CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2016-0017

UPDATED SITE CLEANUP REQUIREMENTS and RESCISSION OF ORDER NO. R2-2000-0010 for:

FORMER CHEVRON CHEMICAL COMPANY PLANT SITE
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
940 HENSLEY STREET
RICHMOND, CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) finds that:

SITE DESCRIPTION

1. The Chevron Environmental Management Company (hereafter called the Discharger or Chevron) owns a facility in Richmond where the Chevron Chemical Company formerly manufactured and distributed a variety of pesticides and fertilizers. Chevron also operated a gasoline additive blending and packaging facility at the site. The facility consists of two separate areas, the Plant Site and the Pond Site, which are located on either side of Castro Street (Figure 1). The Pond Site, located on the northwest side of Castro Street, was a former fertilizer manufacturing plant and an associated system of ponds. The ponds were formerly used for evaporation of process wastewater from pesticide manufacturing but are currently used to capture and store nonhazardous stormwater runoff. The Pond Site is regulated under Waste Discharge Requirements Order No. R2-2015-0030.

2. The Plant Site, located on the southeast side of Castro Street, is the former pesticide and chemical processing area at 940 Hensley Street and the subject of this Order. The area between the Plant Site and Castro Street contains numerous railroad tracks and a low-lying marshy area immediately adjacent to the creek (see Figure 2).

SITE HISTORY

3. Beginning in 1937, Chevron Chemical manufactured and formulated dry and liquid-based pesticides. While products and operations varied during the ensuing years, the major historical operations were grouped into three main manufacturing areas, as shown in Figure 2:
   a) the Orthene Plant, located in the northwest corner of the Plant Site; and
   b) the Pesticide Plant located in the central portion of the site; and
   c) the Polychem Gasoline Additives Manufacturing and Blending Plant located in the central and southern portions of the site.

4. All chemical manufacturing activities at the site ended in 1997, and the Plant Site has since been converted to include the Chevron Training Center, the Chevron Environmental Laboratory, warehousing for shipping, purchasing and storage, and maintenance, as well as storage of empty rail tank cars.

PURPOSE OF ORDER UPDATE

5. Pursuant to California Water Code (CWC) section 13304, this Site Cleanup Requirements (SCR) Order requires Chevron to:

   a) Perform site investigations to assess the present extent of subsurface contamination within the boundaries of the Plant Site;

   b) Continue monitoring the long-term effectiveness of corrective action measures that have been implemented at specific areas of the Plant Site;

   c) Continue to operate the groundwater interceptor trench along Castro Creek: and

   d) Perform any additional corrective actions necessary within the site and along Castro Creek to protect water quality and human health.

REGULATORY HISTORY

6. The Regional Water Board adopted SCR Order No. 96-121 in September 1996 to require Chevron to undertake corrective actions for groundwater containing elevated levels of chlorinated volatile organic compounds in the former Polychem Plant area.

7. The Plant Site's cleanup requirements were updated on September 18, 2000, with the adoption of SCR Order No. R2-2000-0010. Order No. R2-2000-0010 rescinded Order No. 96-121.

HYDROGEOLOGY

8. The Plant Site is located within an alluvial plain adjacent to a low-lying tidal flat in the Richmond Basin. Three water-bearing zones have been identified within 130 feet of the ground surface at the Plant Site. These zones are generally continuous beneath the site and adjoining areas and are of higher permeability than the intervening strata. The water-bearing zones are called, in order of increasing depth, the A-zone, the C-zone and the B-zone.

   a) Groundwater within the A-zone occurs in low-permeability fill above the Bay Mud below a depth of about 5 feet. Water in the A-zone meets one of the exception criteria to Regional Water Board Resolution No. 89-39 (Sources of Drinking Water Policy) because the average concentration of total dissolved solids (TDS) exceeds 3,000 mg/l (with a maximum observed concentration of 13,900 mg/l), and it is not reasonably expected by the Regional Water Board that the groundwater could supply a public water system.

   b) The C-zone extends between depths of about 10 and 90 feet below grade and consists of an upper and lower alluvial sequence separated by near-shore estuarine deposits. In general, the upper 10 to 30 feet of alluvial soils in the C-zone consist of silty clay with occasional thin, localized sandy lenses. The C-zone also meets an exception criterion to Resolution No. 89-39 because average TDS concentrations exceed 3,000 mg/L (with a maximum concentration of 53,280 mg/l), and it is not reasonably expected by the Regional Water Board that the groundwater could supply a public water system. Below the C-zone, at a depth of 90-110 feet, a 20-foot-thick layer of estuarine clay is present. This clay unit acts as an aquitard between the C-zone and the deeper B-zone.

c) The B-zone is encountered at depths ranging from 100 to 130 feet beneath the site. This thin water-bearing zone contains a higher proportion of alluvial sands and gravels compared to surrounding soils. The B-zone is typically 5 to 15 feet thick and is overlain and underlain by alluvial and estuarine clays. The B-zone is the shallowest freshwater zone below the site with TDS concentrations no higher than 671 mg/l; however, B-zone water exceeds the secondary drinking water standard of 0.05 mg/l for manganese, which ranges from ND to 0.23 mg/l. Also, the B-zone groundwater quality west of the site degrades due to saltwater intrusion from San Pablo Bay, limiting the potential use of this water for drinking water or agricultural applications.

9. In general, groundwater gradients in the three water-bearing zones slope in a westerly direction towards San Pablo Bay. Northwest of the site, all three water-bearing zones are hydraulically connected with the Bay. The permeability and transmissivity of all three zones are low, and none of the water-bearing zones are capable of producing significant quantities of groundwater on a sustained yield basis. Groundwater levels measured in adjacent monitoring wells, screened at different depths, indicate an upward vertical gradient.

10. **Background Groundwater Quality**: Analysis of groundwater samples for major cations and anions confirms that water quality varies laterally in all three water-bearing zones, degrading in a northwesterly direction due to saltwater intrusion from San Pablo Bay. As summarized in Finding 8, groundwater quality in the A- and C-zones beneath the site generally exceeds State and federal drinking water standards for TDS as well as for specific conductance, chloride, sulfate, and manganese. The quality of groundwater in the B-zone is better than in the shallower A- and C-zones but varies from moderately fresh to brackish.

11. **Summary of Historic Groundwater Contamination**: Chemicals historically detected in A-zone groundwater beneath the Plant Site include chlorinated volatile organic compounds (CVOCs), metals, pesticides, and the petroleum fuel components benzene, toluene, ethylbenzene, and xylenes. The contaminants in C-zone wells are primarily limited to chlorinated solvents. The groundwater contaminants present in the A- and C-zones have not been detected in the deeper B-zone. An upward hydraulic gradient between the deeper B- and C-zones has also limited downward migration of contaminants.

a) The primary area of CVOC and volatile organic compound (VOC) contamination at the Plant Site is located at the former Polychem Plant. The primary contaminants in the A-zone include cis-1,2-DCE, vinyl chloride, toluene, and benzene. A-zone CVOC concentrations greater than 10 mg/L were identified within the southern half of the former Polychem Plant area. Benzene and toluene concentrations greater than 5 mg/L were identified near the western boundary of the former Polychem Plant. Primary contaminants in the C-zone include trichloroethylene (TCE) and methylene chloride; concentrations greater than 10 mg/L were limited to the southern half of the former Polychem Plant. TCE concentrations greater than 10 mg/L occurred to a depth of approximately 45 feet below ground surface.

b) With a few exceptions, pesticide and arsenic contamination in groundwater was limited to the former Pesticide Plant area. Pesticides historically detected in Plant Site groundwater include chlordane, dichlorodiphenyltrichloroethane (DDT), orthene, lindane, silvex, and paraquat. These pesticides, when detected, are localized at low concentrations that have decreased over time. Arsenic concentrations in groundwater have also generally decreased. The more water-soluble pesticides, paraquat and orthene, have been detected in only a few samples at low

concentrations. With few exceptions, these chemicals are limited to the A-zone in the former Pesticide Plant area.

c) Groundwater monitoring data collected since 1986 shows evidence that intrinsic biodegradation of tetrachloroethylene (PCE) and TCE is occurring beneath the Plant Site. The presence in several wells of intermediate breakdown products, such as cis-1,2-dichloroethene (1,2-DCE) and vinyl chloride, and the final breakdown products (ethane and ethene) demonstrates that reductive dechlorination of PCE and TCE is occurring in groundwater underlying the site. Additionally, low dissolved oxygen concentrations, low or negative oxidative-reduction potential, and the presence of other indicator parameters confirm that the geochemical conditions required for reductive dechlorination exist in groundwater at the site. There has been a consistent drop in PCE, TCE, and DCE in Plant Site wells over the years as a result of natural breakdown through reductive dechlorination.

Corrective Actions

12. Order No. R2-2000-0010 required five corrective actions, all of which were completed during 2001 and 2002. The completed corrective actions are described below. These actions were focused primarily on preventing offsite migration of subsurface contaminants from the Plant Site into the downgradient area along Castro Creek.

a) Task 1: Excavation And Restoration in the Castro Corridor

The area known as the Castro Corridor, located between the Plant Site and Castro Creek, contains a small marshy area bisected by Castro Creek. Surface water and sediments in the marsh and creek were found to contain contaminants released from the Plant Site, principally arsenic from historic discharges of contaminated stormwater runoff. Task 1 of Order No. R2-2000-0010 required the excavation and restoration of the Castro Corridor marsh area, creek bed, and creek bank. This would improve water quality in Castro Creek so that the Basin Plan objective of 36 µg/l would be met.

This remedial action was completed by October 15, 2001, and included excavation and offsite disposal of about 3,430 cubic yards of arsenic-contaminated soil and sediment. Approximately 3,210 yards of clean fill was imported to replace the excavated soil and sediment so that the natural topography was generally preserved. The marshy area was then restored and revegetated and the creek bed was stabilized. Chevron continues to monitor arsenic concentrations in Castro Creek as part of its monitoring program. Surface water sampling conducted within the remediated area has exhibited an overall declining arsenic concentration trend since completion of the corrective action, with only sporadic samples exceeding the Basin Plan objective of 36 µg/l. These sporadic exceedances (up to 75 µg/l) indicate the need for the additional investigation into the potential causes of the exceedances to determine whether additional cleanup is needed.

b) Task 2: WP-4 Area Investigation

Chevron found elevated levels of CVOCs in shallow A-zone and upper C- Zone groundwater in the area of well WP-4, which is located offsite approximately 20 feet west of the former Polychem Plant barrier wall on Union Pacific Railroad property near Castro Creek. It was suspected that this contaminated groundwater had the potential to discharge into Castro Creek. Task 2 of Order No. R2-2000-0010 required Chevron to investigate

whether elevated CVOC concentrations were impacting Castro Creek and to determine whether corrective action was needed.

Groundwater from seven subsurface borings and wells in the WP-4 area was analyzed to assess whether dense non-aqueous phase liquids were was present and to determine the lateral and vertical extent of dissolved phase CVOCs. The investigation results showed that the VOCs in the WP-4 area were not a risk to human health or the ecology of Castro Creek, and that the groundwater interceptor trench (discussed below) would intercept any impacted groundwater that might otherwise discharge to Castro Creek. This Order requires ongoing operation of the interceptor trench as well as continued monitoring of Castro Creek and the Plant Site groundwater.

c) Task 3: Interceptor Trench And Gradient Adjustment System

The former Polychem Plant has a concrete barrier wall extending to a depth of 11 feet below ground surface along the western (downgradient) boundary of the Plant Site. This barrier wall separates Chevron's property from Castro Creek, which flows along the southwest edge of Chevron's property. Studies conducted by Chevron demonstrated that shallow A-Zone groundwater was mounding on the east side of this barrier wall, causing contaminants to flow around and potentially under the wall to Castro Creek. To prevent or limit contaminant migration, Task 3 of Order No. R2-2000-0010 required Chevron to install an interceptor/extraction trench to capture groundwater and reduce groundwater mounding.

Since completion of the trench in October 2001, Chevron has operated the trench continuously, and the captured groundwater is treated and pumped to the integrated wastewater pond system. These ponds are lined and the system includes a vertical barrier wall and a hydraulic control trench to limit migration of groundwater. Eventually the groundwater discharges to either the City of Richmond or the West Contra Costa Sanitary District wastewater treatment plants. Operation of the trench has maintained lower groundwater elevations behind the barrier wall and prevents migration of A-zone groundwater towards Castro Creek.

d) Task 4: Electron Donor Evaluation

Task 4 required Chevron to perform a feasibility study to evaluate the feasibility of enhancing intrinsic biodegradation of CVOCs by injecting electron donor materials into C-zone groundwater. Completed in August 2002, this study indicated that neither the injection of electron donors nor an alternative remedy (construction of a permeable barrier wall) would measurably reduce the CVOC mass entering Castro Creek. However, groundwater monitoring has indicated that intrinsic biodegradation of CVOCs is occurring naturally, as evidenced by the reduction of parent compound concentrations and the appearance of daughter breakdown products such as ethane and ethene (as shown in the table in Finding 13). Construction of the barrier wall and operation of the groundwater interceptor trench have reduced CVOC discharge to the Creek, but continued detections show the need for the additional investigation and cleanup required by this Order.

e) Task 5: Corrective Action Monitoring Plan for Groundwater and Surface Water

Task 5 required Chevron to submit a Corrective Action Monitoring Plan for groundwater and surface water, so that the effectiveness of corrective actions required in Tasks 1 and 3 could be evaluated. The goal of the Task 1 monitoring program was to determine whether the excavation and restoration of Castro Corridor marsh and Castro Creek resulted in decreased concentrations of chemicals of concern in Castro Creek and whether the requirements of the Basin Plan are being achieved. The goal of the Task 3 Monitoring Program was to determine whether the interceptor trench was controlling groundwater mounding in the back of the former Polychem Plant.

In March 2001, Chevron submitted the required plan, which proposed a water level monitoring program to evaluate the operation of the interceptor trench; monitoring of Castro Creek to evaluate the effectiveness of its excavation and restoration; and monitoring of TCE breakdown products to evaluate the electron donor system (described above). The water level monitoring, the monitoring of Castro Creek and the monitoring of CVOC breakdown products in groundwater is ongoing.

Current Water Quality Conditions

13. Groundwater Monitoring Results: Groundwater monitoring has been conducted continuously since 1986. Recent results indicate that the groundwater interceptor trench continues to successfully control groundwater mounding. Chevron will continue to operate the trench to capture A-zone groundwater that would otherwise migrate towards Castro Creek.

Groundwater monitoring indicates that intrinsic breakdown of CVOCs is occurring in the A-zone and to a lesser degree in the C-zone. Lines of evidence include loss of parent compounds and the appearance of their daughter breakdown products, suitable redox geochemistry to support anaerobic conditions, and ample electron donors.

PLANT SITE WATER QUALITY

Contaminant	Historical Maximum oncentration	Maximum 2014 Concentration in A-zone Compliance Wells	Maximum 2014 Concentration in C-zone Compliance Wells	Maximum 2014 Concentration in Castro Creek Monitoring Points
Pesticides	75 µg/l	2 µg/l	ND	0.41 µg/l
Benzene	52 µg/l	6.1 µg/l	1.8 µg/l	NM
PCE	4081 µg/l	ND	910 µg/l	1 µg/l
TCE	192,500 µg/l	2.1 µg/l	12,000 µg/l	60 µg/l
DCE	336,800 µg/l	120 µg/l	2,200 µg/l	180 µg/l
Vinyl Chloride	22,840 µg/l	15 µg/l	78 µg/l	22 µg/l
Methylene	4,467,000	ND	ND	ND
Toluene	216,000 µg/l	6.4 µg/l	ND	NM
Ethane/Ethene	-	170 µg/l	3 µg/l	NM

ND = Not detected
NM = Not measured

14. Castro Creek Monitoring: Surface water monitoring has been conducted since 1997. The effectiveness of the Castro Corridor marsh removal and restoration was based on meeting the 36 ppb Basin Plan criterion for dissolved arsenic in surface water within the remediated area of Castro Creek. The Creek Monitoring program consists of eight sampling stations where data indicates that arsenic concentrations in surface water have been reduced and other contaminant concentrations have stable or decreasing trends. The annual biological assessment of Castro Creek indicates the general condition of the creek has not changed since 1997, save for the restored section of the creek which showed evidence of improved habitat.

Remaining Environmental Concerns

15. Chevron has completed the corrective actions required by Tasks 1-5 of Order No. R2-2000-0010, but several environmental concerns remain. As noted above, the corrective actions Chevron performed in compliance with Order No. R2-2000-0010 were intended to prevent offsite migration; that order did not require Chevron to remediate onsite contamination in soil and groundwater. Continued operation of the groundwater interceptor trench is required, as is an assessment of the extent of contamination remaining in onsite soil and groundwater. Following an evaluation of the risks associated with this residual contamination, a plan to remediate site contamination to appropriate cleanup standards may be necessary.

16. Continued surface water and groundwater monitoring is required. The monitoring requirements for the Pond and Plant Sites were formerly attached to two separate orders, the Waste Discharge Requirements for the Pond Site (Order No. 97-049, now contained in WDR Order No. R2-2015-0030) and Site Cleanup Requirements for the Plant Site (Order No. R2-2000-0010). In a letter dated March 26, 2015, the monitoring requirements for the Pond and Plant Sites were combined into a single monitoring program without any further changes, and these monitoring requirements are attached to this Order. Tasks 3 and 4 of Order No. R2-2015-0030 require that the monitoring program and Water Quality Protection Standards be updated and this is underway.

BASIN PLAN

17. 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 U.S. EPA, where required.

CLEANUP AUTHORITY

18. Basis for 13267 and 13304 Order: CWC section 13304 authorizes the Regional Water Board to issue orders requiring a discharger to cleanup and abate waste where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance. As discussed above, the Discharger has caused or permitted waste to be discharged or deposited,

causing contamination of groundwater. Contamination of groundwater creates and threatens to create conditions of pollution and nuisance. CWC section 13267 authorizes the Regional Water Board to require a person who has discharged, discharges, or is suspected of having discharged or discharging, to furnish technical or monitoring program reports. The burden of the reports required by this Order bears a reasonable relationship to the need for the report and the benefits to be obtained (to characterize the extent of contamination, the associated risks to human health and the environment, and document success of remediation efforts).

19. State Water Board Resolution No. 68-16: State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharger and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background shall be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives.

20. State Water Board Resolution No. 92-49: State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under California Water Code (Water Code) Section 13304," applies to this discharge. It directs the Regional Water Boards to set cleanup levels equal to background water quality or the best water quality that is reasonable, if background levels cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The remedial action plan will assess the feasibility of attaining background levels of water quality. This Order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

21. State Water Board Resolution No. 88-63: The Basin Plan provides that all groundwater sources are considered suitable, or potentially suitable, for municipal or domestic water supply (MUN) and that, in making any exceptions, the Regional Water Board will consider the criteria referenced in State Water Board Resolution No. 88-63, “Sources of Drinking Water”, where:

    a) The total dissolved solids exceed 3,000 mg/l (5,000 µS/cm, electrical conductivity), and it is not reasonably expected by the Regional Water Board that the groundwater could supply a public water system, or

    b) There is contamination, either by natural processes or human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using best management practices or best economically achievable treatment practices, or

    c) The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

BENEFICIAL USES

22. While groundwater underlying or downgradient of the site is not currently used as a source of potable water, Resolution No. 88-63, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region.

23. The potential beneficial uses of groundwater underlying and adjacent to the Plant site include:

    a) Domestic water supply
    b) Industrial process and service water supply
    c) Agricultural water supply
    d) Groundwater replenishment to surface waters

24. Site groundwater can potentially discharge into Castro Creek, the only surface water body within 2,000 feet of the Plant Site. Downstream, Castro Creek joins Wildcat Creek, and the combined creeks flow into Castro Cove, an embayment of San Pablo Bay. The surface water beneficial uses named in the Basin Plan for these bodies of water are therefore applicable to groundwater discharging from the Plant Site. The existing and potential combined beneficial uses of Castro Creek, Castro Cove, and San Pablo Bay include:

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

CEQA, NOTIFICATION, AND PUBLIC HEARING

25. This Order requires continued monitoring, groundwater extraction, and preparation of work plans and reports that do not have the potential for significant impacts on the environment. As such, the Order is not a project as defined in the California Environmental Quality Act (CEQA), which only applies to projects that have the potential for causing a significant effect on the environment (the "common sense" exemption applies). There is no possibility that the activity in question may have a significant effect on the environment. (Cal. Code of Regs., tit. 14, §§ 15378 and 15061, subd. (b)(3).) CEQA analysis will be performed and circulated with a revised SCR order prior to implementation of any remedial actions that are deemed necessary pursuant to Tasks 3, 4, 5, and 6 of this Order that may have significant impacts to the environment.

26. It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This Order promotes that policy by requiring discharges to meet appropriate contaminant cleanup levels designed to protect human health and ensure that water is safe for beneficial uses.

27. The Regional Water Board has notified the Discharger, and interested agencies and persons of its intent to update the SCRs contained in Order No. R2-2000-0010 and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

28. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the update of SCRs for the site.

IT IS HEREBY ORDERED, pursuant to CWC section 13304, that the Discharger (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner that will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2. Migration of pollutants through subsurface transport to waters of the State is prohibited**.**

3. There shall be no discharge of wastes or hazardous substances to surface waters.

4. Activities associated with the subsurface investigation and cleanup that will cause significant adverse migration of wastes or hazardous substances are prohibited.

5. The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in CWC section 13050(m).

6. The Discharger shall not cause the following conditions to exist in waters of the State at any place:
   a) Floating, suspended, or deposited macroscopic particulate matter or foam;
   b) Bottom deposits or aquatic growth;
   c) Adversely altered temperature, turbidity, or apparent color beyond natural background levels;
   d) Visible, floating, suspended or deposited oil or other products of petroleum origin; or
   e) Toxic or other deleterious substances to be present in concentrations or quantities that may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.
   f) Further degradation of existing groundwater quality.

TASKS

ALL REQUIRED SUBMITTALS MUST BE ACCEPTABLE TO THE EXECUTIVE OFFICER (SEE PROVISION NO. 1 COMPLIANCE)

1. Chevron shall continue to extract water from the groundwater interceptor trench at a rate which eliminates or reverses the migration of A-zone contaminants to Castro Creek and prevents the re-establishment of a groundwater mound behind the barrier wall.
   COMPLIANCE DATE: Immediately

2. **Plant Site Historical Investigation Data Review:** Chevron shall compile the results of soil and groundwater investigations conducted at the Plant Site and adjacent Castro Creek area and, in light of current and future proposed land uses, determine whether significant uncertainties exist

with respect to the presence of residual chemical impacts to soil and groundwater that warrant further investigation. Chevron shall submit the results of the data review to the Regional Water Board for review and approval.
COMPLIANCE DATE: October 15, 2016

3. **Plant Site Investigation Work Plan**: If determined to be necessary following the preparation of the Plant Site Historical Investigation Data Review, Chevron shall submit an investigation work plan to assess the extent of soil and groundwater contamination remaining within the boundaries of the Plant Site.
COMPLIANCE DATE: December 15, 2016

4. **Plant Site Investigation and Report:** Upon receiving Regional Water Board staff approval of the Investigation Work Plan (if necessary), Chevron shall perform the remedial investigation and submit a technical report to the Regional Water Board that describes the extent of soil and groundwater contamination on the site.
COMPLIANCE DATE: Within 180 days after completing the investigation

5. **Risk Assessment**: Chevron shall submit an assessment of the risks associated with the residual contamination remaining on the Plant Site, based on the results of the investigation.
COMPLIANCE DATE: July 1, 2017

6. **Remedial Action Plan:** Chevron shall submit a feasibility study and remedial action plan, proposing appropriate cleanup standards for current and future land uses for the Plant Site, and cleanup methods to achieve cleanup standards, based on the results of the investigation and risk assessment.
COMPLIANCE DATE: December 15, 2017

PROVISIONS

1. Compliance: The Discharger shall comply immediately, or as prescribed by the time schedule contained herein, with all Prohibitions, Tasks, and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. The Discharger must also comply with all conditions of this Order. 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 this Order by the Regional Water Board.

2. Authority to Request Technical Reports: All technical and monitoring reports required by this Order are requested pursuant to CWC section 13267. 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 CWC section 13268.

3. Technical Reports: All technical reports submitted pursuant to this Order shall be prepared under the supervision of and signed under penalty of perjury by a California registered civil engineer or a California Professional Geologist.

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

5. Modifications to Remedial Action Plan: The Discharger shall notify the Executive Officer for approval at least 60 days prior to implementing any proposed major modifications to any approved Remedial Action Plan, Implementation Schedule, or remediation system. The notification shall include the rationale for any proposed modification.

6. Delayed Compliance: If the Discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the Tasks, the Discharger shall promptly notify the Executive Officer of the delay and reason for the delay, and the Regional Water Board may consider revisions to this Order.

7. Operation and Maintenance: The Discharger shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.

8. Availability: A copy of this Order shall be maintained by the Discharger and shall be made available by the Discharger to all employees or contractors performing work necessary to comply with the tasks set forth in this Order.

9. 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 control or 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. The succeeding owner or operator shall agree to the existing terms of these SCRs until the transfer of this Order.

10. Stormwater: The Discharger shall comply with the provisions of the Chevron Richmond Refinery's NPDES permit for the management, monitoring, and discharge of stormwater.

11. 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) 622-2369 during regular office hours (Monday through Friday, 8 a.m. – 5 p.m.); and to

ii. The California Office of Emergency Services 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 any reporting to the California Office of Emergency Services that is required pursuant to the Health and Safety Code.

12. Lab Qualifications: All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Regional Water Board using approved U.S. EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance / quality control (QA/QC) records for Regional Water Board review. This provision does not apply to analyses that can only reasonably be performed onsite (e.g., temperature).

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

a. The Regional Water Board,
b. The California Department of Toxic Substances Control, and
c. Contra Costa Health Services, Hazardous Materials Program.

The Executive Officer may modify this distribution list as needed.

14. Submittal Revisions: Where the Discharger becomes aware that it failed to submit any relevant facts in a report or submitted incorrect information in any report to the Regional Water Board, it shall promptly submit such facts or information.

15. Severability: Provisions of this Order are severable. If any provisions of these SCRs are found to be invalid, the remainder of these SCRs shall not be affected.

16. 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 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.

17. 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.

18. 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.

19. Report Certification: 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.
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.

A duly authorized representative of a person designated in this provision may sign documents if all of the following are met:

a. The authorization is made in writing by a person described in paragraph (a) of this provision;
b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
c. The written authorization is submitted to the Executive Officer.

Any person signing a document under this Provision shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

20. Cost Recovery: The Discharger (as applicable) shall be liable, pursuant to CWC section 13304 and Health and Safety Code section 25270.9 to the Regional Water Board for all reasonable costs actually incurred by the Regional Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Water Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the Discharger (as applicable) over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program**.**

21. Periodic Order Review: The Regional Water Board will review this Order periodically and may revise it when necessary. The Discharger (as applicable) may request revisions and upon review the Executive Officer may recommend that the Regional Water Board revise these requirements.

22. Order No. R2-2000-0010 is hereby rescinded.

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 Region, on April 13, 2016.

Digitally signed by Bruce H. Wolfe
DN: cn=Bruce H. Wolfe, o=SWRCB, ou=Region 2, email=bwolfe@waterboards.ca.gov, c=US
Date: 2016.04.15 13:06:36 -07'00'

Bruce H. Wolfe
Executive Officer

Attachments:

Self-Monitoring and Reporting Program, Part A and B

Figure 1 – Chevron Chemical Location Map
Figure 2 – Plant Site Location Map

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN FRANCISCO BAY REGION

REVISED SELF-MONITORING AND REPORTING PROGRAM FOR

CHEVRON CHEMICAL COMPANY
POND and PLANT SITES
940 HENSLEY STREET
RICHMOND, CONTRA COSTA COUNTY

ORDER NO. R2-2016-0017

CONSISTS OF PART A AND PART B

Revised April 2016

PART A

A. GENERAL

Reporting responsibilities of waste dischargers are specified in California Water Code (CWC) sections 13225(a), 13267(b), 13383, and 13387(b) and this Board's Resolution No. 73-16. This Discharge Monitoring Program is issued in accordance with Finding 18 and Specification B.16 of Order No. R2-2015-0030.

The principal purposes of a discharge monitoring program are: (1) to document compliance with waste discharge requirements and prohibitions established by the Board, (2) to facilitate self-policing by waste dischargers in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of standards of performance and toxicity standards, and (4) to assist the dischargers in complying with the requirements of Article 5, Chapter 15 as revised July 1, 1991.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the most recent version of U.S. EPA Standard Methods and in accordance with an approved sampling and analysis plan.

Water and waste analysis shall be performed by a laboratory approved for these analyses by the State of California. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. DEFINITION OF TERMS

1. A grab sample is a discrete sample collected at any time.

2. Receiving waters refers to any surface or groundwater which actually or potentially receives surface or groundwater which pass over, through, or under waste materials or contaminated soils. In this case the groundwater beneath and adjacent to the Pond Site, the surface runoff from the site, adjacent wetlands, Castro Creek, and San Pablo Bay are considered receiving waters.

3. Facility boundary refers to the alignment of the hydraulic control trench/barrier wall system for the Pond Site as shown on Figure 2 of Order No. R2-2015-0030.

4. Standard observations refer to:

    a. Receiving Waters

        i. Floating and suspended materials of waste origin: presence or absence, source, and size of affected area.

        ii. Discoloration and turbidity: description of color, source, and size of affected area.

        iii. Evidence of odors, presence or absence, characterization, source, and distance of travel from source.

b. Perimeter of the facility boundary.

i. Evidence of liquid leaving or entering the waste management unit, estimated size of affected area and flow rate. (Show affected area on map)

ii. Evidence of odors, presence or absence, characterization, source, and distance of travel from source.

iii. Evidence of erosion and/or daylighted waste.

c. The waste management units consisting of SMU1 and the CA.

i. Evidence of ponded water at any point on the waste management facility.

ii. Evidence of odors, presence or absence, characterization, source, and distance of travel from source.

iii. Evidence of erosion and/or daylighted waste.

D. SAMPLING, ANALYSIS, AND OBSERVATIONS

The Discharger is required to perform sampling, analyses, and observations in the following media:

1. Groundwater per section 2550.7(b)(1)(D),

2. Surface water per section 2550.7(c),

and per the non-statistical portions of the general requirements specified in section 2550.7(e) of Article 5, Chapter 15.

E. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the Discharger or laboratory and shall be retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board. Such records shall show the following for each sample:

1. Identity of sample and sample station number.

2. Date and time of sampling.

3. Date and time that analyses are started and completed, and name of the personnel performing the analyses.

4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used.

5. Calculation of results.

6. Results of analyses, and detection limits for each analysis.

F. REPORTS TO BE FILED WITH THE BOARD

1. The Discharger shall submit two Semi-Annual Self-Monitoring and Reporting Program Reports: one for the winter/spring (wet) season and one for the summer/fall (dry) season. The Discharger shall also submit an Annual Self-Monitoring and Reporting Program Summary Report covering the previous monitoring year. The annual summary report can be combined with the summer/fall report. The reporting

period means the duration separating the submittal of the monitoring report from the time the next iteration of that report is scheduled for submittal. Unless otherwise specified, the reporting period for each semi-annual report is six months: 1st and 2nd quarters = January 1 to June 30; and 3rd and 4th quarters = July 1 to December 31. The due date for any given report will be 60 days after the end of its reporting period. The semi-annual reports shall include, but are not limited to the following:

a. Letter of Transmittal

A letter transmitting the essential points in each report should accompany each report. Such a letter shall include a discussion of any requirement violations found during the last report period, and actions taken or planned for correcting the violations. If the Discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last report period this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by a principal executive officer at the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

b. Each semi-annual monitoring report shall include a compliance evaluation summary. The summary shall contain:

i. A graphic description of the elevation, velocity, and direction of groundwater flow under/around the Pond and Plant sites, based upon the past and present water level elevations and pertinent visual observations.

ii. The method and time of water level measurement, the type of pump used for purging, and pump placement in the well; the method of purging, pumping rate, equipment, and methods used to monitor field pH, temperature, and conductivity during purging; calibration of the field equipment; results of the field pH, temperature, conductivity, and turbidity observations; well recovery time or rate (as applicable); and the method of disposing of the purge water. Stabilization of field parameters may not be applicable for wells with extremely slow recovery. In place of tabulating field data, field sampling logs can be included as an appendix to the monitoring report.

iii. A written discussion of the groundwater analyses indicating any change in the quality or characteristics of the groundwater.

iv. Type of pump used, pump placement for sampling, and a detailed description of the sampling procedure; number and description of equipment, field, and travel blanks; number and description of duplicate samples; type of sample containers and preservatives used, the date and time of sampling, the name and qualifications of the person actually taking the samples, and any other observations.

c. A comprehensive discussion of the compliance record and status, as well as any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with Order No. R2-2015-0030 and Chapter 15, Title 23.

d. A map or aerial photograph shall accompany each report showing observation and monitoring station locations.

e. Laboratory statements of results of analyses specified in Part B must be included in each report. The director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board.

i. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer prior to use.

ii. In addition to the results of the analyses, laboratory quality assurance/quality control (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and analytical detection limits; the recovery rates; an explanation for any recovery rate that is less than the recovery acceptance limits specified in the U.S. EPA method procedures or the laboratory's acceptance limits, if they are more stringent than those in the U.S. EPA method procedures; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.

f. An evaluation of the effectiveness of the leachate extraction system or control facilities, which includes an evaluation of leachate buildup within the disposal units and sump areas, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal/treatment methods utilized.

g. A summary and certification of completion of all standard observations for the Pond and Plant sites, the perimeter of the Pond and Plant sites, and the receiving waters.

h. The quantity and types of waste disposed of during each quarter of the reporting period and the locations of the disposal operations. Locations of the waste placement shall be depicted on a map showing the area, if any, in which filling has been completed during the previous calendar year.

i. Tabular and graphical summaries of the monitoring data obtained during the previous year; the report should be accompanied by a computer data disk, tabulating the year's data.

j. The Annual Monitoring Report shall be submitted to the Board covering the previous monitoring year. The Report shall include, but is not limited to, the following:

i. A graphical presentation of the analytical data [§2550.7(e)(14) of Article 5, Chapter 15] for monitoring locations that have shown detectable concentrations during two consecutive monitoring events or greater than ten percent detection frequency for any organic compound. Graphical representation must be provided for monitoring locations with metals and general chemistry analytical parameters that have an increasing trend for three consecutive monitoring events;

ii. A tabular summary of all the monitoring data obtained during the previous year;

iii. A comprehensive discussion of the compliance record and the corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the then current waste discharge requirements;

iv. A map showing the area, if any, in which filling has been completed during the previous calendar year;

v. A written summary of the groundwater analyses indicating any change in the quality of the groundwater; and

vi. An evaluation of the effectiveness of the leachate monitoring/control facilities, which includes an evaluation of leachate buildup within the disposal units, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods utilized.

Demonstration of Intrinsic Remediation: The annual reports shall provide a demonstration of the on-going intrinsic remediation. These reports shall include plots showing trends in concentration over time for the COC-parent compounds and degradation products of intrinsic remediation.

2. Contingency Reporting

a. The Discharger shall report by telephone concerning any seepage from the surface of the disposal area immediately after it is discovered. A written report shall be filed with the Board within seven days, containing at least the following information:

i. A map showing the location(s) of seepage;
ii. An estimate of the flow rate;
iii. A description of the nature of the discharge (e.g., all pertinent observations and analyses); and
iv. Corrective measures underway or proposed.

b. Following the determination that groundwater analytical results for a compliance monitoring location exceed the WQPS concentration limits (CLs), the Discharger shall evaluate QA/QC samples to determine if cross-contamination may have occurred. The Discharger shall follow the procedures below for any monitoring locations still exceeding the CLs:

i. The Discharger shall immediately re-sample at the compliance point where the CL was exceeded and re-analyze.

ii. If re-sampling and analysis confirm the exceedance of a CL, the Discharger shall document this in the text of the next Semi-Annual Monitoring Report and notify the Board in writing within 21 days of re-sampling. In this letter, the Discharger shall evaluate whether any re-sampling or additional corrective measures need to be implemented.

3. Well Logs

A boring log and a monitoring well construction log shall be submitted for each sampling well established for this monitoring program, as well as a report of inspection or certification that each well has been constructed in accordance with the construction standards of the Department of Water Resources. These shall be submitted within 45 days after the completion of well installation activities.

PART B: MONITORING AND OBSERVATION SCHEDULE

1. ONSITE OBSERVATIONS

STATION	DESCRIPTION	OBSERVATIONS	FREQUENCY
V-1 thru V-'n'	Located on the waste disposal area as delineated by a 500 foot grid network.	Standard observations for the waste management unit.	Weekly observations, report semi-annually.
P-1 thru P-'n' (perimeter)	Located at equidistant intervals not exceeding 1000 feet around the perimeter of the facility.	Standard observations for the perimeter.	Weekly observation, report semi-annually.

A map showing the visual and perimeter compliance points (V and P stations) shall be submitted by the Discharger along with the semi-annual monitoring reports.

2. SEEPAGE MONITORING

Seepage monitoring stations include stations S-1 through S-'n' and any point at which seepage is found occurring from the disposal area. The waste management unit perimeters of SMU1 and the CA shall be monitored according to the following; with results reported quarterly:

STATION	DESCRIPTION	OBSERVATIONS	FREQUENCY
S-1 thru S-'n'	At any point(s) at which seepage is found occurring from the disposal area.	Standard observation for the perimeter and standard analysis for other "i" (perform analysis once per seep).	Daily until remedial action is taken and seepage ceases.

3. A-ZONE HYDRAULIC GRADIENT MONITORING

The Discharger will take monthly water level measurements from a network of paired piezometers and sumps along the length of the hydraulic control trench (HCT)/barrier wall system to evaluate its effectiveness in maintaining a groundwater depression along the perimeter of the Pond Site which prevents offsite migration of constituents of concern. The piezometer/HCT sump pairs to be monitored are shown on Figure 1 and listed in Table 1 below:

Table 1: Hydraulic Control Monitoring Points for the Pond Site

Piezometers/Wells outside Barrier Wall	HCT Sumps inside Barrier Wall
GW-17A	HCT Sump 1
GW-69A	HCT Sump 2
GW-3A	HCT Sump 3
GW-77A	HCT Sump 5
PZ-230	HCT Sump 8
PZ-232	HCT Sump 11
PZ-206	HCT Sump 14
PZ-208	HCT Sump 17
PZ-211	HCT Sump 20
PZ-212	HCT Sump 22
GW-38A	Pond Sump 3A

4. CHEMICAL CONSTITUENT MONITORING

The Discharger shall sample the monitoring points shown on Figure 1 and listed in Table 2 on a quarterly basis for the Monitoring Parameters shown in boldface type in Table 3. The Discharger shall sample the monitoring points for the longer COC list every five years. All monitoring activities, including analytical and QA/QC procedures will be conducted in accordance with the Groundwater Quality Monitoring Program, Integrated Wastewater Pond System (IWPS) and Soil Management Unit 1, Chevron Chemical Company, Richmond, California, dated April 30, 1992, the revised version of this program dated July 8, 1993, and the most recent version of the Sampling and Analysis Plan.

Table 2: Chemical Monitoring Points for the Pond Site

A-ZONE WELLS	C-ZONE WELLS	CASTRO CREEK
GW-61A-2 (upgradient)	GW-61C-2 (upgradient)	CW-9 (upstream)
GW-31A	GW-38C	CW-7
GW-38A	GW-3C-1	CW-6
GW-3A	GW-63C	
GW-77A		
GW-78A		

Table 3: Monitoring Parameters* and Constituents of Concern for the Pond Site

Field Measurements
Static Water Level (prior to purging)
pH
Specific Conductivity
Temperature

Metals
Arsenic
Chromium
Iron
Lead
Manganese
Nickel
Zinc
Sodium

Water Quality Indicators
Ammonia
Nitrate
Total Dissolved Solids (TDS)
Chloride
Sulfate
Phenols (total)
Total Organic Carbon (TOC) Total Organic Halogen (TOX)

Volatile Organic Compounds
Benzene
Toluene
Xylenes
Trichloroethene (TCE)
Tetrachloroethene
cis/trans-1,2-Dichloroethene (c/t-1,2-DCE)
1,2-Dichloroethane (1,2-DCA)

* Monitoring Parameters are shown in bold face type. Constituents of Concern are in normal type.

Pesticides
Chlordane
DDT
Dieldrin
Lindane
Malathion
Orthene
Toxaphene
Trithion

Herbicides
2,4,5 TP (Silvex)
2,4D
Paraquat

Other Organic Compounds
Phthalic Anhydride (PA)
Tetrahydrophthalic Anhydride (THPA)
Tetrahydrophthalimide (THPI)

Fuel Hydrocarbons
Total Petroleum Hydrocarbons as Gasoline (TPH-G)
Total Petroleum Hydrocarbons as Diesel (TPH-D)
Total Petroleum Hydrocarbons as Kerosene (TPH-K)
Total Oil and Grease

Polynuclear Aromatic Hydrocarbons
Naphthalene
Fluorine
Phenanthrene
Fluoranthene

5. DETERMINATIQN OF WQPS CONCENTRATION LIMITS (CLs)

Due to the heterogeneous hydrogeology of the site, it is difficult to detect if and when a release has occurred by comparing constituent concentrations in upgradient wells with those in downgradient wells. To remedy this situation, an intra-well tracking of constituent concentrations over time is conducted. For those constituents that have not historically been reported above the laboratory detection limits, the CLs are set as the Practical Quantitation Limit (PQL) or Historic Reporting Limit (HRL) for the laboratory test method for that constituent, whichever is higher. For those constituents that have historically been reported above the HRL, the CLs are evaluated through a statistical comparison with historical data using either the prediction interval method or the non-parametric prediction limit method.

The Discharger shall compare the monitoring results for each quarter to the CLs shown in Table 4 to indicate whether a release from one of the regulated units in the Pond Site could have occurred.

6. The Discharger shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater in the Plant Site according to the schedules shown in Tables 5 and 6.

Table 4: WQPS Concentration Limits for the Pond Site Groundwater Monitoring Program (units - mg/l)

Chemical Constituent (Monitoring Parameters are in bold type)	PQL	GW-3A	GW-31A	GW-38A	GW-77A	GW-78A	GW-JC-1	GW-38C	GW-63C
I,2-Dichloroethane	0.002	0.002	0.002	0.002	0.002	0.016	0.002	0.002	0.002
2,4,5-TP	0.0001	0.0009	0.0005	0.0005	0.0026	0.001	0.0003	0.0005	0.0002
2,4-D	0.001	O.OO1	O.OO1	0.005	0.004	0.01	0.001	0.001	O.O01
Ammonia	0.2	17.9	50.2	32.4	302	135	6.58	6.94	12.4
Arsenic	0.002	0.076	1.52	0.065	0.023	0.092	0.0l8	0.015	0.008
Benzene	0.0005	0.003	0.012	0.012	0.003	0.012	0.003	0.003	0.003
Chlordane	0.0006	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Chromium	0.02	0.036	3	0.25	0.04	0.02	0.178	0.046	0.34
DDT	0.0001	0.0025	0.0002	0.0002	0.0005	0.0002	0.0002	O.OO1	0.0008
Dieldrin	0.0001	0.0025	O.OOOl	O.OOOl	0.0005	0.0004	O.OOOl	O.OOOl	0.0008
Fluoranthene	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluorene	0.002	0.005	0.005	0.005	0.005	0.025	0.005	0.005	0.005
Lead	0.1	0.32	1.48	0.288	0.153	0.015	0.196	0.11	0.23
Lindane	O.OOOl	0.0025	O.OOOl	O.OOOl	0.0005	0.0004	O.OOOl	O.OOOl	O.OOOl
Malathion	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Naphthalene	0.002	0.005	0.005	0.005	0.005	0.01	0.005	0.005	0.005
Nickel	0.057	0.644	1.2	0.057	1	1.77	0.524	0.5	0.397
Nitrate	0.2	756	10	10.8	240	303	24.7	1.4	24.4
Orthene	0.06	0.06	0.06	0.06	0.12	0.12	0.06	0.06	0.06
Phthalic Anhydride	1	1	50	1	1	1	1	1	1
Paraquat	0.05	0.05	0.05	0.05	0.05	0.061	0.05	0.05	0.35
Phenanthrene	0.002	0.005	0.005	0.005	0.005	0.025	0.005	0.005	0.005
t-1,2,-Dichloroethene	0.0005	0.0022	0.276	0.021	O.OO1	O.OO1	0.001	O.OO1	O.O01
Tetrachloroethene	0.0008	0.0008	0.0008	0.0008	0.0008	0.0066	0.0008	0.0008	0.0008
THPA	1	2	1	1	1	1	1	1	1
THPI	1	11	50	1	1	1	1	1	1
TOG	3.0	3.00	3.2	133.00	3.0	5.50	11.10	3.0	3.0
Toluene	0.0024	0.003	0.003	0.003	0.0024	0.012	0.003	0.003	0.003
Toxaphene	0.002	0.008	0.002	0.002	0.01	0.008	0.002	0.002	0.002
TPH as Diesel	0.75	1.40	1.10	1.56	1.20	1.70	1.30	1.10	I.40
TPH as Gasoline	0.20	0.48	0.62	1.23	0.38	0.50	0.50	0.20	0.38
TPH as Kerosene	0.75	1.5	3.00	1.50	1.50	0.97	1.50	1.50	1.50
Trichloroethene	0.0004	O.OO1	0.004	0.003	0.001	0.003	0.027	0.002	O.OOI
Trithion	0.01	0.01	0.01	0.01	0.04	0.04	0.01	0.01	0.01
Xylene (total)	0.005	0.005	0.005	0.005	0.005	0.025	0.005	0.005	0.005
Zinc	0.024	0.269	2.74	0.7I5	0.4I9	24.8	0.488	0.235	0.99I

Table 5:

Groundwater Monitoring Program for Plant Site Wells

Zone	Well	Location	Sampling Frequency	pH	Spec. Cond.	Temp.	TOC	TDS	Chloride	Arsenic	VOCs	Chlordane	Lindane	Orthene	Monitor	Paraquat	2,4-D	2,4,5-TP
A	GW-7A	Upgradient	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-8A	Upgradient	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-10A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-11A	Downgradient	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-12A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-13A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-14A	Plant Site	5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-15A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-19A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	GW-20A	Plant Site	Biannually	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B-4	Plant Site	5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B-5	Plant Site	5 years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C	GW-7C	Upgradient	Annually	X	X	X	X	X	X	X	X							
	GW-8C	Upgradient	Annually	X	X	X	X	X	X	X	X							
	GW-8B	Upgradient	5 years	X	X	X	X	X	X	X	X							
	GW-10C	Plant Site	Biannually	X	X	X	X	X	X	X	X							
	GW-11C	Plant Site	Biannually	X	X	X	X	X	X	X	X							
	GW-14C	Plant Site	5 years	X	X	X	X	X	X	X	X							
	GW-15C	Plant Site	Biannually	X	X	X	X	X	X	X	X							
	GW-19C	Plant Site	Annually	X	X	X	X	X	X	X	X							
	GW-21C	Plant Site	Annually	X	X	X	X	X	X	X	X							
	GW-6C-1	Downgradient	Annually	X	X	X	X	X	X	X	X							
	GW-22C	Downgradient	Biannually	X	X	X	X	X	X	X	X							
	GW-23C	Downgradient	Biannually	X	X	X	X	X	X	X	X							
	GW-25C	Downgradient	Biannually	X	X	X	X	X	X	X	X							
	GW-26C	Downgradient	Biannually	X	X	X	X	X	X	X	X							
	GW-40C	Downgradient	Biannually	X	X	X	X	X	X	X	X							
B	GW-6B-2	Plant Site	Annually	X	X	X	X	X	X	X	X							
	GW-7B	Upgradient	Annually	X	X	X	X	X	X	X	X							
	GW-10B	Plant site	Annually	X	X	X	X	X	X	X	X							

Table 6: Intrinsic Remediation Monitoring Parameters

Well	Benzene	COD	Chloride	Chlorobenzene	c-1,2-DIchlorobenzene	Ethane	Ethene	Ethylbenzene	Methane	Methylene Chloride	Nitrate	Sulfate	Tetrachloroethene	Toluene	TOC	Total Xylenes	Trichloroethene	Vinyl Chloride
GW-7A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-8A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-10A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-11A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-12A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-13A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-15A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-19A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-20A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-6B-2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-7B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-10B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-6C-1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-7C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-8C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-10C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-11C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-15C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-19C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-21C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-22C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-23C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-25C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-26C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
GW-40C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6 (continued): Intrinsic Remediation Monitoring Parameters

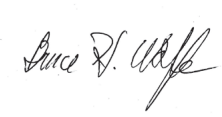
Well	D.O.	pH	ORP	Temperature	Specific Conductance
GW-7A	X	X	X	X	X
GW-8A	X	X	X	X	X
GW-10A	X	X	X	X	X
GW-11A	X	X	X	X	X
GW-12A	X	X	X	X	X
GW-13A	X	X	X	X	X
GW-15A	X	X	X	X	X
GW-19A	X	X	X	X	X
GW-20A	X	X	X	X	X
GW-6B-2	X	X	X	X	X
GW-7B	X	X	X	X	X
GW-10B	X	X	X	X	X
GW-6C-1	X	X	X	X	X
GW-7C	X	X	X	X	X
GW-8C	X	X	X	X	X
GW-10C	X	X	X	X	X
GW-11C	X	X	X	X	X
GW-15C	X	X	X	X	X
GW-19C	X	X	X	X	X
GW-21C	X	X	X	X	X
GW-22C	X	X	X	X	X
GW-23C	X	X	X	X	X
GW-25C	X	X	X	X	X
GW-26C	X	X	X	X	X
GW-40C	X	X	X	X	X

I, Bruce H. Wolfe, Executive Officer, hereby certify that the foregoing Self-Monitoring and Reporting Program:

1. Has been developed in accordance with the procedures set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Board's Order No. R2-2016-0017.

2. Is effective on the date shown below.

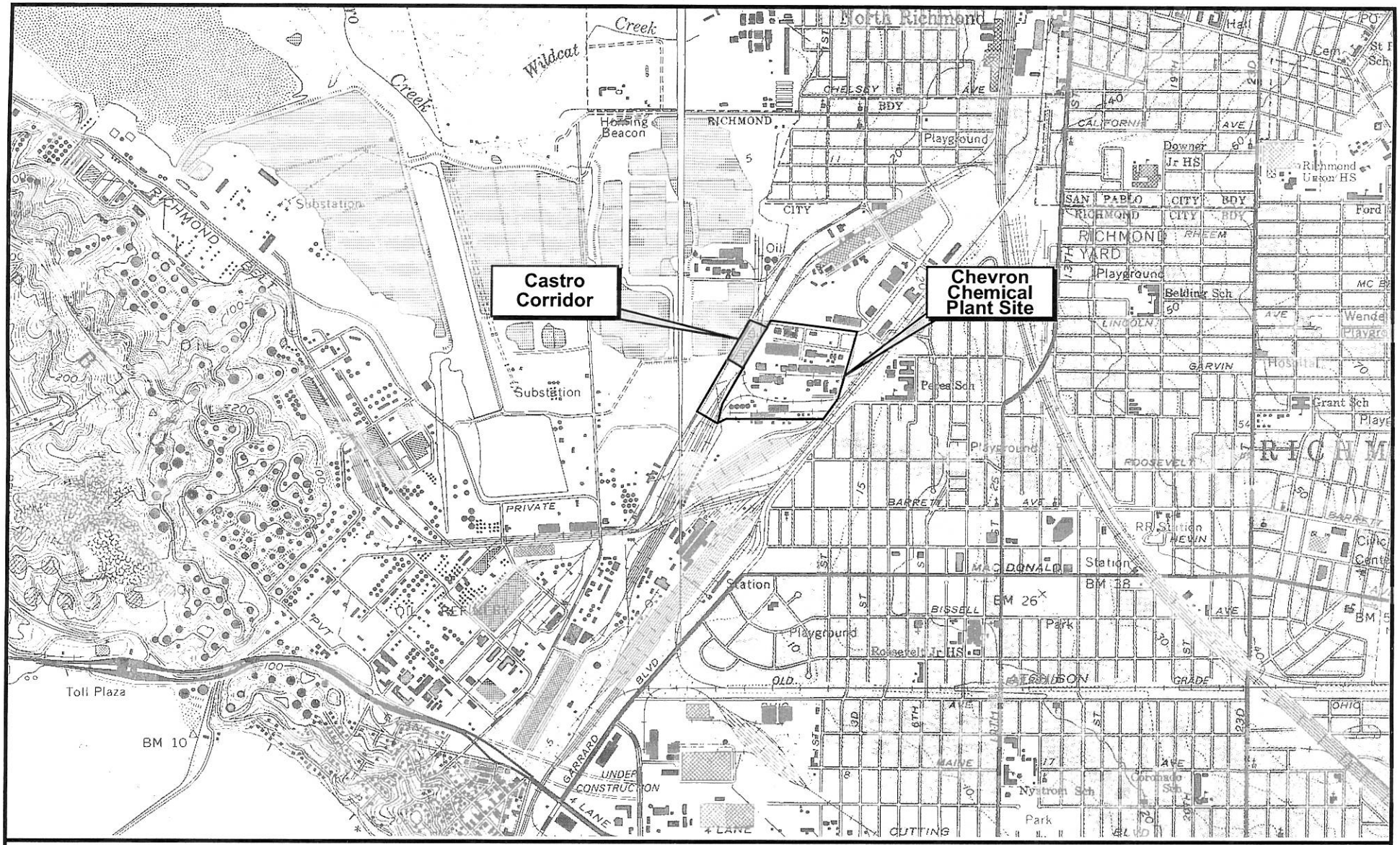
3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer.



Digitally signed by Bruce H. Wolfe
DN: cn=Bruce H. Wolfe, o=SWRCB, ou=Region 2, email=bwolfe@waterboards.ca.gov, c=US
Date: 2016.04.15 13:11:10 -07'00'

Bruce H. Wolfe
Executive Officer

Date Ordered: April 13, 2016



SOURCE: USGS Richmond/San Quentin 7.5 Minute Quadrangle, 1958, Photorevised 1980.

Figure 1
Location of Chevron Chemical Richmond Facility

Chevron Chemical - Richmond CA

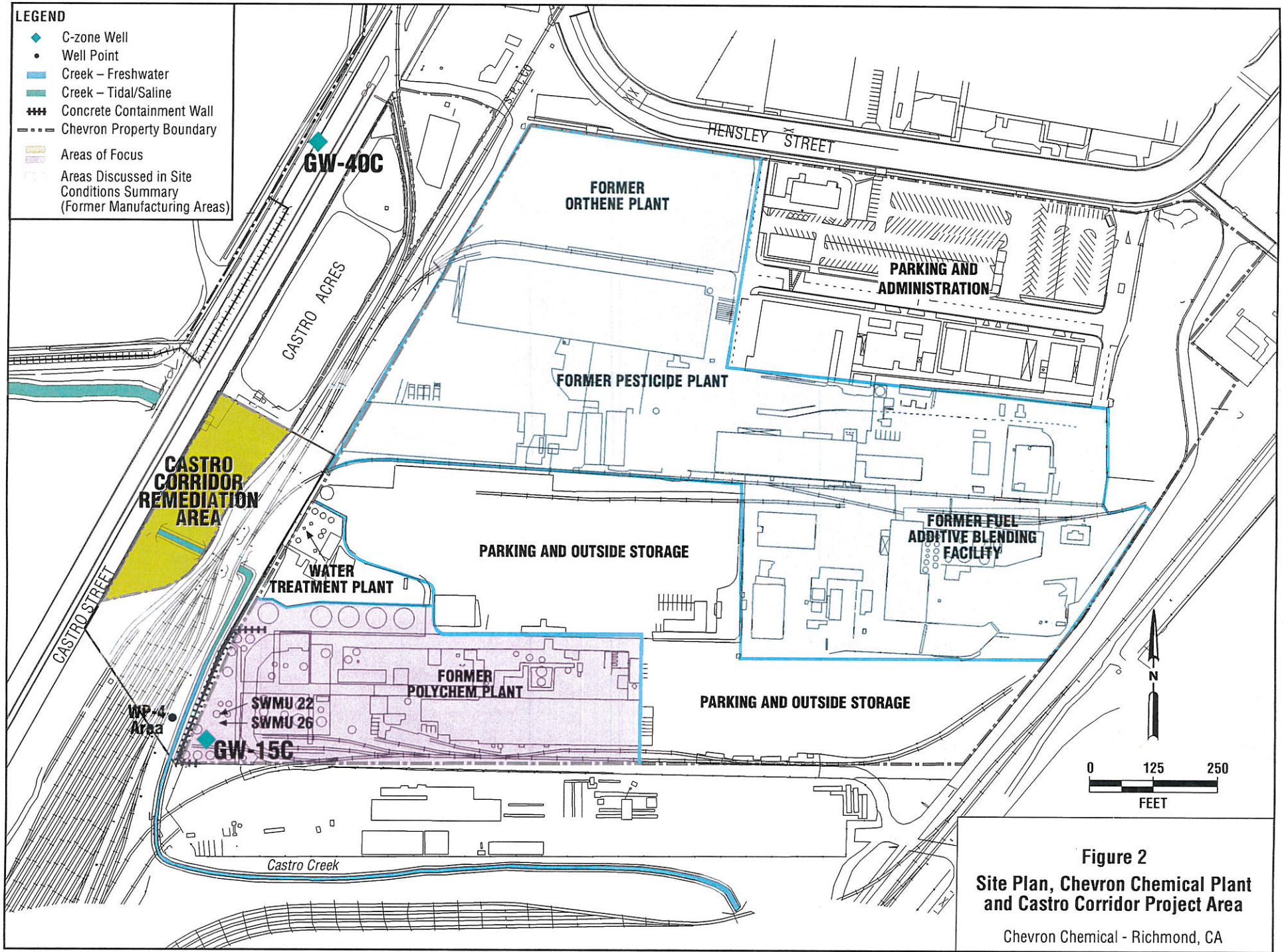


Figure 2
Site Plan, Chevron Chemical Plant and Castro Corridor Project Area
Chevron Chemical - Richmond, CA

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