CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2011-0036

UPDATED WASTE DISCHARGE REQUIREMENTS AND RESCISSION OF ORDER NO. 00-043 FOR:

CHEVRON PRODUCTS COMPANY
CHEVRON RICHMOND REFINERY
841 CHEVRON WAY
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Regional Water Board, finds that:

OWNERSHIP AND LOCATION

1. Chevron Products Company, a subsidiary of Chevron USA, Inc., (hereinafter called Chevron or the Discharger) owns and operates the Chevron Richmond Refinery (hereinafter called the refinery). The refinery was built in 1902 and produces a broad range of fuels, lubricants, asphalt and petrochemicals. The 2,900-acre refinery is located along the southern shore of San Pablo Bay in Contra Costa County (Figure 1). The City of Richmond lies to the east of the refinery. To the east and within one mile from the refinery are industrial, residential, and commercial land uses. Certain wastes generated from the refinery's processes have historically been deposited in Waste Management Units within the refinery, prompting the need for these Waste Discharge Requirements (WDRs).

PURPOSE OF ORDER UPDATE

2. This Order rescinds outdated WDRs and updates the requirements for continued maintenance and monitoring of the inactive and closed Waste Management Units, along with the requirements for the Waste Management Unit corrective action and water quality monitoring programs.

REGULATORY HISTORY

3. Prior to this Order, the Regional Water Board regulated the Waste Management Units and the refinery-wide investigations and corrective actions under Order No. 00-043. The refinery-wide investigation and corrective action activities not associated with the Waste Management Units will be addressed under separate Site Cleanup Requirements Order (SCRs).

   Other Orders previously adopted, but now rescinded, for the refinery are:

93-109	Waste Discharge Requirements
93-016	Site Cleanup Requirements for the S.P. Hill Tank Field
92-092	Site Cleanup Requirements for the Alkane Sector
92-010	Waste Discharge Requirements for Landfill 15
91-098	Cease and Desist Order for Pollard Pond and the Hydropits
90-146	Site Cleanup Requirements for Plant l/Additives Plant
89-175	Waste Discharge Requirements
89-011	Cease and Desist Order for the Pollard Pond
88-044	Waste Discharge Requirements
83-13	Waste Discharge Requirements
81-55	Waste Discharge Requirements

4. The Regional Water Board adopted Order No. R2-2006-0035 (NPDES No. CA0005134) on June 14, 2006. This permit regulates the discharge of effluent from the Discharger's wastewater treatment system, and the discharges of all stormwater associated with industrial activity from the refinery to San Pablo and San Francisco bays.

5. Effective July 18, 1997, many provisions of the California Code of Regulations (CCR) for non-hazardous waste were moved from Division 3, Chapter 15 into Title 27, Division 2 (Title 27). Where applicable, the new regulatory citations have been incorporated in this Order.

FACILITY DESCRIPTION AND HISTORY

Hydrogeologic Setting

6. The refinery and its tankfields are located on the peninsula of the Potrero-San Pablo Ridge, which is composed of the steeply dipping Franciscan Complex. The refining of the petroleum products generally occurs on the bay fill areas northeast of the ridge. The southwest side of the ridge consists of steep topography where the Franciscan Complex has been terraced for the placement of aboveground petroleum storage tanks.

7. Past fluctuations in sea level created a complex sedimentary sequence of interfingered estuarine and alluvial fan deposits overlying the Franciscan Complex bedrock. The uppermost deposits are artificially placed bay fill, ranging from approximately 3 feet to approximately 30 feet in depth. The fill materials overlie bay muds, which consist of silt and silty clay with abundant plant matter or peat. The bay muds overlap onto the Franciscan bedrock and thicken bayward.

8. Three hydrogeologic zones have been identified within the top 150 feet of sediments. in the flat lying areas of the refinery, the A-Zone, the C-Zone, and the B-Zone, in order of increasing depth.

   a. The A-Zone is the first water bearing zone and consists of artificial fill and the naturally occurring peat rich, bay mud. The water table elevation for this zone is within two to ten feet of the ground surface and generally discharges to the Bay.

   b. The C-Zone is an 80 to 90-foot-thick water bearing zone of interfingered alluvial and estuarine sediments. These sediments generally have low hydraulic conductivity, but sandy, more permeable units occur as channels and lenses. The sand units have not been shown to be contiguous across the site, but do appear to be hydraulically connected. However, based on several years of chemical data there is no indication that the C-Zone groundwater has been significantly impacted. Chevron has concluded that the bay mud has been an effective hydraulic barrier between the A- and C-Zones and has prevented the migration of contaminants in groundwater from the A-Zone to the C-Zone. These results and

conclusions were presented to the Regional Water Board in two reports titled C-Zone Investigation - Phase 1 and Phase 2, dated February 8 and December 20, 1991, respectively, and continue to be supported by groundwater monitoring data collected pursuant to the refinery-wide Self-Monitoring Program.

c. The B-Zone is a relatively permeable unit at approximately 100 feet below the ground surface. It ranges from 5 to 15 feet thick and contains potable water, but has limited production capacity. The B-Zone occurs under artesian conditions and appears to be hydraulically separate from the overlying zones.

9. As shown in Figure 2, the refinery lies in four geomorphic/geologic settings referred to locally as the "Alluvial," "Flats," "Ridge," and "Transition" Zones.

a. The **Alluvial Zone** is defined as the broad area of alluvial fan deposits, derived from the Berkeley Hills, east of the refinery. This zone represents flatland areas in which bay mud was not deposited. The upper portion of the alluvial fan deposit is typically clayey with low permeability.

b. The **Flats Zone** comprises the flatland marsh area bounded by San Pablo Bay to the north and extending south along the northeast side of Potrero-San Pablo Ridge. For the purpose of the refinery's investigations, the inland Flats Zone/Alluvial Zone boundary has been defined to be the 5-foot bay mud isopach (line of equal thickness). Thus, the Flats Zone is typically underlain by at least five feet of bay mud except where removed by excavation or erosion, in local areas of non-deposition, or where displaced by differential settlement of overlying fill.

c. The **Ridge Zone** consists primarily of colluvium (slope wash) overlying deformed Franciscan Complex rocks exposed along Potrero-San Pablo Ridge. The boundary of the Ridge Zone is defined as those areas of Potrero-San Pablo Ridge above the 50-foot elevation contour.

d. The **Transition Zone** is defined as the area that separates the Flats Zone from the Ridge Zones. As described above, the Flats-Transition boundary is defined as the 5-foot bay mud isopach and the Ridge-Transition boundary is defined as the 50-foot elevation contour.

Castro/Plant 1 sectors are referred to collectively as the Groundwater Protection Systems (GPS) (see Figure 4). The GPS establishes and maintains a contiguous capture zone which prevents migration of potentially contaminated A-Zone groundwater past the GPS alignment. The slurry walls were installed where thick and/or highly permeable intervals of A-Zone fill soils are encountered. A low permeability bay mud "floor" inhibits transport of A-Zone contaminants to the underlying C-Zone in the "Flats Zone" of the Refinery (see Figure 13).

14. Approximately 24,700 feet of extraction trench, 18,535 feet of barrier wall, over 200 groundwater extraction sumps, and one groundwater treatment plant have been installed. The extracted groundwater is routed to the refinery's wastewater treatment system and discharged in accordance with existing NPDES permit requirements. The GPS extraction trenches and barrier wall are illustrated in Figure 13.

15. The Regional Water Board has determined that the GPS comprised of the slurry walls and extraction trenches at the Alkane, North Yard, Effluent, Landfarms/Landfill, Reclamation, Pollard, and Castro/Plant 1 sectors is a satisfactory corrective action measure for the containment and removal of contaminated groundwater along the perimeter of the refinery. The corrective action at the Alkane, North Yard, Effluent, Landfarms/Landfill, and the Reclamation sectors are addressed by this Order. Activities associated with the Castro/Plant 1 Additives, Pollard, Bayside North, Bayside South and Interior C Zone sectors will be addressed in separate SCRs. There is a single groundwater monitoring program for all sectors which is contained in both these WDRs and the SCRs.

Waste Management Units

The following is a summary of actions taken at previously-identified Waste Management Units pursuant to previous Regional Water Board orders organized by the refinery sectors subject to this Order.

Landfarms/Landfill Sector

16. Perimeter Groundwater Barrier and Soil cover: A GPS barrier wall and/or extraction trench is at the downgradient edge and largely surrounds this sector, consisting of Landfill 15 and the landfarms (described below, see Figures 8 and 12). The monitoring program (as described in the attached monitoring program) monitors both the performance of the GPS (A-Zone corrective action monitoring) as well as C-Zone wells (corrective action monitoring and detection monitoring for Landfarms No. 2-5) for the monitoring parameters (MP) and Constituents of Concern (COC) noted in the monitoring program. Chevron is responsible for inspection and maintenance of the soil cover and stormwater conveyances for the Landfill 15 and Landfarm soil covers.

17. Landfill 15: Landfill 15 is a 41-acre former tidal marsh area converted for waste disposal use (Figure 8) containing about 270,000 cubic yards of waste. The site was used from the early 1960's to 1987 as an evaporation pond and as a landfill for a

variety of wastes including sludges (separator, paint, and water treatment), oily soil and dredge spoils, resins, catalyst fines, lime, and sulfur. Approximately 13 acres of Landfill 15 were reactivated in 1992 for disposal of treated non-hazardous acidic sludge and dredged bay mud generated from the closure of Pollard Pond. The portion of the landfill that accepted the Pollard Pond closure waste was closed by placement of a multi-layer low-permeability cap. The remaining 28 inactive acres that ceased receiving waste material prior to 1987 were capped in 1996 and 1997. No further closure activities are required.

18. Old Drum Storage Area: This is a 180 ft. by 90 ft. area used for storing up to 2448 drums until 1984. The unit was closed in 1986 and is covered with a concrete cap with stormwater diversion away from the site.

19. Landfarms: Between the 1970's and 1987, Chevron conducted landfarming operations at five locations to promote biodegradation of oily soils. Landfarm No. 1 is 13.5 acres and is located in the North Yard sector. Landfarms No. 2-5 are 8, 3.5,3 and 1 acres, respectively. The landfarms were built by placing clean fill over existing waste which contained slop oil solids, leaded tank bottoms, separator sludge and other wastes. The landfarms were used to biologically treat 30,000 tons per year of non-leaded tank bottom sludge, oil water mixtures and other sludges and contaminated soil. The landfarms have not received waste since 1987. A Final Closure Plan for the landfarms was approved in 1998, and closure was completed the following year, which consisted of importing fill, grading, installation of a vegetative cap and shallow groundwater extraction trenches.

20. Landfill under Landfarms Numbers 2 and 3: The unit held about 80,000 cubic yards of refinery waste, completely within the bounds of both Landfarms No. 2 and No. 3. Landfilling was finished about 1977, with the landfarming beginning in about 1980.

North Yard Sector

21. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench is at the downgradient edge of Landfarm No. 1 and the North Yard, located in this sector (see Figure 12). The monitoring program (as described in the attached monitoring program) monitors both the performance of the GPS (A-Zone corrective action) as well as C-Zone wells (corrective action monitoring and detection monitoring at Landfarm No. 1) for the MP and COC also noted in the monitoring program. The aboveground tanks in this area also are subject to the inspection and monitoring programs described below.

22. Tetraethyl Lead Site (TEL): This was a 300 cubic yard impoundment formerly used for tank bottom sludges containing TEL. The wastes were removed in 1980. The soil was removed and disposed of as hazardous waste, and, in the early 1980's, Landfarm No. 1 was expanded over the site. Landfarm No. 1 was subsequently closed as noted in Finding 19.

10. Chevron has subdivided the refinery into ten geographic sectors (see Figure 3). Each sector has unique hydrogeology and varying degrees of environmental concern. The sectors are as follows:

    - Landfarms/Landfill 15
    - Castro/Plant 1 Additives
    - North Yard
    - Bayside Sector – North
    - Bayside Sector - South
    - Alkane Sector
    - Effluent
    - Reclamation
    - Pollard
    - Interior "C" Zone or Main Yard

11. Sector boundaries are generally defined by a physiographic boundary separating adjacent sectors, or by the refinery property line. The upgradient sector boundaries for the Alkane, North Yard, and Main Yard sectors correspond to an inferred groundwater drainage divide, which is generally coincident with topographic drainage divides along San Pablo Ridge. The upgradient sector boundaries for the Landfarms/Landfills, Castro, and Reclamation sectors are generally coincident with the refinery property line. The Bayside North and Bayside South sectors include all Chevron properties on the southwestern side of San Pablo Ridge and adjacent to San Francisco Bay. With the exception of the Bayside North and Bayside South sectors (which are on the west side of the San Pablo Ridge), all sites described in this Order are largely contained by the groundwater protection systems, which are described below.

Corrective Action

12. All sectors have impacted soil and/or groundwater from historic releases and corrective action steps have been implemented. Some of the sectors contain Waste Management Units that are either in the Title 27 Corrective Action Monitoring Program or part of the refinery effluent system; these include the Alkane, Reclamation, North Yard, Effluent, and Landfarms/Landfill sectors. Corrective action occurring at sectors comprised of only impacted soil and/or groundwater from historic releases and not associated with Waste Management Units will be addressed by the SCRs presently under development; these include the Pollard, Castro/Plant 1 Additives, Bayside North, Bayside South and Interior C Zone sectors.

13. Chevron has implemented corrective actions to intercept contaminated groundwater at various locations and thus to prevent migration to San Pablo Bay. The corrective actions include systems comprised of varying combinations of slurry walls, extraction trenches and/or extraction wells for hydraulic control at different locations within the refinery. The systems comprised of slurry walls and/or extraction trenches at the Alkane, North Yard, Effluent, Landfarms/Landfill, Reclamation, Pollard, and the

23. Big Wheels Site: This was an 80 cubic yard impoundment for holding slop oil emulsion prior to landfarming. In 1980 it was clean closed, with the wastes and contaminated soil being placed in the landfarms, which were closed as noted above.

24. Landfill Under Isomax and Landfarm No. 1: This holds about 400,000 cubic yards of waste, such as slop oil solids, separator sludge, leaded tank bottoms. Final closure for the landfarms was achieved as noted above.

25. Oil Water Separators 1, 1A, 2, 2A, 13, 15, and Coalescing plate interceptor: The separators have been used to skim off oil, which is returned to product tankage. Solids settle and the effluent is routed to the Bioreactor. The sludge is a listed hazardous waste and formerly was landfarmed, but now is disposed of offsite or is recycled as a supplemental fuel. Separators 1, 2, 15 and CPI were cleaned and backfilled with clean fill.

26. No. 1 Oxidation Pond: There is petroleum hydrocarbon-contaminated soil in the No. 1 Oxidation pond. The 116-acre pond was built in 1959 and was formerly part of the refinery's effluent treatment system until the late 1980's. It is divided into five basins known as passes. Pass 1 was clean closed in 1990 and is now used for stormwater storage. Passes 2-5 contain oily sediment. In 2008, Regional Water Board staff approved a final closure plan that proposed the placing of sediments dredged from Castro Cove and other non-hazardous refinery soil within the pond, then stabilizing this material with cement and fly ash to support a final Title 27 closure cap. The Final Closure Plan was slightly modified in 2009 and again in 2010. This work is expected to be completed during 2011.

27. Lake Rushing and Majka Ditch: These transported stormwater to the No. 2A separator. 300 cubic yards of contaminated soil were removed from the ditch in 1987.

28. Poleyard Tankfield: There are 32 aboveground petroleum storage tanks, with 24 in service with a total volume of 2 million barrels. Most of these tanks have leak detection bottoms. There are a total of six impound basins including Lake Rushing, Lake Schramm (see below) and four others.

29. Lake Schramm: This was formerly an unlined surface impoundment used for disposal of leaded tank bottoms. 1300 cubic yards of leaded tank bottoms were removed in 1981, and the Lake is now lined and used to contain stormwater runoff.

Alkane Sector

30. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench is at the downgradient edge of the Alkane Sector (see Figure 7). The monitoring program (as described in the attached monitoring program) monitors both the performance of the A- and C-Zone corrective actions noted in the monitoring program. Chevron is

31. Sulfur Recovery Unit Settling Basin: This 3590-gallon basin receives low pH solutions from the sulfur recovery unit, with the supernatant being routed to the wastewater treatment plant.

32. Mud Sump: This unit formerly stored mud and solids that settled at the bottom of the No.13 Separator, but has now been cleaned and backfilled with clean soil.

33. Hydropits: The Hydrolyzing Pits (Hydropits) were three small unlined surface impoundments located on the shore of San Pablo Bay in the Alkane Sector (Figure 7) that historically received wastewater from the refinery's Alkane Plant until 1986. The most significant constituents of this waste stream were neutralized hydrofluoric acid and small amounts of oil containing benzene. Chevron submitted a closure report in 1992. The Hydropits Closure Unit includes a multi-layer cap and the Alkane GPS along the northeastern perimeter of the Hydropits adjacent to Castro Cove. The unit no longer contains liquid hazardous waste and, as such, meets the cease discharge requirements of the Toxic Pits Cleanup Act. No further closure activities are necessary or required for the Hydropits.

34. Schaeffer Slough: This ditch carried the effluent from the Hydropits to the No. 13 Separator for eventual discharge to the wastewater treatment system. The slough has now been closed.

35. No. 13 Separator: This oil/water separator has a volume of 960,000 gallons. In concert with the Mud Sump, it treated oily process water, with the supernatant being routed to the wastewater treatment system.

36. Alkane Plant: There are shallow groundwater plumes containing benzene, fluoride, and free-phase petroleum hydrocarbons originating from the Alkane Plant area (Figure 7). This contamination necessitated source area remediation consisting of free product recovery and groundwater extraction and treatment in addition to implementation of the refinery-wide GPS. In 2001, Chevron started operating eight extraction wells designed to recover floating liquid hydrocarbons and contaminated groundwater in the Alkane Plant plume source area upgradient of the Hydropits Closure Unit and the Alkane Sector GPS. These extraction wells make up the Alkane Plant Groundwater Recovery System. Groundwater and liquid hydrocarbons recovered by the extraction wells are routed to the refinery's wastewater treatment system and is discharged in accordance with existing NPDES permit requirements.

37. Pond 13A: This pond was used to store fluoride salts originating from the Hydroloyzing Pits. It had a capacity of about 28,000 cubic yards and was clean closed in 1992.

38. No. 7 sump: This sump formerly collected stormwater runoff, but is now out of service and is backfilled.

39. Alkane Tankfield: Historically, there were 40 tanks in this tankfield. Currently, no tanks are in active service in this tankfield.

Effluent Sector

40. Perimeter Groundwater Barrier: A GPS barrier wall extends along the 250-foot channel (described below, see Figure 10). The monitoring program (as described in the attached monitoring program) includes A- and C-Zone wells for the evaluation of the performance of the GPS (corrective action).

41. Bioreactor: The Bioreactor was excavated to about -40 feet Mean Sea Level in the early 1900's to be used as a turning basin for ships. Now this 30-acre pond conducts the refinery's secondary wastewater treatment by means of 1100 aerators and a series of baffles.

42. No. 2 Oxidation Pond: This 90-acre pond was historically used for final polishing of NPDES-regulated treated wastewater prior to its discharge to the Bay. The pond was converted to an Experimental Water Enhancement Wetland (Wetland), which is downstream of the biological treatment settling basins (Bioreactor). The treated water from the Wetland and Bioreactor are combined and routed through granular activated carbon, and is discharged in a deep water diffuser, which is the Refinery's NPDES' Point of Compliance under the NPDES permit referenced in Finding 4.

43. 250-foot channel: The 250-foot channel was excavated to about -40 feet MSL in the early 1900's to be used as a shipping channel for the refinery until the 1950's. The channel was then dammed and used as part of the wastewater treatment system until 1987, and now serves to store stormwater and treated process water.

    In 2002, Chevron proposed and implemented interim corrective actions for the channel. These included installation of a High Density Polyethylene barrier, fencing, bank steepening, vegetation control and removal of perching objects used by birds. Chevron also continues collection and removal of oil, and vegetation management and wildlife surveys. Lastly, Chevron conducts water elevation monitoring to assure that there is neither a vertical or lateral gradient allowing for release of contaminated water to either groundwater or the Bay. Ongoing monitoring indicates limited wildlife exposure, that A-Zone groundwater flow is fully contained by the GPS, and that there is largely an upward flow into the channel for the C-Zone water.

44. 50/100 foot channel: This channel conveyed wastewater to the bioreactor. Sampling showed the wastes to be non-hazardous. The channel has been cleaned and converted for use in conveying non-contaminated stormwater to the Bay after sampling.

45. Pond 11: This site received oily waste and paint sludge from the Drum Reconditioning Plant. The site was clean-closed in 1979.

46. Pond 14: This 4,300-cubic yard pond also received waste from the Drum Recondition Plant until 1979. In 1980, all wastes and some underlying soil were removed.

Reclamation Sector

47. Perimeter Groundwater Barrier: A GPS barrier wall and extraction trench largely surrounds the sector's units listed below (see Figure 11). The monitoring program (as described in the attached monitoring program) monitors the performance of the GPS corrective action. Chevron is responsible for inspection and maintenance of the soil cover and stormwater conveyances for the Gertrude Street and Parr-Richmond units.

48. Reclamation Yard Site: Chevron bought this site in 1958, which had been the former City of Richmond municipal landfill since 1947 and has a capacity of about 187,500 cubic yards. No waste disposal occurred following Chevron's purchase of the site.

49. Parr-Richmond Site: Chevron bought this site in 1954, which had been used for municipal landfilling and junkyard storage since 1930. A final cover was built over it in 1997.

50. Gertude Street Site: This 3-acre site was purchased by Chevron and then leased to an outside party that used it for auto dismantling and drum reconditioning between 1961 and 1983. The drums were removed in 1983. In 1987, the site was graded and, in 1997, a final cover was installed along with a groundwater extraction trench.

Seismicity

51. Earthquakes posing a threat to the refinery could occur along the Hayward, San Andreas and Calaveras faults. The maximum ground surface acceleration, calculated for soft to medium clay and silt sites, is expected to be 0.35g for an event originating from a Richter Magnitude 6.4 Maximum Probable Earthquake (MPE) at the Hayward fault about 3.7 km east of the site, 0.35g for an event originating from a Richter Magnitude 7.75 MPE at the San Andreas fault located about 24 km west, and 0.35g for an event originating from a Richter Magnitude 6.6 MPE at the Calaveras fault. In an effort to prepare for such an incident, Chevron routinely and systematically reviews all process facilities for potential hazards, including a seismic review of appropriate structures. In accordance with federal, State and local requirements, Chevron also maintains a facility emergency response plan and tsunami contingency plan for the Richmond Long Wharf.

Aboveground Petroleum Storage Tanks

52. Aboveground petroleum storage tanks are required to comply with the requirements of Chapter 6.67 Section 25270 of the Health and Safety Code. In part, the regulations require installation and utilization of a leak detection system for each regulated tank that has the potential to impact groundwater or surface waters. The refinery operates approximately 160 aboveground petroleum storage tanks with a total storage capacity of approximately 600 million gallons. The majority of these tanks now have leak detection bottoms (LDBs), as Chevron has installed LDBs on all new tanks constructed at the refinery and retrofitted old tanks with LDBs if they are kept in service after their steel bottoms need to be replaced.

53. Aboveground petroleum storage tank facilities are also required to have secondary spill containment for the capture of sudden releases from an aboveground petroleum tank. The refinery utilizes several different types of soil berms, spill collection basins and channels located in the tank fields for containment and diversion of petroleum hydrocarbon releases. The primary regulation governing this activity is Code of Federal Regulations 112.7 Spill Prevention Control and Countermeasure Plans (SPCC). The SPCC is designed to prevent spills at petroleum facilities to the maximum extent practicable and mitigate a spill if it occurs.

MONITORING PROGRAMS

54. To record the compliance of the waste management units and surface impoundments described above, Chevron is required to implement the attached monitoring program described in these WDRs. The monitoring program requires groundwater level and chemical monitoring for inorganic and organic MPs and COCs (both terms are further defined in Specification 5, below) along a point of compliance (POC - also defined in Specification 5, below and generally coincident with the GPS where present). The MPs and COCs are typically metals, semivolatile organic compounds, and volatile organic compounds.

55. In the Landfarm areas, the A-Zone monitoring helps demonstrate that the GPS is maintaining a hydraulic barrier and by evaluating the effectiveness of the GPS as a Corrective Action Monitoring Program. The C-Zone monitoring helps verify that water quality below the bay mud at the POC of the landfarms has not been degraded and is considered to be a Detection Monitoring Program. Outside of the Landfarm area, the A-Zone monitoring likewise helps validate the GPS performance as a Corrective Action Monitoring Program, but C-Zone monitoring is considered to be corrective action monitoring.

56. Pursuant to a plan approved by the Regional Water Board in 2002, Chevron performs a statistical evaluation and trend analysis of groundwater well monitoring results, to establish concentration trends and note the overall effectiveness of the remedial actions at the refinery.

57. Chevron also reports on groundwater elevations, flow patterns and velocities, hydrocarbon thicknesses and recovery, and closure unit monitoring, inspection and maintenance activities as part of their monitoring program.

BASIN PLAN

58. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law and the U.S. EPA, where required.

BENEFICIAL USES

59. Shallow groundwater beneath the "Flats Zone", which comprises the flatland marsh area bounded by the San Pablo Bay to the north and extending south along the northeast side of the Potrero-San Pablo Ridge, has Total Dissolved Solids (TDS) levels that are significantly higher than the 3000 mg/l (5000 µS/cm electrical conductivity) level which the Regional Water Board (Resolution No. 89-39) set as a maximum for a municipal or domestic water supply in its Sources of Drinking Water Policy. There is no historical, existing or planned use of groundwater as a source of drinking water in either the shallow (A- and C-Zones) or deeper (B-Zone) aquifers in this part of the refinery.

    Groundwater beneath the "Ridge Zone," which is bounded on the south by San Francisco Bay and extends northwest up to the top of the Potrero-San Pablo Ridge (Bayside sectors), is primarily contained in fractured bedrock of the Franciscan Complex. Based on hydraulic conductivity data collected during hydrogeologic investigations of the tankfields in the Bayside North and Bayside South sectors, it is unlikely that a single well could produce an average sustained yield of 200 gallons per day for drinking water supply purposes (State Water Board Resolution No. 88-63, exemption criterion 1(c), and Regional Water Board Resolution No. 89-39). There is no historical, existing or planned use of unconfined groundwater as a source of drinking water in this part of the refinery.

    There is the potential, however, for groundwater on either side of the Potrero-San Pablo Ridge to discharge into San Francisco and San Pablo bays at the shoreline groundwater/surface water interface. Therefore, the surface water beneficial uses named in the Basin Plan for these bodies of water are applicable to groundwater in POC monitoring wells near the shoreline interface.

60. The existing and potential beneficial uses of groundwater underlying the site that is not contained in bedrock and is greater than 100 feet below ground surface are:

a. Industrial process and service supply
b. Agricultural water supply
c. Municipal and domestic supply (however, due to the proximity of the Bay, groundwater at the site contains elevated TDS levels, which render the groundwater nonpotable)

61. The existing and potential beneficial uses of San Francisco and San Pablo bays are:

a. Ocean, commercial, and sport fishing
b. Shellfish harvesting
c. Estuarine habitat
d. Fish migration
e. Preservation of rare and endangered species
f. Fish spawning
g. Wildlife habitat
h. Water contact recreation
i. Non-contact water recreation
j. Industrial service supply
k. Industrial process supply
l. Navigation

CALIFORNIA ENVIRONMENTAL QUALITY ACT

62. This action is an Order to enforce the laws and regulations administered by the Regional Water Board. This action is categorically exempt from the provisions of the California Environmental Quality Act pursuant to Section 15308, Title 14, CCR.

NOTICE AND MEETING

63. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to amend the WDRs, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

64. The Regional Water Board, at a public meeting, heard and considered all comments pertaining to this amendment of WDRs.

IT IS HEREBY ORDERED pursuant to the authority in Section 13263 of California Water Code (CWC), Title 27, Division 2, Subdivision 1 of the California Code of Regulations (27CCR), and Chapter 15, Division 3, Title 23 of the CCR (Chapter 15) that the Discharger, its agents, successors, and assigns shall meet the applicable provisions contained in 27CCR, Chapter 15, and Division 7 CWC, and shall comply with the following:

PROHIBITIONS

1. Migration of pollutants through subsurface transport to waters of the State outside of the GPS is prohibited.

2. There shall be no discharge of wastes to surface waters except as permitted under the National Pollutant Discharge Elimination System.

3. The treatment, discharge or storage of materials that may impact the beneficial uses of groundwater or surface water shall not be allowed to create a condition of pollution or nuisance as defined in sections 13050 (l) and (m) of the CWC, nor degrade the quality of waters of the State or of the United States.

4. The creation of any new Waste Management Unit (WMU) is prohibited without prior Regional Water Board staff written concurrence.

5. The relocation of wastes is prohibited without prior Regional Water Board staff written concurrence.

6. The relocation of wastes to or from WMUs shall not create a condition of pollution or nuisance as defined in CWC sections 13050 (l) and (m). Any relocated waste shall not be placed in or allowed to contact ponded water from any source whatsoever. Wastes shall not be relocated to any location where they can be discharged into waters of the State or of the United States.

7. Excavation within or reconfiguration of any existing WMU is prohibited without prior concurrence of Regional Water Board staff. Minor excavation or reconfiguration activities such as for installation of signs or minor landscaping, or for minor routine maintenance and repair do not require prior staff concurrence.

8. Waste shall not be exposed at the surface of any WMU.

9. Disking of WMU covers is prohibited without prior Regional Water Board staff written concurrence. Alternate methods of controlling vegetative growth, which do not affect the integrity of the WMU cap, are preferred.

10. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes during the life of the site.

11. The discharge of hazardous waste at the facility is prohibited. For the purpose of this Order, the term "hazardous waste" is as defined in Section 20164 of Title 27.

12. The discharge of leachate or wastewater (including from surface impoundments, process waters, and runoff from the plant operations areas) that: 1) have the potential to cause corrosion or decay, or otherwise reduce or impair the integrity of the

containment structures; 2) if mixed or commingled with other wastes in the unit, could produce a violent reaction including heat, pressure, fire, explosion, or the production of toxic by-products; 3) require a higher level of containment than provided by the unit; 4) are "restricted hazardous wastes", or 5) impair the integrity of the containment structures, are prohibited per Section 20200(2)(b) of Title 27.

13. Activities associated with subsurface investigations and cleanup that will cause significant adverse migration of pollutants are prohibited.

14. There shall be no discharges to a surface impoundment, and any residual liquids and sludge shall be removed expeditiously if it is determined the surface impoundment is leaking or there is a failure which causes a threat to water quality.

15. Wastes shall not be disposed in any position where they may migrate from the disposal site to adjacent geologic materials, waters of the State or of the United States during disposal operations, closure, and during the post-closure maintenance period, per Section 20310(a) of Title 27.

16. The Discharger shall not cause the following conditions to exist in waters of the State at any place outside of the GPS:

    a. Surface Waters
        i. Floating, suspended, or deposited macroscopic particulate matter or foam;
        ii. Bottom deposits or aquatic growth;
        iii. Adversely altered temperature, turbidity, or apparent color beyond natural background levels;
        iv. Visible, floating, suspended or deposited oil or other products of petroleum origin; or
        v. Toxic or other deleterious substances to be present in concentrations or quantities that may cause deleterious effects on aquatic biota, wildlife or waterfowl, or that render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

    b. Groundwater
        i. Further degradation of groundwater quality and/or substantial worsening of existing groundwater impacts; and
        ii. Subsurface migration of pollutants associated with Chevron's operations to waters of the State is prohibited.

SPECIFICATIONS

Reporting Specifications

1. All technical reports submitted pursuant to this Order shall be prepared under the supervision of and signed by a California registered civil engineer, registered geologist, and/or certified engineering geologist.

2. The Discharger shall implement a Detection Monitoring Program (DMP) for the C-Zone groundwater at the Landfarm area, pursuant to CCR Title 27 Section 20420. The Self-Monitoring Program (SMP) attached to this Order is intended to constitute the DMP for the refinery.

3. The Discharger shall also continue the Corrective Action Monitoring Program for the A-Zone groundwater, and the C-Zone groundwater outside of the landfarms, pursuant to CCR Title 27 Section 20430. The program shall be designed to determine if the corrective action measures, such as the operation of the GPS, are functioning and demonstrate compliance with the corrective action program goals. The SMP attached to this Order is intended to constitute the Corrective Action Monitoring Program for the refinery.

4. At any time, the Discharger may file a written request (including supporting documentation) with the Regional Water Board's Executive Officer, proposing modifications to the attached SMP. If the proposed modifications are acceptable, the Executive Officer may issue a letter of approval that incorporates the proposed revisions into the SMP.

Title 27 Compliance Specifications

5. Title 27 requires the Regional Water Board to establish a Water Quality Protection Standard (WQPS) in a WDR order for each WMU covered by that order. The WQPS for the refinery shall include the following:

   (a) Constituents of Concern (COC): Section 20395 of Title 27 defines COCs as "all waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit." COCs for the refinery include the monitoring parameters identified in the SMP attached to this Order, or any future amendment thereof, and all Appendix II parameters in the federal Subtitle D regulations.

   (b) Monitoring Parameters (MP): MPs, a subset of the COCs, are typically the most mobile and commonly detected COCs in groundwater at a site and are measured on a more frequent basis than the entire list of COCs. The MPs for the refinery shall include, at a minimum, all constituents identified as such in the SMP attached to this Order, or any future amendments thereof. The Discharger may propose modification to the MPs as additional data become available concerning site-specific source characteristics and natural background water quality. However, modifications shall only be made upon written concurrence from the Executive Officer.

   (c) Maximum Allowable Concentration Limits(MACLs): MACLs have been established for each COC listed in Tables 2 and 4 of the SMP. Concentration limits for all COCs detected at the specified monitoring wells are typically established using the background data set pursuant to CCR Title 27 Section

20400. However, use of background data is inappropriate due to the number of releases over the many years of refinery operations, as it may be technologically and/or economically infeasible to cleanup all petroleum refining-related constituents in the groundwater to background concentrations (non-detect for synthetic organics). The MACLs were thus developed to protect the beneficial uses of shallow groundwater beneath the refinery. The applicable beneficial uses with the most stringent water quality objectives are related to shallow groundwater discharge to surface waters of San Francisco Bay and include uses involving the health of aquatic organism receptors in the Bay and humans who consume aquatic organisms from the Bay.

(d) Point of Compliance: Title 27 defines the Point of Compliance (POC) as the "vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit." The appropriate POC for the refinery, based on the areal extent of groundwater impacts and the large number of WMUs involved, is the GPS extraction trench/barrier wall system, which maintains a hydraulic capture zone to protect sensitive ecological receptors in the Bay and wetlands adjacent to the refinery. The GPS/POC boundary was established under the following guidelines: 1) at the downgradient perimeters of individual WMUs that require corrective action but are non-contiguous with other A-Zone areas under corrective action (e.g., Pollard Pond, Parr-Richmond site); 2) at the furthest downgradient boundary common to a group of WMUs and/or areas under corrective action (e.g., Landfarms 2-5, Plant 1/Additives Plant); or, 3) at the refinery shoreline boundary where A-Zone groundwater contamination not associated with specific WMUs is present.

(e) Monitoring Points: Title 27 defines Monitoring Points as "a well, device, or location specified in the waste discharge requirements at which monitoring is conducted and at which the water quality protection standard applies." Monitoring Points for compliance with the refinery-wide corrective action and detection monitoring program are identified in the SMP. These monitoring points generally consist of shallow groundwater monitoring wells located downgradient of the GPS extraction well capture zone. Because refinery operations predate collection of groundwater chemistry data, background water quality monitoring locations do not exist at this site; therefore, intra-well statistical comparisons will be used for evaluating trends in concentrations of COCs detected in groundwater monitoring wells. Concentrations of petroleum hydrocarbon-related COCs reported above MACLs are expected to exhibit decreasing trends over time as the GPS continues to operate and natural biodegradation processes take place.

6. The refinery site shall be protected from any washout or erosion of wastes or covering material and from inundation that could occur during a 100 year flood event. Final cover systems for WMUs shall be graded and maintained to promote lateral runoff and prevent ponding and infiltration of water.

7. The Discharger shall notify the Regional Water Board immediately of any failure that threatens the integrity of any containment and/or control facilities, structures, or devices. Any such failure shall be promptly corrected after approval of the method and schedule by the Executive Officer.

8. The Discharger shall maintain the WMUs so as to prevent a statistically significant increase in water quality parameters at POCs as provided in CCR Title 27, Section 20420.

9. The Discharger shall maintain the WMUs to prevent discharges, such that the units do not constitute a pollution source.

10. The Regional Water Board considers the Discharger to have continuing responsibility for correcting any problems that arise in the future as a result of waste discharge or related operations or site use.

11. The Discharger shall comply with all applicable provisions of Title 27 that apply to the closure and post-closure of WMUs and the design and maintenance of surface impoundments including those that are not specifically referred to in this Order.

12. WMUs shall be closed according to a closure plan prepared according to all applicable requirements of Title 27, and approved by the Executive Officer.

Remediation Facility Specifications

13. The Discharger shall **annually demonstrate** (include results in the Annual Report) that all installed groundwater remedial systems including, but not limited to, groundwater containment, treatment, and/or extraction systems are functioning as intended and designed.

14. Containment, collection, drainage, and monitoring systems at the refinery, shall be maintained as long as contaminated waste, soil, or water is present and poses a threat to water quality.

15. The Discharger shall maintain groundwater or remediation devices or design features installed in accordance with this Order such that they continue to operate as intended without interruption, with the exception of periodic maintenance.

16. If the Executive Officer determines the existence of an imminent threat to the beneficial uses of surface or subsurface waters of the State, the Discharger may be required to install additional groundwater monitoring wells and/or undertake corrective action measures, including submittal of a site investigation report.

17. The Discharger shall install any additional groundwater and leachate monitoring devices required to fulfill the terms of any future SMP issued by the Executive Officer.

18. The Discharger shall install, maintain in good working order, and operate efficiently any facility, alarm, groundwater extraction system, or hydraulic/contaminant migration control system necessary to assure compliance with these WDRs.

19. If it is determined by the Executive Officer, based on groundwater monitoring information, that water quality impairment immediately outside the boundary of the GPS continues to degrade, the Discharger will be required to submit and implement a site specific groundwater corrective action proposal.

Monitoring Specifications

20. The Discharger shall conduct monitoring activities according to the SMP attached to this Order and as may be amended by the Executive Officer, to verify the effectiveness of groundwater remediation and containment systems and WMU closure systems.

21. All monitoring wells shall be constructed in a manner that maintains the integrity of the drill hole, prevents cross-contamination of saturated zones, and produces representative groundwater samples from discrete zones within the groundwater zone each well is intended to monitor.

22. All borings for monitoring wells shall be continuously cored. The drill holes shall be logged during drilling under the direct supervision of a registered geologist whose signature appears on the corresponding well log. Logs of monitoring wells shall be filed with the Department of Water Resources. All information used to construct the wells shall be submitted to the Regional Water Board upon completion of the wells.

23. The groundwater sampling and analysis program shall ensure that groundwater quality data are representative of the groundwater in the area that is monitored.

Surface Impoundment Specifications

24. If it is determined by the Executive Officer that any surface impoundment is degrading beneficial uses, there shall be no discharges to a surface impoundment, and residual liquids and sludges shall be removed expeditiously.

25. The impoundments will be operated such that scouring at points of discharge and by wave action at the water line will not degrade the pond containment features.

26. Pipeline discharges to surface impoundments shall be either equipped with devices, or fail-safe operating procedures, to prevent overfilling. The surface impoundments shall always maintain at least two-feet of freeboard.

27. The Discharger shall operate the surface impoundments according to a detailed operating, maintenance, and contingency plan that will include at a minimum,

procedures for routine inspection of the surface impoundments, discharge into a pond, discharge out of a pond, contingency measures if problems with the containment structures are found, and notification of agencies.

Soil Contamination and Excavated Soil Reuse

28. Chevron shall notify the Regional Water Board of any soil contamination, not previously identified in subsurface investigations, discovered during any subsurface investigation or excavation work conducted on refinery property, which may potentially adversely impact water quality. Chevron shall store, reuse, and/or dispose of non-hazardous contaminated soil according to the *Revised Soil Management Plan, Chevron Richmond Refinery, Contra Costa county, California (SAIC, 2008).*

PROVISIONS

1. Compliance: The Discharger shall comply immediately, or as prescribed by the time schedule below, with all Prohibitions, Specifications, and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. Violations may result in enforcement actions, including Regional Water Board orders or court orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these WDRs by the Regional Water Board [CWC sections 13261, 13267, 13263, 13265, 13268, 13300, 13301, 13304, 13340, and 13350].

2. Authority: All technical and monitoring reports required by this Order are requested pursuant to Section 13267 of the CWC. Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of sufficient technical quality to be acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the CWC.

Reporting Requirements

3. Technical reports/plans, submitted by the Discharger, in compliance with the Prohibitions, Specifications, and Provisions of this Order, shall be submitted to the Regional Water Board on the schedule specified herein. These reports/plans shall consist of a letter report that includes the following:

   a. Identification of any obstacles that may threaten compliance with the schedule,

   b. In the event of non-compliance with any Prohibition, Specification or Provision of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order; and

   c. In the SMP reports, an evaluation of the current groundwater monitoring system and a proposal for modifications as appropriate.

4. All application reports or information to be submitted to the Executive Officer shall be signed and certified as follows:

   a. For a corporation – by a principal executive officer or the level of vice-president or an appropriate delegate.

   b. For a partnership or sole proprietorship – by a general partner or the proprietor, respectively.

   c. For a municipality, State, federal, or other public agency – by either a principal executive officer or ranking elected official.

5. All reports submitted pursuant to this Order must be submitted as both hard copies and electronic files in PDF format. The Regional Water Board has implemented a document database that is intended to reduce the need for printed report storage space and streamline the public review process. All electronic files, whether in PDF or spreadsheet format must be submitted via email (only if the file size is under 1MB), or on CD. Email notification should be provided to Regional Water Board staff whenever a file is uploaded to Geotracker (see below).

6. The State Water Board adopted regulations requiring electronic report and data submittal to the State's GeoTracker database (Title 23, Division 3, Chapter 30, Articles 1 and 2, Sections 3890-3895 of the CCR).

   The Discharger is responsible for submitting the following via Geotracker:

   a. All chemical analytical results for soil, water, and vapor samples;

   b. The latitude and longitude of any permanent sampling point for which data is reported, accurate to within 1 meter and referenced to a minimum two reference points from the California Spatial Reference System, if available;

   c. The surveyed elevation relative to a geodetic datum of any permanent sampling point;

   d. The elevation of groundwater in any permanent monitoring well relative to the surveyed elevations;

   e. A site map or maps showing the location of all sampling points;

   f. The depth of the screened interval and the length of screened interval for any permanent monitoring well;

   g. PDF copies of boring logs; and

   h. PDF copies of all reports, workplan and other documents (the document, in its entirety [signature pages, text, figures, tables, etc.] must be saved to a single PDF file) including the signed transmittal letter and professional certification by a California Licensed Civil Engineer or a Registered Geologist.

7. Upon request, monitoring results shall also be provided electronically in Microsoft Excel® to allow for ease of review of site data, and to facilitate data computations and/or plotting that Regional Water Board staff may undertake during the review

process. Data tables submitted in electronic spreadsheet format will not be included in the case of file review and should therefore be submitted on CD and included with the hard copy of the report. Electronic tables shall include the following information:

a. Well designations;

b. Well location coordinates (latitude and longitude);

c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, screen interval elevation, and a characterization of geology of subsurface the well is located in);

d. Groundwater depths and elevations (water levels);

e. Current analytical results by constituent of concern (including detection limits for each constituent);

f. Historical analytical results (including the past five years unless otherwise requested); and

g. Measurement dates.

Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order related to surface impoundments and solid waste units, submitted by the Discharger, shall also be provided to the Contra Costa County Hazardous Materials Program.

8. Self-Monitoring Program: The Discharger shall comply with the SMP attached to this Order (Part A and Part B). The SMP is intended to constitute both a DMP and a Corrective Action Monitoring Program pursuant to Title 27, sections 20420 and 20430 and is designed to identify significant water quality impacts from the specified WMU and demonstrate compliance with the WQPS established pursuant to Title 27, Section 20390 for the WMU. The SMP may be amended as necessary at the discretion of the Executive Officer.

COMPLIANCE DATE: Immediately

9. Revision of the Self-Monitoring Program: The Discharger shall submit a plan for the revision of the monitoring locations, parameters, frequency and MACLs contained within the SMP attached to this Order (Part B).

COMPLIANCE DATE: December 15, 2011.

10. Contaminated Soil Management Plan: Chevron shall continue to implement the plan, dated August 26, 2008, for managing non-hazardous contaminated soil discovered on refinery property during subsurface investigation or excavation work. This plan includes descriptions of soil sampling, storage, and handling protocols and criteria for reusing non-hazardous contaminated soil within the refinery impacted soils.

11. Final Closure Plan for #1 Oxidation Pond Passes 2 through 5: Chevron shall continue to implement the No. 1 Oxidation Closure Plan, approved by the Regional Water

Board on April 30, 2009. The Plan proposed a final cover system for petroleum hydrocarbon contaminated soil in passes 2 through 5 of #1 Oxidation Pond. Chevron shall submit a final plan documenting the completion of this work.

COMPLIANCE DATE: December 15, 2011

12. Report of Waste Discharge: The Discharger shall submit a technical report, acceptable to the Executive Officer, describing any proposed material change in the character, location, or volume of a discharge, or in the event of a proposed change in use or development of a WMU or landfill (CWC Section 13260(c)). The technical report shall describe the project, identify key changes to the design that may impact any portion of the WMU or landfill, and specify components of the design necessary to maintain integrity of the WMU or landfill cover and prevent water quality impacts.

    COMPLIANCE DATE: 120 days prior to any material change

13. Financial Assurance: The Discharger shall submit to the Regional Water Board evidence of an irrevocable Post-closure Fund acceptable to the Executive Officer, to ensure monitoring, maintenance, and any necessary remediation actions. Every five years, for the duration of the post-closure monitoring period, the Discharger shall submit a report that includes an outline of the financial assurance mechanism and verification that the fund has been created. The fund value shall be supported by calculations, to be included with this submittal, providing cost estimates for all post-closure monitoring, maintenance, repair and replacement of WMU or landfill containment, cover, and monitoring systems.

    Additionally, cost estimates must be provided for corrective action for known or reasonable foreseeable releases that may be required for all WMUs at the facility. The fund value shall be based on the sum of these estimates. The cost estimates and funding shall be updated to reflect change to monitoring systems as they occur. The post-closure maintenance period shall extend as long as the wastes within the WMU pose a threat to water quality.

    COMPLIANCE DATE: Submitted with the 2015 Annual Report then every five years thereafter.

14. Availability: A copy of these WDRs shall be maintained by the Discharger and shall be made available by the Discharger to all employees or contractors performing work (maintenance, monitoring, repair, construction, etc.) at WMUs or groundwater containment systems. (CWC Section 13263)

15. Change in Ownership: In the event of any change in control or ownership of the facility presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Regional Water Board upon a final change in ownership. To assume operation of this Order, the succeeding owner or operator must

apply in writing to the Executive Officer requesting transfer of this Order within 30 days of the change of ownership. The request must contain the requesting entity's full legal name, mailing address, electronic address, and telephone number of the persons responsible for contact with the Regional Water Board. Failure to submit the request shall be considered a discharge without requirements, a violation of the CWC. (CWC Sections 13267 and 13263)

COMPLIANCE DATE: 30 days after a change in facility control or ownership

16. Revision: This Order is subject to Regional Water Board review and updating, as necessary, to comply with changing State or federal laws, regulations, policies, or guidelines; changes in the Basin Plan; or changes in discharge characteristics. The Regional Water Board will review this Order periodically and may revise its requirements when necessary. (CWC Section 13263).

17. Submittal Revisions: Where a Discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Water Board, it shall promptly submit such facts or information. (CWC Sections 13260 and 13267)

18. Vested Rights: This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the Discharger from liability under federal, State or local laws, nor do they create a vested right for the Discharger to continue the waste discharge. (CWC Section 13263(g))

19. Severability: Provisions of these WDRs are severable. If any provisions of these WDRs are found invalid, the remainder of these WDRs shall not be affected. (CWC 9213)

20. Operation and Maintenance: The Discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order. (CWC Section 13263(f))

20. Reporting of Hazardous Substance Release: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it probably will be discharged in or on any waters of the State, the Discharger shall:

a. Report such discharge to the following:

i. The Regional Water Board by calling (510) 622-2300 during regular office hours

(Monday through Friday, 8 a.m. – 5 p.m.); and to

ii. The California Emergency Management Agency (CAL EMA) at (800) 852-7550.

b. A written report shall be filed with the Regional Water Board within five working days.
The report shall describe:

i. The nature of the waste or pollutant.

ii. The estimated quantity involved.

iii. The duration of the incident.

iv. The cause of the release.

v. The estimated size of the affected area, and nature of the effect.

vi. The corrective actions taken or planned, and a schedule of those measures.

vii. The persons/agencies notified.

This reporting is in addition to reporting to CAL EMA that is required pursuant to the Health and Safety Code.

21. Reporting Releases: Except for a discharge that is in compliance with these WDRs, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall immediately notify CAL EMA of the discharge in accordance with the spill reporting provision of the State toxic disaster contingency plan adopted pursuant to Article 3.7 (commencing with Section 8574.7) of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the Regional Water Board of the discharge as soon as:

a. That person has knowledge of the discharge;

b. Notification is possible; and

c. Notification can be provided without substantially impeding cleanup or other emergency measures.

This provision does not require reporting of any discharge of less than a reportable quantity as provided for under subdivisions (f) and (g) of CWC Section 13271 unless the Discharger is in violation of a prohibition in the Basin Plan. [CWC Section 13271(a)]

22. Release Reporting Requirements: In the case of a release defined above the following must be provided to the Regional Water Board within five days of knowledge of the release;

a. Site map illustrating location and approximate size of impacted area;

b. Photographs of the impacted area before and after remediation; and

c. A report detailing the remediation method chosen and its efficacy, and illustrating that the release contingency plan was effective, or else proposing modifications to the contingency plan to increase its effectiveness.

23. Endangerment of Health or the Environment: The Discharger shall report any noncompliance that may endanger human health or the environment. Any such information shall be provided orally to the Executive Officer, or authorized representative, **within 24 hours** from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the Discharger becomes aware of the circumstances. The written submission shall contain:

a. A description of the noncompliance, and its cause;

b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected;

c. The anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours [CWC sections 13263 and 13267]. The following occurrences must be reported to the Executive Officer within 24 hours:

a. Any bypass from any portion of the treatment facility;

b. Any discharge of industrial products, or treated or untreated wastewater; and

c. Any treatment plant upset that causes the discharge limitation(s) of this Order to be exceeded [CWC sections 13263 and 13267].

24. Entry and Inspection: The Discharger shall allow the Regional Water Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this order or as otherwise authorized by the CWC, any substances or parameters at any location. (CWC Section 13267)

25. Discharges to Navigable Waters: Any person discharging or proposing to discharge to navigable waters from a point source (except for discharge of dredged or fill material subject to Section 404 of the Clean Water Act and discharge subject to a general NPDES permit) must file an NPDES permit application with the Regional Water Board. (CCR Title 2 Section 22357)

26. Change in Discharge: In the event of a material change in the character, location, or volume of a discharge, the Discharger shall file with this Regional Water Board a new Report of Waste Discharge. (CWC Section 13260). A material change includes, but is not limited to, the following:

    a. Addition of a major industrial waste discharge to discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the waste;

    b. Significant change in disposal method, e.g., change from a land disposal to a direct discharge to water, or change in the method of treatment which would significantly alter the characteristics of the waste;

    c. Significant change in the disposal area, e.g., moving the discharge to another drainage area, to a different water body, or to a disposal area significantly removed from the original area potentially causing different water quality or nuisance problems;

    d. Increase in flow beyond that specified in the WDRs; or

    e. Increase in area or depth to be used for solid waste disposal beyond that specified in the WDRs. (CCR Title 23 Section 2210)

27. Monitoring Devices: All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices. Annually, the Discharger shall submit to the Executive Officer a written statement signed by a registered professional engineer certifying that all flow measurement devices have been calibrated and will reliably achieve the accuracy required.

    Unless otherwise permitted by the Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the State Department of Public Health. The Executive Officer may allow use of an uncertified laboratory under exceptional circumstances, such as when the closest laboratory to the monitoring location is outside State boundaries and therefore not subject to certification. All analyses shall be required to be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants" (40 CFR Part 136) promulgated by U.S. EPA. (CCR Title 23, Section 2230)

28. Treatment: In an enforcement action, it shall not be a defense for the Discharger that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the Discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost. (CWC Section 13263(f)).

29. Document Distribution: Copies of correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:

    a. Regional Water Board (all submittals);

    b. Department of Toxic Substances Control (all submittals); and

    c. Contra Costa Health Services, Hazardous Materials Programs (Soils Management Plan only).

    The Executive Officer may modify this distribution list as needed.

30. General Prohibition: Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the CWC. (H&SC Section 5411, CWC Section 13263)

31. Earthquake Inspection: The Discharger shall submit a detailed Post Earthquake Inspection Report acceptable to the Executive Officer, in the event of any earthquake generating ground shaking of Richter Magnitude 7 or greater at or within 30 miles of the refinery. The report shall describe the containment features, groundwater monitoring, and control facilities potentially impacted by the static and seismic deformations of any WMU or groundwater containment system. Damage to any waste containment facility, which may impact State waters, must be reported immediately to the Executive Officer.

    COMPLIANCE DATE: Verbally as soon as the data becomes available and in writing within 72 hours of a triggering seismic event. Any damage that may cause negative impacts to waters of the State must be reported immediately upon discovery to the Spill Hotline at 1-800-852-7550 and by sending an email to Rb2SpillReports@waterboards.ca.gov

32. Maintenance of Records: The Discharger shall retain records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer. Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individuals who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individuals who performed the analyses;
e. The analytical techniques or method used; and
f. The results of such analyses.

33. This Order supersedes and rescinds Order No. 00-043.

34. This Order is subject to Regional Water Board review and updating, as necessary, to comply with changing State or federal laws, regulations or policies, or guidelines; changes in the Regional Water Board's Basin Plan; or changes in discharge characteristics.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on June 8, 2011.

Digitally signed by Bruce Wolfe
Date: 2011.06.13 14:21:14 -07'00'

Bruce H. Wolfe
Executive Officer

Attachments:

Self-Monitoring and Reporting Program, Part A and B

Figure 1 - Location Map
Figure 2 - Regional Site Map with Geomorphic Boundaries
Figure 3 - Sector Boundaries
Figure 4 - Groundwater Protection System Location Map
Figure 5 - Plant 1 / Additives Plant Cap
Figure 6 - Pollard Sector
Figure 7 - Alkane Sector
Figure 8 - Landfarm/Landfill Sector
Figure 9 - Bayside Sector
Figure 10 - Effluent Sector
Figure 11 - Reclamation Sector
Figure 12 - North Yard Sector
Figure 13 - Groundwater Protection System

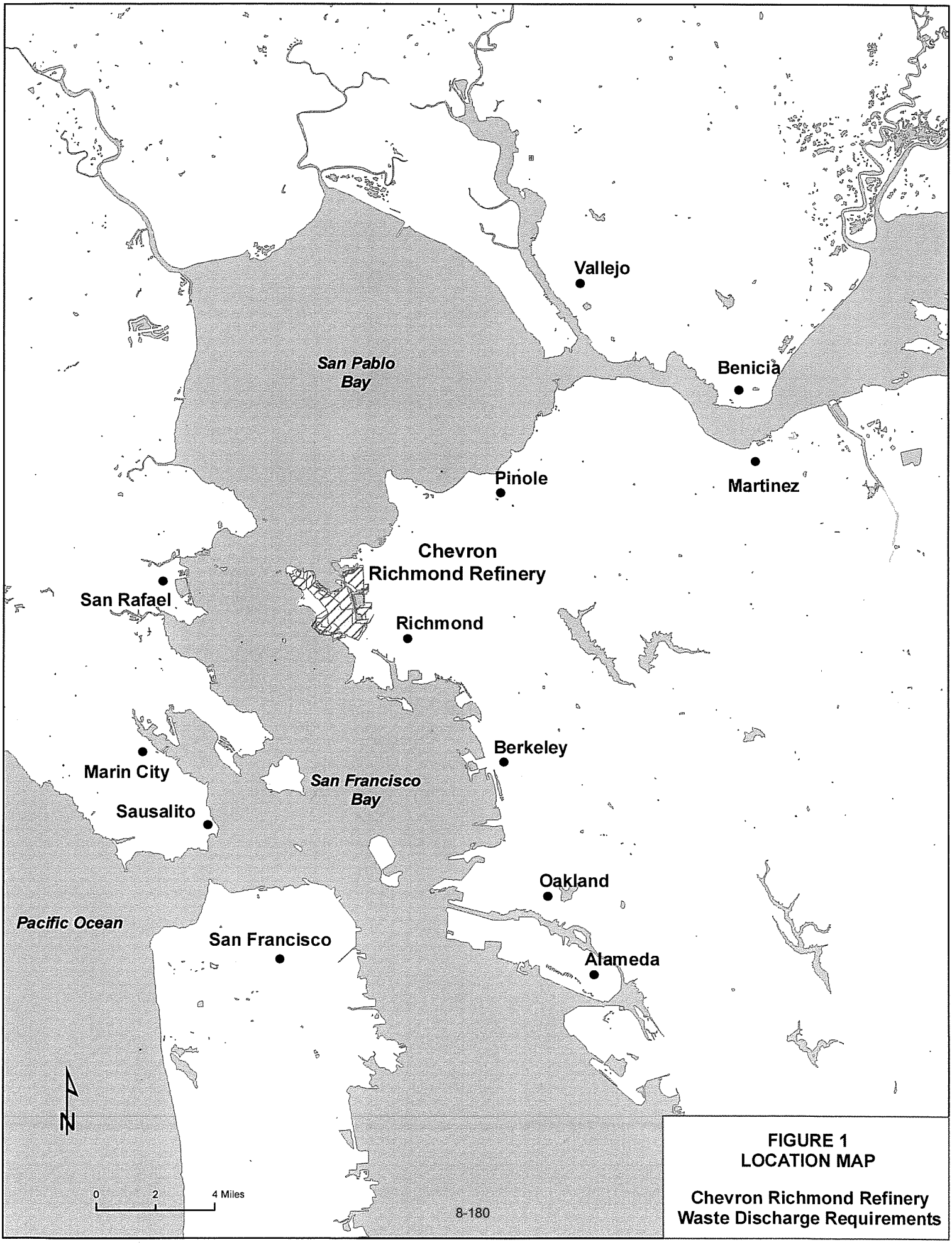

FIGURE 1
LOCATION MAP

Chevron Richmond Refinery
Waste Discharge Requirements

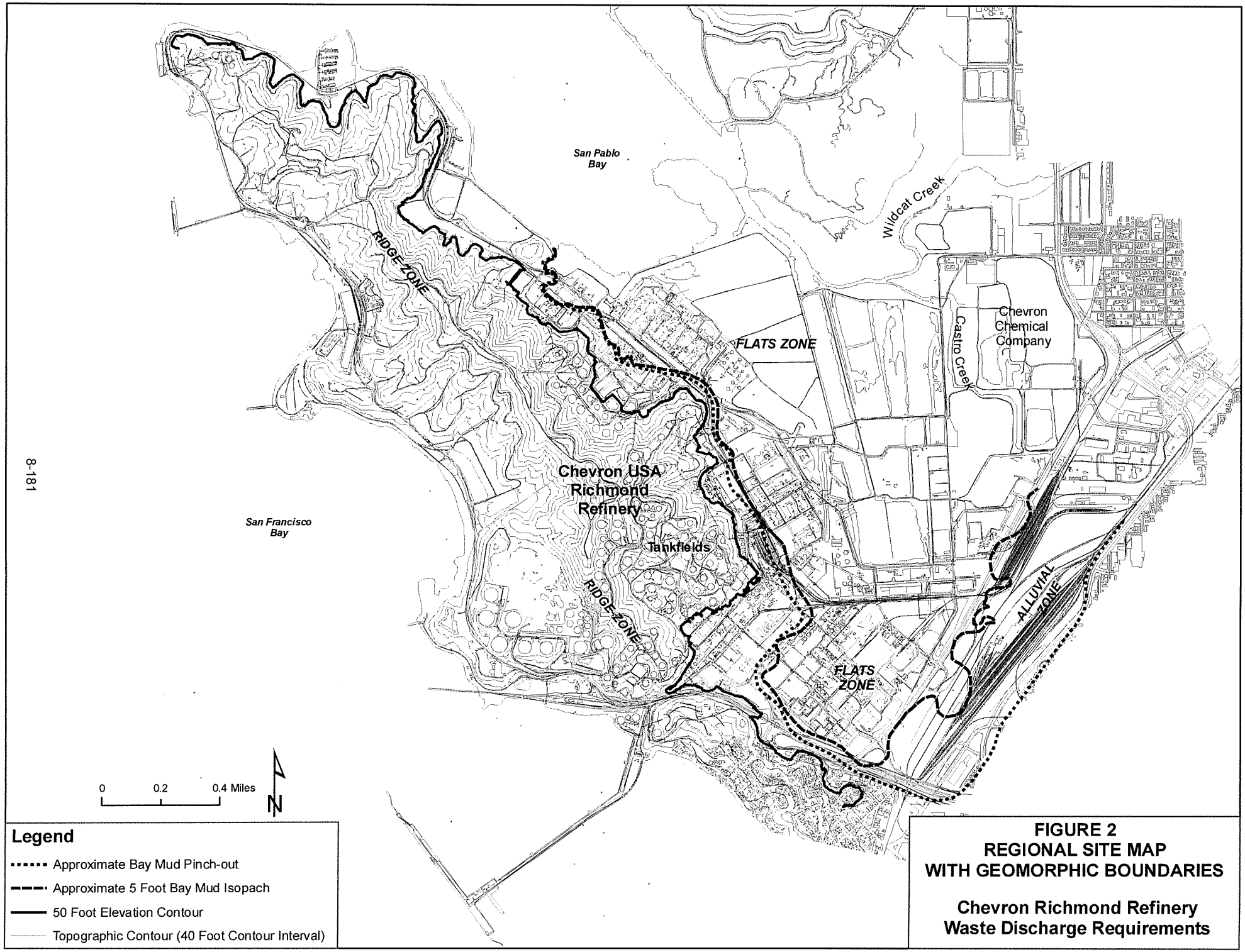

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FIGURE 2
REGIONAL SITE MAP
WITH GEOMORPHIC BOUNDARIES

Chevron Richmond Refinery
Waste Discharge Requirements

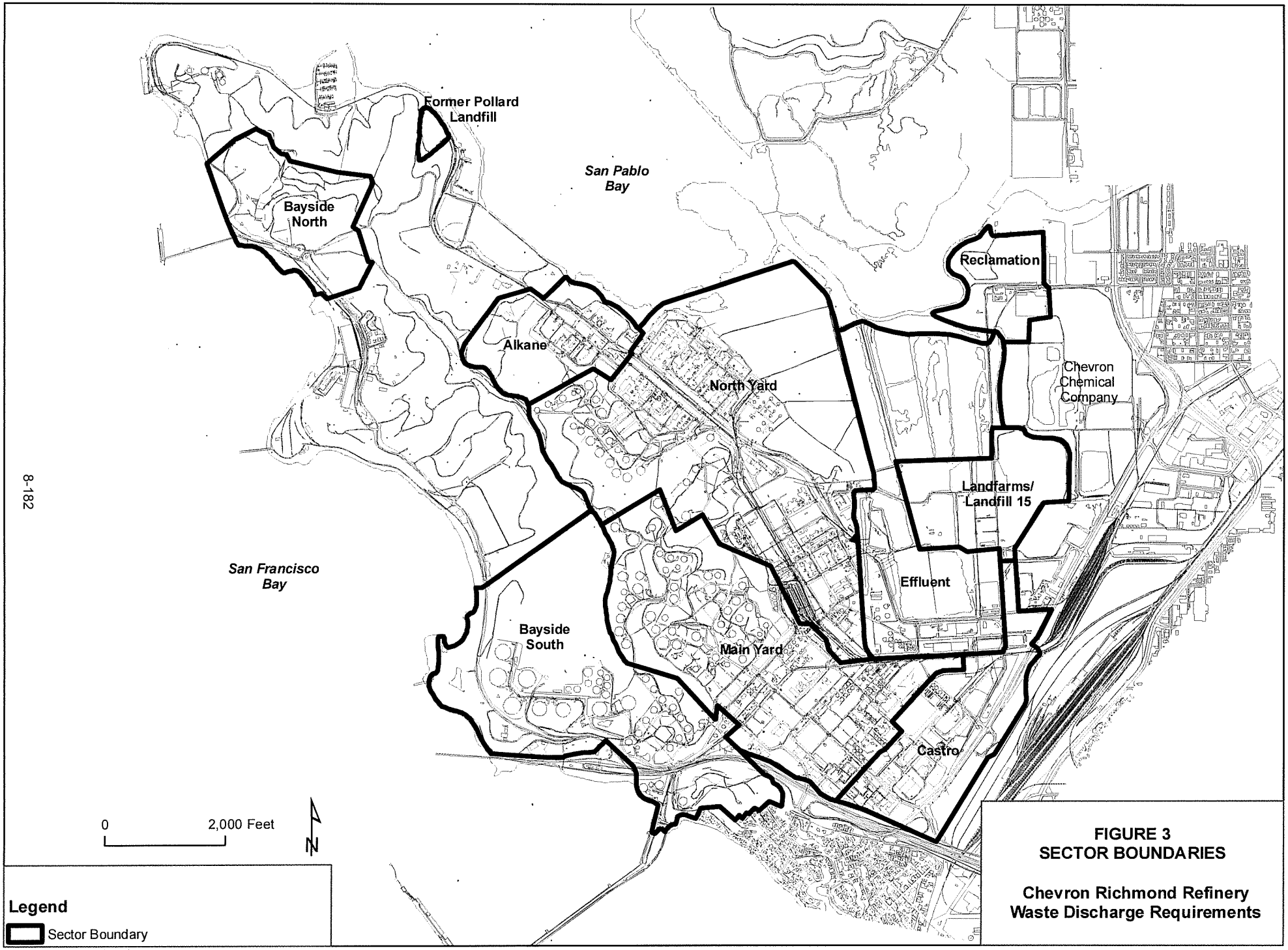

FIGURE 3
SECTOR BOUNDARIES

Chevron Richmond Refinery
Waste Discharge Requirements

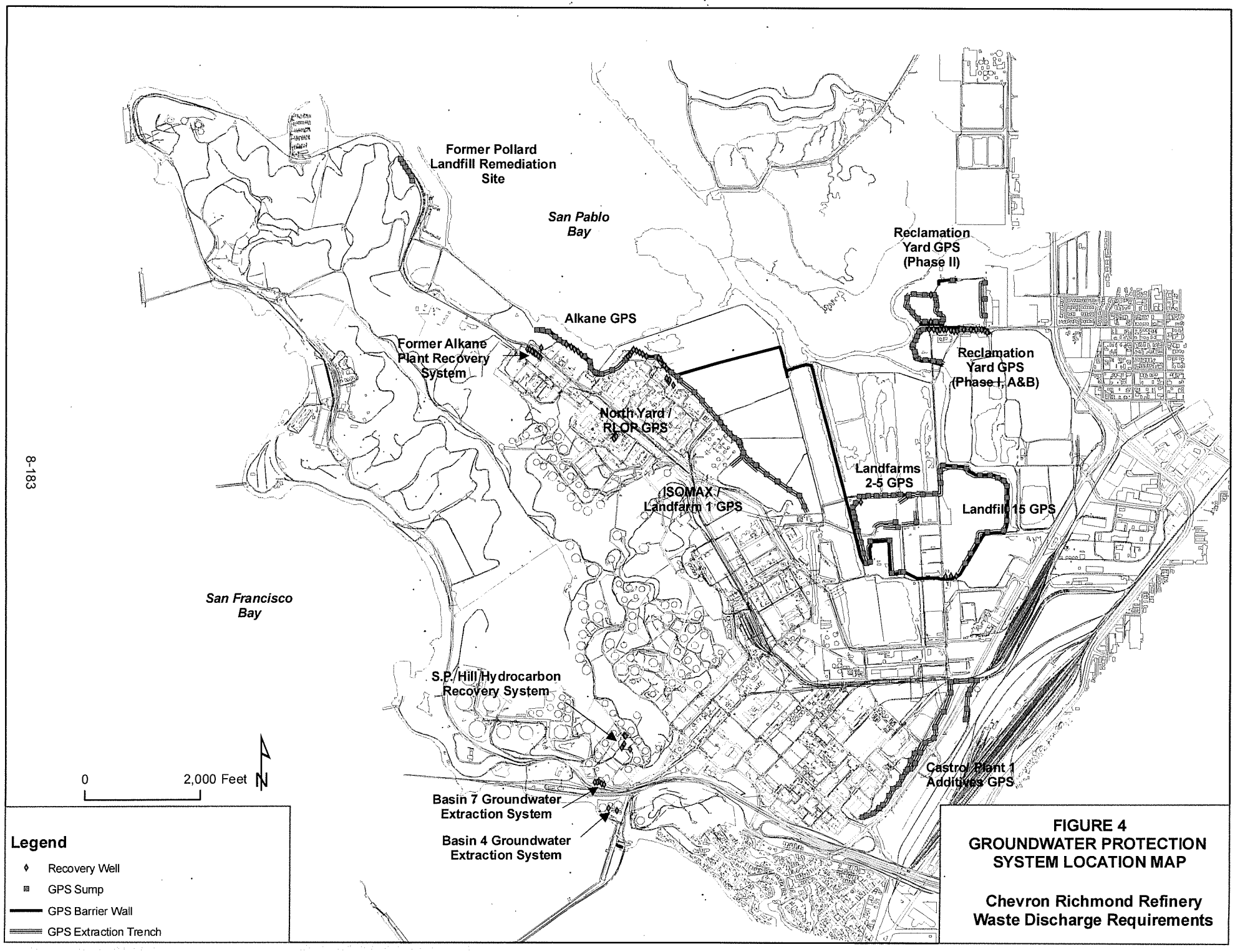

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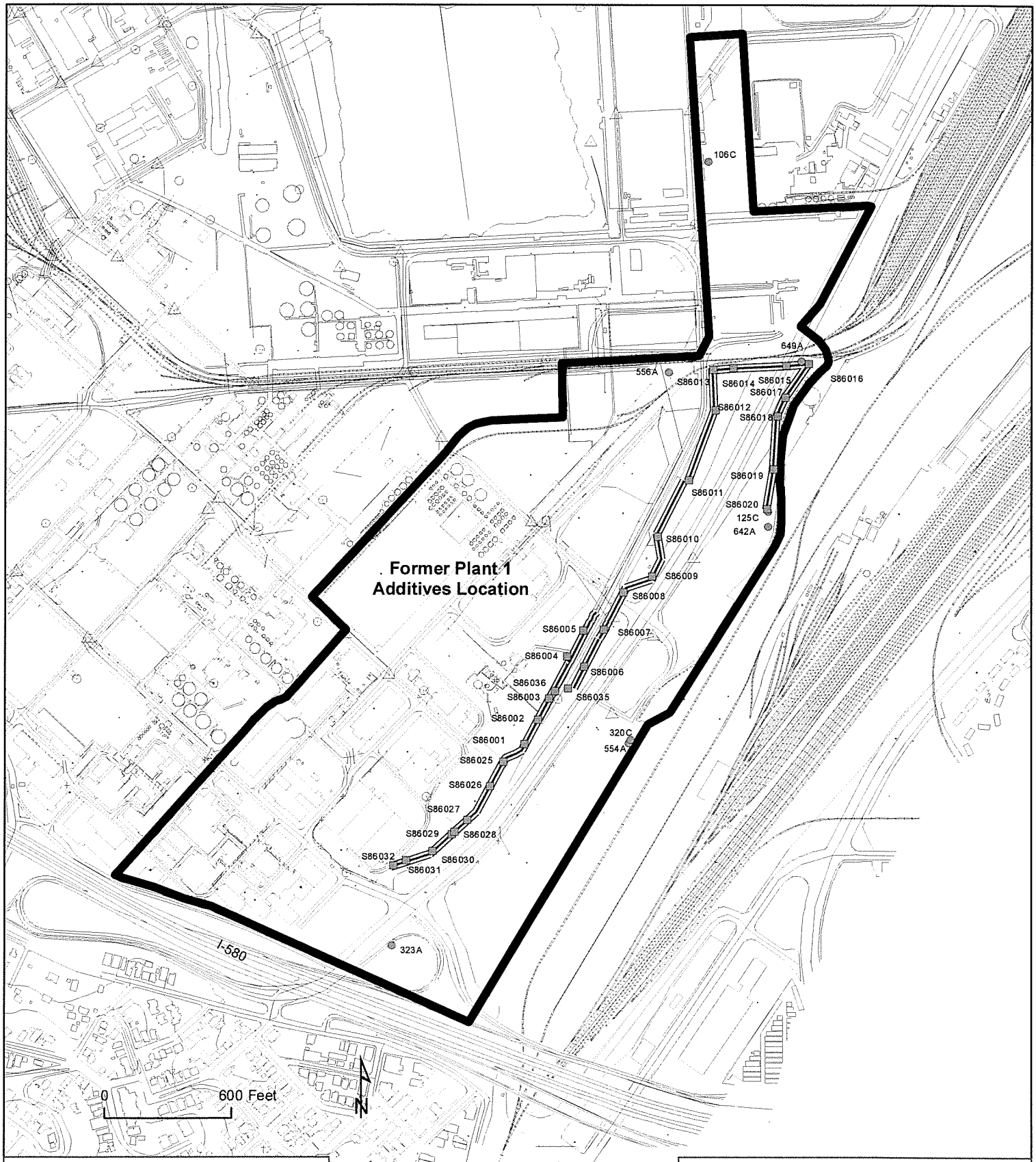
FIGURE 4
GROUNDWATER PROTECTION SYSTEM LOCATION MAP

Chevron Richmond Refinery
Waste Discharge Requirements

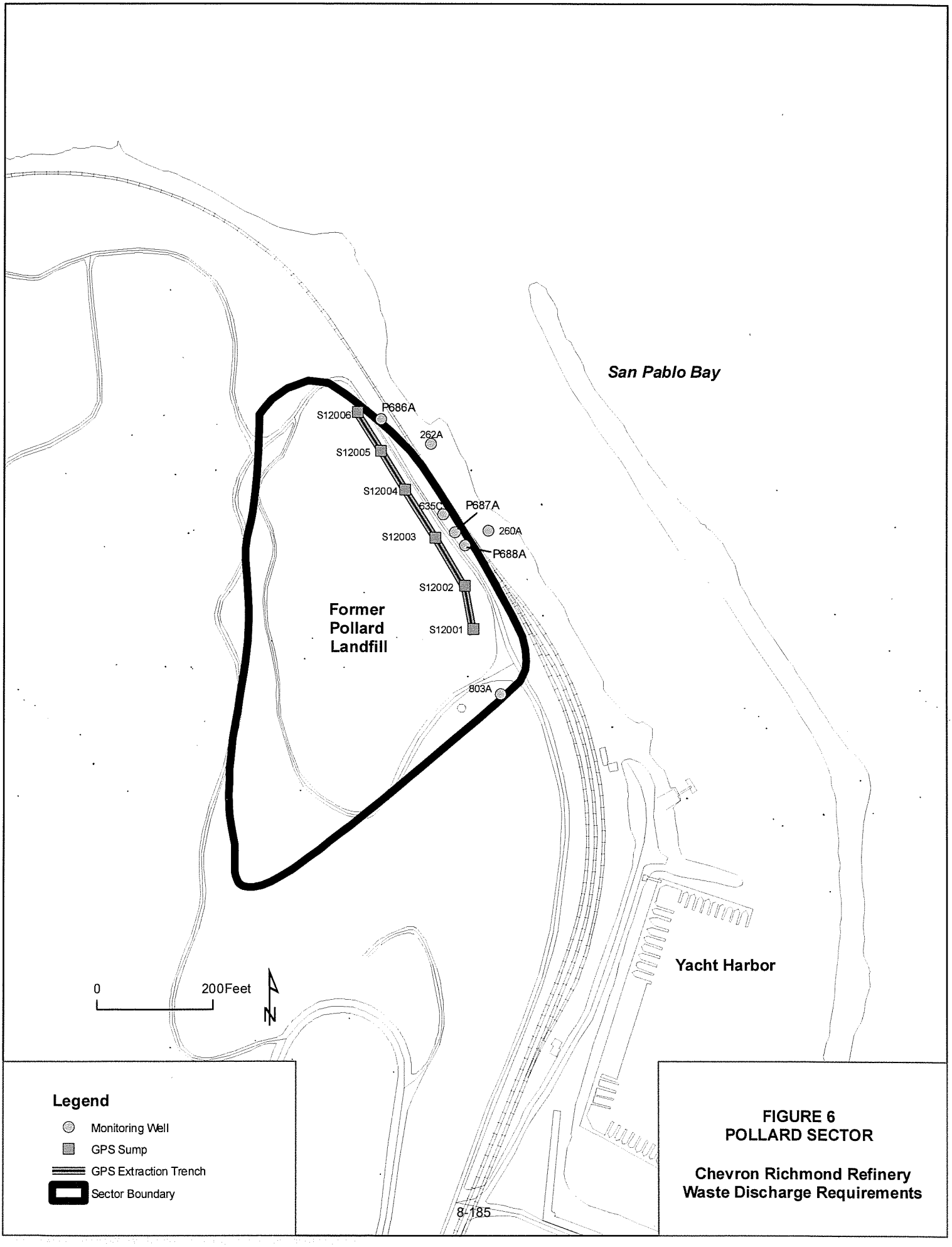


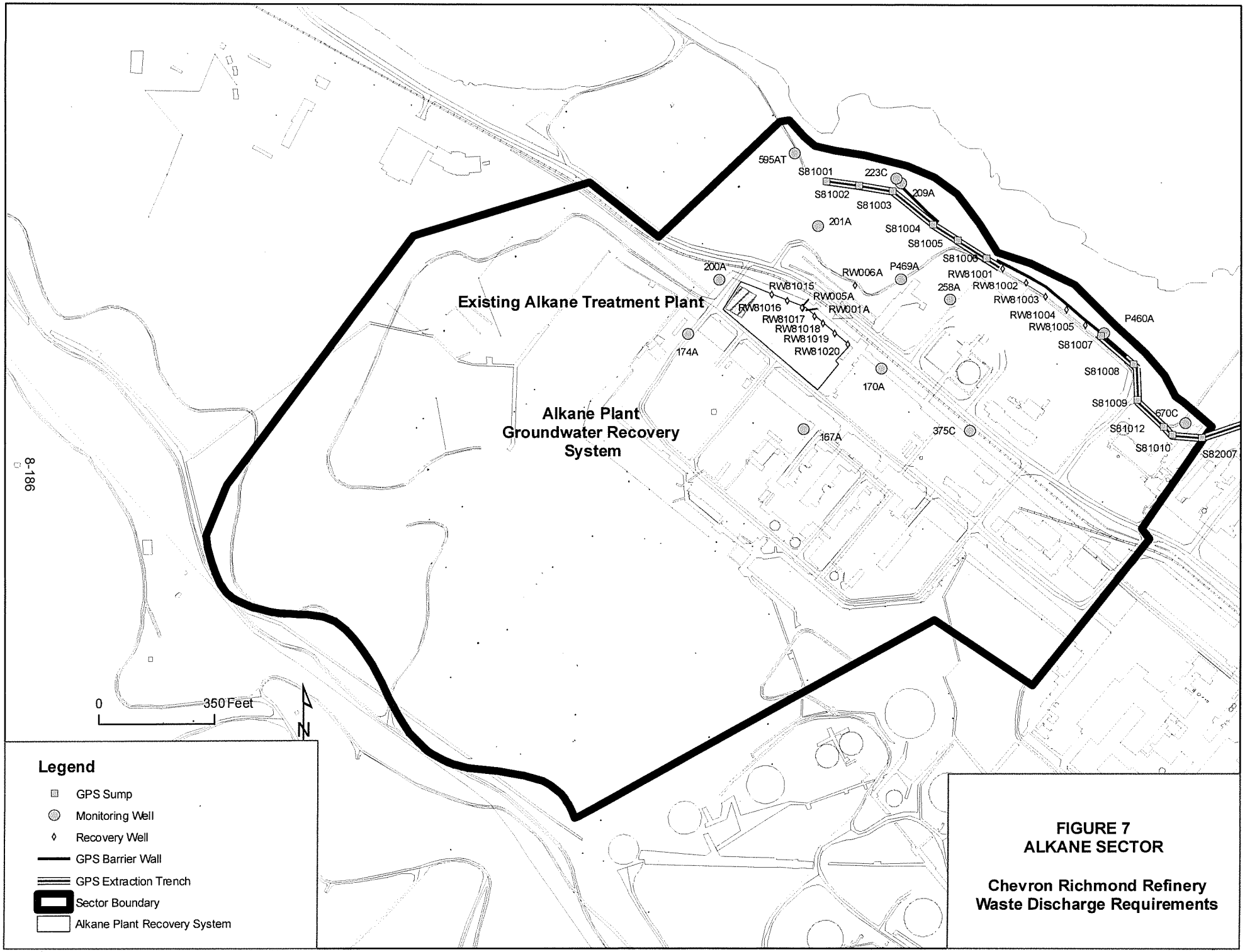
Legend

- GPS Sump
- Monitoring Well
- GPS Extraction Trench
- Sector Boundary

FIGURE 5
PLANT 1 / ADDITIVES PLANT CAP

Chevron Richmond Refinery
Waste Discharge Requirements


San Pablo Bay
S12006
P686A
262A
S12005
S12004
635C
P687A
260A
S12003
P688A
S12002
Former
Pollard
Landfill
S12001
803A
Yacht Harbor
0
200Feet
N
Legend
Monitoring Well
GPS Sump
GPS Extraction Trench
Sector Boundary
FIGURE 6
POLLARD SECTOR
Chevron Richmond Refinery
Waste Discharge Requirements


595AT
S81001
223C
S81002
209A
S81003
201A
S81004
S81005
S81006
200A
RW006A
P469A
RW81001
RW81015
258A
RW81002
RW005A
RW81003
Existing Alkane Treatment Plant
RW81016
RW001A
RW81004
P460A
RW81017
RW81005
RW81018
S81007
174A
RW81019
RW81020
S81008
170A
S81009
Alkane Plant
Groundwater Recovery
System
670C
375C
S81012
167A
S81010
S82007
8-186
0
350 Feet
N
Legend
GPS Sump
Monitoring Well
Recovery Well
GPS Barrier Wall
GPS Extraction Trench
Sector Boundary
Alkane Plant Recovery System
FIGURE 7
ALKANE SECTOR
Chevron Richmond Refinery
Waste Discharge Requirements

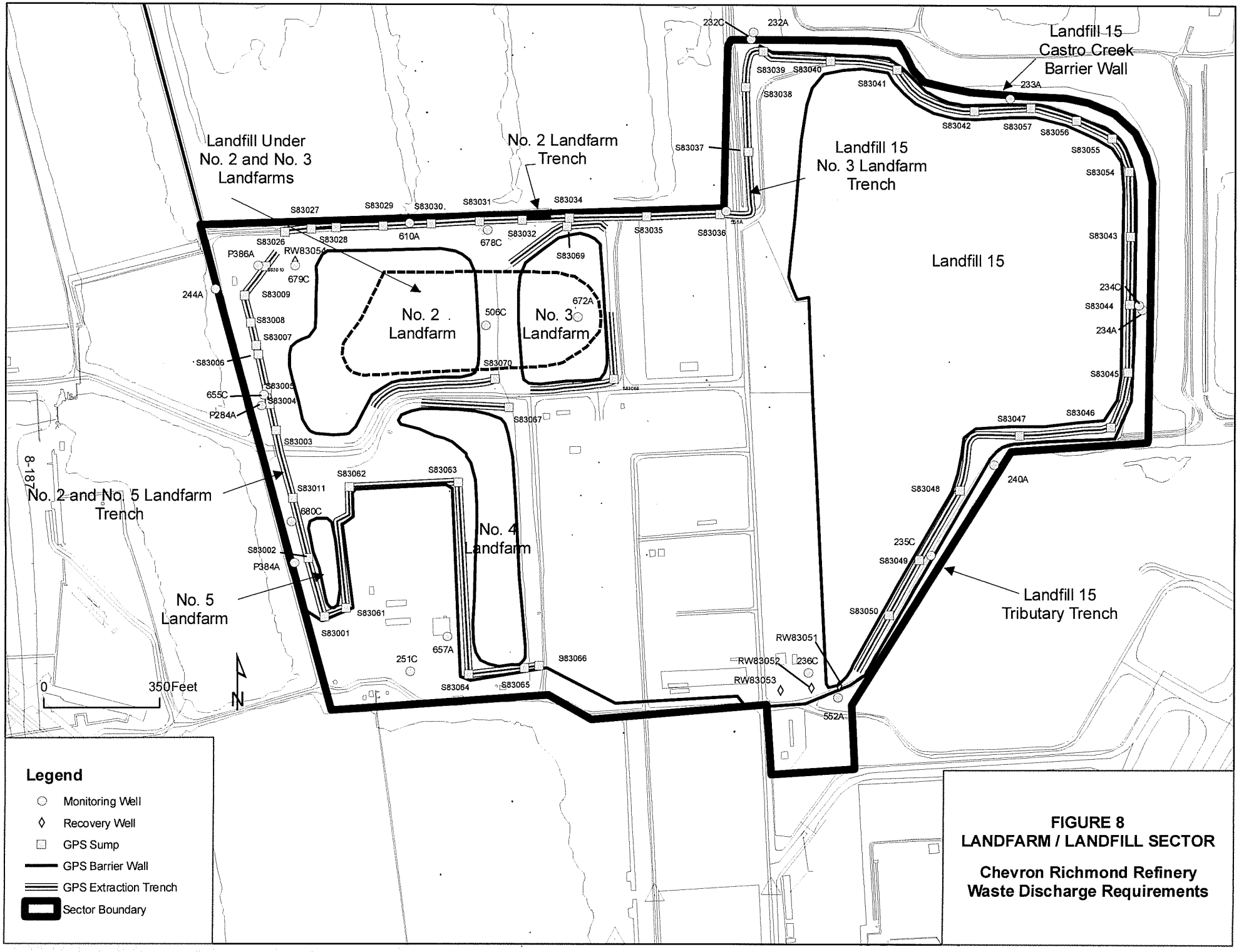


FIGURE 8
LANDFARM / LANDFILL SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

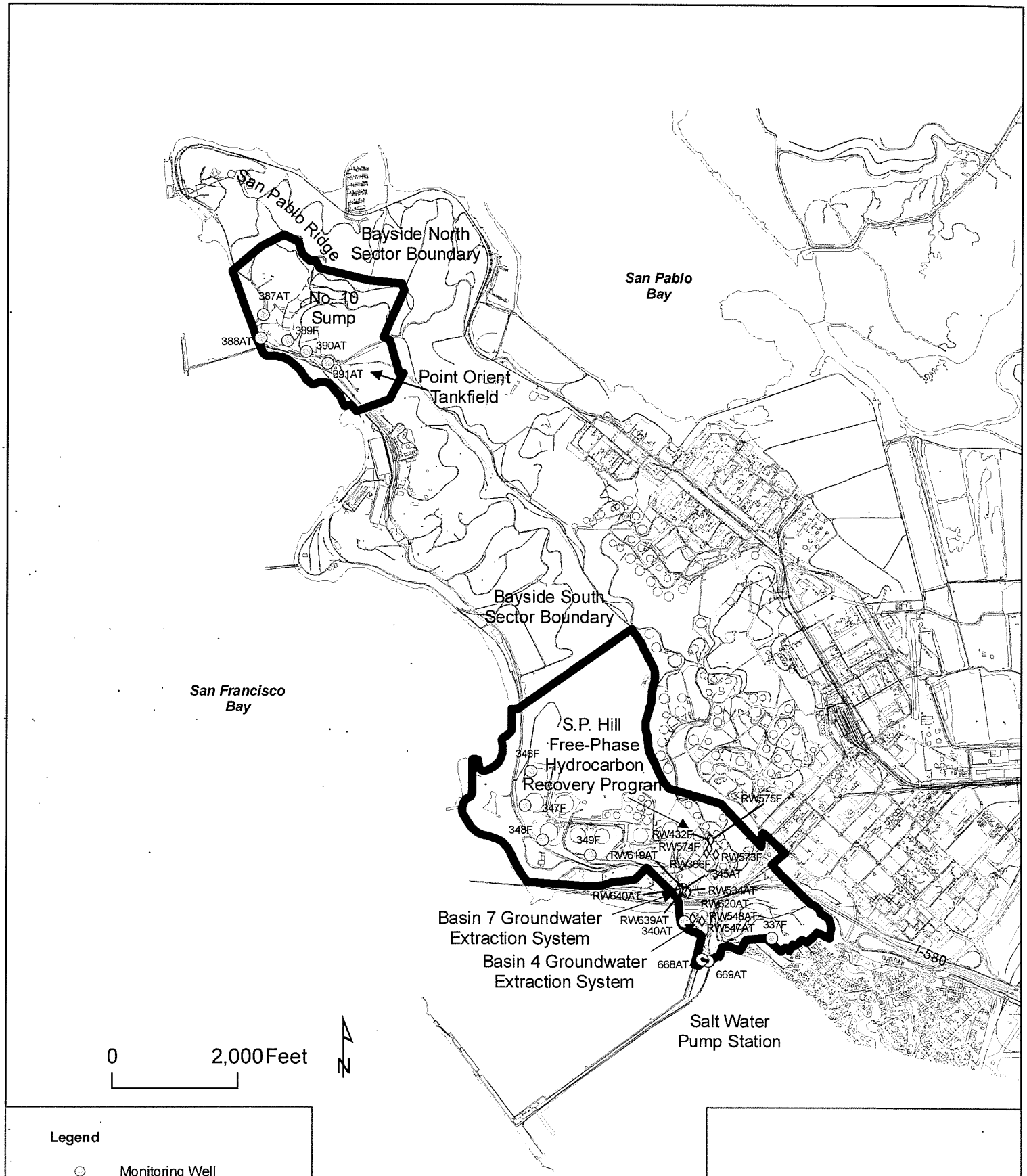


FIGURE 9
BAYSIDE SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

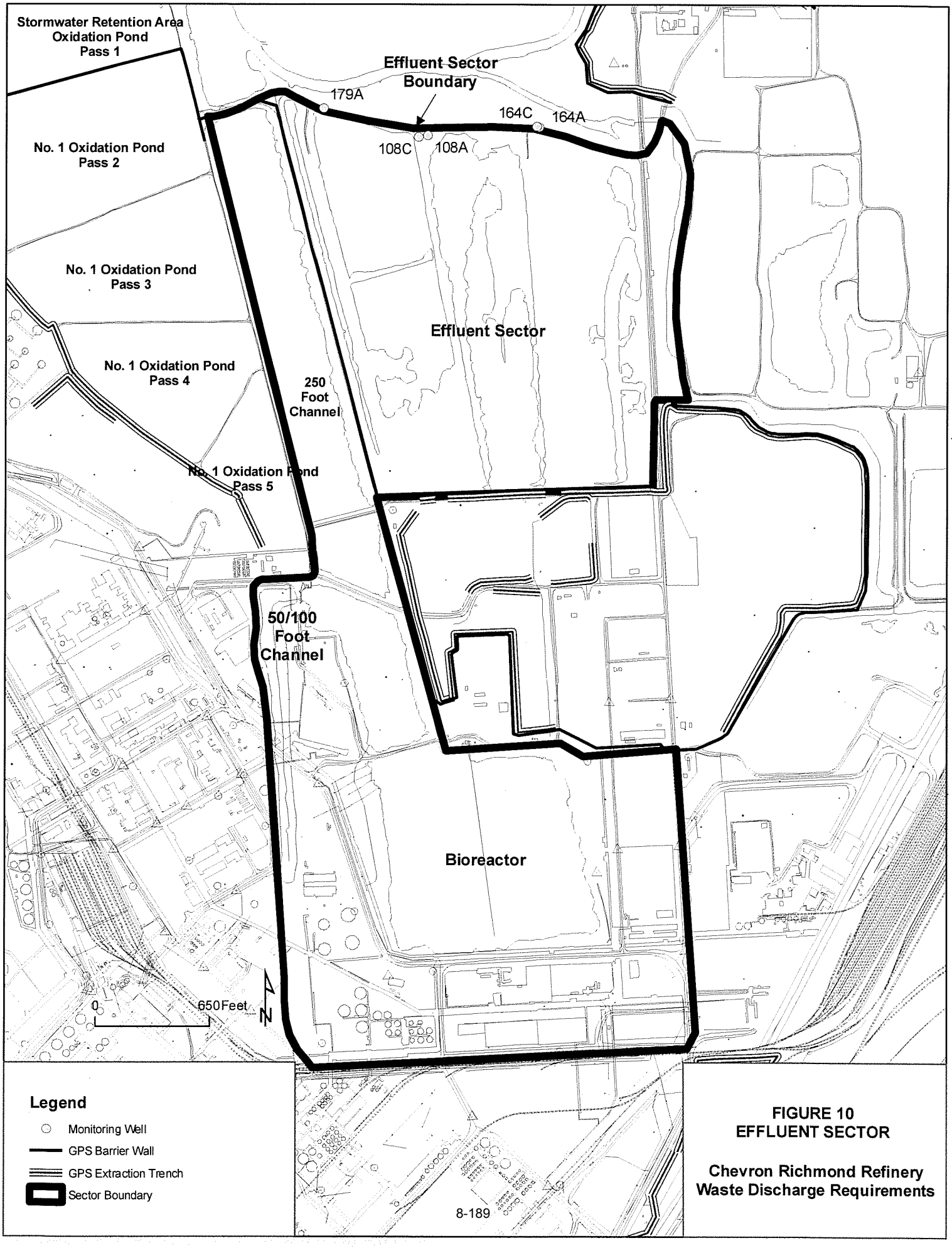


FIGURE 10
EFFLUENT SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

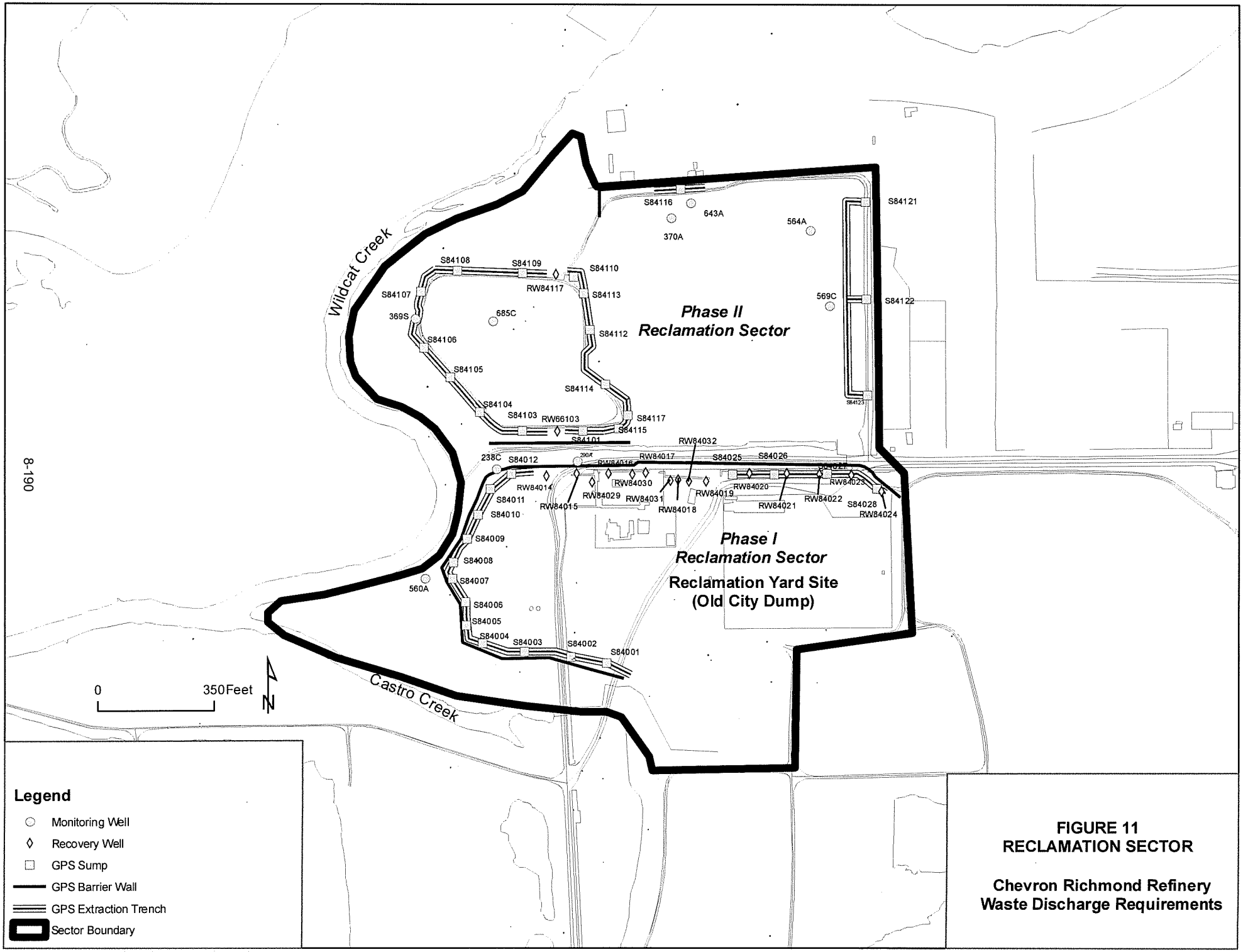


FIGURE 11
RECLAMATION SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements

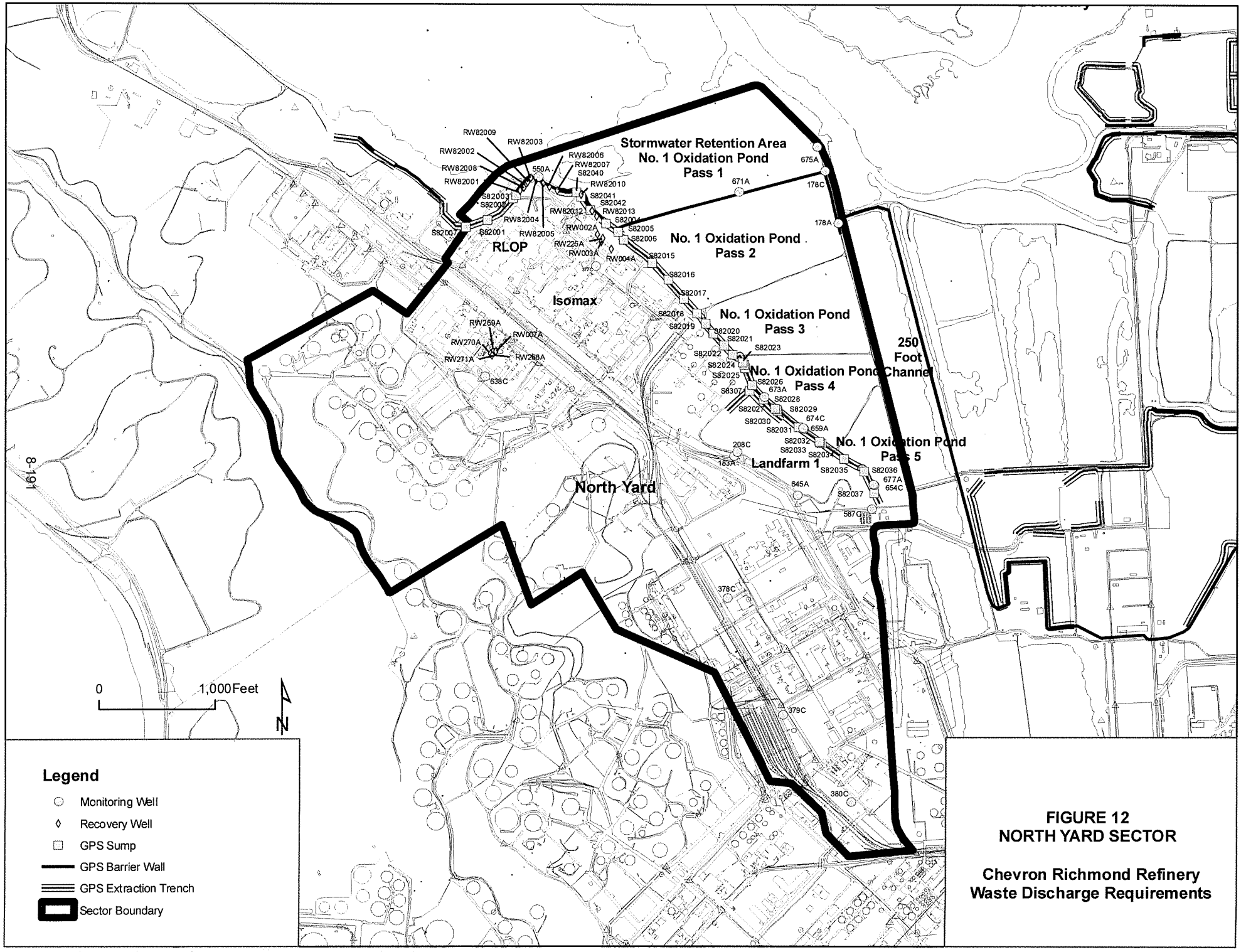
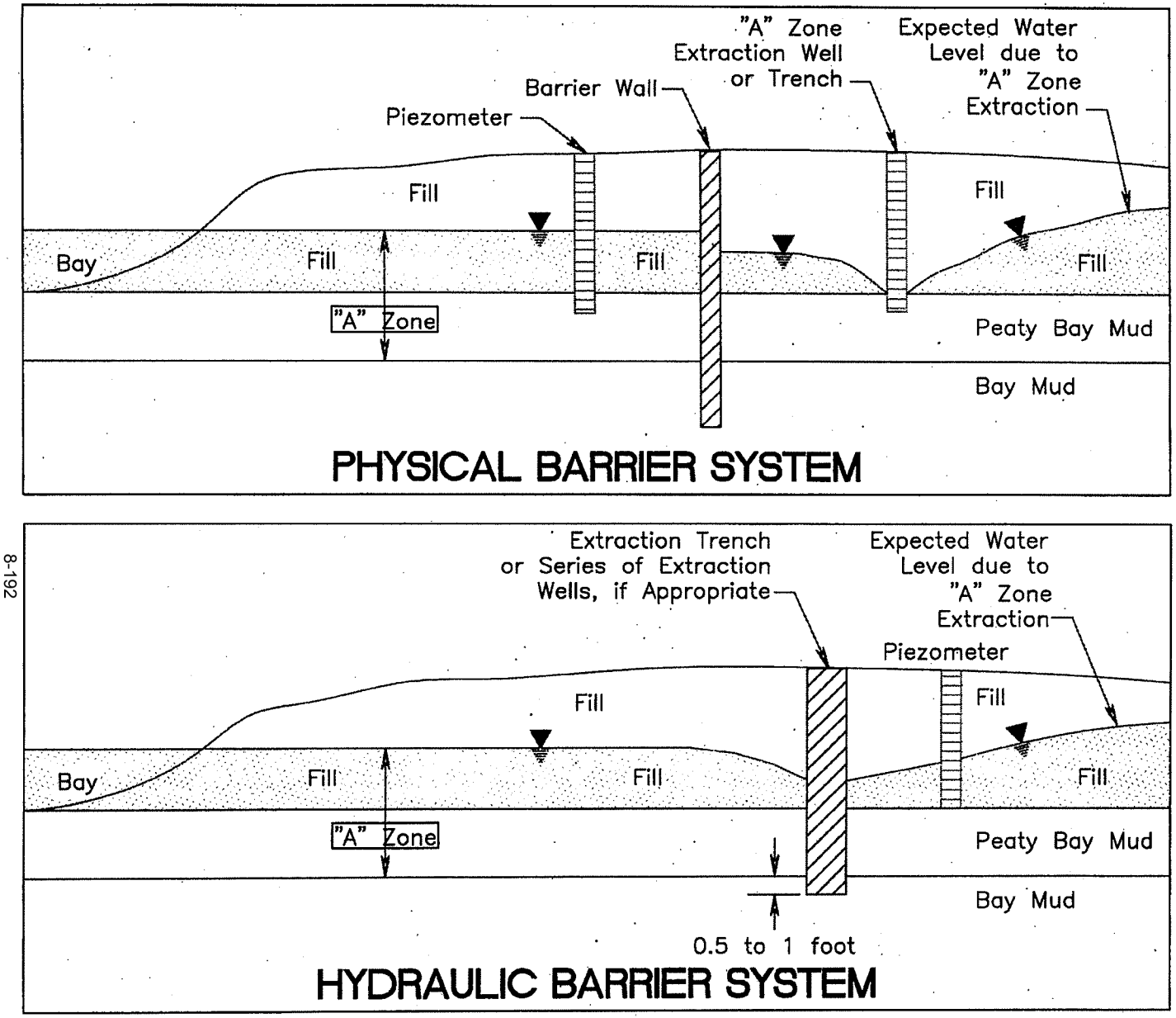


FIGURE 12
NORTH YARD SECTOR

Chevron Richmond Refinery
Waste Discharge Requirements



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GROUNDWATER PROTECTION SYSTEM

Chevron Richmond Refinery
Waste Discharge Requirements

Figure 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING AND REPORTING PROGRAM

FOR

CHEVRON PRODUCTS COMPANY
CHEVRON RICHMOND REFINERY
841 CHEVRON WAY
RICHMOND, CONTRA COSTA COUNTY

ORDER NO. R2-2011-0036

CONSISTS OF PART A AND PART B

PART A

This combined Self-Monitoring Program (SMP) specifies monitoring and reporting programs necessary to fulfill obligations under the Waste Discharge Requirements (WDRs) and Site Cleanup Requirements (SCRs), including:

a) General monitoring requirements for landfills and waste management units under the WDRs (Part A);
b) General monitoring requirements related to cleanup activities performed under the SCRs (Part A);
c) Self-monitoring report content and format (Part A);
d) Self-monitoring report submittal frequency and schedule (Part B);
e) Monitoring locations, parameters, analytes and frequency for programs under the WDRs (Part B); and
f) Monitoring locations, parameters, analytes and frequency for programs under the SCRs (Part B).

A. AUTHORITY AND PURPOSE

For discharges of waste to land, water quality monitoring is required pursuant to the California Code of Regulations (CCR), Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 3, sections 20380 through 20435. The principal purposes of an SMP include: 1) to document compliance with WDRs and prohibitions established by the Regional Water Board, 2) to facilitate self-policing by the discharger in the prevention and abatement of pollution arising from the waste discharge, 3) to develop or assist in the development of effluent standards of performance and toxicity standards, and 4) to assist the discharger in complying with the requirements of Title 27. Additionally, under California Water Code (CWC) Section 13304, Chevron is required to implement corrective actions and monitor the effectiveness of the implemented corrective actions under this combined SMP.

B. MONITORING REQUIREMENTS

Monitoring refers to the observation, inspection, measurement, and/or sampling of environmental media, waste management units (WMUs), containment and control facilities, and waste disposed in each WMU. The monitoring programs designed to evaluate the potential release of wastes from WMUs are included in the WDRs Monitoring Program described in this combined SMP. Monitoring programs designed to evaluate the effectiveness of corrective actions implemented under CWC Section 13304 are also described in the combined SMP. The following defines the types of monitoring that may be required.

Monitoring of Environmental Media

The Regional Water Board may require monitoring of groundwater, surface water, vadose zone, stormwater, leachate, and any other environmental media that may pose a threat to water quality or provide an indication of a water quality threat at the refinery.

Sample collection, storage, and analyses shall be performed according to the most recent version of U.S. EPA-approved methods or in accordance with Groundwater Monitoring Program Standard Operating Procedures (SOP) or subsequent revisions approved by Regional Water Board staff. Analytical testing of environmental media required by this SMP shall be performed by a

California State-approved laboratory for the required analyses. The director of the laboratory whose name appears on the certification shall be responsible for supervising all analytical work in his/her laboratory and shall have signing authority for all laboratory data reports or may designate signing of all such data included in reports submitted to the Regional Water Board.

All monitoring instruments and devices used to conduct monitoring in accordance with this SMP shall be maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once every two years.

Receiving waters refer to any surface water which actually or potentially receives surface or groundwater that pass over, through, or under waste materials or impacted soils. In this case, the groundwater beneath and adjacent to the WMU areas and the surface runoff from the refinery site are considered receiving waters.

Standard Observations

Standard observations refer to observations within the limits of each WMU, at their perimeter, and of the receiving waters beyond their limits. Standard observations include:

1. Waste Management Units:
   a. Evidence of ponded water at any point on the WMU;
   b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
   c. Evidence of erosion and/or daylighted waste.

2. Perimeter of Waste Management Units:
   a. Evidence of liquid leaving or entering the WMU, estimated size of affected area and flow rate (show affected area on map);
   b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source; and
   c. Evidence of erosion and/or daylighted waste.

3. Receiving Waters:
   a. Floating and suspended materials of waste origin, including their presence or absence, source, and size of affected area;
   b. Discoloration and turbidity: description of color, source, and size of affected area;
   c. Evidence of odors, presence or absence, characterization, source, and distance of travel form source;
   d. Evidence of beneficial use, such as presence of water associated with wildlife;
   e. Estimated flow rate; and
   f. Weather conditions, such as estimated wind direction and velocity, total precipitation.

Facilities Inspections

Facilities inspections refer to the inspection of all containment and control structures and devices associated with the environmental monitoring of the refinery. Containment and control facilities may include the following:

1. Intermediate and final covers; and
2. Storm-water management system elements such as perimeter drainage and diversion channels, ditches and downchutes, and detention and sedimentation ponds or collection tanks;

Quality Assurance/Quality Control (QA/QC) Sample Monitoring

Chevron shall collect duplicate, field blank, equipment blank (if appropriate) and trip blank samples for each monitoring event at the frequency specified in the latest version of the Groundwater Monitoring Program SOP.

C. REPORTING REQUIREMENTS

Reporting responsibilities of waste dischargers under WDRs and SCRs are specified in CWC sections 13225(a), 13267(b), 13383, and 13387(b) and this Regional Water Board's Resolution No.73-16 and Title 27. At a minimum, each Self-Monitoring Report (SMR) shall include the following information:

1. Transmittal Letter: A cover letter transmitting the essential points of the monitoring report shall be included with each monitoring report. The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall also certify the completion of all monitoring requirements. The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

2. Graphic Presentation: The following maps, figures, and graphs (if applicable) shall be included in each SMR to visually present data collected pursuant to this SMP:
   a. Plan-view maps showing all monitoring and sampling locations, WMUs, containment and control structures, treatment facilities, surface water bodies, and site/property boundaries;
   b. Groundwater level/piezometric surface contour maps for each groundwater-bearing zone of interest showing inferred groundwater gradients and flow directions under/around each WMU, based upon the past and present water level elevations and pertinent visual observations; and
   c. Any other maps, figures, photographs, cross-sections, graphs, and charts necessary to visually demonstrate the appropriateness and effectiveness of sampling, monitoring, characterization, investigation, or remediation activities relative to the goals of this SMP.

3. Tabular Presentation: The following data (if applicable) shall be presented in tabular form and included in each SMR to show a chronological history and allow quick and easy reference:
   a. Well designation;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths;
   e. Groundwater elevations;
   f. Current analytical results (including analytical method and detection limits for each constituent);

g. Historical analytical results (including at least the past five years in the annual report unless otherwise requested); and
h. Measurement dates.

4. Compliance Evaluation Summary and Discussion:

a. A summary and certification of completion of all environmental media monitoring, standard observations, and facilities inspections;
b. The quantity and types of wastes captured by the GPS and hydrocarbon recovery program, and the location these wastes were disposed of during the reporting period, if applicable;
c. A description of the waste stream, if applicable;
d. The signature of the laboratory director or his/her designee in laboratory data deliverables indicating that he/she has supervised all analytical work in his/her laboratory; and
e. A discussion of the field and laboratory results that includes the following information:

(1) Data interpretations (including of trends, especially in the context of potential correlation to the modified waste acceptance criteria);
(2) Conclusions;
(3) Recommendations;
(4) Newly implemented or planned investigations and remedial measures;
(5) Data anomalies;
(6) Variations from protocols;
(7) Condition of wells; and
(8) Effectiveness of leachate monitoring and control facilities.

5. Appendices: The following information shall be provided as appendices in electronic format only unless requested otherwise by Regional Water Board staff and unless the information is already contained in an SAP or SOP approved by Regional Water Board staff:

a. New boring and well logs;
b. Method and time of water level measurements;
c. Purging methods and results including the type of pump used, pump placement in the well, pumping rate, equipment and methods used to monitor field pH, temperature, and electrical conductivity, calibration of the field equipment, pH temperature, conductivity, and turbidity measurements, and method of disposing of the purge water;
d. Sampling procedures, field, equipment, and travel blanks, number and description of duplicate samples, type of sample containers and preservatives used, the date and time of sampling, the name of the person actually taking the samples, and any other relevant observations; and
e. Documentation of laboratory results, analytical methods, detection limits and reporting limits, and Quality Assurance/Quality Control (QA/QC) procedures for the required sampling.

D. ANNUAL REPORTING

The Discharger shall submit an annual self-monitoring report to the Regional Water Board covering the previous calendar year. The annual report must summarize all monitoring, investigation, and remedial activities that have occurred in the previous year. The annual report shall include the following information for each monitoring event during the year required pursuant to this SMP, in addition to the transmittal letter and appendices described in Sections C.1, C.2, and C.3 of this SMP:

1. **Graphic Presentation**
Include site maps (plot plans) for each aquifer or water-bearing zone monitored that are drawn to a scale that remains constant from reporting period to reporting period. Line or bar graphs are helpful to illustrate variations in groundwater elevations, phase-separated product thickness, and dissolved chemical concentrations with time. These maps and graphs shall include the following information:

   a. Known or probable contaminant sources;
   b. Well locations;
   c. Groundwater elevation contours;
   d. Inferred groundwater flow direction(s);
   e. Identify wells containing phase-separated product;
   f. Extent of dissolved chemical constituents presented in map layout (e.g., isoconcentration maps, chemical box data maps, etc.); and
   g. Appropriate analytical results.

   Geologic cross sections are required if new data is available and/or the previous interpretation of subsurface conditions has changed. When required, geologic cross sections shall include the following:

      i. Vertical and lateral extent of contamination;
      ii. Contaminant sources;
      iii. Geologic structures;
      iv. Soil lithology;
      v. Water table/piezometric surfaces;
      vi. Sample locations;
      vii. Sample analytical results; and
      viii. Subsurface utilities and any other potential natural or manmade conduits for contaminant migration.

2. **Tabular Presentation**
Present all of the following data in one or more tables to show a chronological history and allow quick and easy reference. The table(s) shall include the following information:

   a. Well designations;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths;
   e. Groundwater elevations;
   f. Horizontal groundwater gradients;
   g. Vertical groundwater gradients (including comparison wells from different zones);
   h. Phase-separated product elevations;
   i. Phase-separated product thickness;
   j. Current analytical results (including analytical method and detection limits for each constituent);
   k. Historical analytical results for the most recent four sampling events;
   l. Measurement dates;
   m. Groundwater extraction, including:

i. Average daily extraction rate;
ii. Total volume extracted for monitoring period;
iii. Annual cumulative total volume extracted; and

n. Estimate of contaminant volume extracted (reported in gallons) including:

i. Average daily removal rate;
ii. Total volume removed for monitoring period;
iii. Annual cumulative total volume removed.

3. **Discussion**
Provide a discussion of the field and laboratory results that includes the following information:

a. Data Interpretations;
b. Conclusions;
c. Recommendations;
d. Newly implemented or planned investigations and remedial measures;
e. Data anomalies;
f. Variations from protocols; and
g. Conditions of wells.

E. CONTINGENGY REPORTING

1. The Discharger shall report any seepage from the surface of any WMU or discharge prohibited in the WDRs or SCRs immediately after it is discovered to the Regional Water Board by calling the Spill Hotline at 1-800-852-7550 and by sending an email to Rb2SpillReports@waterboards.ca.gov. The Discharger shall submit a written report with the Regional Water Board within five days of discovery of any discharge. The written report shall contain, at a minimum, the following information:

a. A map showing the location(s) of discharge;
b. Approximate flow rate;
c. A description of the nature of the discharge; and
d. Corrective measures underway or proposed.

2. The Discharger shall submit a written report to the Regional Water Board within seven working days of determining that a statistically significant difference occurred in the sample result compared against the historical dataset and above an approved WQPS in a perimeter segment-monitoring well. In addition, evaluation of GPS performance will be reviewed to examine the effectiveness of hydraulic control.

a. Chevron shall immediately re-sample at the compliance point where the exceedence was observed, evaluate the result against the historical dataset and re-analyze if results are not consistent with historical trends.

b. If re-sampling and analysis confirm the exceedence through statistical analysis, Chevron shall document this in the text of the next Annual Report and notify the Regional Water Board in writing within 21 days of re-sampling. In this letter, Chevron shall evaluate whether any re-sampling or additional corrective measures need to be implemented.

F. ELECTRONIC REPORTING

1. **Geotracker Requirements**
   The State Water Board has adopted regulations requiring electronic report and data submittal to Geotracker. The text of the regulations can be found at the following URL:
   http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/index.shtml

   Parties responsible for cleanup of pollution at sites overseen by the Regional Water Board's Land Disposal Programs are required to submit over the internet, the following information electronically to Geotracker:

   a. Groundwater analytical data;
   b. Surveyed locations of monitoring wells;
   c. Boring logs describing monitoring well construction; and
   d. Portable data format (PDF) copies of all reports (the document in its entirety [signature pages, text, figures, tables, etc.] must be saved as a single PDF file).

   Note that the Discharger is still responsible for submitting one hard copy of all reports pursuant to this Order. The Regional Water Board may require direct submittal of electronic reports and correspondence in addition to the State Water Board's Geotracker requirements.

2. **Data Tables**
   Upon request, monitoring results shall also be provided electronically in Microsoft Excel@ or similar spreadsheet format to provide an easy to review chronological summary of site data, and to facilitate data computations and/or plotting that Water Board staff may undertake during the review process. Data tables submitted in electronic spreadsheet format will not be included in the case file for public review and should therefore be submitted on CD or diskette and included with the print report.
   Electronic tables shall include the following information:

   a. Well designations;
   b. Well location coordinates (latitude and longitude);
   c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation);
   d. Groundwater depths and elevations (water levels);
   e. Phase-separated product thicknesses and elevations;
   f. Current analytical results by constituent of concern (including detection limits for each constituent);
   g. Historical analytical results (including the past four sampling events); and
   h. Measurement dates.

G. MAINTENANCE OF WRITTEN RECORDS

The Discharger shall maintain information required pursuant to this SMP for a minimum of five years. The five-year period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board.

PART B: MONITORING AND OBSERVATION SCHEDULE

1. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

A. GROUNDWATER MONITORING:

Semi-Annual Reports: **Due August 31 and March 1 of each year**
Annual Report: **Due March 1 of each year**

Groundwater shall be sampled and analyzed as detailed in Tables 2 and 4. Monitoring well locations are listed in Tables 1 and 3. Groundwater analyses shall include the following field measurements: pH, temperature, specific conductance, water level, volume purged, number of casings volumes purged, and whether the well went dry during sampling (including measures taken to ensure accuracy of analyses given this condition). Groundwater monitoring wells installed in the future will be sampled and analyzed as detailed in Tables 2 and 4 and on a quarterly basis until a statistically significant dataset is established.

B. FACILITIES MONITORING - **Observe quarterly, report semi-annually**

Semi-Annual Report: **Due August 31 and March 1 of each year**
Annual Report: **Due March 1 of each year**

The Discharger shall inspect all facilities to ensure proper and safe operation and report semi-annually. The facilities to be monitored shall include, but not be limited to:

1. Waste Containment systems;
2. Waste treatment systems;
3. Surface water retention basins;
4. Leak detection systems (where applicable); and
5. Leachate/groundwater management facilities and secondary containment where applicable.

2. GPS PERFORMANCE MONITORING

Chevron shall measure the water level in each GPS corrective action monitoring well and in a sufficient number of wells or piezometers both upgadient and downgradient of the GPS to demonstrate continuous maintenance of a hydraulic depression in the GPS trenches (inward hydraulic gradient). To demonstrate the effectiveness of the GPS, Chevron shall include the following for each refinery sector in the semi-annual SMRs:

a. contour maps of 1st and 3rd quarter GPS groundwater elevation data;
b. hydrographs showing water level data (measured at least once per week) at each operating extraction sump or recovery well;
c. a narrative summary of the GPS performance during the reporting period; and,

d. an estimate of the volume of groundwater extracted during the reporting period.

3. ON-SITE OBSERVATIONS/POST-CLOSURE MAINTENANCE AND MONITORING

Closed WMUs (Plant l/Additives Plant, Landfill 15, Landfarms 1-5, the Hydropits, Parr-Richmond Landfill and the Gertrude Street Site) shall be inspected annually by a registered California engineer or geologist prior to the onset of the rainy season. These annual inspections shall include identification of areas of the final covers where the soil has become eroded, attacked by rodents, or otherwise damaged, or where the paved areas have become damaged. Chevron shall perform appropriate repairs for these areas prior to the rainy season. In addition, Chevron shall monitor runoff/run-on control facilities for their effectiveness and overall condition as needed according to weather conditions during the winter months (November through April) and as prescribed in the approved post-closure maintenance/monitoring plan for each individual WMU. Chevron shall maintain records of all inspections and repairs and summarize in each semi-annual monitoring report any repairs made during the corresponding reporting period.

4. ALKANE PLANT PLUME REMEDIATION MONITORING

Chevron shall continue to monitor the Alkane Plant Plume remediation effort in accordance with *the Revised Alkane Plant Plume Remediation Goals Plan* (URS, 2001). The monitoring components of this plan include measuring potentiometric water levels, liquid hydrocarbon thickness, and benzene and fluoride concentrations. Benzene and fluoride concentrations will continue to be measured annually in samples collected from 6 wells (listed in Table 1), located around the perimeter of the plume to verify containment of the plume.

5. FREE-PHASE LIQUID HYDROCARBON (FPLH) RECOVERY SUMMARY

Chevron shall include a map in each semi-annual SMR that shows the locations of all wells within the refinery that contain FPLH. The measured thickness of the FPLH in each well should be indicated on the map next to the well. Recovery of FLPH will be performed in accordance with the procedures described in the *Free-Phase Liquid Petroleum Hydrocarbon Recovery Evaluation Plan, Chevron Richmond Refinery* (URS, 2000). In addition, the SMR shall include a description of FPLH recovery method used, recovery volume data for the reporting period and cumulative recovery data for each active recovery well or system.

6. CHEMICAL CONSTITUENT MONITORING

a. Refinery-Wide Groundwater Monitoring Program: Chevron shall sample the Refinery-Wide Corrective Action Groundwater Monitoring Program compliance monitoring points listed in Table 1 for the analytical parameters and at the frequencies listed in Table 2. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Chevron's Groundwater Monitoring Program Standard Operating Procedure.

b. Landfarm Post-Closure Monitoring Program: Chevron shall sample the Landfarms Post-Closure Monitoring Program monitoring points listed in Table 3 for the analytical parameters and at the frequencies listed in Table 4. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the most recent version of Chevron's Groundwater Monitoring Program Standard Operating Procedure.

Monitoring events for constituents of concern and Appendix IX analyses shall alternate between periods of highest and lowest groundwater levels.

c. Chevron shall sample new wells installed to monitor Landfarms 1 through 5 for COCs and MPs listed in Table 4 over eight consecutive quarters. Within the first year after installation, Chevron shall analyze new wells for the Appendix IX constituents listed in Table 4. Chevron shall add any new compounds detected in new wells to the list of COCs in Table 4.

d. Chevron shall sample the monitoring points listed in Table 3 regardless of the presence of nonaqueous phase liquid as follows:

   i. For monitoring points with persistent nonaqueous phase liquid (e.g., more than two consecutive quarters), Chevron shall collect samples every other year for COCs and Appendix IX (if well is POC). For monitoring points with intermittent nonaqueous phase liquid (e.g., not detected during consecutive quarters), Chevron shall collect samples semi-annually.

   ii. Chevron shall obtain samples for dissolved phase analysis after purging nonaqueous phase liquid from the well, by low-flow sampling, or by another appropriate method.

   iii. Chevron shall follow the most recent version of the Chevron Groundwater Monitoring Program Standard Operating Procedure.

e. Chevron shall monitor "A" Zone monitoring points in Table 3 under a corrective action monitoring program (22 CCR 66264.100).

f. Chevron shall monitor "C" Zone monitoring points in Table 3 under a detection monitoring program (22 CCR 66264.98).

Attachments:

Table 1:	List of Monitoring Wells by Sector, Refinery-Wide Groundwater Monitoring Program
Table 2:	Maximum Allowable Concentration Limits for Constituents of Concern and Monitoring Parameters for the Refinery-Wide Groundwater Monitoring Program
Table 3:	Landfarm Area Monitoring Well Network
Table 4:	Landfarm Post-Closure Monitoring Program, Monitoring Parameters, Constituents of Concern and MACLs

Table 1: List of Monitoring Wells by Sector
Refinery-Wide Groundwater Monitoring Program
Chevron Richmond Refinery

Alkane Sector	Castro and Plant 1/Add. Sector	Landfarms /Landfill 15 Sector	North Yard Sector	Reclamation Yard Sector	Pollard Sector	Effluent Sector	Bayside North	Bayside South	Interior "C" Zone
209A	323A	232A	178A	290A	260A	108A	387AT	346F	208C
P460A	642A	233A	675A	643A	262A	164A	388AT	347F	638C
595AT	554A	234A	550A	370A	803A	179A	389F	348F	378C
223C	556A	240A	377C	560A	635C	108C	390AT	349F	379C
375C	106C	244A	178C	685C		164C	391AT	351CT	380C
670C	125C		671A	238C				345AT	138C
167A*	320C	551A		369S				340AT	382C
170A*	649A	552A		564A				337F	
174A*		232C		569C				RW619AT#	
200A*		234C						RW534AT#	
201A*		235C							
258A*		236C							

Notes:
* Wells associated with Alkane Plant Plume Remediation Monitoring
# Wells with Remediation Monitoring Plan, S.P. Hill Tankfield

Table 2: Maximum Allowable Concentration Levels (MACLS) for Constituents of Concern and Monitoring Parameters for the Chevron Refinery -Wide Groundwater Monitoring Program

Constituents of concern	MACL (µg/l) Unless otherwise noted		Landfarms/landfills Sector	Castro Sector	North Yard Sector	Bayside Sector- North	Bayside Sector- south	Alkane Sector	Effluent Sector	Reclamation Sector	Pollard Sector	Interior "C" zone
TPH-Gas	1200	*	S	S	S	S	S	S	S	S	S	S
TPH- Diesel	640	*	S	S	S	S	S	S	S	S		S
Benzene	46	*	S	S	S	S	S	S	S	S	B	S
MTBE	1800	*	S	S	S	S	S	S	S	S	B	S
Acenaphthene	40	*	B	B	B	B	B	B	B	B	B	
Acenaphthylene	307	*	B	B	B	B	B	B	B	B	B	
Anthracene	21	*	B	B	B	B	B	B	B	B	B	
Benzo(a)pyrene	0.049	*	B	B	B	B	B	B	B	B	B	
Benzo(b)fluoranthene	0.049	*	B	B	B	B	B	B	B	B	B	
Benzo(g,h,i)perylene		*	B	B	B	B	B	B	B	B	B	
Benzo(k)fluoranthene	0.049	*	B	B	B	B	B	B	B	B	B	
Chrysene	0.049	*	B	B	B	B	B	B	B	B	B	
Dibenzo(a,h)anthracene	0.049	*	B	B	B	B	B	B	B	B	B	
Fluoranthene	7.1	*	B	B	B	B	B	B	B	B	B	
Fluorene	39	*	B	B	B	B	B	B	B	B	B	
Indeno(1,2,3-cd)pyrene	0.049	*	B	B	B	B	B	B	B	B	B	
Naphthalene	194	*	B	B	B	B	B	B	B	B	B	
Phenanthrene	19	*	B	B	B	B	B	B	B	B	B	
Pyrene	10	*	B	B	B	B	B	B	B	B	B	
Chlordane	0.00059	*		B						B		
G-BHC (Lindane)	0.063	*		B						B		
Dieldrin	0.0019	*		B						B		
Selenium	5.0	*	B	B	B			S	B	B	B	
Arsenic	36	*	S	B					B	S		
Cadmium	9.3	*	B	B	B			B	B	B	S	B
Chromium VI	50	*	B	B	B			B	B	B	B	B
Lead	5.6	*	S	S	S	S	S	S	S	S		B
Mercury	0.025	*	B						B	B		
Nickel	8.2	*	S	B	S			S	B	S	S	S

Constituents of concern	MACL (µg/l) Unless otherwise noted		Landfarms/landfills Sector	Castro Sector	North Yard Sector	Bayside Sector- North	Bayside Sector- south	Alkane Sector	Effluent Sector	Reclamation Sector	Pollard Sector	Interior "C" zone
Zinc	71	*	S	B	B			B	B	B	S	B
Fluoride	2400	*						S				
Un-ionized Ammonia-N	25	*							B	B		
pH	6.5 to 8.5	*	S	S	S	S	S	S	S	S	S	S
Turbidity (NTUs)	N/A	N/A	S	S	S	S	S	S	S	S	S	S
Temperature	N/A	N/A	S	S	S	S	S	S	S	S	S	S

Notes:
* MACLs to be reviewed and updated by the Discharger per Provision 9

S = Monitoring Parameter per Sector (analyzed semi-annually)
B= Constituent of concern per Section (analyzed during summer/fall reporting period every 2 years (even-numbered years)

N/A = not applicable
(NTUs) = Nephelometric Turbidity Units

Table 3
Landfarm Area Monitoring Well Network

Monitoring Wells for Landfarm Area
"A" Zone Wells
183A (POC)
610A (POC)
645A
657A
659A (POC)
672A
673A
677A
P284A (POC)
P384A
P386A
"C" Zone Wells
251C (POC)
506C (POC)
587C
654C (POC)
655C (POC)
674C
678C (POC)
679C (POC)
680C (POC)

Notes:
POC indicates that well is a point of compliance well.

Table 4
Landfarms Post-Closure Monitoring Program
Monitoring Parameters, Constituents of Concern and MACLs

Constituent	MACL µg/l (2)	MACL Source	"A" zone Well Monitoring Frequency (5)	"C" zone Well Monitoring Frequency (5)
Monitoring Parameters				
pH	6.5 to 8.5	1	S	S
Specific Conductivity	N/A	N/A	S	S
Turbidity	N/A	N/A	S	S
Temperature	N/A	N/A	S	S
Arsenic	36	*	S	S
Lead	5.6	*	S	S
Nickel	8.2	*	S	S
Zinc	71	*	S	S
TPH-Gasoline	1200	*	S	S
TPH-Diesel	640	*	S	S
TPH-Diesel Silica Gel	640	*	S	S
Benzene	46	*	S	S
MTBE	1800	*	S	S
Toluene	5000	*	S	S
Phenolics (Total)	50	*	S	S
Constituents of Concern				
Cadmium, Dissolved	9.3	*	B	B
Chromium VI, Dissolved	50	*	B	B
Mercury, Dissolved	0.025	*	B	B
Selenium, Dissolved	5	*	B	B
Dissolved sulfide	100	*	B	B
Methylene Chloride	1600	*	B	B
Acenaphthene	40	*	B	S
Acenaphthylene	307	*	B	S
Anthracene	21	*	B	S
Benzo(a)anthracene	2.2	*	B	S
Benzo(a)pyrene	0.96	*	B	S
Benzo(b)fluoranthene	0.049	*	B	S
Benzo(g,h,i)perylene	X	*	B	S
Benzo(k)fluoranthene	0.049	*	B	S
Chysene	0.049	*	B	S
Dibenzo(a,h)anthracene	0.049	*	B	S
Fluoranthene	7.1	*	B	S
Fluorene	39	*	B	S
Indeno(1,2,3-cd)pyrene	0.049	*	B	S
Naphthalene	194	*	B	S
Phenanthrene	19	*	B	S
Pyrene	10	*	B	S
Pentachlorophenol	7.9	*	B	B

Constituent	MACL µg/l (2)	MACL Source	"A" zone Well Monitoring Frequency (5)	"C" zone Well Monitoring Frequency (5)
Benzenethiol	5	*	B	B
Benzyl Butyl phthalate	5200	*	B	B
Bis 2-ethylhexyl phthalate	6	*	B	B
Chromium, dissolved	50	*	B	B
Di-n-butyl phthalate	12000	*	B	B
2,4-dimethylphenol	110	*	B	B
Ethylbenzene	29000	*	B	B
1-methylnapthalene	75	*	B	B
7,12-dimethyl benzo(a)anthracene	X	*	B	B
2-methylphenol	XX	*	B	B
3,4-methylphenol	XX	*	B	B
Phenol	2560	*	B	B
Trichloroethene	381	*	B	B
1,1,1-trichloroethane	62	*	B	B
Chlorobenzene	21000	*	B.	B
Methyl chrysene	X	*	B	B
Total Xylenes	13	*	B	B
2-methylnaphthalene	2.1	*	B	B
Acetophenone		*	B	B
Barium	1000	*	B	B
Cobalt	3	*	B	B
Copper	3.1	*	B	B
N-Nitrosopiperidine		*	B	B
Silver	0.19	*	B	B
Vanadium	19	*	B	B
Vinyl chloride	3.8	*	B	B
Appendix IX Parameters (3)				
Metals (Methods 6010,7060, 7470)	N/A	N/A	(4)	N/A
SVOCs (Method 8270)	N/A	N/A	(4)	N/A
VOCs (Method 8260)	N/A	N/A	(4)	N/A

Notes:
* MACLs to be reviewed and updated by the Discharger per Provision 9

1. SF Bay Basin Plan, 2010
2. MACL is the maximum allowable concentration limit. Applicable to A-Zone wells only. C-Zone wells evaluated based on background concentrations of inorganic constituents and practical quantization limits for organic constituents.
3. Parameters are listed in Appendix IX to 22CFR 66264 for analysis via Methods 6010, 7060, 7470, 8260, 8270. Appendix IX parameters that are detected, but are not COCs, will be added to the list of COCs for all wells.
4. Bi-annually at POC wells. Every five years at all other wells. Within first year in new wells.
5. Monitoring for COCs and Appendix IX parameters will alternate between highest and lowest groundwater levels.

X=Total PAH concentration less than 0.015 mg/l
XX=Total phenolics concentration less than 0.05 mg/l
PAHS are polynuclear aromatic hydrocarbons
POC is point of compliance
B is biennial or monitoring every other year for non-POC wells
S is semi-annual monitoring at all wells
N/A is not applicable

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS

(Those requiring TMDLS (A), being addressed by USEPA approved TMDLS (B), and being addressed by actions other than TMDLs (C))*

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
2	R	San Mateo Creek	20440032					
				Diazinon		B	11 Miles	2007
				This listing was made by USEPA for the 1998 303(d) list. For 2006, diazinon was moved by USEPA from the 303(d) list to this being addressed list because of a completed USEPA approved TMDL.				
					Urban Runoff/Storm Sewers			
2	B	San Pablo Bay	20610010					
				Chlordane		A	68349 Acres	2008
				This listing was made by USEPA.				
					Nonpoint Source			
				DDT		A	68349 Acres	2008
				This listing was made by USEPA.				
					Nonpoint Source			
				Dieldrin		A	68349 Acres	2008
				This listing was made by USEPA.				
					Nonpoint Source			
				Dioxin Compounds (including 2,3,7,8-TCDD)		A	68349 Acres	2019
				The specific compounds are 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, and OCDD. This listing was made by USEPA.				
					Atmospheric Deposition			
				Exotic Species		A	68349 Acres	2019
				Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability to native species.				
					Ballast Water			
				Furan Compounds		A	68349 Acres	2019
				The specific compounds are 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, 2,3,4,7,8-PeCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6, 7,8,-HxCDF, 1,2,3,7,8,9-HxCDF, 2,3,4,6,7,8-HxCDF, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, and OCDF. This listing was made by USEPA.				
					Atmospheric Deposition			
				Mercury		A	68349 Acres	2006
				Current data indicate fish consumption and wildlife consumption impacted uses: health consumption advisory in effect for multiple fish species including striped bass and shark. Major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.				
					Atmospheric Deposition			
					Municipal Point Sources			
					Natural Sources			
					Nonpoint Source			
					Resource Extraction			

2006 CWA SECTION 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS

(Those requiring TMDLS (A), being addressed by USEPA approved TMDLS (B), and being addressed by actions other than TMDLs (C))*

USEPA APPROVAL DATE: JUNE 28, 2007

REGION	TYPE	NAME	CALWATER WATERSHED	POLLUTANT/STRESSOR	POTENTIAL SOURCES	TMDL REQUIREMENT STATUS*	ESTIMATED SIZE AFFECTED	PROPOSED OR USEPA APPROVED TMDL COMPLETION
				Nickel		A	68349 Acres	2019
				This listing was made by USEPA.				
					Source Unknown			
				PCBs (Polychlorinated biphenyls)		A	68349 Acres	2006
				This listing covers non dioxin-like PCBs.Interim health advisory for fish; uncertainty regarding water column concentration data.				
					Unknown Nonpoint Source			
				PCBs (Polychlorinated biphenyls) (dioxin-like)		A	68349 Acres	2019
				The specific dioxin like compounds are 3,4,4,5-TCB (81), 3,3,3,3-TCB (77), 3,3,4,4,5-PeCB (126), 3,3,4,4,4,4-HxCB (169), 2,3,3,4,4-PeCB (105), 2,3,4,4,5-PeCB (114), 2,3,4,4,5-PeCB (118), 2,3,4,4,5-PeCB (123), 2,3,3,4,4,5-HxCB (156), 2,3,3,4,4,5-HxCB (157), 2,3,4,4,5,5,-HxCB (167), 2,3,3,4,4,5,5-HpCB (189). This listing was made by USEPA.				
					Unknown Nonpoint Source			
				Selenium		A	68349 Acres	2019
				Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds, significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategy in place.				
					Agriculture			
					Exotic Species			
					Industrial Point Sources			
					Natural Sources			
2	**R**	**San Pablo Creek**	**20660014**					
				Diazinon		B	9.9 Miles	2007
				This listing was made by USEPA for the 1998 303(d) list. For 2006, diazinon was moved by USEPA from the 303(d) list to this being addressed list because of a completed USEPA approved TMDL.				
					Urban Runoff/Storm Sewers			
2	**L**	**San Pablo Reservoir**	**20660012**					
				Chlordane		A	784 Acres	2019
					Source Unknown			
				Dieldrin		A	784 Acres	2019
					Source Unknown			
				Heptachlor epoxide		A	784 Acres	2019
					Source Unknown			

Draft

McHENRY SOLAR FARM

Environmental Impact Report

SCH#: 2010122021

Prepared for
Modesto Irrigation District
P.O. Box 4060
Modesto, CA 95352

May 2011

ESA

TABLE 3-2
SUMMARY OF ALTERNATIVES SCREENING ANALYSIS
McHENRY SOLAR FARM

Alternative	Project Objectives Criteria	Feasibility Criteria	Environmental Criteria
Passes Screening			
Reduced Project Alternative • Increases setback from roadways to 300 feet • Reduces solar array area by approximately 10% • Reduces energy generating capacity of the site by approximately 3 MW	Would generate 22 MW rather than 25 MW with the proposed Project. Meets most project objectives, but would be less effective than the proposed Project with assisting MID in meeting its Renewable Portfolio Standard and goals aimed at reducing greenhouse gas (GHG) emissions, and in furthering MID's efforts to achieve its goals for renewable energy generating capacity within MID's total energy portfolio.	No elimination factors were identified.	Meets environmental criteria. Aesthetics: would lessen potential visual impacts along McHenry Avenue and Patterson Road Air Quality: would slightly lessen construction air emissions Noise: would slightly lessen construction noise New Impacts: None likely
Non-Agriculture Site Alternative • Former Shell Lab Site, approximately 29 acres • Zoned Planned Industrial • Existing buildings and structures would need to be removed • Approximately 5 MW solar energy output • Approximately 1.25-mile sub-transmission line	Would generate 5 MW rather than 25 MW with the proposed Project. Meets most project objectives, but would be less effective than the proposed Project with assisting MID in meeting its Renewable Portfolio Standard and goals aimed at reducing greenhouse gas (GHG) emissions, and in furthering MID's efforts to achieve its goals for renewable energy generating capacity within MID's total energy portfolio.	No elimination factors were identified.	Meets environmental criteria, although some impacts may be similar to the proposed Project but would merely occur in a different location. Aesthetics: would avoid impacts along McHenry Avenue and Patterson Road Agricultural: would avoid potential conversion of Prime Farmland to non-agricultural use Air Quality: would lessen construction air emissions Noise: would lessen construction noise New Impacts: Demolition of existing structures would at least partially offset any reduction in construction air emissions and noise; aesthetic impact of 1.25-mile sub-transmission line could be greater that the proposed Project
Fails Screening			
Alternative Site: Airport/Industrial Park • In flood plain • Biological habitat along Tuolumne River • Prime Farmland	Meets most project objectives.	No elimination factors were identified.	Fails environmental criteria. Potential impacts would be greater than the proposed Project because this alternative site is located in a flood plain, is designated Prime Farmland, and is very likely to have sensitive species and/or habitat due to its proximity to the Tuolumne River.
Alternative Site: Geer Road Landfill • Ground settling • Construction restrictions in landfill cap	Meets most project objectives.	Fails. Site would not be suitable for a utility-scale solar project due to differential settling of the landfill and construction restrictions on the landfill cap.	Meets environmental criteria. This alternative site is not located on Prime Farmland and would be unlikely to have any new impacts.

8-215

Arsenic - ToxFAQs™

CAS # 7440-38-2

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic

CAS # 7440-38-2

compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys.

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

- If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.
- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.
- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air (10 $\mu g/m^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Arsenic (Update). Atlanta, GA: U.S. Department of Health and Human Services. Public Health Service.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333.

Phone: 1-800-232-4636

ToxFAQs™ Internet address via WWW is http://www.atsdr.cdc.gov/toxfaqs/index.asp.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Letter 5

COMMENTER: Rachael Koss

DATE: September 29, 2015

RESPONSE:

Master Response to Letter 5

The comment letter submitted by Adams, Broadwell, Joseph and Cardoza (Letter 5) included comments regarding the sufficiency of biological studies, noting that full protocol-level surveys were not completed for a variety of species. Responses to comments on the specific details of some surveys have been provided directly for each comment; however, this general response addresses the adequacy of biological surveys in general, and why protocol-level surveys are not required under CEQA to evaluate the potential for impacts to special status plant and wildlife species.

The EIR Biological Resources chapter's environmental setting discussion is based on review by qualified biologists of data contained within a number of biological resource databases, available literature on species known to occur in the project vicinity, and an initial field survey designed specifically to evaluate the presence or absence of suitable habitat to support special status plant and wildlife species on the site and assess the potential for impacts to those species that are known to occur or may occur on the project site.

The project site is located on previously developed and highly disturbed land that will continue to serve as a closed landfill (Landfill 15 on the west parcel) and a former fertilizer pond (on the east parcel). As described in the Draft EIR, the site consists of roughly 60 acres of land within an existing, highly disturbed context of oil refinery development, and is surrounded by developed commercial, industrial and transportation uses. The direct impacts from project development would be strictly limited to the existing, previously disturbed approximately 40-acre area within the landfill and fertilizer (treatment) pond footprints. Indirect impacts to the 20 acres of potential habitat excluded from development would be limited to potential dust and construction runoff that would be controlled through construction SWPPP and BMP measures and potential limitation of wildlife movement between adjacent marsh and stream habitats and the project site, which would be controlled by exclusion fencing and biological monitoring during construction.

The physical and biological characteristics of the project site, identified during the biological site survey, combined with available information on the occurrence of special status species in the region discussed in Section 4.1 (Biological Resources) of the Draft EIR, provide a sufficient basis for a thorough evaluation of the limited number of vegetation communities and potential wildlife habitats within and immediately adjacent to the project site. Protocol species surveys were not warranted due to the small size and highly disturbed nature of the study area within an operating oil refinery context and a distinct lack of native habitats within the project footprint. Biologists, however, did walk the entire site and visually examined the entire 60-acre extent of the impact area to identify any features and habitat capabilities that could indicate the presence of special status species.

Because protocol surveys are not required or performed to determine the potential for the project site to support special status species under CEQA, specific details on the environmental conditions such as temperature, wind, cloud cover, etc., were not relevant to the analysis. Furthermore, according to MCE's biological expert, characterization of highly disturbed habitats on the project site with a full plant inventory is unwarranted and excessive.

The EIR biological analysis does, however, fully evaluate the potential for special status species to occur on the project site, based on a comprehensive literature review and identification of potentially suitable special status species habitat where it occurs within the project area (i.e. burrowing owl and nesting birds), even though field surveys revealed this habitat to be marginal at best for these species. Nonetheless, the Draft EIR evaluated potential project impacts on any special status species that could occur in habitats on the project site and proposed avoidance and mitigation measures for these species. These measures include pre-construction surveys to verify that special status species are not present on the project site during construction, and appropriate avoidance or mitigation measures that could be implemented if any such species are found.

Letter 5 states an opinion that the Draft EIR provided insufficient information to evaluate impacts to biological resources. Appropriate biological survey protocols are based in large part on the nature of a given project site, along with other factors. Highly disturbed and modified sites require less intensive analysis than pristine, natural lands. Full resource inventories and protocol-level surveys for all potentially occurring species are not required under CEQA. The California Court of Appeals in *Association of Irritated Residents v. County of Madera (2003) 107 Cal.App.4th 1383* specifically concluded that protocol-level surveys were not required to adequately determine the significance of impacts to special status species in an EIR and stated that "CEQA does not require a lead agency to conduct every recommended test and perform all recommended research to evaluate the impacts of a proposed project. The fact that additional studies might be helpful does not mean that they are required." Consequently, when there is sufficient information regarding biological resources to determine potential impacts to those resources, then additional studies are not required under CEQA. In the case of this EIR, sufficient information was available through site reconnaissance and habitat assessment surveys, review of CNDDB data (as shows on figure 4.1-2) and other technical documents, including primary literature and USFWS/CDFW reports and technical documents. The Draft EIR identified the potential for special status species to occur on the project site, characterized the risks to those species based on the disturbance associated with the proposed project activity, and provided mitigation to address potential impacts. Mitigation includes pre-construction surveys (appropriately timed for proposed construction schedules to ensure avoidance of impacts to special status species) and/or require avoidance and mitigation for species that are assumed present because suitable habitat is present and protocol surveys were not conducted to document absence.

As outlined in the Draft EIR (see MM BIO-2b and BIO-2c), standard pre-construction surveys are proposed to determine if special status species are present on site at the time of construction. These surveys are required to be conducted by qualified biologists and follow standard protocol. Appropriate mitigation has been proposed to address potential impacts if species are determined to be present at the time of the pre-construction surveys.

Response 5.1

The commenter states an opinion that the Draft EIR is inadequate and should be re-circulated. This general comment introduces the specific comments that follow it in this letter, which are responded to individually below. The responses demonstrate that the Final EIR complies with CEQA and does not require recirculation. Refer also to the Master Response to Letter 5.

Response 5.2

The commenter describes two organizations that have concerns about the proposed project. This comment is noted, but does not pertain to the analysis or conclusions of the Draft EIR.

Response 5.3

The commenter discusses various aspects of CEQA and asserts that the Draft EIR fails to inform the decision makers and the public of the Project's potential environmental impacts and does not avoid or reduce environmental harms if feasible. These general comments precede the specific comments that follow it in the letter, which are responded to individually below. For the reasons below, and contrary to the commenter's assertions, the Final EIR fulfills CEQA's disclosure and mitigation policies.

Response 5.4

The commenter states an opinion that the Draft EIR's project description is incomplete because the proposed project's water demand during construction is not quantified. Water demand from construction and operation of the project would be very low compared to most other land uses (agriculture, parks, residential, commercial, industrial, etc.), and thus, as discussed in the Draft EIR in Section XVII, *Utilities and Service Systems*, of the Initial Study (Appendix A to the Draft EIR), impacts related to water supply would be less than significant. Nevertheless, the following language has been added to Page 2-15 of Section 2.0, *Project Description*:

> Water demand for dust control, concrete mixing and soil compaction during construction is anticipated to total a maximum of three acre feet over the projected 11-month construction period. Water demand for project operation is anticipated to total a maximum of 0.6 acre feet per year for annual washing. Reclaimed water would be supplied by the East Bay Municipal Utilities District for these uses as available.

Reclaimed water for construction is provided by the East Bay Municipal Utilities District via its recycled water truck program. The District "provides recycled water at no charge to trucks for construction and other non-potable purposes." Recycled water from the District is available for construction, landscaping and other non-drinking uses (EBMUD, November 2015) (http://www.ebmud.com/water-and-drought/recycled-water/recycled-water-quality/).

Impacts related to water supply and demand are discussed in Section XVII, *Utilities and Service Systems*, of the Initial Study (Appendix A to the EIR). As discussed therein, impacts would be less than significant. The information above does not change the conclusions of the Initial Study

as to the evaluation or significance of these impacts; therefore no further changes to the EIR are warranted.

Response 5.5

The commenter states an opinion that the Draft EIR project description is incomplete because the proposed project's water demand during construction is not quantified. Please see Response 5.4.

Response 5.6

The commenter states an opinion that the Draft EIR project description is incomplete because the proposed project's water source is not stated. The water source would be the East Bay Municipal Utilities District, which supplies water to the City of Richmond and would have sufficient supplies for the low construction and operational water demands of the project as discussed in Response 5.4.

Response 5.7

The commenter states an opinion that the Draft EIR does not include sufficient detail about future decommissioning of solar photovoltaic (PV) equipment on the site. Decommissioning activities are described in the Draft EIR in Section 4.2, *Hazards and Hazardous Materials,* which states that the impact analysis evaluates decommissioning based on current standard decommissioning practices, which include dismantling and repurposing, salvaging/recycling, or disposing of project components, and site restoration. The commenter does not specify what information or details are lacking; thus a specific response is not possible. Impacts related to decommissioning would be less than significant with implementation of Mitigation Measure HAZ-3, Disposal of PV Modules and Support Structures. No changes to the EIR are warranted.

Response 5.8

The commenter repeats the assertion that the EIR needs more information about decommissioning. Please see Response 5.7. The commenter also states an opinion that decommissioning could result in environmental impacts related to several issue areas. As noted in Section 4.2, *Hazards and Hazardous Materials,* of the Draft EIR, the EIR evaluates decommissioning based on current standard decommissioning practices, which include dismantling and repurposing, salvaging/recycling, or disposing of project components, and site restoration. As also noted therein, it would be speculative to assume whether, when and how decommissioning would be carried out after the estimated minimum equipment lifespan of 30 years. The types of equipment proposed for the project do not require special handling or disposal. Accordingly, the Draft EIR further states that MCE may conduct additional CEQA review to ensure compliance with requirements related to hazards and hazardous materials management (and other issue areas) during decommissioning, if and when it occurs. Therefore, contrary to the commenter's assertion, the public and those decision makers considering the future decommissioning, if and when it occurs, would have the opportunity to comment on any discretionary decisions related to the decommissioning, unless otherwise exempt from CEQA. Commenter's comments reinforce that the EIR reflects MCE's good faith effort at full disclosure, based on information available at this time. As discussed in the Draft EIR, impacts related to decommissioning would be less than

significant with implementation of Mitigation Measure HAZ-3, Disposal of PV Modules and Support Structures. No changes to the EIR are warranted.

Response 5.9

The commenter provides background for establishing the environmental setting, and states an opinion that the Draft EIR's description of the project's environmental setting related to biological resources was developed based on inadequate approach and seasonal timing. However, establishing a sound environmental baseline neither requires the completion of every possible study, nor does it specifically require the completion of protocol level surveys for special status species that may or may not occur in the area. The evaluation of the habitat, vegetation communities, signs of wildlife and potential to support special status plant and animal species undertaken for this project provides sufficient information to address the biological resources impacts of this project, especially when the site's relatively small size, highly disturbed nature, and infill character are considered.

Please also see Master Response to letter 5 for more information on the adequacy of the biological analyses.

Response 5.10

The commenter states that the Draft EIR does not provide information on special status plant and animal species outside of the project site. Please response 5.42 below.

Response 5.11

The commenter states that the Draft EIR includes inconsistent and unreliable information on raptor use of the site. Please see Response 5.43.

Response 5.12

The commenter states that burrowing owl surveys were insufficient. Because the information collected is sufficient to determine potential impacts, and feasible mitigation has been identified, impacts, if any, to burrowing owls would be less than significant. Please see Master Response to Letter 5 and Response 5.44 for additional details.

Response 5.13

The commenter states that botanical surveys were insufficient. Please see Master Response to Letter 5 and response 5.45.

Response 5.14

The commenter states that the evaluation of salt marsh harvest mouse and San Pablo vole were inadequate. Please see response 5.46.

Response 5.15

The commenter states that suitable habitat for salt-marsh harvest mouse and San Pablo vole is present on the site. For clarification, the salt marsh habitat present adjacent to the project site consist of a steep walled channel that is tidal influenced. This channel fills and empties with the tide, but does not expand into any mud flat or marsh areas. While typical salt marsh plant species are present, there are no areas of dense cattail and bulrush or other wet marsh type areas that would provide the required microhabitat conditions to support populations of listed species. Additionally, this salt marsh habitat occurs as a narrow strip, not exceeding more than about 50 feet in most areas adjacent to the project. As such this feature is best described as a narrow drainage with some typical salt marsh plants present along the edges of the channel, and would not be described as typical salt marsh that would be expected to support breeding populations of listed or fully-protected species. Additional detail relating salt marsh harvest mouse and other small mammals is presented in responses 5.42 and 5.46 respectively

Response 5.16

The commenter states that North Coast Salt Marsh, tidal channels and freshwater emergent marsh are within the immediate vicinity of the Project site and that there are five natural vegetation communities within the vicinity of the Project site and 35 special status animal species known to occur within the vicinity of the Project site. The commenter also notes that the Project site is located along the Pacific Flyway and is one mile from San Francisco Bay, which is recognized as a Western Hemisphere Shorebird Reserve Network Site of Hemispheric Importance for shorebirds, and states that the Draft EIR did not adequately disclose, evaluate or mitigate potential impacts to biological resources, noting specifically burrowing owl.

Please see responses 5.44 and 5.47 for responses to the issue of the adequacy of the evolution of potential impacts to burrowing owl.

Regarding the other issues the commenter made, the Draft EIR clearly identified and disclosed the presence of the vegetation communities and special status species noted by the commenter. While it is true that the project is in the vicinity of the Pacific Flyway and San Francisco Bay, the site itself lacks critical components that would make it important for migratory birds, nor would the proposed project directly impact the Pacific Flyway or San Francisco Bay, and as such the Draft EIR did not need to specifically address these issues.

Response 5.17

The commenter states that the mitigation for burrowing owl is insufficient. Details outlining why the pre-construction survey are sufficient is presented in responses 5.44 , 5.47, and 5.53.

Response 5.18

The commenter states that the avoidance buffers for burrowing owl are insufficient. Please see responses 5.44, 5.47 and 5.53.

Response 5.19

The commenter states that the Draft EIR lacks compensatory mitigation for burrowing owl. Compensatory mitigation is only required if owls are present and will be directly impacted by project activities. No owls or suitable nesting or wintering burrows were documented on the project site and as such, no direct impacts to burrowing owls have been identified. Should owls occur on site at the time of pre-construction surveys, avoidance and mitigation, which may include compensatory mitigation, would be required. Additional information on this issue is presented in responses 5.44 and 5.47.

Response 5.20

The commenter states that the Draft EIR did not adequately analyze and mitigate impacts to purple needlegrass habitat and that avoidance of this community could not be evaluated. Please see response 5.48.

Response 5.21

The commenter states that the Draft EIR did not adequately analyze and mitigate impacts to purple needlegrass habitat, and that indirect impacts could occur from several factors. Please see response 5.48.

Response 5.22

The commenter states that the Draft EIR conclusions on loss of foraging habitat for burrowing owl, northern harrier, white-tailed kite and short-eared owl are not supported. Please see response 5.49.

Response 5.23

The commenter states that the Draft EIR does not support the statement that the site consists of poor quality foraging habitat and is a non-significant percentage of the habitat in the region. Please see response 5.49.

Response 5.24

The commenter states that the conclusion in the Draft EIR that the loss of this habitat is not likely to adversely affect regional populations of raptors, specifically burrowing owls. Please see response 5.49.

Response 5.25

The commenter states that the Draft EIR does not adequately analyze and mitigate impacts on birds from collision. Please see response 5.50.

Response 5.26

The commenter notes measures to mitigate potential bird collisions and that these must be incorporated into the Draft EIR. The commenter also notes that it is Mr. Cashen's opinion that the project will result in incidental take of Ridgway's rail (= California clapper rail), because of proximity to populations of this species. This opinion is not based on any reason other than proximity to a species' population. The presence of a species in the vicinity of a project does not equate to incidental take. Furthermore, an issuance of, or application for a CDFW or USFWS incidental take permit is not a necessary process to be completed during the CEQA review period. If during the environmental review, it is determined that take is likely, a proponent may work with agencies to apply for, and potentially receive an ITP; but these processes are always conducted after the completion of environmental review, and in fact, CDFW ITPs require CEQA approval to be processed. For clarification, the salt marsh habitat present adjacent to the project site consist of a steep walled channel that is tidal influenced. This channel fills and empties with the tide, but does not expand into any mud flat or marsh areas. While typical salt marsh plant species are present, there are no areas of dense cattail and bulrush or other wet marsh type areas that would provide the required microhabitat conditions for rail breeding. Additionally, this salt marsh habitat occurs as a narrow strip, not exceeding more than about 50 feet in most areas adjacent to the project. As such this feature is best described as a narrow drainage with some typical salt marsh plants present along the edges of the channel, and would not be described as typical salt marsh that would be expected to support breeding populations of listed or fully-protected species. Because this narrow strip of marsh habitat adjacent to the site lacks suitable microhabitat conditions to support rail breeding (see also Response 5.42), it is unlikely to support abundant rail activity that could result in incidental take. Please see responses 5.50 and 5.54 for additional information relating to this comment.

Response 5.27

The commenter states that the Draft EIR does not adequately mitigate impacts on nesting birds, specifically as relates to pre-construction survey protocol. Please see response 5.52.

Response 5.28

The commenter states that the Draft EIR does not adequately analyze and mitigate impacts to special status mammals and concludes that MCE must consult with the USFWS and CDFW to determine measures needed to comply with the federal Endangered Species Act, the California Endangered Species Act and section 4 700 of the Fish and Game Code. Please see responses 5.15 and 5.46 for additional information on potential impacts to small mammals. The premise that the applicant must consult with CDFW and USFWS is incorrect. Agency consultation is one option for developing avoidance, minimization, and mitigation measures but this option is not required under CEQA. Consultation is optional, and would not necessarily or specifically provide pertinent information for environmental review.

Response 5.29

The commenter states that the Draft EIR does not adequately analyze and mitigate impacts from the spread of non-native plants. Please see response 5.56

Response 5.30

The commenter lists materials and chemicals that may be present on the site and states an opinion that the project could result in significant impacts associated with potential release of hazardous materials, without providing specifics on which to base a response. The commenter goes on to state an opinion that placement of solar PV equipment on the landfill portion of the site could result in settlement of landfill materials that would compromise the landfill cap and result in release of hazardous materials. The commenter also discusses previous landfill settlement and the kinds of impacts that could result if the cap is compromised.

As discussed in Section 4.2, *Hazards and Hazardous Materials* of the Draft EIR, impacts related to potential release of hazardous materials in the capped landfill area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). This analysis is based on existing conditions on the site and the nature of the proposed solar PV equipment proposed to be installed, in particular the non-penetrating, ballasted units. The solar array on the capped portion would be constructed entirely at or above grade. In addition, the project design team retained the services of Wood Rodgers, Inc. to perform an onsite geotechnical investigation (March 2015) to specifically address the issues of bearing capacity and differential settlement. The report states that a baseline bearing capacity of 1,000 pounds per square foot (with a maximum of 1,333 pounds per square foot) can be used for the solar array design and that settlement overall is not expected to be more than six inches over the life of the system. The system would not exceed these loads. Most of the settlement has occurred due to the fact that the landfill cap is approaching 20 years of service. Furthermore, the differential settlement has a radius of curvature of 1 in 300 across the solar array. The low anticipated differential settlement is well within the settlement anticipated by the Chevron Closure Report that mitigates runoff or water quality issues, and would not compromise the landfill cap. The March 2015 geotechnical Investigation has also been included in the Final EIR as a new appendix, Appendix D, for additional clarifying information, and the following text has been added to Page 4.2-9 of Section 4.2, *Hazards and Hazardous Materials:*

> In addition, a Geotechnical Investigation (Wood Rodgers, March 2015 – see Appendix D) has confirmed that "the site appears well suited for the planned improvements when considering potential geotechnical constraints" such as the potential for further landfill settlement, and that "foundation considerations were modeled for an allowable bearing pressure of 1,000 pounds per square foot." The planned construction activity loading and direct loading of installed ballasted system would not exceed 330 pounds per square foot for the units and 750 pounds per square foot for construction equipment.
>
> … Although installation of the tracking arrays on the FFPP portion of the project site would involve ground disturbance to a depth of six feet, nine inches – as this area contains clean, compacted fill to a depth of eight feet– the likelihood that construction workers or operational staff could be exposed to residual chemicals in on-site soils is minor. In addition, pole-mounting would involve pile-driving or a similar technique that would minimize the area of soil disturbance.

This additional information is meant to clarify the information in the EIR. As it does not involve the additional of "significant new information" as defined in the CEQA *Guidelines* in Section 15088.5 (such as a new impact or substantial increase in the severity of an impact), recirculation of the EIR is not required. The additional information simply further supports the conclusions and analysis in the EIR that the landfill cap and soils would not be compromised by the proposed construction and operation of the project. No further changes to the EIR are warranted.

Response 5.31

The commenter states an opinion that Mitigation Measure HAZ -1(a) of the Draft EIR, which requires that MCE "submit…sufficient information about construction and operation parameters as are determined by City and/or RWQCB to be needed to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area," defers evaluation of potentially significant impacts. The commenter also suggests annual surveys as a better mitigation strategy for potential impacts regarding landfill settlement. However, the analysis regarding settlement potential and associated impacts is included in the EIR (see Response 5.30), and because impacts would be less than significant, additional mitigation is not required. In addition, regular inspections of the landfill cap and quarterly water quality monitoring are currently conducted as part of the existing regulatory oversight (RWQCB Order No. R2-2012-0015), as noted in Section 4.2, *Hazards and Hazardous Materials,* of the Draft EIR; as stated in Appendix B of the Draft EIR, "Alterations to the landfill and appurtenances must be in accordance with Order No. R2-2012-0015 and may not negatively impact the cap, GPS, landfill gas collection and vent system, and existing stormwater conveyance." As also discussed in Section 4.2 of the Draft EIR, impacts related to potential release of hazardous materials in the capped landfill area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). No changes to the EIR are necessary.

Response 5.32

The commenter states an opinion that the Draft EIR's conclusions that impacts to water quality would be less than significant with mitigation are unsupported due to project construction, operations, and the increase in impervious surfaces, but does not provide specifics of how or why. Impacts related to water quality are discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR; the analysis there supports the conclusions that impacts to water quality would be less than significant with implementation of Mitigation Measure HYD-2. The commenter also quotes a 2012 report by ARCADIS stating that "New relatively impervious surfaces will cause an increased rate of runoff discharge during storm events." The ARCADIS report was not written with the benefit of the specific proposed project design, so did not address specific project impacts. As discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, the ground under the PV modules on the former landfill site is currently impervious due to the landfill cap. The PV modules would not change the drainage patterns currently on that portion of the site. For the pond site, the PV modules would themselves be considered a discontinuous impervious surface but the area underneath the modules would continue to be pervious.

The commenter inserted, parenthetically, "such as solar panels" into the quote; it should be noted that this phrase is not part of the ARCADIS document and was added by the commenter. As discussed under Impact HYD-3 in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, the

project would incrementally increase impervious surfaces on the site, and impacts would be less than significant.

Response 5.33

The commenter states an opinion that more specific information about the porosity and permeability of the soils on top of the landfill cap must be in the EIR to support "[the Draft EIR's] conclusion." However, the commenter does not state what conclusion requires this support or how this information would support a conclusion; therefore, a specific response is not possible. As discussed in Response 5.30 and 5.57, the cap and fill are able to support the construction equipment and project equipment without compromising the landfill cap or integrity, or resulting in release of hazardous materials or impacts to water quality. Impacts related to stormwater runoff and drainage patterns are discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR; the analysis there supports the conclusions that impacts would be less than significant.

Response 5.34

The commenter states an opinion that stormwater or other precipitation may drip off of the proposed solar PV modules and cause localized/concentrated erosion that could lead to a breach in the landfill cap. As discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, "The topography where the modules would be located is generally flat. Areas temporarily disturbed during construction-related activities would be revegetated (either naturally or re-planted) consistent with a project-specific revegetation plan to avoid changes to peak flows and runoff volume. Impacts would be less than significant." Excessive runoff is not anticipated beyond a 1,000 year storm, which the site is designed for (Wood Rodgers, March 2015) with an existing system of concrete drains that meander throughout the site. Existing vegetation would remain and be enhanced where disturbed to maintain drainage function. Localized "drip line" effects would be further avoided by a one-inch gap between solar modules to facilitate runoff.

As discussed in detail in Section 4.3, *Hydrology and Water Quality*, the solar array would not significantly change drainage at the site or increase runoff. Existing drainage facilities would not be compromised and would continue to operate as designed. No changes to the EIR are warranted.

Response 5.35

The commenter states an opinion that installation of piles for the proposed solar arrays on the filled fertilizer pond could mobilize contaminants. This could occur if the piles would extend through and below contaminated areas into clean soil or groundwater. Imported engineered fill was used to bring the pond area to the existing grade, and, as discussed in the Draft EIR in Section 4.2, is composed of approximately eight-foot deep compacted fill where the proposed piles would be located. The pile driving process would not disturb the underlying fertilizer pond bed because maximum pile depth would not exceed approximately six to seven feet, as shown on Figure 2-8 of the Draft EIR. Therefore, impacts would be less than significant and no changes to the EIR are warranted.

Response 5.36

The commenter states an opinion that the depth of clean fill at the fertilizer pond site is unknown, and reiterates the opinion that pile driving could result in impacts related to hazardous materials. Please see Response 5.35. As the piles would not extend below the fill material or penetrate the pond liner, no mobilization of materials, chemicals or runoff between the areas above and below the liner would occur.

Response 5.37

The commenter states an opinion that an engineering evaluation of the fill on the fertilizer pond site is needed to complete the EIR. The commenter also restates an opinion that hazardous materials impacts related to pile driving on this portion of the site should be further studied and potential health and safety impacts to construction workers evaluated. These comments are noted; however, the commenter does not provide specific reasons such study would be required, other than those addressed in responses 5.35 and 5.36. As discussed in Section 4.2, *Hazards and Hazardous Materials* of the Draft EIR, impacts related to potential release of hazardous materials in the filled fertilizer pond area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). No changes to the EIR are necessary.

Response 5.38

The commenter provides general information on General Plans and related California planning law and practice. This information is noted. The commenter goes on to state an opinion that the proposed project is inconsistent with City of Richmond General Plan Goal CN3 and Policy CN3.2 related to water quality protection. As noted in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, Policy CN3.2 requires the City to work with public and private property owners to reduce stormwater runoff in urban areas to protect water quality in creeks, marshlands and water bodies and the bays. As further discussed in Section 4.3, the project's impacts in this regard would be less than significant with mitigation incorporated and adherence to existing regulations. The project would be consistent with this goal and policy. Please see also Response 5.51.

Response 5.39

The commenter states an opinion that the proposed project is inconsistent with City of Richmond General Plan Policy CN1.1 related to habitat and biological resources protection and restoration. This policy is quoted, among a number of others, in Section 4.1, *Biological Resources*, of the Draft EIR. As discussed in detail in Section 4.1, and in responses 5.10 through 5.29 above, the project's impacts related to habitat and biological resources would be less than significant with implementation of the mitigation measures identified. The project would be consistent with this goal and policy, and City staff has indicated they agree with this interpretation (Lina Velasco, Senior Planner, email correspondence November 4, 2015). Please see also Response 5.51.

Response 5.40 (First Comment on Attachment A to Letter 5)

The commenter presents his qualifications as a biologist, including his educational background and past experience with CEQA and NEPA environmental review. This comment does not pertain to the analysis or conclusions of the Draft EIR but is noted.

Response 5.41

The commenter states an opinion that the surveys conducted on site were insufficient to evaluate direct and indirect impacts to biological resources and lists several specific issues. See Master Response to Letter 5 and Response 5.9, above.

Response 5.42

The commenter states that the Draft EIR did not indicate if there was suitable habitat for special status species outside of the project site. Please see Master Response to Letter 5 above. Additionally, the vegetation communities and habitats present adjacent to and outside of the project site are discussed in the Draft EIR on pages 4.1-2 and 4.1-24 to provide an appropriate contextual analysis of the potential for indirect impacts to species that may occur in those habitats. Fresh water and salt marsh habitat does generally provide potential breeding habitat for California black and California clapper rail. However, these species have very specific nesting habitat requirements that require specific water depths, heavy and extensive vegetative cover, and isolation. The salt marsh habitat present adjacent to the project site consists of a steep-walled canal that is tidal influenced. This channel fills and empties with the tide, but does not expand into any mud flat or marsh areas. While typical salt marsh plant species are present, there are no areas of dense cattail and bulrush or other wet marsh type areas that would provide the required microhabitat conditions for rail breeding. Additionally, this salt marsh habitat occurs as a narrow strip, not exceeding more than about 50 feet in most areas adjacent to the project, and as such does not provide the isolation necessary to support rail breeding. Therefore, the Draft EIR determined that California black rail and California clapper rail may forage in the adjacent salt and freshwater marsh, but there was no suitable nesting habitat for these species. Also, as the rails prefer isolation and avoid areas of human activity, it is unlikely these species would venture anywhere near the project area during construction, effectively self-excluding to avoid potential impacts. Given the required implementation of construction SWPPP and BMPs, such indirect impacts on biological resources would be limited to construction noise, which could potentially indirectly impact nesting birds; however, this potential impact would be reduced to a less than significant level with pre-construction nesting bird surveys and implementation of suitable avoidance buffers if necessary.

Response 5.43

The commenter states an opinion that the Draft EIR presents unreliable information on raptor use. The Draft EIR evaluated the project site for its ability to support raptors. The EIR identified a lack of any suitable nesting habitat or structures, and identified only marginally suitable foraging habitat within the project area based on known occurrence of raptors in the immediate vicinity and region. Information contained within databases, even "positive sighting" databases, provide

useful information on determining the potential for given species to occur within a region. Once those species have been identified as present regionally, an evaluation of the potential impacts to those species can be made. This is a reasonable and standard approach for evaluating potential impacts to raptors and other special status species. The Draft EIR was not contradictory, as the statements had completely different contexts as follows:

From Draft EIR Section 4.4.4 *Setting*:

> *"The eBird database reports only a single white-tailed kite observation within the project area during the last five years, but contains numerous white-tailed kite and northern harrier observation records within two miles of the project site – particularly in the Wildcat Marsh/West County Wastewater District vicinity, where they were reported year round, but substantially less in the winter."*

And From the Draft EIR Section 4.1.2 *Impacts Analysis, BIO Impact 2*:

> *"Furthermore, based on the limited observations of burrowing owl, northern harrier, short-eared owl and white-tailed kite within the vicinity of the project site over the last five years…"*

While the numerous observations from eBird are not limited to only five years, there are apparently only a limited number of observations of these species in the immediate vicinity of the project over the last five years. These statements have different contexts and as such are not mutually exclusive. Adjacent habitat areas were noted in the Draft EIR to provide context for the surrounding area; however, detailed analysis of these areas was not presented as the proposed project activity will not directly affect these off-site areas. Because the project is using existing roads, will be conducting development activity consistent with and similar to the historical development that has occurred on this site and has incorporated standard construction BMPs and stormwater protection, indirect impacts are limited to temporary construction noise. Potential indirect impacts to species in the adjacent habitats are limited to disruption of nesting behavior, and were addressed in the analysis of potential impacts to nesting birds. The above Master Response to Letter 5 outlines why more detailed surveys and analyses are not required to reach CEQA impact conclusions.

Response 5.44

The commenter states that surveys to establish burrowing owl use of the project site were not conducted. As clarified in the Master Response to Letter 5 above, the reconnaissance survey included a field survey of the entire project site and identified no suitable burrows or features that a burrowing owl could use for breeding or cover on the site. Given the lack of suitable cover for nesting or breeding activities, a significantly-reduced number of burrowing owls currently occupying this region, and low quality habitat suitable only for foraging, the need for further protocol surveys was not deemed necessary to evaluate potential impacts to this species. However, because it is conceivable that even this marginally suitable burrowing owl habitat (i.e. open grassland) could attract the species before project construction were to commence, appropriate mitigation was included in the Draft EIR in BIO-2(c) to ensure impacts to the species are reduced in the event that suitable burrows become established (e.g. by occupation of California ground squirrel or black-tailed jackrabbit burrows on site) in advance of project

construction. These measures include development of a Burrowing Owl Exclusion Plan in accordance with the CDFW 2012 Staff Report on burrowing owl. Refinements to Mitigation Measure BIO-2(c) are incorporated into the Final EIR.

Response 5.45

The commenter states an opinion that protocol level botanical surveys must be conducted because the site has natural (or naturalized) vegetation and because a natural community is present, and that species such as the Santa Cruz tarplant have been found in disturbed habitat. The project site consists of a highly disturbed, isolated patch of non-native annual grassland on a landfill cap and within a water treatment basin. This vegetative community is not a natural, or even naturalized community because it consists of exclusively non-native species that have colonized an area of previous and heavy industrial use. The project site is isolated from broader areas of grassland communities that may provide sources of colonization, and includes no features or specific habitat conditions that indicate special status species may be present. Although purple needlegrass grassland was identified on the site, the location and distribution of this community on the project site is indicative of a restoration effort that included a native seed mix that included this species. As such, this would not be considered a sensitive natural community, but would, nonetheless, be avoided by project design. Please also see Master Response to Letter 5 for more information on the adequacy of surveys. Based on the foregoing, the EIR contains sufficient evidence to support the MCE expert's conclusions that impacts to special status plants would be less than significant.

Response 5.46

The commenter notes the protected status of the Salt-marsh harvest mouse and San Pablo vole, notes that the Draft EIR did not disclose that the Salt-marsh harvest mouse is a state fully-protected species, and states an opinion that suitable habitat is present on the site for these species, and that CDFW and USFWS must be consulted. Please refer to Response 5.28 For additional information regarding CDFW and USFWS consultation. The Draft EIR has been revised to note the fully-protected status of the species under CDFW. The impact footprint of the project, however, does not support suitable habitat for these species, which are therefore not expected to occur on site. Although impacts would be less than significant with the mitigation measures already identified, because the site is unlikely to support these special status small mammals, additional information and augmented mitigation has been added under Impact BIO-2 in the Final EIR. The following text will be added to the Final EIR on pages 4.1-23 and 4.1-24:

> Additionally, although Herman's Slough contains only marginally suitable habitat for special status mammal species like the salt marsh harvest mouse, Suisun ornate shrew, saltmarsh wandering shrew, and San Pablo vole, appropriate small-mammal exclusion fencing would be installed around those portions of the construction area abutting this coastal brackish marsh habitat and additional avoidance measures have been included as recommended mitigation, even though potential impacts are less than significant without the additional measures.

The following text will be added to Mitigation Measure BIO-2 on Page 4.1-26:

The following, additional mitigation measures are *recommended* to further ensure no adverse effects on local wildlife by project construction.

BIO-2(d) Small Mammal Avoidance . A biologist shall conduct a pre-construction survey of the disturbance area within 100' of Herman's Slough to confirm the absence of special-status small mammals, installation of small mammal exclusionary fencing , and monitor of the exclusion fence installation (and later repair if necessary) prior to construction, and re-visit this area weekly during site grading and/or solar panel installation in these areas to ensure the fence's effectiveness. Exclusionary fencing shall consist of 48-inch silt fencing with wire-mesh backing shall be installed by hand along the eastern and northern margins of the west parcel (landfill) and along the western margin of the east parcel (water treatment basin) to prevent salt marsh harvest mice from entering the active work area.

BIO-2(e) Worker Environmental Awareness Program Training. Prior to initiation of construction activities construction personnel shall attend a (tailgate) Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist onsite to aid workers in recognizing special status resources that may occur in the project area and advising specific communication and mitigation measures should any of these species be encountered during construction. The specifics of this program shall include identification of the sensitive species and habitats, a description of the regulatory status and general ecological characteristics of sensitive resources, a careful review of the limits of construction and mitigation measures to reduce impacts to sensitive biological resources within the work area, and clear communication protocol should these sensitive resources be encountered during construction. A fact sheet conveying this information shall also be prepared for distribution to all contractors, their employers, and other personnel involved with construction of the project. All construction personnel shall sign a form documenting that they have attended the WEAP training and understand the information presented to them. The form shall be submitted to the City of Richmond and MCE to document compliance.

BIO-2(f) Construction and maintenance vehicles shall observe a maximum speed limit of 15 mph in the construction zone in the vicinity of Herman's Slough to further prevent potential wildlife mortality.

The addition of these measures does not constitute significant new information under CEQA nor require recirculation of the EIR. The Draft EIR already concluded that the impact to the mammal species was less than significant, and although the conclusion remains the same, in an abundance of caution additional mitigation measures have been proposed, and accepted, by MCE to further ensure that impacts would remain less than significant. The CEQA *Guidelines* in Section 15088.5 discuss when recirculation of an EIR is required, as follows:

A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under

Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. "Significant new information" requiring recirculation include, for example, a disclosure showing that:

a) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
b) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
c) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
d) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. (Mountain Lion Coalition v. Fish and Game Com. (1989) 214 Cal.App.3d 1043)

Because the addition of this mitigation measure would not result in significant new information being added to the EIR per the *Guidelines* as quoted above, recirculation of the EIR is not required.

Response 5.47

The commenter states an opinion that the Draft EIR failed to disclose all potential impacts to burrowing owls. The project site did not support any suitable burrows or other cover for burrowing owl, and as such passive relocation is not considered a likely outcome of project development. However, to address the highly unlikely event that burrowing owls are nesting or wintering in burrows on the site at the time of construction, all potential mitigation options were presented. Passive relocation is a standard measure for mitigating potential impacts to burrowing owls, and requires the development of a Burrowing Owl Exclusion Plan to address potential impacts resulting from passive relocation, and which must be approved by CDFW. Refer to response 5.44 for a further discussion of burrowing owl impacts and passive relocation.

Response 5.48

The commenter states an opinion that the avoidance of purple needlegrass grassland community cannot be evaluated without a specific site plan of the solar PV array locations and that indirect impacts to this community could be significant. Purple needlegrass occurs adjacent to the project site in an isolated strip, due to the inclusion of this species in a seed mix used to revegetate the berm on which it is found. This is not a natural occurrence of this community and the project layout avoids any direct impacts to this community by avoiding any development of the berm on which the species occurs. Loss of this patch of purple needlegrass will therefore not occur with project development and would not constitute a loss of a naturally occurring (which this is not) sensitive vegetation community, and as such would not be considered significant.

Response 5.49

The commenter states an opinion that the Draft EIR does not support the evaluation that loss of the potential foraging habitat on the site for raptors is not significant, and concludes that the loss of any "grassland", irrespective of context, should be considered significant. Based on approximate areas reviewed in Google Earth, the project site represents roughly 0.1% of lands that do not show paving or structures (i.e. potential foraging habitat) around San Pablo Bay. If the area of study is expanded to include open lands east of Richmond, the project site represents only 0.05% of the open lands in the immediate region. Unlike much of the lands surrounding San Pablo Bay, the project site is previously disturbed, regularly impacted (mowing and other maintenance), and surrounded by existing industrial, commercial and transportation development. Development of the project would not significantly affect the amount of available habitat for raptor foraging in the region.

Response 5.50

The commenter states that the Draft EIR does not address avian collision risk posed by the project's solar arrays. See Master Response to Letter 5 regarding the general adequacy of biological surveys. The Draft EIR assessed the potential for impacts to listed and special status avian species, raptors, and other nesting birds protected under the MBTA. These analyses were based on standard methodology for establishing existing environmental conditions and assessing potential impacts to these species in the context of specific project conditions. The Draft EIR includes mitigation measures designed to reduce and avoid impacts to migratory birds including pre-construction surveys, avoidance buffers and biological monitoring.

Regarding the potential for PV solar facilities to attract birds that will then collide with and be killed as a result of collision with those panels, little evidence is available to indicate that PV solar panels actually attract birds, no standard for analysis of this issue has been established, and no regulatory agency guidance has been published on this issue. Limited information on bird strikes at solar facilities is available, with the primary study (McCrary, et al, 1986) having been conducted at California's Solar One facility, which used highly reflective mirrors (heliostats) to concentrate sunlight at a centrally located boiler. That study concluded that the mortality effect on local bird populations at the approximate 80-acre site was minimal. It has been suggested that highly reflective panels create the illusion of a body of water that migrating birds may be attracted to, and inadvertently collide with; however, the McCrary study opined that it was the presence of large, man-made ponds and irrigated agricultural fields adjacent the facility that attracted birds to that location. Approximately 27 percent of the recorded bird fatalities at Solar One were water-related species. West Inc. (2014) reviewed impacts at three California solar PV facilities, and concluded that preliminary data indicated that fatality rates for solar arrays are not high in relation to other anthropogenic mortality (e.g., wind projects) and that measurable proportion of the fatalities found at the project may be background and unrelated to the project.

The recent Kagan et al. (2014) study evaluated three solar facilities in southern California, only one of which (Desert Sunlight) consisted of the photovoltaic technology. A total of 61 avian deaths were recorded at the Desert Sunlight facility, and none of these species were state or federally listed. Deaths of birds protected under the MBTA are a misdemeanor offense and do not necessarily equate to a significant impact under CEQA. Impacts to birds protected under the

MBTA and/or considered to be special status by CDFW, but which are not federally or state listed, would only be considered significant if those impacts were at the population-level. Loss of small numbers of non-listed birds would not in and of themselves be considered a significant impact under CEQA.

The deaths of birds reported at the Desert Sunlight Solar Farm (Kagan et al. 2014) identified the cause of death for 39 of the 61 recorded deaths, and impact trauma was the cause of death in 19 of the deaths. Approximately 33 percent of the recorded bird fatalities at Desert Sunlight were water-related species and approximately 60 percent were migrant species. It is noted that Desert Sunlight Solar Farm is located directly in the path between two major desert water bodies (the Salton Sea and Lake Havasu), which presents specific environmental conditions different from those present at the proposed project where the site is not located between two isolated migration stop-over points. Furthermore, the number of reported bird mortalities at the Desert Sunlight facility is minor in relation to the numbers of birds that are present at these two lakes (numbering in the millions), and are likely to move between the lakes.

Spain and Germany have the largest amount of installed solar energy facilities in the world, yet no literature is available to indicate that excessive numbers of bird mortalities are occurring at these facilities. Furthermore, the Kobern-Gondorf PV facility (300 MW) in Germany is used as a nature reserve for endangered species of plants and animals (RSPB 2011). Because of the lack of scientific information regarding this issue and the minimal number of bird mortalities that have been contained in anecdotal reports as compared to bird populations, the impact to migratory birds from collisions with PV panels (particularly reduced-reflectivity panels, as proposed) was considered speculative, and was not further analyzed.

With regards to Ridgway's (California clapper) and California black rails, the commenter refers to the USFWS comments on the Blythe Mesa Solar Project, where USFWS discussed impacts to rails and other similar birds at several large-scale solar facilities and associated infrastructure including gen-tie lines, facility fencing and other structures. The risk of potential impacts to rails at this project site cannot be evaluated in the context of impacts from massive scale solar development in desert regions, as the projects differ significantly in scale and location, and the species differ significantly in behavior and habits. Impacts from massive solar development of 3,000 acres and larger in desert habitat where water is rare and isolated present the most extreme potential for impacts. To use the presumed impacts outlined in the USFWS comments on the Blythe project as an example of potential impacts to this 60-acre solar site, located in an area with comparatively abundant high quality water and marsh habitats is incongruent. Additionally, the Ridgway's and California black rails are non-migratory species that maintain very small ranges compared to Yuma rail and sora rail. Because of limited daily movement by these species, the lack of critical microhabitat features adjacent to the site that are preferred by these species, and the lack of migratory dispersal by these species, impacts to these species from the proposed project are not expected.

Response 5.51

The commenter states an opinion that the Draft EIR is not consistent with Richmond's General Plan because there is no evidence that MCE coordinated with USFWS or CDFW. Coordination with pertinent regulatory agencies is not required to fulfill CEQA environmental review, though

these agencies were provided the Draft EIR for review and comment. Because the site does not provide suitable habitat for any state or federally listed species requiring coordination with resource agencies, no coordination was undertaken. However, mitigation included in the Draft EIR does require coordination with resource agencies if special status species are determined to have established a presence on the project site at the time of pre-construction surveys.

Response 5.52

The commenter states an opinion that the Draft EIR must specify the exact protocol for conducting nesting bird surveys because these are difficult surveys. General pre-construction avian nest surveys do not have published resource agency protocol or standards; however, these surveys are one of the most common surveys conducted, and qualified biologist are well versed in conducting these surveys as appropriate. For clarification Measure BIO-2(b) on Page 4.1-24 has been revised as follows:

> **BIO-2(b) Pre-Construction Nesting Bird Surveys.** If direct disturbance (clearing/grading/vegetation removal) to nesting habitat is unavoidable during the bird breeding season (February 15 to September 15), a qualified biologist shall conduct pre-construction surveys for nesting birds and general avian activity following standard resource agency (e.g. USFWS, CDFW) protocol, in all areas within 500 feet of proposed disturbance areas, prior to any site disturbance (i.e., mobilization, staging, grading, or construction).

Response 5.53

The commenter states an opinion that the mitigation measures for burrowing owl, including details of the pre-construction survey, buffer sizes and compensatory mitigation, are inadequate, and reiterates that protocol surveys should be required prior to impact analysis. CDFW provides recommended guidelines for protocol surveys for burrowing owl to establish where and how specific mitigation may be required; however these are not required surveys and as discussed in Master Response to Letter 5 for a discussion of why protocol surveys are not required under CEQA to evaluate the potential for special status species to occur on a project site. Mitigation Measure B-2(c) requires pre-construction surveys following the guidelines within the CDFW Staff Report (CDFW 2012) to identify active burrowing owl burrows present at the time of construction, and the development of a Burrowing Owl Exclusion Plan should active burrows be encountered during such surveys. For clarification, we have revised measure BIO-2(c) on Page 4.1-25 as shown below. Regarding avoidance buffers, the CDFW 2012 Staff Report provided revised avoidance buffers as an example of standardized buffers; however these buffers are based on studies conducted for oil and gas development in western Canada, and may not be applicable to California populations of burrowing owl exposed to the much lower degrees of disturbance from solar development as compared to oil and gas development. Thus, the example buffers included in the staff report are not necessarily appropriate for all projects and all locations. Earlier CDFW recommended buffers have and continue to provide effective and complete protection of active burrowing owl burrows, and as such, avoidance buffers should be applicable to the specifics of any given project. If present, owls on the project site would be adapted to activity that is currently occurring on and near the site at distances much less than the example buffers provided in the CDFE 2012 staff report. Regarding habitat compensation, the project does not at

this time require compensation for burrowing owl habitat, because the habitat was found generally inadequate for use by the species, and because no impacts to this species have been identified. Should active burrowing owl burrows that cannot be avoided be identified on the project site during pre-construction surveys, then a Burrowing Owl Exclusion and Mitigation Plan would be developed in consultation with CDFW, which may include provision of replacement habitat.

BIO-2(c) **Pre-Construction Burrowing Owl Surveys**. A qualified wildlife biologist (i.e., a wildlife biologist with previous burrowing owl survey experience) shall conduct pre-construction clearance surveys prior to ground disturbance activities (e.g., vegetation clearance, grading, tilling) within all suitable habitat to confirm the presence/absence of burrowing owls (maybe conducted concurrently with BIO-1(b)). The survey methodology shall be consistent with the recommended methods outlined in the 2012 CDFW Staff Report on Burrowing Owl Mitigation. Clearance surveys shall be conducted within 14 days prior to construction and ground disturbance activities and again within 24 hours of construction activity. If no burrowing owls are observed, no further actions are required. The CDFW will be consulted if owl burrows are discovered within the project during these surveys and appropriate measures will be taken to mitigate any adverse impacts on the species. Appropriate measure may include avoidance with minimum avoidance buffers, development of a burrowing owl mitigation and monitoring plan in consultation with CDFW, and compensatory mitigation for loss of breeding and foraging habitat.

Response 5.54

The commenter makes several unrelated statements regarding Avian collisions, including that there could be impacts from polarized light, that the project requires a long-term mitigation monitoring and adaptive management plan for impacts to birds, and that the project requires an incidental take permit from USFWS for the Ridgeway rail. The commenter provided no support for the conclusions regarding polarized light or impacts to Ridgeway rail. Please refer to response 5.50 for a discussion of impacts related to avian collisions.

Response 5.55

The commenters states that the Draft EIR did not include measures to mitigate impacts to special status mammals. Please see Response 5.46.

Response 5.56

The commenter states that the Draft EIR did not address potential impacts of invasive weeds. The project site already supports non-native, non-naturally occurring, post-disturbance non-native grassland and weeds within an existing water treatment basin (i.e. fertilizer pond), and on the artificially seeded cap of an existing landfill. As such, the project site consists almost exclusively of non-native plant species, and does not include any natural vegetation communities or habitats apart from purple needlegrass (*Stipa pulchra*), which is the result of re-seeding of a berm with a

seed mixture that contained this species. Because the site does not contain any native plant or animal communities and is comprised almost exclusively of non-native plant species resulting from the prior highly disturbed nature of the project site, no analysis for the impact of introduced weed species was necessary.

Attachment A to Letter 5 includes a number of attachments. These provide background and technical information on the topics covered in Attachment A Letter 5, but do not directly address the proposed project specifically or address the adequacy, analysis or conclusions of the Draft EIR; therefore, additional responses to these technical and informational attachments are not required.

Response 5.57 (First Comment on Attachment B to Letter 5)

The commenter summarizes the project description and introduces the comments that follow with a summary, also stating an opinion that a revised Draft EIR is required. This general comment introduces the specific comments that follow it in this letter, which are responded to individually below. The responses demonstrate that the Final EIR complies with CEQA and does not require recirculation.

The commenter goes on to provide information on the landfill and landfill cap and states an opinion that settlement of the landfill could compromise the cap, leading to impacts to water quality from infiltration of water through the cap, and that additional mitigation is necessary to address this potential impact.

As discussed in Section 4.2, *Hazards and Hazardous Materials* of the Draft EIR, impacts related to potential release of hazardous materials in the capped landfill area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). This analysis is based on existing conditions on the site and the nature of the proposed solar PV equipment proposed to be installed, in particular the non-penetrating, ballasted units. The solar array on the capped portion would be constructed entirely at or above grade. In addition, the project design team retained the Services of Wood Rodgers, Inc. to perform an onsite geotechnical investigation (March 2015) to specifically address the issues of bearing capacity and differential settlement. The report states that a baseline bearing capacity of 1,000 pounds per square foot (with a maximum of 1,333 pounds per square foot) can be used for the solar array design and that settlement overall is not expected to be more than six inches over the life of the system. As discussed above, the system would not exceed these loads. Most of the settlement has occurred due to the fact that the landfill is approaching 20 years of service. Furthermore, the differential settlement has a radius of curvature of 1 in 300 across the solar array. The low anticipated differential settlement is well within the settlement anticipated by the Chevron Closure Report that mitigates runoff or water quality issues, and would not compromise the landfill cap. The March 2015 geotechnical Investigation has also been included in the Final EIR as a new appendix, Appendix D, for additional clarifying information, and the following text has been added to Page 4.2-9 of Section 4.2, *Hazards and Hazardous Materials:*

> In addition, a Geotechnical Investigation (Wood Rodgers, March 2015 – see Appendix D) has confirmed that "the site appears well suited for the planned improvements when considering potential geotechnical constraints" such as the potential for further landfill

> settlement, and that "foundation considerations were modeled for an allowable bearing pressure of 1,000 pounds per square foot." The planned construction activity loading and direct loading of installed ballasted system would not exceed 330 pounds per square foot for the units and 750 pounds per square foot for construction equipment.
>
> … Although installation of the tracking arrays on the FFPP portion of the project site would involve ground disturbance to a depth of six feet, nine inches – as this area contains clean, compacted fill to a depth of eight feet– the likelihood that construction workers or operational staff could be exposed to residual chemicals in on-site soils is minor. In addition, pole-mounting would involve pile-driving or a similar technique that would minimize the area of soil disturbance.

This additional information is meant to clarify the information in the EIR. As it does not involve the additional of "significant new information" as defined in the CEQA *Guidelines* in Section 15088.5 (such as a new impact or substantial increase in the severity of an impact), recirculation of the EIR is not required. The additional information simply further supports the conclusions and analysis in the EIR that the landfill cap and soils would not be compromised by the proposed construction and operation of the project. No additional mitigation or further changes to the EIR are warranted.

The commenter also states an opinion that Mitigation Measure HAZ -1(a) of the Draft EIR, which requires that MCE "submit…sufficient information about construction and operation parameters as are determined by City and/or RWQCB to be needed to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area," defers evaluation of potentially significant impacts. The commenter also suggests annual surveys as a better mitigation strategy for potential impacts regarding landfill settlement. However, the analysis regarding settlement potential and associated impacts is included in the Final EIR (see Response 5.30), and because impacts would be less than significant, additional mitigation is not required. The additional information referred to in the measure would be required in any case to comply with the RWQCB Order, and the order's intent to ensure appropriate safety thresholds are met. In addition, regular inspections of the landfill cap are currently conducted as part of the existing regulatory oversight (RWQCB Order No. R2-2012-0015); as stated in Appendix B of the Draft EIR, "Alterations to the landfill and appurtenances must be in accordance with Order No. R2-2012-0015 and may not negatively impact the cap, GPS, landfill gas collection and vent system, and existing stormwater conveyance." As discussed in Section 4.2, *Hazards and Hazardous Materials* of the Draft EIR, impacts related to potential release of hazardous materials in the capped landfill area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). No changes to the EIR are necessary. It should also be noted that the MCE sent both the Notice of Preparation of an EIR and Notice of Availability of a Draft EIR to the RWQCB, and the RWQCB had no comments on the scope, project or Draft EIR.

Response 5.58

The commenter states an opinion that the Draft EIR's conclusions that impacts to water quality, specifically in regards to potentially increased runoff and its erosion potential on the landfill site, would be less than significant with mitigation are unsupported, because specific information about soil porosity and permeability is not included in the Draft EIR. Impacts related to water

quality are discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR; the analysis there supports the conclusions that impacts to water quality would be less than significant with implementation of Mitigation Measure HYD-2. The commenter also quotes a report by ARCADIS from 2012, stating "New relatively impervious surfaces will cause an increased rate of runoff discharge during storm events." This statement is acknowledged and does not conflict with the analysis of conclusions of the EIR. The commenter inserted, parenthetically, "such as solar panels" into the quote; it should be noted that this phrase is not part of the ARCADIS document and was added by the commenter.

The commenter also states an opinion that stormwater or other precipitation may drip off of the proposed solar PV modules and impact the covering soils or the stability of the landfill cap. The commenter also states an opinion that additional study is needed to evaluate erosion potential to the soils above the landfill cap. As discussed in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, "The topography where the modules would be located is generally flat. Areas temporarily disturbed during construction-related activities would be revegetated (either naturally or re-planted) consistent with a project-specific revegetation plan to avoid changes to peak flows and runoff volume. Impacts would be less than significant." Excessive runoff is not anticipated beyond a 1,000 year storm, which the site is designed for (Wood Rodgers, March 2015) with an existing system of concrete drains that meander throughout the site. Existing vegetation would remain and be enhanced where disturbed to maintain drainage function. Localized "drip line" effects would be further avoided through close module spacing.

As discussed in detail in Section 4.3, *Hydrology and Water Quality*, the solar array would not significantly change drainage at the site or increase runoff. Existing drainage facilities would not be compromised and would continue to operate as designed. No changes to the EIR are warranted. As discussed under Impact HYD-3 in Section 4.3, *Hydrology and Water Quality*, of the Draft EIR, the project would incrementally increase impervious surfaces on the site, but because similar drainage patterns would result, impacts would be less than significant.

Response 5.59

The commenter lists chemicals that may be present on the former fertilizer pond portion of the site and states an opinion that installation of piles for the proposed solar arrays on the filled fertilizer pond could mobilize contaminants. The commenter also states an opinion that the depth of clean fill at the fertilizer pond site is unknown, and reiterates the opinion that pile driving could result in impacts related to hazardous materials.

Mobilization of contaminants could occur if the piles would extend through the clean fill and into contaminated areas or groundwater. Imported engineered fill was used to bring the pond area to the existing grade, and, as discussed in the Draft EIR in Section 4.2, is composed of approximately eight-foot deep compacted fill where the proposed piles would be located. The pile driving process would not disturb the underlying fertilizer pond bed because maximum pile depth would not exceed approximately seven feet, as shown on Figure 2-8 of the Draft EIR. Therefore, impacts would be less than significant and no changes to the EIR are warranted.

The commenter also opines that an engineering evaluation of the fill on the fertilizer pond site is needed to complete the EIR. This comment is noted; however, based on the information above,

such a study is not required to assess potential environmental impacts of pile driving on the pond site to the depths proposed. As discussed in Section 4.2, *Hazards and Hazardous Materials* of the Draft EIR, impacts related to potential release of hazardous materials in the filled fertilizer pond area of the site would be less than significant with implementation of mitigation measures HAZ-1(a) and HAZ-1(b). No changes to the EIR are necessary.

Response Regarding Attachments to this Letter:

Letter 5 includes a number of attachments. Responses to two of these – letters from the commenter's consulting biologist and the commenter's consulting geologist – are included above. The remaining attachments, including attachments to the consulting biologist's and geologist's letters, provide background and technical information on the project site and on topics covered in Letter 5, but do not directly address the adequacy, analysis or conclusions of the Draft EIR; therefore, additional responses to these technical and informational attachments are not required.

Regarding one specific attachment, it should be noted that the Chevron Powerpoint presentation attached to Mr. Hagemann's letter references a conceptual solar project for the site that would require 55,000 cubic yards of import and various other design assumptions. The associated information is not relevant to the proposed project, which was designed with far less grading and site modification, as discussed in detail in Section 2.0, *Project Description*, of the EIR, or the EIR's analysis and conclusions.

Environmental Impact Report Public Hearing Transcription

August 19, 2015 at 7:00 PM, City of Richmond City Council Chambers

Public Comments:

1. Tim Laidman
   1722 Lexington Avenue
   El Cerrito, CA 94530
   (51) 260-9393
   timelaidman@yahoo.com

TIM LAIDMAN: "That's the quickest I ever got called on in a comment period in this room. I'm in shock. I just want to say thank you to MCE. I'm a proud 100% Deep Green customer now in El Cerrito, which got added to the MCE program without me spending hundreds of hours like I did in Richmond. So I was very happy to get that bonus reward. I really want to state in favor of this project that the building of the solar collectors photovoltaics on the Chevron land is a great use of the brown fields. I hope we can do many more projects and that was one of the reasons that I supported expanding MCE to the Richmond area because it's a great combination between the city of Richmond which has the space to put things and not a NIMBY (not in my backyard) attitude that you might find in Marin County and some of the places that you might want to put solar panels, and a welcoming to get the jobs and the other benefits that accrue to having the project here. So it's a good mix between Marin County and Richmond. Since Richmond has joined, many other cities as they mentioned and areas have expanded the MCE territory. So I'd like to say I'm very much in favor of this project. Thank you."

   Response: These comments do not pertain to the analysis or conclusions of the Draft EIR and therefore do not require a detailed response pursuant to CEQA, but are noted and will be forwarded to MCE's Board of Directors for their consideration.

2. Stephanie Henry
   23 Maine Avenue
   Richmond, CA 94804
   (510) 730-0228

STEPHANIE HENRY: "This is really too quick to be called up for something. I'm used to waiting for like 3 hours. I'm still getting my notes together. Anyway a couple things, I want to advocate for local hire. There's 50% local hire. There are these standards in other cities. Some cities do a better job at enforcing these, and other cities don't. So what's really important is for the developer to look to exceed the 50% local hire. Not only that, [but] to also consider local grassroots organizations that are getting involved in the solar/the clean energy market. Not just institutions, but organizations that work with the people within the community, because the local organizations have the connect with the local people and they will bring the talent to the table. We have a lot of talented local people here in the city of Richmond that should be hired right here and it's more than 50 %. I mean, you're talking about 80 jobs. I'm sure, I mean, there's 20 in here already. So we want to get like 100 jobs hopefully. So that's another thing. Another is the local materials: using panels that are sourced locally here, close to the project. And those are the things that…oh another thing is the unions. We want the workers to be represented, so if

there is no union or if there is no union that they are being paid prevailing wage for the work at least, at the bare minimum living wage. Those are important."

Response: These comments do not pertain to the analysis or conclusions of the Draft EIR and therefore do not require a detailed response pursuant to CEQA, but are noted and will be forwarded to MCE's Board of Directors for their consideration.

3. Vivian Haung
   12818 San Pablo Avenue
   Richmond, CA 94805
   (510) 236-4616
   vivianh@apen4ej.org

VIVIAN HUANG: "Good evening. I'm Vivian Huang with Asian Pacific Environmental Network. So we have been organizing in Richmond for over 20 years and when Richmond was first considering joining Marin Clean Energy, one of our biggest asks was that we really wanted to make sure that we were looking at ways to really generate solar within our local community. So I think similar to what a lot of the previous speakers have said is that's really the way we're able to make sure that the jobs are actually going to residents locally, that we're actually giving more community power and more community ownership to people to understand how to develop their energy needs. So, we are obviously very supportive of this project because it's one step forward for us to really develop a site that is very toxic and polluted and really turn it into something that represents clean energy. But I think it's very important in this process that we make sure that there is a really strong commitment to hiring folks locally and finding ways to connect folks to the unions, because we do want to see more pathway jobs in the solar sector. And then I don't want us to just stop here, right? I really want us to think about what are all the ways that we can continue building renewable energy projects locally in our communities, like on the roof tops of our different community centers, of our public schools, of our recreation centers, other brown fields, and reclaimed lands that are throughout our city and really use those sites as catalysts for really supporting the people that are going through the job training, that are looking for work in this sector, so that we can really make Richmond as clean, green and supportive of this healthy future that we all want. Thank you."

Response: These comments do not pertain to the analysis or conclusions of the Draft EIR and therefore do not require a detailed response pursuant to CEQA, but are noted and will be forwarded to MCE's Board of Directors for their consideration.

4. Ratha Lai
   2530 San Pablo Avenue
   Pinole, CA 94564
   (510) 848-0800
   Ratha.lai@sierraclub.org

RATHA LAI: "Good evening everybody. My name is Ratha Lai. I'm with the Sierra Club, San Francisco Bay Area Chapter. Quick show of hands, who knows what the Sierra Club is? Alright, not bad, not bad! You know, that's better than most, that's better than most. So you know the Sierra Club is an environmental organization. We try to advocate for the environment so we

work on, you know, making our air cleaner to breathe, making water much better. And one of the things that we work on too is climate change. That's real, you know? We're very lucky that we haven't had a disaster like Hurricane Katrina, or else we would be talking in a completely different context. So when we are talking about something like building solar as a way to reduce greenhouse gasses, as a way to provide more local jobs, that's fantastic. You know, we're already up against a timeline and we should be trying to speed things up, like projects like this. So, we're supportive of this project, but we also want to make sure that you know, we're still making steps and this is all unexplored territory, so we have to make sure we're being inclusive and making sure that all the voices, all the voices here, all the voices who are not here, are being included in discussions moving forward. Making sure that the unions are also included, making sure that people of color are included. And also, I just want to like, you know, give a shout out to all the Richmond BUILD graduates right here real quick. And, I hope to…yea, you guys are awesome, and I hope to hear from you all too."

Response: These comments do not pertain to the analysis or conclusions of the Draft EIR and therefore do not require a detailed response pursuant to CEQA, but are noted and will be forwarded to MCE's Board of Directors for their consideration.

5. Carol Weed
   1277 Avenida Sevilla
   Walnut Creek, Ca 94595
   (510) 409-4055
   carol4ofa@gmail.com

CAROL WEED: "I'm not speaking really either for or against it. I had some questions and this may not be the proper arena. But actually, I wrote down two and then I remembered one more. So I'll ask first, Developer Greg Page of STION. As I heard about [in] the discussion again after having read the EIR of these potential nesting birds and the need to defer action to non-seasonal times, you know when the birds aren't going to be a risk and so on, it occurred to me that as you're running up to a timeline of November, and then connecting in December, that doesn't give you much leeway for the 30% Federal tax credit."
RESPONSE (GREG PAGE): "Very true."
CAROL WEED: "So, it makes me very nervous that, I mean, you're already cutting it so close, what are you going to do if anybody finds one of those birds?"
RESPONSE (GREG PAGE): "We would probably have to address that when it would come up. I mean I know…"
CAROL WEED: "Why can't you get it done sooner? Why are you waiting until November? No I don't mean the birds. I'm talking about why aren't you thinking of a timeline for construction that builds in some sort of a leeway so that you're connected by December 31st, because I thought that was the deadline?"
RESPONSE (GREG BREHM): "Well actually, the winter is the non-nesting season. The Spring is when they'd be nesting."
CAROL WEED: "Forget the birds. I was, you don't know my sense of humor. Ok, so with the timeline it seems to me like all the other things that can possibly happen, that could go wrong, like suddenly solar panels aren't available because somebody else over bid you, or whatever. So, can't things be, can't you have a June deadline that builds in some time so that…I mean, it's your 30% tax credit, so maybe I shouldn't be…"

RESPONSE (GREG BREHM): "The biggest impediment to meeting that timeline any faster is the interconnection from PG&E. They're interconnection facilities won't be ready until that August or September timeframe next year. The project will likely be done well before that."
CAROL WEED: "Oh, thank you. That wasn't clear to me."
RESPONSE (GREG PAGE): "Anywhere from 30 to 90 days to actually go from start to finish to complete the project for the whole build so if there is something that does…"
CAROL WEED: "So it will just be sitting there waiting to be connected to PG&E to view the magic."
RESPONSE (GREG PAGE): "Yes, the biggest headache in these types of projects is really the interconnection process with PG&E or the Southern Cal Edison.
CAROL WEED: "Thank you."
RESPONSE (GREG PAGE): "Yea, they don't like these projects much."
CAROL WEED: "Thank you. Then I had a question about this, because I've just begun to understand with the preparation that apparently Chevron made some time ago to make this hazardous site buildable to the extent that you're able to build on it with the membrane and 18 inches of soil. Is there anything, what happens if in the construction process, or in an earthquake or some settling over time, one of these tubs or other things penetrates that? Is it..."
RESPONSE (GREG PAGE): "What are the risks associated with that?"
CAROL WEED: "I'm not, I'm a little bit less concerned with the risks, but whose responsibility is it, and does it create a, does the whole thing have to be turned off, or I mean is that really a risk?"
RESPONSE (GREG PAGE): "As the project is built and completed and commissioned, there will be ongoing monitoring at the site and always making sure that things are functioning correctly, making sure that there isn't a section that might have settled a little bit more than another on top of a landfill. On landfills all sections settle incrementally at different stages. This one has settled quite a bit already over the years that it's been out there, so we're not really projecting it to move too much, but in other cases across the country that we've done other brown fields certain areas move a little bit more and you have to go in and add more top soil to that and add more compaction. But it's just a matter of going through and looking over the array and making sure that those areas are safe and compliant with what's in accordance with EIR and the landfill itself."
CAROL WEED: "And as you start do you assume that what Chevron has done and the membrane that they have underneath there, whatever membrane is, is intact? I mean, what if it's just got a bunch of dirt on top of something that's not real?"
RESPONSE (GREG BREHM): "Well the landfill is actively maintained and monitored. There are monitoring wells around the site."
CAROL WEED: "Thank you. That makes me feel better."
RESPONSE (GREG BREHM): "So it's completely under an existing maintenance regime."
CAROL WEED: "Ok and you had, somebody took the sheet. I was going to ask you to prompt me on my last question."
RESPONSE (GREG BREHM): "Membrane integrity and the disposal of the panels."
CAROL WEED: "Oh yes. Because you, there had been mention of properly disposable. I was just wondering, I'm not doubting that they would be properly disposed. What is proper disposal?"
RESPONSE (GREG PAGE): "Proper disposal in these types of product that STION manufactures themselves, it is a product that is 100% recyclable and actually can be put into any

landfill, or anywhere. They can actually be crushed up and recycled as glass. So there's no harmful contaminants or anything like that in the manufacturing process at all."
CAROL WEEK: "Thank you very much."
RESPONSE (GREG BREHM): "I'll just add that there is another type of thin-film manufacturer out there that is a very big name that I won't mention, which does have some toxic chemicals. We are not using that panel on this project on purpose. For this project, the panels are actually manufactured in the US as well. We're trying to get as much US manufactured content as possible."

Response: The commenter asks questions and raises concerns related to potential impacts to nesting birds, geologic suitability, project construction and operation on sites where hazardous materials may be present. These comments do not raise specific technical or informational issues regarding the Draft EIR; however, the commenter is referred to the responses above where these topics are discussed in detail, including responses 2.2, Letter 5 Master Responses, and responses 5.19, 5.30 through 5.37, 5.42 through 5.44, 5.47, 5.50, 5.52, and 5.57 through 5.59.

Those comments that do not pertain to the analysis or conclusions of the Draft EIR are noted and will be forwarded to MCE's Board of Directors for their consideration.

Appendix A

Notice of Preparation (NOP)
NOP Comment Letters
Initial Study

NOTICE OF PREPARATION
OF A DRAFT ENVIRONMENTAL IMPACT REPORT
MARIN CLEAN ENERGY RICHMOND SOLAR PV PROJECT

DATE: April 8, 2015

TO: State Clearinghouse, Responsible and Trustee Agencies, and Interested Parties

LEAD AGENCY: Marin Clean Energy

Marin Clean Energy (MCE) is a Joint Powers Authority governed by a seventeen-member Board of Directors representing each of the participating jurisdictions, which include the City of Belvedere, Town of Corte Madera, Town of Fairfax, City of Larkspur, City of Mill Valley, City of Novato, City of Richmond, Town of Ross, Town of San Anselmo, City of San Pablo, City of San Pablo, City of Benicia, City of El Cerrito, City of San Rafael, City of Sausalito, Town of Tiburon, unincorporated Napa County and the County of Marin.

MCE intends to prepare an Environmental Impact Report (EIR) for a proposed 10.5 megawatt (MW) utility-scale solar photovoltaic (PV) project. In accordance with Section 15082 of the State CEQA Guidelines, MCE has prepared this Notice of Preparation to provide responsible and trustee agencies and other interested parties with information describing the proposal and its potential environmental effects. All environmental topics on the CEQA *Guidelines*' Appendix G Checklist will be studied in the EIR and/or Initial Study. MCE has suggested that at least the following environmental factors could be affected by the project:

- Biological Resources
- Hazards and Hazardous Materials
- Hydrology/Water Quality

PROJECT SPONSOR: Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, California 94901

PROJECT LOCATION: The proposed project is due west of the intersection of Castro and West Hensley Streets on three separate assessor parcels (561-100-038-0, 561-100-034-9, and 561-100-037-2) in the City of Richmond, in Contra Costa County, California. MCE has an option to lease this 60-acre site from the Chevron Products Company for solar energy development. Approximately 40 of these acres are a capped landfill, while the remaining 20 acres consist of filled and compacted fertilizer ponds.

PROJECT DESCRIPTION: A proposed 10.5 MW PV system at the project site would deploy approximately 80,000 thin-film, non-reflective solar panels, which, in combination with 11 utility scale inverters, would convert sunlight into electricity. This would be fed directly into the Pacific Gas & Electric (PG&E) utility grid from a point adjacent to the site.

The project would be built in two phases. Phase I would involve installation of a non-penetrating, ballasted, fixed-tilt PV array on the southern approximately 13 acres of the landfill. The panels would extend from about 30 inches above grade to a maximum height of eight feet and would be south-facing at a 20-degree tilt in a series of east-to-west rows.

Phase 2 would involve installation of a PV array on the northern 27 acres of the landfill area and 20 acre filled and compacted fertilizer pond. The Phase array 2 on the northern portion of the landfill would use a similar non-penetrating, ballasted, fixed tilt system as Phase 1, while the array on the compacted fertilizer pond site would use single axis tracking, ground mounted arrays. These panels would extend from at least 30 inches above grade to a maximum of height of 14 feet in its highest position. They would be aligned in a north/south orientation, spaced approximately 11 feet apart (east to west), and sloped at zero degrees.

All inverters and transformers would be mounted on concrete pads. The pads on the capped landfill would be placed above ground so as to not penetrate the landfill cap. Multiple pad mounted transformers would be connected by above-grade conduits to switching substations and pole mounted metering connected to existing 12.47 kilovolt PG&E distribution lines. The electrical equipment would pose no electrical shock risk and would be safe for human and wildlife contact, and all electrical conduits would be rated for outdoor use. The proposed site plan is attached to this notice.

Site access during construction and operation would be along existing paved roadways, with parking in the City of Richmond and/or the adjacent Chevron Products Company site. All deliveries and materials would enter by the existing Hensley Street gate onto paved access roads to the project site.

Construction of Phase 1 would begin in the second quarter of 2015 and would be completed during the second quarter of 2016. Construction of Phase 2 would begin in the third quarter of 2015 and be completed during the fourth quarter of 2016. The construction workforce is expected to peak at 100 personnel, and would consist of pre-qualified laborers, electricians, craftsmen, supervisory, support and management staff. Construction would generally occur between 7:00 AM and 5:00 PM on weekdays, though additional work hours and days may be necessary to make up for unexpected delays or testing.

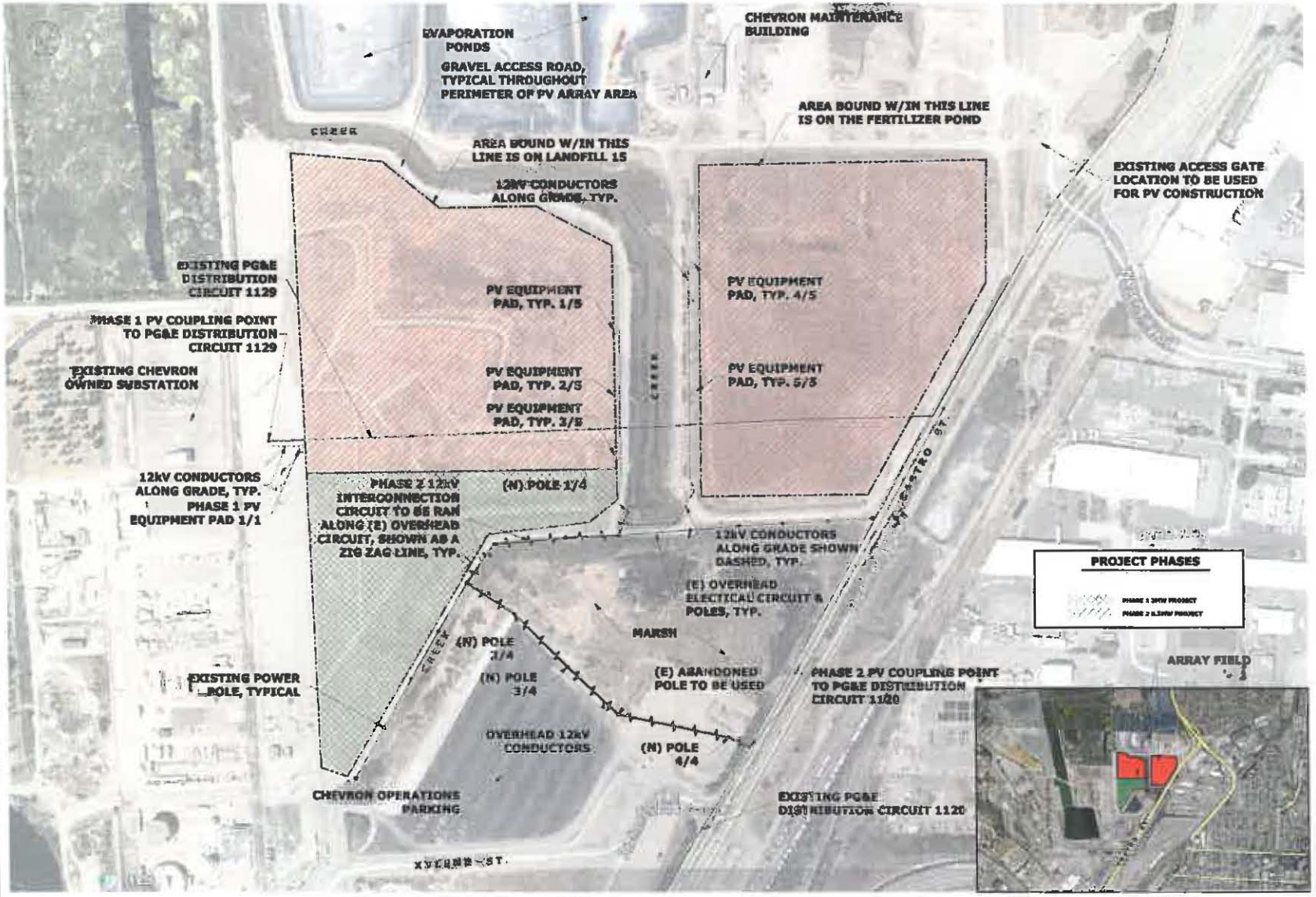
Construction and installation would require minimal vegetation removal and all disturbed areas would be re-vegetated with native grasses and wildflowers. The entire project would use less than 500 cubic yards of fill on the landfill and the only earthmoving on the compacted fertilizer pond would involve removal of a temporary berm and redistribution of the approximately 2800 yards of soil among various low spots on this portion of the project site. Chevron will use any excess soil generated from the project at other locations within the refinery property. All construction sites would be stabilized to minimize wind and storm water erosion and watering and other approved measures would be used to control dust onsite.

REVIEW PERIOD: State CEQA Guidelines require this Notice of Preparation to be circulated for a 30-day public review. Marin Clean Energy welcomes agency and public input during this period regarding the scope and content of environmental information to be included in the Draft EIR. **Responses to this Notice of Preparation may be submitted, in writing, by 5:00 p.m. on May 11, 2015** to:

Greg Brehm, Director of Power Resources
Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, California 94901
email: gbrehm@mcecleanenergy.org

Greg Brehm, Director of Power Resources
Marin Clean Energy

April 8 - 2015
Date



OVERALL PV ARRAY SITE PLAN
SCALE: 1"=120'-0"

SITE VICINITY

Richmond Solar PV Project

Initial Study

Prepared by:

Marin Clean Energy
1125 Tamalpais Avenue
San Rafael, California 94901

Prepared with the assistance of:

Rincon Consultants, Inc.
180 Grand Avenue, Suite 400
Oakland, California 94612

November 2015

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INITIAL STUDY

1. Project Title:	Richmond Solar Project
2. Lead Agency/Project Sponsor Name and Address:	Marin Clean Energy 1125 Tamalpais Avenue San Rafael, California 94901
3. Contact Person and Phone Number:	Greg Brehm Director of Power Resources Marin Clean Energy (415) 464-6037, gbrehm@mcecleanenergy.org
4. Project Location:	The project site is located due west of the intersection of Castro and West Hensley Streets on three separate assessor parcels (561-100-038-0, 561-100-034-9, and 561-100-037-2) in the City of Richmond, in Contra Costa County, California. Marin Clean Energy (MCE) has an option to lease this 60-acre site from the Chevron Products Company for solar energy development. Approximately 40 of these acres are a capped landfill, while the remaining 20 acres consist of filled and compacted fertilizer ponds.
5. General Plan Designation:	Business and Industry
6. Zoning:	M-2 (Light Industrial)

7. Description of Project:

The proposed project would involve site preparation, installation and operation of a 10.5 megawatt (MW) solar photovoltaic (PV) system at the project site. The installation would include approximately 80,000 thin-film, non-reflective solar panels, which, in combination with 11 utility-scale inverters, would convert sunlight into electricity. This would be fed directly into the Pacific Gas & Electric (PG&E) utility grid from a point adjacent to the site.

The project would be built in two phases. Phase I would involve installation of a non-penetrating, ballasted, fixed-tilt PV array on the landfill area (approximately 40 acres). The panels would extend from about 30 inches above grade to a maximum height of eight feet and would be south-facing at a 20-degree tilt in a series of east-to-west rows.

Phase 2 would involve installation of a PV array on the 20 acre filled and compacted fertilizer pond. The array on the compacted fertilizer pond site would use single axis tracking, ground mounted arrays. These panels would extend from at least 30 inches above grade to a maximum

of height of 14 feet in its highest position. They would be aligned in a north/south orientation, spaced approximately 11 feet apart (east to west), and sloped at zero degrees.

All inverters and transformers would be mounted on concrete pads. The pads on the capped landfill would be placed above ground so as to not penetrate the landfill cap, and the tracking arrays have been designed to avoid penetration of the pond liner on the filled former fertilizer ponds. Multiple pad-mounted transformers would be connected by above-grade conduits to switching substations and pole mounted metering connected to existing 12.47 kilovolt PG&E distribution lines. The electrical equipment would pose no electrical shock risk and would be safe for human and wildlife contact, and all electrical conduits would be rated for outdoor use.

Site access during construction and operation would be along existing paved roadways. All deliveries and materials would enter by the existing Hensley Street gate onto paved access roads to the project site. Construction staging and parking would occur adjacent to the northwest of the landfill on an existing paved parking lot.

Construction of Phase 1 would take approximately 6 to 12 months to complete. Construction of Phase 2 would begin ~~approximately three months following~~ concurrently with the start of construction for Phase I and would take approximately 15 12 to 18 months to complete. Thus total construction from start to finish would take approximately 12 to 18 months. The construction workforce is expected to peak at 100 personnel, and would consist of pre-qualified laborers, electricians, craftsmen, supervisory, support, and management staff. Construction would generally occur between 7:00 AM and ~~5:00~~ 7:00 PM on weekdays, though additional work hours and days may be necessary to make up for unexpected delays or testing. The most intense period of construction traffic would be the first two months of construction on Phase I, which would require approximately 150 truck trips over approximately eight to nine weeks, as well as up to 10 to 15 worker vehicle trips per day. Thus, there would be an average of up to approximately 18 daily construction trips during the construction period. Construction traffic would be concentrated in the hours between 7:00 AM and 2:00 PM.

Construction and installation would require minimal vegetation removal and all disturbed areas would be re-vegetated with native grasses and wildflowers. Site preparation would require up to 500 cubic yards of fill on the landfill and removal and redistribution of a temporary berm on the fertilizer pond area of approximately 3,400 cubic yards of soil among various low spots on this portion of the project site. Grading would be balanced onsite; no export or import of cut or fill material is proposed. Construction sites would be stabilized to minimize wind and storm water erosion and watering and other approved measures would be used to control dust onsite. At the end of the project's useful life (anticipated being 30 years or more), the proposed solar facility and associated infrastructure may be decommissioned. Water demand for dust control, concrete mixing and soil compaction during construction is anticipated to total a maximum of three acre feet over the projected 11-month construction period. Water demand for project operation is anticipated to total a maximum of 0.6 acre feet per year for annual washing. Reclaimed water would be supplied by the East Bay Municipal Utilities District for these uses as available.

8. Surrounding Land Uses and Setting:

The proposed solar array is planned for construction and operation at two adjacent parcels within the Chevron Richmond Refinery property near the intersection of West Hensley Street and Castro Street/Richmond Parkway in the City of Richmond, California. The sites were operated as a landfill and evaporation pond until 1987. In the mid-to late- 1990s, the approximately 20 acre evaporation pond site was filled, re-contoured, re-vegetated, and is currently being maintained as a vacant lot; the approximately 40 acre landfill site was filled, re-contoured, caped, and re-vegetated and has been maintained as a closed landfill since March 1998. (Closure Certification Report Landfill15, Waste Discharge Order, Chevron Richmond Refinery, D&M Job No. 38825-001-179 was reviewed and is available upon request). The evaporation pond site contains a berm that was put in place to ensure that water was contained on the site. Since the closure of the pond site, this berm is no longer necessary.

In 1995, the 13-acre area that received waste from the Pollard Landfill was closed and capped with a vegetated cover. In 1996-1997, the remaining 28 acres of the landfill was closed and capped with asphalt (8.5 acres) or vegetated (19.5 acres) cover. The final cover over the landfill area is composed of a layer of 40-milimeter HDPE membrane covered by either two inches of asphalt concrete in the paved areas or 12 inches of vegetated fill in the non-paved areas (ARCADIS, 2012). A methane gas collection and vent system as well as surface drainage control facilities were constructed with the cover in order to protect groundwater resources, control methane emissions, and control stormwater (Dames & Moore, 1998).

Major arterials providing immediate access to the project site include Interstate 580 and Richmond Parkway. The site is located in an industrial area of Richmond which includes uses such as oil refining operations, energy producing facilities, railroad operations, and storage and manufacturing facilities. There are no residential or retail uses in close proximity to the project site. The nearest such uses are residences located approximately 0.25 miles northeast of the site on Vernon Avenue. Peres Elementary School is located approximately 0.45 miles east of the site (across Richmond Parkway).

The project site is located within the M-2 (Light Industrial) Zoning District in the City of Richmond, within Contra Costa County. Contra Costa County is located in the East Bay area of the San Francisco Bay Area region of California. The City of Richmond is located on the western side of the County, with the City of Berkeley to the southeast and surrounding the City of San Pablo. The San Francisco Bay is directly to the north, south, and west of the city. The project area is approximately 60 acres in size, and is located due west of the intersection of Castro and West Hensley Streets. The site is in an industrial area and is directly surrounded by land that is also designated as Business and Industry and zoned Research and Manufacturing (M-1).

9. Other Public Agencies Whose Approval is Required:

The proposed project must be approved by the Marin Clean Energy Board of Directors and the City of Richmond's Design Review Board.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forest Resources	☐ Air Quality
■ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	■ Hazards & Hazardous Materials	■ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities/Service Systems	■ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

■ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potential significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature Date

ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. AESTHETICS				
-- Would the Project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	■	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	■	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	■	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	■	☐

a) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located in an industrial zone on a property that was previously used as a landfill and fertilizer evaporation pond. The project site is not located near any scenic routes and there are no public views of scenic resources available from or through the site. Thus the project would not block such views from public viewing places. Therefore, the proposed project would have a less than significant impact on scenic vistas.

b) ***LESS THAN SIGNIFICANT IMPACT.*** The project site is located in an industrial zone on a property that was previously used as a landfill and fertilizer evaporation pond. The site location is a vacant, generally flat property with no scenic resources such as trees, rock outcroppings or historic buildings. Therefore, the proposed project would have a less than significant impact on scenic resources.

c) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located in an industrial zone on a property that was previously used as a landfill and fertilizer evaporation pond. The property is otherwise vacant and is surrounded by other industrial uses. The site is an open, vacant area with ruderal vegetation and grasses throughout the approximately 60 acres. Dirt roads and paved roads exist on the perimeter and a few berms exist on both the landfill site and the area surrounding the former fertilizer pond area. A concrete lined ditch/channel also flows through the landfill site. While onsite character is generally open grasslands, the area surrounding the site is characterized by industrial use. The installed solar array panels would have a maximum height of 14 feet, with most being a maximum height of 8 feet. Additionally, the project site is not visible from the nearest residential area due to a distance of 0.25 miles and existing obstructions. While the visual character on the project site would change with installation of

solar panels, the impact would not be significant because the character would be consistent with the industrial use and designation of this area in the City and also because the site lacks visibility from any public viewpoints. Therefore, the project would have less than significant impact on visual character and quality.

d) ***LESS THAN SIGNIFICANT IMPACT***. There are currently no sources of night lighting or glare on the project site. The proposed project would not include any exterior lights other than low, downward-focused security lighting where necessary. However, glare would be produced from the reflection of sunlight off of the glass surfaces of the proposed solar panels. A solar panel comprises numerous solar cells. A solar cell differs from a typical reflective surface in that it has a microscopically irregular surface designed to trap the rays of sunlight for the purposes of energy production. The intent of solar technology is to increase efficiency by absorbing as much light as possible (which further reduces reflection and glare). Solar glass sheets (the glass layer that covers the PV panels) are typically tempered glass that is treated with an anti-reflective or diffusion coating that further diffuses the intensity of glare produced. Solar panels without an anti-reflective coating have approximately the same reflectivity as water; with an anti-reflective coating, the reflectivity is significantly less than that of water.

The solar panels installed over the fertilizer evaporation pond would use trackers to allow the panels to follow the sun in its path from east to west across the southern sky as the day progresses. These devices orient the solar panels perpendicular to the incident solar radiation, thereby maximizing solar cell efficiency and potential energy output. Some of these tracking devices use GPS, which enables the tracking to be extremely accurate, and are capable of positioning the array so that the incident rays would be at or very near a surface normal (perpendicular angle). During midday conditions, when the sun is high in the sky, the law of reflection indicates that the reflected ray would be at an equally low angle and reflected in a direction toward the light source or back into the atmosphere away from receptors on the ground. When the sun is low on the horizon (near dawn or dusk), the sun's angle in the sky is low; however, reflected rays would still be directed away from ground-level receptors. The panels would not be expected to cause extreme visual discomfort or impairment of vision for residents because the panels are designed to absorb as much sunlight as possible and therefore would have minimal reflectivity. The type of glare that could be expected in the most extreme conditions, when the sun is low in the sky, is a level of veiling reflection that may cause viewers to be less able to distinguish levels of contrast, but not cause a temporary loss of vision. The solar panels installed above the landfill would be fixed tilt panels and would not follow the sun throughout the day.

Due to the relatively low reflectivity and because the site would not generally be visible from roadways, the panels would not be expected to cause visual impairment for motorists traveling on nearby roadways. Effects would likely be the greatest to motorists traveling east in the early evening, when the sun is at its lowest arc. However, the project site is not bounded by a public, east-west roadway and no motorists will be coming from the west. Similarly, residents of the area would not be affected by the glare, as the nearest residences are approximately 0.25 miles away and do not have an obstructed view of the project site. Therefore, the proposed project would result in less-than-significant impacts related to light and glare.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. AGRICULTURE AND FOREST RESOURCES				
-- In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	■
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	■
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	■
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	■
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	■

a, b, e) ***NO IMPACT***. The project site is within an urban area that is zoned for industrial use. No agricultural activities are present on or adjacent to the property. The California Department of Conservation's 2012 map of Contra Costa County Important Farmland shows that the project site is within an area of "urban and built-up land" and not within an area of "prime farmland" (Department of Conservation, 2012). The project site is not under Williamson Act contract. The project site is not located on agricultural land and the proposed project would not involve any development that could result in the conversion of farmland to non-agricultural uses. For these reasons, the project would have no impact with respect to conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use; conflict with existing agricultural zoning or Williamson Act contract; or other conversion of farmland to non-agricultural use.

c, d) ***NO IMPACT***. The project site is not located on or near forest land or timberland, nor are there any trees within the project area. The project would have no impact on such resources.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. AIR QUALITY				
-- Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	■	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	■	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	■	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	■	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	■

a, b, c, d) ***LESS THAN SIGNIFICANT IMPACT***. The San Francisco Bay Area Air Basin (SFBAAB) is in nonattainment for the federal and state standards for ozone, as well as the state standard for particulate matter (PM_{10} and $PM_{2.5}$) and the federal standard for 24 hour $PM_{2.5}$ (Bay Area Air Quality Management District [BAAQMD] Website, June 2015). Thus, the region currently exceeds several state and federal ambient air quality standards and is required to implement strategies to reduce pollutant levels to recognized acceptable standards.

The *2010 Clean Air Plan* is the most recently approved regional Clean Air Plan (CAP). It was adopted in September 2010 by BAAQMD and updated the Bay Area ozone plan. This plan provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate. The plan is designed to provide a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases in a single, integrated plan. The *2010 Clean Air Plan* developed Transportation Control Measures (TCMs) by reviewing the *2005 Ozone Strategy* measures, and modifying and expanding them based on new investment and policy decisions and public input. In particular, the TCMs have been updated to reflect the policy and investment decisions made in the Metropolitans Transportation Commission's (MTC) regional transportation plan, *Transportation 2035: Change in Motion.* The 2010 Clean Air Plan is also based on population and employment forecasts from the Association of Bay Area Governments (ABAG). The proposed project would not increase the population in the region and would thus be consistent with the 2010 Clean Air Plan. Therefore, impacts related to the CAP are less than significant.

Emissions generated by the proposed solar generation facility would include temporary construction emissions and some minor long-term operational emissions associated with maintenance activities. Construction activities including site preparation which would require up to 500 cubic yards of fill on the landfill and removal and redistribution of a temporary berm on the fertilizer pond area of approximately 3,400 cubic yards of soil and the operation of construction vehicles and equipment over unpaved areas have the potential to generate fugitive dust (PM_{10}) through the exposure of soil to wind erosion and dust entrainment. In addition, exhaust emissions associated with heavy construction equipment would potentially degrade air quality. The BAAQMD has identified feasible PM_{10} control measures for construction activities. According to the BAAQMD CEQA Guidelines, if all of these control measures are implemented, a less than significant impact is expected for PM_{10} emissions. Construction associated with the project would temporarily increase air pollutant emissions, possibly creating localized areas of unhealthy air pollution levels or air quality nuisances. However, as shown in Table 1, construction emissions would not exceed any BAAQMD thresholds and all construction activities would be required to comply with BAAQMD control measures to reduce PM_{10} emissions, including watering exposed ground areas twice a day during construction, covering haul trucks, suspending grading activities when winds exceed 25 miles per hour, and limiting area subject to excavation, grading or other construction activities at any one time, as well as additional measures. ~~Construction emissions would be less than significant~~ Required compliance with BAAQMD control measures is assumed, and therefore the impact would be less than significant. Nevertheless, a recommended mitigation measure for compliance, Mitigation Measure AQ-1, is included below.

Table 1
Maximum Daily Unmitigated Construction Air Pollutant Emissions

	Emissions (lbs/day)				
	ROG	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Year 2016	1.75	13.03	17.52	2.72	1.33
Year 2017	0.81	5.3	8.82	1.01	0.39
Maximum lbs/day [a]	**1.75**	**13.03**	**17.52**	**2.72**	**1.33**
BAAQMD Thresholds	*54*	*54*	*N/A*	*82*	*54*
Threshold Exceeded?	**No**	**No**	**N/A**	**No**	**No**

Source:
BAAQMD, May 2010 CEQA Guidelines: ,
http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx and;
CalEEMod;see Appendix ~~B~~ C of the EIR for calculations
[a] Maximum daily emissions based on highest in any construction year, i.e. 2016 or 2017.

Long-term emissions associated with operational impacts would include emissions from vehicle trips for maintenance workers and landscape maintenance equipment associated with periodic (a few times per year) maintenance of the facility. At most, truck trips for maintenance would be approximately 2 trips per day on those days where maintenance activities would occur. This minimal amount of traffic and use of landscape equipment onsite would result in minimal air emissions as shown in Table 2. Emissions would not exceed BAAQMD significance thresholds and thus would not expose nearby sensitive receptors to pollution. Operational emissions would be less than significant.

Table 2
Maximum Daily Unmitigated Operational Air Pollutant Emissions

	Emissions (lbs/day)				
	ROG	**NOx**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Maximum lbs/day [a]	**0.54**	**0.49**	**0.75**	**0.1**	**0.03**
BAAQMD Thresholds	*54*	*54*	*N/A*	*82*	*54*
Threshold Exceeded?	**No**	**No**	**N/A**	**No**	**No**

Source:
BAAQMD, May 2010 CEQA Guidelines: ,
http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx and;
CalEEMod;see Appendix ~~B~~ C of the EIR for calculations
[a] Maximum daily emissions based on all operational sources including mobile, area (landscaping), and energy.

Mitigation Measure
The following mitigation measure is *recommended* to further reduce less than significant impacts related to construction emissions.

AQ-1 **Construction Emissions**. The following control measures for construction emissions shall be implemented during grading, site preparation and construction.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- All "Basic" control measures listed above.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading and other construction activity at any one time.

e) ***NO IMPACT***. Odors are typically associated with industrial projects involving the use of chemicals, solvents, petroleum products, and other strong-smelling elements used in manufacturing processes, as well as sewage treatment facilities and landfills.

The proposed project would install a solar generation facility on the site. This type of use would not generate objectionable odors that could affect a substantial number of people. Therefore, there are no impacts related to odors.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES				
-- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	■	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	■	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	■	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	■	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	■	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	■

a) ***POTENTIALLY SIGNIFICANT IMPACT***. Implementation of the proposed solar project may result in impacts to special status plant and animal species. Impacts to special status species are potentially significant and will be analyzed further in the EIR.

b) ***POTENTIALLY SIGNIFICANT IMPACT***. Implementation of the proposed solar project may result in impacts to sensitive and riparian habitats. Impacts to sensitive and riparian habitats are potentially significant and will be analyzed further in the EIR.

c) ***POTENTIALLY SIGNIFICANT IMPACT***. Implementation of the proposed solar project may result in indirect impacts to wetland habitat. Impacts to wetland habitats are potentially significant and will be analyzed in the EIR.

d) ***POTENTIALLY SIGNIFICANT IMPACT***. Implementation of the proposed solar project may result in impacts to migratory wildlife. Impacts to migratory wildlife are potentially significant and will be analyzed in the EIR.

e) ***POTENTIALLY SIGNIFICANT IMPACT***. The City of Richmond identifies conservation and natural resource policies in the General Plan 2030 Conservation, Natural Resources, and Open Space Element. The project site is located in the vicinity of jurisdictional wetland and non-wetland waters, which are protected by local policy. Therefore, impacts are potentially significant and will be analyzed further in the EIR.

f) ***NO IMPACT***. There are no habitat conservation plans or natural community conservation plans in force within the project area. No impact would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES				
-- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	■	☐
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	■	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	■	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	■	☐

a-d) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located in an industrial area on a site that was previously a landfill and fertilizer evaporation pond. No known historical or archaeological resources are present at the site. In addition, grading would not extend below areas that have been historically disturbed (landfill and filled ponds), so would not encounter

undisturbed paleontological or archaeological resources or human remains. Therefore, the project would have less than significant impacts to these resources.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY AND SOILS				
-- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	■	☐
ii) Strong seismic ground shaking?	☐	☐	■	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	■	☐
iv) Landslides?	☐	☐	☐	■
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	■	☐
c) Be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	■	☐
d) Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?	☐	☐	■	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	■

a.i, ii) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located to the west of the Hayward Fault Zone. The project is not located within a fault zone. Additionally, once constructed, the project would be low in height and unmanned; no habitable space or structures are proposed. If an earthquake fault were to rupture and strong seismic ground shaking were to occur, people or habitable structures would not be exposed to substantial adverse effects from the project. Therefore, the project would have a less than significant impact in this regard.

a.iii) ***LESS THAN SIGNIFICANT IMPACT***. Studies conducted for the General Plan 2030 EIR place the project site in an area of unknown liquefaction potential. However, because the site is a filled-in landfill and fertilizer evaporation pond, it is highly compacted and less susceptible to liquefaction. Additionally, no habitable space or structures are proposed. If liquefaction were to occur, people or habitable structures would not be exposed to substantial adverse effects from the project. Therefore, the project would have less than significant impact.

a.iv) ***NO IMPACT***. The project site is located on relatively flat land that is not within a fault zone. Therefore, the project would have no impact related to landslides.

b) ***LESS THAN SIGNIFICANT IMPACT***. Because the proposed project would be located on a site that was previously operated as a landfill and fertilizer evaporation pond, the facility would be constructed to minimize ground disturbance and site preparation and grading activities would be balanced cut and fill (no import or export of materials). All inverters and transformers will be on concrete pads, and pads on the landfill site will be placed above ground. PV arrays on the landfill site will be non-penetrating, ballasted, fixed tilt arrays and PV arrays on the fertilizer pond site will be ground mounted, single axis tracking arrays. Less than 500 cubic yards of fill will be used on the landfill and the only earthmoving on the fertilizer evaporation pond would include the removal of a temporary berm and the re-distribution of approximately 3,400 yards of soil among various low spots on this portion of the project site. Any excess soil would be used by Chevron at other areas on the refinery property. After construction, the area will be re-vegetated with native plants and wildflowers to prevent erosion.

Regulations under the federal Clean Water Act require that a National Pollution Discharge Elimination System (NPDES) construction storm water permit be obtained for projects that would disturb greater than one acre during construction. The proposed project would disturb more than one acre during construction. As a result, the proposed project would be required to comply with the NPDES program for storm water discharges associated with construction activities, including through preparation of a Stormwater Pollution Prevention Plan (SWPPP), which outlines Best Management Practices (BMPs) that would address construction and post-construction runoff and would limit erosion. BMPs that are typically specified within the SWPPP may include, but would not be limited to, the following:

- *The use of sandbags, straw bales, and temporary de-silting basins during project grading and construction during the rainy season to prevent discharge of sediment-laden runoff into storm water facilities;*
- *Revegetation as soon as practicable after completion of grading to reduce sediment transport during storms;*
- *Installation of straw bales, wattles, or silt fencing around the perimeter of graded building pads if they are not built upon before the onset of the rainy season (October 15th through April 15th); and/or*
- *Structural BMPs (e.g., grease traps, debris screens, oil/water separators, etc.) incorporated into facility design to minimize potential for contaminated stormwater to leave these areas.*

Compliance with the required SWPPP requirements listed above along with revegetation of the site after construction activities would avoid or minimize potential impacts to erosion. Impacts would be less than significant.

c) ***LESS THAN SIGNIFICANT IMPACT***. The City of Richmond General Plan 2030 EIR identifies the surficial geology of the site as Bay Mud. However, because the site was previously used as a landfill and fertilizer evaporation pond, fill and compaction has occurred and changed the soil profile. During construction, grading and disturbance to the soil profile would be minimized, primarily affecting near-surface depths, preventing lateral spreading. The site and surrounding area is flat and would not be impacted by landslides. Additionally, no habitable space or gathering space for people are proposed. Therefore, impacts from unstable soil would be less than significant.

d) ***LESS THAN SIGNIFICANT IMPACT***. The City of Richmond General Plan 2030 EIR identifies the surficial geology of the site as Bay Mud. However, because the site was previously used as a landfill and fertilizer evaporation pond, fill and compaction have occurred. The site is not expected to have highly expansive soil, and in any case no habitable space or gathering space for people are proposed. Therefore, impacts would be less than significant.

e) ***NO IMPACT***. The proposed project would be an unmanned solar facility and no septic tanks or alternative wastewater dis posal systems would be required. Therefore, no impact would occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GREENHOUSE GAS EMISSIONS				
-- Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	■	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	■

a) ***LESS THAN SIGNIFICANT IMPACT***. Project construction and operation would generate greenhouse gas (GHG) emissions through the burning of fossil fuels or other emissions of GHGs related to the production of solar panels, use of equipment and vehicles during construction, and the use of maintenance vehicles and equipment during the operational phase of the project, thus potentially contributing to cumulative impacts related to global climate change. As shown in Table 3 below, overall GHG emissions associated with construction and operation of the project would result in approximately 329 metric tons Carbon Dioxide equivalent emissions (CO_2e). However, once completed the project would provide a reduction

of approximately 5,458 metric tons CO_2e through the generation of solar energy. Thus the overall net change of GHG emissions would be approximately 5,129 metric tons CO_2e and thus overall GHG emissions would decrease compared to existing conditions. Therefore, impacts to GHG emissions would be less than significant.

Table 3
Combined Annual Emissions of Greenhouse Gases

Emission Source	Annual Emissions
Construction	128 metric tons CO_2e
Operational Area (Landscaping) Energy Solid Waste Water	 0.1 metric tons CO_2e 0 metric tons CO_2e 0 metric tons CO_2e 0 metric tons CO_2e
Mobile	201 metric tons CO_2e
Total	**329 metric tons CO_2e**
Displaced Emissions (as a result of Solar Energy Use)	**- 5,458 metric tons CO_2e**
Net Change of GHG Emissions	**- 5,129 metric tons CO_2e**

Sources: See Appendix ~~B~~ C of the EIR for calculations and for GHG emission factor assumptions.

b) ***NO IMPACT***. Policy EC3.1 of the Richmond General Plan 2030 Energy and Climate Element states: "Promote the generation, transmission and use of a range of renewable energy sources such as solar, wind power, and waste energy to meet current and future demand and encourage new development and redevelopment projects to generate a portion of their energy needs through renewable sources." The proposed project is a solar energy project which would directly fulfill and advance this policy of developing renewable energy sources. Therefore, the project will have no impact.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII.HAZARDS AND HAZARDOUS MATERIALS				
-- Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	■	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	■	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☐	■
d) Be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	■	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	■
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	■
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	■	☐	☐	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	■	☐

a) ***POTENTIALLY SIGNIFICANT IMPACT***. The use and transportation of hazardous materials would occur through the construction, maintenance, and operation of the solar array facility. Additionally, the repowering or decommissioning of the project would require disposal of hazardous waste. These impacts are potentially significant and will be explored further in the EIR.

b) ***POTENTIALLY SIGNIFICANT IMPACT***. The proposed project involves the use, transport and disposal of hazardous materials throughout construction, operation, maintenance, and future decommissioning. Additionally, the project is located on a closed landfill and a filled fertilizer evaporation pond, both of which contain hazardous materials. Therefore, impacts on the public and environment from a potential release of hazardous materials during grading and construction are potentially significant and will be analyzed further in the EIR.

c) ***NO IMPACT***. The proposed project is not located within ¼ mile of an existing or proposed school. Therefore, no impacts would occur in this regard.

d) ***POTENTIALLY SIGNIFICANT IMPACT***. The project site is located on a site previously operated as a landfill and fertilizer evaporation pond. The site is identified in the state's Geotracker database as a Cleanup Program Site with a status of "Open – Remediation. Grading and construction activities at this site have the potential to expose hazardous materials. Therefore, impacts from hazardous materials to the public or environment are potentially significant and will be analyzed further in the EIR.

e, f) ***NO IMPACT***. The project site is not within an airport land use plan, within two miles of a public airport, or within the vicinity of a private airport. Therefore, there would be no impact related to airport safety.

g) ***POTENTIALLY SIGNIFICANT IMPACT***. The proposed project would be located on the Chevron Refinery facility which currently has an emergency response plan and emergency evacuation plan. The proposed project is not currently included as part of those plans and thus development of the solar facility could potentially interfere with an existing emergency or evacuation plan. Therefore, the project would have a potentially significant impact on an emergency response and/or emergency evacuation plan and this issue will be further discussed in the EIR.

h) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located in an urban portion of the city of Richmond in western Contra Costa County. The project site does not fall within any Very High Fire Hazard Severity Zones (VHFHSZ) as designated by the California Department of Forestry and Fire Protection. Wildland fires are not a concern on the project site, as the site is not located near any wildlands. Therefore, the project would have a less than significant impact on wildland fires.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY				
-- Would the project:				
a) Violate any water quality standards or waste discharge requirements?	■	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering or the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	■	☐
c) 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-site?	■	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including 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-site?	■	☐	☐	☐
e) 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?	■	☐	☐	☐
f) Otherwise substantially degrade water quality?	■	☐	☐	☐
g) 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?	☐	☐	☐	■
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	■	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY				
-- Would the project:				
i) 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?	☐	☐	■	☐
j) Result in inundation by seiche, tsunami, or mudflow?	☐	☐	■	☐

a, c, d, e, f) ***POTENTIALLY SIGNIFICANT IMPACT***. The proposed project would include grading and the installation of solar panels and related infrastructure on a site that is a vacant lot over a capped landfill and a filled former fertilized pond. The addition of solar panels on the site and the associated construction activities have the potential to have adverse effects on water quality that drains from the site into surrounding waters and infrastructure. Therefore, impacts to water quality, drainage, and runoff are potentially significant and will be analyzed further in the EIR.

b) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located on a site previously used as a landfill and fertilizer evaporation pond. The landfill site has been capped and filled in, and generally prevent water from infiltrating. The project would use minimal water, as the only water use would be for washing the solar panels approximately once each year and light irrigation for landscape plantings in limited areas. Temporary and permanent impervious areas that would be introduced by the proposed project include impervious footings for the PV modules on the former evaporation pond site and the ballast footings for the PV modules on the former landfill site. The PV modules would themselves be considered a discontinuous impervious surface. However, the area underneath the modules on the former evaporation pond site would continue to be pervious. As such, water would not be prevented from entering the water table to a greater extent than it is with the current use. Therefore, impacts to groundwater resources would be less than significant.

g) ***NO IMPACT***. The proposed project does not include any housing or residential component. Therefore, no impact related to housing within a 100-year flood hazard area would occur.

h) ***LESS THAN SIGNIFICANT IMPACT***. The project site is located in FEMA Flood Zone VE – Coastal Flood Zone with velocity hazard, with a base flood elevation of 9 feet. However, the project would not substantially alter the topography of the site, and would be composed of installations that would not substantially impede or redirect flood flows. Therefore, the impact on flood flows would be less than significant.

i) ***LESS THAN SIGNIFICANT IMPACT***. Although the project site is located in a flood hazard zone, no habitable structures or gathering places for people are proposed. There are no dams in

the City of Richmond or western Contra Costa County. Therefore, impacts from exposure of people or structures to flooding or from dam failure would be less than significant.

j) ***LESS THAN SIGNIFICANT IMPACT***. According to the City of Richmond General Plan EIR, there are no designated risk areas in the City of Richmond for tsunamis or seiches. The wave height for a 'worst case scenario' tsunami in the Aleutians Islands was modeled at about 7.5 feet along the Richmond Bay Coast and 7.9 feet within the Richmond Channel. Therefore, impacts from seiches and tsunamis would be less than significant.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. LAND USE AND PLANNING				
-- Would the project:				
a) Physically divide an established community?	☐	☐	☐	■
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	■
c) Conflict with an applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	■

a) ***NO IMPACT***. The project site is located in an existing industrial area. It is surrounded on all sides by industrial uses and urban development. No features that would separate land uses or otherwise divide a community are proposed. Therefore, there would be no impact.

b) ***NO IMPACT*** The City's General Plan designates the site as Business and Industry and according to the City's zoning code the site is designated as M-2, light industrial. This land use and zoning allows for minor public utilities and major public utilities with a conditional use permit. The project would be consistent with the allowed uses. Therefore, no impact would occur.

c) ***NO IMPACT*** The project site is located on a site previously operated as a landfill and fertilizer evaporation pond. The site is not covered by a habitat conservation plan, natural community conservation plan, or other adopted conservation plan. Therefore, there would be no impact from conflicts with a conservation plan.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. MINERAL RESOURCES				
-- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	■
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	■

a, b) ***NO IMPACT***. The project site is located at a previous landfill and fertilizer evaporation pond. The site is not designated for mining uses nor actively mined. Therefore, the project would have no impact on mineral resources or mineral resource recovery.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE				
-- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	■	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	■	☐
c) A substantial permanent increase in ambient noise levels above levels existing without the project?	☐	☐	■	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	■	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	■

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE				
-- Would the project result in:				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise?	☐	☐	☐	■

a, c) ***LESS THAN SIGNIFICANT IMPACT***. The proposed use of the site for solar energy generation is a passive use. Once operational, noise from the project would be limited to that produced by the inverters that convert the electricity from direct current (DC) to alternating current (AC). Typical noise associated with a large inverter system (comprising four inverters) would be approximately 70 dB at a distance of 10 feet (estimate provided by PV Powered, an inverter manufacturer). Since sound measurements are not proportional and are measured on a logarithmic scale, each additional 4 inverters would add 3 dB to the overall sound produced. The proposed project includes 11 inverters, which would produce approximately 76 dB of sound at a distance of 10 feet. Sound levels typically attenuate from a point source at approximately 6 dB for each doubling of distance. Based on this attenuation rate, the inverters would produce noise levels of approximately 33.6 dB at the nearest multi-family dwellings, which are located approximately, 0.25 miles (1,320 feet) from the proposed project location. This noise level would not exceed City thresholds, of 65 dB, for exterior noise levels, and would be well below ambient noise levels in typical quiet suburban neighborhoods. Therefore, impacts to long-term noise levels resulting from the proposed project would be less than significant.

b) ***LESS THAN SIGNIFICANT IMPACT***. The proposed use of the site for solar energy generation is a passive use. The installed solar cells would not create groundbourne vibrations or noise levels. Some groundbourne vibrations or noise levels may be generated during construction; however, the site is surrounded by industrial uses, with the nearest sensitive receptor being 0.25 miles away, and construction hours would generally occur between 7:00 AM and 5:00 PM on weekdays. Additionally, construction would not involve any excavation and all grading onsite would be balanced cut and fill. Grading equipment would generate vibration but due to the distance to the closest sensitive receptors (0.25 miles away), the vibration and groundbourne noise would not be perceptible. Therefore, impacts from groundbourne vibration and groundbourne noise levels would be less than significant.

d) ***LESS THAN SIGNIFICANT IMPACT***. Some construction noise may be generated during construction; however, the site is surrounded by industrial uses, with the nearest sensitive receptor being 0.25 miles away, and construction hours would generally occur between 7:00 AM and 5:00 PM on weekdays. Additionally, construction would not involve any excavation and all grading onsite would be balanced cut and fill. Construction equipment would generate noise temporarily but due to the distance to the closest sensitive receptors (0.25 miles away), the

ambient noise levels would not increase to a level of significant. Therefore, the impact from temporary increases in ambient noise levels will be less than significant.

e, f) ***NO IMPACT***. The proposed project is not located within an airport land use plan, within two miles of a public airstrip, or within the vicinity of a private airstrip. The nearest airport is the San Rafael Airport, which is located 9.25 miles away from the project location. Therefore, the project would have no impact in this regard.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII.POPULATION AND HOUSING				
-- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	■
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■

a-c) ***NO IMPACT***. The project site is located on an otherwise vacant site previously used as a landfill and fertilizer evaporation pond. The area is zoned industrial and is surrounded by industrial uses. No residences would be demolished or built. As a solar PV project, the proposed project would not increase the residential or employment populations of Richmond or the region. Construction of the project may result in the need for temporary construction workers. However, it is anticipated that workers would be drawn from the local workforce in Richmond or the Bay Area. Consequently, no direct population growth is expected to result from project implementation. Therefore, the project would have no impact on population growth and housing.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	■	☐
ii) Police protection?	☐	☐	■	☐
iii) Schools?	☐	☐	■	☐
iv) Parks?	☐	☐	■	☐
v) Other public facilities?	☐	☐	■	☐

ai-av) ***LESS THAN SIGNIFICANT IMPACT***. The proposed project is a passive use in an industrial area and is anticipated to have a relatively low demand for police and fire protection services. No substantial population growth would result from the project, so demand for school and park services would be minimal. No new fire, police, school, park, or other public facilities would be required. Therefore, impacts to public services will be less than significant.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	■

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. RECREATION				
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	■

a-b) ***NO IMPACT***. The project site is located on a site that was previously used as a landfill and fertilizer evaporation pond and is currently operated as a vacant lot in an industrial area. The proposed use as a solar generation facility would not increase the use of recreational facilities through an increase in population or removal of recreation facilities. The proposed project does not include the construction of recreational facilities. Therefore, the project would have no impact on recreational facilities

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. TRANSPORTATION/TRAFFIC				
-- Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	■	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	■	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	■	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. TRANSPORTATION/TRAFFIC				
-- Would the project:				
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	☐	☐	■	☐
e) Result in inadequate emergency access?	☐	☐	■	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bikeways, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities?	☐	☐	■	☐

a, b, f) ***LESS THAN SIGNIFICANT IMPACT.*** Project construction would take place over approximately 12 to 18 months. The most intense period of construction traffic would be the first two months of construction on Phase I, which would require approximately 150 truck trips over approximately eight to nine weeks, as well as up to 10 to 15 worker vehicle trips per day. Thus, there would be an average of up to approximately 18 daily construction trips during the construction period. Construction traffic would be concentrated in the hours between 7:00 AM and 2:00 PM. Due to the relatively modest number of daily trips required for construction; because the trips would be concentrated in the morning and afternoon outside of the afternoon peak traffic hour; and because construction traffic impacts would be temporary, impacts would be less than significant. In addition, because construction would be completed in 2016 and thus precede the main construction periods for the projects approved as part of the Chevron facility's Modernization Project, cumulative construction impacts would be less than significant.

The proposed project would utilize the site for solar energy generation, which is a passive use. Once constructed, the facility would be unmanned and would not cause a substantial increase in traffic or mass transit use. Traffic to/from the site would be less than two trips per day for maintenance staff vehicles on average which would be periodic (less than a few times per month). The project does not conflict with any plan, ordinance, or policy for the circulation system, conflict with an applicable congestion management program, or conflict with adopted plans, policies, or programs regarding public transit, bikeways, or pedestrian facilities. Therefore, a less than significant impact would occur.

c) ***NO IMPACT***. No airport or airstrip is located within the project area. The proposed project would not affect air traffic patterns. The closest airport to the project location is the San Rafael Airport, which is 9.25 miles away. Therefore, no impact related to air traffic would occur.

d) ***LESS THAN SIGNIFICANT IMPACT***. The proposed project does not include the construction or substantial alteration of any roads. Access to the site is via existing access roads from Castro Street. As discussed under Item I, *Aesthetics*, due to the relatively low reflectivity

and because the site would not generally be visible from roadways, the panels would not be expected to cause visual impairment and associated safety hazards for motorists traveling on nearby roadways. Therefore, a less than significant impact would occur.

e) ***LESS THAN SIGNIFICANT IMPACT***. The project site is fully surrounded by existing access roads. The project would not result in inadequate emergency access. Therefore, no significant impact would occur. Impacts related to emergency response and evacuation are discussed under Item VIII, *Hazards and Hazardous Materials*, above.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. UTILITIES AND SERVICE SYSTEMS				
-- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	■
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	■
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	■
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	■	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	■
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	■
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	■

a, b, e) ***NO IMPACT***. Development in the project vicinity is served by the Richmond Municipal Sewer District with Richmond Municipal Wastewater Treatment Plant providing wastewater

collection and treatment services to the project area. However, the proposed solar project is a passive use that would not generate substantial quantities of wastewater or require wastewater treatment. Therefore, no impacts would occur.

c) ***NO IMPACT***. The project site is located on a capped landfill and filled former fertilizer evaporation pond. Both the landfill and fertilizer evaporation pond sites previously had storm water management systems developed onsite The landfill site has concrete-lined drainage ditches traversing the site and the fertilizer evaporation pond has a constructed swale on the north and west side of the site that carries storm water to a treatment pond north of the parcel. Temporary and permanent impervious areas that would be introduced by the proposed project include impervious footings for the PV modules on the former evaporation pond site and the ballast footings for the PV modules on the former landfill site. The PV modules would themselves be considered a discontinuous impervious surface. However, the area underneath the modules on the former evaporation pond site would continue to be pervious. Thus the project would not substantially increase stormwater runoff. Installation of the solar facility would not alter the existing storm water management infrastructure and no new storm water management would need to be incorporated. Therefore, no impact would occur.

d) ***LESS THAN SIGNIFICANT IMPACT***. The proposed project is a passive use that requires a limited amount of water. The solar panels would be washed once per year and maintenance workers would utilize a portable water tank on maintenance vehicles or a water truck during those days that washing is to be completed. Thus the project would not utilize water from onsite or need to construct water utility lines onsite. No new or expanded water entitlements are needed. Therefore, there would be a less than significant impact on water supplies.

f, g) ***NO IMPACT***. The project site is served by Richmond Sanitary Service with solid waste being disposed of at the Keller Canyon Landfill in northern Contra Costa County. However, the proposed project is passive use that would not generate substantial amounts of solid waste once operational. Some construction waste may be generated, however, because no demolition of existing structures is necessary, the overall amount of construction debris would be minimal and would not exceed the capacity of the Keller Canyon Landfill. Therefore, no impacts on solid waste needs will occur.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self- sustaining levels, eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or	■	□	□	□

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE				
prehistory?				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	■	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	■	☐	☐	☐

a) ***POTENTIALLY SIGNIFICANT IMPACT***. As noted under Section IV, *Biological Resources*, implementation of the proposed solar project would have potentially significant impacts on biological resources. Impacts are potentially significant and will be further addressed in an EIR.

b) ***POTENTIALLY SIGNIFICANT IMPACT***. Cumulative impacts with respect to biological resources, hydrology and water quality, and hazards and hazardous materials are potentially significant and will be analyzed further in an EIR.

c) ***POTENTIALLY SIGNIFICANT IMPACT***. Substantial adverse effects on human beings associated with hydrology and water quality and hazards and hazardous materials are potentially significant and will be analyzed further in an EIR.

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Appendix B

Environmental Design and Implementation Considerations

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November 17, 2014
Project No. 14-00951

Greg Brehm
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Marin Clean Energy
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San Rafael, CA 94901

Subject: Environmental Design and Implementation Considerations for Installing Solar Array at the Chevron Refinery in the City of Richmond, California

Dear Mr. Brehm:

Rincon Consultants, Inc. (Rincon) is pleased to submit this memorandum regarding environmental design and implementation considerations for the Chevron Refinery Solar Project located in the City of Richmond, California.

This memorandum is based on Rincon's current understanding of the project, which is the installation of solar arrays on Chevron's properties, Landfill 15 and the Former Fertilizer Plant and Ponds (FFPP). Maps from existing documents, which show the location and layout of the sites, are included in Attachments A to C. This memorandum summarizes potential environmental constraints at the sites due to the former operations and implemented engineering controls, which are maintained by Chevron and regulated by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). The first section of this memorandum provides background information that describes the physical characteristics and historical land uses at the site. The remainder of the document is organized by the following implementation phases: Design; Pre-Construction; Construction; and Operation, Maintenance, and Monitoring.

Recommended next steps for the initial design stage of the project are summarized at the end of this document. In general, during the initial design stage, close collaboration will be needed with Chevron, the RWQCB, and other agencies to ensure parties are in concurrence with proposed modifications to the sites. The project applicant should seek to identify all permits that the facility is operating under and conduct a review of those permit conditions. Documents related to post-closure requirements at each site should be obtained from Chevron or the RWQCB to better understand existing engineering controls, their limitations to construction of a solar array, and how the post-closure documents may need to be modified, due to design and construction of the solar array to meet regulatory requirements.

This document is based on Rincon's review of the documents provided by Marin Clean Energy and independent research conducted by Rincon Consultants. A complete list of references is provided at the end of this memorandum.

BACKGROUND

This background information is provided to describe the history of the sites and engineering controls and environmental monitoring that have been implemented at the Landfill 15 and FFPP site.

Landfill 15

The 41-acre site was operated as an evaporation pond and landfill from the early 1960's to 1987. The site location and layout are shown in the figures included in Attachment A. The landfill received a variety of wastes including sludges (separator, paint, and water treatment), oily soils and dredge spoils, resins, catalyst fines, lime, and sulfur. In 1992, treated non-hazardous acidic sludge and dredged bay mud generated from the closure of the Pollard Pond (northwest of the refinery, adjacent to San Pablo Bay) was disposed over 13 acres of this landfill site (RWQCB, 2011a). The site is managed under RWQCB Order No. R2-2012-0015. Currently, Landfill 15 is capped and engineering controls have been designed and implemented to protect groundwater resources, control methane emissions, and control stormwater, as described below.

Disposal Area Cover (Dames & Moore, 1998; RWQCB, 2011a)
The old evaporation pond sludges, which operated from the early 1960's to 1987, are covered by clayey-gravel fills. In 1995, the 13-acre area that received treated, non-hazardous materials from the Pollard Landfill was closed by placement of a low-permeability cap consisting of (from bottom up) 24 inches of compacted fill, 6 inches of clay, geomembrane, geonet, non-woven geotextile layer, and 12 inches of vegetated fill (ARCADIS, 2012; Attachment B). The remaining 28 acres of Landfill 15 was covered during 1996 to 1997 with a cover consisting of (from bottom up) compacted fill, 40-mil HDPE, and 6 inches of aggregate base with 2 inches of asphaltic concrete (8.5 acres) or 12 inches of vegetated fill in non-paved areas (19.5 acres) (ARCADIS, 2012; Attachment B).

Groundwater Protection System (Dames & Moore, 1998; RWQCB, 2012)
Groundwater elevations typically occur within 2 to 10 feet below grade (outside of the landfill area). Three hydrogeologic zones have been identified, in the refinery area, within the top 150 feet of the subsurface: A-zone (2 to 10 feet below grade, consists of artificial fill and Bay Mud, discharges to Bay); C-zone (an 80- to 90-foot thick zone beneath A-zone consisting of interbedded alluvial and estuarine sediments; Bay Mud has been an effective hydraulic barrier between the A- and C-zones); and B-zone (relatively permeable unit 5 to 15 feet thick at approx. 100 feet below grade).

Collection trenches, backfilled with gravel, were installed along the western, northern, and northwestern boundaries of the main landfill as an interim remedial measure from 1988 to 1989 to prevent phase-separated hydrocarbons from seeping to the ground surface or migrating to Castro Creek. GPS components are shown in Attachment A, on Figure 8 from

RWQCB Order No. R2-2012-0015. Trenches drained to sumps and phase-separated hydrocarbons were routinely extracted.

In 1992, a groundwater protection system (GPS) consisting of extraction trenches, extraction wells, and barrier walls (soil-bentonite) were installed along the north, east, and southern edge to prevent offsite migration of potentially contaminated groundwater. Approximately 3,750 linear feet of barrier wall, ranging in depth from 9 to 20 feet below grade has been constructed at Landfill 15 (Attachment A, Figure 8).

Landfill Gas Collection and Vent System (Dames & Moore, 1998)
To vent potential methane or other vapors generated from the landfill waste located beneath the cap, a layer of non-woven geotextile was installed beneath the HDPE membrane. Twelve vents were installed in 8-inch square by 6-inch deep pockets of clean gravel beneath the geotextile; location of these elements were not shown in the documents researched, as-built drawings will need to be obtained.

Surface Drainage Control (Dames & Moore, 1998; RWQCB, 2011b)
Surface runoff either flows through a system of concrete-lined ditches or flow over the surface. Runoff from Landfill 15 discharges to Castro Creek or its tributary.

Self-Monitoring and Reporting Program (RWQCB, 2012)
As required by RWQCB Order No. R2-2012-0015, the area within the boundary of Landfill 15 and the receiving waters must be observed quarterly to monitor the condition of final covers and stormwater management system elements, evidence of ponded water, odors, erosion, day lighted waste, and floating/suspended materials of waste origin or discoloration/turbidity in receiving waters. Annually, the site must be inspected by a registered California engineer/geologist prior to onset of rainy season to identify damaged areas from erosion, rodents, or otherwise. Appropriate repairs shall be performed prior to the rainy season. Runoff/run-on control facilities for their effectiveness and overall conditions as needed according to weather conditions during the winter months (November to April).

Groundwater monitoring (semi-annual): water level measurements, analyze groundwater for field measurements and site-specific constituents of concern as listed in RWQCB Order No. R2-2012-0015. In addition, annual reporting and contingency reports are required if any seepage or prohibited discharge occurs. According to the RWQCB Order No. R2-2012-0015, an approved post-closure maintenance/monitoring plan was prepared for the site. This document needs to be obtained and reviewed.

Former Fertilizer Plant and Ponds

The FFPP were built in 1959 for nitrogen-based fertilizer manufacturing (ARCADIS, 2009). The plant was demolished in 1995 and the area was covered with clean fill and asphalt base. The ponds were filled with approximately 8 feet of clean fill during 2000 to 2003. As of 2009, the plant area was a relatively flat gravel surface covering approximately 15 acres and the pond area was a vegetative field covering approximately 20 acres. The FFPP area is shown in relation to the surrounding Pond Site area in Attachment C (Figure 1, Leidos,

2014). Metals in soil (arsenic, beryllium, cadmium, and cobalt) are the primary risk driver for this site (ARCADIS, 2009).

The groundwater zones are identical to the zones discussed above for the Landfill 15 area (uppermost A-zone, intermediate C-zone, and lower B-zone). The low-permeability Bay Mud, which underlies the site, and an engineered Hydraulic Containment System (HCS) provide containment of groundwater at the site. The HCS consists of a hydraulic control trench and a containment wall which surrounds the FFPP area (along the southern, eastern, and western boundaries) and adjacent Integrated Wastewater Pond System (IWPS) (Attachment C, Figure 1 by Leidos). The hydraulic control trench consists of a 2-foot wide trench filled with granular material and slotted drain pipes installed near the base of the trench which collected and convey groundwater to sumps with extraction pumps spaced at 500-foot intervals along the trench (ARCADIS, 2009). From 1980 to 1983, a barrier wall made of asphalt emulsion, sand, cement, and water (Aspemix) was constructed to the east and west of the FFPP area, which connected to a pre-existing clay barrier installed in 1973 and 1974. In 1991, a bentonite-soil slurry barrier was installed to the south and east of the FFPP area (RWQCB, 1997).

Based on Rincon's research an oversight agency was not identified for the FFPP area; the project applicant should verify this with Chevron during negotiations. The HCS that surrounds the site is related to the adjacent Pond Site which is regulated by RWQCB Order No. 97-049; impacts to the HCS should be avoided during the installation of a solar array on the FFPP.

ENVIRONMENTAL DESIGN CONSIDERATIONS

This section outlines environmental considerations for the design phase of the solar array for each site. Site specific items are discussed below:

Landfill 15

Landfill 15 is regulated by RWQCB Order No. R2-2012-0015, close collaboration with the RWQCB and Chevron's Landfill 15 Engineer-of-Record will be needed during the design and planning stages of the solar array. Alterations to the landfill and appurtenances must be in accordance with Order No. R2-2012-0015 and may not negatively impact the cap, GPS, landfill gas collection and vent system, and existing stormwater conveyance. The RWQCB may charge the client to recover reasonable expenses for overseeing design modifications to Landfill 15.

CRITICAL PATH ITEMS

- ☐ Chevron, RWQCB, and other agency collaboration
- ☐ Obtain documents:
  - Permits and permit conditions
  - As-built drawings
  - Closure documents for FFPP
  - Post-closure Maintenance/Monitoring Plan
- ☐ Revise documents (if required by regulatory body):
  - Post-closure Maintenance/Monitoring Plan
  - Financial Assurance for Post-Closure Maintenance/Monitoring

Grading

Based on recommendations listed in a 2012 presentation prepared by ARCADIS for installing a solar array on Landfill 15 (ARCADIS, 2012), a slope grade of less than or equal to 4% is preferred for installation of a solar array. It was recommended that approximately 5.5 acres of Landfill 15 be re-graded such that a total of 23.1 acres would be available for installation of a solar array; it was estimated that approximately 55,000 cubic yards of fill material and 1,350 tons of aggregate base-rock material would be imported and placed on top of the existing cap. The landfill has currently settled approximately 1.03 feet; there was an estimated lifetime settlement estimate of 3.2 feet, therefore settlement is likely to continue, especially if additional material is placed on the cap (ARCADIS, 2012). An updated settlement evaluation and geotechnical evaluation is recommended to account for weight of the solar array and additional fill material, if needed.

Stormwater Management

Stormwater flow rates should be re-evaluated based on the solar array design, grading, and existing stormwater features. The existing stormwater features may need to be redesigned to accommodate revised flow rates.

Underground Utilities

Rincon's current understanding is that the proposed solar array would not require the installation of underground utilities. However, if it is later deemed necessary to install underground utilities, they should be placed within the top fill layer, above the low-permeable geomembrane liner of the cover. The fill layer ranges in thickness between 6 inches (beneath the asphaltic concrete cap) and 12 inches (beneath the vegetated cover). If subsurface penetrations will occur through the low-permeable geomembrane, the layer must be replaced or repaired, in accordance with site design standards and regulatory requirements.

Regulatory Involvement

Post-closure modifications are likely regulated by the RWQCB; however, other agencies may be involved. The following documents, if applicable, may need to be updated, as required by the RWQCB: Financial Assurance and Post-Closure Maintenance/Monitoring Plan.

According to the ARCADIS 2012 presentation, a California Department of Toxic Substances Control (DTSC) permit exists for the site, which would require a post-closure amendment. However, Rincon could not find a post-closure permit for Landfill 15 on the DTSC's online EnviroStor system; a post-closure permit for only the neighboring Landfarms area (west of Landfill 15) was obtained. If a DTSC permit does exist for Landfill 15, the DTSC may become involved with the project and the permit may need to be modified to demonstrate that the liner will not be impacted.

The project applicant should request Chevron to disclose all permits and permit conditions related to the site.

Former Fertilizer Plant and Ponds

No site-specific solar array details have been provided for this site. Impacts to the HCS must be avoided so as not to interfere with groundwater containment operations. Otherwise, it appears no cover, liner, or cap exists at this site. If no waste layers exist at the site and minimal settlement would be expected to occur. No limitations to installing underground utilities or pilings for a solar array were identified.

PRE-CONSTRUCTION

Following finalization of solar array design and prior to initiating construction, the following items should be addressed:

CRITICAL PATH ITEMS

- ☐ Schedule coordination with Chevron, RWQCB, and additional agencies
- ☐ Prepare Health and Safety Plan
- ☐ If performing earthwork, prepare Soil Management Plan
- ☐ Prepare Stormwater Pollution Prevention Plan

- Coordinate with the RWQCB and any addition agencies that may become involved regarding proposed schedule. Agencies may send a representative to the site to observe construction.
- As required by the Occupational Safety and Health Administration (OSHA) standard addressing hazardous waste site operations (Code of Federal Regulations, Title 29, Section 1910.120), prior to beginning construction, prepare a site-specific Health and Safety Plan to outline the procedures that onsite personnel will follow to minimize the potential for health and safety hazards and exposure to constituents of concern during the course of work to be performed at the subject properties.
- If earthwork activities are anticipated (grading or excavation), the RWQCB may require a Soil Management Plan be prepared to address how to handle material impacted by historical operations. The Soil Management Plan should detail procedures to properly excavate, transport, and dispose of potentially impacted materials that may be encountered during solar array construction.
- Prepare a Stormwater Pollution Prevention Plan (SWPPP) following the Construction General Permit (CGP) 2009-0009-DWQ as amended by 2012-0006 DWQ CGP. The objective of the SWPPP is to prescribe Best Management Practices (BMP) to reduce pollutants in stormwater discharges and prevent them from leaving the construction site.

CONSTRUCTION

During construction, the following measures should be anticipated:

Grading

If grading activities are performed, the final grade should be completed in a way to prevent ponding of stormwater.

Dust Mitigation
To avoid dust generation, control excavation areas with soil wetting and physical barriers (plastic sheeting), as needed. Wetted surfaces should be visually wet and care shall be taken during wetting procedures to avoid generation of runoff.

Stormwater Management
Implement stormwater management methods and strategies to reduce the sediment and pollutants being transported offsite during excavation activities and temporary storage of hazardous materials (to be detailed in the SWPPP as described above). If applicable, best Management Practices (BMPs) will be applied to stockpiles to reduce the potential of sediment being transported offsite by wind gusts and storm events. In addition, hazardous waste management activities shall be performed as outlined in the California Stormwater Quality Association BMP Handbook.

Landfill 15

During placement of imported soil/aggregate, if required, and installation of solar array components, small, lighter construction equipment should be used to minimize damage to the existing landfill cover.

Former Fertilizer Plant and Ponds

If stained or impacted soil is discovered during earthwork activities, Chevron and the RWQCB should be notified and the material should be characterized and sampled for offsite disposal. If material is shipped offsite, use waste manifest documentation to track the movement of waste soils from the point of generation to the disposal facility, as required by Section 66260.10 of the California Code of Regulations, Title 22, Division 4.5, Chapter 10, Article 2.

OPERATION, MONITORING, AND MAINTENANCE

Landfill 15

While monitoring and maintaining solar array components at Landfill 15, the operator should look for evidence of ponding water, odors, erosion, day lighted waste, liquid leaving or entering the area. All suspected issues and observations should be provided to Chevron's landfill monitor. The project applicant may be required to assist Chevron or their designated representative with semi-annual and/or annual report requirements by RWQCB Order No. R2-2012-0015.

Former Fertilizer Plant and Ponds

Look for evidence of ponding water, erosion, liquid leaving or entering the area and report to the property owner. At this time it is unknown if reports are required for the FFPP area.

SUMMARY

Summarized below are the next steps Rincon recommends for the initial design stage:

RECOMMENDED NEXT STEPS

- ☐ Schedule meeting with Chevron and their consultant to discuss conceptual plan for solar array and potential installation limitations and requirements. Obtain all existing permits, agreements, compliance reporting, and other permit conditions related to operation of the current facilities.
- ☐ Schedule meeting with RWQCB, and include Chevron, to discuss conceptual plan. Other agencies may be involved.
- ☐ Obtain documents related to closure of FFPP and post-closure of Landfill 15 (and FFPP, if applicable):
  - Post-closure Maintenance/Monitoring Plan
  - As-built drawings
  - Closure documents for FFPP
  - Parsons, CH2M Hill, and URS, 2003. *Part 1 Site Investigation Report for Selective Data Gathering – Castro Site, Richmond, California*. Volume 1. May 13.
- ☐ Revise documents (if required by RWQCB or other regulatory agency):
  - Post-closure Maintenance/Monitoring Plan
  - Financial Assurance for Post-Closure Maintenance/Monitoring

We appreciate your consideration of Rincon for this assignment and welcome the opportunity to meet with you to further discuss our recommendations. If you have any questions or require any additional information, please do not hesitate to contact us.

Sincerely,
RINCON CONSULTANTS, INC.

Nisha Been, AICP
Senior Project Manager

Michael P. Gialketsis
President

Jennifer Schwartz, PE, QSD
Environmental Engineer

Attachments

Attachment A – Figures from RWQCB Order No. R2-2012-0015
Attachment B – Figures from Landfill 15 Solar Array Evaluation (ARCADIS, 2012)
Attachment C – Figures from 2014 Semi-Annual Monitoring Report for the Pond Site (Leidos, 2014)

REFERENCES

ARCADIS, 2009. *Final Draft Human Health Risk Assessment in Support of the CAESAR Project*. Prepared for Chevron Environmental Management Company, November 30.

ARCADIS, 2012. *Landfill 15 Solar Array Installation – Engineering and Regulator Evaluation*. Presentation.

Dames & Moore, 1998. *Closure Certification Report, Landfill 15, Waste Discharge Order, Chevron Richmond Refinery.* Prepared for Chevron Products Company, March 31.

Leidos Engineering, LLC (Leidos), 2014. *Former Chevron Chemical Company Pond Site, Richmond, California, 2014 Semi-Annual Monitoring Report*. Prepared for Chevron Environmental Management Company, August 29.

Regional Water Quality Control Board (RWQCB), 1997. *Order No. 97-049, Updated Waste Discharge Requirement and Rescission of Order 81-65, 91-149, and 91-183 for: Chevron Chemical Company, Pond Site, Richmond Manufacturing Facility, Contra Costa County*.

RWQCB, 2011a. *Order No. R2-2011-0036, Updated Waste Discharge Requirements and Rescission of Order No. 00-0043 for Chevron Products Company, Chevron Richmond Refinery, 814 Chevron Way, Richmond, Contra Costa County*, June 13.

RWQCB, 2011b. *Order No. R2-2011-0049, NPDES No. CA0005134*. Waste discharge requirements for the Richmond Refinery (Discharger: Chevron Products Company and General Chemical), July 14.

RWQCB, 2012. *Order No. R2-2012-0015, Site Cleanup Requirements for Chevron Products Company, Chevron Richmond Refinery, 814 Chevron Way, Richmond, Contra Costa County*, February 13.

Attachment A

Figures from RWQCB Order No. R2-2012-0015

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2012-0015

SITE CLEANUP REQUIREMENTS

FOR

CHEVRON PRODUCTS COMPANY
CHEVRON RICHMOND REFINERY
841 CHEVRON WAY
RICHMOND, CONTRA COSTA COUNTY

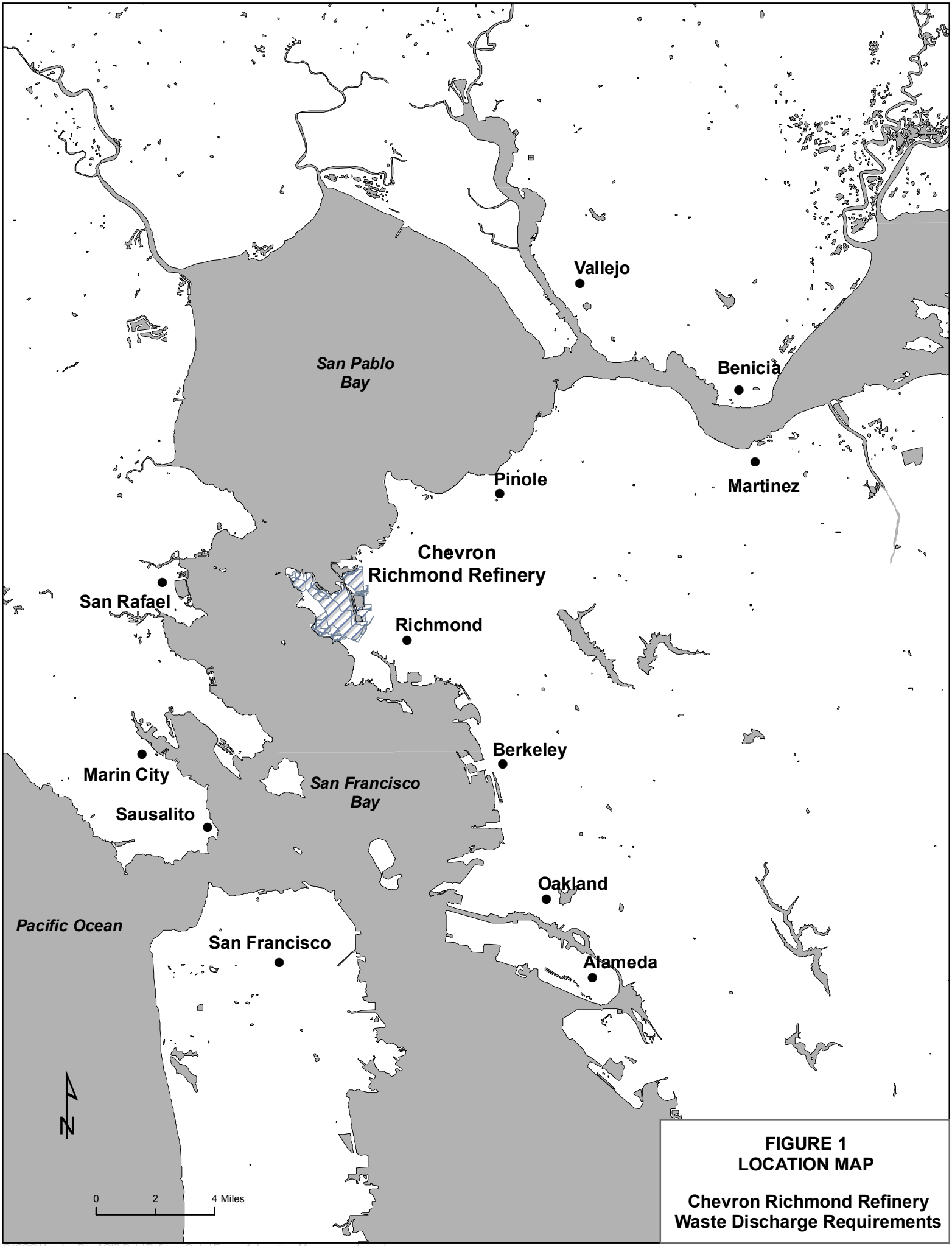


FIGURE 1
LOCATION MAP

Chevron Richmond Refinery
Waste Discharge Requirements

O:\CCC\Hensley Road\GIS Data\Refinery Order\Figure_1_Location_Map_grayscale.mxd

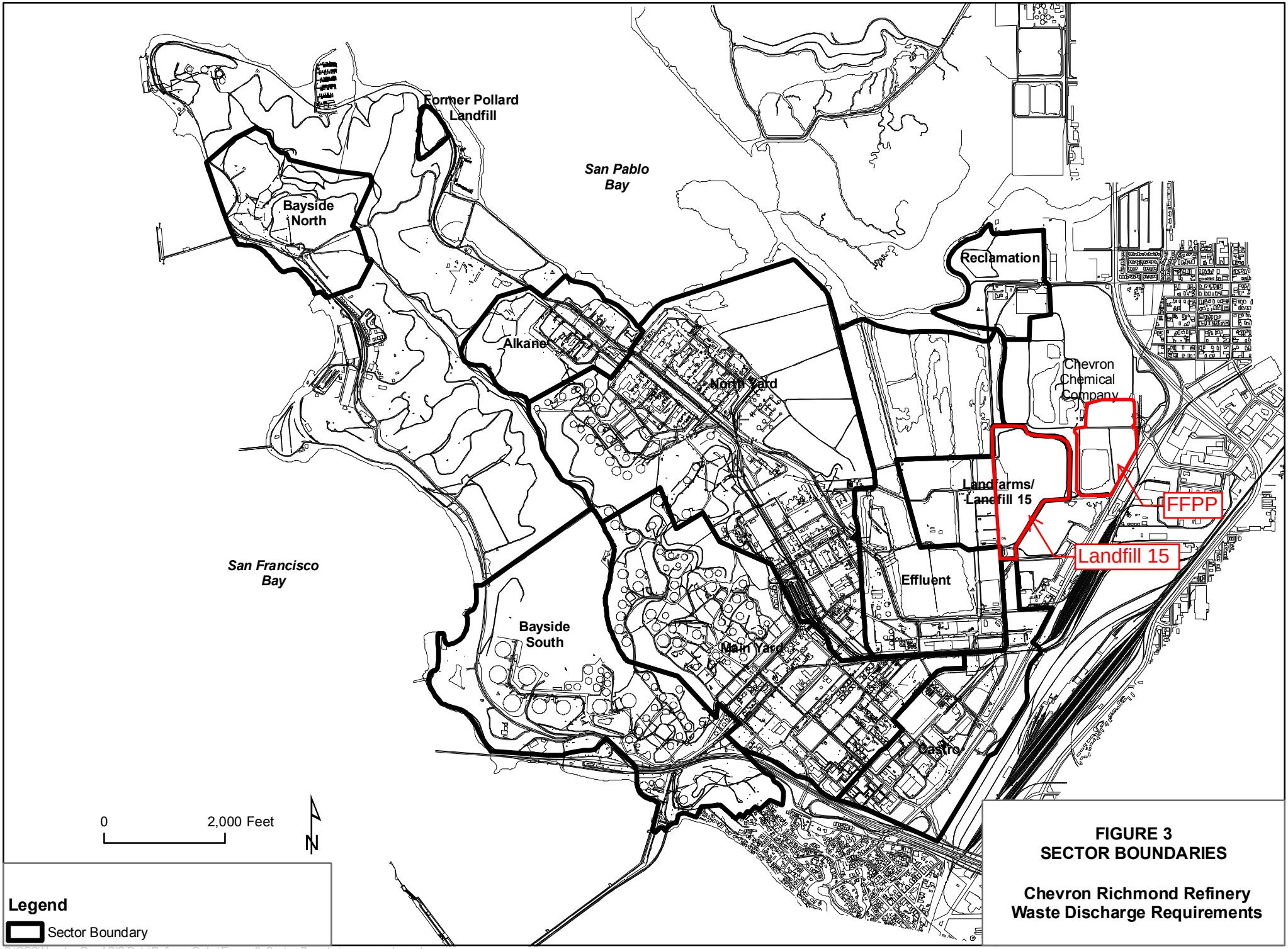
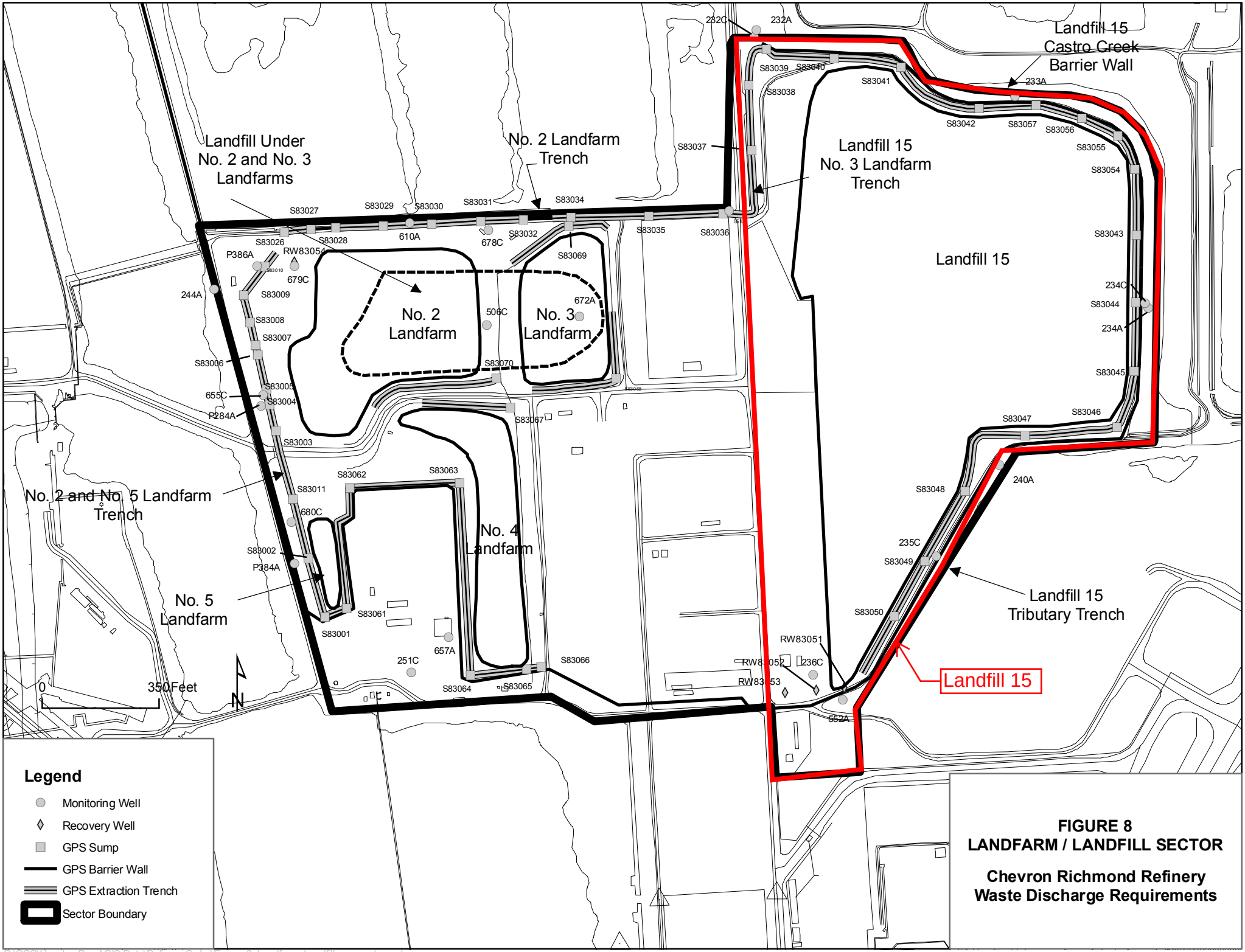


FIGURE 3
SECTOR BOUNDARIES

Chevron Richmond Refinery
Waste Discharge Requirements

O:\CCC\Hensley Road\GIS Data\Refinery Order\Figure_3_Sector_Boundaries_grayscale.mxd


Landfill Under
No. 2 and No. 3
Landfarms
No. 2 Landfarm
Trench
Landfill 15
Castro Creek
Barrier Wall
Landfill 15
No. 3 Landfarm
Trench
Landfill 15
No. 2
Landfarm
No. 3
Landfarm
No. 4
Landfarm
No. 2 and No. 5 Landfarm
Trench
No. 5
Landfarm
Landfill 15
Tributary Trench
Landfill 15
232C
232A
233A
234C
234A
240A
235C
236C
562A
610A
678C
679C
672A
506C
680C
657A
251C
655C
244A
P386A
P284A
P384A
RW83054
RW83051
RW83052
RW83053
S83001
S83002
S83003
S83004
S83005
S83006
S83007
S83008
S83009
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S83054
S83055
S83056
S83057
S83061
S83062
S83063
S83064
S83065
S83066
S83067
S83069
S83070
0
350Feet
N
Legend
Monitoring Well
Recovery Well
GPS Sump
GPS Barrier Wall
GPS Extraction Trench
Sector Boundary
FIGURE 8
LANDFARM / LANDFILL SECTOR
Chevron Richmond Refinery
Waste Discharge Requirements
O:\CCC\Hensley Road\GIS Data\Refinery Order\Figure_8_Landfarm_Landfill_grayscale.mxd

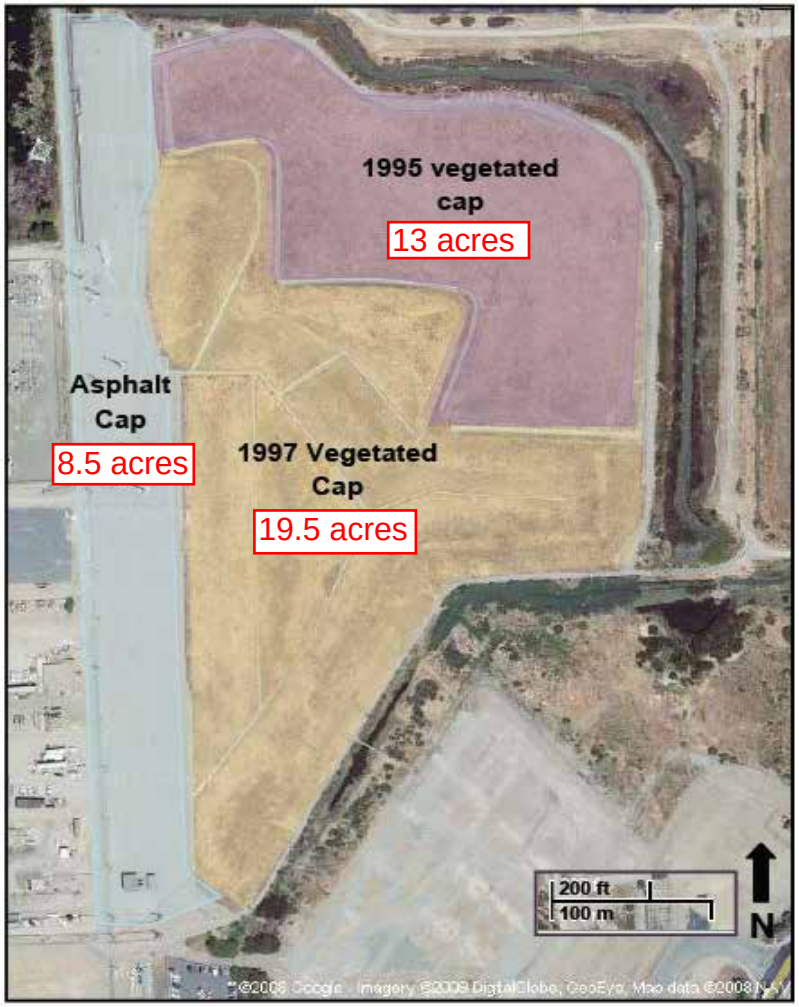
Attachment B

Figures from Landfill 15 Solar Array Evaluation (ARCADIS, 2012)

Landfill 15 Solar Array Installation - Engineering and Regulatory Evaluation

ARCADIS-US
Richmond, CA

Site Closure History

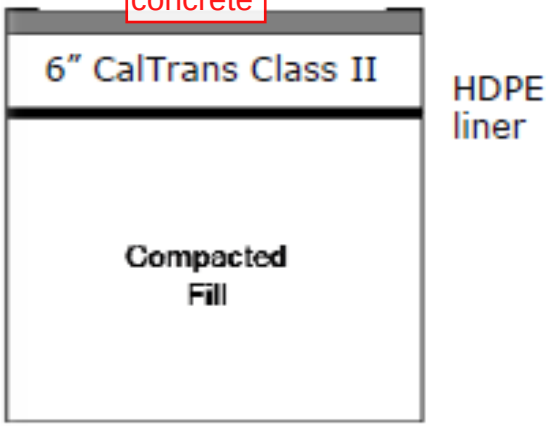


- 2 generations and 3 configurations
  - 1995 – NE activated waste management portion closed and capped with a vegetated cover.
  - 1997 – remainder of site closed with an asphalt or vegetated cover.
  - Groundwater protection, methane venting, and stormwater control systems were installed.

Cover Design Cross Sections

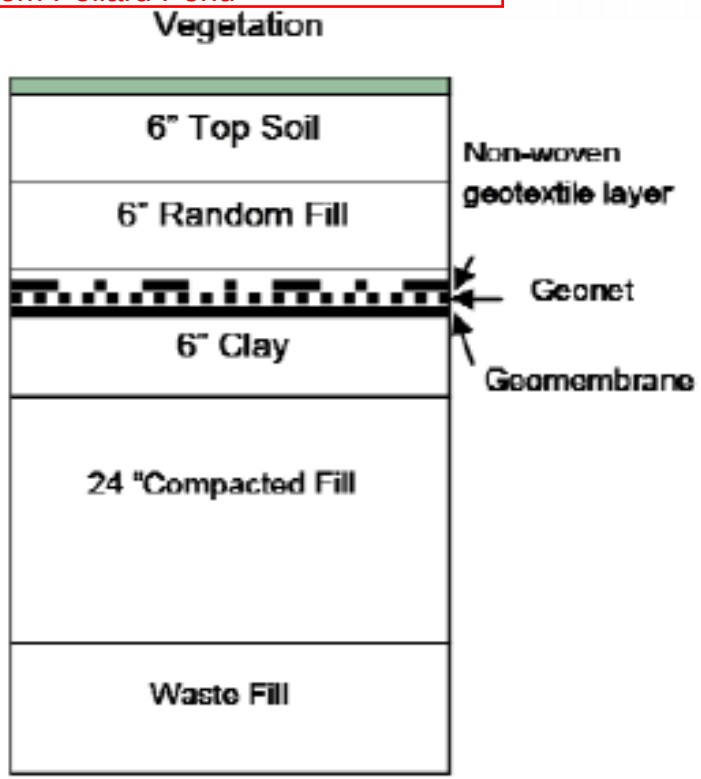
1997 Asphalt Cover

8.5 acres



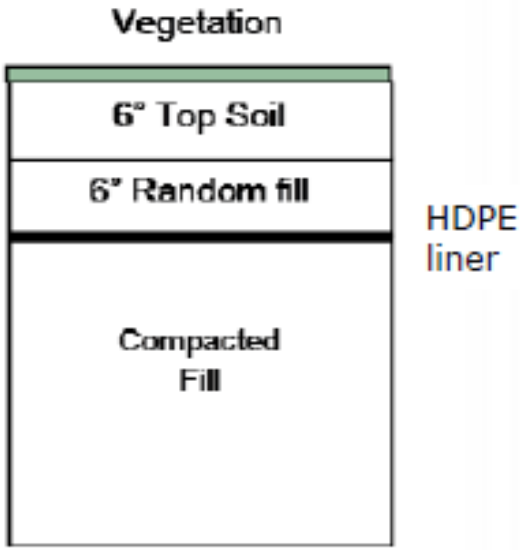
1995 Vegetated Cover

13-acre area which received waste from Pollard Pond



1997 Vegetated Cover

19.5 acres



Attachment C

Figures from 2014 Semi-Annual Monitoring Report for the Pond Site (Leidos, 2014)

FORMER CHEVRON CHEMICAL COMPANY
POND SITE
RICHMOND, CALIFORNIA

2014 SEMI-ANNUAL MONITORING REPORT

August 29, 2014

Prepared for:
Chevron Environmental Management Company
940 Hensley Street
Richmond, California 94801

Prepared by:
Leidos Engineering, LLC
1000 Broadway, Suite 675
Oakland, California 94607

leidos

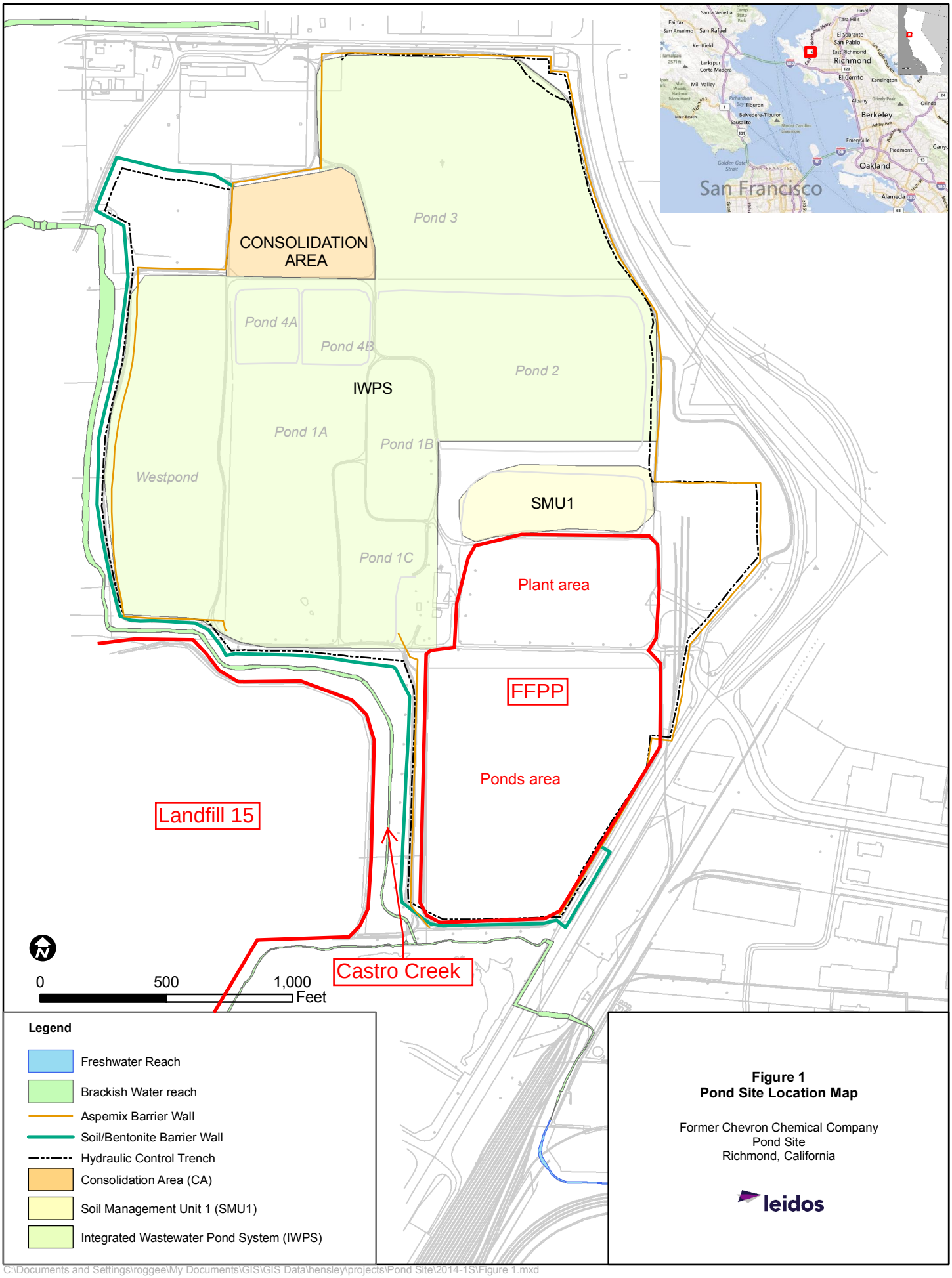


Figure 1
Pond Site Location Map

Former Chevron Chemical Company
Pond Site
Richmond, California

leidos

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Appendix C

Air Quality and Greenhouse Gas Emissions Modeling Results

MCE Richmond Solar PV

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	60.00	Acre	60.00	2,613,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	5			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - City Park used to show that no buildings or other land uses would be onsite as this is a solar facility.

Construction Phase - 1.5 year total construction. Phase I and Phase II overlap.

Off-road Equipment - Grading on Fertilizer Pond to remove berm

Off-road Equipment - Install Solar Panels - no dozers or cranes

Trips and VMT - 100 workers during construction per day.

Grading - Phase I - 500 CY of fill on 13 acres of landfill
Phase II Grading - Removal of berm and redistributing 3400 acres of berm soil on low areas of Fertilizer pond site (no import or export)

Vehicle Trips - 2 Maintenance Truck trips per month for monthly maintenance. Worst case day = 2 trips per day.

Vechicle Emission Factors - Maintenance truck

Vechicle Emission Factors - Maintenance Truck only

Vechicle Emission Factors - Maintenance Truck only

Consumer Products - None

Area Coating - None

Water And Wastewater - No water/wastewater

Solid Waste - No waste

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Interior	3920400	0
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tblConstructionPhase	NumDays	40.00	120.00
tblConstructionPhase	PhaseEndDate	10/23/2017	6/30/2017
tblConstructionPhase	PhaseEndDate	6/16/2016	7/28/2016
tblConstructionPhase	PhaseStartDate	7/29/2016	4/7/2016
tblConsumerProducts	ROG_EF	2.14E-05	1E-29
tblGrading	AcresOfGrading	0.00	60.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	5.16	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	LDA	0.53	0.00
tblVehicleEF	LDA	0.53	0.00
tblVehicleEF	LDA	0.53	0.00
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tblVehicleEF	LDT1	0.07	0.00
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tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
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tblVehicleEF	LHD1	0.04	1.00
tblVehicleEF	LHD1	0.04	1.00
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tblVehicleTrips	WD_TR	1.59	2.00
tblWater	OutdoorWaterUseRate	71,488,880.98	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.7497	13.0277	17.5225	0.0288	2.1845	0.5337	2.7182	0.8364	0.4967	1.3331	0.0000	2,455.3625	2,455.3625	0.2427	0.0000	2,460.4587
2017	0.8134	5.3073	8.8219	0.0167	0.8290	0.1748	1.0038	0.2241	0.1630	0.3872	0.0000	1,368.9694	1,368.9694	0.0907	0.0000	1,370.8746
Total	**2.5631**	**18.3350**	**26.3445**	**0.0455**	**3.0136**	**0.7085**	**3.7220**	**1.0605**	**0.6597**	**1.7202**	**0.0000**	**3,824.3318**	**3,824.3318**	**0.3334**	**0.0000**	**3,831.3333**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.7497	13.0277	17.5225	0.0288	1.6093	0.5337	2.1429	0.5309	0.4967	1.0276	0.0000	2,455.3617	2,455.3617	0.2427	0.0000	2,460.4579
2017	0.8134	5.3073	8.8219	0.0167	0.8290	0.1748	1.0038	0.2241	0.1630	0.3872	0.0000	1,368.9691	1,368.9691	0.0907	0.0000	1,370.8743
Total	**2.5631**	**18.3350**	**26.3445**	**0.0455**	**2.4383**	**0.7085**	**3.1468**	**0.7550**	**0.6597**	**1.4147**	**0.0000**	**3,824.3308**	**3,824.3308**	**0.3334**	**0.0000**	**3,831.3322**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**19.09**	**0.00**	**15.46**	**28.81**	**0.00**	**17.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.5438**	**0.4943**	**0.7491**	**2.2800e-003**	**0.0958**	**5.2800e-003**	**0.1011**	**0.0260**	**4.8600e-003**	**0.0309**	**0.0000**	**200.7838**	**200.7838**	**6.6700e-003**	**0.0000**	**200.9240**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.5438**	**0.4943**	**0.7491**	**2.2800e-003**	**0.0958**	**5.2800e-003**	**0.1011**	**0.0260**	**4.8600e-003**	**0.0309**	**0.0000**	**200.7838**	**200.7838**	**6.6700e-003**	**0.0000**	**200.9240**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Prep	Site Preparation	1/1/2016	7/28/2016	5	120	
2	Solar Installation	Building Construction	4/7/2016	6/30/2017	5	322	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Prep	Concrete/Industrial Saws	1	8.00	81	0.73
Site Prep	Excavators	3	8.00	162	0.38
Site Prep	Rubber Tired Dozers	2	8.00	255	0.40
Site Prep	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Solar Installation	Cranes	1	7.00	226	0.29
Solar Installation	Forklifts	3	8.00	89	0.20
Solar Installation	Generator Sets	1	8.00	84	0.74
Solar Installation	Scrapers	1	8.00	361	0.48
Solar Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Solar Installation	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Prep	10	25.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Solar Installation	8	1,098.00	428.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Prep - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.9431	0.0000	0.9431	0.5008	0.0000	0.5008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4238	4.4007	3.3511	3.9300e-003		0.2471	0.2471		0.2294	0.2294	0.0000	366.3207	366.3207	0.1022	0.0000	368.4677
Total	**0.4238**	**4.4007**	**3.3511**	**3.9300e-003**	**0.9431**	**0.2471**	**1.1902**	**0.5008**	**0.2294**	**0.7302**	**0.0000**	**366.3207**	**366.3207**	**0.1022**	**0.0000**	**368.4677**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0600e-003	0.0104	0.1014	2.0000e-004	0.0171	1.4000e-004	0.0172	4.5400e-003	1.3000e-004	4.6700e-003	0.0000	15.4164	15.4164	8.5000e-004	0.0000	15.4343
Total	**7.0600e-003**	**0.0104**	**0.1014**	**2.0000e-004**	**0.0171**	**1.4000e-004**	**0.0172**	**4.5400e-003**	**1.3000e-004**	**4.6700e-003**	**0.0000**	**15.4164**	**15.4164**	**8.5000e-004**	**0.0000**	**15.4343**

3.2 Site Prep - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3678	0.0000	0.3678	0.1953	0.0000	0.1953	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4238	4.4007	3.3511	3.9300e-003		0.2471	0.2471		0.2294	0.2294	0.0000	366.3203	366.3203	0.1022	0.0000	368.4672
Total	**0.4238**	**4.4007**	**3.3511**	**3.9300e-003**	**0.3678**	**0.2471**	**0.6149**	**0.1953**	**0.2294**	**0.4247**	**0.0000**	**366.3203**	**366.3203**	**0.1022**	**0.0000**	**368.4672**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0600e-003	0.0104	0.1014	2.0000e-004	0.0171	1.4000e-004	0.0172	4.5400e-003	1.3000e-004	4.6700e-003	0.0000	15.4164	15.4164	8.5000e-004	0.0000	15.4343
Total	**7.0600e-003**	**0.0104**	**0.1014**	**2.0000e-004**	**0.0171**	**1.4000e-004**	**0.0172**	**4.5400e-003**	**1.3000e-004**	**4.6700e-003**	**0.0000**	**15.4164**	**15.4164**	**8.5000e-004**	**0.0000**	**15.4343**

3.3 Solar Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4066	3.9180	2.4583	3.5200e-003		0.2179	0.2179		0.2041	0.2041	0.0000	321.4296	321.4296	0.0845	0.0000	323.2039
Total	**0.4066**	**3.9180**	**2.4583**	**3.5200e-003**		**0.2179**	**0.2179**		**0.2041**	**0.2041**	**0.0000**	**321.4296**	**321.4296**	**0.0845**	**0.0000**	**323.2039**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5152	4.1151	5.9136	9.7600e-003	0.2647	0.0608	0.3254	0.0758	0.0559	0.1317	0.0000	885.5234	885.5234	7.0900e-003	0.0000	885.6722
Worker	0.3972	0.5835	5.6982	0.0114	0.9597	7.8200e-003	0.9675	0.2552	7.1700e-003	0.2624	0.0000	866.6724	866.6724	0.0480	0.0000	867.6807
Total	**0.9123**	**4.6986**	**11.6118**	**0.0211**	**1.2244**	**0.0686**	**1.2930**	**0.3310**	**0.0630**	**0.3940**	**0.0000**	**1,752.1958**	**1,752.1958**	**0.0551**	**0.0000**	**1,753.3528**

3.3 Solar Installation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4066	3.9180	2.4583	3.5200e-003		0.2179	0.2179		0.2041	0.2041	0.0000	321.4292	321.4292	0.0845	0.0000	323.2035
Total	**0.4066**	**3.9180**	**2.4583**	**3.5200e-003**		**0.2179**	**0.2179**		**0.2041**	**0.2041**	**0.0000**	**321.4292**	**321.4292**	**0.0845**	**0.0000**	**323.2035**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5152	4.1151	5.9136	9.7600e-003	0.2647	0.0608	0.3254	0.0758	0.0559	0.1317	0.0000	885.5234	885.5234	7.0900e-003	0.0000	885.6722
Worker	0.3972	0.5835	5.6982	0.0114	0.9597	7.8200e-003	0.9675	0.2552	7.1700e-003	0.2624	0.0000	866.6724	866.6724	0.0480	0.0000	867.6807
Total	**0.9123**	**4.6986**	**11.6118**	**0.0211**	**1.2244**	**0.0686**	**1.2930**	**0.3310**	**0.0630**	**0.3940**	**0.0000**	**1,752.1958**	**1,752.1958**	**0.0551**	**0.0000**	**1,753.3528**

3.3 Solar Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2526	2.4556	1.5884	2.3800e-003		0.1342	0.1342		0.1257	0.1257	0.0000	214.9924	214.9924	0.0565	0.0000	216.1787
Total	**0.2526**	**2.4556**	**1.5884**	**2.3800e-003**		**0.1342**	**0.1342**		**0.1257**	**0.1257**	**0.0000**	**214.9924**	**214.9924**	**0.0565**	**0.0000**	**216.1787**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3233	2.4983	3.8089	6.6000e-003	0.1792	0.0356	0.2148	0.0513	0.0327	0.0841	0.0000	589.5544	589.5544	4.5500e-003	0.0000	589.6501
Worker	0.2375	0.3535	3.4247	7.7000e-003	0.6498	5.0500e-003	0.6548	0.1728	4.6500e-003	0.1775	0.0000	564.4225	564.4225	0.0297	0.0000	565.0458
Total	**0.5608**	**2.8518**	**7.2335**	**0.0143**	**0.8290**	**0.0407**	**0.8697**	**0.2241**	**0.0374**	**0.2615**	**0.0000**	**1,153.9770**	**1,153.9770**	**0.0342**	**0.0000**	**1,154.6959**

3.3 Solar Installation - 2017

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2526	2.4555	1.5884	2.3800e-003		0.1342	0.1342		0.1257	0.1257	0.0000	214.9921	214.9921	0.0565	0.0000	216.1784
Total	**0.2526**	**2.4555**	**1.5884**	**2.3800e-003**		**0.1342**	**0.1342**		**0.1257**	**0.1257**	**0.0000**	**214.9921**	**214.9921**	**0.0565**	**0.0000**	**216.1784**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3233	2.4983	3.8089	6.6000e-003	0.1792	0.0356	0.2148	0.0513	0.0327	0.0841	0.0000	589.5544	589.5544	4.5500e-003	0.0000	589.6501
Worker	0.2375	0.3535	3.4247	7.7000e-003	0.6498	5.0500e-003	0.6548	0.1728	4.6500e-003	0.1775	0.0000	564.4225	564.4225	0.0297	0.0000	565.0458
Total	**0.5608**	**2.8518**	**7.2335**	**0.0143**	**0.8290**	**0.0407**	**0.8697**	**0.2241**	**0.0374**	**0.2615**	**0.0000**	**1,153.9770**	**1,153.9770**	**0.0342**	**0.0000**	**1,154.6959**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Unmitigated	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	120.00	0.00	0.00	250,411	250,411
Total	120.00	0.00	0.00	250,411	250,411

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Unmitigated	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Total	**0.4543**	**1.0000e-005**	**5.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0700e-003**	**1.0700e-003**	**0.0000**	**0.0000**	**1.1400e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Total	**0.4543**	**1.0000e-005**	**5.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0700e-003**	**1.0700e-003**	**0.0000**	**0.0000**	**1.1400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

MCE Richmond Solar PV

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	60.00	Acre	60.00	2,613,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	5			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - City Park used to show that no buildings or other land uses would be onsite as this is a solar facility.

Construction Phase - 1.5 year total construction. Phase I and Phase II overlap.

Off-road Equipment - Grading on Fertilizer Pond to remove berm

Off-road Equipment - Install Solar Panels - no dozers or cranes

Trips and VMT - 100 workers during construction per day.

Grading - Phase I - 500 CY of fill on 13 acres of landfill
Phase II Grading - Removal of berm and redistributing 2800 acres of berm soil on low areas of Fertilizer pond site (no import or export)

Vehicle Trips - 2 Maintenance Truck trips per month for monthly maintenance. Worst case day = 2 trips per day.

Vechicle Emission Factors - Maintenance truck

Vechicle Emission Factors - Maintenance Truck only

Vechicle Emission Factors - Maintenance Truck only

Consumer Products - None

Area Coating - None

Water And Wastewater - No water/wastewater

Solid Waste - No waste

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Interior	3920400	0
tblConstructionPhase	NumDays	1,110.00	322.00
tblConstructionPhase	NumDays	40.00	120.00
tblConstructionPhase	PhaseEndDate	10/23/2017	6/30/2017
tblConstructionPhase	PhaseEndDate	6/16/2016	7/28/2016
tblConstructionPhase	PhaseStartDate	7/29/2016	4/7/2016
tblConsumerProducts	ROG_EF	2.14E-05	1E-29
tblGrading	AcresOfGrading	0.00	60.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblSolidWaste	SolidWasteGenerationRate	5.16	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	HHD	0.02	0.00
tblVehicleEF	LDA	0.53	0.00
tblVehicleEF	LDA	0.53	0.00
tblVehicleEF	LDA	0.53	0.00
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT1	0.07	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LDT2	0.18	0.00
tblVehicleEF	LHD1	0.04	1.00
tblVehicleEF	LHD1	0.04	1.00
tblVehicleEF	LHD1	0.04	1.00
tblVehicleEF	LHD2	4.8880e-003	0.00
tblVehicleEF	LHD2	4.8880e-003	0.00
tblVehicleEF	LHD2	4.8880e-003	0.00
tblVehicleEF	MCY	6.3590e-003	0.00
tblVehicleEF	MCY	6.3590e-003	0.00
tblVehicleEF	MCY	6.3590e-003	0.00
tblVehicleEF	MDV	0.15	0.00
tblVehicleEF	MDV	0.15	0.00
tblVehicleEF	MDV	0.15	0.00
tblVehicleEF	MH	2.0520e-003	0.00

tblVehicleEF	MH	2.0520e-003	0.00
tblVehicleEF	MH	2.0520e-003	0.00
tblVehicleEF	MHD	9.6710e-003	0.00
tblVehicleEF	MHD	9.6710e-003	0.00
tblVehicleEF	MHD	9.6710e-003	0.00
tblVehicleEF	OBUS	1.2210e-003	0.00
tblVehicleEF	OBUS	1.2210e-003	0.00
tblVehicleEF	OBUS	1.2210e-003	0.00
tblVehicleEF	SBUS	2.1010e-003	0.00
tblVehicleEF	SBUS	2.1010e-003	0.00
tblVehicleEF	SBUS	2.1010e-003	0.00
tblVehicleEF	UBUS	1.4870e-003	0.00
tblVehicleEF	UBUS	1.4870e-003	0.00
tblVehicleEF	UBUS	1.4870e-003	0.00
tblVehicleTrips	DV_TP	28.00	0.00
tblVehicleTrips	PB_TP	6.00	0.00
tblVehicleTrips	PR_TP	66.00	100.00
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	WD_TR	1.59	2.00
tblWater	OutdoorWaterUseRate	71,488,880.98	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.7497	13.0277	17.5225	0.0288	2.1845	0.5337	2.7182	0.8364	0.4967	1.3331	0.0000	2,455.3625	2,455.3625	0.2427	0.0000	2,460.4587
2017	0.8134	5.3073	8.8219	0.0167	0.8290	0.1748	1.0038	0.2241	0.1630	0.3872	0.0000	1,368.9694	1,368.9694	0.0907	0.0000	1,370.8746
Total	**2.5631**	**18.3350**	**26.3445**	**0.0455**	**3.0136**	**0.7085**	**3.7220**	**1.0605**	**0.6597**	**1.7202**	**0.0000**	**3,824.3318**	**3,824.3318**	**0.3334**	**0.0000**	**3,831.3333**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	1.7497	13.0277	17.5225	0.0288	1.6093	0.5337	2.1429	0.5309	0.4967	1.0276	0.0000	2,455.3617	2,455.3617	0.2427	0.0000	2,460.4579
2017	0.8134	5.3073	8.8219	0.0167	0.8290	0.1748	1.0038	0.2241	0.1630	0.3872	0.0000	1,368.9691	1,368.9691	0.0907	0.0000	1,370.8743
Total	**2.5631**	**18.3350**	**26.3445**	**0.0455**	**2.4383**	**0.7085**	**3.1468**	**0.7550**	**0.6597**	**1.4147**	**0.0000**	**3,824.3308**	**3,824.3308**	**0.3334**	**0.0000**	**3,831.3322**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**19.09**	**0.00**	**15.46**	**28.81**	**0.00**	**17.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.5438**	**0.4943**	**0.7491**	**2.2800e-003**	**0.0958**	**5.2800e-003**	**0.1011**	**0.0260**	**4.8600e-003**	**0.0309**	**0.0000**	**200.7838**	**200.7838**	**6.6700e-003**	**0.0000**	**200.9240**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.5438**	**0.4943**	**0.7491**	**2.2800e-003**	**0.0958**	**5.2800e-003**	**0.1011**	**0.0260**	**4.8600e-003**	**0.0309**	**0.0000**	**200.7838**	**200.7838**	**6.6700e-003**	**0.0000**	**200.9240**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Prep	Site Preparation	1/1/2016	7/28/2016	5	120	
2	Solar Installation	Building Construction	4/7/2016	6/30/2017	5	322	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Prep	Concrete/Industrial Saws	1	8.00	81	0.73
Site Prep	Excavators	3	8.00	162	0.38
Site Prep	Rubber Tired Dozers	2	8.00	255	0.40
Site Prep	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Solar Installation	Cranes	1	7.00	226	0.29
Solar Installation	Forklifts	3	8.00	89	0.20
Solar Installation	Generator Sets	1	8.00	84	0.74
Solar Installation	Scrapers	1	8.00	361	0.48
Solar Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Solar Installation	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Prep	10	25.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Solar Installation	8	1,098.00	428.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Site Prep - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.9431	0.0000	0.9431	0.5008	0.0000	0.5008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4238	4.4007	3.3511	3.9300e-003		0.2471	0.2471		0.2294	0.2294	0.0000	366.3207	366.3207	0.1022	0.0000	368.4677
Total	**0.4238**	**4.4007**	**3.3511**	**3.9300e-003**	**0.9431**	**0.2471**	**1.1902**	**0.5008**	**0.2294**	**0.7302**	**0.0000**	**366.3207**	**366.3207**	**0.1022**	**0.0000**	**368.4677**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0600e-003	0.0104	0.1014	2.0000e-004	0.0171	1.4000e-004	0.0172	4.5400e-003	1.3000e-004	4.6700e-003	0.0000	15.4164	15.4164	8.5000e-004	0.0000	15.4343
Total	**7.0600e-003**	**0.0104**	**0.1014**	**2.0000e-004**	**0.0171**	**1.4000e-004**	**0.0172**	**4.5400e-003**	**1.3000e-004**	**4.6700e-003**	**0.0000**	**15.4164**	**15.4164**	**8.5000e-004**	**0.0000**	**15.4343**

3.2 Site Prep - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3678	0.0000	0.3678	0.1953	0.0000	0.1953	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4238	4.4007	3.3511	3.9300e-003		0.2471	0.2471		0.2294	0.2294	0.0000	366.3203	366.3203	0.1022	0.0000	368.4672
Total	**0.4238**	**4.4007**	**3.3511**	**3.9300e-003**	**0.3678**	**0.2471**	**0.6149**	**0.1953**	**0.2294**	**0.4247**	**0.0000**	**366.3203**	**366.3203**	**0.1022**	**0.0000**	**368.4672**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0600e-003	0.0104	0.1014	2.0000e-004	0.0171	1.4000e-004	0.0172	4.5400e-003	1.3000e-004	4.6700e-003	0.0000	15.4164	15.4164	8.5000e-004	0.0000	15.4343
Total	**7.0600e-003**	**0.0104**	**0.1014**	**2.0000e-004**	**0.0171**	**1.4000e-004**	**0.0172**	**4.5400e-003**	**1.3000e-004**	**4.6700e-003**	**0.0000**	**15.4164**	**15.4164**	**8.5000e-004**	**0.0000**	**15.4343**

3.3 Solar Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4066	3.9180	2.4583	3.5200e-003		0.2179	0.2179		0.2041	0.2041	0.0000	321.4296	321.4296	0.0845	0.0000	323.2039
Total	**0.4066**	**3.9180**	**2.4583**	**3.5200e-003**		**0.2179**	**0.2179**		**0.2041**	**0.2041**	**0.0000**	**321.4296**	**321.4296**	**0.0845**	**0.0000**	**323.2039**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5152	4.1151	5.9136	9.7600e-003	0.2647	0.0608	0.3254	0.0758	0.0559	0.1317	0.0000	885.5234	885.5234	7.0900e-003	0.0000	885.6722
Worker	0.3972	0.5835	5.6982	0.0114	0.9597	7.8200e-003	0.9675	0.2552	7.1700e-003	0.2624	0.0000	866.6724	866.6724	0.0480	0.0000	867.6807
Total	**0.9123**	**4.6986**	**11.6118**	**0.0211**	**1.2244**	**0.0686**	**1.2930**	**0.3310**	**0.0630**	**0.3940**	**0.0000**	**1,752.1958**	**1,752.1958**	**0.0551**	**0.0000**	**1,753.3528**

3.3 Solar Installation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4066	3.9180	2.4583	3.5200e-003		0.2179	0.2179		0.2041	0.2041	0.0000	321.4292	321.4292	0.0845	0.0000	323.2035
Total	**0.4066**	**3.9180**	**2.4583**	**3.5200e-003**		**0.2179**	**0.2179**		**0.2041**	**0.2041**	**0.0000**	**321.4292**	**321.4292**	**0.0845**	**0.0000**	**323.2035**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5152	4.1151	5.9136	9.7600e-003	0.2647	0.0608	0.3254	0.0758	0.0559	0.1317	0.0000	885.5234	885.5234	7.0900e-003	0.0000	885.6722
Worker	0.3972	0.5835	5.6982	0.0114	0.9597	7.8200e-003	0.9675	0.2552	7.1700e-003	0.2624	0.0000	866.6724	866.6724	0.0480	0.0000	867.6807
Total	**0.9123**	**4.6986**	**11.6118**	**0.0211**	**1.2244**	**0.0686**	**1.2930**	**0.3310**	**0.0630**	**0.3940**	**0.0000**	**1,752.1958**	**1,752.1958**	**0.0551**	**0.0000**	**1,753.3528**

3.3 Solar Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2526	2.4556	1.5884	2.3800e-003		0.1342	0.1342		0.1257	0.1257	0.0000	214.9924	214.9924	0.0565	0.0000	216.1787
Total	**0.2526**	**2.4556**	**1.5884**	**2.3800e-003**		**0.1342**	**0.1342**		**0.1257**	**0.1257**	**0.0000**	**214.9924**	**214.9924**	**0.0565**	**0.0000**	**216.1787**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3233	2.4983	3.8089	6.6000e-003	0.1792	0.0356	0.2148	0.0513	0.0327	0.0841	0.0000	589.5544	589.5544	4.5500e-003	0.0000	589.6501
Worker	0.2375	0.3535	3.4247	7.7000e-003	0.6498	5.0500e-003	0.6548	0.1728	4.6500e-003	0.1775	0.0000	564.4225	564.4225	0.0297	0.0000	565.0458
Total	**0.5608**	**2.8518**	**7.2335**	**0.0143**	**0.8290**	**0.0407**	**0.8697**	**0.2241**	**0.0374**	**0.2615**	**0.0000**	**1,153.9770**	**1,153.9770**	**0.0342**	**0.0000**	**1,154.6959**

3.3 Solar Installation - 2017

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2526	2.4555	1.5884	2.3800e-003		0.1342	0.1342		0.1257	0.1257	0.0000	214.9921	214.9921	0.0565	0.0000	216.1784
Total	**0.2526**	**2.4555**	**1.5884**	**2.3800e-003**		**0.1342**	**0.1342**		**0.1257**	**0.1257**	**0.0000**	**214.9921**	**214.9921**	**0.0565**	**0.0000**	**216.1784**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3233	2.4983	3.8089	6.6000e-003	0.1792	0.0356	0.2148	0.0513	0.0327	0.0841	0.0000	589.5544	589.5544	4.5500e-003	0.0000	589.6501
Worker	0.2375	0.3535	3.4247	7.7000e-003	0.6498	5.0500e-003	0.6548	0.1728	4.6500e-003	0.1775	0.0000	564.4225	564.4225	0.0297	0.0000	565.0458
Total	**0.5608**	**2.8518**	**7.2335**	**0.0143**	**0.8290**	**0.0407**	**0.8697**	**0.2241**	**0.0374**	**0.2615**	**0.0000**	**1,153.9770**	**1,153.9770**	**0.0342**	**0.0000**	**1,154.6959**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229
Unmitigated	0.0895	0.4943	0.7485	2.2800e-003	0.0958	5.2800e-003	0.1011	0.0260	4.8600e-003	0.0309	0.0000	200.7827	200.7827	6.6700e-003	0.0000	200.9229

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	120.00	0.00	0.00	250,411	250,411
Total	120.00	0.00	0.00	250,411	250,411

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Unmitigated	0.4543	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Total	**0.4543**	**1.0000e-005**	**5.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0700e-003**	**1.0700e-003**	**0.0000**	**0.0000**	**1.1400e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.4543					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0700e-003	1.0700e-003	0.0000	0.0000	1.1400e-003
Total	**0.4543**	**1.0000e-005**	**5.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0700e-003**	**1.0700e-003**	**0.0000**	**0.0000**	**1.1400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Use	Energy Use (MWh/day)	CO2	N2O	Ch4	
Electricity	55.6				
Emission Factor (lbs/MWh)		589.00	0.01	0.04	
Electricity Offseet from Grid (lbs/day)		32,748.40	0.56	2.22	
Metric Tons Per Year		5,421.86	0.09	0.37	
Metric Tons CO2E per year		5,421.86	28.54	7.73	
Total Metric tons CO2E Per year					**5,458.13**

GHG emissions based on emission factors from the California Air Pollution Control Officers Association, Quantifying Greenhouse Gas Mitigation Measures, September 2010 and California Climate Action Registry (CCAR) Database, Power/Utility Protocol (PUP) Report, 2007

Appendix D

Geotechnical Investigation

Geotechnical Investigation

Landfill 15

Solar Array Installation

Richmond, Contra Costa County, California

Mr. Jeffrey Cheng
Corporate Vice President
Stion Energy Services – a division of Stion Corporation
6321 San Ignacio Avenue
San Jose, CA 95119

Project No.: 8581.002

March 25, 2015

Amended: April 15, 2015

Amended: April 23, 2015

Amended: November 4, 2015

Mischelle J. Smith, PE, GE
GE 2892

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
5440 Reno Corporate Drive Tel: 775.823.4068
Reno, NV 89511 Fax: 775.823.4066

WOOD RODGERS

November 4, 2015
Project No. 8581.002

Mr. Jeffrey Cheng
Corporate Vice President
Stion Energy Services – a Division of Stion Corporation
6321 San Ignacio Avenue
San Jose, CA 95119

RE: Landfill 15 – Northern Portion

REF: Geotechnical Investigation
Landfill 15
Solar Array Installation
Richmond, Contra Costa County, California
Report No.: 8581.002
Report Date: 04/23/15

Dear Mr. Cheng:

Per your request we have evaluated the additional geophysical surveys performed specific to the northern portion of Landfill 15. Based on our evaluation of the geophysical profiles and prior assessments developed as part of our original geotechnical report (referenced above), it is our opinion the recommendations and assessments previously presented are appropriate for the remainder of the landfill structure with the exception of settlement (Section 9.1 Settlement). Because of the increased fill depth to the north, we anticipate long term settlement of the landfill to the north, over the life of the array, could incur another ½ to ¾ foot. Settlement specific to the array and skid would remain near ½ inch as originally modeled. The accompanying plates present locations and profiles associated with our geophysical surveys.

Please contact our office should you have any related questions or comments.

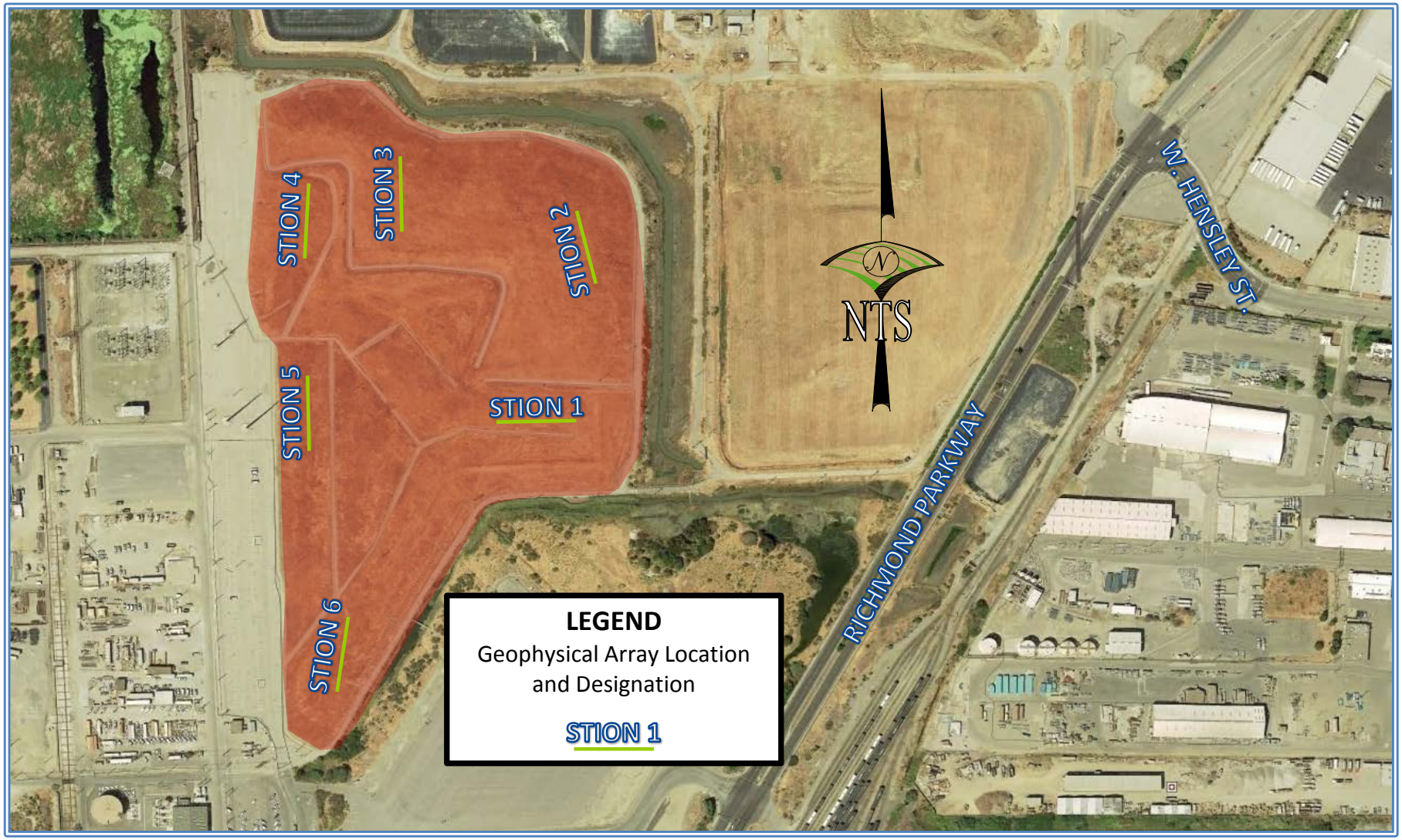
Sincerely,

WOOD RODGERS, INCORPORATED

REGISTERED PROFESSIONAL ENGINEER
MISCHELLE JANINE SMITH
No. GE 2892
Exp. 3-31-17
11-4-15
GEOTECHNICAL
STATE OF CALIFORNIA

Mischelle J. Smith, PE
GE 2892
Expires: 3/31/2017

Blake D. Carter
C 82175
Expires 3/31/16



WOOD RODGERS
5440 Reno Corporate Drive, Reno, NV 89511
Phone 775.823.4068 Fax 775.823.4066

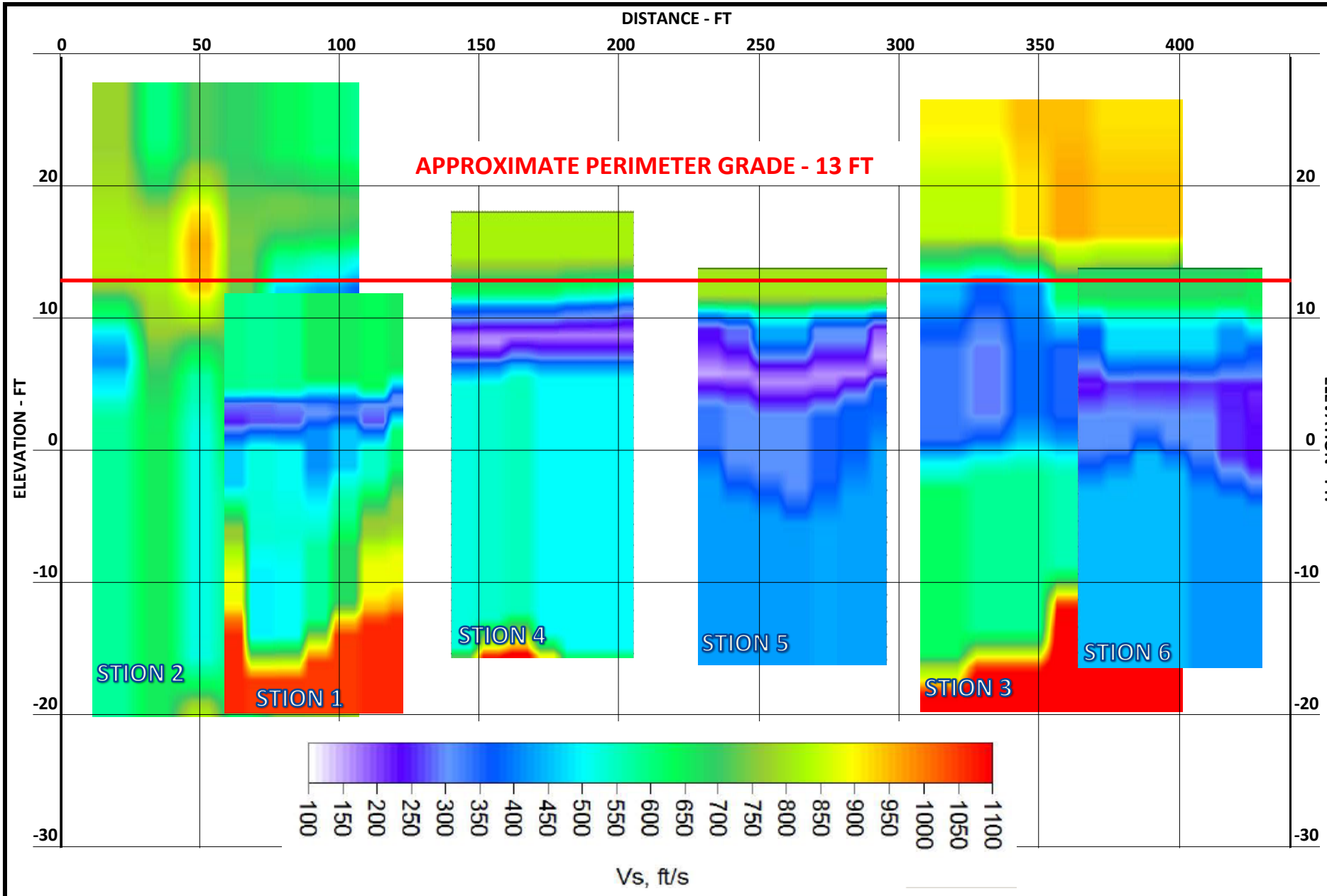
SITE PLAN
&
APPROXIMATE GEOPHYSICAL ARRAY LOCATIONS

Geotechnical Investigation

MCE SOLAR ONE
Richmond, CA

Project No.: 8581.002
Date: 11.4.15

PLATE 1



WOOD RODGERS
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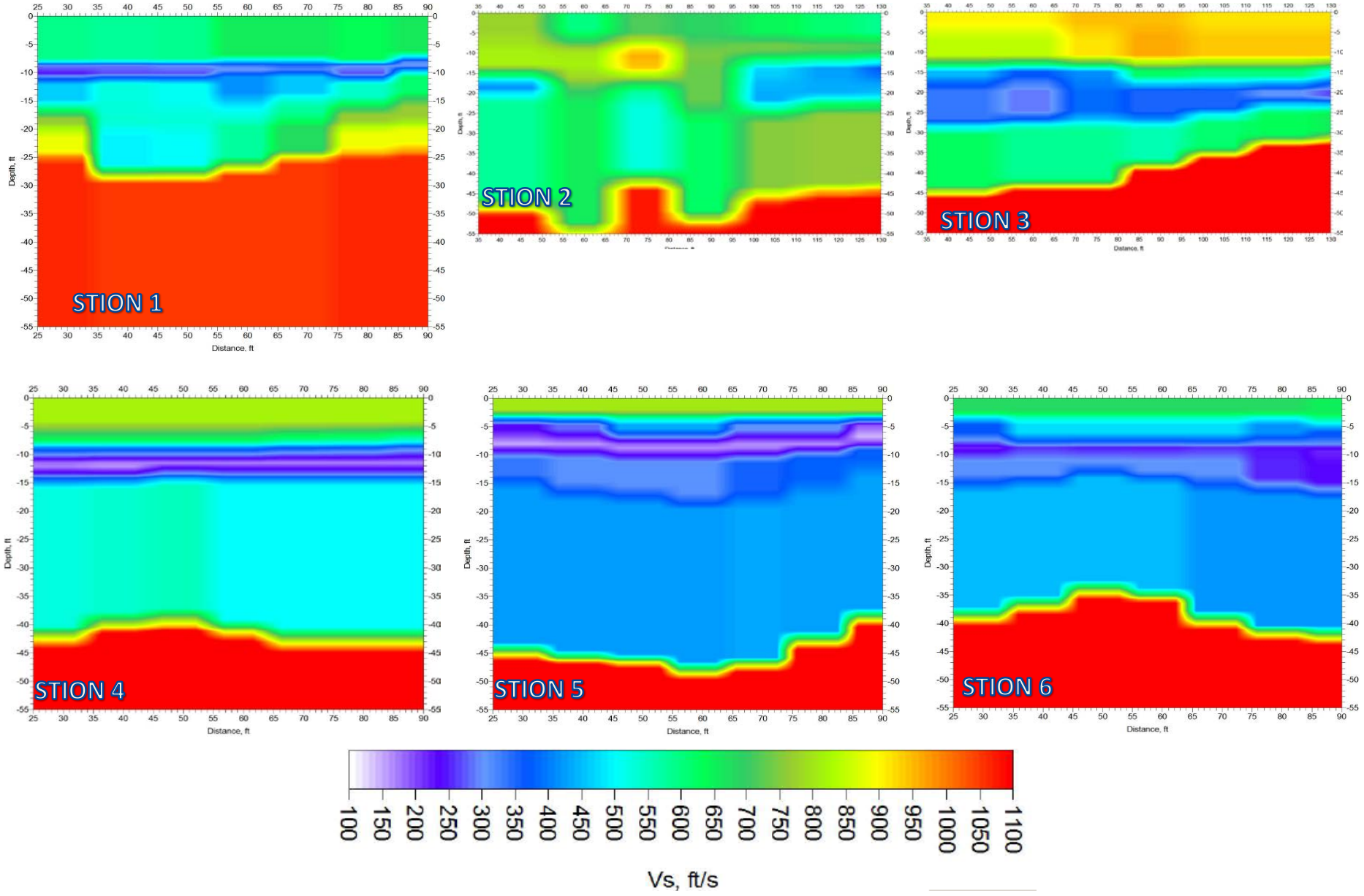
GEOPHYSICAL PROFILES
(Based on Elevation)

Geotechnical Investigation

MCE SOLAR ONE
Richmond, CA

Project No.: 8581.002
Date: 11.13.15

PLATE 2a



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GEOPHYSICAL PROFILES
(By Number)

Geotechnical Investigation

MCE SOLAR ONE
Richmond, CA

Project No.: 8581.002
Date: 11.13.15

PLATE 2b

Geotechnical Investigation

Landfill 15

Solar Array Installation

Richmond, Contra Costa County, California

Mr. Jeffrey Cheng
Corporate Vice President
Stion Energy Services – a division of Stion Corporation
6321 San Ignacio Avenue
San Jose, CA 95119

Project No.: 8581.002

March 25, 2015

Amended: April 15, 2015

Amended: April 23, 2015

4-23-15

Mischelle J. Smith, PE, GE
PE Number – 2892 (CA)

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
5440 Reno Corporate Drive Tel: 775.823.4068
Reno, NV 89511 Fax: 775.823.4066

WOOD RODGERS

April 23, 2015
Project No. 8581.002

Mr. Jeffrey Cheng
Corporate Vice President
Stion Energy Services – a Division of Stion Corporation
6321 San Ignacio Avenue
San Jose, CA 95119

RE: Coefficient of Friction

REF: Performance Test Report
Intertek – Architectural Testing
FBO Gamechange Racking, LLC
Ballast Coefficient of Friction Testing
Brimfield, Massachusetts
Report No.: E6761.01-250-47
Test Date: 04/06/15
Report Date: 04/22/15

Dear Mr. Cheng:
We are in receipt of the coefficient of friction testing performed for the benefit of Gamechange Racking, LLC (attached). It is our opinion Gamechange Racking may rely on these values, with associated factors of safety as established by the appropriate design protocol, in lieu of using the values presented in Wood Rodgers' geotechnical design report.

Please contact our office should you have any related questions or comments.

Sincerely,

WOOD RODGERS, INCORPORATED

REGISTERED PROFESSIONAL ENGINEER
MISCHELLE JANINE SMITH
No. GE 2892
Exp. 3-31-17
4-23-15
GEOTECHNICAL
STATE OF CALIFORNIA

Mischelle J. Smith, PE
GE 2892
Expires: 3/31/2017

Intertek | Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

GAMECHANGE RACKING LLC

PROJECT: **Ballast Coefficient of Friction Testing**
Brimfield, Massachusetts

Report No.: **E6761.01-250-47**
Test Date: **04/06/15**
Report Date: **04/22/15**

3 Lexington Road, Unit 3
Windham, NH 03087

www.archtest.com . www.intertek.com/building

p. 603.421.2788
f. 717.764.4129

Intertek | Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

GAMECHANGE RACKING LLC
750 Fifth Avenue
New York, New York 10019

Report No.: E6761.01-250-47
Test Date: 04/06/15
Report Date: 04/22/15

Project Identification: Ballast Coefficient of Friction Testing
Brimfield, Massachusetts

Product: Concrete Ballast in Plastic Tub

Project Summary: Architectural Testing, Inc., an Intertek Company ("Intertek-ATI"), was contracted by Gamechange Racking LLC to witness static coefficient of friction tests on their concrete ballast. Testing was preformed onsite in Brimfield, Massachusetts by Zach Cutting of Gamechange Racking LLC. Testing was performed on grass, loam, mud, gravel, and sand.

Product Description: 1750 lb. concrete ballast in a plastic tub

Test Results: The results are reported in the following tables.

Concrete Ballast in Plastic Tub-1750lbs				
Surface Condition	**Pull Number**	**Pull Orientation**	**Value (lbs)**	**Coefficient of Friction (F_D)**
Grass	**1**	90°	1250	0.71
	2	90°	1400	0.80
Surface Condition	**Pull Number**	**Pull Orientation**	**Value (lbs)**	**Coefficient of Friction (F_D)**
Loam	**1**	90°	900	0.51
	2	90°	900	0.51
Surface Condition	**Pull Number**	**Pull Orientation**	**Value (lbs)**	**Coefficient of Friction (F_D)**
Gravel	**1**	90°	650	0.37
	2	90°	775	0.44
Surface Condition	**Pull Number**	**Pull Orientation**	**Value (lbs)**	**Coefficient of Friction (F_D)**
Sand	**1**	90°	725	0.41
	2	90°	850	0.49
Surface Condition	**Pull Number**	**Pull Orientation**	**Value (lbs)**	**Coefficient of Friction (F_D)**
Mud	**1**	90°	1000	0.57
	2	90°	1300	0.74

Witnesses: The following representatives witnessed all or part of the testing.

Zach Cutting	Gamechange Racking
Brian Philcrantz	Intertek-ATI

Intertek-ATI will service this report for a period of four years from the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

For INTERTEK-ATI:

Digitally Signed by: Brian Philcrantz

Brian Philcrantz
Technician

Digitally Signed by: Daniel J. Carroll

Daniel Carroll
Project Manager

BP:ds

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Photographs (2)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	04/22/15	N/A	Original report issue.

APPENDIX A

Photographs

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Executive Summary

The proposed project consists of constructing a 2MW photovoltaic solar array with an associated equipment (skid) pad at Landfill 15 of the Chevron Refinery facility. The development area is currently covered with a thick growth of native grasses and is frequented by rabbits, turkeys, and deer. Landfill 15 became active in the early 1960's and the portion that encompasses the study area was closed in 1997. Landfill was typically limited to hydro-carbon contaminated soil, non-hazardous fill from the refinery, oily and acid sludge, and sulfur wastes. In 1992, approximately 30,000 yards of hydrocarbon contaminated materials were imported during the dismantling of the Pollard Dam. The bulk of this material was placed in the ridge area to the north. Multiple concrete lined drainages cross the site; it has been reported that the site is designed to mitigate the 1,000 year storm.

Planned improvements will be supported by spread foundations constructed at or near the surface of the existing landfill. The existing vegetation surface will be mowed and incidental fills will be required to help sculpt the existing landfill surface to facilitate the layout of the PV system while maintaining the integrity of the landfill cap. Other than meeting the level of care necessary during construction to help keep from compromising the landfill cover, the site appears well suited for the planned improvements when considering potential geotechnical constraints.

1.0 INTRODUCTION

This report presents the results of Wood Rodgers' geotechnical investigation summary and geotechnical design recommendations for the proposed MCE Solar One project in Richmond, California. The proposed development area encompasses a portion of Landfill 15, which was developed in association with the Chevron Richmond Refinery. The geotechnical design considerations presented herein are specific to the array structures and one equipment pad planned for the improvement area indicated in this report. Geotechnical design considerations have been developed with the understanding that environmental considerations associated with Landfill 15 (such as: groundwater considerations, containment issues, permits, access, etc.) are under the purview of others. The following discussions have been formulated around the findings of our site investigation and field observations and upon the findings and opinions presented in the references summarized at the end of this report.

The objectives of this study were to:

1. Review historic documents to garner information that can aid in the overall understanding of the site conditions and information that can be used in the modeling and prediction of continued landfill settlement and response to the proposed structures.
2. Observe, test, and assess general soil and ground water conditions pertaining to the design and construction of the proposed MCE Solar One project.
3. Provide recommendations for the design and construction of the project as related to the documents provided for our review and observed geotechnical conditions.

The area covered by this report is presented on Plate A-1 (Site Plan) in Appendix A of this report. Our study included: performing geophysical surveys at the project site, observing site conditions, and performing engineering analyses to predict settlement response characteristics of the existing landfill over the performance life of the project.

2.0 PROJECT DESCRIPTION

The proposed project consists of constructing a 2MW photovoltaic solar array with an associated equipment pad at Landfill 15 of the Chevron Refinery facility. Planned improvements will be supported by foundations and slabs constructed at or near the surface of the existing landfill. Foundations are anticipated to consist of cast-in-place concrete elements. Isolated fills and limited will be incorporated to help sculpt the existing landfill surface to facilitate the layout of the PV system while maintaining the integrity of the landfill cap.

3.0 SITE CONDITIONS

Closure of Landfill 15 occurred within two phases, with three final design cross sections. The northeast portion of Landfill 15 was closed in 1995[1] and was covered with a vegetated cap. The remaining portions of the Landfill, closed in 1997, consisted of approximately 8.5 acres with asphalt cap paralleling the western limits of the landfill, and 19.5 acres with vegetated cap covering the southern 'wing' of the landfill[2]. Our study is specific to the southern 'wing' of the 1997 vegetated cap (See Site Plan, Plate A-1). The reported cross section consists of vegetation, capping 6-inches of topsoil, capping 6-inches of random fill, placement of an HDPE liner, capping an undisclosed depth of compacted fill[3]. Engineering controls have been established to control emissions, direct storm water, and protect groundwater. Surface drainage features specific to the handling of storm water can be seen in Figure 1.

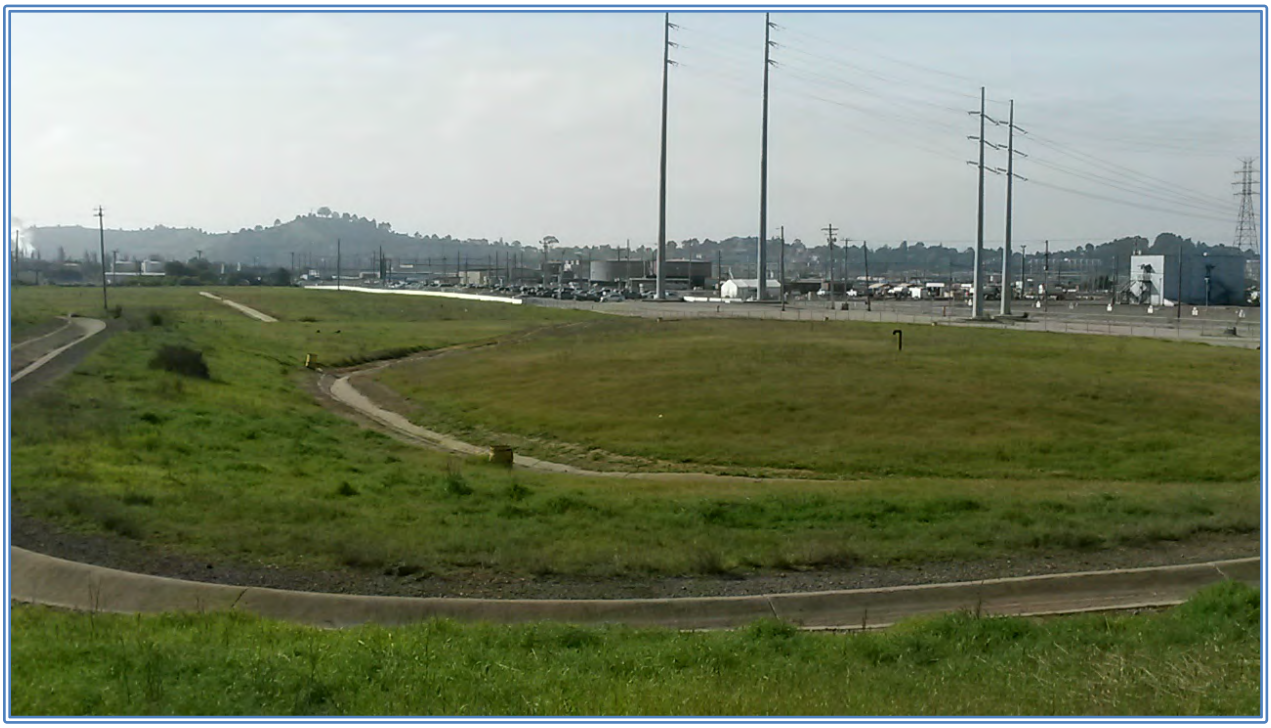


FIGURE 1 – Western Limits of Study Area

Reported settlement to date approximates 1.03 feet; estimated lifetime settlement was predicted to approximate 3.2 feet[4]. Several concrete drainages cross the landfill; in some locations the landfill was observed to have settled (~ ¼-inch or less) away from the drainages.

[1] Rincon Consultants, Incorporated – *Environmental Design and Implementation Considerations for Installing Solar Array at the Chevron Refinery in the City of Richmond, California,* Project No. 14-00951, November 17, 2014, Landfill 15 and Former Fertilizer Plant and Ponds (FFPP), page 2 of 9.
[2] Rincon Consultants, Incorporated, page 2 of 9
[3] Rincon Consultants, Incorporated, Attachment B, page 5
[4] Rincon Consultants, Incorporated, page 5 of 9

The improvement area is covered with grasses and deer, turkeys, and rabbits were observed within the study corridor. In addition, small rodent burrows were prevalent within the western, vegetated zone of the landfill. Figure 1 encompasses the western limit of the study area, looking toward the south.

4.0 REGIONAL SETTING

The regional setting of the site places the combined physiography, geology, faulting, and soils in context.

4.1 Physiography

The site is located in an area that prior to 1850 was covered with marshes. Since that time most of the marshes have either been filled our isolated by levees.

The refinery crosses four geomorphic/geologic zones: Alluvial, Flats, Ridge, and Transition. Landfill 15 is located within the eastern limits of the Richmond Refinery in the area known as the Flats Zone. The Flats Zone encompasses the marsh area bounded by San Pablo Bay southward along the northeast flank of the Potrero-San Pablo Ridge. The Flats Zone is typically underlain by at least 5 feet of Bay Mud unless locally removed by erosion or displaced by differential settlement of overlying fills.

4.2 Geology

The San Pablo Bay area lies within the Coast Ranges geologic and physiographic province. Faulting and folding have molded this province to present a series of northwest-southeast trending valleys separated by mountain ranges.

The perimeter geology to the San Francisco and San Pablo Bay is controlled by both the Quaternary climatological sea level changes and tectonic elevation changes of the shores. This advance and retreat dynamic of the bays presents a distinct series of sediments. The entire study area is underlain by the Bay Muds. Bay Mud has been reported to be on the order of 40 feet thick for sites proximate to the property. Bay Mud, in turn, overlies Old Bay Mud that can be up to 100 feet thick. Old Bay Mud is more competent and doesn't present the physical property limitations offered by the Bay Mud.

4.3 Faulting

The property lies at the edge of a significant plate tectonic boundary between the Pacific and North American Plates. Several known active fault zones are in the vicinity of the property. However, because the planned improvements cannot support human occupancy, the criticality of proximity to faults is significantly diminished.

The site is not mapped within an Alquist Priolo fault zone. Although this does not guarantee that a potential surface rupture could not exist; this indicates, in tandem with the geologic profile, a very low level of identified risk.

The property however is located in an area where intense ground shaking during a large earthquake should be expected. Liquefaction can occur in saturated loose sand/silt zones underlying the site. Shear wave velocities are sufficiently low that liquefaction would occur if the appropriate soil type is present. However, given the planned improvements and associated foundations, the effects of liquefaction could likely be remedied if it should occur over the life of the structure.

4.4 Seismicity

The average shear wave velocity for a depth of 100 feet was calculated to be 750 feet per second (fps). Although our shear wave velocity profile was only reported to 55 feet, the Old Bay Mud velocity was extended to a depth of 100 feet. Based on our calculated shear wave velocity of 750, Site Class D is appropriate for the seismic design of the proposed structures. Representative longitude and latitude for determining mapped spectral accelerations are 37.9436 and -122.3794, respectively.

5.0 INVESTIGATION

The project area was explored in March, 2015, by performing a series of geophysical surveys at 6 locations within the overall Landfill 15 area. Two surveys, Stion 1 and Stion 6, are specific to this report and study area. The remaining surveys, Stion 2 thru 5, were performed across the remainder of Landfill 15. Although these additional surveys were reviewed as part of this study they have not been integral to the development of our design recommendations.

Seismic refraction surveys were performed utilizing the refraction microtremor (ReMi) method. A linear array of geophones is set across the ground surface and the equipment collects and records signatures of ambient noise to develop and model subsurface shear-wave velocity. Geophone spacing was adjusted to attempt to capture the depth of the landfill and underlying Bay Muds while maintaining as much resolution in the process as possible.

The shear-wave velocity profile can be analyzed and translated into shear modulus which provides an indication to a material's stiffness. The shear modulus typically deals with the deformation of a material as it distorts due to an applied load in one direction while meeting resistance from opposing forces acting on an adjacent face. This behavior can be readily visualized by considering the variation in response that would occur between pushing laterally on molded Jello versus a block of ice. Correlations have been developed between shear modulus and the Standard Penetration Test (ASTM D1586), a test commonly used in geotechnical engineering to gauge the consistency of a soil. Therefore, the shear wave profile was obtained to: develop a landfill profile that would offer insight as to the material integrity and depth of fill, offer insight as to thickness of underlying Bay Mud, and help provide a basis for evaluating continued landfill response and the potential incremental response when subject to foundation loads. Shear wave velocity profiles obtained for this study are presented on Plate A-2, in the Appendix of this report.

6.0 LANDFILL PROFILE

This discussion regarding the landfill profile is specific to the materials that will directly impact the performance of the proposed array. It is not our intent to discuss or document all of the facilities and improvements, e.g. trenches, barriers, vents, etc., associated with Landfill 15.

Landfill 15 was active between 1960 and 1987 as an evaporation pond and as landfill for various wastes and inter fills. Fill material consisted mostly of hydro-carbon contaminated soil, non-hazardous fill from the refinery, oily and acid sludge, and sulfur wastes. In 1992, approximately 30,000 yards of hydrocarbon contaminated materials were imported during the dismantling of the Pollard Dam. The placement of the Pollard Dam materials created a rise approximately 10 to 25 feet in height. The southern, panhandle, portion of Landfill 15 was covered in 1996 to 1997; based on Google Earth imagery this area appeared to be a staging area with limited structures and vehicles. Based on our review of available references, the vegetated cover consists of a layer of compacted fill, capped by an HDPE liner, which is subsequently covered by an additional foot of fill/topsoil and vegetation.

The entire study area is underlain by Bay Muds. Shear wave velocities associated with the Bay Muds have been studied and reported to be on the order of 350 to 500 feet per second[5]; in addition Bay Mud thickness has been reported to be on the order of 40 feet for sites proximate to the property. Bay Mud, in turn, overlies Old Bay Mud that can be up to 100 feet thick. These values have been used to define the site profiles based on shear wave velocity as indicated in Figure 2. The Figure 2 insert shows the Landfill 15 area in 1987, with our approximate survey location superimposed.

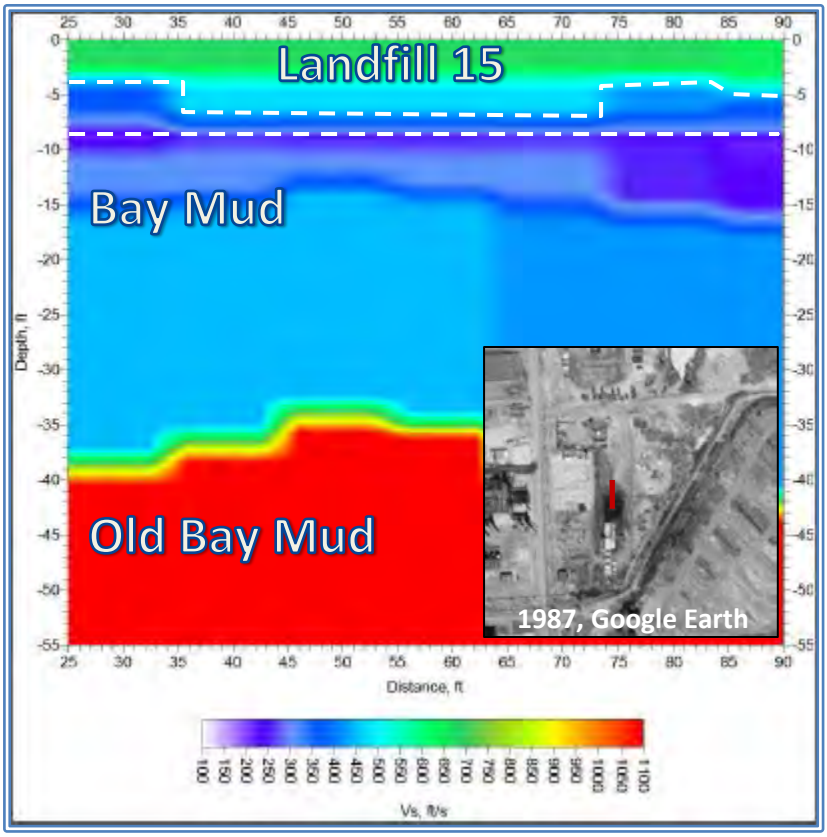


FIGURE 2 – Shear Wave Velocity Profile (Stion 6)

When reviewing our shear wave velocity profiles, both surveys present a continuous low velocity

[5] Holzer, Thomas L. M.EERI, Michael J. Bennett, Thomas E. Noce, and John C. Tinsley, III, *Shear-Wave Velocity of Surficial Geologic Sediments in Northern California: Statistical Distributions and Depth Dependence*

layer at a depth of approximately 8 to 10 feet. This continuous zone likely reflects the transition to the Bay Mud. Shear wave velocities in the Bay Mud are consistent with those previously discussed and these velocities serve as a marker to differentiate between the Bay Mud and underlying Old Bay Mud. Bay Mud at the site would vary between 20 to 30 feet thick. The Old Bay Mud, which is stiffer, appears at depths approaching 30 to 40 feet. The Old Bay Mud is considered 'incompressible' for improvements associated with our study area.

7.0 Analysis

Long term settlement of Landfill 15 has been monitored. The latest document provided to Wood Rodgers is dated December 12, 2008 and presents a synopsis of the settlement history of the landfill:
In general, the settlements observed between October 2007 and October 2008 were slightly lower (ranging between 0.02 and 0.12 feet) than settlements recorded between 2006 and 2007. The average settlement over the past year was 0.02 feet, compared to 0.06 feet from 2006 to 2007. The long-term trend shows a gradual decrease in annual settlements as the consolidation of the fill material is reduced each year. Cumulative settlements (since 1997) currently range from 0.22 to 1.39, with an average of 0.95 feet. When examining settlement specific to the lower elevations of Landfill 15, the incremental average settlement from 2007 to 2008 was 0.07 feet, the total cumulative settlement was 1.05 feet.

Average settlement measurements were used in our analyses. Historic settlement data was plotted as a function of log-time. Several models which have been developed for the prediction of long-term municipal solid waste landfill settlement[6] were used to evaluate which predictive model most closely followed the measured response of Landfill 15. A soil mechanics-based model by Sowers (1973) incorporating both primary and secondary compression ratios provided the best correlation. This model was then used to forecast future settlement that would occur within the landfill/Bay Mud structure. Once landfill response was gauged, the potential additional settlement induced by the proposed structures was then added.

8.0 Site Preparation

Recommendations are presented herein for the site preparation and grading of the development area. The means and methods necessary to meet these recommendations are incumbent upon the contractor being knowledgeable in the site conditions and grading limitations imposed by those conditions. Large, heavy equipment could cause: excessive settlement, localized bearing degradation, and excessive surface disturbance.

[6] Babu, G.L. Sivakumar, Krishna R. Reddy, Sandeep K. Chouskey, and Hanumanth S. Kulkarni, *Prediction of Long-Term Municipal Solid Waste Landfill Settlement Using Constitutive Model,* Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management, ASCE, April 2010

Because the current study area is limited to the southern wing of Landfill 15, required grading is limited. Prior to placing any bearing aggregate the foundation locations should be mowed to remove excess vegetation. Removal of the root zone specific to foundation location could also be considered; however, this would result in a reduction of cover over the HDPE liner. Rodent burrows will likely result in additional subsidence of the ground surface during foundation preparation, especially if the surface soils have become wet due to precipitation. We recommend moisture conditioning the landfill surface (via surface wetting) prior to placing base course or aggregate and performing a proof-roll of the soils with light equipment. A landscaping fabric should be considered for placement between the landfill surface and surface aggregate to help limit the potential for subsequent weed growth or rodent influence. Treatment with an herbicide may also be beneficial specific to foundation locations only.

Once the foundation footprint has been mowed, we recommend any required incidental grading be accomplished by the use of 1 ½-inch minus angular aggregate (AASHTO M43 or ASTM C33, #467 Stone) placed as necessary to level grade.

9.0 Foundations

Foundations typical to landfill PV arrays and associated skid consist of isolated spread foundations resting on the ground surface. The required bearing to support these arrays is a function of foundation support, panel elevation, use of stationary or tracking panels, design loads, etc. Our foundation considerations were modeled for an allowable bearing pressure of 1,000 pounds per square foot. This value may be increased by a factor of 1.33 when considering dynamic loading such as wind or seismic.

9.1 Settlement

Settlement to date ranges between 0.22 to 1.39 feet. Long term settlement of the landfill, over the life of the array, is predicted to incur approximately another ½ foot. Settlement specific to the array and skid structures at the recommended bearing approaches ½ inch. Differential settlement, across a specific structure, could develop a radius of curvature approaching 1:300.

9.2 Coefficient of Friction

Because these bearing structures are constructed/placed at or near grade, passive resistance to lateral loading is not available and therefore lateral resistance must solely rely on friction between the bottom of the footing and ground surface. The current development approach is to mow the existing vegetation and place the concrete support directly on the vegetated surface. Coefficient of friction values for precast or cast-in-place concrete on a vegetated mat are not readily available. Cursory testing performed by Wood Rodgers determined a coefficient of friction of 0.25 for precast concrete on sod. This value may be relied upon for preliminary design but field verification should be performed as part of the design process. The recommended value should also be reduced if a potential exists for the underlying nubs to become wet throughout the life of the project. A coefficient of base friction of 0.45 can be used when considering lateral resistance developed between a precast or cast-in-place concrete element and localized fills developed with the 1 ½-inch aggregate. This value has been decreased by a factor of 1.5 on the ultimate strength.

10.0 DRAINAGE

Where existing drainages will be abandoned, perforated pipe should be placed within the bottom of the channel and sloped to drain. The recommended #467 aggregate should be adequately graded to preclude fines from migrating into and through the drain system. Compaction of drainage backfill is not required.

11.0 CONSTRUCTION OBSERVATION AND TESTING SERVICES

The recommendations presented in this report are based on the assumption that the contractors perform their work as required by the project documents and that owner/project manager provides sufficient field-testing and construction review during all phases of construction. Prior to construction, the owner/project manager should schedule a pre-job conference including, but not limited to, the owner, architect, civil engineer, the general contractor, earthwork and materials subcontractors, building official, and geotechnical engineer. It is the owner's/project manager responsibility to set-up this meeting and contact all responsible parties. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report, and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to the owner/project manager for review and distributed to the appropriate parties.

During construction, Wood Rodgers Incorporated should have the opportunity to provide sufficient on-site observation of site preparation and grading, over-excavation, fill placement, foundation installation, and paving. These observations would allow us to document that the geotechnical conditions are as anticipated and that the contractor's work meets with the criteria in the approved plans and specifications. Verification of horizontal and vertical control must be provided by whoever was responsible for establishing those boundaries and constructing associated improvements.

12.0 STANDARD LIMITATION CLAUSE

This report has been prepared in accordance with generally accepted local geotechnical practices. The analyses and recommendations submitted are based upon field exploration performed and the conditions encountered as discussed in our report. This report does not reflect soils variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary. We recommend our firm be retained to perform construction observation in all phases of the project related to geotechnical factors to document compliance with our recommendations. The owner/project manager is responsible for distribution of this geotechnical report to all designers and contractors whose work is related to geotechnical factors.

It is the contractor’s responsibility for the grading and construction of the designed improvements. This responsibility includes the means, methods, techniques, sequence, and procedures of construction and safety of construction at the site. All construction shall conform to the requirements of the project

documents and the City of Richmond and Contra Costa County, California. Failure to inspect the work shall not relieve the contractor from his obligation to perform sound and reliable work as described herein, by the project documents, or by the governing agencies.

All plans and specifications should be reviewed by the design engineer responsible for this geotechnical report, to determine if they have been prepared in accordance with the recommendations contained in this report, prior to submitting to the building department for review. It is the owner's/project manager responsibility to provide the plans and specifications to the engineer.

This report has been prepared to provide information allowing the architect and engineer to design the project. The owner/project manager is responsible for distribution of this report to all designers and contractors whose work is affected by geotechnical aspects. In the event of changes in the design, location, or ownership of the project after presentation of this report, our recommendations should be reviewed and possibly modified by the geotechnical engineer. If the geotechnical engineer is not accorded the privilege of making this recommended review, we can assume no responsibility for misinterpretation or misapplication of our recommendations or their validity in the event changes have been made in the original design concept without our prior review. The engineer makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of this agreement and included in this report.

This report was prepared by Wood Rodgers, Inc. for the benefit of Stion Energy Services. The material in it reflects Wood Rodgers' best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Wood Rodgers' accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

13.0 REFERENCES

Some of the following references have been copyrighted. Although reasonable attempts have been made to not infringe upon those rights, technical information and specific data have been reported as true as possible and cited for ease of reference. This report was prepared with the understanding that because the documents have been made available and are beneficial to the development of this report, the copyright owners have agreed to their use in this manner.

California Regional Water Quality Control Board San Francisco Bay Region, Order No. R2-2012-0015, *Site Cleanup Requirements for Chevron Products Company, Chevron Richmond Refinery, 841 Chevron Way, Richmond, Contra Costa County*

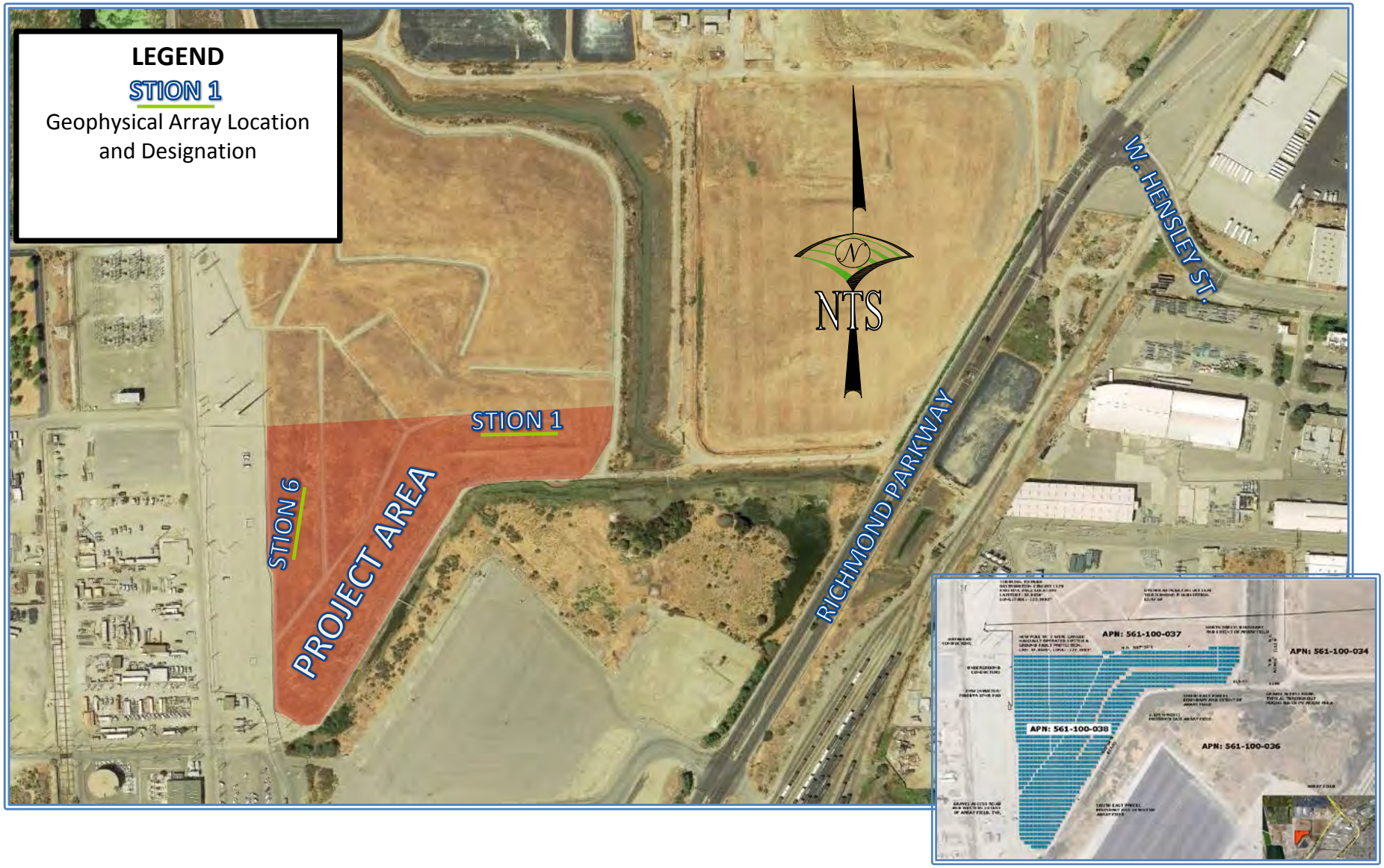
Dames and Moore – *Closure Certification Report, Landfill 15, Waste Discharge Order, Chevron Richmond Refinery, D&M Job No. 38825-00-179*

Holzer, Thomas L. M.EERI, Michael J. Bennett, Thomas E. Noce, and John C. Tinsley, III, *Shear-Wave Velocity of Surficial Geologic Sediments in Northern California: Statistical Distributions and Depth Dependence*

Rincon Consultants, Incorporated – *Environmental Design and Implementation Considerations for Installing Solar Array at the Chevron Refinery in the City of Richmond, California,* Project No. 14-00951, November 17, 2014, Landfill 15 and Former Fertilizer Plant and Ponds (FFPP).

SAIC – *2008 Annual Inspection and Monitoring Report – Landfill 15 Closure Site*, letter to Mr. Martin Swinderman, Chevron Environmental Management Company, December 12, 2008

APPENDIX A



WOOD RODGERS
5440 Reno Corporate Drive, Reno, NV 89511
Phone 775.823.4068 Fax 775.823.4066

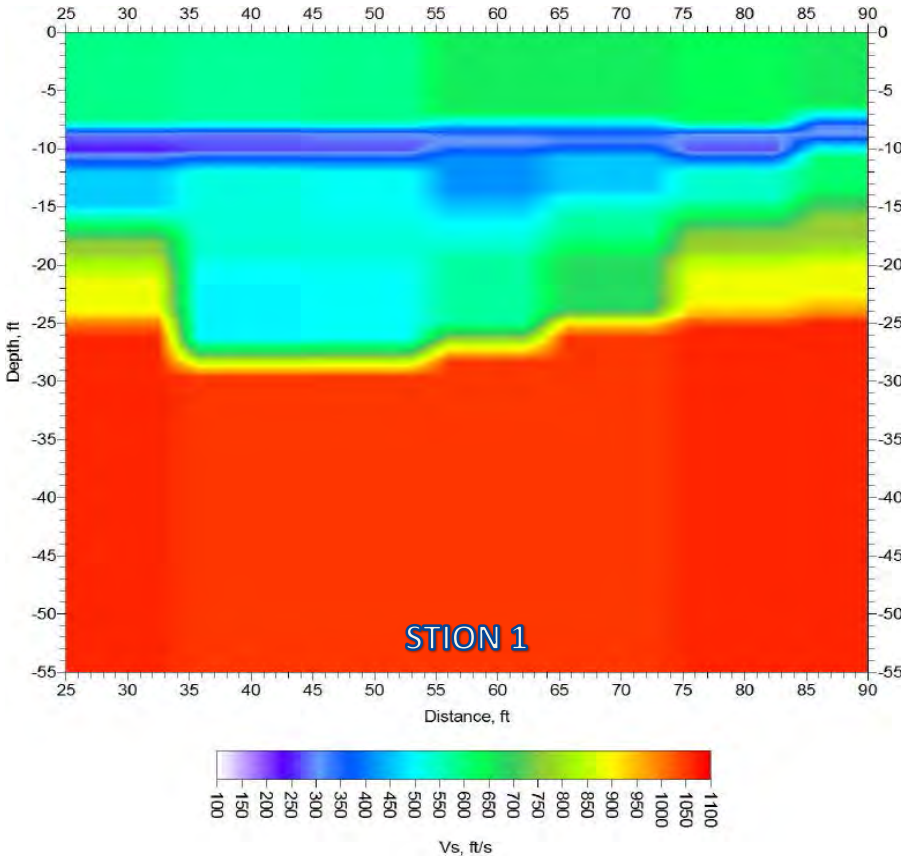
SITE PLAN & APPROXIMATE GEOPHYSICAL ARRAY LOCATIONS

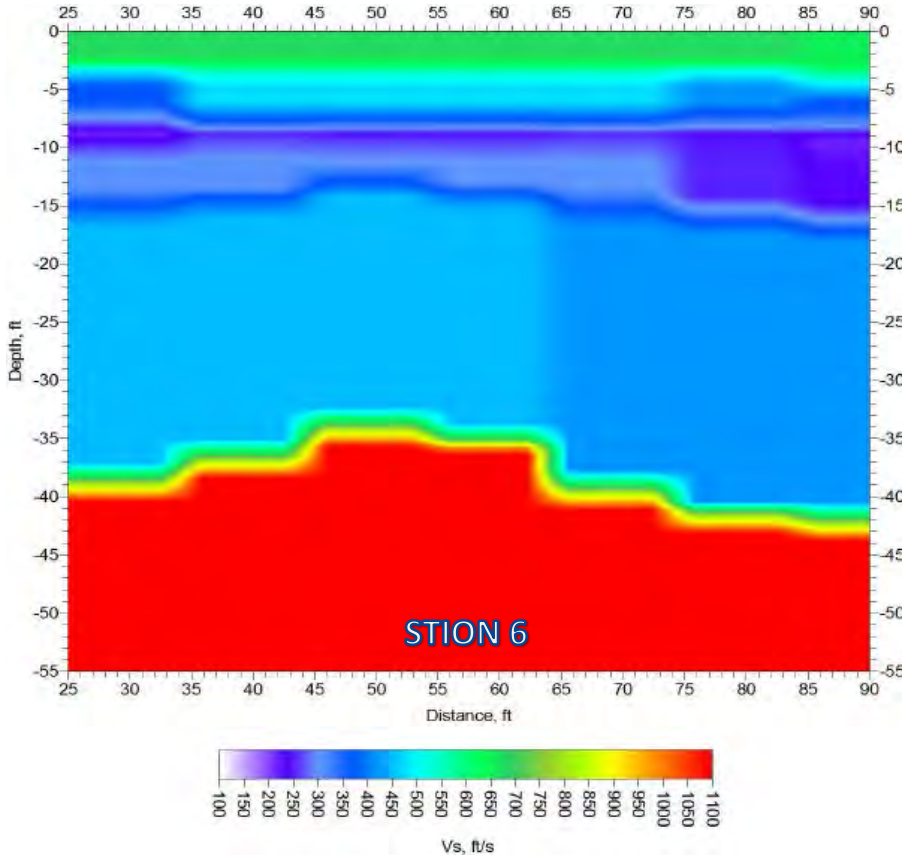
Geotechnical Investigation

MCE SOLAR ONE
Richmond, CA

Project No.: 8581.002
Date: 3.22.15

PLATE A-1





WOOD RODGERS
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GEOPHYSICAL PROFILES

Geotechnical Investigation

MCE SOLAR ONE
Richmond, CA

Project No.: 8581.002
Date: 3.22.15

PLATE A-2

Appendix E

Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

This document is the Mitigation Monitoring and Reporting Program (MMRP) for the Richmond Solar PV Project EIR, a Marin Clean Energy project located in the City of Richmond. Public Resources Code Section 21081.6(a) requires that a Lead Agency adopt an MMRP prior to approving a project in order to mitigate or avoid significant impacts that have been identified in an Environmental Impact Report (EIR). The purpose of the MMRP is to ensure that the required mitigation measures identified in the EIR are implemented as part of the overall project implementation. In addition to ensuring implementation of mitigation measures, the MMRP provides feedback to agency staff and decision-makers during project implementation, and identifies the need for enforcement action before irreversible environmental damage occurs.

The following table summarizes the mitigation measures for each issue area identified in the EIR for the Richmond Solar PV Project. The table identifies each mitigation measure; the action required for the measure to be implemented; the time at which the monitoring is to occur; the monitoring frequency; and the agency or party responsible for ensuring that the monitoring is performed. In addition, the table includes columns for compliance verification. These columns would be filled out by the monitoring agency or party and would document monitoring compliance. Where an impact was identified to be less than significant, no mitigation measures were required.

This MMRP will be used by MCE staff and contractors to determine compliance with permit conditions.

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Mitigation Measure	Responsible Party	Monitoring Action	Monitoring Frequency	Verification of Completion	
				Initial	Date
Air Quality					
(Recommended) **AQ-1 Construction Emissions.** The following control measures for construction emissions shall be implemented during grading, site preparation and construction. • Water all active construction areas at least twice daily. • Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard • Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. • Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. • Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets. • All "Basic" control measures listed above. • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more). • Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.) • Limit traffic speeds on unpaved roads to 15 mph. • Install sandbags or other erosion control measures to prevent silt runoff to public roadways. • Replant vegetation in disturbed areas as quickly as possible. • Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site. • Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph. • Limit the area subject to excavation, grading and other construction activity at any one time.	MCE Project Manager and MCE Construction Manager and Contractor	Verification of control measures	Periodically during construction		

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Biological Resources					
BIO-1 A highly visible barrier fence or flagging shall be installed around the identified Valley Needlegrass Grassland community to prevent equipment and employee movement through the community. This fence or flagging shall be installed prior to the onset of grading or construction, maintained throughout project activities, and removed following project completion.	MCE Project Manager and MCE Construction Manager and Contractor	Verification of flagging	Once prior to commencement of grading or construction activities and periodically during construction		
BIO– 2(a) Avoid Nesting Bird Season. Direct disturbance (clearing/grading/vegetation removal) to nesting habitat shall be conducted between September 16 and January 31, outside of the nesting bird breeding season, to the greatest extent possible. No preconstruction nesting bird surveys would be required for construction occurring during the non-breeding season. Removal of potential nesting habitat during the non-breeding season would prevent mated pairs from nesting in proposed disturbance areas.	MCE Project Manager, MCE Construction Manager, and Contractor	Ensure disturbance of nesting habitat has been scheduled between September 16 and January 31	Once prior to initiation of construction activities		
BIO-2(b) Pre-Construction Nesting Bird Surveys. If direct disturbance (clearing/grading/vegetation removal) to nesting habitat is unavoidable during the bird breeding season (February 1 to September 15), a qualified biologist shall conduct pre-construction surveys for nesting birds and general avian activity following standard resource agency (e.g. USFWS, CDFW) protocol, in all areas within 500 feet of proposed disturbance areas, where accessible, prior to any site disturbance (i.e., mobilization, staging, grading, or construction). If active nests are found, they shall be protected with a minimum 100-foot no-work buffer for songbirds and 500-foot buffer for raptors. These buffers could be adjusted according to existing noise, topography, or disturbance conditions. Buffer zones would be designated in the field in various ways, including flagging, fencing, and/or signage. Surveys shall be completed no more than 14 days prior to ground disturbance and vegetation removal. If buffers	MCE Project Manager, MCE Construction Manager, and Contractor	Review and approval of survey results (if necessary) Field verification that sufficient space is given to nesting birds (if necessary)	Once prior to initiation of construction activities Periodically during construction		

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and follow-up monitoring are required, the qualified biologist shall submit a monthly monitoring report identifying active nests, monitoring results, and condition of buffer zones. Reports can be combined with other reporting requirements where appropriate.					
BIO-2(c) Pre-Construction Burrowing Owl Surveys. A qualified wildlife biologist (i.e., a wildlife biologist with previous burrowing owl survey experience) shall conduct pre-construction clearance surveys prior to ground disturbance activities (e.g., vegetation clearance, grading, tilling) within all suitable habitat to confirm the presence/absence of burrowing owls (maybe conducted concurrently with BIO-1(b)). The survey methodology shall be consistent with the recommended methods outlined in the 2012 CDFW Staff Report on Burrowing Owl Mitigation. Clearance surveys shall be conducted within 14 days prior to construction and ground disturbance activities and again within 24 hours of construction activity. If no burrowing owls are observed, no further actions are required. The CDFW will be consulted if owl burrows are discovered within the project during these surveys and appropriate measures will be taken to mitigate any adverse impacts on the species. Appropriate measure may include avoidance with minimum avoidance buffers, development of a burrowing owl mitigation and monitoring plan in consultation with CDFW, and compensatory mitigation for loss of breeding and foraging habitat. If burrowing owls are detected on-site, no ground-disturbing activities shall be permitted within a buffer of no fewer than 100 meters (330 feet) from an occupied burrow during the breeding season (February 1 to August 31), unless otherwise authorized by CDFW. During the non-breeding (winter) season (September 1 to January 31), ground-disturbing work can proceed near active burrows as long as the work occurs no closer than 50 meters (165 feet) from the burrow. Depending on the	MCE Project Manager, MCE Construction Manager, and Contractor	Review and approval of survey reports Field verification that sufficient space is given to burrowing owls (if necessary)	Once prior to initiation of construction activities Periodically throughout construction		

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level of disturbance, a smaller buffer may be established in consultation with CDFW. If avoidance of active burrows is not feasible during the non-breeding season, then, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping, a qualified biologist shall implement a passive relocation program in accordance with the CDFW 2012 Staff Report on Burrowing Owl. If passive relocation is required, a qualified biologist shall prepare a Burrowing Owl Exclusion and Mitigation Plan in accordance with CDFWs 2012 Staff Report on Burrowing Owl Mitigation and for review by CDFW prior to passive relocation activities. The Plan shall include all necessary measures to minimize impacts to burrowing owls during passive relocation, including all necessary monitoring of owls and burrows during passive relocation efforts. Relocation of owls can only occur during the non-breeding season.					
BIO-2(d) Small Mammal Avoidance. A biologist shall conduct a pre-construction survey of the disturbance area within 100' of Herman's Slough to confirm the absence of special-status small mammals, installation of small mammal exclusionary fencing , and monitor of the exclusion fence installation (and later repair if necessary) prior to construction, and re-visit this area weekly during site grading and/or solar panel installation in these areas to ensure the fence's effectiveness. Exclusionary fencing shall consist of 48-inch silt fencing with wire-mesh backing shall be installed by hand along the eastern and northern margins of the west parcel (landfill) and along the western margin of the east parcel (water treatment basin) to prevent salt marsh harvest mice from entering the active work area. *(Recommended)*	MCE Project Manager, MCE Construction Manager, and Contractor	Review and approval of survey reports Field verification that sufficient space is given to special-status small mammals (if necessary)	Once prior to initiation of construction activities Periodically throughout construction		

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BIO-2(e) Worker Environmental Awareness Program Training. Prior to initiation of construction activities construction personnel shall attend a (tailgate) Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist onsite to aid workers in recognizing special status resources that may occur in the project area and advising specific communication and mitigation measures should any of these species be encountered during construction. The specifics of this program shall include identification of the sensitive species and habitats, a description of the regulatory status and general ecological characteristics of sensitive resources, a careful review of the limits of construction and mitigation measures to reduce impacts to sensitive biological resources within the work area, and clear communication protocol should these sensitive resources be encountered during construction. A fact sheet conveying this information shall also be prepared for distribution to all contractors, their employers, and other personnel involved with construction of the project. All construction personnel shall sign a form documenting that they have attended the WEAP training and understand the information presented to them. The form shall be submitted to the City of Richmond and MCE to document compliance. *(Recommended)*	MCE Project Manager, MCE Construction Manager, and Contractor	Verification that training completed	Once prior to initiation of construction activities		
BIO-2(f) Construction and maintenance vehicles shall observe a maximum speed limit of 15 mph in the construction zone in the vicinity of Herman's Slough to further prevent potential wildlife mortality. *(Recommended)*	MCE Project Manager, MCE Construction Manager, and Contractor	Review and approval of construction plans Verification of implementation during construction	Once prior to initiation of construction activities Periodically during construction		
BIO-3 Stormwater Control Measures. The following best management practices (BMPs) shall be implemented throughout construction activities and/or as part of project design. • The Facility shall provide environmental awareness	MCE Project Manager, MCE Construction Manager, and Contractor	Review and approval of construction plans	Once prior to initiation of construction activities		

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training for all construction personnel to address potential impacts to wetlands and waters of the US and State. • Bright-colored fencing and signage shall identify and restrict construction within environmentally sensitive areas. • A construction monitor/environmental inspector shall confirm the fence integrity on a daily basis to protect the area from accidental equipment damage. • Any and all necessary fence repair and/or reinforcements shall be completed immediately. • Temporary perimeter silt fencing shall be installed where storm water runoff and non-storm water discharges could flow into surrounding marshes. • Placement of exclusion fencing 5–10 feet from the perimeter of the coastal brackish marsh boundary or on the edge of the temporary disturbance area when this distance is greater. • Temporary straw wattles, sand bags, or water velocity dissipaters shall be installed around concrete drainage channels to prevent sediment from entering channels and storm drains. • Ground disturbance and vegetation grubbing shall be minimized and limited to the area required to complete project activities. • Bare ground exposed or inactive for more than 14 days shall be stabilized or re-vegetated to prevent erosion. Following project completion all areas of bare ground shall be stabilized or re-vegetated prior to termination of installation activities. • Entrances and exits onto the landfill and evaporation pond sites shall be stabilized to prevent sediments from being tracked off site. • Staging or storing of equipment and materials shall occur onsite or on existing paved surfaces and shall be covered or contained within appropriate secondary containment to prevent pollutants from		Verification of implementation during construction	Periodically during construction		

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running off site or onto the ground. • BMPs shall be installed prior to initiation to work and all temporary BMPs shall be removed following project completion.					
HAZARDS AND HAZARDOUS MATERIALS					
HAZ-1(a) Prior to issuance of building permits, the applicant shall submit for City of Richmond review the design of the 10.5MW facility, and sufficient information about construction and operation parameters as are determined by City and/or RWQCB to be needed to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area.	City of Richmond	Verification and approval of study	Prior to issuance of City of Richmond building permits		
HAZ-1(b) Prior to issuance of building permits, the landowner (Chevron) shall submit for RWQCB review the design of the 10.5MW facility, and sufficient information about construction and operation parameters as are determined by City and/or RWQCB to be needed to assure that the solar project would not reduce the effectiveness of the remediation measures currently implemented in the solar site area.	MCE Project Manager	Verification of submittal to RWQCB	Prior to issuance of City of Richmond building permits		
HAZ-3 Disposal of PV Modules and Support Structures. Prior to construction permit issuance, the system operator shall prepare a recycling or disposal plan for PV modules and support structures for MCE review and approval, in order that project structures not pose a risk to human health or the environment after project repowering and/or decommissioning. The plan shall specify how these project components shall be disposed of in a manner that will not pose a risk to human health or the environment, and the costs of such disposal.	MCE Project Manager	Review and approval of plan.	Prior to issuance of City of Richmond construction permit		

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(Recommended) **HAZ-4 Emergency Response and Evacuation Plans.** Prior to commencing grading or construction of the project, MCE shall work with the City of Richmond to ensure that Chevron updates its emergency response and evacuation plans to the City's satisfaction.	MCE Project Manager, City of Richmond	Coordinate with City of Richmond to ensure that Chevron updates plans.	Prior to commencing grading or construction.		
Hydrology and Water Quality					
HYD-2 Maintain Vehicles and Equipment. All vehicles and equipment, including hydraulic hoses, shall be maintained in good working order to minimize leaks that could contact the ground. A vehicle and equipment maintenance log shall be updated and provided by the project proponent to Marin Clean Energy on a monthly basis for the duration of project construction.	MCE Project Manager, MCE Construction Manager, and Contractor	Verify equipment maintenance log is complete and updated.	Periodically during construction.		