

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

TENTATIVE ORDER No. R2-2021-00XX

**REVISION OF SITE CLEANUP REQUIREMENTS and RESCISSION OF ORDER
NO. R2-2012-0019 for:**

**RAYTHEON TECHNOLOGIES CORPORATION (FORMERLY UNITED
TECHNOLOGIES CORPORATION)**

For the property located at:

**600 METCALF ROAD
SANTA CLARA COUNTY**

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

1. **Named Discharger:** United Technologies Corporation (UTC) acquired Raytheon Company and changed its name from UTC to Raytheon Technologies effective April 3, 2020. Raytheon Technologies, hereinafter also referred to as the Discharger, is named as the sole discharger because it has knowledge of the discharges or the activities that caused the discharges and has the legal ability to prevent future discharges. The name UTC refers to the Discharger prior to April 3, 2020, but current and future requirements will reference Raytheon Technologies.
2. **Site Location:** Raytheon Technologies' San Jose facility currently occupies 1,768 acres in an unincorporated area of Santa Clara County, approximately five miles south of San Jose and four miles east of U.S. Highway 101, as shown in Figure 1. The site is situated in the foothills with elevations ranging from 680 to 1,400 feet above mean sea level. Three seasonal creeks flow through the site, and a fourth passes around the eastern and southeastern perimeter of the site. The four creeks converge offsite and become Las Animas Creek offsite, which discharges into Anderson Reservoir, Santa Clara County's largest drinking water reservoir.
3. **Site History:** UTC operated the site from 1959 until 2004 to develop, manufacture, and test space and missile propulsion systems. All manufacturing operations had ceased by December 2004. The developed portion of the site previously housed laboratories, research, testing, manufacturing, storage, and maintenance facilities associated with the production of solid rocket propellants. These propellants consisted primarily of ammonium perchlorate and aluminum suspended in a rubber matrix. Other materials used at the site included epoxies, paints, insulating materials, chlorofluorocarbons, and degreasing agents (primarily chlorinated and non-chlorinated solvents). Operations at the site resulted in extensive chemical contamination of soil and groundwater across portions of the site.
4. **Purpose of the Order:** The Site Cleanup Requirements (SCR) are being revised for the following reasons:

- a. To acknowledge that the discharger has completed all tasks stipulated in Order No. R2-2012-0019 (Order) (as summarized in Finding 14);
 - b. To reflect the ownership change that occurred in April 2020 and name Raytheon Technologies as the Discharger responsible for ongoing regulatory activities;
 - c. To recognize the current size of the property retained by Raytheon Technologies after two large property transfers in 2015 and 2020;
 - d. To optimize the Self-Monitoring Program (SMP) to reflect multiple revisions to the program since 2012.
5. **Former Operational Areas:** The site has been divided into the following eight geographic areas, each of which has been impacted to some extent by chemicals released to the environment:
- a. Upper Shingle Valley (USV)
 - b. Middle Shingle Valley (MSV)
 - c. Lower Shingle Valley (LSV)
 - d. Motor Test Area (MTA)
 - e. Research and Advanced Technology Area (R&AT)
 - f. Motor Assembly Area and Component Test Area (MAA/CTA)
 - g. Mixer Valley
 - h. Open Burning Facility (OBF)

These areas are identified on Figure 2. More information on environmental investigations and remedial actions in these areas is provided below.

6. **Adjacent properties:** Land surrounding the site is used primarily for grazing. Ranch lands are located to the north, east, and southeast of the site. The nearest residences are located approximately 3,000 feet to the north, northeast, and southeast of the site's boundaries. The Seebach property, located immediately to the north of the OBF, has undergone years of environmental characterization and cleanup, as discussed further in Finding #18e. Two regional parks and public open space are located to the west and northwest. The amount of open space increased after UTC transferred ownership of 1,831 acres of the site to the Santa Clara County Open Space Authority in 2015, and another 1,521 acres of the western portion of the site to the Santa Clara Valley Habitat Agency in 2020.
7. **Regulatory History:** The site has been regulated by the Water Board, as the lead agency for site-wide corrective actions, since 1965. The Department of Toxic Substances Control (DTSC) has also regulated the OBF portion of the site since 1986 under its Resource Conservations and Recovery Act (RCRA), as explained in Finding 7.

In the 1990s, the site was divided for regulatory purposes into two operable units based on the status of correction actions. At the time, the fully characterized portion of the site was designated Operable Unit 1 (Mixer Valley and most of Shingle Valley), the remainder of the site was designated Operable Unit 2. Previous orders issued for the site include:

- a. The SCR Order for Operable Unit 1, Order No. 94-064, was adopted May 18, 1994 and amended several times thereafter in May 1995, September 1995, and May 1997.

- b. The SCR for Operable Unit 2, Order No. 95-193, was adopted September 14, 1995 and was later replaced by Order 98-070, which was adopted in July 1998.
- c. Waste Discharge Requirements (WDR) Order No. 95-190 was adopted on September 13, 1995 to regulate the discharge of treated water from the site's sanitary wastewater treatment plant (WWTP). The WWTP was decommissioned in 2009, and final closure approved in 2010. On April 14, 2010, the Water Board adopted Order No. R2-20100063 which rescinded WDR Order No. 95-190.
- d. SCR Order No. R2-2004-0032, adopted May 19, 2004, rescinded all previous orders, and regulated cleanup of soil and groundwater for the entire site.
- e. SCR Order No. R2-2012-0019 was adopted March 3, 2012 and amended in 2015 (R22015-0025) and 2019 (R2-2019-0013) to reflect the property transfers to open space designation.

In 1991, the Water Board issued Water Reclamation Requirements Order (No. 91-006), which permitted UTC to reuse treated groundwater for onsite irrigation and dust control. Order No. R2-2004-0032 rescinded Order No. 91-006; however, Order No. R2-2012-0019 permitted the continued use of treated groundwater, as does this Order, subject to requirements specified in Section D below.

This Order rescinds Order No. R2-2012-0019 and its amendments, except for enforcement purposes, and will regulate the entire site, and satisfy the requirements of RCRA corrective action as the lead agency.

8. **RCRA Regulation:** Some portions of the site are regulated by DTSC under RCRA Corrective Actions, which have been coordinated with work completed under the Water Board's SCR Orders. In 1991, DTSC certified closure of three RCRA Class I surface impoundments (stations 0250, 0635, and 0706; Figure 3). The three impoundments were not clean-closed due to the presence of impacted groundwater below them. Although the groundwater impacts were likely due to releases from other nearby or upgradient operations, the closed impoundments are regulated and monitored under a RCRA Post-Closure Permit. The Permit was issued in 2006, with several updates prior to issuance of the current Permit, effective August 2, 2018 and modified on May 28, 2019.

Two additional RCRA units are regulated by DTSC: the former OBF and the former hydrolysis treatment facility (HTF). The OBF is located in the eastern Panhandle portion of the site (Figure 2) and was a RCRA-regulated thermal treatment facility used for open-air burning of waste propellants and explosives. Thermal treatment at the OBF was discontinued in 1996, and closure certification addressing impacts to soil and groundwater was submitted to DTSC in 2000. A Post-Closure Permit application was submitted to DTSC in 2004 and 2005, and

DTSC approved a revised Closure Plan in 2011 that allowed some hazardous waste to be left in place. Since the issuance of the Water Board's 2012 SCR, implementation of remedial activities described in the approved Closure Plan, and DTSC's 2018 Post-Closure Permit, the OBF is now considered to be closed, as explained in more detail in Finding#18c. In May 2015, DTSC acknowledged the former HTF as closed. The former HTF was also added to the 2018 Post-Closure Permit due to residual contamination in the area.

9. **Surface Hydrology:** Three seasonal creek systems (Shingle Creek, Mixer Creek, and Las Animas Creek) are present within the site's boundaries, as shown on Figure 4. Shingle Creek and Mixer Creek flow in a southeasterly direction through Shingle Valley and Mixer Valley, respectively. Las Animas Creek flows southward through the site, passing between the OBF and the main portion of the site. A fourth creek, San Felipe Creek, traverses the eastern side of the site before flowing into Las Animas Creek southeast of the site's boundary. Shingle Creek, Mixer Creek, and San Felipe Creek flow into Las Animas Creek, and this combined flow empties into Anderson Reservoir.

The discharge of contaminated groundwater into the creeks flowing through the site has been documented through numerous hydrologic investigations. Thus, the creeks provide a pathway for the potential transport of volatile organic compounds (VOCs) and perchlorate to Anderson Reservoir, which is a source of drinking water for Santa Clara County residents. Although VOCs and perchlorate have not been detected in the reservoir, they have been detected in surface waters on the site, most often during the wetter winter months. Previous studies have shown that these detections resulted primarily from the transport of contaminants from surface soils via stormwater runoff, as well as from the discharge of groundwater in gaining sections of the creeks.

10. **Surface Water Monitoring:** Creeks are currently sampled monthly at 36 specified sampling stations inside and outside the site's boundaries. Figure 4 shows the surface water monitoring locations.

Low concentrations of perchlorate have been detected occasionally in Las Animas Creek between the site boundary and Anderson Reservoir. Since enhanced surface water monitoring was initiated in 2005, 12 of the monthly manual creek samples collected from offsite monitoring station C-29a on Las Animas Creek have shown perchlorate detections. In the period from March 2012 through April 2020, perchlorate was detected in seven monthly grab samples collected at C-29a. Sample results collected from both manual and automated samplers detected perchlorate concentrations between 3.1 and 5.9 µg/L, with the exception of two results (15.5 µg/L and 14.4 µg/L, in December 2014 and January 2016, respectively); thus most detections were below the perchlorate maximum contaminant level (MCL) (6 µg/L). Also, neither VOCs nor perchlorate have been detected to date in the reservoir.

Valley Water previously sampled Anderson Reservoir monthly for perchlorate and quarterly for VOCs. Anderson Reservoir was drained to begin seismic retrofitting beginning on October 1, 2020. By December 2020, the Reservoir reached 3% of total storage capacity after approximately 14,900 acre-feet of water were released, and sampling for perchlorate and VOCs ceased. Once the seismic retrofit is complete, and the reservoir is refilled, the previous sampling plan will be reinstated.

An expanded surface monitoring program was implemented at the site beginning in late 2019 including 15 additional monitoring locations and expanded sample collection. Due to limited rainfall events, very limited data are available from the new sampling program. The results of the expanded sampling program will be used to gain a better understanding of where perchlorate is entering surface water and to evaluate possible remedial measures to eliminate perchlorate in concentrations that exceed the cleanup goal in onsite surface water. Raytheon Technologies will continue to add or remove surface water sample locations as data are available to optimize surface water evaluations at the site. Any recommended change to the surface water monitoring program will be outlined in the annual Environmental Monitoring Program Reports for Water Board consideration and approval.

Further assessment of surface water data was conducted in 2020 based on the expanded sampling network installed in 2019. There were formerly three ISCO automated surface water samplers across the site: C-02A located on Shingle Creek in LSV, C-04B located on Las Animas Creek immediately downstream of the OBF drainage, and C-29A located offsite on Las Animas Creek at the confluence with Shingle Creek (approximately 600 feet from the property boundary). The 2020 assessment concluded that the ISCO sampling data were variable and didn't provide conclusive evidence regarding the effectiveness of surface water remedial actions. The assessment also suggested that the data from the expanded monitoring network would provide a better indication of areas where perchlorate may be discharging from surface water to groundwater, transport of perchlorate in surface water, and the effectiveness of surface water remedial measures. In October 2020, Raytheon Technologies submitted a request for cessation of the Enhanced Monitoring Program (ISCO sampling) conducted under Task 1b of Order No. R2-2012-0019. Water Board issued an email concurrence on November 2, 2020.

11. **Site Hydrogeology:**

Hydrogeologic Units: The previously developed portions of the site are located either in stream valleys filled with geologically young, unconsolidated alluvium, or on hilly areas underlain by exposed or thinly buried bedrock. Bedrock at the site generally consists of variably consolidated, non-marine sediments of the Santa Clara Formation, which is of Plio-Pleistocene age. The Santa Clara Formation is a heterogeneous assemblage of discontinuous, fluvial deposits ranging from clays to sandy gravels, and dips to the northeast. The alluvium that fills the stream valleys consists of lenses and layers of clay, silt, sand, and gravel. The Santa Clara Formation underlies alluvium in the stream valleys. Isolated lenses of groundwater have been identified in the Santa Clara Formation between 25 and 70 feet below ground surface (bgs).

Hydrogeology of the Valleys: In Shingle and Mixer valleys (Figure 2), groundwater occurs primarily in unconsolidated alluvium, which attains a maximum thickness of approximately 50 feet. In Shingle Valley, the water table typically occurs between 15 to 40 feet bgs. In Mixer Valley, groundwater is encountered in the alluvium at shallower depths, typically between 4 and 20 feet bgs. Groundwater in the alluvium appears to be unconfined in some portions of the valleys and semiconfined in others.

Hydrogeology of the Hills: The other previously developed areas of the site are located in hilly areas underlain primarily by Santa Clara Formation bedrock. These areas include the

MAA/CTA, R&AT area, MTA, and the OBF (Figure 2). Isolated occurrences of groundwater in the MAA/CTA are generally encountered in the Santa Clara Formation at depths between 25 and 70 feet bgs. Isolated groundwater at the R&AT and MTA is encountered at various depths ranging from approximately 14 to 42 feet bgs in alluvium and the Santa Clara Formation.

The OBF is located on a north-sloping ridge of exposed Santa Clara Formation. Surface drainage is toward both the northwest and east. A thin layer of colluvium varying from 1 to 5 feet thick overlies the Santa Clara Formation in the area. Groundwater flow at the OBF is variable because of the lateral discontinuity of Santa Clara Formation deposits and because of surface topography associated with the nearby Calaveras Fault.

12. **Groundwater Contamination and Monitoring:** Groundwater in portions of the site has been impacted by chemicals (primarily VOCs and perchlorate) released from historical site operations. Groundwater beneath Shingle Valley, Mixer Valley, and the OBF contain the highest concentrations of chemicals, although groundwater has been impacted in other portions of the site as well. The highest concentrations of perchlorate occur in the Oxidizer Road area of Mixer Valley and at the OBF. Impacts from VOCs are also significant in these areas. Groundwater contamination in Shingle Valley consists primarily of VOCs with lower concentrations of perchlorate. Raytheon Technologies has been performing remediation of groundwater through extraction and treatment since 1988. As a result of remediation, groundwater plumes have remained stable and the maximum chemical concentrations have decreased. However, a significant mass of perchlorate and VOCs remains in site groundwater.

Groundwater on the site, and beneath drainage pathways adjacent to the site, has been monitored since 1983. Since that time, groundwater monitoring has been expanded and reduced as needed. At the present time, Raytheon Technologies monitors groundwater at 186 onsite monitoring locations and at five offsite monitoring locations (Figure 5).

13. **Remedial Investigations:** UTC began conducting remedial investigations at the site in the 1980s. Until the late 1990s, most investigations were focused on remediation of VOCs, metals, and polychlorinated biphenyls (PCBs). Since 1998, the primary focus at the site has been on characterization and remediation of perchlorate impacts. Site investigations have defined the general extent of VOC and perchlorate impacts, which generally overlap in groundwater plumes. The highest concentrations of VOCs occur in the OBF and Shingle Valley, and the highest concentrations of perchlorate in soil and groundwater occur in the Oxidizer Road area, but concentrations are also significant in Mixer Valley and the OBF.

From 2004 to 2014, additional investigations further characterized soil, soil gas, and groundwater on and offsite. Finding #18 explains these investigations in greater detail.

14. **Work Performed in Compliance with Previous Order:** The Discharger has completed the following tasks, as required in Order No. R2-2012-0019, by submitting the reports listed and approved by Water Board staff below:

- a. **Task 1a. 2011 Site Characterization Report**

UTC Submitted a *Characterization Report Addendum* on July 27, 2012. Water Board staff issued concurrence on October 16, 2012.

- b. **Task 1b. 2011 Soil Excavation Completion Report**
UTC submitted a *Sitewide Soil Excavation Completion Report Addendum* on July 27, 2012. Water Board staff issued a concurrence letter on October 16, 2012.
- c. **Task 1c. Evaluation of CVOC Extraction in Upper Shingle Valley**
UTC submitted an *Evaluation of CVOC Extraction in USV* on September 27, 2012. Water Board staff issued a partial concurrence on October 16, 2012.
- d. **Task 1d. Workplan for Station 0470 Soil Excavation**
UTC submitted the *Remedial Action Work Plan for Station 0470* in July 2012. Water Board staff issued a concurrence letter on August 15, 2012.
- e. **Task 1e. Completion Report for Station 0470 Soil Excavation**
UTC submitted the *Station 0470 Remedial Action Completion Report* on November 30, 2012. Water Board staff issued a concurrence letter on December 6, 2012.
- f. **Task 1f. Workplan for Installation of Bioremediation Trenches or Treatment Zones**
UTC submitted the In-Situ Bioremediation Trenches Work Plan on May 13, 2013. The proposed trench locations included one in Lower Mixer Valley (LMV) and one in MSV. Water Board staff issued a concurrence letter on June 17, 2013.
- g. **Task 1g. Completion Reports for Bioremediation Trenches or Treatment Zones**
UTC submitted an *In-Situ Bioremediation Trenches, Lower Mixer Valley and Middle Shingle Valley Completion Report* on February 27, 2014. Water Board staff issued a concurrence letter on March 11, 2014.
- h. **Task 1h. Operation and Maintenance of Centralized Groundwater Treatment System (CGTS)**
This is an ongoing task with no completion date, and will be carried over as an ongoing Task in this revised SCR. See Task 1 of this Order.
- i. **Final Risk Assessment**
UTC submitted the *Final Risk Assessment* on December 14, 2012. Water Board staff issued concurrence on July 13, 2013. The report describes the risk for both human and ecological receptors. See Finding 14 for more detail.
- j. **Risk Management Plan**
UTC submitted the *Final Risk Management Plan* on February 6, 2014, Water Board staff issued a concurrence letter on February 13, 2014. See Finding 15 for more detail.

15. **Risk Assessment:** The Sitewide Human Health and Ecological Risk Assessment (HHERA) was completed for the eight operational areas within the facility in December 2012. A total of 129 exposure areas were identified and evaluated for both human health and ecological receptors. Additionally, 67 larger exposure areas were identified for ecological risk. Impacted media at the site were soil, sediment, groundwater, surface water, and soil gas.

Human Health Risk Assessment (HHRA) for Soil: There were no unacceptable risks identified in soil at the R&AT, LSV, MTA, or MAA/CTA. The screening evaluation and risk calculation found that the target excess lifetime cancer risk of 1×10^{-6} , and the target hazard index of 1 were met for potential residents, commercial/industrial site workers, and construction workers who might be exposed to remaining chemicals of concern (COC) in all site areas except:

- MSV: Station 1210 for residential receptors,
- Mixer Valley: Station 0680 for residential receptors, and
- USV: Stations 0020 and 0211 for residential receptors

HHRA for Soil Gas: UTC identified the need for a deed restriction requiring engineering controls to limit vapor intrusion into any future enclosed building. These areas include portions of the site overlying the known groundwater VOC plume, such as Stations 1210, 0680, 1970, 0301, and 0501 where soil gas data have indicated potential risk from inhalation of VOCs in indoor air.

HHRA for Groundwater: Potential risk from groundwater exposure was identified for residential and construction worker receptors via inhalation of VOCs from groundwater in some areas of LSV, MAA/CTA, MSV, Mixer Valley, USV and the OBF. Active groundwater treatment is ongoing at the facility (see Finding #19) and is expected to reduce concentrations of COCs in groundwater to protective levels in time.

Ecological Risk Assessment (ERA): For ecological receptors, the COCs in all operational areas were perchlorate, VOCs, and metals. Although metals were found mostly found at background concentrations, the risk to receptors exceeded the hazard quotient of 1 in many areas. VOCs were generally detected at low concentrations where biota would be impacted, and the overall risk to receptors was determined to be minimal. Perchlorate was widely detected across the facility, although the majority of detections were below the risk-based concentration of 1.9 milligrams per kilogram (mg/kg) in soil, except for the areas summarized below.

ERA for Soil: No unacceptable risks were identified in seven of the eight operational areas (R&AT, LSV, MTA, MAA/CTA, MSV, USV, and the OBF). The only potentially unacceptable risks were identified in soils in the following areas in Mixer Valley:

- Area 0521 (containing stations 0502, 0521, and 0706), and
- Area 0532 (containing Station 0635).

At each of these areas, the risks were for herbivorous mammals exposed to perchlorate in subsurface soil. Elevated concentrations of perchlorate were detected in some subsurface soil samples, generally between 3.5 to 6 feet bgs and below clean fill placed following excavation of surface soil for protection of surface water or receptors. Ecological receptors are mostly exposed only to surface soil, and therefore exposure to deeper perchlorate-impacted soil is expected to be minimal.

ERA for Soil Gas, Surface Water, and Sediment: Potential risks to burrowing mammals from VOCs in burrow air were identified in some areas of Mixer Valley (stations 0635, 0680, and 0705) and USV (stations 0021, 0211, and 1950). However, this localized exposure is not expected to adversely affect populations of burrowing mammals, which are abundant at the site.

Exposure to surface water and sediment is not expected to pose an unacceptable risk to ecological receptors or wildlife, except possibly in Mixer Valley from perchlorate. In USV, surface water concentrations of some VOCs exceed cleanup goals but as a result of ongoing

active remediation at the site, it is expected that constituent concentrations in surface water will continue to decrease over time. There is suitable habitat for special-status species onsite. The California Tiger Salamander (CTS) and California Red-Legged Frog (CRLF) populations on the site are robust, according to a three-year population study conducted from 2007-2010, and there have been no indications that CTS or CRLF are adversely affected by on-site exposure to perchlorate or other COCs in the surface and subsurface soil or in surface water. However, UTC was required to monitor these species periodically for the five-year period from 2006-2010 to ensure the health of these species was maintained.

16. **Risk Management Plan (RMP):** The RMP summarized actions completed up to 2014 to remediate COCs in soil and groundwater, detailed the institutional controls and other mitigation measures planned to protect human health and the environment, and provided a strategy for effectively managing residual risks after the final remedies were implemented. In addition, the RMP discussed the various potential risks associated with the site and the risk management/mitigation measures that have been implemented up to 2014, and recommended additional measures that may be needed. Each of the former operational areas onsite has various restrictions and conditions that must be observed under current and future scenarios. There is no redevelopment currently planned for the site; however, Raytheon Technologies and/or prospective developers must comply with the terms in this Order when implementing any future redevelopment activities.

The following risk management measures were recommended:

- *Elevated concentrations of VOCs in soil gas in areas overlying groundwater VOC plumes* – UTC planned to file a deed restriction required engineering controls to limit vapor intrusion into any future enclosed buildings in areas that overlie the current groundwater VOC plumes and in areas with elevated VOC concentrations in soil gas.
- *Potential unacceptable risk to future residential receptors from direct contact with soil* - At certain locations within MSV, Mixer Valley, and USV, UTC also planned to file deed restrictions to limit land use to prevent future residential redevelopment and other sensitive uses.
- *Elevated concentrations of perchlorate in groundwater* - Currently, a deed restriction prohibits the use of onsite groundwater as a source for drinking water or other domestic purposes. In addition, potential risk to future human receptors coming into contact with groundwater can be reduced to insignificant levels by use of appropriate personal protective equipment and safe work practices.
- *Areas where surface soil was excavated to protect surface water* – To protect the quality of surface water (ponds, creeks) onsite and offsite, perchlorate-impacted surface soil (0 to 2 feet below ground surface) was excavated at the site to meet a soil cleanup goal of 138 ug/kg perchlorate. The areas that were excavated and replaced with clean

backfill need to remain in place. If future redevelopment is planned, these areas will need to be reevaluated.

17. **Institutional Controls:** UTC has implemented institutional controls that are expected to limit onsite exposure potential. Institutional controls include two deed restrictions, measures to maintain site security, and requirements for worker notification of potential health and safety concerns due to the potential presence of hazardous chemicals in the environment. Portions of the site covered under deed restrictions are shown in Figure 3. The first deed restriction, which was approved by the RWQCB's Executive Officer and recorded with Santa Clara County in 2002, prohibits the use of groundwater for drinking water at the site, among other restrictions. For areas overlying the groundwater VOC plume and other areas where soil vapor data exceed screening levels for inhalation of indoor air due to vapor intrusion concerns from subsurface, UTC filed a second deed restriction on January 23, 2015, requiring vapor mitigation for future enclosed buildings for as long as soil vapor data exceed screening levels for inhalation of indoor air (shown on Figure 3), as recommended in the RMP. This deed restriction also included areas where soil remediation to residential standards is infeasible or impractical, limiting their future uses to commercial/industrial operations. In March 2015, UTC filed an additional deed restriction for a limited portion of the 18-acre OBF referred as the "Capped Property," consisting of a 3.5-acre northern area and 0.77-acre southern area where a vegetative cap was added as part of RCRA closure activities. Activities that may disturb the engineered covered system or groundwater monitoring and extraction system and any use other than maintenance and inspection of the cover system is prohibited.

18. **Recently Implemented Remedial Measures:** Since SCR Order No. R2-2012-0019 was issued, UTC has implemented the following remedial measures, as required by specific tasks in the Order:
 - a. **Former Station 0470:** In August-September 2012, three areas around Station 0470 were excavated to a maximum depth of 26 feet bgs to remove contaminated soil with perchlorate concentrations that exceeded an average of 988 micrograms per kilogram ($\mu\text{g}/\text{kg}$). Approximately 4,000 cubic yards of soil were excavated and transported to an appropriate off-site facility, resulting in the removal of an estimated 95% of the perchlorate-contaminated mass from these areas. The excavation pits were backfilled with a five-foot basal layer of carbon amendment material followed by approximately 20 feet of clean on-site soil generated from benching the excavations and clean imported soil to bring the fill to ground surface.

 - b. **In-Situ Bioremediation (ISBIO) Trenches and Supplemental Injections:** In July-September 2013, ISBIO trenches were constructed in MSV and LMV to address impacted groundwater discharges to surface water in these two areas. Backfill material for the trenches included a carbon amendment placed in the lower portion of the trenches and native soil from the top of the carbon amendment to ground surface. To facilitate future additions of carbon substrate to the trenches, vertical injection wells were installed within the trenches. Three new performance

monitoring wells downgradient of the MSV ISBIO trench, and one new well in the LMV area were installed to monitor the effectiveness of the trenches.

An ISBIO trench was previously constructed in Upper Mixer Valley (UMV) in 2009 by constructing two sections; one located east of Mixer Creek (120 feet long) and one located west of Mixer Creek (220 feet long).

Based on the review of semi-annual ISBIO trench monitoring data, supplemental carbon addition into one or more of the trenches was performed in 2016 and 2019 in an effort to promote continued treatment of perchlorate in groundwater:

- In 2016, approximately 57,600 gallons of water (treated effluent from the CGTS) and 880 gallons of an emulsified vegetable oil were injected into the MSV and LMV injection wells.
- In 2019, approximately 86,500 gallons of water (treated effluent from the CGTS) and 1,100 gallons of emulsified vegetable oil were injected into the MSV, UMV, and LMV ISBIO injection wells.

- c. **OBF Cover System and Maintenance:** Between 2010-2013, remedial measures were implemented to address chemically impacted surface and subsurface soils and obtain closure of the former OBF. This included mass removal of primarily perchlorate impacted soil by excavation and offsite disposal; thermal treatment of VOC-impacted surface and subsurface soils to 15 feet bgs using electrical resistance heating; installation of an engineered cover system throughout the OBF; installation of additional groundwater extraction wells and continued treatment of extracted groundwater.

During May-September 2012, a 24-inch thick engineered cover system was installed over all of the open burn units. The cover system included an engineered subgrade, a 12-inch layer of clean soil, a steel mesh burrow barrier, followed by another 12-inch layer of clean soil. The engineered cover system and site drainage pattern improvements were completed to attain the surface soil closure performance standard of reducing human, ecological, and stormwater contact to impacted soils (Arcadis, 2013). A closure report for OBF was submitted to DTSC on March 4, 2013. DTSC approved the closure report on March 12, 2015, and the OBF will be maintained under a post-closure permit. Activities that may disturb the engineered covered system or groundwater monitoring and extraction system and any use other than maintenance and inspection of the cover system is prohibited by a deed restriction.

Routine inspections, maintenance, and repairs of the OBF cover system are completed each spring and fall. Beginning in 2015, a surface amendment (potting soil) was placed over sparsely vegetated areas, seeded with approved seed mix, and covered with jute matting, and irrigation water applied to promote growth. Repair activities to address gopher burrowing began in 2017 when evidence of burrowing was first observed. By 2018, evidence of burrowing activity (soil mounding) by pocket gophers appeared to be significantly reduced. Four raptor perches were

installed around the perimeter of the cover system to increase predation in the cover system area.

- d. **Installation of Station 0706 Extraction Well:** Former Station 0706 included the following remedial measures to address high perchlorate concentrations in Mixer Valley: check dams, a retention dam with overflow grate, and sump pump within the Oxidizer Road swale at former Station 706. The retention dam served as a surface water flow barrier between the swale and Mixer Creek; and if sufficient water accumulated behind the dam, it was pumped to former treatment system GTS 2404. In 2004 and 2005, the former Station 0706 system was expanded and upgraded to include its own interim remedial treatment system. In accordance with RWQCB approval dated June 2015, the interim remedial system was removed based on the downward trend of surface water concentrations. However, to better capture perchlorate mass in the vicinity of former Station 706 before discharge to surface water, an additional extraction well (20C-64) was installed and connected to the CGTS. The former Station 0706 system was removed to facilitate the Middle Mixer Valley grading project (see “f” below).
- e. **Seebach Property Boundary Bioremediation and Well Destruction:** The objectives of this remedial measure were to reduce perchlorate concentrations in offsite groundwater beneath the adjacent Seebach property (Figure 2) and along the site boundary to below the cleanup goal of 6 µg/L, and to enhance hydraulic capture of impacted onsite groundwater to prevent future offsite migration. Three new extraction wells were constructed to maintain hydraulic control in the aquifer and prevent migration of perchlorate to the Seebach property. Nineteen new groundwater injection wells were also installed as part of project activities: 1) sixteen on the northern boundary of the property in the OBF, just south of the Seebach property fence line; and 2) three wells north of the Seebach property fence line.

A 5% “eco molasses” substrate was used to increase the biological activity within the soil and groundwater. Approximately 116,000 gallons of the eco molasses substrate were injected into the wells between December 7, 2015 and January 12, 2016. Post-injection monitoring continued monthly thereafter until monitoring was completed on January 19, 2017. The observed reduction in perchlorate concentrations indicated that the bioremediation had been successful in reducing perchlorate concentrations to non-detect levels in monitoring wells along the Seebach property line and on the Seebach property.

Based on the effective removal of perchlorate in these areas, Water Board staff agreed that no further in-situ bioremediation was necessary. UTC requested and received approval from Water Board staff (in 2018) to destroy the offsite monitoring and injection wells located on the Seebach property; the well destruction activities were completed in November 2019. The remaining extraction wells located along the property boundary will maintain hydraulic control in the aquifer and prevent perchlorate from migrating to the Seebach property.

- f. **Middle Mixer Valley (MMV) Oxidizer Swale Drainage Restoration:** The MMV-Oxidizer Road Drainage Cleanup and Restoration Completion Project was completed between August and November 2018. The project included construction activities related to the restoration of the Oxidizer Swale located within Middle Mixer Valley and approximately 6.04 acres in the Middle Mixer Valley area. The objectives of the project were to reduce or retard perchlorate-contaminated groundwater from discharging into the Oxidizer Swale; to sustainably improve the overall geomorphic and ecological condition of the Oxidizer Swale where it was previously channelized and check-dammed; to attenuate flood flows from the Oxidizer Swale; and to mitigate ongoing incision in Mixer Creek and further downstream in the Las Animas watershed, which drains to Anderson Reservoir. Restoration activities included the removal of engineered channel and culverts, importing clean fill and grading the drainage area to increase the elevation of streambed, and hydroseeding with native grasses and installation of container plants in the drainage area. Post-construction monitoring and maintenance will be conducted for a period of 10 years in accordance with the Middle Mixer Valley-Oxidizer Road Drainage and Restoration Monitoring and Maintenance Plan prepared by H.T. Harvey and Associates (EnSafe 2019).

19. Centralized Groundwater Treatment System (CGTS): The CGTS comprises a pretreatment system and a main treatment system. The design intent of the pretreatment system is to treat groundwater extracted from areas of the site with historically higher concentrations of perchlorate with a higher capacity cation exchange resin, relative to the more perchlorate ion-specific resin used in the main treatment train. Groundwater is conveyed from these wellfields directly into a 4,500-gallon equalization tank dedicated to the pretreatment system. Groundwater extraction and treatment by the CGTS occurs in Shingle Valley, Mixer Valley, and the Panhandle. Since system startup during first quarter 2011 through the end of 2019, the CGTS has treated 294.03 million gallons of water, resulting in the removal of approximately 1,814.84 lbs of VOCs, perchlorate, and 1,4-dioxane. Of this total, 1,548.49 lbs were perchlorate (85.3 percent), 256.27 lbs were VOCs (14.1 percent), and 10.08 lbs were 1,4-dioxane (0.56 percent).

The CGTS effluent management system consists of a conveyance pipeline, treated groundwater storage Pond 2130, and an associated irrigation system. Water is transferred from the CGTS to treated groundwater storage Pond 2130 and is in turn pumped to one of several spray fields. The spray fields are fitted with an irrigation timer and a valve manifold for selecting zones. The spray fields are irrigated year-round at rates that vary with weather to prevent water runoff or ponding. Samples are collected monthly from Pond 2130 for perchlorate analysis and semiannually for 1,4-dioxane analysis.

20. Basin Plan: The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the 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 and amended by the Water Board and approved by the State Water Resources Control Board, U.S. EPA, and the Office of Administrative Law where required.

The Basin Plan considers all groundwater within the Region to be suitable, or potentially suitable, for municipal or domestic water supply (MUN) and that, in making any exceptions, the Water Board will consider the criteria referenced in Water Board Resolution No. 88-63, "Sources of Drinking Water," where:

- (a) The total dissolved solids exceed 3,000 mg/l (5,000 μ S/cm, electrical conductivity), and it is not reasonably expected by the 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.

21. California Safe Drinking Water Act and Human Right to Water: 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 (Water Code §106.3, subd. (a)). The Safe Drinking Water Act provides that all Californians have a right to pure and safe drinking water (Health & Safety Code §116270, subd. (a)). This order promotes that policy by requiring Raytheon Technologies to handle and dispose of contaminated media in a manner that will protect water quality objectives, including those that protect drinking water supplies.

22. Basis for Cleanup Standards:

- a. **Antidegradation Policy:** This Order is consistent with the Antidegradation Policy outlined in State Water Board Resolution No. 68-16, which requires the disposal of wastes into the waters of the State to be regulated "to achieve [the] highest water quality consistent with [the] maximum benefit to the people of the State." The Antidegradation Policy prohibits waters that were high quality as of 1968 from being degraded unless such degradation is consistent with the maximum benefit of the people of the state, will not unreasonably affect beneficial uses, and will not result in water quality that does not meet water quality objectives. It is not known whether the groundwaters underlying the site were high quality as of 1968 because the industrial activities that contaminated the groundwater had been underway for almost a decade by then. However, assuming that these groundwaters were high quality as of 1968, the discharges of treated groundwater authorized by this Order are consistent with the Antidegradation Policy. The treated groundwater contains lower concentrations of

contaminants than the groundwater below the ground surface, meaning that the discharges will not lead to additional degradation if they percolate to groundwater. Furthermore, because treated groundwater is sprayed on land first, any infrequent residual concentrations of VOCs will likely volatilize before the treated water seeps back into the soil and groundwater. Finally, this Order continues the status quo with respect to the discharges authorized in the previous order and does not allow for a reduced level of treatment or less stringent effluent limitations. It holds Dischargers to the same performance or better.

- b. State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304," applies to this discharge. Resolution No. 92-49 requires dischargers to "clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible....

The Water Board concurs with the Discharger's conclusion in the *Supplemental Final Remedial Action Plan* (SFRAP) that background levels of water quality probably cannot be restored in a reasonable amount of time at this site; thus alternative cleanup standards are warranted and appropriate. The Maximum Contaminant Levels (MCLs) were chosen as appropriate cleanup standards to achieve safe levels of residual contamination for human health and the environment. This Order and its requirements are consistent with Resolution No. 92-49.

- c. **Beneficial Uses:** The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the 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 Water Board and approved by the State Water Board, Office of Administrative Law and U.S. EPA, where required. Water Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the San Francisco Bay Region, with limited exceptions for areas of high total dissolved solids (TDS), low yield, or naturally high contaminant levels. Groundwater underlying and adjacent to the site is a potential source of drinking water. The Basin Plan designates the following potential beneficial uses of groundwater underlying and adjacent to the site:
 - i. Municipal and domestic water supply
 - ii. Industrial process water supply
 - iii. Industrial service water supply
 - iv. Agricultural water supply, and
 - v. Freshwater replenishment to surface waters.

At present, there is no known use of groundwater underlying the site for the above purposes other than localized replenishment to the creeks that flow through the site. Anderson Reservoir is located downstream from the site. The existing and potential beneficial uses of Anderson Reservoir and the streams that flow into the reservoir include:

- i. Municipal water supply
 - ii. Groundwater recharge
 - iii. Non-contact water recreation
 - iv. Warm and cold freshwater habitat
 - v. Wildlife habitat
 - vi. Fish spawning, and
 - vii. Preservation of rare and endangered species.
- d. **Basis for Groundwater and Surface Water Cleanup Standards:** Groundwater and surface water cleanup goals for the site are summarized in Table 1. The groundwater cleanup goals are based on applicable water quality objectives and are the more stringent of U.S. EPA or California primary MCLs for each potential contaminant. For chemicals that do not have established MCLs, current California provisional action levels or public health goals are used, if such exist. Because groundwater discharges to creeks that flow through the site, and these creeks discharge into Anderson Reservoir that is used as a source of drinking water, the same cleanup goals are generally applied to surface waters at the site. To protect aquatic life, surface water cleanup goals for some chemicals are lower than drinking water goals. Cleanup to these levels will result in acceptable residual risk to humans and ecologic receptors.
- e. **Provisional Discharge Limits for VOCs in Surface Water:** In Upper Shingle Valley, groundwater containing VOCs discharges into Shingle Creek, causing certain VOC concentrations in the creek to sometimes exceed the surface water cleanup goals, which are set equal to drinking water standards (i.e., MCLs). However, human consumption of water from the creeks within the site is prohibited under institutional controls. VOCs are not detected in surface waters at concentrations that threaten aquatic organisms, and VOC concentrations decrease downstream from discharge areas due to various attenuation processes, including evaporation, dilution and photodegradation. The discharge of VOCs into creeks, and the resultant exceedance of surface water VOC standards is expected to persist until groundwater in the USV is adequately remediated.

In 2012, UTC evaluated its ability to expedite remediation by increasing the capture of contaminated groundwater or to reduce VOC concentrations prior to discharge; however, remedial options are limited because of the likelihood of dewatering streams during portions of the year and reducing the quality of riparian habitat. For this reason, this Order establishes provisional discharge limits for VOCs in surface water that will apply until groundwater standards for VOCs are achieved. These limits do not apply to groundwater, do not apply to non-volatile chemicals including perchlorate, and do not replace the long-term surface water

cleanup standards. The approved limits, which are set at concentrations that are protective of aquatic receptors, are provided in Table 1.

- 23. Future Changes to Cleanup Goals:** The goals of any ongoing or future remedial actions performed at this site are 1) to reduce risk to human health and to ecological receptors and 2) to restore the beneficial uses of groundwater and surface water within and adjacent to the site. If full restoration of beneficial uses is not technologically or economically achievable within a reasonable period of time, UTC may request modification to the cleanup goals with adequate justification for such request. Conversely, if new technical information indicates that cleanup goals can be surpassed, or if water quality standards are revised to a lower concentration, the Water Board may determine that further cleanup actions should be taken.
- 24. Treated Groundwater Reuse:** Regional Water Board Resolution No. R2-1988-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible. Consistent with State policy, treated effluent has been used extensively throughout the site. Groundwater that has been treated at the CGTS is discharged to Pond 2130 for storage prior to onsite reuse. Water from this pond is sampled monthly to provide control over the quality of reclaimed water that is used for beneficial purposes. This Order maintains the prohibition against the offsite use of reclaimed water (Prohibition A.3) but allows onsite reuse of reclaimed water to continue. Raytheon Technologies currently uses treated effluent from the CGTS for various purposes such as dust control, landscape irrigation, and pasture irrigation. In addition, treated effluent can also be transferred to Pond 2120.
- 25. Basis for 13304 Order:** CWC Section 13304 authorizes the 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.
- 26. CEQA:** The Santa Clara County Planning Department prepared and certified a Final Environmental Impact Report (FEIR) (State Clearinghouse Number 2006102114) on December 14, 2007, for UTC's San Jose Facility Site Closure Program. The FEIR concluded the Program, with mitigation, would not have any significant environmental impacts.
- 27. Notification:** The Water Board has notified the Discharger and all interested agencies and persons of its intent under CWC Section 13304 to prescribe Site Cleanup Requirements for the Discharger and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
- 28. Public Hearing:** The Water Board, at a public meeting, heard and considered all comments pertaining to this discharge.

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

A. PROHIBITIONS

1. The storage or treatment of wastes or materials in a manner that will degrade groundwater or surface water quality or adversely affect beneficial uses of the waters of the State is prohibited.
2. Activities associated with any subsurface investigation and cleanup efforts that could cause significant migration of wastes or hazardous substances are prohibited.
3. The use of treated effluent from the CGTS shall not be discharged or applied for any purpose outside the site's property boundaries.
4. Subsurface migration of residual pollutants from onsite source areas into previously unimpacted waters of the State is prohibited.
5. Upon completion of remedies pursuant to this Order, further discharge of contaminated groundwater into creeks and other surface waters will be prohibited. Specifically, no concentrations of contaminants exceeding the associated drinking water standard shall be allowed in surface waters or groundwater on the site. In addition, concentrations of contaminants above the MCL at offsite sample location C-29a will be prohibited. While the remedy continues to be implemented, occasional exceedances of target surface water cleanup goals that are not the result of a new release may occur, and shall not be subject to issuances of notices of violation by the Water Board.

B. REMEDIAL GOALS

1. **Groundwater Cleanup Goals:** The cleanup goals specified in Table 1 apply to groundwater onsite and outside the site's property boundaries in areas that have been impacted by migration from the site. Groundwater remediation is a lengthy process and full attainment of groundwater cleanup goals in contaminant source areas and within onsite plumes will not be achieved for many years. The Discharger must periodically evaluate the effectiveness of the final remedies and must demonstrate steady progress towards attainment of the cleanup goals, as specified in Task 6. Should the implemented remedies prove ineffective, alternative remedies shall be evaluated to determine if cleanup can be expedited through other technologies.
2. **Surface Water Cleanup Goals:** The cleanup goals specified in Table 1 apply to surface waters in drainages and streams onsite and outside the site's property boundaries in areas that could be impacted by migration from the

site. Surface water standards are the same as for groundwater, except for five chemicals (chlorobenzene, phenol, and 1,1,1-TCA) that have more stringent standards for surface water to protect aquatic fauna.

Table 1. Groundwater/Surface Water Cleanup Goals

Chemical	Groundwater/Surface Water Cleanup Goal (µg/L)^{a,b}	Provisional Surface Water Cleanup Goal^e (µg/L)
Benzene	1	N/A ^f
Chlorobenzene	70 (25 for surface water ^c)	N/A
Chloroform	80	N/A
Carbon tetrachloride	0.5	N/A
1,1-Dichloroethene	6	150
cis-1,2-Dichloroethene	6	1,000
1,1- Dichloroethane	5	130
1,2-Dichloroethane	0.5	N/A
1,4-Dioxane	1 ^d	N/A
Freon 11	150	N/A
Freon 113	1,200	N/A
Methylene chloride	5	N/A
Tetrachloroethene (PCE)	5	50
Perchlorate	6	N/A
Phenol	4,200 (1,300 for surface water ^c)	N/A
Total Petroleum Hydrocarbons as diesel (TPHd)	200	N/A
Trichloroethene	5	180
1,1,1- Trichloroethane	200 (62 for surface water ^c)	385
Toluene	150	N/A
Trans-1,2-dichloroethene	10	N/A
Vinyl Chloride	0.5	N/A

Notes for Table 1:

- a. $\mu\text{g/L}$ = micrograms per liter
- b. Groundwater cleanup goals are set at the primary MCL or drinking water standard for each chemical. For chemicals that do not have an established MCL, the following hierarchy is applied: the California provisional action level or Public Health Goal, the Division of Drinking Water Notification Level, and the Environmental Screening Level.
- c. For most chemicals, the surface water cleanup goals are the same as for groundwater. To protect aquatic life, surface water cleanup goals for chlorobenzene, phenol, and 1,1,1-TCA are set lower than drinking water goals.
- d. OEHHA issued a public notice for initiation of PHG development for 1,4-dioxane in March 2020. The cleanup goal for 1,4-dioxane will be revised to reflect the PHG once the value is published.
- e. Provisional Goals are values that will apply to onsite surface water until cleanup goals for groundwater are met. The surface water interim discharge limits (Table 2 of Order R2-2012-0019) were derived from toxicity test results reported in the scientific peer-reviewed literature and are intended to be protective of the California red-legged frog, a federally listed threatened amphibian species and California species of special concern, known to inhabit surface streams on the site. Numerous studies were reviewed for applicable test procedures, species, chemical exposure methods, test durations and data quality. From the qualifying toxicity studies the most conservative test result for each analyte was selected and uncertainty factors (or safety factors) were applied (i.e., the test concentration was divided by the uncertainty factor) to derive an estimated no adverse effect concentration suitable for chronic exposure of an amphibian.
- f. N/A= not applicable

C. TASKS

The Discharger shall complete the following tasks under the terms of this Order:

1. OPERATION AND MAINTENANCE OF CENTRALIZED GROUNDWATER TREATMENT SYSTEM

The Discharger shall operate the CGTS until groundwater cleanup goals are achieved or until the Executive Officer determines that operation is no longer required for attainment of the cleanup goals specified in Table 1. The Discharger shall maintain hydraulic capture of groundwater plumes through groundwater pumping and maintain proper operation of the CGTS and related wells, piping, and infrastructure. The Discharger shall routinely report the performance of the CGTS by providing the volume of groundwater treated and the mass of chemicals removed by the CGTS in each annual Environmental Monitoring Report (EMR), as described in Section 3.d. of the Self-Monitoring Program (Attachment 1).

2. FIVE-YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION

COMPLETION DATE: APRIL 30, 2025, and every five years thereafter

Submit a technical report acceptable to the Executive Officer that includes:

- a) a summary of the results of any soil or groundwater investigations performed during the prior five-year period;
- b) a tabular summary of analytical environmental data collected during the five-year period;

- c) a summary of the progress made towards achieving site cleanup goals during this time (i.e., an estimate of the mass of chemicals removed, reductions in groundwater and surface water contaminant concentrations, goals that have been achieved, etc.); and
- d) an evaluation of the effectiveness of the remedial measures that were implemented during the prior five-year period.

If the final cleanup goals established in this Order (Table 1) have not been achieved during the five-year reporting period, this report shall also contain:

- e) an evaluation and recommendations for alternative remedial measures that may be implemented to expedite the attainment of final cleanup goals; and
- f) an estimate of the time required to achieve the cleanup goals and a determination of whether attainment of cleanup goals is technically or economically feasible within a reasonable period of time.

3. GROUNDWATER EXTRACTION CURTAILMENT

3a. PROPOSAL TO CURTAIL GROUNDWATER EXTRACTION

COMPLETION DATE: 90 days prior to proposed extraction well pumping curtailment

Submit a technical report and implementation schedule acceptable to the Executive Officer containing a proposal for curtailing pumping from groundwater extraction wells and the criteria used to justify such curtailment. Curtailment of groundwater extraction may include, but is not limited to, final shutdown of the system, phased approach to shutdown, pulsed pumping, or a significant change in pumping rates. The report shall include the rationale for curtailment or modifying the system. This report shall also include data to show that cleanup goals for COCs have been achieved and have stabilized or are stabilizing and that the potential for contaminant levels rising above cleanup goals is minimal. This report shall also include an evaluation of the potential for contaminants to migrate into the creeks' surface or subsurface flow and downward to the Santa Clara Formation aquifers.

All significant system modifications to the extraction and treatment systems are subject to approval by the Executive Officer. This requirement may be waived by the Executive Officer if deemed appropriate. Significant system modifications do not include routine maintenance activities or replacement of system components with generally similar equipment.

3b. COMPLETION OF EXTRACTION WELL CURTAILMENT

COMPLETION DATE: According to schedule in task 3a approved by the Executive Officer

Submit a technical report acceptable to the Executive Officer documenting

completion of the necessary tasks identified in the technical report submitted for Task 3a.

4. EVALUATION OF NEW HEALTH CRITERIA

COMPLETION DATE: 90 days after request made by the Executive Officer

Submit a technical report acceptable to the Executive Officer containing an evaluation of how the final cleanup plan and cleanup goals would be affected if the concentrations listed in Table 1 are changed as a result of promulgation of revised drinking water goals, MCLs or action levels, or other health-based criteria.

5. EVALUATION OF NEW TECHNICAL INFORMATION COMPLETION

DATE: 90 days after request made by the Executive Officer

Submit a technical report acceptable to the Executive Officer that contains an evaluation of new technical and economic information indicating that cleanup goals or cleanup technologies in some areas may be considered for revision. Such technical reports shall not be required unless the Executive Officer determines that such new information indicates a reasonable possibility that the Order may need to be changed.

D. TREATED WATER REUSE SPECIFICATIONS

1. **Limits:** In order to protect groundwater quality, groundwater that has been extracted and treated by the CGTS and applied for beneficial uses onsite shall not exceed the numeric limits specified in Table 2 below:

Table 2. Treated Groundwater Effluent Limits

Constituent	Instantaneous Maximum Limit (µg/L)
VOCs	
Vinyl Chloride	0.5
Benzene	1
All others, per constituent	5
TPH	200
Perchlorate	6

2. **Runoff Control:** Treated groundwater shall not be allowed to escape from authorized application areas by airborne spray or by surface runoff. The Discharger shall employ best management practices to prevent surface runoff at application areas.

3. **Application Limitations:** No treated groundwater shall be applied during rainfall, or when soils are saturated to a point where runoff is likely to occur, with the exception of times when significant runoff causes the freeboard at Pond 2130 to be less than two feet and threatens shutdown of the groundwater treatment system. In this instance, treated water may be applied at designated reuse areas to create additional storage capacity for treated groundwater, thereby preventing the shutdown of the groundwater extraction system(s).
4. **Public Contact:** Adequate measures are taken to minimize public contact with treated groundwater and to inform the public by placing legible, conspicuous warning signs at adequate spacing around Pond 2130 and application areas.
5. **Cross Connection:** There shall be no cross-connection between potable water supply and any piping containing treated groundwater.
6. **Freeboard:** The storage ponds shall be operated to have a minimum of two feet of freeboard to reduce this risk of overflows.
7. **Violation Notification:** In the event that the Discharger is unable to comply with any of the specifications that apply to treated groundwater reuse, the Discharger shall notify the Water Board by telephone or email within 24 hours of the incident and confirm it in writing within one week of the telephone notification.
8. **Change in Use:** In accordance with CWC Section 13260, the Discharger shall file a report with the Water Board of any material change or proposed change in the character, location, or volume of the treated groundwater.
9. **No Consumption:** Under no circumstances shall treated groundwater be used for public consumption.
10. **Vehicle Signs:** Vehicles used for carrying or spraying the treated groundwater shall be identified as such with legible signs.

E. PROVISIONS

1. **No Nuisance:** The storage, handling, treatment, or disposal of contaminated soil or groundwater, including treated groundwater reuse, shall not create a nuisance as defined in CWC Section 13050(m).
2. **Good Operation and Maintenance:** The Discharger shall operate and maintain in good working order, and operate efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order, including groundwater reclamation.
3. **Cost Recovery:** The Discharger shall be liable, pursuant to CWC Section 13304, to the Water Board for all reasonable costs actually incurred by the 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 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 over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records:** In accordance with CWC Section 13267(c), the Discharger shall permit the Water Board or its authorized representative:
 - a. Entry upon premises in which any contamination source exists, or may potentially exist, or in which any required records are kept that are relevant to this Order.
 - b. Access to copy any records that must be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in response to this Order.
 - d. Sampling of any groundwater or soil that is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the Discharger.

5. **Self-Monitoring Program:** The Discharger shall implement the Self-Monitoring Program (SMP) attached to this Order, or as amended by the Executive Officer. The Discharger shall submit Environmental Monitoring Reports (EMR), in accordance with the SMP, that summarize and interpret the monitoring data collected during the previous monitoring period. The EMR reports shall also include a summary of the results of any investigations conducted during the period covered, provide notice of any unusual results from environmental monitoring, and summarize any remedial actions implemented during the monitoring period. The EMR shall include, in a separate section, all monitoring data required by DTSC for all waste management units regulated under the RCRA Post-Closure Permit. The EMRs shall be submitted in accordance with the schedule provided in the SMP. The Discharger may request changes to the SMP and the EMR for the following year. The request for changes must be submitted no later than October 15 of the preceding year. Any changes to the SMP and the EMR must be approved by the Executive Officer prior to implementation. The Executive Officer may require changes to the SMP and the EMR at his/her discretion, based on a need for additional monitoring data to make regulatory decisions regarding site cleanup of protection of human health and the environment.

6. **Contractor/Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California professional geologist, a California certified engineering geologist, or a California registered civil engineer.

7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Water Board using approved U.S. EPA methods for the type of analysis to be performed or other methods approved by the Water Board. All laboratories shall maintain quality assurance/quality control records for Water Board review. This provision does not apply to analyses that can only reasonably be performed onsite (e.g., temperature).
8. **Document Distribution:** Copies of all correspondence, reports, and documents pertaining to compliance with this Order shall be uploaded to GeoTracker and provided electronically, or on USB drive if preferred, to DTSC and/or Valley Water if they desire. The Executive Officer may modify this distribution list as needed.
9. **Reporting of Changed Owner or Operator:** The Discharger shall file a technical report on any changes in site occupancy and ownership associated with the site described in this Order.
10. **Reporting of Hazardous Substance Release:** Other than natural migration and transport within the site of hazardous substances that are site-related COCs and are known or are later established to occur in site media due to historical releases, if any other hazardous substance is discharged in or on any waters of the State, or discharged and deposited where it is, or probably will be discharged in or on any waters of the State, the Discharger shall report such discharge to this Water Board, by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 AM to 5:00 PM). A written report shall be filed with the Water Board within five (5) working days. The report shall describe the nature of the quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, and persons/agencies notified. This reporting is in addition to the reporting to the California Emergency Management Agency required pursuant to the Health and Safety Code.
11. **Rescission of Existing Orders:** This Order rescinds and supersedes Order No. R2-2012-0019, and Amendments R2-2015-0025, and R2-2019-0013.
12. **Periodic SCR Review:** The Water Board will review this Order periodically and may revise its requirements when necessary.

I, Michael Montgomery, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on XXXX 2021.

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

Attachments:

Figure 1 – Site Location Map

Figure 2 – Former Operational Areas and Stations, and Adjacent Seebach Property

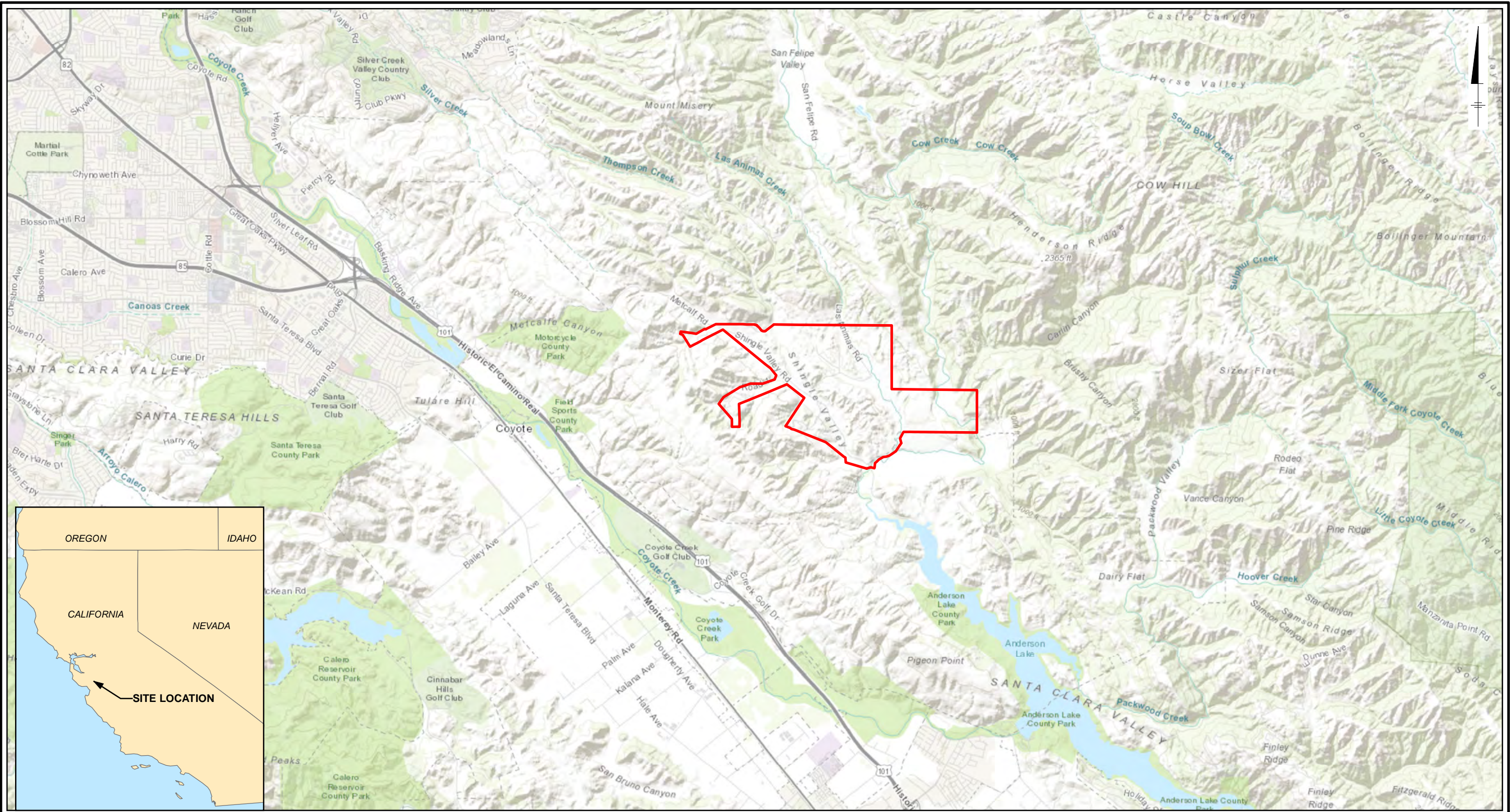
Figure 3 – Property Retained and Donated, and Areas with Land Use Restrictions

Figure 4 – Surface Water Monitoring Locations

Figure 5 – Groundwater Monitoring Locations

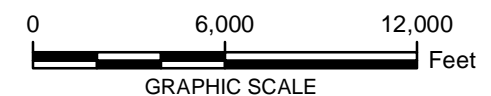
Self-Monitoring Program

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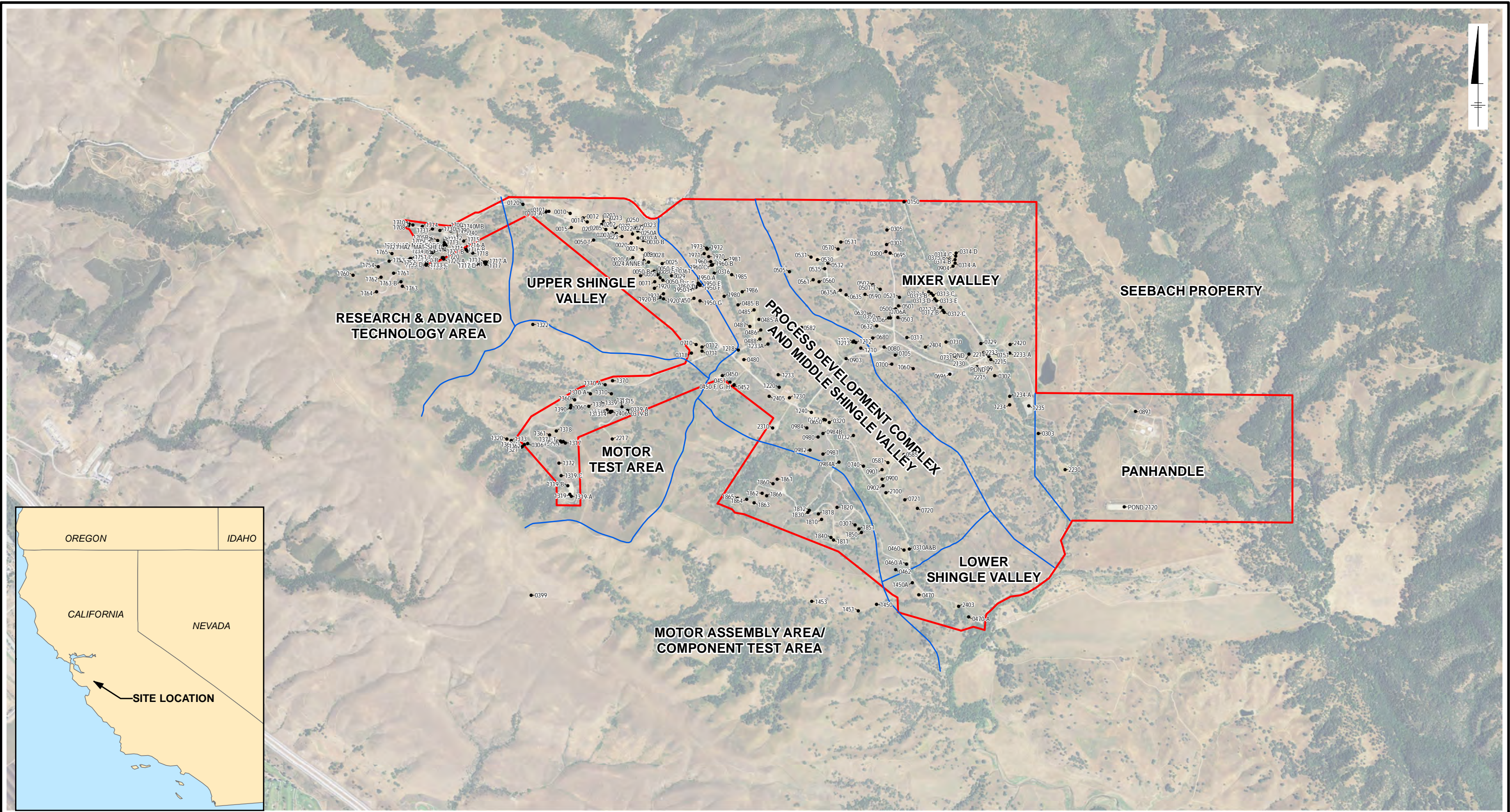


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NOTES:
1. PROPERTY BOUNDARY IS APPROXIMATE.

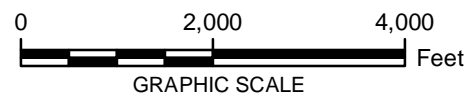


RAYTHEON TECHNOLOGIES CORPORATION SAN JOSE, CALIFORNIA	
SITE LOCATION MAP	
 ARCADIS	Design & Consultancy for natural and built assets
FIGURE 1	



LEGEND:

- FACILITY AREA BOUNDARIES
- PROPERTY BOUNDARY
- STATION LOCATIONS



NOTE:

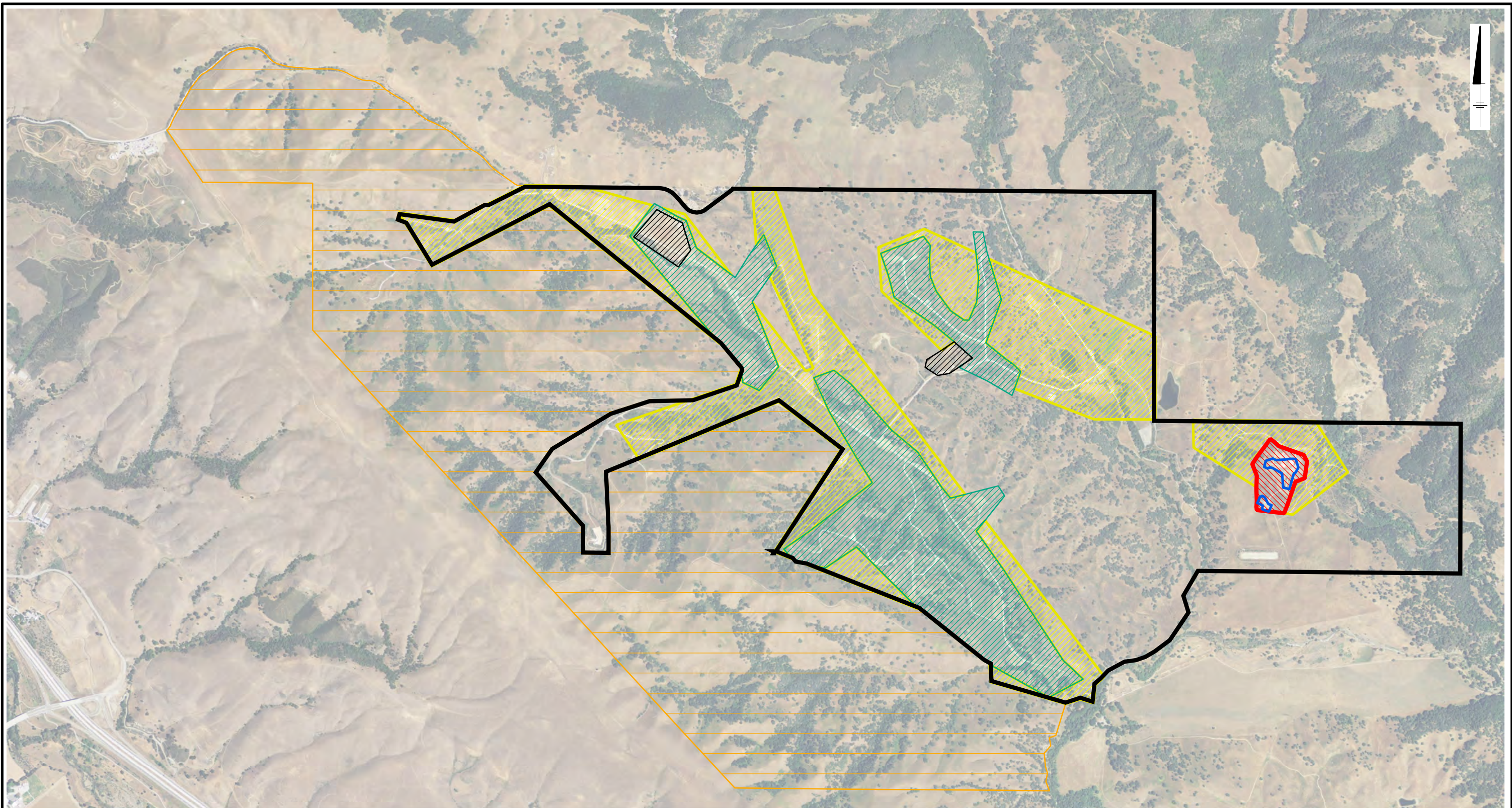
1. AERIAL IMAGERY SOURCE: NAIP IMAGERY, USDA, 2012








RAYTHEON TECHNOLOGIES CORPORATION
SAN JOSE, CALIFORNIA

FORMER OPERATIONAL AREAS AND STATIONS AND ADJACENT SEEBACH PROPERTY

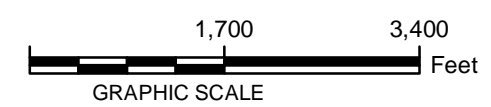


CITY: CLE DIV\GROUP: SER\JM DB\ GREENE LD: EAL PIC: PM: TM: TR:
Document Path: T:\ENV\UTC_PandW_Rocketdyne\San_Jose\DTSC Permit_Update\Transfer_Letter_Report\F3_PROPERTY RETAINED AND DONATED AND AREAS WITH LAND USE RESTRICTIONS.mxd



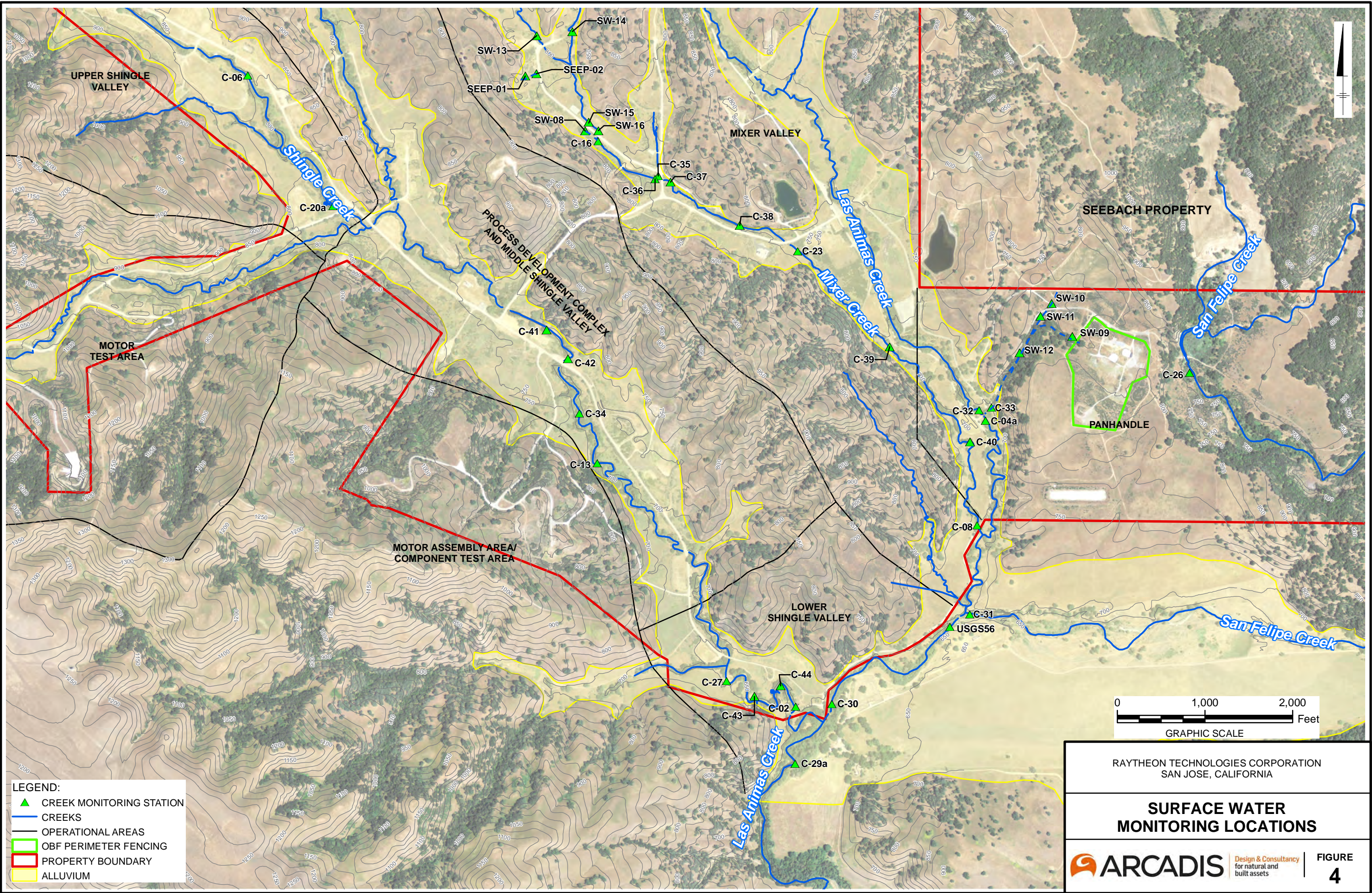
- LEGEND:**
-  RETAINED PROPERTY (1768 Acres)
 -  COYOTE RIDGE PROPERTY (1521 Acres)
 -  2015 DEED RESTRICTION (LAND USE)
 -  2015 DEED RESTRICTION (LAND USE AND GROUNDWATER)
 -  2015 DEED RESTRICTION (ENGINEERING CONTROLS)
 -  2002 DEED RESTRICTION (GROUNDWATER USE)
 -  OBF COVER SYSTEM

NOTES:
1. AERIAL PHOTO SOURCE: GOOGLE EARTH PRO, 2013

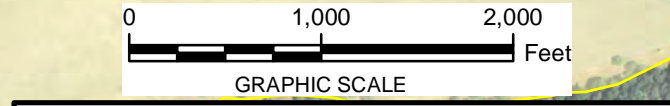


RAYTHEON TECHNOLOGIES CORPORATION SAN JOSE, CALIFORNIA	
PROPERTY RETAINED AND DONATED AND AREAS WITH LAND USE RESTRICTIONS	
 ARCADIS <small>Design & Consultancy for natural and built assets</small>	FIGURE 3

CITY: CLE DIV/GROUP: IMDV DB: LUG LD: PIC: PM: TM: TR:
 UTC Document Path: T:\ENVTUC_PandW_Rocketdyne\SanJose\DTSC Permit Update\Transfer_Letter_Report\F4_SURFACE WATER MONITORING LOCATIONS.mxd



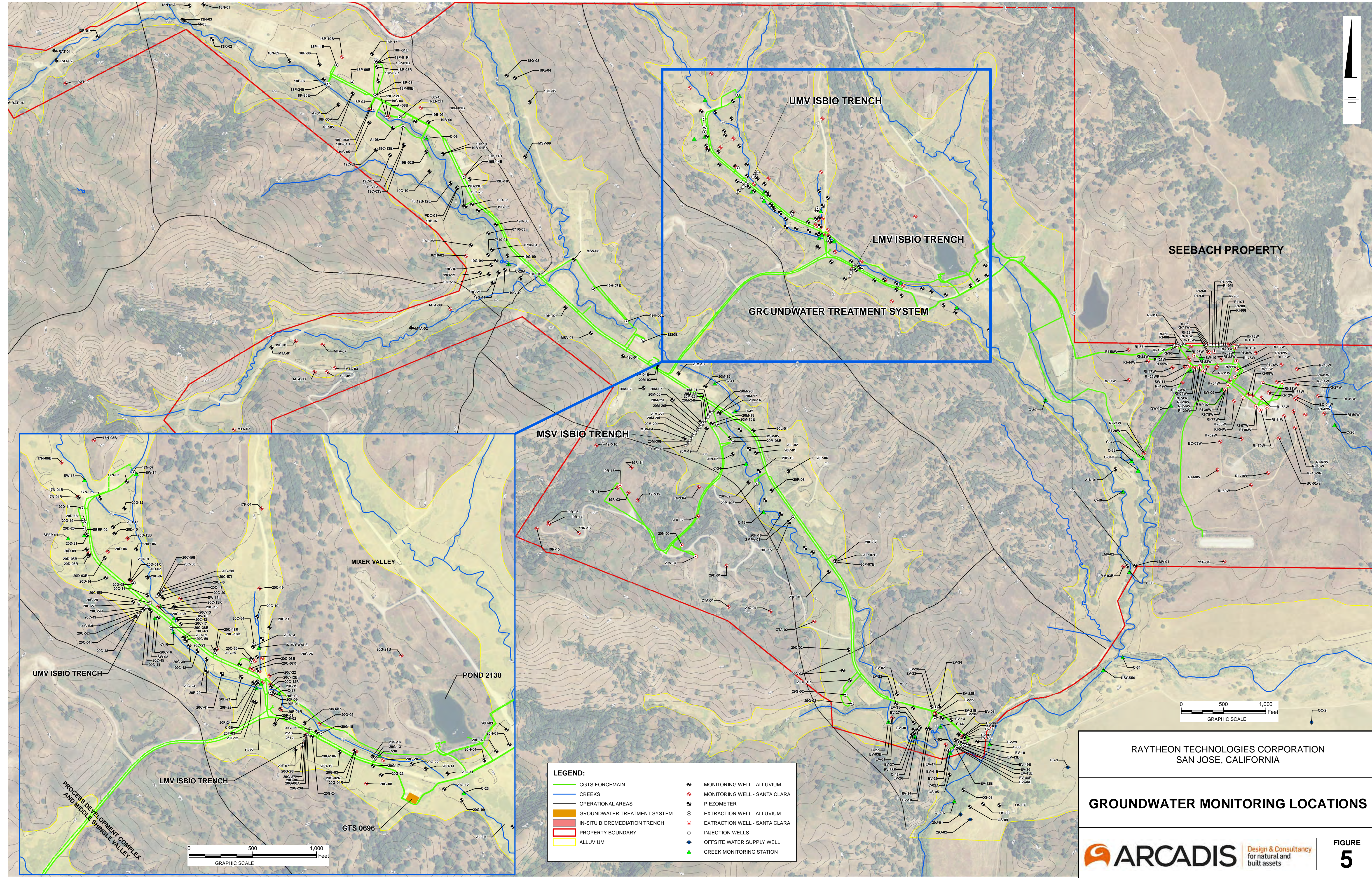
LEGEND:
 ▲ CREEK MONITORING STATION
 — CREEKS
 — OPERATIONAL AREAS
 — OBF PERIMETER FENCING
 — PROPERTY BOUNDARY
 — ALLUVIUM



RAYTHEON TECHNOLOGIES CORPORATION
 SAN JOSE, CALIFORNIA

SURFACE WATER MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets **FIGURE 4**



LEGEND:

	CGTS FORCEMAIN		MONITORING WELL - ALLUVIUM
	CREEKS		MONITORING WELL - SANTA CLARA
	OPERATIONAL AREAS		PIEZOMETER
	GROUNDWATER TREATMENT SYSTEM		EXTRACTION WELL - ALLUVIUM
	IN-SITU BIOREMEDIATION TRENCH		EXTRACTION WELL - SANTA CLARA
	PROPERTY BOUNDARY		INJECTION WELLS
	ALLUVIUM		OFFSITE WATER SUPPLY WELL
			CREEK MONITORING STATION

RAYTHEON TECHNOLOGIES CORPORATION
SAN JOSE, CALIFORNIA

GROUNDWATER MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

CITY: DLE DWGGROUP:SERVIM DBL GREENE LD EAL PIC PM: TM: TR:
Path: T:_ENV\UTC_Panama_FockebaymeSanJose\DTSC Permit Update\Transfer Letter_Report\F5_GROUNDWATER MONITORING LOCATIONS.mxd Date Saved: 11/15/2021 5:11:33 PM

SELF-MONITORING PROGRAM for:

RAYTHEON TECHNOLOGIES

for the property located at:

**600 METCALF ROAD
SANTA CLARA COUNTY**

1. **Authority and Purpose:** The Water Board requests the technical reports required in this Self-Monitoring Program (SMP) pursuant to CWC sections 13267 and 13304. This SMP is intended to document compliance with Order No. R2-2012-0019 (Site Cleanup Requirements).
2. **Monitoring:** The Discharger shall measure groundwater elevations in monitoring wells and shall collect and analyze representative samples of groundwater, surface water, and reclaimed water according to this SMP.
3. **Monitoring Reports:** The Discharger shall submit annual Environmental Monitoring Reports (EMR) to the Water Board by August 1. The Report shall include:
 - a. Transmittal Letter: The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem(s). 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 Annual Report is true and correct to the best of the official's knowledge.
 - b. Groundwater Elevations: Groundwater elevations are measured once a year during the wet season sampling; therefore, the Annual Report shall present the groundwater elevation data in tabular form. The Annual Report shall also include a groundwater elevation map or maps. Historical groundwater elevations (for the past five years) shall be included in tabular form with each Annual Report.
 - c. Groundwater Analyses: Groundwater monitoring wells will be sampled according to a schedule and program as indicated in Table 1. Newly installed wells shall be sampled on a frequency appropriate for the purpose of the well, typically quarterly, for the first year. The appropriate U.S. EPA methods, pH, and turbidity tests shall be required for all new monitoring and extraction wells. Other tests shall be required for some wells, depending on the well location. Groundwater sampling data from the current year shall be presented in tabular form, and key monitoring data shall be presented on site figures showing the monitoring well locations. The annual Report shall indicate the analytical methods used, detection limits obtained for each reported constituent, and a summary of quality assurance/quality control data. Historical groundwater sampling results for the past five years shall also be included in tabular form. Supporting data, such as laboratory data sheets, need not be included in the report but must be available upon request (however, see "Record Keeping" below).
 - d. Groundwater Extraction and Treatment: The annual Report shall include groundwater extraction results for the CGTS in tabular form, expressed in gallons per month, and the total groundwater volume for the year. The annual Report shall also include contaminant removal results from the CGTS for the year, expressed in units of chemical mass, as well as historical mass removal results for the CGTS for the previous five years.

- e. **Status Report:** The annual Report shall describe relevant work completed during the reporting period (e.g., site investigation, remedial measures) and work planned for the following year.
4. **RCRA Post-Closure Compliance Monitoring:** Scheduled monitoring of groundwater at closed RCRA Surface Impoundments 0250, 0635, and 0706; the former Hydrolysis Treatment Facility (0503); and the former Open Burning Facility (OBF) is required under RCRA Post-Closure. This portion of the monitoring program is administered by DTSC. The sampling and analysis program for the closed RCRA units is summarized in Tables 2, 3, and 4. Point of Compliance (POC) wells for each RCRA unit are specified in each table and sampling locations are shown on Figure SMP-1.

The groundwater monitoring plan for the units under the RCRA Post-Closure Permit will include, at a minimum, those analyses and the frequency of analyses for wells listed in Tables 2, 3, and 4. Raytheon Technologies will report the results of the RCRA sampling on an annual basis in a specific section of the annual monitoring reports. The RCRA post-closure monitoring program can only be changed with concurrence from DTSC. Other parts of the monitoring program performed under the SMP can be changed by the Water Board without concurrence from DTSC.

5. **Miscellaneous Requirements:**

- a. Well depths shall be determined on an annual basis and compared to the depth of the well as constructed. If greater than 25 percent of the well screen is covered, the Discharger shall redevelop and clear the screened interval before the next sampling event.
- b. Chemical detection limits shall be lower than cleanup goals established in the Order, unless it is technically impractical to achieve detection limits lower than cleanup goals.
6. **Violation Reports:** Other than exceedance of cleanup goals for soil, surface water, and groundwater prior to substantial completion and operation of remedies pursuant to this Order, if the Discharger violates requirements in the Site Cleanup Requirements, then the Discharger shall notify the Water Board office by telephone or email as soon as practicable once the Discharger has knowledge of the violation. Water Board staff may, depending on violation severity, require the Discharger to submit a separate technical report on the violation within five working days of telephone/email notification.
7. **Other Reports:** The Discharger shall notify the Water Board in writing prior to any site activities that have the potential to cause further migration of contaminants or that would provide new opportunities for site investigation.
8. **Record Keeping:** The Discharger or his/her agent shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of five years after origination and shall make them available to the Water Board if requested.
9. **SMP Revisions:** Revisions to the SMP may be ordered by the Executive Officer, either on his/her own initiative or at the request of the Discharger. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

Attachments: Tables 1, 2, 3 and 4

Figure: SMP1- Groundwater and Surface Water Sampling Locations

Table 1. Site-Wide Groundwater Monitoring Program
Raytheon Technologies
San Jose Site

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
0024 TRENCH	USV	EXT_WELL		2YR	2YR	2YR	
1230E	MSV	EXT_WELL		2YR	2YR		
13R-01	RAT	ADDITIONAL_MON		2YR	2YR		
17N-04B	MIX	INCR_CONC_TREND		2YR	2YR		
17N-04R	MIX	ADDITIONAL_MON		2YR			
17N-07	MIX	EXT_WELL		A		A	
17N-08B	MIX	ADDITIONAL_MON		2YR			
18P-01B	USV	ADDITIONAL_MON			2YR		
18P-01E	USV	EXT_WELL		A	2YR	2YR	
18P-01R	USV	RCRA_MON		2A	2A	2A	5YR 6010-Dissolved, 9012
18P-02R	USV	RCRA_MON		2A	2A	2A	5YR 6010-Dissolved, 9012
18P-03R	USV	INCR_CONC_TREND		2YR	2YR	2YR	
18P-04A	USV	EXT_WELL		2YR	2YR	2YR	
18P-08E	USV	EXT_WELL		2YR	2YR	2YR	
18P-09E	USV	EXT_WELL		2YR	2YR	2YR	
18P-11E	USV	EXT_WELL		2YR	2YR	2YR	
18P-25E	USV	EXT_WELL		2YR	2YR	2YR	
19B-01E	USV	EXT_WELL		2YR	2YR	2YR	
19B-13E	USV	ADDITIONAL_MON		2YR	2YR	2YR	
19B-14E	USV	EXT_WELL		A	2YR	2YR	
19B-18	USV	ADDITIONAL_MON		A		A	
19C-12E	USV	EXT_WELL		2YR	2YR	2YR	
19C-13E	USV	EXT_WELL		2YR	2YR		
19G-11	USV	OTHER_NON-RCRA			2YR		2YR 8015, 8310
19H-01	USV	OTHER_NON-RCRA			2YR		2YR 8015, 8310
19H-06E	MSV	EXT_WELL		A	2YR	2YR	
19H-07E	MSV	EXT_WELL		A	2YR	2YR	
19R-10	MAA	ADDITIONAL_MON			2YR		
19R-13	MAA	ADDITIONAL_MON			2YR		
19R-17	MAA	EXT_WELL			2YR	2YR	
20C-06B	MIX	INCR_CONC_TREND		2YR	2YR		
20C-07R	MIX	RCRA_MON		2A	2A		5YR Appendix IX
20C-10	MIX	ADDITIONAL_MON		2A	2A	2A	
20C-11	MIX	ADDITIONAL_MON		A	A	A	

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Tentative Site Cleanup Requirements
Raytheon Technologies

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
20C-13	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-13	MIX	RCRA_MON		2A	2A		5YR 6010-Dissolved, 8081A, 8270
20C-14	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-14	MIX	RCRA_MON		2A	2A		5YR 6010-Dissolved, 8081A, 8270
20C-15	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-16	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-17	MIX	RCRA_MON		2A	2A		5YR 6010-Dissolved, 8081A, 8270
20C-19	MIX	ADDITIONAL_MON		2YR			
20C-22	MIX	ADDITIONAL_MON		2YR	2YR		
20C-23	MIX	EXT_WELL			2YR	A	A 6860
20C-25	MIX	RCRA_MON		2A	2A	A	5YR 6010-Dissolved, 8081A, 8270
20C-26	MIX	RCRA_MON		2A	2A		5YR Appendix IX
20C-27	MIX	EXT_WELL			2YR	2YR	A 6860
20C-27	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-35	MIX	RCRA_MON		2A	2A		5YR 6010-Dissolved, 8081A, 8270
20C-38E	MIX	EXT_WELL			A	A	A 6860
20C-38E	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-39	MIX	ADDITIONAL_MON			A		A 6860
20C-44	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-45	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-46	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-47	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-48	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-49	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-50	MIX	ISBIO					2A 353.2, 6860, SM5310
20C-62	MIX	ADDITIONAL_MON		2A	2A	2A	
20C-64	MIX	EXT_WELL		2A	2A	2A	
20D-02	MIX	ADDITIONAL_MON		2YR	2YR		

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Raytheon Technologies

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
20D-03R	MIX	ADDITIONAL_MON		2YR	2YR		
20D-08	MIX	EXT_WELL		2YR	2YR	2YR	
20D-09	MIX	ADDITIONAL_MON		2YR	2YR		
20D-10	MIX	ADDITIONAL_MON		A			
20D-11	MIX	EXT_WELL		A	2YR	2YR	
20D-18	MIX	EXT_WELL		A		A	
20D-19	MIX	EXT_WELL		A		A	
20D-20	MIX	EXT_WELL		A		A	
20D-21	MIX	ADDITIONAL_MON		A			
20F-07	MIX	ISBIO					2A 353.2, 6860, SM5310
20F-11	MIX	EXT_WELL		A	2YR	A	
20F-24	MIX	ADDITIONAL_MON		2A	2A	2A	
20G-05	MIX	ADDITIONAL_MON		2YR	2YR		
20G-06	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-07	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-07	MIX	RCRA_MON		2A	2A		5YR Appendix IX
20G-12	MIX	ADDITIONAL_MON		A	2YR	2YR	
20G-13	MIX	EXT_WELL		A	2YR	2YR	
20G-14	MIX	ADDITIONAL_MON		A	2YR		
20G-15	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-15	MIX	RCRA_MON		2A	2A	A	5YR 6010-Dissolved, 8081A, 8270
20G-18R	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-20	MIX	ADDITIONAL_MON		2YR	2YR		
20G-22	MIX	ADDITIONAL_MON		A	A	A	
20G-23	MIX	ADDITIONAL_MON		2YR			
20G-24	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-25I	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-26I	MIX	ISBIO					2A 353.2, 6860, SM5310
20G-27I	MIX	ISBIO					2A 353.2, 6860, SM5310
20J-01	MIX	ADDITIONAL_MON		A			
20L-01	MSV	INCR_CONC_TREND		2YR	2YR		
20M-04E	MSV	EXT_WELL		2YR	2YR	2YR	
20M-07	MSV	ISBIO					2A 353.2, 6860, SM5310

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Raytheon Technologies

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
20M-08E	MSV	EXT_WELL		A	2YR	2YR	
20M-12	MSV	ADDITIONAL_MON		A			
20M-15E	MSV	EXT_WELL			A	2YR	
20M-15E	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-17	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-18	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-19	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-20I	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-22I	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-26I	MSV	ISBIO					2A 353.2, 6860, SM5310
20M-31I	MSV	ISBIO					2A 353.2, 6860, SM5310
20N-04	CTA	EXT_WELL			2YR	2YR	
20N-05	CTA	EXT_WELL			2YR	2YR	
20P-01	MSV	INCR_CONC_TREND		A			
20P-06	MSV	ADDITIONAL_MON		2YR			
20P-07E	MSV	EXT_WELL		2YR	2YR	2YR	
20P-08	MSV	ADDITIONAL_MON		2YR			
20P-10E	MSV	EXT_WELL		A	2YR	2YR	
29C-04	CTA	ADDITIONAL_MON			2YR		
29G-02	LSV	EXT_WELL		A	2YR	2YR	
29G-03	LSV	EXT_WELL		A	2YR	2YR	
AI-06	USV	RCRA_MON		2A	2A	2A	5YR 6010-Dissolved, 9012
BC-02W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
BC-03W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
BP-02	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
EV-16	LSV	ADDITIONAL_MON		A	2YR	2YR	
EV-21E	LSV	EXT_WELL		A	2YR	2YR	
EV-28	LSV	EXT_WELL		2YR	2YR	2YR	
EV-29	LSV	ADDITIONAL_MON		2A	2YR	A	
EV-43E	LSV	EXT_WELL		2A	A	A	
EV-44E	LSV	EXT_WELL		2A	2A		
EV-45E	LSV	EXT_WELL		2A	A	A	
EV-47	LSV	ADDITIONAL_MON		A	A	A	
EV-48E	LSV	EXT_WELL		2A	2A	2A	
EV-49E	LSV	EXT_WELL		2A	2A	2A	

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Tentative Site Cleanup Requirements
Raytheon Technologies

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
LMV-01	MIX	ADDITIONAL_MON		A			
LMV-02	MIX	ADDITIONAL_MON		A			
LMV-03B	MIX	ADDITIONAL_MON		A			
MSV-04	MSV	ISBIO					2A 353.2, 6860, SM5310
MTA-09	MTA	INCR_CONC_TREND		2YR	2YR		
OS-03	OFF	ADDITIONAL_MON		2A	2A	2A	
OS-05	OFF	ADDITIONAL_MON		2A	2A	2A	
OS-07	OFF	ADDITIONAL_MON		2A	2A	2A	
OS-08	OFF	ADDITIONAL_MON		2A	2A	2A	
OS-09	OFF	ADDITIONAL_MON		2A	2A	2A	
RI-03W	PAN	EXT_WELL	LUZ	2A	2A	A	
RI-04W	PAN	EXT_WELL	LUZ	A	2YR	2YR	
RI-05W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
RI-06W	PAN	EXT_WELL	UPZ	A	2YR	2YR	
RI-07W	PAN	EXT_WELL	UPZ	A	2YR	2YR	
RI-09W	PAN	ADDITIONAL_MON	LCZ	2YR	2YR	2YR	
RI-10WR	PAN	ADDITIONAL_MON	UPZ	A	A		
RI-11W	PAN	EXT_WELL	UPZ	A	2YR	2YR	
RI-12W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
RI-13W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
RI-16W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-17AW	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-19W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-20W	PAN	ADDITIONAL_MON	LCZ	2YR	2YR		
RI-21W	PAN	ADDITIONAL_MON	LCZ	2YR	2YR		
RI-25WR	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-30W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-32W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-33W	PAN	EXT_WELL	LUZ	2YR	2YR	A	
RI-35W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
RI-42W	PAN	ADDITIONAL_MON	UPZ	A			
RI-43W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX
RI-44W	PAN	ADDITIONAL_MON	LCZ	A	2YR		
RI-45W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-46W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-47W	PAN	ADDITIONAL_MON	LUZ	2YR	2YR		
RI-48W	PAN	ADDITIONAL_MON	LUZ	2YR	2YR		
RI-49W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-51W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-53W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-54W	PAN	RCRA_MON	UPZ	2A	2A	2A	5YR Appendix IX

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Tentative Site Cleanup Requirements
Raytheon Technologies

Well ID	Operational Unit	Sampling Rationale	OBF Zone	Sampling Frequency			
				Perchlorate 314.0	VOCs 8260	1,4-Dioxane 8260 SIM	Other Analyses
RI-55W	PAN	EXT_WELL	LUZ	A	2YR	2YR	
RI-56W	PAN	EXT_WELL	LUZ	2YR	2YR	2YR	
RI-59W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-67W	PAN	ADDITIONAL_MON	LUZ	2A	2A		
RI-68W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-69W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-70W	PAN	RCRA_MON	LCZ	2A	2A	2A	5YR Appendix IX
RI-71W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-72W	PAN	ADDITIONAL_MON	LUZ	2A	2A		
RI-73W	PAN	ADDITIONAL_MON	LUZ	2A	2A		
RI-74W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-75W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-76W	PAN	RCRA_MON	LUZ	2A	2A	2A	5YR Appendix IX
RI-77W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-78W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-79W	PAN	EXT_WELL	UPZ	A	2YR	A	
RI-81W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-82W	PAN	EXT_WELL	LUZ	2A	2A	2A	
RI-83W	PAN	EXT_WELL	LUZ	2A	2A	2A	
SMPA-01	MSV	EXT_WELL		A	2YR	2YR	

Notes:

- 6010 – USEPA Method for dissolved metals
- 6860 – USEPA Method for perchlorate
- 8015 – UPEPA Method for diesel-range organics
- 8081A – USEPA Method for organochlorine pesticides
- 8270 – USEPA Method for semi-volatile organic compounds
- 8310 – USEPA Method for polycyclic aromatic hydrocarbons
- 9012 – USEPA Method for cyanide
- SM5310 – Standard method for total organic carbon
- 2A – Semi-Annual Sampling Frequency
- A – Annual Sampling Frequency
- 2YR – Biennial Sampling Frequency
- 5YR – Every 5 Years Sampling Frequency
- CTA – Component Test Area
- LSV – Lower Shingle Valley
- MAA – Motor Assembly Area
- MIX – Mixer Valley
- MSV – Middle Shingle Valley
- MTA – Motor Test Area
- OFF – Offsite
- PAN – Panhandle
- RAT – Research and Advanced Technology
- USV – Upper Shingle Valley
- UPZ – Upper Perched Zone
- LUZ – Lower Unconfined Zone
- LCZ – Lower Confined Zone

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ADDITIONAL_MON – Sampling for additional monitoring data

EXT_WELL – Extraction well sampling

INCR_CONC_TREND – Monitoring for increasing concentration trend

ISBIO – in situ biological treatment trench monitoring

NEW_WELL – New well monitoring data (first 1-2 years)

OTHER_NON_RCRA – Sampling for miscellaneous monitoring data

RCRA_MON – Monitoring specified in Resource Conservation and Recovery Act (RCRA) Post-Closure permit

Each analytical method employed must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.

Table 2. RCRA Post-Closure Groundwater Monitoring Plan – Stations 0250, 0635, and 0706
Raytheon Technologies
San Jose Site

RCRA Unit	RCRA Well ID	COPC	Frequency	USEPA Method ^(a)
0250	18P-01R* 18P-02R AI-06	<i>RCRA Post-Closure Monitoring Plan</i>		
		Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		17 CAM Metals	5-years	6010
		Total Cyanides	5-years	9012
0635	20C-14* 20C-13 20C-17	<i>RCRA Post-Closure Monitoring Plan</i>		
		Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		OC Pesticides	5-years	8081A
		<i>Additional Appendix IX Parameters</i>		
		Dissolved Metals	5-years	6010
		SVOCs	5-years	8270
0706	20C-35* 20C-25 20G-15	<i>RCRA Post-Closure Monitoring Plan</i>		
		Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane (20C-25 and 20G-15 only)	Annually	8260 SIM
		<i>Additional Appendix IX Parameters</i>		
		Dissolved Metals	5-years	6010
		OC Pesticides	5-years	8081
		SVOCs	5-years	8270

Notes:

^(a) The analytical method must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.

* indicates a Point of Compliance (POC) well

COPC = Chemical of potential concern

OC Pesticides = organochlorine pesticides

17 CAM Metals = California Assessment Manual metals

RCRA = Resource Conservation and Recovery Act

SVOCs = semi-volatile organic compounds

USEPA = U.S. Environmental Protection Agency

VOCs = volatile organic compounds

5-years = Sampled once every 5 years

Perchlorate will be analyzed by USEPA Method 314.0 or an equivalent method such as USEPA Method 6860.

RCRA sampling will be completed in accordance with the current Post-Closure Permit, or in the case of the sampling associated with these former impoundments, can be modified upon approval from DTSC.

**Table 3. RCRA Post-Closure Groundwater Monitoring Plan – Former Hydrolysis Treatment Facility
0503**
Raytheon Technologies
San Jose Site

RCRA Unit	RCRA Well ID	COPC	Frequency	USEPA Method ^(a)
0503	20C-26*	Perchlorate	Semi-annually	314.0
	20C-07R	VOCs	Semi-annually	8260
	20G-07	Appendix IX Compounds	5-years	(See Note 1)

Notes:

^(a) The analytical method must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.

¹ Appendix IX consists of VOCs, semi-volatile organic compounds, perchlorate, organochloride and organophosphate pesticides, 17 California Assessment Manual (CAM) metals, polychlorinated biphenyls (PCBs), sulfide, chlorinated herbicides, dioxins and furans, and cyanides.

* indicates a Point of Compliance (POC) well

COPC = Chemical of potential concern

RCRA = Resource Conservation and Recovery Act

USEPA = U.S. Environmental Protection Agency

VOCs = volatile organic compounds

5-years = Sampled once every 5 years

Perchlorate will be analyzed by USEPA Method 314.0 or an equivalent method such as USEPA Method 6860.

Table 4. RCRA Post-Closure Groundwater Monitoring Plan – Former Open Burning Facility
Raytheon Technologies
San Jose Site

RCRA Well ID	Monitoring Purpose	COPC	Frequency	USEPA Method ^(a)
<i>Upper Perched Zone</i>				
BP-02* RI-05W RI-12W* RI-13W* RI-43W* RI-54W	Plume Boundary Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
RI-35W*	Plume Source Area Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
<i>Lower Unconfined Zone</i>				
RI-25WR* RI-30W RI-45W* RI-46W RI-49W* RI-51W* RI-53W RI-71W*	Plume Boundary Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
RI-19W	Vertical Migration Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
RI-32W RI-76W*	Plume Source Area Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
<i>Lower Confined Zone</i>				
BC-02W RI-59W* RI-68W* RI-69W* RI-70W	Plume Boundary Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)
BC-03W RI-16W* RI-17AW	Vertical Migration Monitoring	Perchlorate	Semi-annually	314.0
		VOCs	Semi-annually	8260
		1,4-Dioxane	Semi-annually	8260 SIM
		Appendix IX	5-years	(See Note 1)

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Notes:

^(a) The analytical method must be able to attain a laboratory reporting limit at or below the cleanup level set for each chemical in Table 1 of the Site Cleanup Requirements Order.

¹ Appendix IX consists of VOCs, semi-volatile organic compounds, perchlorate, organochloride and organophosphate pesticides, 17 California Assessment Manual (CAM) metals, polychlorinated biphenyls (PCBs), sulfide, chlorinated herbicides, dioxins and furans, and cyanides.

* indicates a Point of Compliance (POC) well

COPC = Chemical of potential concern

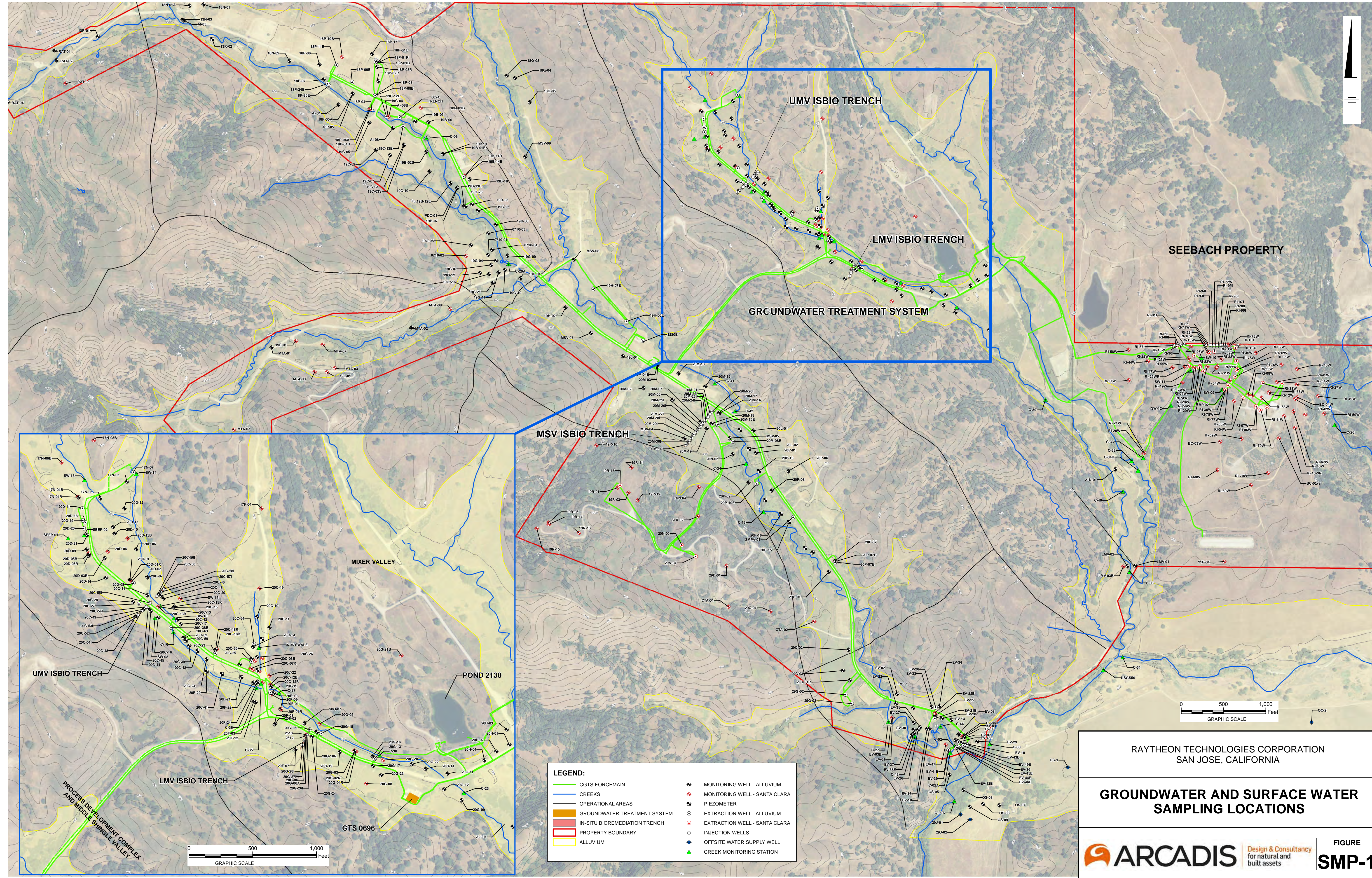
RCRA = Resource Conservation and Recovery Act

USEPA = U.S. Environmental Protection Agency

VOCs = volatile organic compounds

5-years = Sampled once every 5 years

Perchlorate will be analyzed by USEPA Method 314.0 or an equivalent method such as USEPA Method 6860.



LEGEND:

CGTS FORCEMAIN	MONITORING WELL - ALLUVIUM
CREEKS	MONITORING WELL - SANTA CLARA
OPERATIONAL AREAS	PIEZOMETER
GROUNDWATER TREATMENT SYSTEM	EXTRACTION WELL - ALLUVIUM
IN-SITU BIOREMEDIATION TRENCH	EXTRACTION WELL - SANTA CLARA
PROPERTY BOUNDARY	INJECTION WELLS
ALLUVIUM	OFFSITE WATER SUPPLY WELL
	CREEK MONITORING STATION

RAYTHEON TECHNOLOGIES CORPORATION
SAN JOSE, CALIFORNIA

**GROUNDWATER AND SURFACE WATER
SAMPLING LOCATIONS**

ARCADIS Design & Consultancy
for natural and built assets

**FIGURE
SMP-1**

CITY: DLE DIV: GROUP: SER: W: D: B: L: GREENE: L: D: E: A: L: P: M: C: T: M: T: R: C:
 Path: T:_ENV\UTC_Plan\WV_Fork\Raytheon\SanJose\DTSC Permi Update\Transfer_Letter_Report\F_SMP1_GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS.mxd Date Saved: 1/20/2021 7:43:19 AM