V. ENVIRONMENTAL IMPACT ANALYSIS
G. HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section evaluates information from the following site-specific technical reports, which are included in Volume II, Appendix G in this DEIR:

- *Hydrology Report for Dutra-Haystack Landing Asphalt and Recycling Facility, Petaluma, California,* prepared by CSW/Stuber-Stroeh Engineering Group, Inc., April 2006.
- *Evaluation of Potential Pollutant Loading - Petaluma River, Proposed Dutra Asphalt Production Facility, Haystack Landing, Petaluma, California,* prepared by BASELINE Environmental Consulting, May 2006.

ENVIRONMENTAL SETTING

Hydrology and Flooding

Regional Conditions

The project site is located in southern Sonoma County, California and within the valley of the Petaluma River (River). The Petaluma Valley is oriented northwest-southeast and extends approximately 18 miles from north of the City of Petaluma to San Pablo Bay. The site is situated near the western margin of the valley floor. The topography of the majority of the site is relatively flat with the exception of a low hill in the northern portion. The remainder of the site is level to slightly sloping, characterizing a graded tidal marsh. The hills to the west comprise a portion of the Coast Range and rise to elevations between approximately 400 feet above mean sea level (msl) to over 1,500 feet at Mount Burdell.

The climate of the area of the project site is characterized as dry-summer subtropical (often referred to as Mediterranean). Under this temperate climatic regime, two dominant seasons occur; cool, wet winters (October through April) and relatively warm, dry summers (May through September). Sustained rainy periods can occur during the winter and coastal fog is common in summer. The temperature is moderated by proximity to San Pablo Bay and the Pacific Ocean. The average annual high temperature is 70.6º Fahrenheit (F); the average annual low is 45.2 ºF.[1]

The mean annual rainfall in the vicinity of the project site, for the period between 1948 and 2005, is approximately 25.3 inches, with the vast majority of rainfall between October and May.[2] During the period of record, annual rainfall has varied from 9.0 inches (1976) to 45.9 inches (1995). Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region.

The project site is positioned on the western margin of the Petaluma River. The River has a drainage area of approximately 146 square miles with its headwaters in the hills between Petaluma and Sebastopol and its mouth at San Pablo Bay.[3] The lower reaches (portions) of the River function as a tidal slough. As a tidal

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[1] *Western Regional Climate Center, 2004. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6826.*

[2] *Ibid.*

[3] *Southern Sonoma County Resource Conservation District, 2004. Petaluma River Watershed Website: http://www.sscrcd.org/area/petaluma.html.*

slough, water levels in the River respond to the rise and fall of the tides. Additionally, the tidal action within the River results in variations of the salinity as more saline bay water is mixed with freshwater runoff.

Local Conditions

Topography and Drainage

The project site is located between the Petaluma River and the northeast-facing slopes which bound the western side of the River valley. As described in detail in Section III. Project Description, for purposes of this discussion, the site is divided into four areas designated in the project description for this DEIR. Figure V.G-1 shows the preliminary hydrology plan for the existing conditions. The letter designations in Figure V.G-1 indicate drainage areas, as further described in the Hydrology Report by CSW/Stuber-Stroeh Engineering Group, Inc in Volume II, Appendix G; and are not related to the four areas as described in the Project Description.

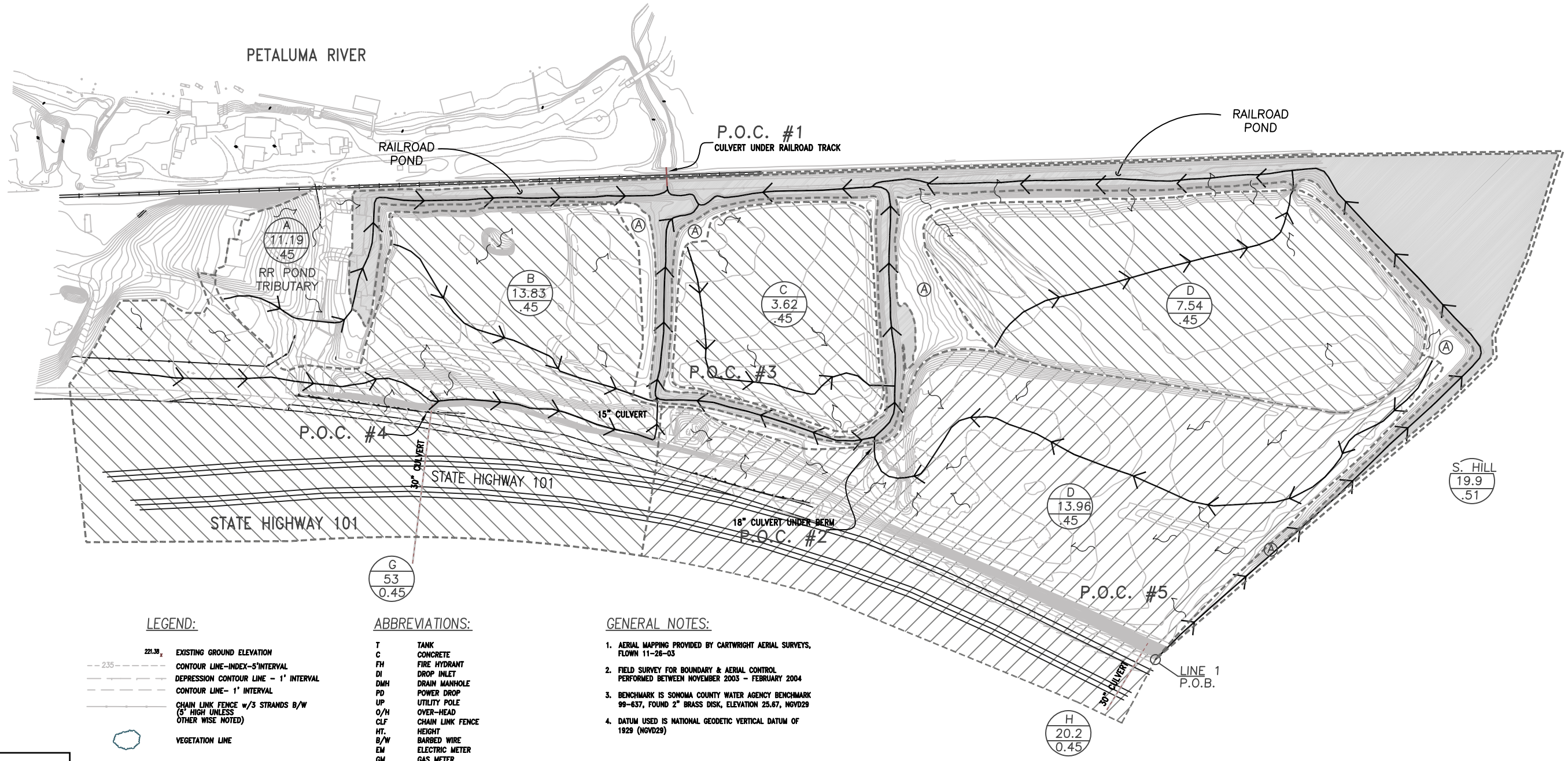
Area A is located in the northeastern portion of the site and occupies a narrow strip of land between the Petaluma River and the Sonoma Marin Area Rail Transit right-of-way (SMART-ROW). The natural topography of this area was a relatively flat tidal marsh surface prior to human development. Starting in the 1960s, the area has been graded and further leveled to a nearly flat surface. A small channel that is hydraulically connected to the Petaluma River bisects area A. Runoff drainage in the area is directed by grading to this channel.

Area B is located at the northern part of the site area west of the SMART-ROW and north of the gravel access road to Haystack Landing. The topography and geology of the uplands to the west extend into Area B to form a low hill. The top of the hill has been graded (leveled) and has a maximum elevation of the approximately 34 feet msl. The eastern slope of the hill is relatively steep (approximately 45 percent slope) and has been modified as a cut for the former Northwest Pacific Railroad (NWPRR) tracks. The western portion of Area B has been graded to a broad bench at approximate elevation 25 feet msl. Drainage from Area B occurs as sheetflow away from the top of the hill southward toward the unnamed drainage ditch along the access road and eastward to the SMART-ROW. This ditch intersects the ditch parallel to the railroad tracks within the SMART-ROW which is subsequently referred to as the "Railroad Ditch."

The remainder of the site is relatively flat with variations in elevation resulting from previous grading for the creation and operation of former quarry settling basins. The settling basins received wash water from the former Dutra quarry site located approximately 4,000 feet northwest (and across U.S. 101) of the project site. Sediment-laden water was transported from the quarry via pipelines to the settling basin. The sediment was allowed to settle in the ponds; water was evaporated, infiltrated, and occasionally discharged to the River.

Area C is located south of the gravel access road and between the western margin of the site and the SMART-ROW. One drainage ditch (DD1)[4] bisects Area C, and four more ditches are located at the margins of Area C (western margin (DD5 and DD6), southern (DD2), and eastern (Railroad Ditch). The western drainage ditches flow toward, and are intercepted by, the central ditch (DD1), which drains eastward to the

[4] *The designation of drainage features and wetlands for this section of the DEIR follows designations presented in the Wetlands Mitigation and Monitoring Plan (Lynch, et al., 2006) prepared for the project*



LEGEND:

- 221.38 — EXISTING GROUND ELEVATION
- 235 — CONTOUR LINE–INDEX–5'INTERVAL
- DEPRESSION CONTOUR LINE – 1' INTERVAL
- CONTOUR LINE– 1' INTERVAL
- CHAIN LINK FENCE w/3 STRANDS B/W (5' HIGH UNLESS OTHER WISE NOTED)
- VEGETATION LINE
- RAILROAD TRACKS
- GRAPHIC PROPERTY LINE/CORNER (SEE NOTES)
- PRIMARY DRAINAGE FLOW PATH
- TRIBUTARY AREA BOUNDARY
- FLOW DIRECTION

Graphic Scale (in feet)

C 9.82 .45 — TRIBUTARY AREA DESIGNATION; AREA (ACRES); RUNOFF COEFFICIENT –"C" FACTOR

ABBREVIATIONS:

T	TANK
C	CONCRETE
FH	FIRE HYDRANT
DI	DROP INLET
DMH	DRAIN MANHOLE
PD	POWER DROP
UP	UTILITY POLE
O/H	OVER–HEAD
CLF	CHAIN LINK FENCE
HT.	HEIGHT
B/W	BARBED WIRE
EM	ELECTRIC METER
GM	GAS METER
w/	WITH
EOP	EDGE OF PAVEMENT
TYP.	TYPICAL

GENERAL NOTES:

1. AERIAL MAPPING PROVIDED BY CARTWRIGHT AERIAL SURVEYS, FLOWN 11–26–03
2. FIELD SURVEY FOR BOUNDARY & AERIAL CONTROL PERFORMED BETWEEN NOVEMBER 2003 – FEBRUARY 2004
3. BENCHMARK IS SONOMA COUNTY WATER AGENCY BENCHMARK 99–637, FOUND 2" BRASS DISK, ELEVATION 25.67, NGVD29
4. DATUM USED IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

Legend

NORTH

0 100 200 300 400

Scale (Feet)

Source: CSW/ST, CAJA 2007.

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Figure V.G-1
Preliminary Hydrology Plan, Existing Conditions

Petaluma River. The flow in the DD1 is conveyed through a culvert beneath the SMART-ROW. The culvert (referred to herein as the Railroad Culvert) is the only direct hydraulic connection between the River and the drainage ditches at the project site.

The Railroad Culvert was submerged during the site inspection in May 2006 and could not be visually observed. The condition of the culvert has been variously described by consultants for the project as a wooden box culvert, a concrete box culvert, or a corrugated metal pipe.[5] Estimates of the size of the opening of the culvert range from 24 to 30 inches. The hydraulic analysis for the project assumes the culvert to have a cross-section of 18 by 24 inches.[6]

The portion of Area C south of DD1 drains southward to DD2. The flow in DD2 is directed eastward and is intercepted by the Railroad Ditch. This channel flows northward to DD1 and through the Railroad Culvert. Runoff from the area west of DD5 and DD6 flows into these ditches and then to DD1 (Figure V.G-1).

Area D is located south of DD2 and includes several designated wetland areas. The topography of Area D is characterized by relatively flat areas surrounded by narrow embankments or "levees." A northwest-southeast trending embankment separates two separate groups of wetlands. The wetlands east of the embankment generally drain to the southeast corner of the site and through a breach in the embankment and into the Railroad Ditch. A second breach in the eastern levee was observed during the May 2006 site reconnaissance. Freshly deposited (nonvegetated) sediment within Area D indicates recent flow through the breach. Flow within the Railroad Ditch is directed northward to the Railroad Culvert.

The portion of Area D west of the northwest-southeast trending embankment drains northward as sheetflow and collects in a relatively large wetland in the northwest corner of Area D. This wetland is connected to DD2 by a breach in the levee at the north side of Area D (FigureV.G-1).

The south side of the project site is bounded by a drainage ditch (DD3) that conveys flow around the project boundary to a pond located off the site but adjacent to the southeast corner of the site. The pond is connected to the Railroad Ditch by a culvert at the southeast corner of the site. Therefore, overflow from the pond can flow into the Railroad Ditch.

A hydrology analysis prepared for the proposed project has evaluated the flow of runoff under existing conditions.[7] The analysis identifies three main watersheds, which include portions of project site. The most northerly watershed encompasses approximately 53 acres of the hillside west of Highway 101. The runoff from this area is conveyed under the highway and onto the project site through a 30-inch concrete pipe culvert (Figure V.G-1). The pipe discharges to the western ditch (DD6), then to the central ditch (DD1), and ultimately through the Railroad Culvert and into the Petaluma River.

Another small watershed (approximately 20 acres) on the hillside west of Highway 101 drains onto the southwestern corner of the site through a 30-inch concrete pipe. The discharge from the pipe flows northward through Area D and passes through the levee break, and into Ditch DD2 and then discharges to the Railroad Ditch and the Petaluma River (Figure V.G-1).

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[5] *CSW-[St]2, 2006, Hydrology Report for Dutra-Haystack Landing Asphalt and Recycling Facility, Petaluma, Sonoma County, California, consulting report prepared for Dutra Materials, 4 p. + maps and appendices, April.*

[6] *Ibid.*

[7] *CSW-[St]2, 2006, op. cit.*

A third watershed collects runoff from the small hill south of the project site. The runoff from this area drains to the "railroad pond" (approximately three acres). Although this watershed (approximately 20 acres) does not include the project site, the railroad pond is hydraulically connected to the Railroad Ditch at the eastern edge of Areas C and D of the project site (Figure V.G-1).

Tidal Conditions

The drainage ditches of the project site are hydraulically connected to the Petaluma River through the Railroad Culvert. Therefore, tidal fluctuations within the River result in the flow of water into the ditches during high tide and out of the ditches and into the River during low tide. The constriction of the culvert mutes the tidal effect within the on-site drainage ditches. The tidal conditions at the site were investigated during a hydrologic evaluation for the proposed wetland restoration plan.[8] As part of the investigation, tidal measurements were made at three monitoring stations: at the mouth of the Railroad Ditch (Station #1), at the upstream end of the Railroad Culvert (Station #2), and in Ditch DD2 (Station #3). Water levels, specific conductance,[9] and temperature were automatically recorded from May 7 to July 26, 2004 (representing two 28-day tidal cycles).

The water level measurements indicate that the tidal effects at Station #1 were similar but somewhat suppressed relative to tidal response within the Petaluma River at the D Street Bridge. Tidal response was more muted at Stations #2 and #3, affected by the constriction presented by the Railroad Culvert. Table V.G-1 shows the average tides measured at the site and the D Street Bridge for the period June 10 through July 7, 2004. The data show that portions of the ditches at the project site are inundated during high tide. The duration of inundation when the water levels exceeded mean high tide ranged from 6 percent at Station #3 (relatively further and higher than the tidal inlet) to 18 percent at Station #2 (upstream of the partially blocked inlet).

The specific conductance measurements at the monitoring stations document seasonal variations in dissolved solids (salinity) in the Petaluma River. The specific conductance steadily increased during the May through July monitoring period as a response to the warm season migration of Bay water up the Petaluma River. At Station #1, the specific conductance increased from approximately 18 mmhos/cm in early June to 37 mmhos/cm by late July.

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[8] *Balance Hydrologics, Inc. (BHI), 2004, Preliminary Hydrologic Investigation of Wetland Restoration Potential at Haystack Landing, Petaluma, California, consulting report prepared for Lucy Macmillan, 11 p. + appendices.*

[9] *Specific conductance is a measure of the capability of water to conduct electrical current. The conductance of water is increased with the concentration of dissolved solids. The salinity of water is also a measure of the concentration of dissolved solids. Therefore, these two properties of natural waters are related. However, the conductance is dependent to a degree on the specific ions dissolved in water. Specific conductance is measured electrically and commonly recorded in the units millimhos per centimeter (mmhos/cm).*

Table V.G-1
Tidal Peaks and Percent of Time Exceeded

Station Location	Elevation Range from MHW to MHHW[1] (feet, NGVD)	Percent of Time Exceeded
Petaluma River at D Street Bridge[2]	4.44 to 5.11	9 to 4%
Mouth of slough at bridge	3.49 to 4.16	13 to 5%
Slough above train tracks culvert	3.06 to 3.47	18 to 7%
Jurisdictional area DD2[3]	3.41	6%

Notes:

1 *Elevation range of interest for pickleweed is Mean High Water (MHW) to Mean Higher High Water (MHHW) having a inundation range from 18 to 5 percent.*

2 *California Department of Water Resources Petaluma River at D Street Bridge (PTB) station is operated by the City of Petaluma. The data are reported in feet above the 1929 National Geodetic Vertical Datum (NGVD) and recorded at variable intervals. Some high water levels conceivably may have occurred between long time-interval readings.*

3 *Channel elevation of jurisdictional area DD2 is above the Mean High Water (MHW) tide and thus cannot be calculated.*

Source: Balance Hydrologics Inc., 2004.

Flood Zone Designation

The majority of the site is located on relatively low and flat topography adjacent to the Petaluma River. Flooding hazard mapping prepared by the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Mapping (FIRM) program (Figure V.G-2) indicates that the majority of the project site is within the 100-year flood hazard zone.[10] The County has established an "F2" zoning district, approximately equivalent to the 100-year flood hazard zone as mapped by FEMA. The purpose of the F2 is to provide a zoning designation that requires compliance with certain building requirements for protection of life and property. The F2 district is applied to properties that lie within the 100-year flood hazard area as shown on the most recent FEMA maps and accompanying report.[11]

The probability of a 100-year flood event in any given year is one percent. FEMA has determined that the base flood elevation of the 100-year event (i.e., water surface) to be 7 feet msl at the project site location. Therefore, areas of the site below this elevation would be expected to be inundated by flood waters of the Petaluma River during a 100-year flood. Areas of the site that would not be expected to flood are the small hill in Area B and the western margin of Areas C and D.

The project site is not located in any mapped dam failure inundation zones.[12] Due to the distance of the project site from San Pablo Bay (approximately nine miles), the potential for coastal flooding hazards, including tsunami, extreme high tides, and sea level rise is very low to negligible.

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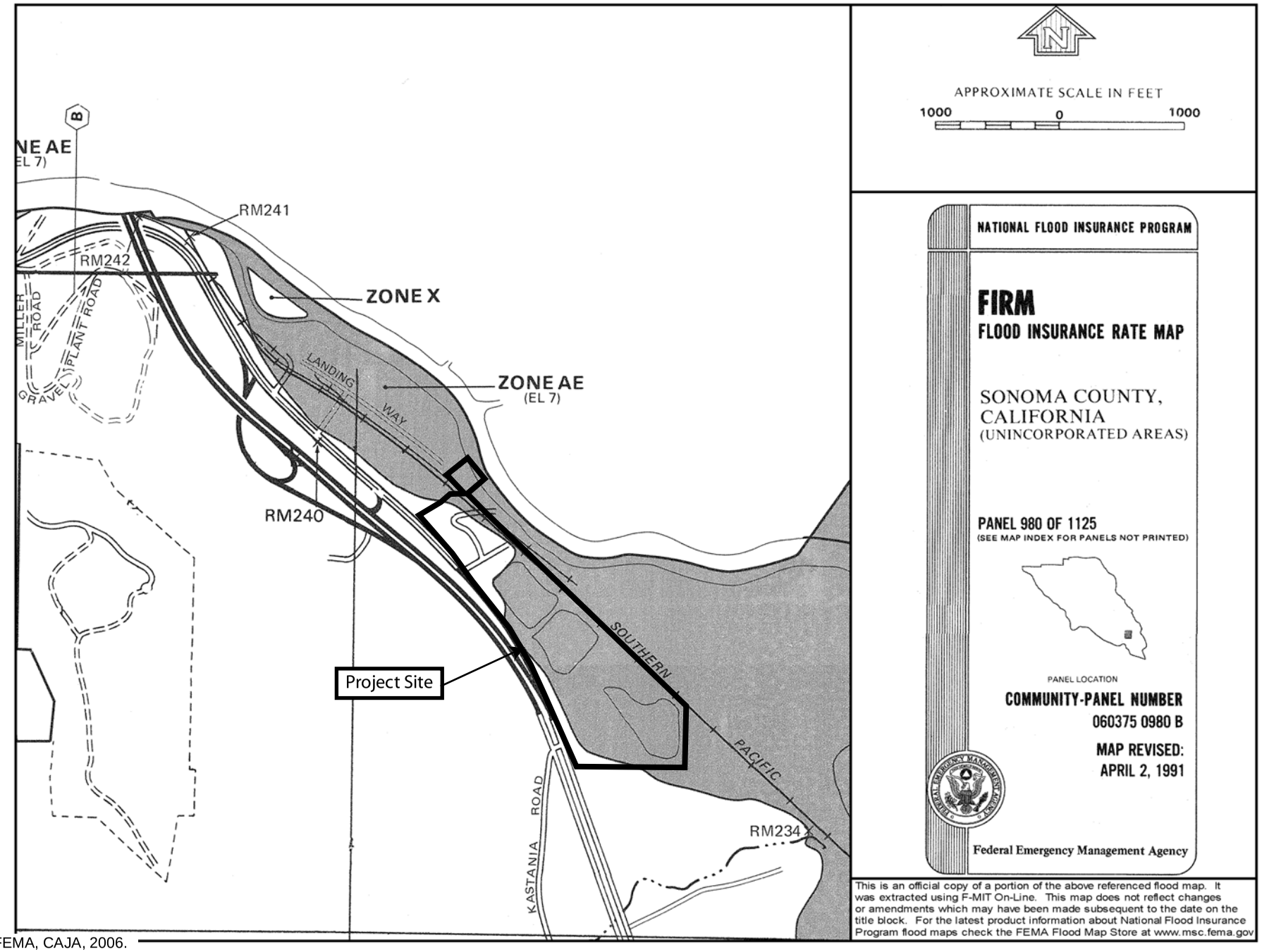
10 *Federal Emergency Management Agency (FEMA), 1991, Flood Insurance Rate Map (FIRM), Sonoma County, California (Unincorporated Areas), Community Panel Numbers 060375 0980B, 2 April.*

11 *Sonoma County Permit and Resource Department Website, Flood plain Combining District, retrieved July 19, 2006 from http://www.sonoma-county.org/prmd/docs/zoning/article_58.htm#zc26-58-030*

12 *Association of Bay Area Governments, 2005, Interactive ABAG (GIS) Maps Showing Dam Failure Inundation http://www.abag.ca.gov/bayarea/eqmaps/damfailure/damfail.html.*



Source: FEMA, CAJA, 2006.

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NORTH

0 500 1000 1500 2000
Scale (Feet)

Figure V.G-2
Project Vicinity Flood Map

Sea Level Rise

The earth has gone through several cycles of cooling and warming over recent geologic time, resulting in both periods of glaciation with attendant sea level drop, and warming with sea level rise. The most recent cycle, which started before the industrial revolution and the associated increase in resource consumption, of global climate change (GCC) is resulting in a warming trend of the earth's atmosphere and an associated sea level rise. Based on long term monitoring of stationary tidal gauges around the world, it is estimated that the current background rate of sea level rise is 0.07 to 0.08 inches per year. Rates vary at specific locations, as local subsidence or uplift affects the relative change in sea level between land masses and the ocean.

In the San Francisco Bay area, the background rate of sea level rise has been approximately 0.05 inches per year over the past 100 years. California recently passed AB-32, a bill designed to address the environmental issues resulting from the manmade generation of green house gases (GHG). The exact contribution of manmade effects over and above the background GCC warming cycle is still under debate; however, the planet is currently warming above and beyond the apparent natural trend, resulting in additional sea level rise. Recent research indicates that the maximum predicted rate of sea level rise over the next 50 years is 0.33 inches per year, which if realized, would result in a sea level rise of 14.4 inches by 2050.[13,14,15] One effect of sea level rise will be that receiving waters surface elevations would be higher than under existing conditions, which would decrease available coastal floodplain storage volumes and conveyance capacity, potentially exacerbating backwater flooding effects. The result would be that lesser storms may result in what are currently classified as 100-year storm events, resulting in more frequent and severe flooding. The proposed elevation of the processing and aggregate storage area would be sufficient to protect the project from foreseeable sea level rise, and associated flood pattern changes, for the duration of the life of the project (until about 2050). If sea levels rise dramatically faster than anticipated, or the project develops a significantly longer life than expected, then the proposed pads at the site protecting equipment and stock piles could be raised, or levees could potentially be erected to provide further protection to the site.

Groundwater

The physiographic setting of the project site is a tidal marsh bounded by the Petaluma River to the east and low hills to the west. The site is underlain by unconsolidated alluvial sediments. Within this setting, groundwater occurs at relatively shallow depths and fluctuates in response to changes in the water level in the River and seasonal rainfall. During subsurface investigations at the project site,[16] groundwater was encountered at depths ranging from 11.0 to 14.5 feet. The report for the investigation noted that the groundwater levels may not have stabilized during the subsurface field work and could fluctuate in response to seasonal changes.

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[13] *James G. Titus and Vijay Narayanan, 1995, Washington, D.C.: The Probability of Sea Level Rise, U.S. Environmental Protection Agency. 186 pp. EPA 230-R95-008.*

[14] *James G. Titus and Charlie Richman, 2001, Maps of Lands Vulnerable to Sea Level Rise: Modeled Elevations along the U.S. Atlantic and Gulf Coasts, Climate Research, CR 18:205-228.*

[15] *E. Robert Thieler and Erika S. Hammar-Klose, 2000, National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast, U.S. Geological Survey Open-File Report 00-178, http://pubs.usgs.gov/of/2000/of00-178/*

[16] *Miller Pacific Engineering Group, 2004, Geotechnical Investigation Dutra Materials – Haystack Landing Asphalt and Recycling Facility, Petaluma, California, report prepared for Dutra Materials, 22 p. Figures and appendices.*

BASELINE geologists observed standing water in ditches on the western margin of Areas C and D during a field inspection of the site on May 3, 2006. The water may represent groundwater discharging to the ditches. In addition, a 48-inch diameter vertical concrete pipe was identified at the western margin of Area D. Evidence that this feature may have been a well used for stock watering includes an abandoned pressure tank and electrical line post. The pipe was open and the water level was measured at 3.7 feet below ground surface. The ditch adjacent to this feature also had water with a similar surface elevation to that observed in the pipe.

Water Quality

The quality of surface water and groundwater in the vicinity of the project site is affected by past and current land uses at the site and within the watershed and the composition of geologic materials in the vicinity. The proximity of the site to the Petaluma River, a tidal slough, influences the quality of surface and ground waters at the project site. Brackish conditions in the River result from mixing of saline and fresh waters during tidal fluctuations. Limited water quality data are available for the project site. Specific conductance measurements in tidal waters at the site ranged from 17 to 38 mmhos/cm, steadily increasing from May to July 2004.[17] By comparison, sea water has a specific conductance of approximately 53 mmhos/cm.[18] Additionally, specific conductance measurements made (January 2004) in standing water throughout the site ranged from 4 to 15 mmhos/cm.[19] No data on groundwater quality are available at the project site.

REGULATORY SETTING

Federal/State and Regional/Local

The following section describes the federal, state, and local regulatory framework for hydrology and water quality requirements.

The State Water Resources Control Board and Regional Water Quality Control Boards regulates water quality in surface and groundwater bodies. The project site is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB), which is responsible for implementation of state and federal water quality protection guidelines in the area of the project site. The RWQCB implements the *Water Quality Control Plan (Basin Plan),*[20] a master policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

The Petaluma River has been identified as an "impaired waterway" by the State Water Resources Control Board in compliance with Section 303 of the Federal Clean Water Act. This designation indicates that the water quality within a waterway has been adversely affected by one or more pollutants. Listed waterways do not meet water quality objectives, even after point (individual) sources of pollution have installed the minimum required levels of pollution control. The Petaluma River (including the area of the project site) has been listed for diazinon, nutrients, pathogens, sedimentation/siltation, and nickel. The identified potential sources of these pollutants include urban runoff, agricultural operations, construction and land development,

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[17] *Miller Pacific Engineering Group, 2004, Geotechnical Investigation Dutra Materials – Haystack Landing Asphalt and Recycling Facility, Petaluma, California, consulting report prepared for Dutra Materials, 22 p. + Figures and appendices.*

[18] *Ibid.*

[19] *Ibid.*

[20] *San Francisco Bay Regional Water Quality Control Board, 1995, Water Quality Control Plan.*

and atmospheric fallout. The RWQCB is responsible for defining regulatory thresholds, or "total maximum daily loads" (TMDLs), for the listed pollutants.[21] The TMDLs for the Petaluma River are under development.

California storm water regulations control the potential for release of pollutants from the proposed project. Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Nonpoint Source Program (established through the Clean Water Act); the NPDES program objective is to control and reduce pollutants to water bodies from nonpoint discharges. The project site is under the jurisdiction of the RWQCB and the Sonoma County Storm Water Management Program (SCSWMP), which is jointly administered by the Sonoma County Permit and Resource Management Department and Sonoma County Water Agency (SCWA). The SCSWMP maintains compliance with the NPDES Storm Water Discharge Permit and promotes storm water pollution prevention within that context. Compliance with the NPDES Permit is mandated by state and federal statutes and regulations.

The SCSWMP has developed a permitting program for two classes of municipal areas of the County. As part of the SCSWMP, the County developed the Standard Urban Storm Water Mitigation Plan (SUSMP) for controlling pollutant discharges from urbanized areas of the County. Regulation of storm water runoff from the major cities within the County is managed under various City-specific municipal NPDES permits. Municipal permits (including implementation regulations) have been approved for the urbanized portions of designated Phase I areas (Santa Rosa) and smaller Phase II areas (Petaluma, Rohnert Park, Cotati, Sonoma, and unincorporated areas adjacent to these cities).

The project site lies outside the permit boundaries for these existing municipal storm water system permits. Therefore, the management of the storm water generated at the project site is regulated by the statewide general permits for control of storm water runoff associated with construction activities (Construction General Permit, 99-08-DWQ) and the permit for industrial activities (Industrial Storm Water General Permit Order 97-03-DWQ). The applicant is responsible for filing a Notice of Intent to comply with the statewide general permit for construction activities and the general permit for industrial activities. Compliance with the general permits require development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The plan must identify effective best management practices (BMP) for minimizing sources of pollution, and control measures to reduce or treat the potential pollutant loads carried by runoff from the site to receiving waters.

The County provides updated erosion prevention and sediment control notes on the county website.[22] These latest updates should be integrated into the planning and design phase of project preparation prior to submittal of plans and permit applications. Also, properties within the County defined F2 floodplain combining district should incorporate design and engineering features as defined by the County in Chapter 7B of the Sonoma County Code.

The applicable hydrology and water quality policies contained in the Sonoma County General Plan are analyzed in the Policy Analysis, in Section V.H (Land Use), Table V.H-2. Additionally, applicable policies

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[21] *On a broad level, the Total Maximum Daily Load (TMDL) process leads to a "pollution budget" designed to restore the health of a polluted body of water. The TMDL process provides a quantitative assessment of water quality problems, contributing sources of pollution, and the pollutant load reductions or control actions needed to restore and protect the beneficial uses of an individual water body impaired from loading of a particular pollutant.*

[22] *http://www.sonoma-county.org/prmd/docs/handouts/storm.htm*: *accessed May 15, 2007 by BASELINE staff.*

outlined within the Petaluma Daily Belt Area Plan and San Francisco Bay Plan are analyzed in further detail in Section V.H (Land Use), Table V.H-3 and Table V.H-4.

Unauthorized Grading and Equipment Storage

In September 2005, grading and equipment storage at the site occurred without permitting by regulatory agencies, including Sonoma County and the San Francisco Bay Regional Water Quality Control Board. Based on the DEIR author's review of aerial photographs and topographic maps developed prior to and subsequent to these activities, the grading did not result in significant changes to the surface water drainage at the site. However, the grading removed pickleweed and other vegetation and disturbed surface soils, potentially increasing the erosion and transport of sediment to drainage ditches. The grading primarily produced more uniform grades within Area A and the former settling ponds in Area C. In Area A, the grading created a compacted gravel surface that gently slopes northward to a small slough. Photographs taken prior to (i.e., baseline condition) and after the grading indicate that the completed surface may have encroached on the south edge on the slough, potentially disturbing existing vegetation that lined this feature. The surface was surrounded by silt fencing and fiber rolls for control of erosion and sedimentation. After the grading was completed, Area A was covered with gravel, reducing the erosion potential of the graded surface. Relative to the vegetated surface present prior to grading, the compacted gravel surface would be expected to have a higher runoff coefficient (i.e., higher rates of runoff).

In Area C, surfaces were created to provide relatively uniform sheetflow drainage toward the southwest. Runoff from these areas is directed into drainage ditches DD5 and DD6. Silt fencing and fabric rolls were installed on the downgradient margins of the surfaces to control sediment. Additionally, the surfaces were hydroseeded to promote vegetation of the exposed surfaces. During inspection of the site by BASELINE geologists in May 2006, these surfaces were primarily covered in grasses and no significant recent erosion channels were observed. However, the surfaces were freshly graded during relatively heavy rainfalls in the 2005-2006 rainy season, potentially causing transport of exposed sediments. Culverts draining DD6 (16-inch corrugated metal pipe) and DD5 (18-inch corrugated plastic pipe) to DD1 were observed to be partially filled with sediment. The source of the sediment could not be definitively identified and could have been generated by any of the areas draining to these ditches.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

In accordance with Appendix G of the *CEQA Guidelines*, the proposed project could have a significant environmental impact on Hydrology and Water Quality if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off the site;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off the site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Be inundated by seiche, tsunami, or mudflow.

Issues Not Analyzed Further

The Hydrology and Water Quality impacts that were determined by the Initial Study not to rise to the level of significance are not discussed further in this section, as per thresholds provided in Appendix G of the *CEQA Guidelines*. This includes the following:

- The project would not place housing within a 100-year hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- The project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
- The project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- The project would not be inundated by seiche, tsunami, or mudflow.

Project Impacts and Mitigation Measures

Impact HYDRO-1 Substantially Alter the Drainage Pattern in a Manner That Would Result in Substantial Erosion or Siltation On- or Off-Site

River Bank Erosion

The project proposes the construction and operation of an aggregate products unloading facility on the Petaluma River. Aggregate would be transported to the facility via barges. The project anticipates that deliveries would be made to the facility at a rate of approximately 125 barge trips per year. Under existing conditions, approximately 25 barge trips per year have served the applicant's aggregate facilities. Increased barge traffic and associated boat wakes can increase the potential for bank erosion along the Petaluma River, resulting in increased bank instability and increased sediment loading in the River. The design and operation of low-speed barges and tow boats present a relatively low risk of wake erosion relative to other water craft traffic on the River.

It is possible that the project could alter flow patterns within the River in the vicinity of the proposed barge off-loading facility and the adjacent tidal inlet. Substantial changes in flow patterns or velocities due to the placement of new piles supporting the off-loading facility could cause changes in scour patterns and/or bank erosion. Based on a visual inspection of the River bank upstream and downstream of the proposed off-loading facility (both land-based and boat-based inspections were conducted), no conditions were observed that would indicate that this bank is particularly susceptible to flow pattern changes. The River bank in this area is relatively straight, not undercut, and well vegetated. The off-loading facility would be supported on approximately 15 driven piles; the bulk of the facility would be supported by the piles above the high tide level. Tidal and stormflows would be expected to flow freely around the piles, which would be spaced approximately 10 feet apart. Other facilities, including other barge off-loading facilities, were inspected along the banks of the Petaluma River, and no apparent problems with bank stabilization have been caused by these existing facilities. Tidal flow in and out of the inlet adjacent to the off-loading facility would not be substantially obstructed by the proposed project.

For these reasons, the potential for bank erosion by increased barge traffic, adverse changes to scour patterns in the vicinity of the off-loading platform, and tidal flow in the vicinity of the inlet is a ***less-than-significant*** impact.

Pumping from the Petaluma River and Inland Waterways

The project proposes to include pumping 40 gallons per minute (gpm) of water from the Petaluma River and on-site inlet for dust suppression. Water for dust suppression has been estimated at 10,000 gallons per day (gpd) average, with peak days requiring 20,000 gpd. Specifically, the water for Area A would be extracted directly from the River at the barge facility, and the water for Area C would be extracted from the tidal watercourse.

Although the applicant proposes screening to prevent intake of aquatic species, it is possible that if not properly designed and constructed, entrainment of sediment and/or erosion could occur at the intake. In an extreme case, the suction could scour a depression in the channel bottom, potentially affecting bank stability, particularly at an inland waterway pumping location. Also it is possible that backflow could occur through the suction hose or piping, which could discharge water from the pumping system (which may have come into contact with pollutants) back into the River, degrading water quality. The potential impacts to erosion and sedimentation and water quality at the water supply intakes would be considered ***significant***.

Dust Control Water, On-Site Effects

As mentioned above, the project proposes to pump approximately 10,000 (with a maximum of up to 20,000) gallons of River water per day for on-site dust suppression. Water would be applied to roadways, equipment areas, and stockpiles, all within the working area of the site that drains to the proposed runoff treatment BMPs. The proponent has an economic incentive not to use more water than necessary for dust control (due to the cost associated with pumping and application of the water), or to over-water the site resulting in excessively wet conditions. Ten thousand gallons of water spread over five acres of the total 38-acre site (estimated from the preliminary landscape plan) during an eight hour work day would result in an average rate of water sprayed on the site of 250 gallons per hour per acre. The water would be applied to facilitate dust control and most will evaporate; erosion and sediment transport due to dust control operations will be minimal. The salinity of the River water varies throughout the year from brackish to nearly fresh. During the rainy season, fresh water from storm flows pushes the brackish water toward the bay. However, during

the dry season, when most of the dust control water would be pumped from the River, brackish conditions dominate. It is possible that application of brackish water to the working areas of the site could result in deposition and accumulation of salt residues (as the water is evaporated and the salt left behind). However, each year, when the rains come, the salt residue would either infiltrate in the soils or be flushed from the site. During the first storms of the season, accumulated salt residue would be transported along with runoff through the water treatment system and returned to the River. The River ecosystem has adapted to substantial shifts in salinity and therefore the salts that may be included in the site runoff would not be expected to adversely affect water quality. Impacts would be ***less than significant***.

Construction Impacts

Construction and grading within the project site would require temporary disturbance of surface soils. During the construction period, grading and excavation activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment and contaminants in the runoff. Soil stockpiles and excavated areas on the project site would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation and pollutants in storm water. The potential for chemical releases is present at most construction sites given the types of materials used, including fuels, oils, paints, and solvents. Once released, these substances could be transported to the Petaluma River in storm water runoff, wash water, and dust control water, potentially reducing water quality. Excluding Area A, the proximity of the project site to the Petaluma River reduces the chances that the pollutants (e.g., sediment, petroleum hydrocarbons, and lubricants) would be naturally attenuated prior to discharge to the River. In addition, installation of concrete piles for the proposed barge off-loading facility could result in temporary disturbance of River sediments and increases in turbidity within the River. The pile-driving activities would be of short duration (on the order of days or weeks). The potential impacts to water quality would be temporary and would be considered ***significant***.

Start-up Phase

During the start-up phase of the proposed project the barge off-loading facility and the conveyor over the railroad tracks would not be in place. No construction related to the barge off-loading facility would occur along the Petaluma River at Area A of the site, which includes a small channel that is hydraulically connected to the River. Area A would not be used for material transport or for pumping of water from the River for dust suppression during this phase. As a result, impacts related to erosion and/or siltation on- or off-site would be reduced compared to erosion and/or siltation impacts associated with full build out of the project. The overall significance of impacts to erosion and/or siltation associated with the start-up phase would not change from that described above for Impact HYDRO-1.

Mitigation Measure HYDRO-1a

The River water supply intakes shall be designed and constructed to minimize agitation and entrainment of sediments. This may be accomplished by elevating the intake above the River bottom and/or providing an energy dissipation structure around the intake. Water shall not be pumped from an inland tidal waterway when the tide is low, as pumping could expose the channel bottom, potentially increasing erosion and scour. The potential for backflow to occur through the system shall be minimized by the incorporation of one or more check valves (backflow prevention devices).

Mitigation Measure HYDRO-1b

The grading of the project site shall be conducted in conformance with the approved Grading Plan. All recommendations for grading presented in the site-specific geotechnical reports shall be incorporated into the grading activities.

Mitigation Measure HYDRO-1c

Prior to construction, the owner/operator shall file a Notice of Intent to comply with the statewide General Permit for Discharges of Storm Water Associated with Construction Activities. A SWPPP shall be prepared for construction activities. The SWPPP shall include all provisions of the Erosion and Sediment Control Plan submitted by the applicant. In addition to the regulatory requirements for the SWPPP, the site-specific SWPPP shall include provisions for the minimization of sediment disturbance and production of turbidity in and adjacent to the Petaluma River during construction of the proposed barge unloading facility.

Impact HYDRO-2 Substantially Alter the Drainage Pattern or Substantially Increase the Rate or Amount of Surface Runoff in a Manner That Would Result in Flooding On- or Off-Site

Increased Storm Water Runoff Volume

Under existing and proposed conditions, drainage from Areas C and D of the project site is directed to a single discharge point, the Railroad Culvert, which connects drainage ditch DD1 to the Petaluma River. The project proposes to enhance and expand the wetland areas in the southern part of the project site, increasing storage for runoff. The proposed drainage system is designed to direct runoff from the processing and stockpile facilities to ditches DD5 and DD6. The system includes a weir that connects to the wetlands in Area D at moderate flows (i.e., when the water level in the ditches rises to elevation 3.5 feet). If water levels increase during higher runoff events, DD6 would spill to DD1 and DD5 would overflow to DD2 through culverts with inverts at elevation 4.7 and 4.0 feet, respectively. This system provides detention of storm runoff from developed areas in DD5 and DD6 and allows flow to the wetlands in higher flows. Hydraulic analysis for the project indicates that runoff discharge at the Railroad Culvert would be reduced from 6.36 cubic feet per second (cfs) to 1.38 cfs during a 100-year precipitation event, due to the proposed modifications to the floodplain morphology. Therefore, the project would not increase runoff discharge. Changes to the storm water runoff at the site would be ***less than significant***.

Wetland Maintenance

The project proposes the enhancement of existing wetlands (including drainage ditch DD4) in Area D of the site. Maintenance of existing drainage ditches DD1, DD2, DD3, DD5, and DD6 as vegetated drainage channels is also proposed. The hydraulic system for the wetland area is connected to the Petaluma River at only one point, the Railroad Culvert. As demonstrated in the hydrology report for the wetland plans, the culvert restricts tidal flow onto the project site. The condition of the culvert has not been investigated. The project also involves pumping River water from drainage ditch DD1, west of the culvert. If the culvert partially or fully collapses or becomes otherwise blocked, tidal circulation into the proposed wetlands could be reduced or eliminated. The habitat of the proposed wetlands would be dependent on tidal circulation. Therefore, potential blockage of the Railroad Culvert would be a ***significant*** impact on the proposed project.

Start-up Phase

During the start-up phase of the proposed project no development would occur at Area A of the project site. Storm water runoff conditions at Area A during this phase of the project would be similar compared to the full build out phase of the project because minimal impermeable surfaces would be added to Area A as a part of full build out.

Because the start-up phase also involves pumping River water from drainage ditch DD1, impacts related to wetland maintenance would be similar during this phase compared to the full build out phase described above.

Overall, impacts related to increased runoff and wetland maintenance during the start-up phase would be similar compared to impacts associated with full build out of the project. The overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-2.

Mitigation Measure HYDRO-2

As required by Mitigation Measure BIO-3a(4), the applicant would be required to repair or replace the existing partially blocked culvert under the railroad right-of-way to improve tidal circulation. The function of the culvert shall be maintain for the life of the project. A maintenance program for all culverts shall be developed and incorporated into the site's Storm Water Pollution Prevention Plan (SWPPP).

Impact HYDRO-3 Otherwise Substantially Degrade Water Quality

Long-Term Operational Impacts

Storm Water Runoff

The operation of the new and recycled aggregate storage and processing facilities and asphaltic concrete plant would introduce new potential sources of water quality degradation at the project site. The project proposes the storage of hazardous materials, including heated asphalt, which could be accidentally released to the surface and subsurface. Intensified land uses at the project site would result in increased vehicle use and potential discharge of associated pollutants. Increased numbers of vehicles and outdoor parking facilities at the project site would likely result in increased leaks of fuel, lubricants, tire wear, and fallout from exhaust, which would contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from landscaped areas at the site may contain residual pesticides and nutrients.

In addition, the barge off-loading facility would include operation of a diesel-powered loader and aggregate conveyor system adjacent to and over the Petaluma River. This operation could result in the direct discharge of petroleum hydrocarbons and sediment to the Petaluma River.

Long-term degradation of water quality runoff from the site could impact local water quality in the River. The project proposes design elements that would reduce the potential for the discharge of untreated runoff from the proposed industrial facilities. According to the applicant, runoff from the asphalt plant area of the site would be directed into a below-ground catchment basin designed to provide for settlement of larger solids entrained in runoff. Discharge from the basin would pass through a sand filter prior to flowing to the vegetated drainage ditch DD6 at the western margin of the site. The ditch would serve as an extended detention basin during low and moderate runoff events. Additional settlement of suspended sediments (and

associated contaminants such as hydrocarbons and metals) would occur within the ditch. Runoff from the aggregate storage area would primarily drain westward to DD5, which would also be operated as an extended detention basin. The project as proposed does not include specific measures to prevent stormwater and River water quality degradation at the barge off-loading facility. The application does not include specifications for site-specific emergency preparedness and response for the potential release of hazardous materials or a maintenance plan for operation of the storm water management system. This is a ***significant*** impact.

In addition, the proposed facility would store and process recycled asphalt and concrete. It is possible that the asphalt itself and/or the oil and other urban residues deposited on the surface of the recycled materials could represent a significant source of pollutants. The leachability of pollutants from hardened asphalt[23] has been evaluated using U.S. EPA toxicity characteristic leaching potential (TCLP) analyses.[24,25] The results of these analyses indicate that asphalt does not leach significant quantities of pollutants. Recycled asphalt materials from between the wheel paths of roadways were evaluated for leachability of metals and PAHs. The results of this study indicated that there was no difference in the leachate contaminant concentrations from the roadway centerline materials than anywhere else on the roadway.[26] It should be noted that asphalt paving materials are routinely used by water agencies (including the Metropolitan Water District of Southern California and the East Bay Municipal Utilities District) to line domestic water supply reservoirs. Therefore, leaching of pollutants from the piles of recycled materials is considered ***less than significant***.

Septic System Operation

The project design includes construction and operation of a new septic system for the proposed facilities. The application and treatment of on-site sewage, if not appropriately managed, can result in degradation of surface and subsurface water quality. The septic system would be located in the northwestern portion of Area B; the footprint of the septic system would cover approximately 6,000 square feet. The design of the septic system submitted with the application includes a leach field on gently sloping topography with an upslope groundwater interceptor trench. The system would be designed and operated in conformance with the requirements of the Sonoma County PRMD. Conformance with permitting and monitoring requirements for the proposed septic system would reduce the potential impacts on water quality to a ***less-than-significant*** level.

Release of Contaminants from Asphaltic Concrete Production

The project proposes the operation of an asphaltic concrete plant that would use a counter flow drum mix assembly. The plant would be operated under a Permit to Operate issued by the Bay Area Air Quality Management District (BAAQMD). The permit conditions would require Best Available Control Technologies (BACT) to reduce air emissions from the plant. Plant emissions could include particulate matter (PM) containing contaminants, including polynuclear aromatic hydrocarbons and metals. Some of these emissions may settle directly into the River (atmospheric fallout) or be deposited on the land surface and eventually be discharged to the River in runoff. To determine whether the pollutant emissions for the

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[23] *Releases from liquid asphalt are not considered, since liquid asphalt becomes a solid under ambient conditions.*

[24] *Vashisth, P ; Lee, K W; Wright, R M, 1998, Assessment of Water Pollutants from Asphalt Pavement Containing Recycled Rubber in Rhode Island, Transportation Research Record No. 1626, p. 95-104.*

[25] *Townsend, T., 1998, Leaching Characteristics of Asphalt Road Wastes, Department of Environmental Engineering Sciences, University of Florida, June15.*

[26] *Kriech, A., 1992, Leachability of Asphalt and Concrete Pavements, Heritage Research Group, March 5.*

proposed asphalt production process could result in project-level water quality impacts to the Petaluma River, BASELINE conducted a quantitative analysis of the potential exchange of pollutants from the air in the vicinity of the proposed plant to the water in the River. A "project-level" water quality impact would occur if the project, by itself, could result in the discharge of a new pollutant load that would impact one or more designated beneficial uses of the Petaluma River.

The U.S. EPA has estimated the proposed project's air emissions factors (after implementation of BACT) for various pollutants associated with the type of asphalt production activities, which are further described in Section V.B, Air Quality, of this Draft EIR. To evaluate the potential water quality impact associated with these air emissions, it is necessary to calculate how these emissions might affect pollutant concentrations in the Petaluma River. A conservative "worst-case" approach was used, which: 1) assumed that all the pollutants emitted from the asphalt production process were deposited in the River and 2) assumed very low flow conditions in the River. Both these assumptions tend to overestimate the pollutant concentrations in the River that may be caused by the proposed project.[27] The results indicate that none of the pollutants would be generated in quantities that would, by themselves, exceed applicable screening levels.[28]

The portion of the River adjacent to the project site has been designated as water-quality impaired for diazinon, pathogens, nutrients, and sediment. However, the project would not be expected to generate or discharge diazinon (an insecticide that has been banned except for specific agricultural uses). The project could create new sediment sources (as described under the Impact HYDRO-3 discussion above), but these potential sediment discharges would be fully mitigated by the project-level mitigation. Similarly, the project could generate a new pathogen source by installing a new septic system near the River. This is considered a ***potentially significant*** impact; however, compliance with the required project-level mitigation would reduce the potential impact of increased pathogen discharge to a less-than-significant level. Based on the air quality analysis conducted for this DEIR, the proposed asphalt plant would produce phosphorous emissions. Phosphorous is a nutrient and is discussed further below.

Even after all BACT measures are undertaken to reduce pollutant emissions, some relatively small amount of phosphorous is expected to be emitted to the air from the asphalt production process. Some of these emissions may settle directly into the River (atmospheric fallout) or be deposited on the land surface and eventually be discharged to the River in runoff. Based on a worst-case analysis conducted for this DEIR (included in Volume II, Appendix G), if all the phosphorous emissions from the plant were deposited in the River, the resulting concentration of phosphorous in the River water would be 0.091 micrograms per liter (ug/L). This concentration would be below the National Oceanic and Atmospheric Administration water quality screening level of 0.1 ug/L Therefore, the project by itself would not be expected to impact beneficial uses and the project-level impact is less than significant. However, the RWQCB has determined that the assimilative capacity of the Petaluma River system has already been exceeded for nutrients, and therefore the project may contribute to a cumulative impact. Refer to the Cumulative Impact section below for further discussion.

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[27] *BASELINE, 2007, Revised Technical Memorandum, included in Volume II, Appendix G.*

[28] *Water quality screening levels provide a context for evaluation of the results of the pollutant loading calculations. If the pollutant concentrations in the Petaluma River remain below the screening levels, it is unlikely that any impact to beneficial uses would occur.*

Start-up Phase

During the start-up phase of the proposed project no development would occur at Area A of the project site and the barge off-loading facility would not be constructed at the edge of the River. The barge off-loading facility involves operation of a diesel-powered loader and aggregate conveyor system adjacent to and over the River. By eliminating this component of the project from the start-up phase, impacts related to potential direct discharge of petroleum hydrocarbons and sediment to the River would be reduced. However, the start-up phase would still involve the operation of new and recycled aggregate storage and processing facilities and an asphaltic concrete plant which would introduce new potential sources of water quality degradation at the project site.

The start-up phase also includes construction and operation of a new septic system for the proposed facilities. The application and treatment of on-site sewage, if not appropriately managed, can result in degradation of surface and subsurface water quality.

Similar to the full build out phase, during the start-up phase plant emissions could include particulate matter containing contaminants, including polynuclear aromatic hydrocarbons and metals. Some of these emissions may settle directly into the River or be deposited on the land surface and eventually be discharged to the River in runoff.

Overall, potential water quality impacts during the start-up phase would be less compared to impacts associated with full build out of the project. However, the overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-3.

Mitigation Measure HYDRO-3a

Prior to commencement of operations, the owner/operator shall prepare a site-specific SWPPP for the operational period of the project. The SWPPP shall meet all requirements of the most recent statewide Industrial Storm Water General Permit. At minimum, the SWPPP shall include design, operation, and maintenance specifications for:

- Control of sediment discharges at the loading facility on the Petaluma River that minimizes the potential for spillage of aggregate materials into the River and the disturbance of River sediments during anchorage of the barges. Barges should arrive "clean" (no sediment or aggregate materials on horizontal surfaces outside of the hold). Off-loading procedures shall include provisions for eliminating the creation of dust (e.g.. continuous misting so that newly exposed aggregate surfaces stay wet, but not so much water application that runoff is created). The conveyor system shall be enclosed and fitted with dust control devices (e.g., misting units). Aggregate exiting the conveyor system shall be moist to wet so that dust is not generated as it drops from the conveyor to the storage piles.
- Measures designed to protect River water quality at the barge off-loading facility. The loader shall not be refueled or receive major maintenance while on the over-the-water off-loading facility. The loader shall be moved to an appropriate land-based location (a minimum of 30 feet from the top of River bank) for refueling and maintenance.
- The entire parcel adjacent to the off-loading facility (Area A) shall be modified to provide enhanced water quality protection for the River and tidal inlet. A limited access zone shall be established

within 50 feet of the High Tide Line and within 10 feet of the top of bank to the slough as further described under Mitigation Measure Bio-2 in Section V.C. (Biological Resources). This will allow limited access roads to the off-loading facility and along the conveyor system to be constructed. The roads shall be placed at the maximum feasible distance (but not less than 50 feet) from the tidal inlet to provide a water quality buffer. If it is necessary for any road to be elevated above the surrounding grade, the escarpment created by the road shall be protected by riprap and/or bioengineering techniques so that the road is stable if the site is inundated during flooding. Permitted improvements within this zone shall be clearly identified and mapped, and no industrial or commercial activities other than those proposed by this project shall be permitted on this parcel. The remainder of the parcel shall be regraded so that shallow stormwater bioswales border the access roads on either side. The bioswales shall be designed and constructed in accordance with the requirements of the County PRMD. The existing baserock shall be removed from the parcel and the existing soils either amended or new planting medium imported so that vegetation can be re-established over the entire parcel (except at the road locations). The applicant shall ensure that no net fill occurs on the site (i.e. any fill imported to the site must be offset by an equal or greater volume of material export out of the floodplain).

- A pretreatment catch basin and sand filter (or multiple basins and filters) that will capture and treat all runoff from all processing and storage areas for at least the 10-year design storm event. Discharge from the catch basin and sand filter shall be visibly clear (i.e., not turbid). If turbid water is observed to be discharging from the catch basin and sand filter, the system shall be expanded and/or redesigned in coordination with the County and RWQCB so that adequate pretreatment is achieved. Only visibly clear water should be discharged to the secondary treatment system. The SWPPP shall include specifications for regular maintenance of the basin and sand filter and procedures for disposal and/or reuse of the used filtration material.
- An emergency shutoff system that will allow the plant operator to stop discharge from the catch basin should a chemical spill occur at the facility. A gate valve or similar structure that can shut off flows out of the catch basin shall be included in the basin design. The method for engaging the shutoff system shall be simple and the procedure provided to all appropriate plant employees as part of routine training.
- The secondary storm water treatment system shall use a portion of the existing network of drainage ditches to provide additional treatment and on-site residence time prior to discharge of site runoff to the Petaluma River. These drainage ditches should be redesigned to act as extended wet ponds and/or detention features. Flows for the catch basin and sand filter shall be discharged into the tidally-influenced ditches in a manner so that turbulence is not created (e.g., using an energy dissipation structure). The grading plan and drainage design shall include measures that ensure maximum residence times in the detention features.
- As required by the general permit for industrial activities, the applicant shall conduct regular inspections of the facility BMPs and collect storm water runoff samples during storm events where a discharge occurs. These data shall be reviewed for compliance with applicable published U.S. EPA benchmark values for storm water runoff. If the analytical results from the sampling events indicate

that benchmark values are being exceeded, corrective action shall be implemented in coordination with the RWQCB.

All activities and operation of storm water runoff BMPs are subject to regular inspection by the County and the RWQCB. If the County inspectors observe practices that do not protect surface water quality to the maximum extent practicable, then they are empowered to and shall require the operator to implement corrective action.

Mitigation Measure HYDRO-3b

Prior to the commencement of operations, the proposed septic system shall be installed under permitting by the PRMD. Additionally, abandonment of the existing septic system shall be performed under PRMD permitting requirements.

Impact HYDRO-4 Place Within a 100-Year Flood Hazard Area Structures Which Would Impede or Redirect Flood Flows

Figure V.G-3 shows the preliminary hydrology plan for the proposed conditions for the project site. As stated previously, the letter designations in Figure V.G-3 indicate drainage areas, as further described in the Hydrology Report by CSW/Stuber-Stroeh Engineering Group, Inc in Volume II, Appendix G, and are not related to the four areas as described in the Project Description (i.e., Areas A, B, C, and D).

The majority of the developed project site, including most areas of proposed industrial facilities and the parcel adjacent to the barge off-loading facility, is located within the FEMA 100-year flood hazard zone and the County F2 (floodplain) zoning district. Therefore, the project site is expected to be inundated in the 100-year flood event. Although the project site is located within the 100-year flood zone, the elevation of the proposed processing facilities would be above the base flood elevation of 7 feet msl. Additionally, the base of the proposed aggregate storage stockpiles would also be above the base flood elevation. Therefore, the proposed facilities would not be expected to be flooded during the 100-year event. Although the proposed grading for the site would result in placement of fill within portions of the flood zone, excavation within the zone would occur as part of wetland enhancement. Analysis prepared for the project[29] indicates that the project would increase the flood storage volume below elevation 7 feet msl from 28.57 acre-feet (existing) to 32.53 acre-feet. The increases in flood storage would be expected to incrementally reduce flood hazards within the Petaluma River by retaining more water on-site during flooding events. Changes to the flood hazard conditions would be ***less than significant***.

Start-up Phase

During the start-up phase of the proposed project no development would occur at Area A of the project site which is located within the FEMA 100-year flood hazard zone similar to most other areas of the site proposed to be developed with industrial facilities. Although the project site is located within the 100-year flood zone, the elevation of the proposed processing facilities and aggregate stockpiles would be above the base flood elevation of 7 feet msl. Therefore, the proposed facilities would not be expected to be flooded during the 100-year event. Impacts related to the 100-year flood zone during the start-up phase would be similar compared to impacts associated with full build out of the project. The overall significance of these impacts during the start-up phase would not change from that described above for Impact HYDRO-4.

[29] *CSW-[St]2, 2006, op.cit.*

CUMULATIVE IMPACTS

The project would generate emissions of phosphorous (a nutrient) from the asphalt plant. Some of these phosphorous air emissions may be aerially deposited in the Petaluma River. The RWQCB has determined that the Petaluma River is water-quality impaired for nutrients (mainly forms of nitrogen and phosphorous). The water-quality impairment designation indicates that the River has received excessive nutrients that have impacted beneficial uses.

The proposed project would result in an incremental increase in nutrient loading. As noted in Impact Hydro-3, the implementation of BACT measures would significantly reduce phosphorous emissions, but a relatively small amount may be emitted from the asphalt plant process. This amount would not exceed National Oceanic and Atmospheric Administration 's water quality screening criteria of 0.1 ug/L even under a worst case scenario, in which all phosphorous emissions from the plant are assumed to deposit directly into the River. The amount would nevertheless represent a contribution to nutrient loading in the River, which is likely to continue experiencing a significant cumulative impact due to the contributions from Related Projects included in Table III-1 in Section III (Project Description). Given the River's finite location and number of pollutant sources, the project's contribution is conservatively assumed to be ***cumulatively considerable***.

The project would not result in any other cumulative hydrology or water quality impacts that would not be adequately mitigated by project-level mitigation measures described above.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of the mitigation measures listed above, and with the exception of cumulative nutrient impacts, all impacts to hydrology and water quality would be ***less than significant***.

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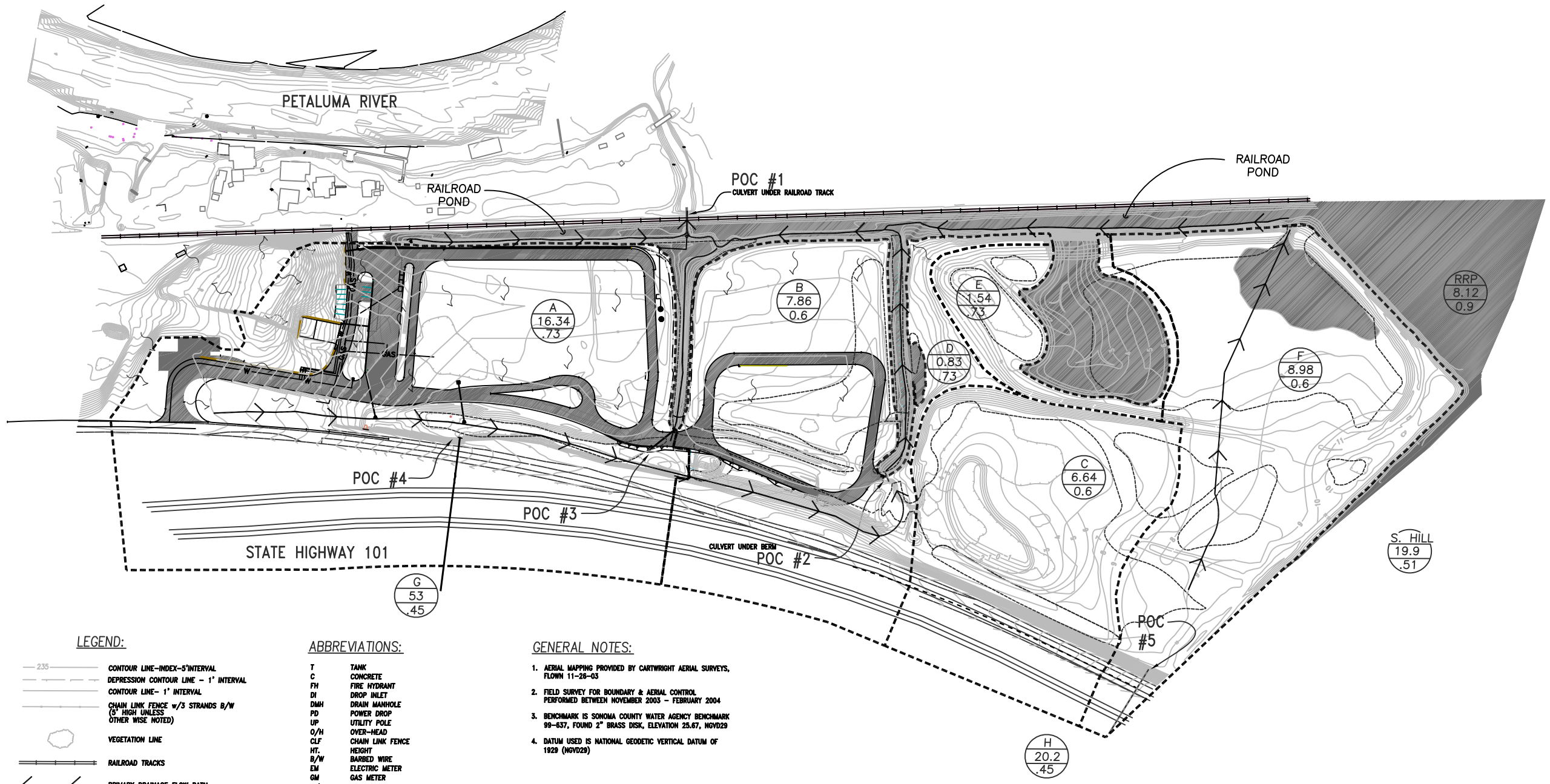

LEGEND:

- CONTOUR LINE–INDEX–5'INTERVAL
- DEPRESSION CONTOUR LINE – 1' INTERVAL
- CONTOUR LINE– 1' INTERVAL
- CHAIN LINK FENCE w/3 STRANDS B/W (5' HIGH UNLESS OTHER WISE NOTED)
- VEGETATION LINE
- RAILROAD TRACKS
- PRIMARY DRAINAGE FLOW PATH
- TRIBUTARY AREA BOUNDARY
- FLOW DIRECTION

ABBREVIATIONS:

T	TANK
C	CONCRETE
FH	FIRE HYDRANT
DI	DROP INLET
DMH	DRAIN MANHOLE
PD	POWER DROP
UP	UTILITY POLE
O/H	OVER–HEAD
CLF	CHAIN LINK FENCE
HT.	HEIGHT
B/W	BARBED WIRE
EM	ELECTRIC METER
GM	GAS METER
w/	WITH
EOP	EDGE OF PAVEMENT
TYP.	TYPICAL

D — TRIBUTARY AREA DESIGNATION
13.94 — AREA (ACRES)
.46 — RUNOFF COEFFICIENT –"C" FACTOR

GENERAL NOTES:

1. AERIAL MAPPING PROVIDED BY CARTWRIGHT AERIAL SURVEYS, FLOWN 11–26–03
2. FIELD SURVEY FOR BOUNDARY & AERIAL CONTROL PERFORMED BETWEEN NOVEMBER 2003 – FEBRUARY 2004
3. BENCHMARK IS SONOMA COUNTY WATER AGENCY BENCHMARK 99–637, FOUND 2" BRASS DISK, ELEVATION 25.67, NGVD29
4. DATUM USED IS NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29)

Legend

NORTH

0 100 200 300 400

Scale (Feet)

Source: CSW/ST, CAJA 2007.

CHRISTOPHER A. JOSEPH & ASSOCIATES
Environmental Planning and Research

Figure V.G-3
Preliminary Hydrology Plan, Proposed Conditions