Village (1,050,000 sf) for the Proposed Project). All other project elements would be the same as the Proposed Project (see Table 6-1).

Identical to the Proposed Project, the developer would provide funds towards improvements to Lagoon Valley Regional Park. Therefore, park improvements anticipated under the proposed Regional Park Master Plan would occur. The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process because these improvements would occur as part of a future as yet undeveloped project.

Land Use and Planning

Similar to the Proposed Project, Alternative 5 would result in the construction of developed uses adjacent to existing agricultural and open space lands, and Lagoon Valley Regional Park. Identical to the Proposed Project, potential incompatibilities would be less than significant. Alternative 5 includes the construction and operation of business village and commercial uses. Therefore, potential incompatibilities between residential/recreational uses and office park would be less than significant, but more severe when compared to the Proposed Project. Identical to the Proposed Project, inconsistencies with existing plans, policies and regulations would be less than significant. Identical to the Proposed Project, this alternative would result in the conversion of Prime and Unique Farmland to developed uses.

Therefore, the Increased Commercial Use Alternative would result in similar land use and planning impacts; however, they would be more severe when compared to the Proposed Project.

Parks and Recreation

The Increased Commercial Use Alternative would result in the same increase in population as the Proposed Project. Therefore, this alternative would result in an identical increased demand

for park facilities and increased use of Lagoon Valley Regional Park, (by residents and employees) when compared to the Proposed Project. Identical to the Proposed Project, neighborhood park facilities would be constructed and the developer would provide funds towards improvements to Lagoon Valley Regional Park in addition to contributing to the Park and Recreational Development Impact Fee. Identical to the Proposed Project, the construction of off site infrastructure could result in short-term disruption of recreational facilities.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to parks and recreation.

Visual Resources

Identical to the Proposed Project, Alternative 5 would result in a significant adverse affect on the scenic vista that travelers along I-80 have into Lower Lagoon Valley. Alternative 5 would also result in a significant and unavoidable change to the existing visual character of the valley because it would develop a currently primarily undeveloped area.

The Increased Commercial Use Alternative would include the same amount of total developed uses; therefore, it would result in the identical potential sources of light. Identical to the Proposed Project, this impact would be significant. Mitigation measures to minimize light and glare impacts would be required (Mitigation Measure 4.4-3).

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to visual resources.

Transportation and Circulation

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. More trips would be generated under Alternative 5 when compared to the Proposed Project. As a result, intersections, roadway segments, freeway ramp capacity, and freeway merge and diverge LOS that were identified as operating at an unacceptable levels with the project would continue to operate at unacceptable levels and the impact would be more severe. Identical to the Proposed Project, mitigation measures for improvements would be required to improve operating conditions (Mitigation Measures 4.5-1 through 4.5-5).

Identical to the Proposed Project, adequate on-site emergency access would be provided as would adequate transit service.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in similar transportation and circulation impacts, but they would be more severe.

Air Quality

The same amount of the Specific Plan area would be developed under Alternative 5 when compared to the Proposed Project. Therefore, construction-related air quality impacts would be identical and significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-1).

Alternative 5 would result in more vehicle trips. Therefore, vehicle emissions would also be similar, but greater when compared to the Proposed Project. Similar to the Proposed Project, stationary area source emissions would be generated. Identical to the Proposed Project, this impact would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-2). Exposure to TAC would be less under Alternative 5 compared to the Proposed Project because less business village uses would be developed. Also identical to the Proposed Project, odors could be generated along wastewater collection system facilities.

Therefore, the Increased Commercial Use Alternative would result in similar air quality impacts; however, they would be more severe when compared to the Proposed Project.

Noise

The same amount of the Specific Plan area would be developed under Alternative 5 (Proposed Project business village uses would be replaced with highway commercial uses) when compared to the Proposed Project. Therefore, construction-related noise impacts would be the same as the Proposed Project. Identical to the Proposed Project, construction-related noise impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measures 4.7-1 and 4.7-2).

Operation of uses under Alternative 5 could result in exposure of sensitive existing and proposed residential and other land uses to noise in excess of City standards. Because Alternative 5 would result in more vehicle trips, there would be greater associated noise levels when compared to the Proposed Project. Implementation of measures would ensure that sensitive land uses were constructed so they were not exposes to noise levels in excess of standards (Mitigation Measure 4.7-3).

Therefore, the Increased Commercial Use Alternative would result in similar noise impacts; however, they would be more severe when compared to the Proposed Project.

Public Utilities

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. Therefore, the demand for wastewater collection and treatment facilities, and electricity and natural gas supply and distribution facilities would be the same as the Proposed Project. Identical to the Proposed Project, new wastewater collection facilities would need to be constructed because Lower Lagoon Valley currently has limited service.

Identical to the Proposed Project, the increased demand for electricity and natural gas could be met; however, additional distribution facilities would be required. Identical to the Proposed Project, any distribution facilities would be accomplished consistent with PG&E and City requirements. Similarly, increased demand for cable television infrastructure would be met consistent with City requirements.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to public utilities.

Public Services

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. The total increase in population associated with Alternative 5 would be the same as the Proposed Project. Therefore, there would be an increased demand for police and fire protection services. The demand for police protection services would be the same when compared to the Proposed Project. Identical to the Proposed Project, impacts would be significant unless the business village uses include the integration of features to maximize public safety (Mitigation Measure 4.9-1).

Impacts on fire protection services would be the same. Identical to the Proposed Project, Alternative 5 includes construction of a new fire station.

Solid waste demand could be met by current facilities, and because the same amount of development would occur, the demand would be the same when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to public utilities.

Water Supply

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. Therefore, the demand for water supply distribution and treatment facilities would be the same when compared to the Proposed Project. The increased demand for water generated by development of Alternative 5 would be the same and could be met. Similar to the Proposed Project, potable and non-potable water distribution system improvements would be required (Mitigation Measures 4.10-1 through 4.10-4).

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to water supply.

Hydrology, Drainage and Water Quality

With implementation of the Increased Commercial Use Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, Alternative 5 would result in an identical need to develop drainage collection infrastructure and identical associated increases in sedimentation and urban contaminant water quality impacts. Identical to the Proposed Project, measures to ensure that sufficient drainage facilities are designed and constructed (Mitigation Measure 4.11-1) and measures to protect receiving water quality (Mitigation Measure 4.11-3) would be required.

Identical to the Proposed Project, Alternative 5 would result in development in the designated flood plain. Implementation of Mitigation Measure 4.10-2 would reduce risk associated with the 100-year flood plain hazard to a less-than-significant level. Development of the Alternative 5

would result in identical potentially significant exposure to dam failure inundation and seiche activity. Mitigation Measures 4.10-5 and 4.10-6 would ensure that people and structures would be protected from flooding associated with dam failure and seiche activity.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to hydrology and water quality.

Geology and Soils

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. Therefore, Alternative 5 would result in the exposure of the same number of people and structures and/or infrastructure to potential risk associated with: seismic activity (groundshaking, liquefaction); landslide hazards; and/or unstable soil conditions. Implementation of Mitigation Measures 4.11-1, and 4.11-3 through 4.11-6 would ensure that project design incorporates required construction techniques to minimize risks to a less-than-significant levels.

Under Alternative 5 the same acreage of the Specific Plan area would be developed when compared to the Proposed Project; therefore, construction activities associated with this alternative such as grading and trenching would result in an identical increase in the rate of erosion. Mitigation Measure 4.11-2 would minimize erosion impacts.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical impacts to geology and soils.

Hazards and Human Health

With implementation of the Increased Commercial Use Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the risk of exposure to previously unidentified soil contaminants would be identical. Implementation of Mitigation Measure 4.12-3 would ensure that this potentially significant impact would be reduced to a less-than-significant level by ensuring that previously unidentified hazards are identified and remediated.

Under the Increased Commercial Use Alternative, Proposed Project business village uses would be replaced with highway commercial uses. The total amount of business village/highway commercial sf would be identical to the Proposed Project business village uses (1,050,000 sf). The same amount of residential dwelling units would be developed and occupied. Because there would be less business village uses, Alternative 5 would result in less hazardous materials transported, used and/or stored. Identical to the Proposed Project there would be a potentially significant impact associated with the construction and/or operation of an elementary school. Implementation of Mitigation Measure 4.13-4 would ensure that previously unidentified hazards are investigated and/or remediated prior to school construction. Because the residential component under Alternative 5 would be the same, the less-than-significant impact of exposure to wildland fires would be identical to the Proposed Project.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in similar hazards and human health impacts, but they would be less severe.

Cultural Resources

Under the Increased Commercial Use Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to disturb known prehistoric and historic archaeological features, unidentified prehistoric and/or historic resources, paleontological resources, and/or human remains would be the same as the Proposed Project. Identical to the Proposed Project, these impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.14-1, 4.14-2, 4.14-3, 4.14-5, and 4.14-6 which would ensure that cultural resources are identified and either avoided and/or subject to scientific recovery and evaluation. Identical to the Proposed Project, trenching for the proposed sewer line option 2 could result in a significant impact to the Peña Adobe due to ground vibration. Implementation of Mitigation Measure 4.14-4 would ensure that vibration impacts are reduced to a less-than-significant level.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical cultural resource impacts.

Biological Resources

Under the Increased Commercial Use Alternative, the same acreage of the Specific Plan area would be developed when compared to the Proposed Project. Therefore, the potential to adversely contribute to the loss of wetlands, vernal pool habitat, Swainson's hawk and other nesting raptors and their habitat, Valley elderberry and its habitat, longhorn beetles and their habitat, western pond turtles and their habitat, rare plant populations and their habitat, oak woodland/savannah and other protected trees, riparian habitat, loggerhead shrike and its habitat would be the same as the Proposed Project. Identical to the Proposed Project, the significant impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.15-1 – 4.15-11.

Therefore, compared to the Proposed Project, the Increased Commercial Use Alternative would result in identical biological resource impacts.

Comparison to Project Objectives

Implementation of the Increased Commercial Alternative would achieve most of the project objectives. Because Alternative 5 includes the development of highway commercial uses in place of business village uses, it would not fully achieve the objective for providing for high-end employment.

<u>Alternative 6: Off-Site Alternative</u>

The Off-Site Alternative would involve the development of approximately 736 acres in the Vaca Valley/Rodgers Lane Area north of and adjacent to the City limits with residential (1,325 units on 523 acres, inclusive of the proposed school site and 10,000 sf Village Center) and a 213-acre golf course (including a 10,000 sf clubhouse with offices, pro shop, restaurant and meeting rooms, and a 7,000 sf maintenance facility).

The site is outside of existing Urban Service Area Boundary, outside the City limits, and outside the City's SOI. A General Plan Amendment, SOI amendment, annexation, and rezone would be required, along with LAFCO approval. Much of the site consists of Prime Farmland, and there

are a total of approximately 250 acres under active Williamson Act contracts. These contracts would need to be cancelled in order to permit development to occur in this area. In addition, a portion of the site south of Alamo Creek cannot be developed until adoption of the Habitat Conservation Plan.

This alternative would require major improvements to Vaca Valley Road as well as other off-site roadway extensions (e.g., Alamo Drive) and bridge widenings. Water main extensions and a water reservoir would be needed; however, existing and planned sewer mains would be sufficient to accommodate the project, and no substantial modifications would be required.

The 88 acres of Office/Business Village (1,050,000 sf) would be developed at Lower Lagoon Valley, consistent with the Proposed Project. The remainder of the Lower Lagoon Valley Specific Plan area (approximately 2,264 acres) would remain in its current condition. Any future development of the Lower Lagoon Valley Specific Plan area would be limited to rural subdivisions and/or small-scale commercial not requiring connection to City services such as water and sewer consistent with existing zoning.

Identical to the Proposed Project, the developer would provide funds towards improvements to Lagoon Valley Regional Park. Therefore, park improvements anticipated under the proposed Regional Park Master Plan would occur. The environmental impacts of physical improvements would be evaluated as part of a separate CEQA process and are not included in this alternatives analysis.

Land Use and Planning

Similar to the Proposed Project, Alternative 6 would result in the construction of developed uses adjacent to existing agricultural and open space lands, and Lagoon Valley Regional Park. Identical to the Proposed Project, potential incompatibilities would be less than significant. Alternative 56 includes the construction and operation of business village in Lower Lagoon Valley so there would be no potential incompatibilities between residential/recreational uses and office park uses.

Unlike the Proposed Project, the Off-Site Alternative would require the City to expand its sphere of influence (SOI) to include the approximately site as well as request that the site be annexed to the city. In addition, a General Plan amendment would be required to change current land use designations from Agricultural to residential. The project site is also located outside of the City's Urban Services Boundary. Therefore, unlike the Proposed Project, Alternative 6 would result in inconsistencies with existing plans, policies and regulations would be less than significant. However, because the Off-Site Alternative is not located in the Travis Air Force Base land use compatibility plan area, there would be no inconsistency with this plan. Currently there are approximately 250 acres under Williamson Act contracts that would need to be cancelled in order to permit development; therefore, similar to the Proposed Project, this alternative would result in the conversion of Prime and Unique Farmland to developed uses, but this significant and unavoidable impact would be more severe.

Therefore, the Off-Site Alternative would result in new and similar land use and planning impacts; however, they would be more severe when compared to the Proposed Project.

Parks and Recreation

The Off-Site Alternative would result in the same increase in population as the Proposed Project. Therefore, this alternative would result in an identical increased demand for park facilities and increased use of Lagoon Valley Regional Park, (by residents and employees) when compared to the Proposed Project. Identical to the Proposed Project, neighborhood park facilities would be constructed and the developer would provide funds towards improvements to Lagoon Valley Regional Park in addition to contributing to the Park and Recreational Development Impact Fee. Identical to the Proposed Project, the construction of off site infrastructure could result in short-term disruption of recreational facilities.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical impacts to parks and recreation.

Visual Resources

Identical to the Proposed Project, Alternative 6 would result in a significant adverse affect on the scenic vista that travelers along I-80 have into Lower Lagoon Valley; however, this impact would be less severe because less of Lower Lagoon Valley would be developed. Alternative 6 would also result in a significant and unavoidable change to the existing visual character of both Lower Lagoon Valley and the Vaca Valley/Rodgers Lane area because it would develop currently primarily undeveloped areas.

The Off-Site Alternative would include the same amount of total developed uses; therefore, it would result in the identical potential sources of light. Identical to the Proposed Project, this impact would be significant. However, these new light sources would occur at two different sites. Mitigation measures to minimize light and glare impacts would be required (Mitigation Measure 4.4-3).

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical impacts to visual resources.

Transportation and Circulation

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, more trips would be generated under Alternative 6 when compared to the Proposed Project. As a result, intersections, roadway segments, freeway ramp capacity, and freeway merge and diverge LOS that were identified as operating at an unacceptable levels with the project would continue to operate at unacceptable levels and the impact would be more severe. In addition, because traffic would occur in the area around Vaca Valley/Rodgers Lane there would be additional circulation impacts not identified for the project at Lower Lagoon Valley alone. Identical to the Proposed Project, mitigation measures for improvements would be required to improve operating conditions (Mitigation Measures 4.5-1 through 4.5-5).

Identical to the Proposed Project, adequate on-site emergency access would need to be provided as would adequate transit service.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in similar transportation and circulation impacts, but they would be more severe.

Air Quality

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, construction-related air quality impacts would be identical and significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-1).

Alternative 6 would result in more vehicle trips. Therefore, vehicle emissions would also be similar, but greater, when compared to the Proposed Project. Similar to the Proposed Project, stationary area source emissions would be generated. Identical to the Proposed Project, this impact would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.6-2). Exposure to TAC would be identical under Alternative 6 compared to the proposed. Also identical to the Proposed Project, odors could be generated along wastewater collection system facilities.

Therefore, the Off-Site Alternative would result in similar air quality impacts; however, they would be more severe when compared to the Proposed Project.

Noise

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, construction-related noise impacts would be the same as the Proposed Project. Identical to the Proposed Project, construction-related noise impacts would be significant and unavoidable even with implementation of emission reduction measures (Mitigation Measure 4.7-1 and 4.7-2).

Alternative 6 would result in more vehicle trips. Operation of uses under Alternative 6 could result in exposure of sensitive existing and proposed residential and other land uses to noise in excess of City standards. Because the residential uses would not located adjacent to I-80 under Alternative 6, there would be no potential for increased disturbances to project residents associated with traffic noise. However, because Alternative 6 would result in more vehicle trips along other roadways, there would be greater associated noise levels when compared to the Proposed Project. Implementation of measures would ensure that sensitive land uses were constructed so they were not exposes to noise levels in excess of standards (Mitigation Measure 4.7-3).

Therefore, the Off-Site Alternative would result in similar noise impacts; however, they would be more severe when compared to the Proposed Project.

Public Utilities

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, the demand for wastewater collection and treatment facilities, and electricity and natural gas supply and distribution facilities would be the same as the Proposed Project. Identical to the Proposed Project, new wastewater collection facilities would need to be constructed because Lower Lagoon Valley and Vaca Valley/Rodgers Lane currently have limited service. The increased

demand for infrastructure would be greater because it would require the extension of facilities to two sites instead of one.

Identical to the Proposed Project, the increased demand for electricity and natural gas could be met; however, additional distribution facilities would be required. The increased demand for infrastructure would be greater because it would require the extension of facilities to two sites instead of one. Identical to the Proposed Project, any distribution facilities would be accomplished consistent with PG&E and City requirements. Similarly, increased demand for cable television infrastructure would be met consistent with City requirements.

Therefore, the Off-Site Alternative would result in similar public utilities impacts; however, they would be more severe when compared to the Proposed Project.

Public Services

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. The total increase in population associated with Alternative 6 would be the same as the Proposed Project. Therefore, there would be an increased demand for police and fire protection services.

Because the Off-Site Alternative would need to be annexed to the City of Vacaville police and fire services are currently provided by Solano County. City of Vacaville police and fire departments would serve proposed business village uses developed in Lower Lagoon Valley.

The demand for police protection services would be the same when compared to the Proposed Project. Identical to the Proposed Project, impacts would be significant unless the business village uses include the integration of features to maximize public safety (Mitigation Measure 4.9-1).

Impacts on fire protection services would be the same. Identical to the Proposed Project, Alternative 6 includes construction of a new fire station.

Solid waste demand could be met by current facilities, and because the same amount of development would occur, the demand would be the same when compared to the Proposed Project.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical impacts to public services.

Water Supply

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, the demand for water supply distribution and treatment facilities would be the same when compared to the Proposed Project. The increased demand for water generated by development of Alternative 6 would be the same and could be met. Similar to the Proposed Project, potable and non-potable water distribution system improvements would be required (Mitigation Measures 4.10-1 through 4.10-4).

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical impacts to water supply.

Hydrology, Drainage and Water Quality

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, Alternative 6 would result in an identical need to develop drainage collection infrastructure and identical associated increases in sedimentation and urban contaminant water quality impacts. Identical to the Proposed Project, measures to ensure that sufficient drainage facilities are designed and constructed (Mitigation Measure 4.11-1) and measures to protect receiving water quality (Mitigation Measure 4.11-3) would be required.

Identical to the Proposed Project, Alternative 6 would result in development in the designated flood plain in Lower Lagoon Valley; however, less area would be located in the flood plain. A small portion of the Off-site alternative adjacent to Alamo Creek is also located in a designated 100-year flood plain. Implementation of Mitigation Measure 4.10-2 would reduce risk associated with the 100-year flood plain hazard to a less-than-significant level. Development of the Alternative 6 would result in potentially significant exposure to dam failure inundation and seiche activity; however, because the residential portion of the project would not be developed in Lower Lagoon Valley, this impact would be less severe. Mitigation Measures 4.10-5 and 4.10-6 would ensure that people and structures would be protected from flooding associated with dam failure and seiche activity.

Therefore, the Off-Site Alternative would result in similar hydrology and water quality impacts; however, they would be less severe when compared to the Proposed Project.

Geology and Soils

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. The total increase in population associated with Alternative 6 would be the same as the Proposed Project. Therefore, Alternative 6 would result in the exposure of the same number of people and structures and/or infrastructure to potential risk associated with: seismic activity (groundshaking, liquefaction); landslide hazards; and/or unstable soil conditions. However, the exposure to landslide hazards could be less severe because less development would occur in Lower Lagoon Valley adjacent to hillside areas. Implementation of Mitigation Measures 4.11-1, and 4.11-3 through 4.11-6 would ensure that project design incorporates required construction techniques to minimize risks to a less-than-significant levels.

Under Alternative 6 the same acreage of the Specific Plan area would be developed when compared to the Proposed Project; therefore, construction activities associated with this alternative such as grading and trenching would result in an identical increase in the rate of erosion. Mitigation Measure 4.11-2 would minimize erosion impacts.

Therefore, the Off-Site Alternative would result in similar geology and soils impacts; however, they would be less severe when compared to the Proposed Project.

Hazards and Human Health

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. No site-specific investigation has been undertaken to determine if any known site contamination exists. Therefore, the risk of exposure to previously unidentified soil contaminants would be unknown at the Vaca Valley/Rodgers Lane area site. Implementation of Mitigation Measure 4.12-3 would ensure that this potentially significant impact would be reduced to a less-than-significant level by ensuring that previously unidentified hazards are identified and remediated.

The total amount of business village uses would be identical to the Proposed Project. The same amount of residential dwelling units would be developed and occupied. Therefore, when compared to the Proposed Project, Alternative 6 would result in identical hazardous materials transported, used and/or stored. Identical to the Proposed Project there would be a potentially significant impact associated with the construction and/or operation of an elementary school. The exact location of the school site has not been determined. Implementation of Mitigation Measure 4.13-4 would ensure that previously unidentified hazards are investigated and/or remediated prior to school construction. Under Alternative 6 residential units would be constructed adjacent to undeveloped grassland, therefore, identical to the Proposed Project, this alternative would result in a less-than-significant impact of exposure to wildland fires.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical hazards and human health impacts.

Cultural Resources

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. Therefore, the potential to disturb known prehistoric and historic archaeological features, unidentified prehistoric and/or historic resources, paleontological resources, and/or human remains would be the similar to the Proposed Project. A site-specific cultural resource analysis has not been prepared for the Vaca Valley/Rodgers Lane site, and therefore no known prehistoric and/or historic resources have been identified. Less of the Specific Plan area would be disturbed under Alternative 6. Identical to the Proposed Project, these impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.14-1, 4.14-2, 4.14-3, 4.14-5, and 4.14-6 which would ensure that cultural resources are identified and either avoided and/or subject to scientific recovery and evaluation. Identical to the Proposed Project, trenching for the proposed sewer line option 2 could result in a significant impact to the Peña Adobe due to ground vibration. Implementation of Mitigation Measure 4.14-4 would ensure that vibration impacts are reduced to a less-than-significant level.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical cultural resource impacts.

Biological Resources

The same amount of development would occur under Alternative 6; however, the development would be located on two different sites (88 acres at Lower Lagoon Valley and 736 at Vaca Valley/Rodgers Lane) when compared to the Proposed Project. A site-specific biological

resource investigation has not been prepared for the Vaca Valley/Rodgers Lane site, and therefore biological resources have not been identified. Less of the Specific Plan area would be disturbed under Alternative 6. Therefore, the potential to adversely contribute to the loss of wetlands, vernal pool habitat, Swainson's hawk and other nesting raptors and their habitat, Valley elderberry and its habitat, longhorn beetles and their habitat, western pond turtles and their habitat, rare plant populations and their habitat, oak woodland/savannah and other protected trees, riparian habitat, loggerhead shrike and its habitat would be the same as the Proposed Project. Identical to the Proposed Project, the significant impacts would be mitigated to a less-than-significant level by implementation of Mitigation Measures 4.15-1 – 4.15-11.

Therefore, compared to the Proposed Project, the Off-Site Alternative would result in identical biological resource impacts.

Comparison to Project Objectives

Implementation of the Off-Site Alternative would achieve most of the project objectives. Because Alternative 6 includes developing the residential/recreation uses at an offsite location and the office park uses in Lower Lagoon Valley, this alternative would not achieve the objective of providing a land use plan promoting the development of a high quality program consistent with the nature of Lower Lagoon Valley.

6.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As discussed above and shown in Table 6-2, when compared to the Proposed Project, the No Project/No Development Alternative would not result in the impacts identified for the Proposed Project and is therefore, the environmentally superior alternative. However, as described in CEQA Guidelines section 15126.6(e)(2), when the No Project Alternative is identified as the environmentally superior alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives. Therefore, the No Golf Course Alternative would be the environmentally superior alternative because while it would result in similar impacts as the Proposed Project, most of the impacts would be less severe (see Table 6-2). In addition, the No Golf Course Alternative would achieve most of the project objectives. However, because Alternative 2 does not include the development of a golf course, it would prevent the City from providing a land use plan that achieves a superior quality residential environment (executive housing) integrated with a golf course.

7. REFERENCES

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Albers, J.P., and Fraticelli, L.A. *Preliminary Mineral Resource Assessment Map of California*, United States Geological Survey, 1984.

Association of Bay Area Governments, Earthquake Hazard Map for Vacaville Scenario: Concord-Green Valley Fault, website http://www.abag.ca.gov, accessed on August 20, 2003.

Association of Bay Area Governments, Liquefaction Map for Bay Area, website http://www.abag.ca.gov, accessed on August 13, 2003.

Association of Bay Area Governments, *The San Francisco Bay Area On Shaky Ground*, Publication Number P95001EQK, April 1995.

Bacchini, Sam. Wildlife Biologist, EIP Associates, Personal observation.

Borderdt, D. *et al.*, *Maximum Earthquake Intensity Predicted on a Regional Scale*, United States Geological Survey, Miscellaneous Field Investigations Map MF-09, 1975, scale 1:125,000.

Bortugno, E.J., *Map Showing Recency of Faulting*, Santa Rosa Quadrangle, California Geological Survey (formerly the Division of Mines and Geology), Regional Geologic Map Series, No. 2A, Sheet 5, scale 1:250,000.

California Department of Fish and Game. *California Natural Diversity Database,* 2003.

California Department of Health Services, Disease Control Section, Infectious Disease Branch, Letter from Dr. Ronald, M. Roberto, Chief, to Dr. Thomas L. Charron, Health Officer, Solano County Health Department, dated July 11, 1991.

California Energy Commission website, http://www.energy.ca.gov/html/energysources.html, accessed August 5, 2003.

California Environmental Protection Agency, Department of Toxic Substances Control, California Code of Regulations, Title 22, Division 4.5, Chapter 51.5, Phase I Environmental Site Assessments (Schools), Effective February 10, 2003.

California Environmental Protection Agency, Department of Toxic Substances Control, School Property Evaluation and Cleanup Division, *Fact Sheet: New Environmental Requirements for Proposed Schoolsites (Assembly Bill 387 and Senate Bill 162),* April 2001.

California Environmental Protection Agency, Department of Toxic Substances Control, *Interim Guidance for Sampling Agricultural Fields for School Sites*, 2nd Revision, August 26, 2002.

California Integrated Waste Management Board. http://www.ciwmb.ca.gov/Profiles, accessed on June 17, 2003.

California Integrated Waste Management Board. http://www.ciwmb.ca.gov/Profiles, accessed on June 20, 2003.

California Regional Water Quality Control Board, Central Valley Region, *Order No. 5-01-044 NPDES No. CA0077691: Waste Discharge Requirements for City of Vacaville Easterly Waste Water Treatment Plant, Elmira, Solano County,* March 15, 2001.

Carollo Engineers, *City of Vacaville Recycled Water Master Plan (Draft)*, July 2003.

Cieslak, Theodore J. and Edward M. Eitzen, Jr., "Clinical and Epidemiological Principals of Anthrax," *Emerging Infectious Diseases*, Vol.5, No. 4, July-August 1999, pages 552-555.

City of Vacaville, *Comprehensive Annexation Plan 2001-2015*.

City of Vacaville, *Development Impact Fee Study*, February 1992.

City of Vacaville, *Easterly WWTP Expansion Project Draft EIR* (SCH #97062009), October 1997.

City of Vacaville, *General Plan Policy Document*, Transportation Element, November 1999.

City of Vacaville, *Infrastructure, Facilities and Services, Status Report 2003 Update*, January 2003.

City of Vacaville, *Lower Lagoon Valley Development Project* (State Clearing house No. 90030075), August 1990.

City of Vacaville, *Lower Lagoon Valley Development Project* (State Clearing house No. 90030075), August 1990, Exhibit "A";

City of Vacaville, *Lagoon Valley Design Guidelines*, *An Amendment to the Policy Plan for Lagoon Valley*, Adopted March 1992.

City of Vacaville, *Lagoon Valley Draft EIR*, August 1990.

City of Vacaville, *Lower Lagoon Valley Specific Plan*, Figure 13: Primary Views.

City of Vacaville*, Standards of Response Cover Study (Volumes 1 and 2),* Draft Report, July 11, 2003.

City of Vacaville*, Standards of Response Cover Study (Volume 2),* Draft Report, July 11, 2003; revised on December 1, 2003 per Fred Buderi and Fire Department comments.

City of Vacaville*, Vacaville General Plan*, Volume *One: Plan Policies*, Adopted August 1990; Amended November 1999.

Coop, Leigh. Director of Facilities, Vacaville Unified School District, written communication, June 12, 2003.

Coop, Leigh. Director of Facilities, Vacaville Unified School District, written communication, June 24, 2003.

Dupras, D.L., J. Lloyd, S.L. Kohler, and P.A. Lowry, *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento – Fairfield Production — Consumption Region*, California Geological Survey, Special Report 156, 1988, Plates 31 and 32 (scale 1:48,000).

ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Residential Portion*, September 30, 2003.

ENGEO Incorporated, *Phase One Environmental Site Assessment, Lagoon Valley, Business Portion*, September 30, 2003.

ENGEO Incorporated, *Preliminary Geotechnical Exploration, Lagoon Valley, Vacaville, California*, July 25, 2003.

ENGEO Incorporated, *Preliminary Geotechnical Exploration, Commercial Development, Lagoon Valley, Vacaville, California*, August 14, 2003.

ENGEO Inc., *Phase I Environmental Site Assessment, Office/Commercial Portion*, August 15, 2003.

Environmental Science Associates, *Nut Tree Ranch Development Project, Draft Environmental Impact Report*, March 2002.

Far Western Anthropological Research Group, Inc., *Archaeological Survey for the Lower Lagoon Valley Project*, Vacaville, Solano County, California, September 2003.

FEMA Flood Insurance Rate Map, *City of Vacaville, California, Solano County*, January 17, 1997, Panel 060373-0013 C & 060373-0011 C.

Gunby, Michael. Land Project Analyst, Pacific Gas & Electric Company, written communication, August 8, 2003.

Gunby, Michael. Land Project Analyst, Pacific Gas & Electric Company, oral communication on October 7, 2003.

Gunby, Michael. Land Project Analyst, Pacific Gas & Electric Company, written communication, December 15, 2003.

Harrison, Bob. Police Chief, Vacaville Police Department, written communication, June 13, 2003.

Harrison, Bob. Police Chief, Vacaville Police Department, written communication, August 5, 2003.

Harrison, Bob. Police Chief, Vacaville Police Department, written communication, September 22, 2003.

Hickman, J.C., Ed. *The Jepson Manual – Higher Plants of California*. 1993.

Jennings, C.W., *An Explanatory Text to Accompany the 1:750,000 Scale Fault and Geologic Maps of California*, California Department of Conservation, Division of Mines and Geology (now the California Geological Survey), Bulletin 201, 1985.

Jennings, C.W., *Fault Activity Map of California and Adjacent areas, with locations and ages of Recent Volcanic Eruptions*, Geologic Data Map No. 6, California Geological Survey, 1994, scale 1:750,000, accompanied by 92 pages of explanatory text.

Jennings, Mark R. and Marc P. Hayes. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Natural Heritage Division, 1994.

JRP Historical Consulting Services, *Historic Resource Evaluation Report, Lagoon Valley Project*, Vacaville, Solano County, California, October 2003.

Kendricks, Staci. Management Analyst II, City of Vacaville Fire Department, verbal communication, September 24, 2003.

LSA Associates, Inc., *Biological Resources, Lagoon Valley Property*, Solano County, September 23, 2003.

LSA Associates, Inc., *City of Vacaville Proposed Lagoon Valley Lake Management Plan*, October 13, 1999.

LSA Associates, Inc., *Delineation of the Waters of the United States on the Lagoon Valley Residential/Commercial Project Site*, Solano County, California, October 7, 2003.

LSA Associates, Inc., *Watershed Restoration Plan – Lagoon Valley Lake,* June 1, 2003.

Moore, Frank. Fire Chief, Vacaville Fire Department, written communication, June 13, 2003.

Moore, Frank. Fire Chief, Vacaville Fire Department, written communication, June 13, 2003; revised on December 1, 2003 per Fred Buderi and Fire Department comments.

Nolte Associates, Inc., *SB610 Water Supply Assessment Report for Lagoon Valley, Southtown, and Rice McMurtry*, September 2003.

Nolte Associates, Inc., *Water System Master Plan, City of Vacaville*, May 1990.

Peat, Lori. Associate Planner, City of Vacaville, personal communication, June 10, 2003.

Pelz, Jeff. West Yost & Associates, personal communication, December 2003.

Pierce, Rob. Director of Facilities, Fairfield-Suisun Unified School District, written communication, August 7, 2003.

Reyes, Tom. "Comments Regarding Scope of EIR Lower Lagoon Valley Development," letter to Fred Buderi, City of Vacaville, April 10, 2003.

Schaub, Chris. Crime Analyst, Supervisor, Crime Analysis Section, Vacaville Police Department, written communication, June 20, 2003.

Sitts, John. Profiles Coordination Supervisor for www.ciwmb.ca.gov/Profiles/, verbal communication, September 23, 2003.

Summers Engineering, Inc., "Lower Lagoon Valley Project" letter from Roger Reynolds, to Jim Daniels, Solano Irrigation District, September 23, 2003.

State Water Resources Control Board, Phase II Small Municipal Separate Storm Sewer (MS4) Program, SWRCB website, accessed February 11, 2003.

State Water Resources Control Board – Water Quality, Storm Water Program – Construction Frequently Asked Questions, SWRCB website http://www.swrcb.ca.gov/stormwtr/constfaq.html, accessed June 23, 2003.

Stebbins, Robert C. *A Field Guide to Western Reptiles and Amphibians*, Second Edition, Revised. Houghton Mifflin Company, 1985.

Steinbrugge, K.V., J.H. Bennett, H.J. Lagorio, J.F. Davis, G.A. Bordardt and T.R. Toppozada, *Earthquake Planning Scenario for a Magnitude 7.5 Earthquake on the Hayward Fault in the San Francisco Bay Area*, California Geological Survey, Special Publication 78, 1987, 243 pages, 12 scenario maps, scale 1:200,000, see maps and accompanying text on adjacent page.

Stinson, M.C., M.W. Manson, and J.J. Plappert, *Mineral Land Classification: Aggregate Materials in the San Francisco — Monterey Bay Area, Part III: Classification of Aggregate Resource Areas, North San Francisco Bay Production — Consumption Region*, California Geological Survey, Special Report 146, Part III, 1983, Plate 3.2 (scale 1:125,000).

Tibor, D.P., Ed. California Native Plant Society's Inventory of Rare and Endangered Plants of California. 2001.

Travis Air Force Base Guide, http://www.travis.af.mil/news/base_guide/, accessed September 11, 2003.

University of California, Berkeley, Museum of Paleontology, UCMP Online Database search, August 2003. (http://elib.cs.berkeley.edu/ucmp/index.shtml); R.W. Graymer, D.L. Jones and E.E. Brabb, Geologic Map and Map Database of Northeastern San Francisco Bay Region, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-2403, 2002.

U.S. Center for Disease Control (CDC), Disease Information on Anthrax, http://www.cdc.gov/ncidod/dbmd/diseaseinfo/anthrax_t.htm, Accessed on October 1, 2003.

U.S. Department of Agriculture, Fact Sheet on Anthrax, http://www.usda.gov/homelandsecurity/anthraxfs.htm, Accessed on October 01, 2003.

U.S. Department of Agriculture, Natural Resources Conservation Service, *Soil Survey of Solano County, California,* May 1977.

U.S. Department of Agriculture, Natural Resources Conservation Service, *Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance: Solano County*, October 1980.

U.S. Department of Agriculture, Natural Resources Conservation Service, *Soil Survey of Solano County, California*, May 1977.

USFWS, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle*, July 9, 1999.

USFWS Sacramento Fish and Wildlife Quad Species Lists Website http://sacramento.fws.gov/es/spp_lists/QuadName_Search.cfm

Wallace, R.E., "General Features", in Wallace, R.E., ed. *The San Andreas Fault System, California*, U.S. Geological Survey Professional Paper 1515, January 1990.

West Yost & Associates, *2003 Annual Data Report – City of Vacaville Infiltration and Inflow Program*, June 24, 2003.

West Yost & Associates, *City of Vacaville 2000 Sanitary Sewer Flow Metering Master Plan (Draft),* May 5, 2000.

West Yost & Associates, *Lagoon Valley Draft Environmental Impact Report Facilities Plan,* Potable and Irrigation Water Systems, April 1990.

West Yost & Associates, *Project Report, Easterly Wastewater Treatment Plant Renovation & Expansion Facilities Plan,* July 7, 1998.

West Yost & Associates, *Solano County Water Agency Hydrology Manual*, June 1999.

Working Group on California Earthquake Probabilities, *Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 - A Summary of Findings,* United States Geological Survey Open File Report 99-517, Online Version 1.0, 1999.

8. REPORT PREPARATION

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TECHNICAL APPENDICES

TECHNICAL APPENDIX A

Notice of Preparation
Environmental Impact Report For
The Lower Lagoon Valley Project

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TO: Interested Persons

FROM: Fred Buderi, Planning Project Manager

DATE: March 13, 2003

SUBJECT: NOTICE OF PREPARATION: ENVIRONMENTAL IMPACT REPORT FOR THE LOWER LAGOON VALLEY PROJECT (03-003)

PUBLIC REVIEW PERIOD: March 13, 2003 through April 11, 2003

The City of Vacaville, Planning Division is circulating this Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed Lower Lagoon Valley project. The California Environmental Quality Act (CEQA), Section 15082, requires that once a decision is made to prepare an EIR, the lead agency must prepare a Notice of Preparation (NOP) to inform all responsible agencies of that decision. The purpose of the NOP is to provide responsible agencies and interested persons with sufficient information describing the Proposed Project and its potential environmental effects to enable them to make a meaningful response as to the scope and content of the information to be included in the EIR.

Project Location

The proposed Lower Lagoon Valley project submitted to the City by Triad Communities would be located on approximately 729 acres located in the Lower Lagoon Valley area of the City of Vacaville (see Figure 1). The Proposed Project site is located on the southeast side of I-80 from Lagoon Valley Road to the City limits. The site is surrounded by a range of hills to the south and east, the Lagoon Valley Lake to the north and I-80 to the west. The project area now contains residential uses, open land and/or grazing and agricultural uses, including the large Hines Nursery facility.

Project Description

The City selected Triad Communities' proposed land use plan as meeting the requirements for consideration of a General Plan Amendment and other related actions on February 11, 2003. The proposed project would consist of a residential community with approximately 1,300 homes, a championship style golf course, neighborhood commercial uses, and open space areas. The project area will also include an adjacent business park area, and would include funding for improvements to the existing Lagoon Valley Regional Park.
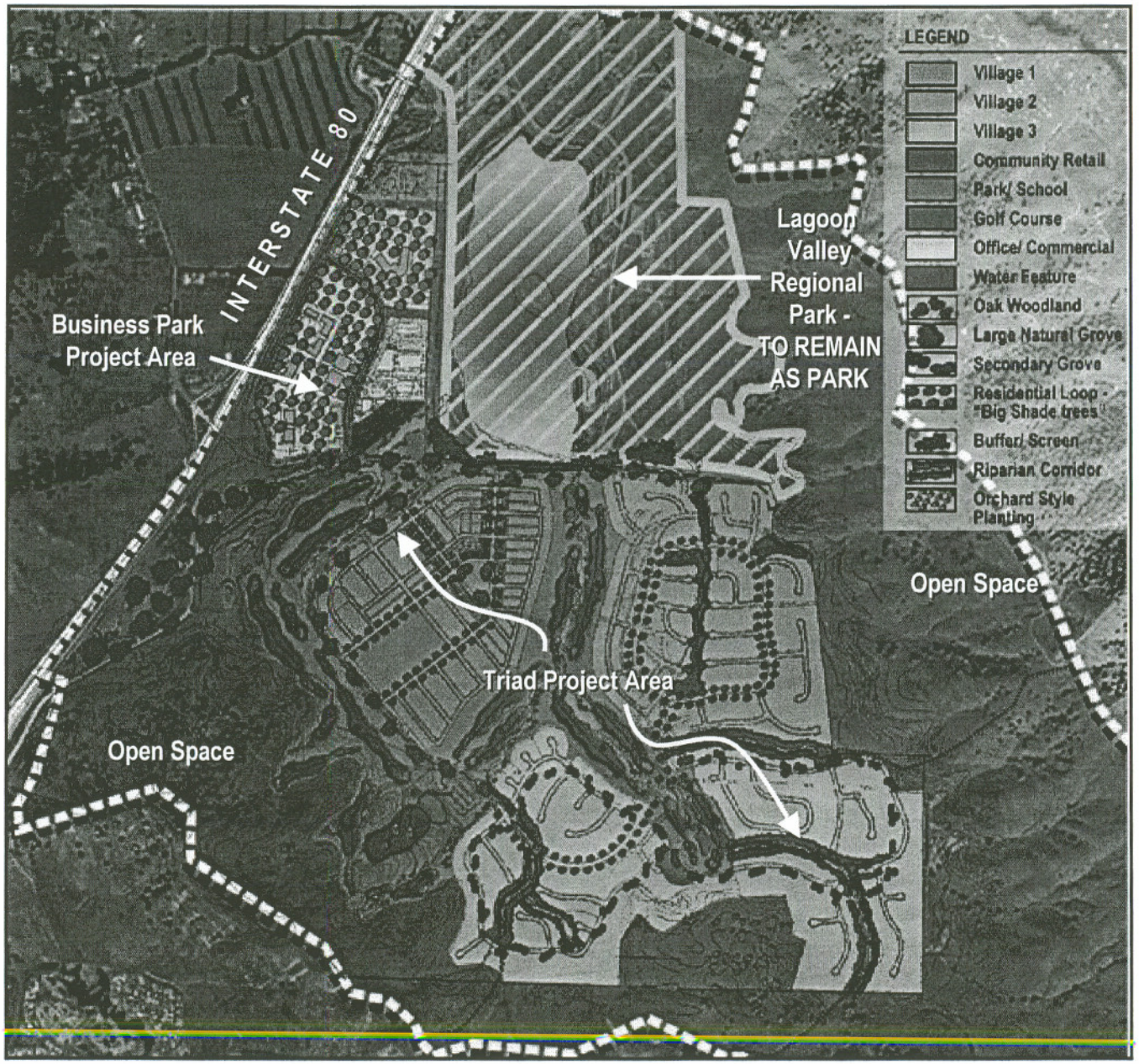
Figure 1 - Proposed Lower Lagoon Policy Plan and Surrounding Areas