3.5 CULTURAL RESOURCES

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INTRODUCTION

This section of the EIR describes the cultural resources, both prehistoric and historic, and the paleontological resources existing or potentially existing on the project site. Prehistoric resources are those sites and artifacts associated with indigenous, non-Euroamerican populations, generally prior to contact with people of European descent. Historical resources include structures, features, artifacts, and sites that date from Euroamerican settlement of the region. Paleontological resources consist of the fossils of plants, animals, and other organisms, as well as the geological deposits in which fossils are found.

The extent to which development of the proposed project could remove, damage, or destroy existing cultural or paleontological resources is evaluated in this chapter. The Cultural Resources chapter is based on information in the Sonoma County General Plan,[1] the Sonoma County General Plan EIR,[2] the Paleontological Sensitivity and Monitoring Report prepared by James R. Allen,[3] the Cultural Resources Assessment prepared by Maximillian Neri of North Coast Resource Management, Inc. (NCRM),[4] the archaeological investigation conducted by Tom Origer & Associates, [5] and a supplemental investigation conducted by Tom. M. Origer & Associates.[6] In conformance with California Government Code Section 6254.10 the cultural resources reports are not provided as appendices to this document to protect sensitive historical resources. The documents are on file with California Department of Forestry and Fire Protection, and are available for the review by qualified persons.

ENVIRONMENTAL SETTING

The project site is situated on and around the crest of Beatty Ridge, which separates the South Fork of the Gualala River and the Wheatfield Fork of the Gualala River from Buckeye Creek and Buckeye Creek's tributaries. Beatty Ridge trends generally northwest to southeast, the portion located in the project site is approximately 700-800 feet above sea level. The ridge crest is relatively gentle with soils belonging primarily to the Goldridge and Hugo series. Goldridge soils are moderately well-drained fine sandy loams underlain with sandstone, while Hugo soils are well-drained gravelly loams underlain by sandstone and shale. In their natural state, Goldridge soils support forest trees including redwood, Douglas fir, baywood, and oak, and Hugo soils support Douglas fir, redwood, and California laurel. Historically, lands that contained these soils were used for timber, orchards, range, and pasture.

The project site consists of mixed grassland and young-growth redwood/Douglas fir forest, with a hardwood component including tanoak, pacific madrone, and various oak species. Historically, a large portion of the site was utilized as an apple orchard and for sheep grazing. Currently, the project site contains an old barn and the remnants of a sawmill. The site has remained fallow since approximately 1964.

Major creeks do not flow through the project area, although drainages forming the heads of several creeks are located throughout the site. Within the general project area, one location might have served as a fresh water source for prehistoric residents. The head of an unnamed creek located near the northeast corner of the property appears to contain a seep based on damp soils and the species of plants observed in that location.

The following discussion of the cultural and historical resources addresses both the paleontological and cultural artifacts potentially located on the project site. Paleontological artifacts are fossilized flora and fauna. Cultural artifacts are those that are related to human habitation, both pre- and post-European contact.

Paleontological History

The geology of the area consists of the Jurassic-Early Tertiary era Franciscan Complex soils overlain by the Pliocene era Ohlson Ranch soil formation. The relationship between the layers is not uniform, and in some areas weathering has exposed Franciscan soils. An extensive collection of marine fauna from the Ohlson Ranch Formation is curated at the California Academy of Sciences (CAS), Golden Gate Park, California, and the University of California Museum of Paleontology (UCMP) at U.C. Berkeley. A list of this fauna is included in the Paleontological Sensitivity and Monitoring Report. These fossils were collected by Charles G. Higgins and Charles E. Weaver, and studied by Joseph P. Beck. The fossil fauna collected from the Ohlson Ranch Formation to date are predominantly marine pelecypods, gastropods, and vertebrates (in particular, whale). During site investigation, burrows by marine organisms were encountered in the friable sandstone of the Ohlson Ranch Formation. Overlying soils encountered during the site investigation were dominantly 1-2 feet thick and consist of organic A-horizons.

Cultural Setting

Pre-Contact Native American History

Archaeological evidence indicates that human occupation of California began at least 12,000 years ago. Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on extended family units. Later, milling technology and an acorn economy were introduced. As the economy diversified populations grew. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

At the time of European settlement, the study area was near the boundary between the Kashaya and Southern Pomo groups. Both groups lived similar lifestyles. In general, the Pomo peoples practiced a diversified hunter-gatherer strategy that exploited various resources according to seasonal availability and territorial access. The relatively rich environment had large carrying capacities that allowed for dense populations with complex social structures. The Pomo settled in large, permanent villages about which were distributed seasonal camps and task specific sites. Primary village sites were occupied throughout the year, and other sites were visited to procure

particular resources that were especially abundant or available seasonally. Sites often were situated near fresh water sources and in areas where plant life and animal life were diverse and abundant.

The division between the various Pomo groups is based on distinct linguistic differences. Linguists Sally McLendon and Robert L. Oswalt cite E.W. Gifford in further defining the divisions present within each particular Pomo group: "[Each tribe was] divided into a number of small groups, which at one time or another have been called tribes, villages, village communities or tribelets. Each of these was completely autonomous and owned a tract of land that might or might not be exactly defined, but was substantially recognized by all neighboring communities. According to most informants, nearly every community spoke a slightly but perceptibly distinct subdialect (dialect of one of the seven languages). Each normally possessed a main settlement or village which in many of the groups appears to have been fixed for generations."[7]

Settlement patterns and the tracts claimed by the various "village-communities" were largely dependent upon the terrain and ecology, with the size of the claim directly related to its ability to provide a suitable resource base. The wide variability in these factors resulted in far-flung communities in the more inhospitable regions and denser, more concentrated habitation in favorable areas such as along the major rivers and creeks. The coastal areas and inland oak forests were the favored source of foodstuffs, with the coastal redwood belt generally providing far less opportunities. Inland groups would make regular trips along various creeks and rivers, and larger ridgelines, as well as to the coast to gather the abundant shellfish, seaweed, and fish resources. Similarly, the large habitation sites such as villages tended to be concentrated on the major inland rivers or the coastal plains, with the interior and coastal ridges used only temporarily or periodically by the various groups; these latter types of use are generally reflected in smaller and potentially more specialized sites reflecting travel or area-specific hunting or gathering activities.

The terrain in the vicinity of Annapolis is generally much gentler and flatter that other inland areas associated with the North Coast Range, making the region somewhat unique and likely more attractive to prehistoric habitation. As such, the location and density of archaeological sites within this particular area may reflect patterns outside of the typical Northern Coastal habitation model. Thus, prehistoric archaeological evidence within the Kashaya Pomo region may actually reflect travel by more inland groups through the region.

Post-Contact History

The earliest documented European contact with the central or northern Pomo peoples was recorded by Colonel Redick McKee on an 1851 reconnaissance of the Russian River region. The Kashaya peoples were first contacted by the Russians associated with the Fort Ross colony of 1812 to 1841. The significant growth of historical settlement began around 1860, with the coastal areas and interior regions around the Russian River quickly settled by homesteaders. Habitation gradually spread westward from the interior valleys and eastward from the coastal regions as timber harvesting and agriculture became established as the predominant industries.

The project area has been settled by non-Native American homesteaders since at least since 1875, as indicated in the records check; an 1875 Government Land Office (GLO) map depicts the

presence of "Maling's House" in the northeast corner of the THP area along the Annapolis Road. The same map also depicts the "trail from the coast;" the historic route is the same as the current Annapolis Road. The records survey also indicates the presence of historical barns in the northeast portion of the property and suggests that these may have some historical value. The barn and a small outbuilding were likely over 120 years in age and situated on the adjacent property; both were completely destroyed by fire in 2001. The remains of a fruit (apple) dryer is still present adjacent to Annapolis Road in the area where the barns stood.

The Annapolis Historical Society responded to the author's request for any historical information with an initial letter dated August 12, 2000 describing a brief history of the property and a discussion of some of the known historical resources within the project vicinity. The letter noted the presence of two historical sawmills, the Horicon School and the Annapolis Cemetery. The author subsequently contacted the Historical Society to ascertain whether the locations of the two sawmills were specifically known and received a second response dated October 4, 2000. The second letter indicated that the two historic sawmills were present within the project area. Eventually, in the course of an unrelated project in the Annapolis vicinity, the author was able to meet with local landowner and historical society member Gary Craig and further discuss the presence of the two mills, the exact location of only one of which was known (the mill recorded herein as Artesa Site-06/H).

Timber Industry History

Lumber trade in California began as early as 1776 when timber was shipped from Monterey south to the Misión San Diego Alcalá. While this operation was not large scale, it was enough to supply the lumber needs of the state at that time. Some of the first sawmills in the state were in Sonoma County, the first water-powered mill on Mark West Creek (1834), and the first steam-powered mill near Bodega (1844).

As the population in California grew, so did the construction needs of the people. The lumber industry gradually grew over the next twenty years and in the late 1860s, large-scale logging operations began to be developed in Humboldt County (Cornford 1987:14-15). By the 1880s, investors from the other parts of the United States were beginning to take an interest in the potential profits that the lumber industry in California offered. The Korbel brothers of Sonoma County first created Humboldt Lumber Mill Company in 1883 and four years later investors from Nevada started the Pacific Lumber Company (Cornford 1987:14-15). Locals continued to own most of the mills along the Pacific Coast at this time, however small operations were often unable to compete with larger ones and eventually would sell to larger companies, or go bankrupt (Medin 1994:29).

Lumbering was a dangerous job which required long hours. Worker unrest was common. However, because of the somewhat transient nature of the mill employees, organizing unions and protest meetings was difficult (Medin 1994: 74). Mill owners also refused to acknowledge unions, putting out a statement in 1903 that they would not negotiate with them (Medin 1994:74). The statement was representative of the sentiment of the mill owners for nearly forty years. In spite of these difficulties, Humboldt County lumber workers were able to organize the first international union of lumber workers, the International Brotherhood of Woodsmen and

Sawmill Workers (IBWSW) in 1905 (Cornford 1987:135). The Industrial Workers of the World came to town the same year (Medin 1994:75).

The first major labor issue that workers had was the length of the work day. Although the work day varied from mill to mill, the establishment of the 10-hour work day, down from 12-hours, was a major accomplishment (Cornford 1987:24). Throughout the early part of the twentieth century, unions continued to fight for the rights of their members, and mill owners continued to fight against their demands. It was not until the 1940s that unions began to be recognized by mills. This was possibly due to the smaller work force and increased demand brought on by World War II (Medin 1994:76-77).

In 1946 a major strike affected all of California lumbering and closed all the mills in Mendocino, Humboldt, and Del Norte counties (Melendy 1952 cited in Medin 1994:77). However, other sources state that Arrow Mills continued operation after signing wage agreements with the Lumber and Sawmill Union, A.F. of L (Mendocino County Historical Society 1996:3). Although mills were able to hire on enough hands to resume business, the strike did not end until 1948. While unions were unable to obtain the demands made by their members, the strike showed mill owners that labor unions were here to stay. This helped change the mindset of mill owners, and after this point they began to work with unions to help solve hour and wage problems, safety issues, and improve living conditions (Medin 1994:78).

Although logging and milling slowed during the depression, World War II required significant resources which reinvigorated the industry. The boom that came after the war was over continued to support the lumber industry for many years (Mendocino County Historical Society 1996).

Onsite Mill History

The mills on the Artesa property would be considered small in relation to the industrial operations to the north. There were three phases of ownership for the on-site mills. The first mill was owned and operated by John Patchett, Harding Chenoweth, and Jim Peoples beginning in 1938. The mill employed approximately 22 men many of whom lived on site with their families year round. According to local residents this first mill closed around 1941.

The second generation operation likely began in 1946. The owner of the property, Merle Evans, entered into a contract with C. R. Gordon (SCRO 1946) who planned to harvest lumber on the property. At that time, Gordon was also given the right to make any improvements to the parcel needed to conduct his timber harvest. Further documentary evidence of Gordon's operation does not exist, and none of the local residents interviewed by Origer & Associates in April 2008 could recall any milling activity during Gordon's five year lease. The possibility exists that Gordon's plans were thwarted by the 1946 lumber workers' strike.

The final phase of milling on the property was the Fish and Mullins Lumber Company, which operated from 1952 to about 1956. This operation appears to have been similar in scale to the Patchett, Chenoweth, and People's mill.

Archaeological Context

The northwestern region of Sonoma County has received little archaeological investigation beyond surface surveys. However, nearby localities, such as the Warm Springs Dam to the east and Salt Point State Park to the south have been the locations of several site investigations. Those studies, combined with regional investigations, have provided a basic chronology and understanding of local archaeology.

A regional chronology has been developed for the area, which clearly shows that native peoples have occupied the region for over 12,000 years, and during that time shifts took place in their social, political, and ideological regimes (Fredrickson 1984:506). In addition, a three-phase sequence has been defined for the Warm Springs Dam project area. The sequence emphasizes later occupation of the Warm Springs Dam area spanning a period from 5,000 years ago to the time of Euro-American settlement. The sequence relies heavily on obsidian, which is taken to be an indicator of exchange, neighbor interaction, and population movement. Research at archaeological sites along the Sonoma County Coast that has provided information regarding occupation and use of the coastal environment has been largely based on the importation/movement of interior resources (including obsidian) to the coast.

The current project area is located within a region that has experienced occupation over a long period, stretching from approximately 12,000 years ago until the present. During that time, a number of groups have moved in and out of the region and adapted their social-economic systems to a rich environment that included nearby coastal, riverine, and upland terrestrial resources.

Information generated by the numerous regional site investigations provided Fredrickson (1974, 1994) with data used to develop one of the more recent chronologies applicable to this portion of California's North Coast Ranges. The following chronology is based largely on Fredrickson's (1974, 1994) research with modifications based on recent research.

Emergent Period (approximately 200 – 1,000 years ago)

Upper Emergent Period characteristics include the appearance of the clam disk bead money economy. Local specialization in the production and exchange of goods increased as trade expanded in both volume of goods and distances traveled. South and central exchange systems were interpenetrated.

Lower Emergent Period characteristics included the introduction of the bow and arrow, which largely replaced the dart and atlatl. South coast marine adaptations flourished. Territorial boundaries became well established, and regularized exchange between groups continued with increased goods being exchanged. Researchers have also found evidence of distinctions in social status within groups that is linked to increased wealth.

Archaic Period (approximately 1,000 – 8,000 years ago)

Upper Archaic Period characteristics include the growth of social-political complexity, including status distinctions based on wealth. Shell beads increased in importance during this period as they appear to serve as indicators of both exchange and wealth. Group-oriented religious organizations are also apparent, which may have been the origin of the Kuksu religious system. Exchange systems became more complex with regularized sustained exchanges occurring between groups. Territorial boundaries remained fluid as groups expanded and contracted.

Middle Archaic Period characteristics include a change in the climate, which became more benign. The economy became more diverse; including the introduction of acorn use as suggested by use of mortars and pestles. However, hunting was also important as evidenced by the abundance of dart tips. Groups were also increasingly sedentary as populations increased.

Lower Archaic Period characteristics include lakes drying due to climatic changes. Abundant milling stones suggest a strong emphasis on plants/small seeds for food, while relatively little hunting appears to have occurred. Limited exchange took place, and there was a reliance on the use of local materials. Wealth was not emphasized during this period, and the dominant social unit appears to be the extended family.

Paleoindian Period (approximately 8,000 – 12,000+ years ago)

Humans first entered California during the Paleoindian Period. Lakeside sites were established with a probable emphasis on hunting. This period is characterized by a lack of milling technology. Exchange of goods was conducted on a one-to-one basis and was not regularized. Social units consisted of extended families that were largely self-reliant, and moved to resources as they became available and were needed.

Existing Cultural Resources

Maximilian Neri Site Investigations

Six cultural sites were observed and recorded by Maximilian Neri during initial site investigations. Neri reported the condition of the six cultural sites as follows:

Artesa Site-01

Artesa Site-01 is a prehistoric site consisting of a dense shell midden deposit with groundstone and a few lithic artifacts. The site is located on a small semi-discreet bench between two seasonal drainages. Vegetation on site consists of seasonal grasses and a few redwood trees; unlike the historically cleared areas to the west and north, the site area appears to have been a natural meadow. A small perennial spring is located in the drainage to the southwest of the site.

Noted on site were thousands of shell fragments, extensive amounts of fire-cracked rock, several groundstone fragments and a few (15+/-) Franciscan chert flakes. Midden soils are a uniform dark brown and were easily distinguished from the surrounding light tan non-midden soils. The midden

measures approximately 50 x 30 meters in size and may be up to one meter in depth and possibly even more.

Artesa Site-02

Artesa Site-02 is a prehistoric site consisting of a rather sparse lithic located on a small knoll top within a ridgeline. Vegetation on site is primarily manzanita and tan oak, and is indicative of extensive previous ground disturbance and timber harvesting. The Neri evaluation noted one lanceolate chert projectile point, 15+ Franciscan chert flakes, 5 obsidian flakes, one groundstone (mano) fragment, and several fragments of possibly fire-effected rock on site.

Artesa Site-03

Artesa Site-03 is a prehistoric site consisting of an extremely sparse scatter of Franciscan chert flakes (10+), two groundstone fragments and one Monterey chert biface fragment (designated Artessa Site-03-01). The site is located on the edge of a broad, gently sloping ridgeline, just to the north of a seasonal drainage; vegetation on site consists of seasonal grasses and a few old fruit trees, remnants of a much larger orchard that was originally present. Some portions of the site have suffered from severe topsoil erosion, with several incised channels and broad areas of exposed eroding sandstone bedrock; some artifacts are likely to have eroded away into the seasonal drainage to the south along with the topsoil.

Artesa Site-04

Artesa Site-04 is a prehistoric site consisting of a sparse scatter of Franciscan chert flakes (15 plus), one possible groundstone fragment, three obsidian flakes, one Monterey chert flake, and one Franciscan chert biface fragment. The site is located on a small knoll on the edge of a broad, gently sloping ridgeline, just to the east of a seasonal drainage. Vegetation on site consists of seasonal grasses, redwood trees and various shrubs, including whitethorn; a large and very dense brush patch obscures the central portion of the site, making effective investigation difficult. The entire site has suffered from mechanized impacts and probable agricultural impacts; a seasonal road passes along the eastern edge of the site and through the southern portion.

A small scatter of historical debris, including pottery, glass and metal fragments and auto parts, and a small pile of milled lumber are also present on site. The scatter of historic debris appears to represent a small dump rather than the location of historical activity or habitation.

Artesa Site-05

Artesa Site-05 is a prehistoric site consisting of a widely dispersed low-density lithic scatter located on the edge of a broad, flat ridgetop and bordered on the west by a steeply incised seasonal drainage. The site is situated on the ecotone between mixed hardwood and conifer forest and some possibly natural meadow areas to the east. Observed on site were approximately 50+ Franciscan chert flakes, several small groundstone fragments, 5+ Monterey chert flakes, 20+ obsidian flakes and several fragments of probable fire cracked rock. The artifacts appear to be

somewhat concentrated in the northern portion of the site in the vicinity of a cleared landing but this may be due to increased visibility in this portion of the site.

Mechanized equipment, timber harvesting and some landscaping have heavily impacted all portions of the site; the southeastern portion of the site is close to the historical mill recorded as Artessa Site-06/H that is likely responsible for most of these impacts. The second mill known to have been present in the vicinity may have been located within the site boundaries, however, clear evidence of such was not noted besides the numerous road and landscaped areas. Extensive amounts of more recent trash is present on and around the site area, including a 1960s Jaguar and other auto and truck remains, various logging debris and household trash generally dating to the 1960-70s.

Artesa Site-06H

Artesa Site-06H is a historical mill probably dating to the 1920-30s and located on top of a broad, flat ridgetop. All that remains of the site is an extremely decomposed foundation consisting of large redwood beams with some of the main floor joists still visible as well. Surrounding the foundation is extensive evidence of landscaping and grading, and the entire area adjacent to the mill has clearly been leveled as evidenced by large push piles of soils and some trash present mostly to the southwest of the mill. In addition various historical trash items are present, many in the above mentioned push piles, including iron pipe sections, clear and colored glass fragments, miscellaneous machinery and cable fragments, automotive parts and various food tin fragments.

An improved dirt road passes just south of the mill and a second much smaller collapsed structure that may be a garage is located adjacent to the road and roughly 120 feet southwest of the mill. This structure appears to be more recent than the mill itself despite the fact that the structure is completely collapsed, as the milled board fragments are much less deteriorated than the mill foundation.

<u>Tom Origer & Associates Site Investigations</u>

Based on Neri's descriptions, Tom Origer & Associates was contracted to conduct archaeological investigations of three of the previously discovered prehistoric archaeological sites referred to as Artesa Site-02, Artesa Site-03, and Artesa Site-05. Additionally, a historic/modern lumber mill site, Artesa Site-06H, was subjected to archival research, surface inspection, and mapping to assess the site's historical value. Artesa Site(s)-01 and -04 were not assessed by Tom Origer & Associates as they do not lie within the proposed development area.

Artesa Site-02

The matrix at Artesa Site-02 was generally a light-gray, fine sandy loam. Surface soil had a relatively loose texture; however, with depth the soil became more compact. The parent material is sandstone. One hundred and twenty eight archaeological specimens were recovered from Artesa Site-02 by Tom Origer & Associates, including: one projectile point, three bifacially worked fragments, three edge modified pieces (EMPs), one chopper made of glaucophane (blue)

schist, four grinding slab fragments, six handstones, one pestle, two Annadel obsidian flakes, two Borax Lake obsidian flakes, two Mt. Konocti obsidian flakes, and a large number of chert flakes.

Seven obsidian specimens were recovered at Artesa Site-02, and all were subjected to hydration band analysis. The information obtained from the dating indicates that the use of obsidian at Artesa Site-02 was relatively long in that the period of use spanned from the Middle Archaic through Emergent periods. The hydration measurement range suggests that site occupation ranged from approximately 2,600 to 450 years before present.

Artesa Site-03

The matrix at Artesa Site-03 is generally marked by gray sandy loam. The topsoil is underlain by a transition zone of decomposing sandstone that lies atop sandstone bedrock. Fifty-eight archaeological specimens were recovered from this site, including: two bifacially worked fragments, one EMP, ten Annadel obsidian specimens, 6 Borax Lake obsidian flakes, seven Mt. Konocti obsidian flakes, 22 Napa Valley obsidian flakes, and 10 chert flakes. Specimens were not found below 20cm within the site area, and of the 55 pieces of debitage, 30 were recovered from the ground surface and 25 were recovered from the ground surface down to 20 cm. Origer determined that the site was more substantial than as described by Neri.

Napa Valley obsidian dominates the collection and makes up slightly more than 50 percent of the obsidian debitage. The greater number of Napa Valley specimens, which represent a wider range of debitage types, suggest that the network responsible for transportation of this commodity across space was focused on this obsidian. The predominance of Napa Valley obsidian suggests that there was a relatively strong tie between the occupants of Artesa Site-03 and the people (Wappo) who controlled Napa Valley obsidian.

Twenty specimens were subjected to obsidian hydration dating. Based on the obsidian hydration dating the use of obsidian at Artesa Site-03 was relatively long. The activity spanned primarily from the Middle Archaic through Emergent periods, with emphasis during the Middle Archaic Period. The site occupation ranged from approximately 5,000 to 400 years before present.

Artesa Site-05

The site matrix at Artesa Site-05 generally was marked by deep brown loam soils that included roots and natural stone in low amounts. Generally, the soil strata appeared to be intact with only a small amount of disturbance to the uppermost stratum.

A total of 656 archaeological specimens (excluding the historic/modern items – see Artesa Site-06H Investigation Results) were recovered from Artesa Site-05. Included in the assemblage from this site were: three projectile points, 13 bifacially worked specimens, ten EMPs, four choppers, two mending pieces of a mortar, one pestle fragment, seven handstones, two mending pieces of a grinding slab, one net weight, a fragment of a steatite bowl, 41 Annadel obsidian flakes, 19 Borax Lake obsidian flakes, 65 Mt. Konocti flakes, 175 Napa Valley flakes, chert flakes, and a basalt flake. Steatite bowls are uncommon in this region. Origer found the site to be much more substantial than the “widely dispersed low-density lithic scatter” described by Neri.

Forty-five specimens were subjected to obsidian hydration dating. The measurements indicated that the specimens dated from the Upper Emergent Period to the Lower Archaic periods, a range of up to 7,800 years. Based on the measurements the use of obsidian at Artesa Site-05 was relatively long. The use spanned from the Middle Archaic through Emergent periods, with an emphasis in obsidian knapping/site occupation during the Upper Archaic. The overall site occupation range extended from approximately 5,000 to 200 years before present as estimated by Obsidian Hydration Dating. Possible trends appear with regard to the use of the sources over time. Obsidian from the Napa Valley source appears to dominate the Archaic Period occupation, while Annadel and Mt. Konocti obsidian dominate the Emergent Period occupation.

The findings clearly demonstrate that the site deposit has significant depth, with large numbers of specimens down to 70cm, and lesser numbers extending well below 100cm. Significant quantities of specimens are present across the site, primarily within the core area. Peripheral locations are marked by lower quantities of materials. Based on this investigation, the limits of Artesa Site-05 were adjusted to include a larger area than documented by Neri. The site boundaries were moved to the south and east.

Artesa Site-06H

Archival research with the Sonoma County Recorder's Office found that the Patchett family owned the property from the 1890s to approximately 1943. The family used the property for fruit farming. John Patchett is listed as a "general farmer" age 31 in the 1920 census and as a "fruit farmer" in the 1930 census (U.S. Bureau of the Census).

The property was sold to a Merle Evans in 1945 (Sonoma County Recorder's Office), and in 1946 Merle Evans entered into a contract with C. R. Gordon who planned to harvest lumber on the property. At that time, Gordon was also given the right to make any improvements to the parcel needed to conduct his timber harvest. Nothing specific was found regarding the construction of the mill; however, the mill and associated buildings likely date to the period of Gordon's timber lease. Merle Evans died in 1947, and his wife, who inherited the property (Sonoma County Probate Records), sold the property to their son, George Evans.

Field examination of the site area found that Artesa Site-06H clearly overlapped with the prehistoric archaeological site, Artesa Site-05. Therefore, historic/modern materials recovered from Artesa Site-05 are considered part of Artesa Site-06H.

A variety of objects were found in relation to Artesa Site-05, including: a button, ceramic fragments, glass fragments, nails, rubber fragments, metal objects, shells, and logs with protruding spikes. The objects are attributed to historic use as food and beverage containers, or objects related to work done on the project site.

Supplemental Investigation Site

The 1943 USGS topographic map shows up to six houses that appear to be outside the boundaries of Artesa Site-05, but within the project area and in close proximity to the known lumber mill operations. The portion of the lumber mill site where associated residences appeared

to be situated was subjected to a thorough surface examination in a search for historical remains associated with the mill workers' residences. In addition, a metal detector, probe, and pick and shovel were used to search for buried archaeological phenomena (e.g., artifact filled privy pits, trash deposits).

As a result of this work, two types of historic archaeological deposits were found that could satisfy criteria for inclusion on the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) in that they could yield information about the area's history. One type of deposit consists of "sheet refuse" which is often a relatively dispersed scatter of archaeological materials that accumulates at building (in this case, residential) locations. The second type of deposit is marked by concentrations of archaeological specimens. This second type of phenomenon is best described as a "dump" or place where people deliberately discarded items.

The types of archaeological specimens found in sheet refuse scatters and dumps include fragments of flat (window) glass, fragments of glass containers (bottles and jars), fragments of ceramic items (i.e., plates, cups, saucers), ferrous nails (wire shanks), amorphous pieces of metal, and milled boards. A primary distinction made between sheet refuse and dumps is that sheet refuse often presents itself as a thin deposit at and near the ground surface, while, in contrast, dumps can be marked by an accumulation of archaeological materials with substantial depth to the deposit. Six locations where these two types of archaeological deposits are present have been identified within the project area. All six locations of these archaeological deposits are excluded from vineyard development.

Regulatory Context

Paleontological Resources

Paleontological resources on federal lands are protected under various laws relating to the protection of public properties; these laws are enforced through the issuance of permits by the appropriate agencies.[8] Even though CEQA requires the disclosure of impacts to cultural resources, paleontological resources existing on private property within California are generally unprotected under State law. Although such resources may be protected under local laws or regulations, the Sonoma County General Plan does not specifically address paleontological resources.

Cultural Resources

Federal, state, and local governments have developed laws and regulations designed to protect significant cultural resources that could be affected by actions that they undertake or regulate. The National Environmental Policy Act (NEPA), the National Historic Preservation Act of 1966 (NHPA), the Antiquities Act, and the California Environmental Quality Act (CEQA) are the principal federal and state laws governing preservation of historic and archaeological resources of national, regional, state, and local significance.

Federal

National Historic Preservation Act

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 implementation 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 that are listed on or have been determined eligible for listing on the National Register of Historic Places. The criteria for determining National Register eligibility are found in 36 CFR Part 60. Amendments to the Act (1986 and 1992) and subsequent revisions to the implementing regulations have, among other things, strengthened the provision for Native American consultation and participation in the Section 106 review process. Although federal agencies must follow federal regulations, most projects of private developers and landowners do not require this level of compliance. Federal regulations only apply in the private sector if a project requires a federal permit or if the project uses federal money.

Under NHPA, the quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, material, handiwork, feeling, and association. Additionally, the National Register of Historic Places requires consideration of significance of any structure over 45 years old.

State

California Environmental Quality Act

State historic preservation regulations affecting this project include the statutes and guidelines contained in the California Environmental Quality Act (CEQA; Public Resources Code sections 21083.2 and 21084.1 and sections 15064.5 and 15126.4 (b) of the CEQA Guidelines). CEQA requires lead agencies to carefully consider the potential effects of a project on historical resources. An "historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record or manuscript that is historically or archaeologically significant (Public Resources Code Section 5020.1).

Advice on procedures to identify such resources, evaluate their importance, and estimate potential effects is given in several agency publications such as the series produced by the Governor's Office of Planning and Research (OPR).[9] The technical advice series produced by OPR strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associations and societies be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains.[10]

California Register of Historical Resources

The State Historic Resources Commission oversees the administration of the California Register of Historical Resources (CRHR) [Public Resources Code Section 5020.3(a)(8)]. Properties that are formally determined eligible for, or those that are listed on the National Register of Historic Properties (NRHP) are automatically listed on the CRHR, along with State Historical Landmarks and Points of Historical Interest [Public Resources Code Section 5024.1(d)(1)]. The CRHR can also include properties designated under certain local ordinances or identified through local historical resource surveys under certain circumstances [Public Resources Code Section 5024.1(d)(2-3)].

Senate Bill (SB) 18

Senate Bill 18, signed into law by Governor Schwarzenegger in September 2004, requires cities and counties to notify and consult with California Native American Tribes about proposed adoption of, or changes to, general plans and specific plans for the purpose of protecting Traditional Tribal Cultural Places ("cultural places"). Interim tribal consultation guidelines were published by OPR on March 1, 2005. However, the proposed project does not fall under the SB 18 requirements as defined by OPR.

Local

Sonoma County General Plan

The following applicable goals, objectives, and policies are from the 1989 Sonoma County General Plan:

Goal OS-9 Preserve significant archaeological and historical sites, which represent the ethnic, cultural, and economic groups that have lived and worked in Sonoma County.

Objective OS-9.1 Encourage the preservation and conservation of historic structures by promoting their rehabilitation or adaptation to new uses.

Objective OS-9.2 Encourage preservation of historic buildings or cemeteries by maintaining a Landmarks Commission to review projects, which may affect historic structures or other cultural resources.

Objective OS-9.3 Encourage preservation of archaeological resources by reviewing all development projects in archaeologically sensitive areas.

Policy OS-9c The County Landmarks Commission shall review Historic Building Surveys and make

recommendations for designation of structures or cemeteries as county landmarks.

Policy OS-9e	Refer applications, which involve the removal, destruction or alteration of a structure or cemetery identified in a historic building survey to the Landmarks Commission for mitigation. Measures may include reuse, relocation, or photo-documentation.
Policy OS-9f	Refer applications for discretionary permits to the Northwest Information Center to determine if the project site might contain archaeological or historical resources. If a site is likely to have these resources, require a field survey and include mitigation measures if needed. Discourage paving over resources.

IMPACTS AND MITIGATION MEASURES

Standards of Significance

Paleontology

The proposed project would be considered to have a significant effect on paleontological resources if the project were to cause a substantial adverse change to one or more scientifically significant fossil deposits on the project site, as determined by a qualified paleontologist.

Cultural Resources

Federal

National Register of Historic Places Criteria

Under Section 106, the importance of an identified historic property, or archaeological site is evaluated in terms of NRHP criteria put forth in 36CFR60, as follows:

The quality of significance is present in properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant in our past; or

(c) That embody the distinct characteristics of a type, period, or method of construction,

or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded or may be likely to yield, information important in prehistory or history.

State

California Register of Historical Resources Criteria

For the purposes of CEQA, an historical resource is a resource listed in, or determined eligible for listing in the California Register of Historical Resources (CRHR). When a project will impact an archeological site or other cultural resource, the determination must be made whether the site is an historical resource [Public Resources Code Section 15064.5(c)(1)]. According to Public Resources Code Section 15064.5(a)(3), a historical resource is defined as 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, or cultural annals of California. Generally, the 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 Resources (Public Resources Code SS5024.1, Title 14 CCR, Section 4852). The applicable criteria for evaluating cultural resources is as follows:

(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; or

(d) Has yielded, or may be likely to yield, information important in prehistory or history.

A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

California Forest Practice Rules Criteria

Additionally, 14 CCR Section 929.7 [949.7, 969.7] of the California Forest Practice Rules specifies that a determination of significance shall be made for an identified archaeological or historical site located within the site survey area of a timber harvesting plan (THP) if damaging effects from timber operations cannot be avoided. The determination of significance shall be based upon criteria defined for a "significant

archaeological or historical site" found in 14 CCR Section 895.1, any information provided by Native Americans, archaeological, historical, or ethnographic data pertinent to the region or to the site, and the physical characteristics of the site. If required, a preliminary determination of significance shall be made by the Registered Professional Forester (RPF), or RPF's supervised designee, and included in the Confidential Archaeological Addendum prepared for the THP. The Director of the California Department of Forestry and Fire Protection shall make the final determination of significance and substantial adverse change, based on advice of a professional archaeologist.

A significant archaeological or historical site is defined in the Forest Practice Rules (14 CCR Section 895.1) as follows:

A significant archaeological or historical site is a specific location, which may contain artifacts or objects and where evidence clearly demonstrates a high probability that the site meets one or more of the following criteria:

(a) Contains information needed to answer important scientific research questions,

(b) Has a special and particular quality such as the oldest or best available example of its type,

(c) Is directly associated with a scientifically recognized important prehistoric or historic event or person,

(d) Involves important research questions that historical research has shown can be answered only with archaeological methods, or

(e) Has significant cultural or religious importance to Native Americans as defined in 14 CCR Section 895.1.

Method of Analysis

Paleontology

Paleontologist James R. Allen conducted a literature study and paleontological site investigation for the Fairfax Conversion/THP project. The site investigation took place on January 25, 2001. The results of the study and investigation are contained in the Paleontological Sensitivity and Monitoring Report dated March 25, 2001. The document addresses the paleontological sensitivity of the area proposed for conversion to vineyards.

Cultural Resources

A Cultural Resources Assessment for the project site was conducted by NCRM Consulting Archaeologist Maximillian Neri and is described in the "Confidential Addendum for Timber

Operations on Non-federal Lands in California," dated April 16, 2001, and revised June 19, 2001; December 17, 2001; and March 11, 2004. Prior to fieldwork, Mr. Neri conducted a literature review for the project area and requested a cultural resources records search by the Northwest Information Center (NWIC) at Sonoma State University. Mr. Neri provided written notification of the proposed project to Native American individuals and/or groups included on the Sonoma County portions of the California Department of Forestry and Fire Protection Native American Contact List on June 30, 2000 and May 25, 2001. Mr. Neri also contacted the Annapolis Historical Society regarding historical land uses on the project site, and received from them letters dated August 12, 2000 and October 4, 2000. Additionally, Mr. Neri met with local landowner and historical society member Gary Craig to discuss the presence of the two sawmills described in the historical record.

NCRM staff archaeologist Max Neri searched the project site for cultural resources. Ground visibility was generally fair in the wooded areas, and fair to poor in the grassy meadow areas. Numerous roads and skid trails were present throughout the wooded and grassy areas and provided the best opportunity for observing project soils. The areas of high archaeological sensitivity were investigated completely using pedestrian transects spaced between 20 and 30 meters, and random hoe scrapes. The areas of archaeological sensitivity included ridgelines, midslope benches, creek terraces, saddles, springs, riparian areas, and areas of moderately sloped ecotone transition.

Based on the sites identified by Mr. Neri's fieldwork, a second field investigation was conducted by Tom M. Origer of Tom Origer & Associates. Archival research was conducted using the State Archives, Sonoma County Recorder's Office, Sonoma County Assessor's Office, Sonoma County Courts, County Library History Annex, communication with local residents, examination of old county maps and atlases, census data, and USGS topographic maps.

Fieldwork was conducted on September 8th through 15th, 2006, and September 26th through 29th, 2006 for Artesa Site-02, -03, -05, and -06H. Previously recorded prehistoric archaeological resources Artesa Site-02, -03, and -05 were subjected to the following investigation procedures leading to conclusions regarding their significance. Because Artesa Site-02, Artesa Site-03, and Artesa Site-05 were marked by chipped stone specimens and dubious "groundstone" items, Origer & Associates initially attempted to apply the California Archaeological Resource Identification and Data Acquisition Program (CARIDAP): Sparse Lithic Scatters, (Jackson et al. 1988; 1994) with the intention of treating these sites as sparse lithic scatters. Additionally,

a. Each site area was mapped with the result being a map that included locations of excavation units, surface finds, and environmental features of note such as rock outcrops, trees, drainages, and springs.

b. The surface of each site was examined and artifacts were flagged, mapped, and collected for analysis. Examination of the distribution of exposed archaeological materials guided the placement of excavation units.

c. Based on information gathered from the sites' surfaces and from information contained on Neri's site record forms, 25 investigation units were excavated (eight at

Artesa Site-02, six at Artesa Site-03, and 11 at Artesa Site-05) in arbitrary 10cm or 20cm levels or according to soil strata. The bulk of the soil removed from the units was screened with 6mm wire mesh; however, soils samples were processed with 3mm wire mesh to search for smaller objects. Soil samples represented approximately 20% of the level (by volume) from which they were taken. Cultural materials caught by the screens were bagged according to provenience (unit and depth below grade) and retained for laboratory processing and analysis.

d. Standard processing and analysis of recovered specimens was completed and included: cleaning, sorting, classifying, cataloging, and preparing the collection for accessioning. However, the Kashia prefer to have the collection reburied on site if possible (Reno Franklin, personal communication). Analysis of recovered materials included obsidian sourcing and hydration dating, technical analysis of flaked stone debris, species determination of shellfish, and examination of the distribution of site constituents and site structure.

The sites had not been previously tested to determine their importance. Tasks completed at the sites were designed to accurately establish each site's boundaries, depth, integrity, and contents.

A supplemental investigation was conducted on April 24 and 25, 2008, during which a crew of three archaeologists from Origer & Associates completed a field examination of the previously documented resource locations. Notes were made regarding current conditions at each location. Recording of the lumber mill sites was facilitated by thorough surface inspection. During the ground truthing process, which used a metal detector, probe, and pick and shovel, any archaeological deposits discovered were incorporated into the resource field sketch maps, and notes were taken. Interviews with knowledgeable local residents of the general area added information about the lumber milling activities, especially within the project site. All of the information was incorporated into the site recording documents. Archival research also added information incorporated onto the DPR 523 forms. Because there was extensive overlap in the locations of mill features, a single record was completed for the two operations.

Laboratory Procedures and Analyses

Procedures used to process cultural materials obtained by field investigation at the sites included cleaning, sorting, classifying, and cataloging. Analyses included obsidian sourcing, obsidian hydration dating, and technical analysis of flaked stone debris. Additionally, the provenience of recovered specimens was examined to assess site integrity as well as depositional history and to search for patterns in the distribution of constituents. Discernment of intra-site patterns could lead to an understanding of the activities that took place at each site and where within the sites those activities took place.

Obsidian Sources

Archaeological studies have developed the ability to assign dates of manufacture and use through projectile point analysis. In addition, Origer's (1987) Masters Thesis provides basic data regarding hydration dating of obsidian specimens to establish approximate habitation dates.

Obsidian specimens are often one of the few datable constituents consistently found at prehistoric archaeological sites in the region. All obsidian specimens were subjected to examination to determine their geologic origins. Most southern North Coast Ranges obsidian specimens possess macroscopic characteristics that allow them to be "sourced."

The main Annadel obsidian source is located just east of Santa Rosa approximately 45 miles southeast of Annapolis. Napa Valley obsidian could have derived from any of the source locations within Napa County from northwest of Calistoga south to the area around the town of St. Helena. These source localities are from 40 to 50 miles east-southeast of Annapolis.

Lake County obsidian sources are present on the east side of Clear Lake (the Borax Lake obsidian source) and south of Clear Lake (the Mt. Konocti obsidian source). Mt Konocti obsidian, approximately 35 miles northeast of Annapolis, is often black or grey with a high luster and occasional banding. Borax Lake obsidian, approximately 45 miles northeast of Annapolis, ranges from black to grey and can have surfaces that range from smooth to rough.

Obsidian Hydration Dating

Obsidian is a glassy volcanic stone that takes in moisture (hydrates) from its environment and develops what is known as a hydration band or rim. Hydration bands form at the surface of obsidian specimens and they enlarge as moisture "soaks" into a specimen's matrix. Hydration bands begin to form when a freshly created obsidian surface is exposed and enlarge over time. The rate of growth is dependent upon the chemistry of the obsidian and ambient temperature.

As a dating tool, obsidian hydration is based on the growth of hydration bands and an understanding of the rates at which they grow. Consequently, to establish a date the specimen must be assigned to a chemical source (sourced), the ambient temperature must be known, and the rate of hydration must be understood. Research by Origer (1987) provides the basic information needed to use obsidian hydration dating in project area.

Project-Specific Impacts and Mitigation Measures

3.5-1 Impacts to paleontological resources.

Generally speaking, paleontological resources on private lands in California have less protection than prehistoric and historic cultural resources, which are protected by existing federal, State, and local laws and policies. The Sonoma County General Plan does not specifically address paleontological resources.

The Paleontological Sensitivity and Monitoring Report (p. 3) for the proposed project states that fossil localities have not been identified in the immediate project area. However, during the site investigation conducted by James R. Allen, burrows by marine organisms were encountered in the friable sandstone of the Ohlson Ranch Formation. This fossiliferous geological formation is covered by a thin 1-2 foot veneer of organic A-horizon soils on the project site.

If fossils were encountered during project implementation, they would be deemed significant for both scientific study and overall geologic history of this part of the Ohlson Ranch Formation. Because fossil-bearing geological strata underlie the project site, and currently unidentified, scientifically significant fossil deposits may be damaged or destroyed during project construction activities, the impact to paleontological resources would be considered ***potentially significant***.

Mitigation Measure(s)

Implementation of the following mitigation measures recommended in the Paleontological Sensitivity and Monitoring Report would reduce project impacts to a *less-than-significant* level by ensuring that any paleontological resources uncovered during earthmoving operations would be properly preserved and/or documented.

3.5-1 *The applicant shall arrange for a qualified paleontologist to be on-site for two to three full days during the initiation of earthmoving activities on the project site. Following the two to three days of paleontological monitoring, the paleontologist shall meet with the earthmoving equipment operators and the project archaeologist, in order to train them in the identification of fossils potentially existing on the site.*

In the event that any paleontological resources are discovered during vineyard development activities, the qualified paleontologist shall be immediately notified by the foreman supervising the excavation activities. The applicant shall provide the foreman with the paleontological contact information prior to initiation of construction activities. If loose, the fossils shall be set aside in a safe location for evaluation of significance by the paleontologist. If discovered within immovable bedrock, all work shall be halted in the vicinity of the find to the extent feasible, and the paleontologist shall be consulted in order to determine whether the find is an isolated example or part of a more complex resource. Upon determining the significance of the resource, the consulting paleontologist, in coordination with the Director of the County Permit and Resource Management Department, shall determine the appropriate actions to be taken. The appropriate measures may include as little as recording the resource with a recognized paleontological authority such as the University of California, Berkeley, Museum of Paleontology (UCMP), or as much as excavation, recording, and preservation of the resources that have outstanding paleontological significance. A note requiring compliance with this measure shall be indicated on construction drawings and in construction contracts for the review and approval of the County Permit & Resource Management Department prior to issuance of grading permits.

3.5-2 Impacts to prehistoric cultural resources.

The Northwest Information Center record search results indicated that the Fairfax Conversion Project site had not been previously surveyed, and that previously documented cultural resources did not exist on the site at the time of the record search. However, the records search noted that the project area should be considered to have a high likelihood of containing unrecorded prehistoric resources.

The NCRM Cultural Resources Assessment states that the archaeological survey resulted in the discovery of five prehistoric sites identified as Artesa Site-01, -02, -03, -04, and -05; as well as several isolates and noted finds. The various prehistoric resources discovered within the project area reflect both intensive and generalized use of the project area by prehistoric peoples. Of the five prehistoric archaeological sites Maximillian Neri recorded, consulting archaeologist Tom Origer evaluated only three, because at the time of the Origer investigations the site plan indicated that only three of the five would be impacted by the proposed project. Tom Origer & Associates conducted field research to better define the site limits and provide necessary information to assess the legal significance and integrity of archaeological sites -02, -03, and -05.

Archaeological Sites Identified as Ineligible for Listing

Artesa Site-03

The Artesa Site-03 is a prehistoric archaeological site. The site does not meet Criterion A(1) as the site does not have a demonstrable association with important events in our history. Criterion B(2) is also not met because the site is not associated with important individuals. Because the site does not have designed elements Criterion C(3) does not apply. Origer's investigation of the site revealed that it is marked by a paucity of archaeological specimens, which included chert and obsidian flakes, within a shallow matrix that had been previously disturbed by cultivation when this area was used as an orchard. The paucity of materials and lack of integrity indicate that the site does not have potential to yield data important in history or prehistory. Therefore, because the site does not meet Criterion D(4), it is not eligible for listing on the NRHP or the CRHR.

Archaeological Sites Identified as Eligible for Listing

Artesa Site-01

The Artesa Site-01 is a prehistoric archaeological site. The site does not meet Criterion A(1) as the site does not have a demonstrable association with important events in our history. Criterion B(2) is also not met because the site is not associated with important individuals. Because the site has no designed elements, Criterion C(3) does not apply. The Artesa Site-01 appears to retain fair to excellent surface integrity, and the site is very likely to contain an extensive sub-surface archaeological deposit. Furthermore, the

site is very possibly the Kashaya Pomo ethnographic village of Kabatui, which is known to have been present in the general vicinity, and that human remains may be present. Therefore, the site meets Criterion D(4) for inclusion on the NRHP and CRHR, and has good integrity. As a result, the site should be excluded from vineyard development. The proposed project would not adversely affect Artesa Site-01, as the proposed site plan has been designed to exclude the site from the development area.

Artesa Site-02

The Artesa Site-02 is a prehistoric archaeological site. The site does not meet Criterion A(1) as the site does not have a demonstrable association with important events in our history. Criterion B(2) is also not met because the site is not associated with important individuals. Because the site has no designed elements, Criterion C(3) does not apply. The site contains a wide range of specimens including projectile points, bifaces, unifacial tools, chipped stone tool manufacture waste debris (e.g., chert and obsidian flakes), and grinding implements such as handstones and grinding slabs. Therefore, the site meets Criterion D(4) for inclusion on the NRHP and CRHR, and has good integrity. As a result, the site should be excluded from vineyard development. The proposed project would not adversely affect Artesa Site-02, as the proposed site plan has been designed to exclude the site from the development area.

Artesa Site-04

The Artesa Site-04 is a prehistoric archaeological site. Based on observation of artifacts visible on the ground surface within the site Neri initially determined that the site exhibited poor surface integrity due to previous mechanized impacts and resulting erosion, especially the slopes descending to the drainage in the western portion of the site, and extensive sub-surface deposits are unlikely to be present. However, pending additional evaluation of the resource by scientific means, this prehistoric site must be considered significant according to Criterion A(1) as the site may have a demonstrable association with important events in our history. Criterion B(2) is not met because the site is not associated with important individuals. Because the site does not have designed elements Criterion C(3) does not apply. The lack of integrity indicates that the site does not have potential to yield data important in history or prehistory; therefore, the site does not meet Criterion D (4). However, as the site may be eligible under Criterion A(1), the site should be avoided. The proposed project would not adversely affect Artesa Site-04, as the proposed site plan has been designed to exclude the site from the development area.

Artesa Site-05

The Artesa Site-04 is a prehistoric archaeological site. The site does not meet Criterion A(1) as the site doe not have a demonstrable association with important events in our history. Criterion B(2) is also not met because the site is not associated with important individuals. Because the site does not have designed elements Criterion C(3) does not apply. The site is marked by a relatively wide variety of artifacts including projectile

points, bifacial tools, (e.g., knives), unifacial tools (e.g., scrapers), a grooved stone net weight, steatite bowl fragment, handstones, grinding slabs, abundant chert tool knapping debris, obsidian tool knapping debris. The abundance and variety of materials and deep site matrix that appears to extend below any near-surface ground disturbance suggest that this site retains integrity. Therefore, the site does meet Criterion D(4) and is eligible for listing on the NRHP and the CRHR. The proposed project would not adversely affect Artesa Site-05, as the proposed site plan has been designed to exclude the site from the development area.

Conclusion

In summary, Artesa Site(s) -01, -02, -04 and -05 are important archaeological resources. As discussed previously the site plan shows that Artesa Site(s) -01, -02, -04 and -05 have been avoided in the vineyard design and development process. Therefore, the sites would not be impacted by development and vineyard activities. Artesa Site -03 was identified by the archaeological consultants as being ineligible for inclusion on the NRHP or the CRHR.

In addition, two prehistoric isolates and five noted prehistoric finds were documented in Maximilian Neri's Cultural Resources Assessment. The isolates consisted of a single obsidian leaf-shaped biface (probable projectile point) fragment and a single double-sided metate fragment, both of which were discovered along roads. The noted finds were observed throughout the project site and included various Franciscan chert flakes, a single possibly modified blue-schist cobble, and a single Clear Lake Basin obsidian flake. The various discoveries are considered to not have a measurable degree of potential significance, as they simply reflect the widespread prehistoric use of the project area. The discovery of isolated prehistoric artifacts is a common occurrence throughout the region, and the isolates and noted finds encountered within the project area do not constitute particularly unique or diagnostic artifact types. However, the two prehistoric isolates have been collected and will be protected from possible project impacts. According to Neri, none of the various isolates merit site- or area-specific mitigation measures.

Although the known significant archaeological sites on the project site would be avoided, the project site could contain further significant prehistoric sites that have yet to be discovered. Furthermore, the potential exists that unknown human remains exist on the project site. Ground-related construction activities could result in the uncovering of undiscovered cultural resources and/or human remains. Therefore, the proposed project would result in a ***potentially significant*** impact to unknown prehistoric cultural resources.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce project impacts to a *less-than-significant* level.

3.5-2(a) *In the event that any buried cultural resources (including, but not limited to: chipped chert and obsidian stone tools and tool manufacture waste flakes; grinding and hammering implements that look like fist-sized river tumbled stones; and/or locally darkened soil with artifacts, deposits of marine shell, dietary bone) are discovered during vineyard development activities, all work shall be halted within 50 feet of the find and a qualified consulting archaeologist, the Department of Forestry and Fire Protection Northern Region Headquarters Archaeologist and the Stewarts Point Tribal Historic Preservation Officer (THPO) shall be consulted in order to evaluate the materials and offer recommendations for their treatment. The decision about how to proceed shall be made through consultation among the consulting archaeologist, the Department of Forestry and Fire Protection Northern Region Headquarters Archaeologist and the Stewarts Point Rancheria THPO (or his designee) in coordination with the appropriate County representative. Appropriate treatment measures may include recording the resource with the Northwest Information Center of the California Historical Resources Inventory System database, data recovery excavation, analysis and reporting, and/or complete avoidance of the sites that have outstanding cultural or historic significance. A note requiring compliance with this measure shall be indicated on construction drawings and in construction contracts for the review and approval of the County Permit & Resource Management Department prior to issuance of grading permits.*

3.5-2(b) *In the event that human remains are found during vineyard development activities, the steps required by 14 CCR Section 15064.5(e) of the CEQA Guidelines shall be carried out. All excavation or disturbance of the location and any nearby area reasonably suspected to overlie adjacent human remains shall cease. The Sonoma County Coroner shall be immediately contacted. If the coroner determines the remains to be Native American the coroner is then required to contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American. The most likely descendant may then make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98. A note requiring compliance with this measure shall be indicated on construction drawings and in construction contracts for the review and approval of the County Permit & Resource Management Department prior to issuance of grading permits.*

3.5-2(c) *As recommended in the NCRM Cultural Resources Assessment, during project development and operation, the applicant shall restrict use of the seasonal road located to the immediate northwest of Artesa Site-01 to*

ingress and egress. Mechanical grading or widening of the road, parking, and turning around in this area shall not be permitted. Segments of the seasonal roadway within 100 feet of the site shall be fenced with highly visible and/or other appropriate measure(s). Measures shall be implemented prior to the beginning of logging operations. A note requiring compliance with this measure shall be indicated on construction drawings and in construction contracts for the review and approval of the County Permit & Resource Management Department prior to issuance of grading permits.

3.5-2(d) *In consultation with the Department of Forestry and Fire Protection Northern Region Headquarters Archaeologist and the Stewarts Point Rancheria THPO (or his designee) the applicant shall establish a conservation easement protecting Artesa Site(s) -01, -02, -04, and -05 prior to timber harvesting. Measures shall be taken by the project foreman throughout the process to ensure that construction and vineyard operation activities do not degrade the cultural significance of the site(s). Measures to be taken include: the placement of protective fencing prior to any activity within 100 feet of an archaeological site, and the education of all on-site workers. Preservation plans shall be submitted to the County Permit & Resource Management Department prior to issuance of grading permits.*

3.5-3 Impacts to historic resources.

The Northwest Information Center record search requested by NCRM indicated that the project site has a moderate likelihood of containing historic resources. Maximillian Neri of NCRM contacted the Annapolis Historical Society regarding historical uses of the project site. The Historical Society responded to the Neri's request for historical information with an initial letter dated August 12, 2000. The letter described a brief history of the property and a discussion of some of the known historical resources within the project vicinity. The letter noted the presence of two historical sawmills, the Horicon School, and the Annapolis Cemetery.

Neri subsequently contacted the Historical Society to ascertain whether the locations of the two sawmills were specifically known and received a second response dated October 4, 2000. The second letter indicated that the two historic sawmills were present within the project area. Neri met with local landowner and historical society member Gary Craig to further discuss the presence of the two mills; however, the exact location of only one of the mills sites is known.

The NCRM archaeological investigation of the project site resulted in the discovery of one historic site, which is the sawmill referenced above. This mill is identified as Artesa Site-06H and probably dates to the mid-1940s. All that remains of the site is an extremely decomposed foundation consisting of large redwood beams, with some of the main floor joists still visible as well. Surrounding the foundation is extensive evidence

of landscaping and grading, and the entire area adjacent to the mill has clearly been leveled as evidenced by large push piles of soils and some trash present, mostly to the southwest of the mill. In addition, various historical refuse items are present, many in the above mentioned push piles. The items include iron pipe sections, clear and colored glass fragments, miscellaneous machinery and cable fragments, automotive parts, and various food tin fragments.

The Neri report discusses four noted historical finds on the project site. The discoveries are predominantly related to the practices of agriculture and timber harvest, economic activities that continue to this day in the Annapolis area. The noted finds include:

- A collapsed structure, probably a warehouse or storage facility, appearing to date from a period not earlier than 1950;
- The remains of a small logging/woods camp, comprised of a large pile of split redwood fencing remnants of various length and widths and a square arrangement of three large redwood logs which probably formed the foundation for a cabin or tent structure;
- A broad scattering of historic logging debris in the bottom of a seasonal drainage ditch, associated with split rail and fencing production; and
- A large wooden cross and two wooden benches almost certainly associated with the Starcross community. This site probably served as a secluded location for reflection and prayer. Although the possibility exists that the cross marks a grave, the site does not appear over 30 years in age and evidence of a burial, such as a mound or bordered area, is not present; therefore, this possibility is considered extremely slight.

Subsequent to the Neri report, Tom Origer & Associates conducted field research to further assess the integrity of the site and to investigate the potential for other resources to be located on the project site.

Artesa Site-06H

Artesa Site-06H is a lumber mill dating approximately from the 1940s. The site is associated with a historically important activity (Criterion A[1]); however, the mill has collapsed and is unable to convey this historical association. Furthermore, the mill is not associated with important individuals (Criterion B [2]), does not have extant architecture or designed elements (Criterion C [3]), and is relatively young (dating only to the mid-20th century). This last characteristic suggests that the mill site does not hold information that would not be available through historical research (Criterion D [4]). Therefore, as the site does meet any of the criteria, the mill is not eligible for listing on the NRHP and the CRHR.

Logging Camps

The Neri report states that the other sawmill noted by Gary Craig was likely located just to the north of Artesa Site-06H. According to the *Report on Supplemental Studies for the*

Artesa-Fairfax Project, Annapolis, Sonoma County prepared by Origer & Associates, May 5, 2008, the 1943 USGS topographic map of the project area shows up to nine probable house locations that are within the project area; however, three of those are outside of areas where vineyard development is planned.

The three house locations that do not appear to be vulnerable to vineyard development are within the boundaries of Artesa Site-05, a prehistoric Native American site that is planned to be protected so that it remains in its current condition. Because those three sites are within the boundaries of Artesa Site-05, investigation of any historic deposits there would cause disturbance to prehistoric site deposits.

The 1943 USGS topographic map shows up to six houses that appear to be outside the boundaries of Artesa Site-05, but within the project area and in close proximity to the known lumber mill operations. The portion of the lumber mill site where associated residences appeared to be situated was subjected to a thorough surface examination by Origer & Associates in April 2008 in a search for historical remains associated with the mill workers' residences. In addition, a metal detector, probe, and pick and shovel were used to search for buried archaeological phenomena (e.g., artifact filled privy pits, trash deposits).

As a result of this work, two types of historic archaeological deposits were found that could satisfy criteria for inclusion on the NHRP and CRHR in that they could yield information about the area's history. One type of deposit consists of "sheet refuse" which is often a relatively dispersed scatter of archaeological materials that accumulates at building (in this case, residential) locations. The second type of deposit is marked by concentrations of archaeological specimens. This second type of phenomenon is best described as a "dump" or place where people deliberately discarded items.

The types of archaeological specimens found in sheet refuse scatters and dumps include fragments of flat (window) glass, fragments of glass containers (bottles and jars), fragments of ceramic items (i.e., plates, cups, saucers), ferrous nails (wire shanks), amorphous pieces of metal, and milled boards. A primary distinction made between sheet refuse and dumps is that sheet refuse often presents itself as a thin deposit at and near the ground surface, while, in contrast, dumps can be marked by an accumulation of archaeological materials with substantial depth to the deposit.

Conclusion

Most of the noted historic finds are not considered to be significant enough to warrant protective measures because they do not meet the criteria for historical significance noted in Public Resources Code SS5024.1, Title 14 CCR, Section 4852. According to Section 15064.5(a)(3) of the Public Resources Code, the finds must be associated with significant historical events or persons; represent distinctive characteristics of a type, period, region, or method of construction; represent the work of a creative individual; or be likely to yield important historic or prehistoric information. Most of the finds listed above do not meet these criteria. Although Artesa Site-06H, the former sawmill site,

would be removed with implementation of the proposed project after on-site excavation conducted for Site-06H by Origer & Associates, the site was identified as being ineligible for inclusion on the NRHP or the CRHR , due to the advanced deterioration of the sole feature remaining, the mill foundation, and due to the fact that this resource type is extremely common throughout Mendocino County and Northern California. Furthermore, the location of the logging camps, and associated deposits, have been excluded from the vineyard development area. However, as historically significant resources have been identified in the project area the potential exists that unidentified historical resources may be discovered during project implementation. As a result, the proposed project would result in ***potentially significant*** impacts to historic resources.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce project impacts to a *less-than-significant* level.

3.5-3(a) *Prior to the issuance of grading permits, the applicant shall hire a qualified archeologist to prepare an archaeological monitoring plan for the review and approval of the County Permit and Resource Management Department. At a minimum the plan shall cover the Neri "Noted Find" locations and all areas within 100 feet of previously identified archaeological sites. The plan shall include but not be limited to the following measures:*

- *Any location with prehistoric Native American material shall require both a Native American monitor (representing the tribe) and an archaeological monitor.*
- *Historical features shall be considered historically significant if the feature is a discrete deposit identifiable to the period of significance for the two mills, or if the deposit relates to substantially earlier occupation and the agricultural activities on the project site.*
- *Prehistoric Native American deposits shall be considered an archaeological site if three or more cultural items are found within an area measuring roughly ten feet on a side.*
- *Archaeological deposits that retain a strong focus, that is the ability to clearly represent the activities that created the deposit, shall be considered to have sufficient integrity to meet the criteria for listing on the National Register.*
- *Identified sites shall be avoided by establishing construction fencing around the perimeter of the site to prevent damage from vineyard development activities. Vineyard workers shall be trained regarding the importance of cultural materials.*
- *If the resources cannot remain in situ, a program of investigation appropriate to the resource shall be developed. To the extent*

feasible, exiting research designs shall be incorporated into investigation programs.

The Tribal Historic Preservation Officer for the Kashia Band of Pomo Indians has provided general information regarding the Kashia needs for monitoring and treatment of human remains. It is recommended that the project applicant enter into an agreed treatment plan with the tribe prior to beginning any ground disturbing activities in the project area.

3.5-3(b) *Prior to the issuance of grading permits, an archeological monitor shall be hired by the applicant and approved by the County Permit & Resource Management Department to train the construction grading crew prior to commencement logging and grading activity in regard to the types of artifacts that they are likely to find (including, but not limited to, ceramics/pottery, glass and/or metal artifacts and fragments, building foundations, linear features such as railroad grades, wells, privies, trash pits). In the event that an artifact is discovered, all work shall cease within 50 feet of the discovery until the archaeological monitor has evaluated the find. The archaeological monitor shall promptly consult with the Department of Forestry and Fire Protection Northern Region Headquarters Archaeologist. Work shall not occur within 50 feet of the find until a decision about how to proceed has been made through consultation among the consulting archaeologist and the Department of Forestry and Fire Protection Northern Region Headquarters Archaeologist, in coordination with the appropriate County representative. Appropriate treatment measures may include recording the resource with the Northwest Information Center of the California Historical Resources Inventory System database, and/or complete avoidance of the sites that have outstanding cultural or historic significance. A note requiring compliance with this measure shall be indicated on construction drawings and in construction contracts for the review and approval of the County Permit & Resource Management Department prior to issuance of grading permits.*

Cumulative Impacts

Cumulative impacts to Cultural Resources are analyzed in Impact Statement 4-6 of Chapter 4, Cumulative Impacts.

Endnotes

[1] *Sonoma County General Plan*, March 1989.
[2] *Sonoma County General Plan Update Environmental Impact Report*, December 1986.

[3] *Paleontological Sensitivity and Monitoring Report, Artesa Conversion/THP Project, Annapolis, California*, James R. Allen, Paleontologist, March 25, 2001.

[4] *Confidential Archaeological Addendum for Timber Operations on Non-federal Lands in California*, Maximillian A. Neri, North Coast Resource Management, April 16, 2001. Revised March 11, 2004.

[5] *Archaeological Investigations at Three Prehistoric Native American Sites and Archival Research of One Lumber Mill Site on the Artesa Vineyards Property near Annapolis, Sonoma County, California*, Tom M. Origer, M.A., October 3, 2006.

[6] *Report on Supplemental Studies for the Artesa-Fairfax Project, Annapolis, Sonoma County, California*, Tom Origer & Associates, May 5, 2008, Revised June 23, 2008.

[7] Gifford, Edward W. and A. L. Kroeber. 1939. *Culture Element Distributions, II*. University of California Publications in American Archaeology and Ethnology 37(2):117-254 qtd. in *Confidential Archaeological Addendum for Timber Operations on Non-federal Lands in California*, Maximillian A. Neri, North Coast Resource Management, April 16, 2001. Revised March 11, 2004., p. 2

[8] Personal communication with Mr. Richard Hilton, Sierra College, Rocklin, California. December 7, 2004.

[9] State of California, Governor's Office of Planning and Research, *CEQA and Archaeological Resources*, 1994.

[10] California Health and Safety Code Section 7050.5, California Public Resources Code Sections 5097.98 *et seq.*

3.6 GEOLOGY

3.6 GEOLOGY

INTRODUCTION

This section analyzes the potential effects of the proposed Fairfax Conversion Project upon soils and geology within the project area. Much of the analysis focuses on the potential for erosion of topsoil during and after timber harvest. Information in this chapter is drawn from the *Erosion Control and Mitigation Plan* (ECP) prepared by Erickson Engineering[1] (Draft EIR Appendix D); the O'Connor Environmental *Hydrologic Analysis, Artesa Fairfax THP and Conversion*[2] (Draft EIR Appendix M); the O'Connor Environmental *Erosion Analysis* (Daft EIR Appendix N); the *Baseline Soil Analysis for Vineyard Development* prepared by Crop Care Associates, Inc.[3] (Draft EIR Appendix L), the Sonoma County *General Plan*[4] and its associated EIR[5], the *Geotechnical Investigation, Artesa Vineyards, Reservoir and Sump Pond*[6] prepared by Brunsing Associates, Inc. (Draft EIR Appendix K), and the *Hydrologic Evaluation* prepared by West Yost & Associates (Draft EIR Appendix O) for the project site.[7]

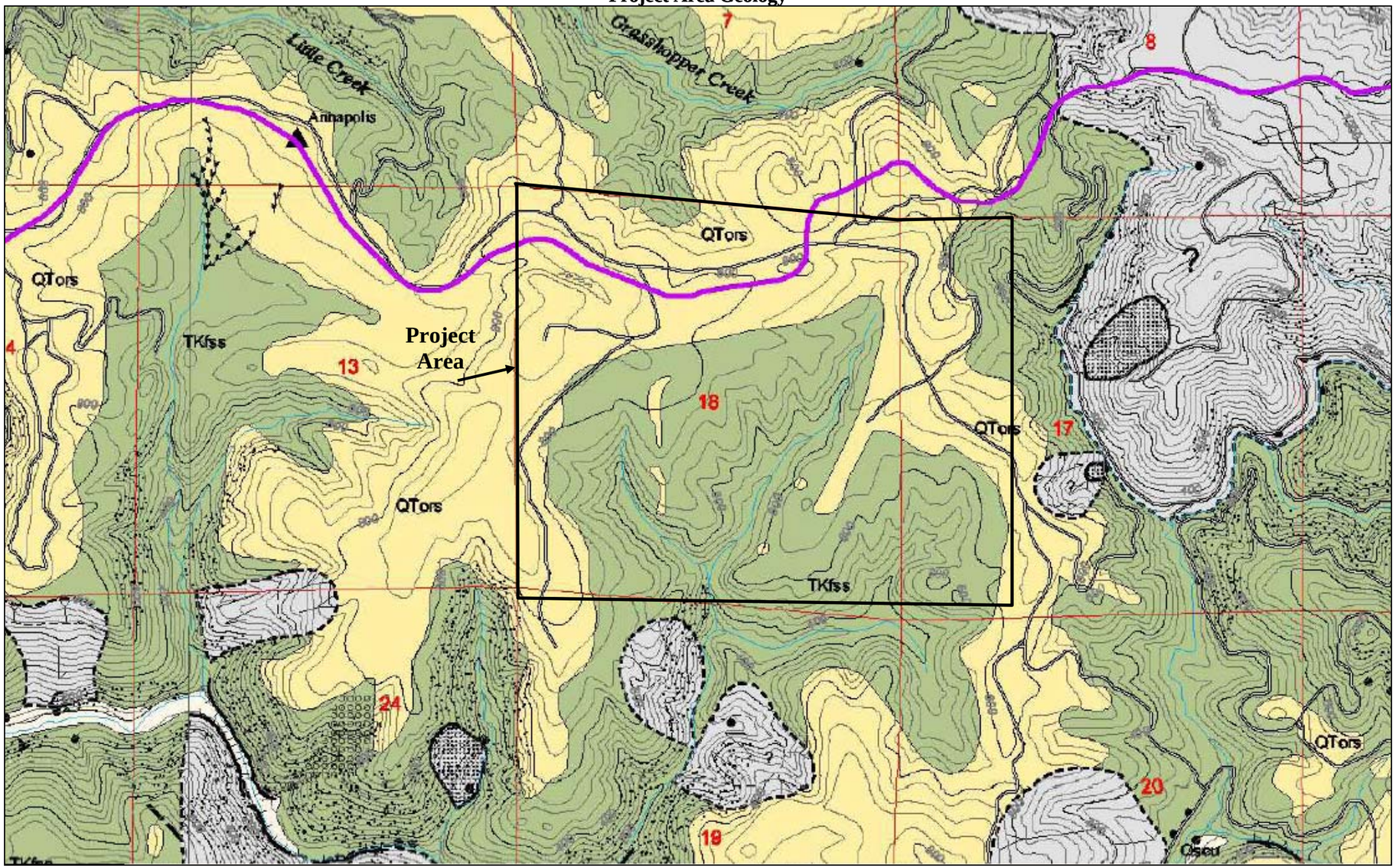
ENVIRONMENTAL SETTING

The following background setting information focuses on the existing topography of the project site, the underlying bedrock, and the site seismicity.

Regional Geology

The *Geologic and Geomorphic Features Related to Landsliding, Gualala River Watershed, Sonoma and Mendocino Counties, California, Plate 1, Sheet 2 of 3* [8] (See Figure 3.6-1) indicates that much of the Sonoma coastal area is located within a large-scale block described as the early Cretaceous era Coastal Belt Franciscan Formation (TKf), identified by subsurface geology consisting of marine sandstone, shale, and conglomerate typical of adjacent ridge-top uplands. This formation is frequently found on northwest trending major ridges in the interior Coastal Range area in northern Sonoma County. Portions of the area are capped by more recent Pliocene age Ohlson Ranch Formation (Por) subsurface geology consisting of marine sandstone, siltstone, and conglomerate. Based on the presence of marine sandstones and undamaged fossilized seashells commonly found at relatively shallow depth in local profiles, the area is considered to have been uplifted from sea beds as part of the tectonic activity forming this part of California.

Figure 3.6-1
Project Area Geology



Source: Fuller et al (2002)
The proposed project is wholly contained within the Project Area Boundary; however, the project Area Boundary is for illustrative purposes only, and does not indicate property or project lines.

Surficial Deposits (Holocene-Pleistocene)

- Qbs — **Beach sand-** marine-laid deposits of fine-to coarse-grained sand and gravel; may migrate seasonally.
- Qf — **Alluvial fan-** characteristic fan-cone shapes at the mouths of eroding stream canyons; includes debris fans.
- Qmt — **Marine terrace deposits**
- Qscu — **Undifferentiated stream channel deposits-** unconsolidated sediments in active channels and flood plains.
- Qsc1 — **Stream channel deposits-** stage/return period 5 years or less
- Qrt — **River terrace deposits**
- Qoal — **Older alluvium**

Overlap (Quaternary-Tertiary)

- QTors — **Ohlson Ranch Formation-** siltstone.
- QTorc — **Ohlson Ranch Formation-** conglomerate.
- QTor — **Ohlson Ranch Formation-** undifferentiated Marine sandstone and conglomerate.

Gualala Block (Tertiary-Cretaceous)

- TKu — **Undifferentiated strata of German Rancho, Anchor Bay and Stewarts Point-** sandstone, siltstone, claystone and conglomerate.
- Tg — **German Rancho Formation-** marine sandstone and mudstone.
- Tsm — **Monterey Group-** marine sandstone and shale.
- Ka — **Gualala Formation, Anchor Bay Member-** sandstone, mudstone and conglomerate.
- Ks — **Gualala Formation, Stewarts Point Member-** sandstone, conglomerate and mudstone.
- Ksb — **Black Point Spilite**

Undifferentiated Franciscan Complex (Cretaceous)

- Kigs — **Greenstone**
- Kfss — **Sandstone**
- sp — **Serpentinite**
- m — **Metamorphic**

Coastal Belt Franciscan, includes Coastal Terrane (Eocene-Early Cretaceous)

- TKfss — **Coastal Belt Franciscan-** marine sandstone.
- TKfs — **Coastal Belt Franciscan-** marine siltstone.

Central Belt Franciscan, includes Central Terrane (Cretaceous)

- KJfs — **Undifferentiated Central Belt Franciscan-** siltstone.

Eastern Belt Franciscan, includes Yolla Bolly and Pickett Peak Terranes (Early Cretaceous-Late Jurassic)

- Jfmg — **Melange**
- KJfm — **Central Belt Franciscan-** melange: includes chert- ch, greenstone- gs, greywacke- gwy and sandstone- ss.

Great Valley Complex (Cretaceous)

- KJgvs — **Sandstone and claystone**

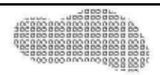
ROCK SLIDE: Slope movement with bedrock as its primary source material. This class of failure includes rotational and translational landslides; relatively cohesive slide masses with failure planes that are deep-seated in comparison to those debris slides of similar areal extent. The slide plane is curved in a rotational slide. Movement along a planar joint or bedding surface may be referred to as translational. Complex versions with combinations of rotational heads and translational movement or earthflows downslope are common. indicates a scarp; arrows show direction of movement; queried where the presence of the slide is uncertain; boundary is solid where historically active, dashed where dormant, queried where uncertain.

EARTHFLOW: Slow to rapid movement of mostly fine-grained soil with some rocky debris in a semi-viscous, highly plastic state. After initial failure, the mass may flow or creep seasonally in response to changes in groundwater level. These types of slope failures often include complexes of nested rotational slides and deeply incised gullies; boundaries are usually indistinct. indicates a scarp; arrow indicates direction of movement; queried where the presence of the slide is uncertain. Boundary is solid where historically active, dashed where dormant, queried where uncertain.

DEBRIS SLIDE: Mass of unconsolidated rock, colluvium, and coarse-grained soil that has moved slowly to rapidly downslope along a relatively steep, shallow, translational failure plane. Debris slides form steep, unvegetated scars in the head region and possibly irregular, hummocky deposits in the toe region. Scars commonly ravel and remain unvegetated for several seasons depending on slope aspect. Queried where the presence of the side is uncertain. Boundary is solid where historically active, queried where uncertain.

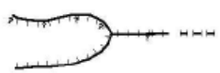
DEBRIS FLOW / TORRENT TRACK: Long stretches of bare ground that have been scoured and eroded to bedrock by extremely rapid movement of water-laden debris. Debris flows are commonly triggered by debris sliding in the source area during high intensity rains. Debris is often deposited downslope as a tangled mass of organic material in a matrix of rock and soil; debris may be reworked and incorporated into subsequent events; lack of vegetation indicates recent activity. Queried where the presence of the slide is uncertain. Boundary is solid where historically active, dashed where dormant, queried where uncertain.

SMALL LANDSLIDE: Landslide too small to delineate at 1:24,000 scale (typically less than 1/5 acre in area or less than 150 feet in length).



DISRUPTED GROUND: Irregular ground surface caused by complex landsliding processes resulting in features that are indistinguishable or too small to delineate individually at 1:24,000 scale; also may include areas affected by downslope creep, expansive soils, and/or gully erosion. Boundaries are usually indistinct.

DEBRIS SLIDE SLOPE / SOURCE AREA: A geomorphic feature characterized by steep, usually well vegetated slopes that appear to have been sculpted by numerous debris slides and debris flows. Upper reaches (source areas) of these slopes are often tightly concave and very steep. Soil and colluvium atop bedrock may be disrupted by active debris slides and debris flows. Slopes near the angle of repose may be relatively stable except where weak bedding planes, bedrock joints and fractures parallel the slope.



INNER GORGE: A geomorphic feature consisting of steep slopes adjacent to channels. The gorge typically is created by accelerated downcutting in response to regional uplift. It is defined as an area of streambank between the channel and the first break in slope. Line is queried where uncertain, or broken into segments to represent a stretch of discontinuous inner gorge too small to accurately represent at 1:24,000 scale. One-sided hachures indicate inner gorge on one side of channel only; hachures point downslope.

GULLY: Distinct, narrow channels formed by erosion of soil or soft rock material by running water. Channels are larger and deeper than rills and usually carry water only during and immediately after heavy rain or following the melting of ice or snow. Arrows point downhill; line is queried where uncertain.

Lithologic Contact: Solid where location is certain, dashed where approximately located or inferred, dotted where concealed, and queried where continuation or existence is uncertain.

Fault: Solid where location is certain, dashed where approximately located or inferred, dotted where concealed, and queried where continuation or existence is uncertain.

Lineament: Linear feature of unknown origin noted on aerial photographs.

Project Site Geology

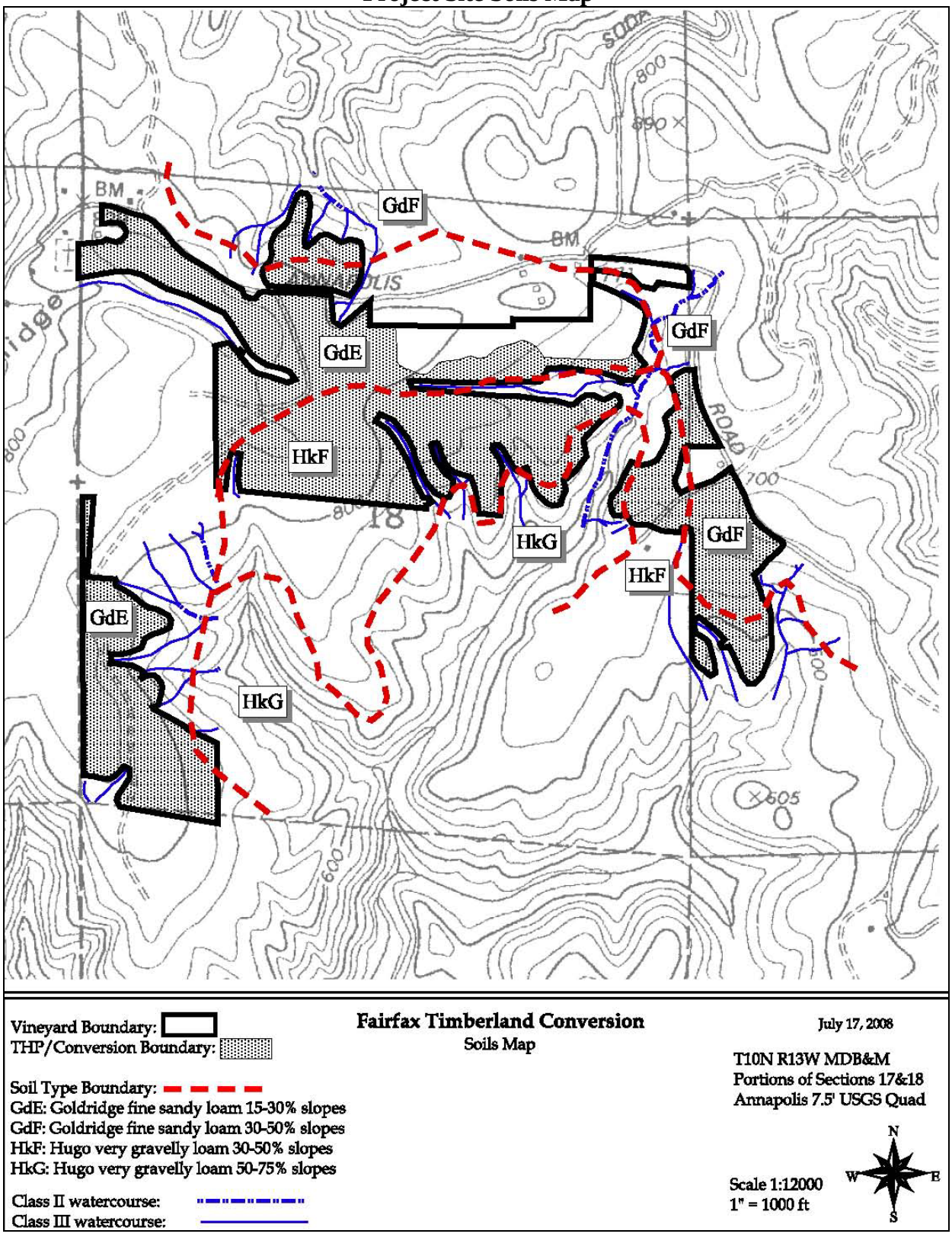
Based on site surveys conducted in conjunction with the development of the ECP, the majority of the project area appears to be located within the Ohlson Ranch Formation, which is situated atop the underlying Coastal Belt Franciscan Formation. However, significant diversity likely exists in subsurface features. Surface characteristics on the project site are consistent with an uplift and erosional-derived history varying from area to area. Most of the project site has a topography consistent with natural long-term erosion (rather than recent or surficial landsliding processes), which is characterized as gentle swales in uplands and vee-shaped channel areas bisected by prominent ridges, rather than stair-stepped benches on the hillsides. The project site does not exhibit obvious characteristics of recent slumping or landslide activity. The onsite observations are consistent with the findings of Fuller et al (2002) as depicted in Figure 3.6-1 which do not depict rock, earth, or debris slides on the project site. However, as shown in Figure 3.6-1, soil disruptions are depicted to the east, south, and southwest.

Soil Conditions

Surficial soils in the project area have been mapped by the U.S. Department of Agriculture (USDA) Soil Conservation Service, and are shown on Sheet 16 of the *Soil Survey of Sonoma County, California*. Area soils have been mapped as predominantly Goldridge fine sandy loam with 15 to 30 percent slopes (GdE), which consist of moderately well-drained fine sandy loams that have a sandy clay loam subsoil and are formed from coarse-grained, weakly consolidated sandstone (See Figure 3.6-2). GdE soils are generally located on uplands inland from the coast, extending from Sebastopol to the Annapolis area, and are found in association with Blucher, Cotati, Sebastopol, and Steinbeck soil types. Other site soils include Goldridge fine sandy loam, 30 to 50 percent slopes (GdF); Hugo very gravelly loam, 30 to 50 percent slopes (HkF); and Hugo very gravelly loam, 50 to 75 percent slopes (HkG). The Goldridge soil is approximately 16 inches deep, light brownish gray in color, strongly acidic, with light gray, pale yellow, and yellow-brown subsoils. Permeability is moderately slow in the subsoil. Runoff is medium to very rapid, with moderate erosion hazard on low slopes and increasing to a high level on elevated slopes. The Goldridge series of soils are defined as "highly erodible soils" in the Sonoma County Vineyard Erosion and Sediment Control Ordinance (VESCO). Please refer to page 3.2-18 of the Draft EIR for a discussion of this ordinance.

The *Baseline Soil Analysis for Vineyard Development* prepared by Crop Care Associates, Inc. notes that the project site soils are acidic and generally low in fertility due to excessive leaching, a profile which is typical for a high-rainfall area. Soil pH is characterized in the soil analysis as ranging from extreme to strong acidity. The site's surface soils and subsoils were found to be poorly structured and compacted at relatively shallow depths (less than 24 inches). However, soil chemical hazards that would preclude effective vineyard development were not observed. Levels of sodium and boron are favorably low.

Figure 3.6-2
Project Site Soils Map



Calcium/magnesium ratios are low but adequate; and nitrogen, phosphorus, potassium, and organic matter (OM) levels are unfavorably low; however, the incorporation of soil amendments would be expected to compensate for the strong acidity and nutrient deficiencies.

The local soils are believed suitable for vineyard development, based on historical and ongoing agricultural activity in similar upland soils in the region. Soil amendments are typically applied in response to soil testing, in order to moderate acidity. Nutrients are applied to vineyards on an as needed basis through foliar or irrigation methods, based on annual monitoring results. Satisfactory levels of surface drainage and permanent cover crop development will be necessary to prevent formation of sheet and rill erosion.

The *Baseline Soil Analysis* also notes moderate to extensive subsoil rust mottling in the project site soils. Rust mottles form from decomposition of organic matter under anaerobic conditions. Mottles are commonly found in soils that are seasonally very wet (near saturation) for an extended period of time. The finding of mottled soils on the project site is not considered unusual due to the very high annual rainfall in coastal Sonoma County. According to Crop Care Associates, the mottling indicates the need for installation of artificial subsurface drainage in vineyard development.

Slopes

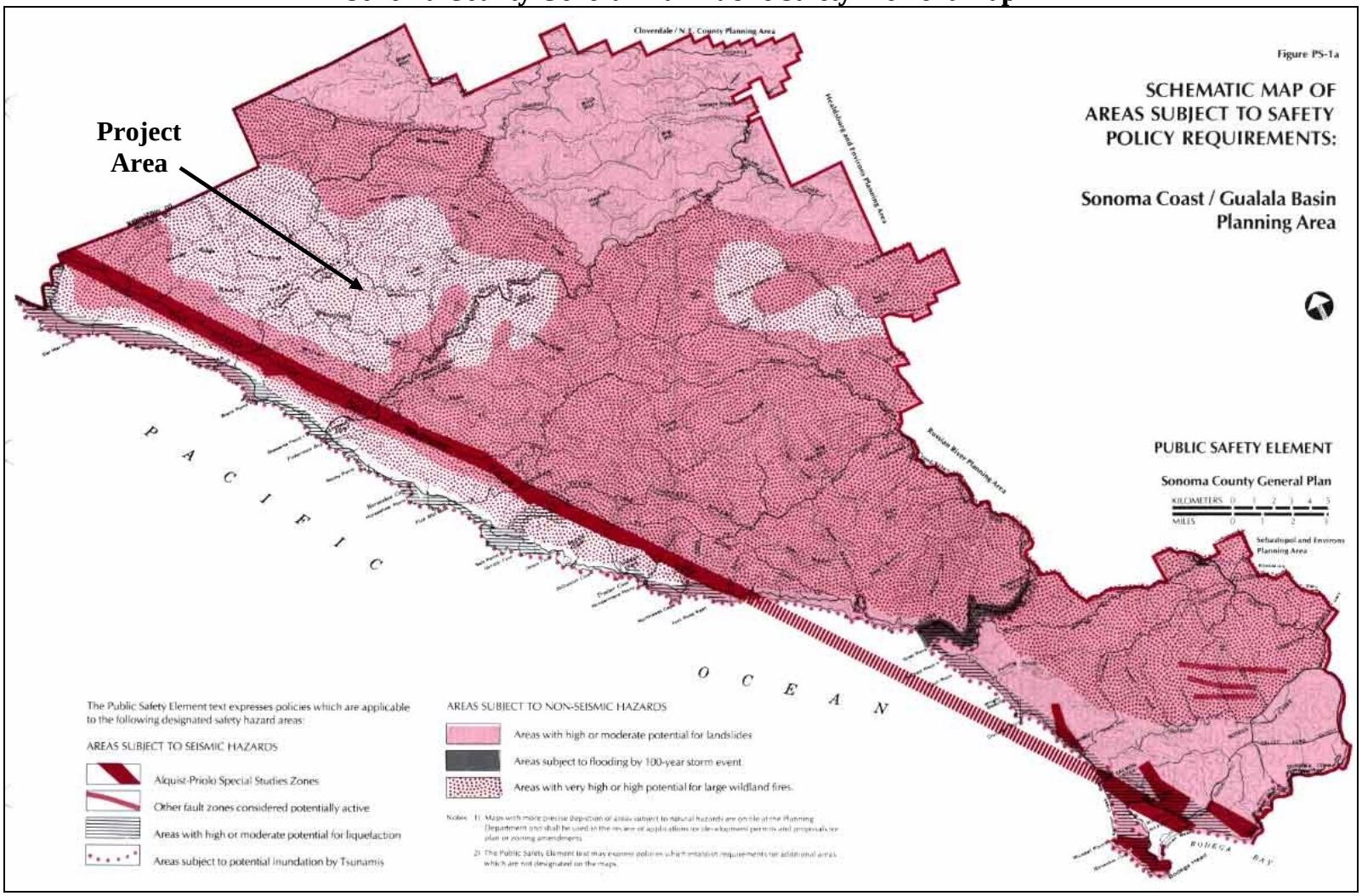
Slopes on the timberland conversion area are generally south- and east-facing and range from two percent to 35 percent, with a calculated average slope of approximately 11.7 percent. Elevation in the conversion area ranges from 660 feet to 860 feet above sea level.

Site Seismicity

Earthquakes are usually caused by sudden movement along geologic faults. Sonoma County faults are part of the San Andreas fault system, which extends along the California coast. The geologically active San Andreas fault extends through Plantation and the South Fork of the Gualala River canyon. The nearest active faults are the San Andreas and Maacama Faults, located approximately three miles southwest and 21 miles northeast, respectively, of the project site. All of the known faults in the County show evidence of movement during the past and are considered to be potentially active (See Figure 3.6-3, Sonoma County General Plan Public Safety Element Map).

Since 1855, more than 140 earthquakes have been felt in the Santa Rosa area. The 1906 earthquake caused 61 deaths and major damage in Santa Rosa, Sebastopol, Healdsburg and other communities. The last major earthquake in Sonoma County was the 5.7 magnitude event on the Healdsburg fault in Santa Rosa in 1969. Analysis of seismic data indicates that magnitude 8.5 and 7.5 earthquakes can be expected for the San Andreas and the Healdsburg-Rodgers Creek faults, respectively. Earthquakes of 8.0 or more on the San Andreas fault can be expected every 50 to 200 years.

Figure 3.6-3
Sonoma County General Plan Public Safety Element Map



Groundshaking, Ground Failure, and Ground Displacement along Fault Traces

Groundshaking from earthquakes affects the most people and can cause the most damage of any geologic hazard. The amount of groundshaking depends on the magnitude of the earthquake, the distance from the epicenter and the type of earth materials in between. Association of Bay Area Governments (ABAG) maps showing the groundshaking hazard in Sonoma County are on file at the County Planning Department. Groundshaking similar to that which took place in Santa Rosa during the 1969 earthquake can be expected somewhere in Sonoma County once every 20 to 30 years. Therefore, the project site would likely experience groundshaking of a similar magnitude during a similar time frame.

Damage from groundshaking can be increased by liquefaction and landslides. Liquefaction changes water-saturated soil to a semi-liquid state, removing support from foundations and causing buildings to sink. The most hazardous areas are valleys and tidal marshes with high water tables and sandy soils. In some locations the project site does have a high water table; however, a single storage shed is the only structure that would be subject to adverse effects from liquefaction.

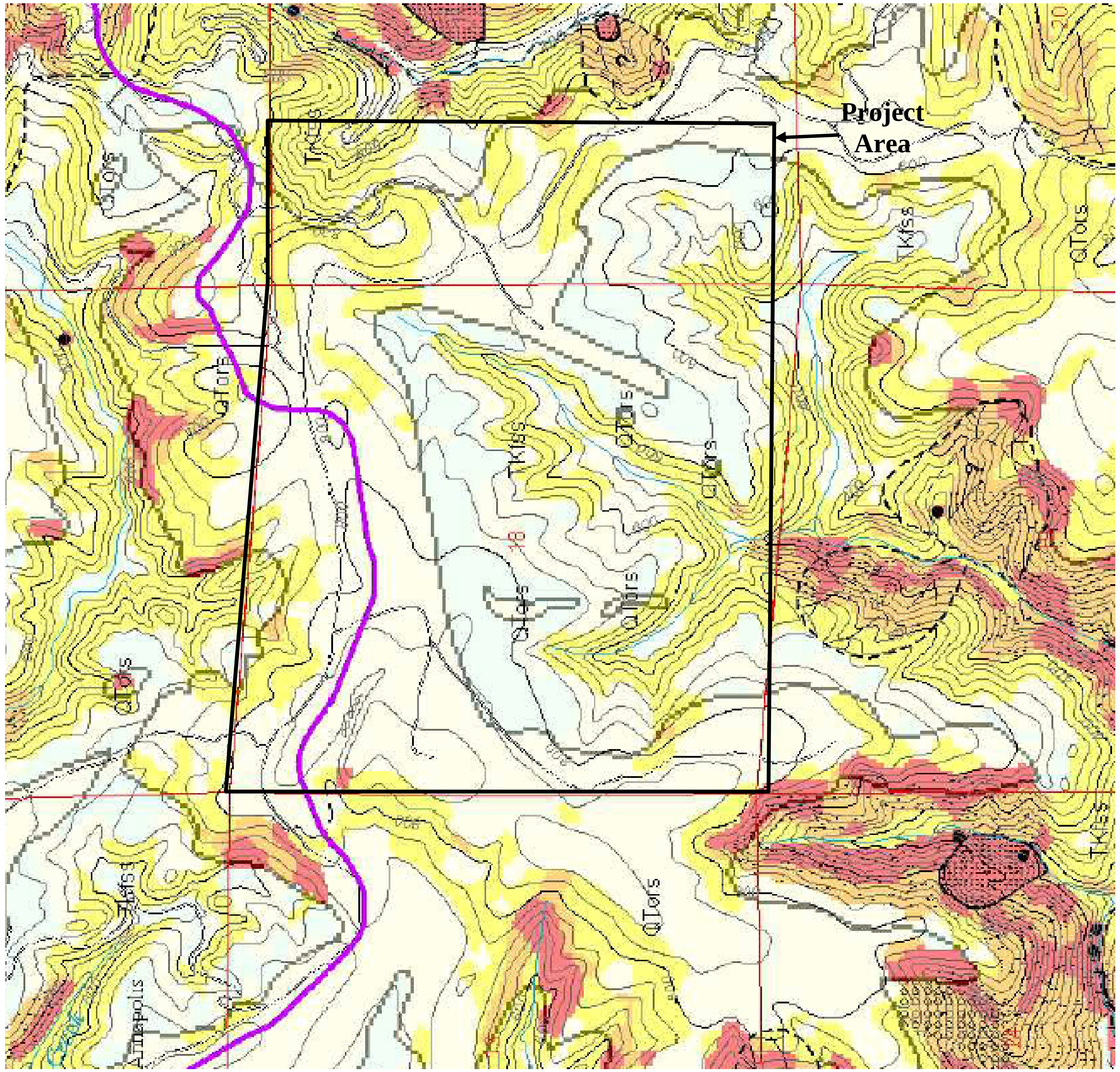
During the 1906 earthquake, horizontal displacement along the San Andreas fault averaged 15 feet in Sonoma County. The Healdsburg, Rodgers Creek, and Maacama faults also show evidence of surface displacement during the past 11,000 years.

Earthquake damage to utilities and other public facilities can produce disastrous secondary effects. Much of the destruction from the 1906 earthquake was from fires that could not be extinguished due to broken water lines, damaged roads and lack of communications. These secondary effects can be reduced by various methods, but larger facilities and population growth increase the potential damage.

Landslides

The most common type of ground failure in Sonoma County is landslides. Landslides can be characterized as the downslope movements of soil and/or rock materials. Landslides can result from groundshaking and may occur in areas of gentle slopes due to liquefaction of subsurface materials. Extensive land areas of the County are subject to this hazard and are shown in Figure 3.6-3, Sonoma County General Plan Public Safety Element Map (from Figure PS-1a of the Sonoma County General Plan, p. 257). In addition, Figure 3.6-4, Landslide Potential, illustrates the relative landslide potential for the project site and surrounding areas.[9] Landslides can be triggered by heavy rainfall, earthquakes or human activities such as road cuts, grading, construction, removal of vegetation, and changes in drainage. Of particular concern for timberland conversion areas are road-related landslides. As shown in Figure 3.6-4, the proposed project is located on slopes that have a very low to moderate landslide potential. As a result, landslides are not a large risk, but they could result if grading and removal of vegetation were to weaken the slope stability.

Figure 3.6-4
Landslide Potential



RELATIVE LANDSLIDE POTENTIAL CATEGORIES

1 VERY LOW LANDSLIDE POTENTIAL. Landslides and other features related to slope instability are very rare to non-existent within this area. This area includes relatively flat marine terraces, lower stream valleys, and flat topped ridges in the Gualala River watershed.

2 LOW LANDSLIDE POTENTIAL. Gentle to moderately steep slopes underlain by relatively competent material that is considered unlikely to mobilize as landslides under natural conditions given the current understancing of regional seismicity. Landsliding in these areas is not common. This area generally includes the flat-topped ridges of the Ohlson Ranch Formation and marine rocks west of the San Andreas Fault.

3 MODERATE LANDSLIDE POTENTIAL. Moderate to moderately steep, relatively uniform slopes that are generally underlain by competent bedrock, may also include older dormant landslides. Some slopes within this area may be at or near their stability limits due to weaker materials, steeper slopes, or a combination of these factors. This area dominantly occurs in dormant landslides west of the San Andreas Fault and in the rocks of the Coastal Terrane west of the Tombs Creek Fault zone. Landslides typically occur as small (less than an acre) debris flows, debris slides, and rockslides.

4 HIGH LANDSLIDE POTENTIAL. Moderately steep to steep slopes that include many dormant landslides in upslope areas and slopes upon which there is substantial evidence of downslope creep of surface materials. This area consists of large dormant earthflows dominantly occurring in the rocks east of the Tombs Creek Fault zone, areas of disrupted ground on moderately steep (30-64%) slopes, and much of the incised and moderately steep area of the Coastal Terrane.

5 VERY HIGH LANDSLIDE POTENTIAL. Areas include historically active landslides (<150 years old) and inner gorges, as well as debris slide/flow source areas on steep to very steep slopes (>65%). Landslides typically occur as large earthflows in the Central Terrane east of the Tombs Creek Fault zone and as small (less than one acre) rock slides, debris slides, and debris flows in the Coastal Terrane.

Source: Fuller et al (2002).
The proposed project is wholly contained within the Project Area Boundary; however, the Project Area Boundary is for illustrative purposes only, and does not indicate property or project lines.

Expansive Soils

Buildings, utilities and roads can be damaged by clay-rich soils that shrink and swell in response to soil moisture conditions. The project soils are not considered to be highly expansive; furthermore, only one structure and minimal roads are planned for the project site.

Existing Soil Erosion in the Project Area

The following is a brief outline of soil erosion in the project area. For a more in-depth discussion, please see Section 3.7 – Hydrology and Water Quality, pages 3.7-4 to 3.7-12. The Environmental Protection Agency (EPA) 303(d) list includes the Gualala River Watershed due to impairment and/or threat of impairment to water quality by sediment. Therefore, as required by the Clean Water Act, a total maximum daily load (TMDL) assessment for sediment was completed for this watershed in late 2002. The information in the TMDL document was developed based on the North Coast Regional Water Quality Control Board (Regional Board) *Gualala River Watershed Technical Support Document for Sediment* (TSD). To date, the Regional Board has not adopted an implementation plan for the prescribed TMDL program.

Both the TSD and the TMDL documents identify road construction associated with logging as the primary cause of sediment problems in the Gualala River Watershed. In general, the determination was made that natural sediment sources currently account for approximately one-third of the total sediment delivered to the Gualala River and two-thirds is human-caused. Furthermore, the analysis showed that road-related erosion is the major portion of the human caused erosion, and the higher road density in a given area results in a greater loading from roads.

After identifying the major contributors to sediment water quality impairments in the Gualala River watershed, the TSD and TMDL documents outline proposed load allocations from each major contributing source. These allocations will be necessary to reduce the total loading to meet the loading capacity of the watershed. The loading capacity for road-related landslides is 56 tons per square mile per year (tons/mi^2/yr). According to the Hydrology Report prepared for the project, road-related landslides currently contribute 310 tons/mi^2/yr of sediment to the Gualala River Watershed. Therefore, road-related landslides are allocated approximately 18 percent of their current estimated delivery (56 tons/mi^2/yr divided by 310 tons/mi^2/yr = 18 percent). In order to attain this allocation, the TSD recommends that landowners in high road density areas decommission some roads as reasonable.

The TSD and TMDL documents indicate that road densities in the Annapolis Watershed and Grasshopper Creek Watershed are approximately 6.1 and 6.5 miles per square mile, respectively. Compared to other watersheds within the Gualala River Basin, these densities are higher than average.

The Regional Board TSD also addressed the potential for sedimentation due to viticulture. Although viticulture was not determined to be a major contributing factor to sediment loads in the Gualala River watershed, viticulture and the associated clearing of vegetation are likely to increase surface erosion through exposure of bare earth to rainfall and runoff. Observations made by Regional Water Board staff in conjunction with the TSD development show that conservation practices used in viticulture (cover cropping, buffer strips, terracing, etc.) have variable effects on erosion prevention.

REGULATORY CONTEXT

Existing policies, laws and regulations that would apply to the proposed project are summarized below.

California Building Standards Code / Uniform Building Code

Site development and design are regulated in the State of California by the California Building Standards Code (CBC), based on the federal Uniform Building Code (UBC) and suited to the unique sensitivity of the State's geology and faultlines. CBC and UBC regulations must be adhered to with regard to expansive soils, drainage, erosion, earthquake resistance, and required safety measures during on-site development.

Sonoma County General Plan

Applicable goals and policies established in the 1989 Sonoma County General Plan are listed below:

Goal PS-1 Prevent unnecessary exposure of people and property to risks of damage or injury from earthquakes, landslides and other geologic hazards.

- Objective PS-1.1 Continue to utilize available data on geologic hazards and associated risks.
- Objective PS-1.2 Regulate new development to reduce the risks of damage and injury from known geologic hazards to acceptable levels.

IMPACTS AND MITIGATION MEASURES

Standards of Significance

An impact to the Fairfax Timberland Conversion project would be considered significant if any of the following conditions would result from the proposed project implementation:

- Exposure of people or structures to substantial, adverse effects as a result of strong groundshaking, seismic-related ground failure, liquefaction, lateral spreading, landslides, or lurch cracking;
- Substantial erosion or unstable slope or soil conditions through alteration of topographic features, dewatering, or changes in drainage patterns; or
- Exposure of people, structures, or infrastructure components to increased risk of injury or damage due to the presence of expansive soils, soil settlement/compaction, or other geotechnical constraints.

Method of Analysis

The impacts and mitigation measures section is primarily based upon information contained in the Geotechnical Investigation prepared for the reservoir and sump pond by Brunsing Associates. The Erosion Control Plan and Hydrologic Evaluation are also used, albeit, to a lesser degree.

The geotechnical investigation consisted of both field exploration and laboratory testing. The field exploration included excavating, logging, and sampling seven test pits to depths ranging from 10.5 to 15.5 feet on December 11, 2001. The test pits were excavated with a client-provided backhoe. Within the deeper cut areas of the reservoir, the field exploration also consisted of drilling, logging, and sampling two test borings about 23.5 feet and 25.0 feet in depth on January 14, 2002. The borings were drilled with a track-mounted drill rig utilizing flight auger equipment.

A staff engineer at Brunsing Associates logged the test pits and obtained relatively undisturbed (tube) and loose bulk samples of the soil and rock materials encountered for visual classification and laboratory testing. The relatively undisturbed tube samples were obtained using a three-inch outside diameter Sprague & Henwood (S & H) split-barrel sampler, pushed with the backhoe bucket.

The Brunsing Associates staff engineer also logged the test borings and obtained relatively undisturbed tube samples of the materials encountered for visual classification and laboratory testing. Samples of the soil and rock materials encountered were obtained using the S & H split-barrel sampler, driven by a 140-pound drop hammer falling 30 inches per blow. Blows required to drive the sampler were converted to equivalent "Standard Penetration" blow counts for correlation with empirical test data. Sampler penetration resistance (blow counts) provides a relative measure of soil consistency and strength.

Selected samples were tested at Brunsing Associates' laboratory to determine their pertinent geotechnical engineering characteristics. Laboratory testing consisted of moisture content/dry density, maximum dry density (compaction), triaxial compressive strength, classification (particle size analysis), and remolded permeability (triaxial cell).

Project-Specific Impacts and Mitigation Measures

3.6-1 Impact of seismic activity on proposed vineyard blocks.

The geologically active San Andreas Fault extends through Plantation and the South Fork of the Gualala River canyon, approximately three miles southwest of the project site. Earthquakes generated from this fault or other sources may cause ground shaking during the lifetime of the project, but are not normally considered as a design factor during vineyard development. The only structures that would be constructed for the project are those associated with the on-site 1-acre corporation yard area. As required by Sonoma County, all structures would be constructed to Uniform Building Code (UBC) standards. While the project site is located approximately three miles from an active fault line, the presence of bedrock at a relatively shallow depth would tend to minimize potential for earthquake induced damage at this location (Erosion Control Plan, p. 2). As a result, seismic activity would have a ***less-than-significant*** impact on the vineyard proposed for the project site.

Mitigation Measure(s)
None required.

3.6-2 Impact of seismic activity on proposed reservoir.

A surface water collection and storage system has been designed for the vineyard. The proposed system would collect diffuse surface sheet flow from vineyard units 2 and 6 with a total tributary area of about 36 acres. Runoff would be delivered to a two acre-foot sump pond and pumped to an upland off-channel 73 acre-foot reservoir for seasonal storage. The reservoir would be recharged by a combination of captured sheet flow and direct precipitation on an annual basis. The lined reservoir and sump surface areas total 9 acres, with 100 percent rainfall capture at any annual rainfall total.

A geotechnical investigation was prepared in June 2002 for the Artesa Vineyards reservoir and sump pond to evaluate the site soil/rock conditions in order to determine project feasibility, and to provide geotechnical conclusions and recommendations regarding site grading, including embankments and compacted soil liner construction, suitability of on-site soils for use as liner material, and the need for subdrainage. At the time that Brunsing Associates prepared the geotechnical investigation, a 36.5 acre-foot reservoir was proposed for the project as compared to the currently proposed 73 acre-foot reservoir. This difference in reservoir area is due to the fact that the total area for vineyard development has increased since the initial project design. However, due to the fact that the entire site is composed of similar soils and is underlain by the Ohlson Ranch Formation, the subsurface geology of the initial reservoir area and the revised reservoir area is likely the same; therefore, the conclusions contained in the geotechnical investigation are likely applicable to the expanded reservoir area. However, the

likelihood exists that expansion of the reservoir area could have a ***potentially significant*** impact if site-specific design and construction measures are not studied and implemented.

Mitigation Measure(s)

The geotechnical investigation concluded that based upon field exploration and laboratory testing, the site is geotechnically suitable for the planned reservoir and sump pond. The main geotechnical constraints that should be considered in design and construction for the reservoir and sump include the presence of weak/porous surface soils, isolated seepage areas, and strong seismic shaking from future earth quakes because the site would be subject to strong ground shaking from future earthquakes. With the embankments founded upon firm soil/rock, and with interior and exterior slopes of 2.5H:1V, the embankments should be well suited to resist the effects of ground shaking. Because active faults were not found and are not shown on published references in the site vicinity, the possibility of fault rupture is considered low. Therefore, the site appears suitable for the expanded reservoir. Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

3.6-2 *Prior to the issuance of grading permits, the applicant shall provide a final geotechnical report to the Sonoma County Permit and Resource Development Department that addresses the entire reservoir area. All of the recommendations in the final geotechnical report shall be incorporated into the construction plans for the reservoir.*

3.6-3 Impacts caused by road-related landslides.

As discussed in Chapter 3.7, Hydrology and Water Quality, the North Coast Regional Water Quality Control Board (Regional Board) *Gualala River Watershed Technical Support Document for Sediment* (TSD) has identified road-related landslides as the greatest current contributor of sedimentation to the Gualala River Watershed. Landslides not only result in potential impacts to downstream water quality, but also create potential safety issues to timber harvesters and vineyard workers.

As stated in the Timber Harvest Plan (THP)[10] prepared for the project, with the exception of the two permanent roads that provide access to neighboring residences, all existing seasonal roads, tractor roads, and landings located within the project area would be abandoned following completion of timber harvest operations. These temporary roads would also be located away from streambeds on slopes that are less than 20 percent and in areas that are currently stable.

Furthermore, in the event that timber harvesting operations cannot be immediately followed by vineyard development, tractor roads would have drainage and/or

drainage collection and storage facilities installed as soon as practicable, but prior to October 15.

Access to the vineyard units following the conversion of the site would be via the existing permanent roads shown on the ECP (See Figures 2-4 to 2-10). Roads would be constructed in conformance with the measures included in the ECP, including: all access roads would be crowned and graded to prevent flow in wheel tracks, water bars would be installed at 100' on center max for slopes over 15 percent, rocked fords would be installed through seasonal swales or runoff areas, ditches would be graded and shaped, cut and fill slopes would be constructed consistent with slope stability, available access corridors, and sidecast material stabilized by slope limits, compaction, mulching, seeding. Furthermore, any road surface erosion that may occur would drain to sedimentation basins. As required by mitigation measures in Chapter 3.7, the performance of the sedimentation basins and other measures intended to reduce onsite erosion would be evaluated for a number of years after project completion to ensure that onsite erosion is reduced as compared to the existing conditions. Therefore, as the potential for road-related landslides would be minimized, and erosion reducing measures would be implemented and evaluated overtime, the safety impacts would be considered ***less-than-significant***.

Mitigation Measure(s)
None required.

3.6-4 Increased soil erosion during and after construction from conversion and grading activities.

One of the two soil series present on the project site, the Goldridge Series is identified as a "highly erodible" soil in the Sonoma County Vineyard Erosion and Sediment Control Ordinance (VESCO). The proposed project would result in the conversion of approximately 190-acres of timberland, grassland, and brush to a viticultural operation, which would require the loosening and removal of topsoil, primarily through grading activities. Once disturbed, the topsoil would be subject to wind and water erosion. According to the Erosion Control Plan prepared for the project, grading activities would be necessary throughout the conversion process. For example, after tree removal, surface shaping and grading would be carried out as desired/required to facilitate efficient vineyard layout, and rough grading or shaping would be carried out as required to smooth field irregularities, improve drainage, modify field layout, or meet other management objectives. The grading and subsequent potential for erosion of topsoil could have adverse impacts to downstream water quality in addition to site productivity. The impact of soil erosion and subsequent sedimentation of downstream water quality is addressed in full detail in Section 3.7 of this Draft EIR, *Hydrology and Water Quality*, Impact 3.7-2. For Impact 3.7-2, the Draft EIR concludes that project impacts to downstream water quality would be considered ***potentially significant***.

Mitigation Measure(s)
The current California Forest Practice Rules require the implementation of extensive water quality protection measures for timber harvesting activities such as the one proposed. Implementation of the mitigation measures listed below would reduce timber harvest-related sedimentation impacts to project area waterways to a *less-than-significant* level

3.6-4 Implement Mitigation Measures 3.7-2(a) to 3.7-2(h) and 3.7-3(a) and (b).

3.6-5 Impacts to slope stability during and after construction from conversion and grading activities.

According to the Hydrologic Analysis by O'Connor Environmental, slope stability hazards are generally low or very low in the project conversion area, with some areas of moderate hazard. Furthermore, landslides have not been observed in the project conversion area during field studies or in previous landslide surveys of the area. In addition, local slopes along the perimeter of conversion areas are not sufficiently steep (e.g. approximately 60% gradient or greater) to be generally susceptible to debris slide processes, and the extent and density of woody vegetation (trees and shrubs) that will remain in these areas provide significant additional reinforcement to the soil, reducing the potential for slope failure in the future.

Potential increases in pore water pressure or short-term increases in the elevation of a perched water table lying above the geologic contact between the overlying Ohlson Ranch Formation and the underlying Franciscan Formation is a mechanism that could hypothetically translate increased soil moisture from hydrologic change into increased risk of debris slides or debris torrents. However, evidence of such landslides does not exist in the historic aerial photo record analyzed by the California Geological Survey in the NCWAP. Therefore, potential increases in soil moisture in the vicinity of the project area are not expected to significantly increase potential slope instability in the vicinity of the project.

One area of "high" potential for landslides is located within the watershed described by Drainage Node 33. This area of high potential was observed in the field to have evidence of one debris slide originating on steep slopes in past decades. Vineyard drainage for Node 33 would be largely controlled by sedimentation basins, mitigating the potential for increased soil moisture on down-gradient slopes. (For a complete description of erosion and mitigation of erosion, please refer to Section 3-7). Existing woody vegetation is to be retained in this area, and the maintenance of root strength in this area is expected to provide significant reinforcement of slopes. Project hydrologic impacts are not expected to significantly increase landslide hazards in the project area, either within or adjacent to project conversion areas. Therefore, implementation of the proposed project would result in a ***less-than-significant*** impact to slope stability.

Mitigation Measure(s)
None required.

Cumulative Impacts

Cumulative impacts to Geology are analyzed in Impact Statement 4-7 of Chapter 4, Cumulative Impacts.

Endnotes

[1] *Erosion Control and Mitigation Plan*, Fairfax Ranch Vineyard, Erickson Engineering, Inc., April 14, 2008.
[2] O'Connor Environmental, Inc. *Hydrologic Analysis, Artesa Fairfax THP and Conversion.* May 2008.
[3] *Baseline Soil Analysis for Vineyard Development: Annapolis Property/Project #9798*, Crop Care Associates, Inc. October 26, 1999.
[4] Sonoma County *General Plan*, March 23, 1989.
[5] Sonoma County *General Plan Update Environmental Impact Report*, December 1986.
[6] Geotechnical Investigation, *Artesa Vineyards Reservoir and Sump Pond, Annapolis Road, Annapolis California*, Brunsing Associates, Inc., June 25, 2002.
[7] *Fairfax Timberland Conversion and Vineyard Development Project -- Hydrologic Evaluation*, West Yost & Associates, July 15, 2008.
[8] *Geologic and Geomorphic Features Related to Landsliding, Gualala River Watershed, Sonoma and Mendocino Counties, California.* Michael Fuller, CEG, Wayne D. Haydon, CEG, Michael G. Purcell, RG, and Kit Custis, CEG, CHG, 2002.
[9] *Relative Landslide Potential with Geologic and Geomorphic Features, Gualala River Watershed, Sonoma and Mendocino Counties, California, Plate 2, Sheet 2 of 3,* Michael Fuller, CEG, Wayne D. Haydon, CEG, Michael G. Purcell, RG, and Kit Custis, CEG, CHG, 2002.
[10] *Timber Harvesting Plan, Fairfax Conversion*, Longcrier, Jeff, RPF #2593, North Coast Resource Management, March 2008.