CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2019-0060

WASTE DISCHARGE REQUIREMENTS
FOR
UNIVERSITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION
YOLO COUNTY

FINDINGS

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) finds as follows.

Introduction

1. The Regents of the University of California (UC) owns and University of California, Davis operates the UC Davis Class III Landfill (Facility), which is located approximately 3 ½ miles west of the City of Davis in Yolo County, Section 24, T8N, R1E, Mount Diablo Base and Meridian (MDB&M). The Facility's location is depicted on the Site Location Map in **Attachment A**.

2. The Regents of the University of California as the Facility's owner, and University of California, Davis as the Facility's operator (collectively, Discharger), are each jointly responsible for compliance with this Order.

3. This Waste Discharge Requirements (WDRs) Order encompasses the postclosure maintenance and corrective action associated with the following waste management units (WMUs) at the Facility as shown in **Attachment B**:

WMU	Unit Type	Class	Size	Status
Unlined WMU-1[1]	Landfill	Class III	23 acres	Closed in 2001
Lined WMU-2[2]	Landfill	Class III	8 acres	Closed in 2015

[1] Unlined WMU-1 is divided into a North Area and a South Area

[2] Lined WMU-2 was approved as a 16-acre expansion but only three cells 6, 7, and 8 were constructed for a total of 8-acres. The installed liner complies with Subtitle D requirements for liner systems.

4. The following materials are attached to this Order, and incorporated herein:

Attachment A Site Location Map

Attachment B Facility Map

Attachment C Nearby Water Supply Wells

Attachment D FEMA 100-Year Flood Zone Map

Attachment E Groundwater Flow and Direction (A-Zone)

Attachment F Groundwater Flow and Direction (B-Zone)

Attachment G Facility Monitoring Points

Attachment H Facility Stormwater Management Map

Attachment I Chloroform Groundwater Plume

Attachment J Carbon Tetrachloride Groundwater Plume

Attachment K WMU-1 Landfill Gas Extraction Network

Attachment L WMU-2 Landfill Gas Extraction Network

Standard Provisions and Reporting Requirements, December 2015 Edition (SPRRs)

Information Sheet

5. Also attached and incorporated as part of this Order is the separately-issued **Monitoring and Reporting Program R5-2019-0060** (MRP), which sets forth the approved Water Quality Protection Standard (WQPS). (See Title 27, § 20390 et seq.) Compliance with the operative MRP (including subsequent amendments) is required under this Order.

Waste / Unit Classifications

6. The Facility's landfills are subject to federal municipal solid waste (MSW) regulations promulgated under the Resource Consideration Recovery Act (RCRA), 42 U.S.C. section 6901 et seq. Typically referred to as "Subtitle D," these MSW regulations are now codified as 40 C.F.R. part 258, and implemented in part through the provisions California Code of Regulations, title 27 (Title 27).

7. On 9 August 1996, the Central Valley Water Board adopted WDRs Order No. 96-228, classifying the Facility's unlined WMU-1 as a Class III unit for the discharge of non-hazardous or inert wastes in accordance with the regulations in effect when the Order was issued. On 23 April 2003, the Central Valley Water Board adopted WDRs Order 2003-0077, classifying the Facility's unlined WMU-1 and lined WMU- 2 as Class III units for the discharge of non-hazardous wastes including municipal solid waste in accordance with Title 27, section 20005, et seq.

8. The landfill began operation in approximately 1966, although the exact date that landfill operations began is unknown. It was reportedly first permitted by the state in 1978 under a Solid Waste Facility Permit (SWFP) number 57-AA-0004 and was later re-permitted in 1995 by Yolo County Environmental Health. The total permitted disposal area is 39 acres. However, only 23 acres of landfill footprint was constructed as shown in Finding 3. In the past, the unlined WMU-1 received municipal solid wastes, agricultural wastes, green wastes, animal wastes, construction/ demolition wastes, and inert materials. It was estimated that approximately 958,000 cubic yards of waste had been placed in unlined WMU-1 as of March 1998 and that a total of approximately 1,028,000 cubic yards of waste would be placed before closure of WMU-1 in April 2001. Additionally, chemical burn pits were located near WMU-1 that were used until the late 1970's. An unclassified surface impoundment was also located immediately west of WMU-1 as shown in **Attachment B**.

9. Groundwater impacts were identified in groundwater samples collected as part of the Solid Waste Assessment Test (SWAT) in 1987. As a result of the impacts, WDRs Order No. 96-228 required the early closure of WMU-1 due to significant groundwater impacts from the unlined Unit. Order No. 96-228 also approved the construction of lined WMU-2. Subsequent WDRs Order No. 5-00-191 approved the substitution of a geosynthetic clay liner (GCL) in place of the previously approved two-feet of compacted clay for the low permeability layer in the WMU-2 liner.

10. WMU-2 was to consist of eight cells totaling 16 acres. However, only three cells were ultimately constructed. WDRs Order No. 5-00-191 approved the liner system design for Cell 6 only. The first cell, Cell 6 was constructed during late 2000 and early 2001. WDRs Order R5-2003-0077 approved the liner system design for the remaining cells to be constructed in WMU-2. The Discharger constructed Cell 7 and Cell 8 during 2003. The total constructed area of cells 6, 7, and 8 was 8 acres.

11. WMU-2 stopped accepting waste on 28 August 2011 and UC Davis began hauling refuse to the Yolo County Central Landfill on 29 August 2011. According to the annual 2012 groundwater monitoring report, approximately 115,369 tons of waste had been placed in lined WMU-2 by 28 August 2011.

12. On 19 September 2012, the Final Closure and Post-Closure Maintenance Plan for WMU-2 was approved by the appropriate regulatory agencies. The WMU-2 closure construction project began in August 2014 and was completed in 2015. The landfill has been officially closed since 2015 and is currently operated per an approved Post-Closure Maintenance Plan.

13. On 20 September 2018, Central Valley Water Board staff in a letter notified the Discharger that WDRs Order R5-2003-0077 for closed UC Davis Class III Landfill needed to be updated. The determination was made based on the Facility's threat/complexity rating (2B), which has a ten-year review cycle. The letter requested that the Discharger submit an updated Report of Waste Discharge (ROWD) as part of a Joint Technical Document (JTD) to obtain updated WDRs.

14. On 31 January 2019, due to time constraints specified in the Central Valley Water Board staff's request for ROWD the Discharger submitted an abbreviated ROWD as part of an abbreviated JTD for the Facility. Information in the abbreviated JTD was used in the development of this revised Order. This revised Order contains findings, prohibitions, specifications, and provisions related to:

    a. Addressing the release of volatile organic compounds (VOCs) including carbon tetrachloride, chloroform, cis-1,2-DCE, and vinyl chloride from the facility which includes:

        i. Determination of the lateral and vertical extent of the VOC plume in the three hydro-stratigraphic units identified as A-zone, B-zone, and C-zone downgradient of WMU-1 and WMU-2;

        ii. A requirement to continue to operate, maintain, and expand as necessary the Discharger's groundwater extraction system as corrective action to mitigate the release of VOCs;

        iii. A requirement to provide an updated corrective action evaluation technical report that assesses the effectiveness of the groundwater extraction system and describes how long it can be expected before the corrective action measures restore downgradient water quality to background water quality. If background water quality cannot ever be attained through the current corrective action measures the technical report should evaluate additional technically and economically feasible corrective action measures.

    b. Include a prohibition preventing the off-property discharge of water from stormwater detention ponds to waters of the US where comingling of effluent from the Aquatic Biology and Aquaculture Aquatic Center (CABA) facility with non-contact stormwater from the landfill has occurred. To comply with this prohibition the Discharger must provide an updated water

balance demonstrating that the surface water detention ponds have adequate capacity to prevent an off-property discharge to waters of the US;

c. Provide Water Quality Protection Standards (WQPS) and associated concentration limits that protect background water quality taking into account conditions prior to the release from the WMU. The intrawell statistical method proposed in the ROWD should not be used when a release has already occurred or for VOCs. This method should only be used at a facility when (1) waste has not been placed in any WMU and 8 quarters of data has been collected to determine background water quality, or (2) if the Central Valley Water Board has granted concentration limits greater than background (CLGB) and now the monitoring system will be used to detect a new release.

Site Description

15. The Facility is situated on a 52-acre property comprised of Yolo County Assessor's Parcel Number (APN) 37-190-09. The address associated with the Facility is West End of UCD Campus on County Road 98, Davis California 95616.

16. The Facility and surrounding area are located on the geomorphic unit termed "low-alluvial plains and fans", specifically the Putah Plain. The Putah Creek Fan is underlain by the Plio-Pleistocene Tehama Formation that was eroded prior to the deposition of the overlying alluvial material.

17. The land slopes at generally less than one percent. The official elevation level of nearby city of Davis is 51 feet mean sea level (MSL). Elevations range from 60 feet MSL in western parts of the city to 25 feet MSL in some eastern parts.

18. Land uses within one mile of the Facility include irrigated agriculture and UC Davis facilities.

19. Any domestic, industrial and agricultural supply wells downgradient of the Facility within one mile are mapped in **Attachment C**.

20. Class III WMUs must be designed and constructed to withstand a maximum probable earthquake. (Title 27, § 20370.) According to a site-specific seismic analysis for the Facility, such seismic events occurring along the Dunnigan Hills (Zamora) Fault at a closest rupture distance of 12 miles to the northwest would result in a maximum credible earthquake with a magnitude of 6.6, a peak ground acceleration of 0.3g, and an estimated seismic duration of 12 seconds.

21. Based on data from the nearest weather station Davis 2 WSW station (Source: Department of Water Resources California Data Exchange Center), the Facility has an annual average precipitation of 17.4 inches, and a mean pan evaporation of 61 inches per year based on Davis 1 WSW station (Source: Western Regional Climate Center).

22. WMUs must be constructed to accommodate stormwater runoff from 24-hour precipitation events with a return period of 100 years for Class III WMUs. (See Title 27, § 20320.) According to National Oceanic and Atmospheric Administration's (NOAA) Precipitation Frequency Atlas 14, Volume 6 (rev. 2014), the Facility's 100-year, 24-hour rainfall event is estimated to result in 5.24 inches[1] of precipitation. (Source: NOAA Precipitation Frequency Data Server, https://hdsc.nws.noaa.gov/hdsc/pfds.)

23. Stormwater sedimentation basins are situated in the western portion of the Facility, as depicted in **Attachment H**. Due to discharges from the adjacent Center for Aquatic Biology and Aquaculture Aquatic Center (CABA) facility any stormwater basin used conjunctively by the CABA Facility and the landfill Facility is prohibited from discharging to Putah Creek, waters of the US which requires permitting under a US Environmental Protection Agency (US EPA) National Pollutant Discharge Elimination System (NPDES) permit.

24. According to the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps, available online at https://msc.fema.gov/portal, WMU-1 and WMU-2 are located within a 100-year floodplain as shown in **Attachment D**. However, the projected floodwater level is less than 1 foot in depth and the only anticipated hydrodynamic forces would be from wave action caused by wind across the ponded water. A limited access road, which serves as a berm against floodwaters and prevents inundation or washout of the WMUs due to floods with a 100-year return period, has been built along the northern edge of the Facility.

Groundwater and Surface Water conditions

25. The Site and surrounding area are located on the geomorphic unit termed "low-alluvial plains and fans", specifically the Putah Plain. The Putah Creek Fan is underlain by the Plio-Pleistocene Tehama Formation that was eroded prior to the deposition of the overlying alluvial material.

26. The Putah Creek Fan is the uppermost surficial unit identified in all soil borings and is composed of two subunits:

[1] Precipitation frequency estimate with 90% confidence interval of 4.39 to 6.38 inches.

a. an upper unit consisting of interbedded silts, clays, fine sands, and some coarse sand and gravel deposits; and

b. a lower unit consisting predominantly of coarse sands and gravels.

27. Directly underlying the Putah Creek Fan is the Tehama Formation. The depth to the contact between these two formations varies across the site consistent with the erosion of the Tehama Formation from stream channels during the depositional period of the Putah Creek Fan. The Tehama Formation was only partially penetrated by several soil borings where two subunits were recognized:

a. an upper unit consisting of clays and silts; and

b. a lower unit consisting of sands and gravel with silt and clay.

28. The occurrence of groundwater beneath the Facility has been described in terms of three hydrostratigraphic units referred to as the A-zone, B-zone, and C-zone. The A-zone and B-zone form the upper and lower units, respectively, of the Putah Creek Fan and the C-zone forms the lower unit recognized within the Tehama Formation.

29. The A-zone is composed predominantly of fine-grained silts and clays. The results of a constant rate pumping test within this unit calculated a K value between 10.3 ft/day to 18 ft/day. These K values are consistent with a silt to fine sand unit. Using these K values, the average gradient value for the A-zone (0.0027 feet/feet) and assuming an effective porosity of 0.25, the average seepage velocity for the A-zone ranges from 40 feet per year to 70 feet per year.

30. The B-zone and C-zone are composed of the coarser gravel deposits and represent aquifers that are used as a source of water in the vicinity of the Facility. The lower unit of the Putah Creek Fan (B-zone) is very permeable whereby wells completed in this unit have high specific capacities. The average hydraulic conductivity (K) value calculated for this unit from a constant rate pumping test was determined to be 665 feet per day (ft/day), consistent with a coarse sand to gravel unit. Using this K value, the average gradient value for B-zone (0.0015 feet/feet) and assuming an effective porosity of 0.30, the average seepage velocity for the B-zone is 1,214 feet per year.

31. Wells in the area completed within the gravel unit of the Tehama Formation (C-zone) have lower specific capacities than those completed within the B-zone. The average hydraulic conductivity (K) value calculated for this unit from the constant rate pumping test was determined to be 110 ft/day. Using this K value, the average gradient value for the C-zone (0.0028 feet/feet) and assuming an effective porosity of 0.30, the average seepage velocity for the C-zone is 375 feet per year.

32. In general, groundwater flow is to the northeast in the A-zone, east- northeast in the B-zone, and north to east-southeast within the C-zone. The average gradient for the: A-zone is 0.0027 feet/feet; B-zone is 0.0015 feet/feet; and C-zone is 0.0028 feet per feet. Groundwater flow for A-zone is shown in **Attachment E** and for B-Zone in **Attachment F**.

33. Groundwater recharge around the Facility occurs from adjacent Putah Creek which is a losing stream. Surface water from the creek infiltrates and recharges groundwater. This is evidenced by the groundwater flow direction away from the creek and the higher water levels observed in the shallow wells (MW-3A and MW-14A) closest to Putah Creek. Surface water slowly infiltrates downward through the low permeability A-zone into the more permeable B-zone where it flows laterally away from the creek.

34. Groundwater recharge due to human activities also occurs from the adjacent CABA facility upgradient and immediately west of the Facility. Since 2014, the CABA facility has been discharging its effluent into the Ecosystem Pond which if its capacity is exceeded can overflow into Pond 1 and Pond 2 shown on **Attachment H**. Since 2014, the CABA facility discharges to the ponds approximately 0.4 million gallons per day (MGD) which infiltrates into the A-zone which is hydraulically connected to the B-zone and C-zone beneath the Facility. The Facility's West Basin (stormwater basin) and agricultural irrigation in the surrounding area also contributes to groundwater recharge.

35. The site consists of three drainage areas, north, east and west, as shown in **Attachment H**. The area components of the Facility are shown in **Attachment B**, and the drainage directions and systems are shown in **Attachment H**. The East Drainage area consists of the eastern portion of WMU-2, biodigester process and receiving areas, and storage areas. Sheet flow from the east side of WMU-2 landfill cell is collected in the drainage perimeter ditch lined with erosion control blankets. The drainage perimeter ditch connects to two concrete v-ditches, which convey stormwater to the South Basin. Stormwater in the South Basin is manually pumped to the West Basin. Stormwater from the biodigester receiving area is contained in a sloped concrete pad, and drains into an inlet to a lift station, which pumps the stormwater to the West Basin. The North Drainage area includes the aboveground storage tanks, truck scale, and the scale house. Stormwater in this area ponds due to the flat nature of the topography. Stormwater from this area may flow to the north to the drainage ditch that runs along the south side of the driveway into the site. This is the only drainage area with a potential to discharge off-site. The West Drainage area captures precipitation runoff from the western portion of WMU-2. The stormwater flows through the drainage perimeter ditch lined with erosion control blankets, then to the concrete V-ditches west of WMU-2, finally to the West Basin, where it infiltrates.

Monitoring Networks

36. The Facility's current **groundwater** monitoring network consists of the following existing monitoring wells as shown in **Attachment G**:

Table 1. Existing Groundwater Monitoring Well Network

Monitoring Well	Program	Monitored WMU	Water-Bearing Zone	Status
MW-02A	Corrective Action	WMU-1	A-Zone	Operational
MW-03A	Corrective Action	WMU-1	A-Zone	Operational
MW-04A	Corrective Action	WMU-1	A-Zone	Operational
MW-06A	Corrective Action	WMU-2	A-Zone	Operational
MW-07A	Corrective Action	WMU-2	A-Zone	Operational
MW-08A	Background	WMU-1	A-Zone	Operational
MW-09A	Corrective Action	WMU-1	A-Zone	Operational
MW-10A	Corrective Action	WMU-1	A-Zone	Operational
MW-11A	Corrective Action	WMU-1	A-Zone	Operational
MW-12A	Corrective Action	WMU-2	A-Zone	Operational
MW-13A	Corrective Action	WMU-2	A-Zone	Operational
MW-14A	Corrective Action	WMU-1	A-Zone	Operational
MW-15A	Corrective Action	WMU-1	A-Zone	Operational
MW-16A	Corrective Action	WMU-1	A-Zone	Operational
MW-17A	Corrective Action	WMU-1	A-Zone	Operational
MW-34A	Corrective Action	WMU-2	A-Zone	Operational
MW-35A	Corrective Action	WMU-2	A-Zone	Operational
MW-10B	Corrective Action	WMU-1	B-Zone	Operational
MW-16B	Corrective Action	WMU-1	B-Zone	Operational
MW-17B	Corrective Action	WMU-1	B-Zone	Operational
MW-18B	Corrective Action	WMU-1	B-Zone	Operational
MW-19B	Corrective Action	WMU-1	B-Zone	Operational
MW-20B	Corrective Action	WMU-1	B-Zone	Operational
MW-23B	Corrective Action	WMU-1	B-Zone	Operational
MW-24B	Corrective Action	WMU-1	B-Zone	Operational
MW-25B	Corrective Action	WMU-1	B-Zone	Operational
MW-26B	Corrective Action	WMU-1	B-Zone	Operational
MW-27B	Corrective Action	WMU-1	B-Zone	Operational
MW-28B	Corrective Action	WMU-1	B-Zone	Operational
MW-29B	Corrective Action	WMU-1	B-Zone	Operational
MW-30B	Corrective Action	WMU-1	B-Zone	Operational
MW-31B	Corrective Action	WMU-1	B-Zone	Operational
MW-32B	Corrective Action	WMU-1	B-Zone	Operational
MW-33B	Corrective Action	WMU-1	B-Zone	Operational
MW-36B	Corrective Action	WMU-1	B-Zone	Operational

Monitoring Well	Program	Monitored WMU	Water-Bearing Zone	Status
MW-16C	Corrective Action	WMU-1	C-Zone	Operational
MW-18C	Corrective Action	WMU-1	C-Zone	Operational
MW-19C	Corrective Action	WMU-1	C-Zone	Operational
MW-20C	Corrective Action	WMU-1	C-Zone	Operational
MW-21C	Corrective Action	WMU-1	C-Zone	Operational
MW-22C	Corrective Action	WMU-1	C-Zone	Operational

37. The Facility's current **unsaturated zone** monitoring network consists of the following existing monitoring points as shown in **Attachment G**:

Table 2. Existing Unsaturated Zone Monitoring Network

Monitoring Point	Type	Program	Monitored Units	Status
Gas-1	Gas Probe	Corrective Action, Soil-Pore Gas	WMU-1	Operational
Gas-2	Gas Probe	Corrective Action, Soil-Pore Gas	WMU-1	Operational
Gas-3	Gas Probe	Corrective Action, Soil-Pore Gas	WMU-1	Operational
Gas-4	Gas Probe	Detection, Soil-Pore Gas	WMU-1	Operational
Gas-5	Gas Probe	Detection, Soil-Pore Gas	WMU-1 / WMU-2	Operational
Gas-6	Gas Probe	Detection, Soil-Pore Gas	WMU-1 / WMU-2	Operational
Gas-7	Gas Probe	Corrective Action, Soil-Pore Gas	WMU-1	Operational
Gas-8	Gas Probe	Detection, Soil-Pore Gas	WMU-2	Operational
Gas-9	Gas Probe	Detection, Soil-Pore Gas	WMU-2	Operational

Monitoring Point	Type	Program	Monitored Units	Status
6L	Suction Lysimeter	Detection	WMU-2, Cell 6	Operational
6R	Suction Lysimeter	Detection	WMU-2, Cell 6	Operational
7/8	Pan Lysimeter	Detection	WMU-2, Cell 7 and 8	Operational

38. The Facility's current **surface water** monitoring network consists of the following existing monitoring points as shown in **Attachment G**:

Table 3. Existing Surface Water Monitoring Network

Monitoring Point	Location	Program	Monitored Units	Status
SW-1	Putah Creek	Background (Upstream)	Putah Creek	Operational
SW-2	Putah Creek	Detection (Downstream)	Putah Creek	Operational

39. The Facility's current **leachate** monitoring network consists of the following monitoring points:

Table 4. Existing Leachate Monitoring Network

Monitoring Point	Location	Program	Monitored Units	Status
Leachate 6	LCRS Sump	N/A	WMU-2, Cell 6	Operational
Leachate 7/8	LCRS Sump	N/A	WMU-2, Cell 7 and 8	Operational

40. Current groundwater monitoring results during 2017 and 2018 are summarized in the table below. The highest reported monitoring result for the calendar year is shown in the table. Monitoring results shown in italics are the highest detected result for the year below the California Public Health Goal (PHG). Monitoring results where there is a dash indicates that the Constituent of Concern (COC)

was not detected above the method detection limit (MDL). Results shown non-italicized are results above the PHG but below the California Code of Regulations, title 22 (Title 22) Primary Maximum Contaminant Level (MCL). Monitoring results in bold are above the primary MCL for the COC.

Table 5. Groundwater Monitoring Data for 2017-2018

Constituent of Concern (COC)	Carbon Tetrachloride		Chloroform		1,1-Dichloroethane		Benzene		cis-1,2-Dichloro-ethene		Trichloroethene (TCE)		Tetrachloroethene (PCE)		Vinyl Chloride	
Title 22 Primary MCL[1] (ug/L)	**0.5**		**80**		**5**		**1**		**6**		**5**		**5**		**0.5**	
Public Health Goal (ug/L)	**0.1**		**1**		**3**		**0.15**		**100**		**1.7**		**0.06**		**0.05**	
Well ID	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**
MW 02A	-	-	0.16	-	2.6	1.7	-	-	2.9	-	4.2	1.8	0.46	0.33	-	-
MW 03A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 04A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 06A	-	0.19	-	-	-	-	-	-	-	-	-	-	0.15	-	-	-
MW 07A	0.13	0.17	0.17	-	-	-	-	-	0.36	-	0.17	-	0.15	-	-	-
MW 08A	-	0.16	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 09A	-	0.16	0.20	-	-	-	-	0.16	0.14	-	0.35	0.26	0.33	0.36	-	-
MW 10A	-	0.17	0.17	-	0.66	0.49	-	-	-	1.2	1.5	1.1	0.32	0.28	-	-
MW 10B	0.14	0.21	0.20	-	-	-	-	-	-	-	-	0.15	0.13	-	-	-
MW 11A	-	-	0.16	-	-	-	-	-	0.16	-	0.15	-	0.15	-	-	-
MW 12A	-	0.16	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-
MW 13A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 14A	-	0.19	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 15A	-	-	0.23	-	4	3.3	-	-	**33**	**37**	4	3.4	0.71	0.64	**1.1**	**0.87**
MW 16A	0.21	0.27	7.1	4.3	-	-	-	-	-	-	-	-	0.12	0.14	-	-
MW 16B	0.19	0.2	7.6	0.82	-	-	-	-	-	-	0.17	0.19	0.2	0.2	-	-
MW 16C	**3.1**	**2.9**	61	**81**	-	-	-	-	-	-	0.18	0.2	0.13	0.14	-	-
MW 17A	-	-	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 17B	0.17	0.19	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-
MW 18B	**0.6**	**0.71**	19	17	-	-	-	-	0.16	-	0.37	0.4	0.21	0.2	-	-

Constituent of Concern (COC)	Carbon Tetrachloride		Chloroform		1,1-Dichloroethane		Benzene		cis-1,2-Dichloro-ethene		Trichloroethene (TCE)		Tetrachloroethene (PCE)		Vinyl Chloride	
Title 22 Primary MCL[1] (ug/L)	**0.5**		**80**		**5**		**1**		**6**		**5**		**5**		**0.5**	
Public Health Goal (ug/L)	**0.1**		**1**		**3**		**0.15**		**100**		**1.7**		**0.06**		**0.05**	
Well ID	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**	**2017**	**2018**
MW 18C	0.16	0.27	2.4	-	-	-	-	-	-	-	-	-	-	0.12	-	-
MW 19B	0.18	0.28	0.49	0.29	0.13	0.15	-	-	-	-	0.3	0.29	0.15	0.13	-	-
MW 19C	0.16	0.27	0.14	-	-	-	-	-	-	-	-	-	0.12	0.12	-	-
MW 20B	**1.6**	**1.4**	49	46	-	-	-	-	-	-	0.26	0.27	0.31	0.32	-	-
MW 20C	0.2	0.24	2.7	0.33	-	-	-	-	-	-	-	0.14	-	0.12	-	-
MW 21C	0.17	0.22	0.24	-	-	-	-	-	-	-	-	-	0.13	0.12	-	-
MW 22C	0.25	0.27	3.5	-	-	-	-	-	-	-	-	-	-	0.13	-	-
MW 23B	0.14	0.26	0.29	0.22	-	-	-	-	-	-	-	-	0.16	-	-	-
MW 24B	0.29	0.36	5.1	5.7	-	-	-	-	-	0.21	0.3	0.3	-	-	-	-
MW 25B	0.18	0.3	0.43	0.23	-	-	-	-	-	-	-	-	0.14	-	-	-
MW 26B	0.17	0.3	0.15	-	-	-	-	-	-	-	-	-	0.15	-	-	-
MW 27B	0.36	0.41	6	6.1	-	-	-	0.34	-	-	0.14	-	-	-	-	-
MW 28B	0.31	0.36	3.4	4.3	-	-	-	0.25	-	-	0.17	0.18	0.15	-	-	-
MW 29B	0.28	0.3	6.3	7.1	-	-	-	0.25	-	-	-	-	-	-	-	-
MW 30B	0.16	-	7.1	9.4	-	-	-	0.24	-	-	-	-	0.14	-	-	-
MW 31B	0.25	0.35	20	14	-	-	-	0.34	-	-	0.13	-	0.15	-	-	-
MW 32B	0.16	0.29	0.55	0.74	-	-	-	0.32	-	-	-	-	-	-	-	-
MW 33B	-	0.17	3.5	3.8	-	-	-	0.2	-	-	-	-	0.15	-	-	-
MW 34A	-	0.25	0.15	-	-	-	0.33	-	-	-	-	-	-	-	-	-
MW 35A	-	-	1.2	-	-	-	0.36	-	-	-	0.13	-	0.14	-	-	-
MW 36B	-	-	0.9	0.69	-	-	0.23	-	-	-	-	-	-	-	-	-

41. Lined WMU-2 has a leachate collection and removal system (LCRS) in which leachate drains through a geocomposite drainage layer and is collected by a network of perforated high-density polyethylene (HDPE) pipe laterals that drain to two riser sumps located on the north and west side of WMU-2. Leachate is

pumped from the sumps into onsite storage tanks and then is collected from the storage tanks by water trucks and hauled to the UC Davis Wastewater Treatment Plant for treatment and disposal.

42. As discussed in the operative MRP, the above-described monitoring networks comply with the requirements of Title 27. (See Title 27, §§ 20415–20435.)

43. In the Discharger's 2019 ROWD the Discharger proposed a Water Quality Protection Standard (WQPS) using an intrawell statistical method for determining earliest detection of a release. Review of the proposed WQPS determined that intrawell statistical method proposed in the ROWD should not be used when a release has already occurred or for VOCs. These WDRs in the Provisions require the Discharger to Water Quality Protection Standards (WQPS) and associated concentration limits that protect water quality taking into account background groundwater conditions prior to a release from a WMU or propose CLGBs in accordance with Title 27, section 20400.

Corrective Actions

44. **Previous Corrective Action for Chloroform Plume.** Groundwater impacts and historical corrective action associated with the UC Davis Class III former landfill have consisted primarily of chloroform. Former chemical burn pits have been identified as the likely source of the chloroform in groundwater (URS 2003, HLA 1995). The landfill began operating in 1966 and the chemical burns were discontinued in the late 1970's. The approximate location of the former chemical burn pits is shown on **Attachment B**. As part of a 1994 investigation Harding Lawson Associates (HLA) completed a source area investigation consisting of a review of historical information, geophysical surveys, trenching, soil gas surveys, and soil and groundwater sampling (HLA 1995). Based on this investigation it was concluded that the chloroform detected in groundwater was associated with the former burn pits. The grab-groundwater samples collected during the 1994 investigation that had the highest chloroform concentrations were in the B-zone approximately 600 and 1,500 feet downgradient (northeast) of the burn pits, with concentrations of 220 and 600 µg/L, respectively. The following corrective action measures were taken to address the release of chloroform from the facility's past operations:

    a. **Final Closure Cover.** Groundwater impacts were identified in groundwater samples collected as part of the Solid Waste Assessment Test (SWAT) in 1987. As a result of the impacts, WDRs Order No. 96-228 required the early closure of WMU-1 due to significant groundwater impacts from the unlined Unit. WMU-1 was closed in April 2001with a Title 27 compliant prescriptive final closure cover as described in Finding 48.

b. **Soil Vapor Extraction.** A soil vapor extraction (SVE) pilot test was conducted as part of an investigation of the former burn pits. Chloroform concentrations in soil gas reported for samples collected during this test ranged from 4.7 parts per million by volume (ppmv) to 100 ppmv. A soil vapor extraction system was installed in the vicinity of the burn pits in March 1996. Eleven soil vapor extraction wells, designated SV-1 through SV-11, were installed in 1996 between the North and South WMU-1 fill areas. This system operated intermittently through May 1999 when it was taken offline due to WMU-1 landfill closure activities. These wells were part of a groundwater corrective action program but are no longer in use as a result of reductions of VOC concentrations. The maximum chloroform concentration in soil gas samples collected from the SVE wells in August 2000 was 0.25 µg/L. Based on those results, it was concluded that soil gas concentrations had been reduced to the point that the system was no longer effective in removing VOCs from the soil. These wells have been capped, but the soil vapor well lateral piping remains connected to the main header. The 2003 WDRs stated that the soil vapor extraction was discontinued due to reduction of VOC concentrations in the extracted soil vapor to nearly non-detectable levels.

c. **Landfill Gas (LFG) Extraction.** Active landfill gas extraction is an effective corrective action measure for reducing the amount of VOCs leaving a WMU through reducing gas pressure within the waste mass and as a result reducing gas migration to the underlying vadose zone and groundwater. Landfill gas at WMU-1 and WMU-2 is controlled through 36 landfill gas extraction wells and the gas is conveyed through a network of pipes to the UC Davis Primate Center as fuel for the facility's boiler unit or to the existing gas flare state when not used by the Primate Center. 34 vertical extraction wells, designated VW-01 through VW-32, VW-33A and VW-34B were installed in WMU-1 as shown in **Attachment K**. Well depths vary from 19 to 45 feet bgs. Ten of these wells are installed in shallow waste or soils at the unit perimeter for purposes of soil gas migration control: VW-9, VW-26, VW-27, VW-28, VW-29, VW-30, VW-31, VW-32, VW-33A and VW-33B. Wells VW-34 and VW-35 were installed in WMU-2. Three additional wells were installed as part of the closure of WMU-2 as shown in Attachment L.

d. **Groundwater Extraction.** Aquifer testing and groundwater modeling activities were conducted in 1995 to support the design of a B-zone groundwater extraction well field (Dames & Moore, 1995). Based on the results of this work five groundwater extraction wells were installed and brought online in 1996 (BC 2017). Extraction well EW-1 was shut down in July 2001 when monitoring data indicated that chloroform concentrations at the location were below detection limits. In 2002 and 2003, monitoring

well installation and sampling, aquifer testing, and groundwater modeling were conducted to assess remedial alternatives in response to increasing VOC concentrations in the C-zone groundwater. An additional groundwater extraction well was installed near MW-16C in early 2003 (URS 2003). The groundwater extraction system continues to operate at the site.

In 2003 URS conducted additional sampling in the former burn pit area and chloroform was not detected in the two B-zone samples in the former chemical burn pit area or three downgradient sample locations (URS 2003). The 2003 URS report concluded that while the former chemical burn pits were in the past a source area for chloroform, they were no longer an ongoing source and the initial mass of chloroform from the burn pits had moved downgradient (URS 2003).

45. **Additional Corrective Action Required.** As shown in Finding 40 recent groundwater monitoring in 2017 and 2018 indicates that there continues to be a release of constituents of concern above the California Division of Drinking Water's Primary Maximum Contaminant Level (MCL) for carbon tetrachloride in groundwater monitoring wells MW-16C, MW-18B, and MW-20B. Also, chloroform continues to exceed the primary MCL in MW-16C. Furthermore, in groundwater monitoring well MW-15A, cis-1,2-dichloroethene and vinyl chloride exceeds the primary MCL. **Attachment I** shows the iso-concentration map the Discharger provided for chloroform. **Attachment J** shows an estimated iso-concentration map for carbon tetrachloride that was created from data provided by the Discharger. These WDRs in the Provisions require the Discharger to:

a. Determine of the lateral and vertical extent of the VOC plume of chloroform, carbon tetrachloride, cis-1,2-dichloroethene, and vinyl chloride in the three hydro-stratigraphic units identified as A-zone, B-zone, and C-zone downgradient of WMU-1 WMU-2;

b. Continue to operate, maintain, and expand as necessary the Discharger's groundwater extraction system as corrective action to mitigate the release of VOCs; and

c. Provide an updated corrective action evaluation technical report based on corrective action measures currently in use that describes how long it can be expected before the corrective action measures restore downgradient water quality to background water quality. If background water quality cannot ever be attained through the current corrective action measures the technical report should evaluate additional corrective action measures or propose a level of water quality where concentration limits are greater than background (CLGB).

46. **CABA Facility Groundwater Recharge.** In 2014 UC Davis began diverting effluent from the CABA Putah Creek Facility into infiltration basins and ceased discharge to Putah Creek. The infiltration of effluent from CABA does not appear to have resulted in the degradation of groundwater quality, particularly with respect to chloroform (BC 2017). Since 2013, the chloroform plume size has not changed significantly (Attachment F). Infiltration Basins 1, 2 and 3 are located approximately 2,000 feet west of the chloroform plume and effects on groundwater levels are dissipated as groundwater travels from Basins 1, 2 and 3 to the chloroform plume. The concentrations of chloroform in groundwater near the discharge basins are no longer detectable. Therefore, the additional 2 to 3 feet of infiltration localized around Basins 1, 2 and 3 do not appear to have a significant effect on groundwater 2500 feet to the west the basins, where chloroform concentrations are present (BC 2017). The potential changes in groundwater levels caused by infiltration of CABA effluent to the basins is controlled by extraction wells EW-2, EW-3, EW-4 and EW-6 which are on the western portion of the chloroform plume and draw the groundwater levels down by pumping.

Unit Closures

47. On 7 May 1999 and 19 September 2012, the Discharger submitted a Final Closure and Post-Closure Maintenance Plan (FCPMP) for unlined WMU-1 and lined WMU-2 respectively, which set forth a schedule for closure of the WMUs at the Facility. In accordance with the FCPMP the WMUs were closed as shown below:

WMU Module	Closure Date
WMU-1	31 October 2001
WMU-2	17 February 2015

48. WMU-1 was closed with a Title 27 prescriptive cover consisting of (bottom to top):

    a. 2-foot thick foundation layer;

    b. 1-foot thick low hydraulic conductivity soil layer having a hydraulic conductivity of 1 $x10^{-6}$ cm/sec or less; and

    c. 1-foot thick vegetative cover soil layer.

49. WMU-2 was closed with an engineered alternative to the Title 27 prescriptive cover consisting of (bottom to top):

a. A foundation layer;

b. 1-foot thick low hydraulic conductivity soil layer having a hydraulic conductivity of 1 $x10^{-6}$ cm/sec or less or geosysynthetic clay layer where applicable;

c. 50-mil low density polyethylene (LLDPE) geomembrane barrier layer;

d. 8-ounce geotextile to serve as a drainage layer;

e. A toe drain consisting of geotextile wrapped gravel and HDPE piping; and

f. 1.5-foot thick vegetative cover soil layer.

Post-Closure Maintenance

50. The Discharger's 2012 Final Closure and Post-Closure Maintenance Plan (FCPMP) provides for post-closure maintenance of WMU-1 and WMU-2 for the entire post-closure maintenance period of at least 30 years, and until it is demonstrated that the Facility no longer poses a threat to the public health and safety and the environment. (See Title 27, §§ 20950(a)(1), 21180(a).) The FCPMP includes the following components:

a. Inspection and maintenance of final cover(s), drainage feature(s), LCRS, all groundwater and unsaturated zone monitoring points, any onsite landfill gas extraction systems, any required groundwater corrective action systems, and Facility security systems.

b. workplans for inspection, maintenance and monitoring during the post-closure maintenance period.

Financial Assurances

51. The Discharger's FCPMP includes costs estimates for: (a) post-closure maintenance; and (b) corrective action for foreseeable releases. As of the date of this Order, the Discharger's cost estimates, calculated in accordance with Title 27, are as follows:

Financial Assurance Requirement	Estimated Cost
Post-Closure Maintenance (Title 27, §§ 22210–22212)	$2,554,441
Non-Water Corrective Action (Title 27, §§ 22220–22222)	$3,437,864

52. This Order requires the Discharger to maintain financial assurances with CalRecycle in at least the Estimated Cost amounts specified above.

53. As of the date of this Order, post-closure maintenance fund and corrective action fund balances are as follows:

Financial Assurance Requirement	Current Fund Balance
Post-Closure Maintenance	$2,554,441 (Pledge of Revenue)
Non-Water Corrective Action	$3,437,864 (Pledge of Revenue)

Other Regulatory Considerations

54. This Order implements the Central Valley Water Board's *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (*Basin Plan*), which designates beneficial uses for surface water and groundwater and establishes water quality objectives (WQOs) necessary to preserve such beneficial uses. (See Wat. Code, § 13241 et seq.)

55. Surface drainage that does not drain to onsite stormwater ponds shown in **Attachment H** drains to Putah Creek which drains into the Yolo Bypass and then into the Sacramento-San Joaquin Delta.

56. According to the operative *Basin Plan*, designated **beneficial uses of the nearest surface water** include municipal and domestic supply (MUN); agricultural supply (AGR); water contact recreation (REC-1); non-water contact recreation (REC-2); warm freshwater habitat (WARM); potential cold freshwater habitat (COLD); wildlife habitat (WILD); and spawning, reproduction and/or early development (SPAWN).

57. Per the operative *Basin Plan*, designated **beneficial uses of groundwater** at the Facility include municipal and beneficial use (MUN); agricultural supply (AGR); and industrial process supply (PRO).

58. The issuance of this Order, which prescribes waste discharge requirements and monitoring for an existing facility, is exempt from the procedural requirements of the California Environmental Quality Act (CEQA), Public Resources Code section 21000 et seq., pursuant to section 15301 of the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.).

59. The State Water Resources Control Board's *Statement of Policy with Respect to Maintaining High Quality Waters in California*, Resolution 68-16 (*Antidegradation Policy*) prohibits the Central Valley Water Board from authorizing degradation of "high quality waters" unless it is shown that such degradation: (1) will be consistent with the maximum benefit to the people of California; (2) will not unreasonably affect beneficial uses, or otherwise result in water quality less than as prescribed in applicable policies; and (3) is minimized through the discharger's best practicable treatment or control.

60. Consistent with Title 27, this Order requires the Discharger to maintain the Facility so as to contain waste within WMUs, thereby preventing degradation of water quality. Accordingly, this Order complies with the *Antidegradation Policy*.

61. For the purposes of California Code of Regulations, title 23 (Title 23), section 2200, the Facility has a threat-complexity rating of **2**-**B**, where:

    a. Threat Category "2" reflects waste discharges that can impair receiving water beneficial uses, cause short-term water quality objective violations, cause secondary drinking water standard violations, and cause nuisances; and

    b. Complexity Category "B" reflects any discharger not included in Category A, with either (1) physical, chemical or biological treatment systems (except for septic systems with subsurface disposal), or (2) any Class II or Class III WMUs.

62. Water Code section 13263, subdivision (b)(1) provides that:

> [T]he regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region … shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

63. The technical reports required under this Order, as well as those required under the separately issued MRP, are necessary to ensure compliance with prescribed WDRs and the provisions of Title 27.

Procedural Requirements

64. All local agencies with regulatory jurisdiction over land-use, solid waste disposal, air pollution and public health protection have approved the use of the Facility's site for the discharge of waste to land as provided for herein.

65. The Discharger, interested agencies and interested persons were notified of the Central Valley Water Board's intent to prescribe the WDRs in this Order, and provided an opportunity to submit their written views and recommendations at a public hearing. (Wat. Code, § 13167.5; Title 27, § 21730.)

66. At a public meeting, the Central Valley Water Board heard and considered all comments pertaining to the discharges regulated under this Order.

REQUIREMENTS

IT IS HEREBY ORDERED THAT, pursuant to Water Code sections 13263 and 13267: WDRs Order R5-2003-0077 is hereby rescinded, except for enforcement purposes; and that the Discharger, their agents, successors and assigns, in accordance with Water Code division 7 (§ 13000 et seq.), shall comply with the following requirements.

A. Prohibitions

Except as otherwise expressly directed below, the Discharger shall comply with all *Standard Prohibitions* (SPRRs, § C), which are incorporated herein, as well as the following.

1. The Discharger is prohibited from discharging any waste to the closed waste management units.

2. The Discharger is prohibited from discharging any liquids to waters of the US from any stormwater ponds mutually shared with the CABA facility.

B. Discharge Specifications

The Discharger shall comply with all *Standard Discharge Specifications* (SPRRs, § D), which are incorporated herein.

C. Facility Specifications

The Discharger shall comply with all *Standard Facility Specifications* (SPRRs, § E) which are incorporated herein.

D. Landfill Post-Closure Maintenance

Except as otherwise directed below, the Discharger shall comply with all *Standard Post-Closure Specifications* (SPRRs, § G) and closure-related *Standard Construction Specifications* (SPRRs, § F), as well as the following with respect to post-closure of landfills at the Facility.

1. After final cover installation, the Discharger may perform minor modifications to problematic areas of the final cover, provided that: (a) the barrier layer of the final cover (e.g., geomembrane, GCL and/or compacted clay layer) remains intact; and (b) the Central Valley Water Board approves of such modifications.

2. The Discharger shall apply sufficient seed, binder and nutrients to the vegetative/erosion-resistant layer to establish the vegetation proposed in the final closure plan. The Discharger shall also install any necessary erosion and sedimentation controls to protect vegetation while it is being established.

E. Financial Assurances

Except as otherwise directed below, the Discharger shall comply with all *Standard Financial Assurance Provisions* (SPRRs, § H), as well as the following.

1. The Discharger shall maintain with CalRecycle assurances of financial responsibility for the Estimate Cost amounts specified for each category in **Finding 51**, adjusted annually for inflation.

2. A report regarding financial assurances, or a copy of the financial assurances report submitted to CalRecycle, shall be submitted to the Central Valley Water Board **annually**, no later than **1 June**.

3. If CalRecycle determines that the Discharger's financial assurances for the facility are inadequate, the Discharger shall, within 90 days of such determination:

    a. Obtain a new financial assurance mechanism for the amount specified by CalRecycle; and

    b. Submit a report documenting such financial assurances to CalRecycle and the Central Valley Water Board.

4. The Discharger's FCPMP shall include all components required per Title 27, section 21769, subdivision (c), and include a lump sum cost estimate for undertaking at least 30 years of post-closure maintenance.

5. Whenever changed conditions increase the estimated costs of post-closure maintenance, Discharger shall promptly submit an updated FCPMP to the Central Valley Water Board, CalRecycle and the LEA.

F. Monitoring

Except as otherwise directed below, the Discharger shall comply with all applicable Standard Monitoring Specifications (SPRRs, § I) and Standard Response to Release Specifications (SPRRs, § J), as well as the following:

1. The Discharger shall comply with all provisions of the separately-issued MRP R5-2019-0060 and any subsequent revisions thereto.

2. The Discharger shall comply with the Water Quality Protection Standard (WQPS) set forth in the operative MRP (see also Title 27, § 20390); and shall verify the compliance of each WMU with each subsequent monitoring event.

3. For all WMUs, the Discharger shall implement a groundwater, surface water and unsaturated zone detection monitoring program (DMP) in accordance with Title 27, sections 20385, 20415 and 20420.

4. For each WMU subject to corrective action, the Discharger shall implement a corrective action program (CAP) in accordance with Title 27, sections 20385, 20415 and 20430, and Section I of the SPRRs.

5. Constituents of concern (COC) in water passing through each WMU's Point of Compliance shall not exceed concentration limits specified in the operative MRP. The Point of Compliance is a vertical plane situated at the hydraulically downgradient limit of each WMU, extending through the uppermost underlying aquifer. (See Title 27, §§ 20164, 20405.)

G. General Provisions

Except as otherwise expressly directed below, the Discharger shall comply with the Standard General Provisions (SPRRs, § K), as well as the following.

1. Notwithstanding **Section F.1**, the provisions of this Order shall supersede any contrary provision in MRP R5-2019-0060 and revisions thereto.

2. The Discharger shall comply with all applicable provisions of Title 27 and Code of Federal Regulations, title 40, part 258, including those not specifically referenced in this Order.

3. Measures implemented as part of a Corrective Action Program (e.g., landfill gas or groundwater extraction) shall not be terminated without

express written approval by the Executive Officer. Central Valley Water Board staff shall be notified of all extraction system shutdowns lasting longer than 24 hours. For the purposes of this provision, "terminated" does not include:

a. Extraction system shutdowns of less than 24 hours (e.g., routine maintenance); and

b. Planned periods of extraction system nonoperation, if previously-approved in writing by Central Valley Water Board staff.

4. The Discharger shall ensure that operating personnel are familiar with this Order (including all attachments and SPRRs) and the operative MRP, both of which shall be kept onsite and made available at all times to operating personnel and regulatory agency personnel.

5. All reports and monitoring data shall be submitted online in an appropriately-formatted file via the State Water Board's **GeoTracker** Database, at http://geotracker.waterboards.ca.gov. (Title 23, §§ 3892(d), 3893.) Additional information regarding electronic submittals is accessible through the "Information" tab on the GeoTracker homepage.

   After uploading a document via GeoTracker, the submitting party shall notify Central Valley Water Board staff via email at centralvalleysacramento@waterboards.ca.gov, including the following information body of the email:

Attention:	Title 27 Compliance & Enforcement Unit *or* Title 27 Permitting Unit
Report Title:	[title of submitted report]
Discharger:	University of California, Davis
Facility:	UC Davis Class III Landfill
County:	Yolo County
CIWQS Place ID:	268925

6. All reports and workplans that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geological sciences, shall:

   a. Be prepared by, or under the direction of, professionals registered to practice in California pursuant to Business and Professions Code sections 6735, 7835 and 7835.1; and

b. Bear the signature(s) and seal(s) of the responsible registered professional(s) described above.

H. Time Schedule

The Discharger shall complete all tasks according to the time schedule set forth below.

Task	Compliance Date
A. Construction Plans	
Submit construction and design plans for review and approval. (See Unit Construction, § D; SPRRs, § I.)	**90 days prior to proposed construction date**
B. Construction Report	
Submit a construction report for review and approval upon completion demonstrating construction in accordance with approved construction plans. (See SPRRs, § F.27.)	**60 days prior to proposed discharges of waste**
C. Water Quality Protection Standards (WQPS). The Discharger shall submit a WQPS and associated concentration limits for review and approval that protects water quality taking into account background groundwater water quality conditions that existed prior to a release from a WMU or propose CLGBs in accordance with Title 27 section 20400	**1 January 2020**
D. Corrective Action- Determining Extent of Release. The Discharger shall submit a technical report, workplan, and schedule for review and approval that determines the lateral and vertical extent of the VOC plume of chloroform, carbon tetrachloride, cis-1,2-dichloroethene, and vinyl chloride in the three hydro-stratigraphic units identified as A-zone, B-zone, and C-zone downgradient of WMU-1 and WMU-2. The Discharger shall implement the workplan and schedule within 180 days of approval.	**1 May 2020**

E.	**Corrective Action- Groundwater Extraction System Effectiveness and Operation.** The Discharger shall submit a technical report, workplan, and schedule for review and approval that evaluates the operation, maintenance, effectiveness of the Discharger's groundwater extraction system as corrective action to mitigate the release of VOCs. If background water quality cannot ever be attained through the current corrective action measures the Discharger shall propose enhancements to the groundwater extraction system as necessary to provide additional corrective action to address the release of VOCs from the WMUs. The Discharger shall implement any workplan and schedule for improvement of the groundwater extraction system within 180 days of approval.	**1 May 2020**
F.	**Corrective Action- Corrective Action Program (CAP) Completion Date.** The Discharger shall submit a technical report based on corrective action measures currently in use or to be proposed that describes how long it can be expected before the corrective action measures restore downgradient water quality to background water quality. The CAP report should evaluate the effectiveness of various corrective action measures currently used i.e., effectiveness of final closure covers, groundwater extraction etc. and other measures that may be used i.e., source removal, cutoff walls, in-situ treatment, etc. in accordance with Title 27 section 20400. If background water quality cannot ever be attained the technical report shall propose a level of water quality where concentration limits are greater than background (CLGB).	**1 January 2021**

Persons aggrieved by this Central Valley Water Board action may petition the State Water Board for administrative review in accordance with Water Code section 13320, and California Code of Regulations, title 23, section 2050 et seq. To be timely, a petition must be received by the State Water Board no later than 5 pm on 30th day after the date that this Order becomes final. However, if the 30th day falls on a Saturday, Sunday or state holiday, the petition must be received by the State Water Board by 5 pm on the

next business day. Copies of the law and regulations applicable to filing petitions are available online (at the address below) and will be provided upon request.

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

I, PATRICK PULUPA, 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, Central Valley Region, on 7 June 2019.

PATRICK PULUPA, Executive Officer

Order Attachments

Glossary of Common Abreviations, Acronyms & Terms

ADC.....Alternative Daily Cover

Antidegradation Policy.....*Statement of Policy with Respect to Maintaining High Quality Waters in California*, State Water Board Resolution 68-16

bgs .....Below Ground Surface

BPTC.....Best Practicable Treatment and Control

C&D.....Construction and Demotion Materials

CalRecycle .....California Department of Resources Recovery and Recycling

CAP.....Corrective Action Program

CAMP.....Corrective Action Monitoring Program

CEQA.....California Environmental Quality Act

CEQA Guidelines .....California Code of Regulations, Title 14, section 15000 et seq.

C.F.R. .....Code of Federal Regulations

COCs .....Constituents of Concern

C-Soil .....Contaminated Soil

CQA .....Construction Quality Assurance

DEIR.....Draft Environmental Impact Report

DMP .....Detection Monitoring Program

DTSC .....California Department of Toxic Substances Control

DWR.....California Department of Water Resources

EC .....Electrical Conductivity

EIR .....Environmental Impact Report

EMP .....Evaluation Monitoring Plan

FCPMP.....Final Closure and Post-Closure Maintenance Plan

FEIR.....Final Environmental Impact Report

FEMA ..... Federal Emergency Management Agency

GCL ..... Geocomposite Liner

HDPE ..... High-Density Polyethylene

JTD ..... Joint Technical Document

LCRS ..... Leachate Collection and Removal System

LEA ..... Local Enforcement Agency

LFG ..... Landfill Gas Condensate

MCE ..... Maximum Credible Earthquake

MDB&M ..... Mount Diablo Base and Meridian

MDL ..... Method Detection Limit

µg/L ..... Micrograms per Liter

mg/L ..... Milligrams per Liter

MPE ..... Maximum Probable Earthquake

msl ..... Mean Sea Level

MRP ..... Monitoring and Reporting Program

MSW ..... Municipal Solid Waste

MSWLF ..... Municipal Solid Waste Landfill

MW ..... Monitoring Well

PCPMP ..... Preliminary Closure and Post-Closure Maintenance Plan

SPRRs ..... Standard Provisions and Reporting Requirements

Subtitle D ..... USEPA-promulgated MSW regulations under RCRA (see 40 C.F.R. part 258)

RCRA ..... Resource Conservation and Recovery Act

ROWD ..... Report of Waste Discharge

TDS ..... Total Dissolved Solids

Title 22 ..... California Code of Regulations, Title 22

Title 23 ..... California Code of Regulations, Title 23

Title 27 ..... California Code of Regulations, Title 27

USEPA ..... United States Environmental Protection Agency

VOCs ..... Volatile Organic Compounds

WDRs ..... Waste Discharge Requirements

WMU ..... Waste Management Unit

WQPS ..... Water Quality Protection Standard

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2019-0060
FOR
UNIVERSITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
CLASS III LANDFILL
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
YOLO COUNTY

This monitoring and reporting program (MRP) is issued pursuant to California Water Code section 13267, subdivision (b)(1), and incorporates requirements for groundwater, surface water, and unsaturated zone monitoring and reporting; facility monitoring, maintenance, and reporting; and financial assurances reporting contained in California Code of Regulations, title 27 (Title 27), section 20005, et seq., Waste Discharge Requirements Order R5-2019-0060 (WDRs), and the Standard Provisions and Reporting Requirements for Landfills dated December 2015 (Landfill SPRRs).

Compliance with this MRP is ordered by the WDRs and the Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Water Board or the Executive Officer.

A. Monitoring

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with Section I of the Landfill SPRRs (Standard Monitoring Specifications) and the Monitoring Specifications in Section G of the WDRs. All monitoring shall be conducted in accordance with the most current approved Sample Collection and Analysis Plan, which includes quality assurance/quality control standards.

All compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern (COCs) as indicated and listed in Tables I through VI.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program, and are identified in the approved Sample Collection and Analysis Plan.

The monitoring program of this MRP includes:

Section	Monitoring Program
A.1	Groundwater Monitoring
A.2	Unsaturated Zone Monitoring
A.3	Leachate, Leachate Seep, Gas Condensate, and Annual LCRS Testing
A.4	Facility Monitoring
A.5	Corrective Action Monitoring

1. Groundwater Monitoring

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of Title 27, Subchapter 3 (Water Monitoring). The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The current groundwater detection monitoring system meets the applicable requirements of Title 27. Section H of the WDRs (Provisions) requires the Discharger to make corrections to its groundwater detection monitoring system and *Sample Collection and Analysis Plan* in order to comply with Title 27.

The Discharger shall revise the groundwater detection monitoring system and update its *Sample Collection and Analysis Plan* (after review and approval by Central Valley Water Board staff) as needed to bring the detection monitoring system in compliance with Title 27 requirements or each time a new landfill cell or module is constructed.

The current groundwater monitoring network shall consist of the following:

Well	**Status[1]**	**Zone[2]**	**Units Monitored**
MW-02A	CAP[3]	A-Zone	WMU-1
MW-03A	CAP	A-Zone	WMU-1
MW-04A	CAP	A-Zone	WMU-1
MW-06A	CAP	A-Zone	WMU-2
MW-07A	CAP	A-Zone	WMU-2
MW-08A	Background	A-Zone	WMU-1

Well	Status[1]	Zone[2]	Units Monitored
MW-09A	CAP	A-Zone	WMU-1
MW-10A	CAP	A-Zone	WMU-1
MW-11A	CAP	A-Zone	WMU-1
MW-12A	CAP	A-Zone	WMU-2
MW-13A	CAP	A-Zone	WMU-2
MW-14A	CAP	A-Zone	WMU-1
MW-15A	CAP	A-Zone	WMU-1
MW-16A	CAP	A-Zone	WMU-1
MW-17A	CAP	A-Zone	WMU-1
MW-34A	CAP	A-Zone	WMU-2
MW-35A	CAP	A-Zone	WMU-2
MW-10B	CAP	B-Zone	WMU-1
MW-16B	CAP	B-Zone	WMU-1
MW-17B	CAP	B-Zone	WMU-1
MW-18B	CAP	B-Zone	WMU-1
MW-19B	CAP	B-Zone	WMU-1
MW-20B	CAP	B-Zone	WMU-1
MW-23B	CAP	B-Zone	WMU-1
MW-24B	CAP	B-Zone	WMU-1
MW-25B	CAP	B-Zone	WMU-1
MW-26B	CAP	B-Zone	WMU-1
MW-27B	CAP	B-Zone	WMU-1
MW-28B	CAP	B-Zone	WMU-1

Well	Status[1]	Zone[2]	Units Monitored
MW-29B	CAP	B-Zone	WMU-1
MW-30B	CAP	B-Zone	WMU-1
MW-31B	CAP	B-Zone	WMU-1
MW-32B	CAP	B-Zone	WMU-1
MW-33B	CAP	B-Zone	WMU-1
MW-36B	CAP	B-Zone	WMU-1
MW-16C	CAP	C-Zone	WMU-1
MW-18C	CAP	C-Zone	WMU-1
MW-19C	CAP	C-Zone	WMU-1
MW-20C	CAP	C-Zone	WMU-1
MW-21C	CAP	C-Zone	WMU-1
MW-22C	CAP	C-Zone	WMU-1

[1] Evaluation monitoring wells may enter a corrective action monitoring program and require increased monitoring frequency as specified in section A.6 if it is determined that these evaluation monitoring points become corrective action monitoring points to address a known release.
[2] "Zone means" relative depth of groundwater monitoring well below ground surface within the uppermost aquifer which are hydraulically connected but have different vertical and lateral permeabilities.
[3.] CAP- Corrective Action Program

Groundwater samples shall be collected from the background wells, detection monitoring wells, evaluation and corrective action monitoring wells, and any additional wells added as part of the approved groundwater monitoring system. The collected samples shall be analyzed for the parameters and constituents listed in Table I for detection monitoring and Section A.5 for corrective action monitoring in accordance with the specified methods and frequencies. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the approved Sample Collection and Analysis Plan.

Once per quarter, the Discharger shall measure the groundwater elevation in each well, determine groundwater flow direction, and estimate groundwater flow rates in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored. If groundwater monitoring wells and wells used only for

monitoring groundwater elevation have monitoring devices installed in them capable of daily monitoring groundwater elevation the Discharger shall daily monitor and record groundwater elevation and report the results on a semiannual basis. Such monitoring devices shall only be removed for (1) allowing groundwater sampling of the well; and (2) maintenance, repair or replacement.

The results shall be reported semiannually, including the times of expected highest and lowest elevations of the water levels in the wells, pursuant to Title 27, section 20415, subdivision (e)(15). All groundwater elevations shall be reported using only one common datum i.e., NAVD88 for the entire network for each quarter/sampling event.

Samples collected for the constituent of concern (COC) monitoring specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VI every five years for all monitoring wells/groundwater monitoring devices. Five-year COCs were last monitored in 2011 and shall be monitored again in 2019. The results shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. The current unsaturated zone detection monitoring system **meets** the applicable requirements of Title 27.

The current unsaturated zone monitoring network consists of:

Mon Pt.	Type	Status	Units Monitored
Gas-1	Gas Probe	CAP, Soil-Pore Gas	WMU-1
Gas-2	Gas Probe	CAP, Soil-Pore Gas	WMU-1
Gas-3	Gas Probe	CAP, Soil-Pore Gas	WMU-1
Gas-4	Gas Probe	Detection, Soil-Pore Gas	WMU-1
Gas-5	Gas Probe	Detection, Soil-Pore Gas	WMU-1/WMU-2
Gas-6	Gas Probe	Detection, Soil-Pore Gas	WMU-1/WMU-2

Mon Pt.	Type	Status	Units Monitored
Gas-7	Gas Probe	CAP, Soil-Pore Gas	WMU-1
Gas-8	Gas Probe	Detection, Soil-Pore Gas	WMU-2
Gas-9	Gas Probe	Detection, Soil-Pore Gas	WMU-2
6L	Suction Lysimeter	Detection	WMU-2, Cell 6
6R	Suction Lysimeter	Detection	WMU-2, Cell 6
7/8	Pan Lysimeter	Detection	WMU-2, Cell 7 and 8

Unsaturated zone samples shall be collected from the monitoring network listed above and shall be analyzed for the parameters and constituents listed in Table II in accordance with the specified methods and frequencies (pan lysimeters need only be sampled when liquid is present). Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed in Table II. Samples collected for the 5-year COC analyses specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VI every five years, beginning again in **2019** (does not include soil-pore gas).

The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan.

Monitoring results for the unsaturated zone shall be included in monitoring reports and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard (WQPS).

3. Leachate, Leachate Seep, Gas Condensate and Annual LCRS Testing

The Discharger shall operate and maintain leachate collection and removal system (LCRS) sumps, conduct monitoring of any leachate LCRS sumps, monitoring of any detected leachate seeps, monitoring of any

underdrain systems, Class II surface impoundments, and conduct annual testing of each LCRS in accordance with Title 27 and this order.

a. Leachate Monitoring

The current LCRS leachate sump monitoring points are:

Monitoring Point	Location	Monitored Units
Leachate 6	LCRS Sump	WMU-2, Cell 6
Leachate 7/8	LCRS Sump	WMU-2, Cells 7-8

All LCRS sumps shall be inspected monthly for the presence of leachate, and flow shall be recorded in accordance with Table III. If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff **within 7 days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table III. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table III whenever liquid is present. All LCRS sump samples shall be analyzed for the 5-year COCs specified in Table III every 5 years, **beginning again in 2019**. The Discharger shall obtain representative samples of leachate in the landfill LCRS sumps prior to discharge into the Class II surface impoundment. Reporting for leachate in LCRS sumps shall be conducted as required in Section B.1 of this MRP, below.

b. Seep Monitoring

Leachate that seeps to the surface from a landfill unit shall be sampled and analyzed for the Field and Monitoring Parameters listed in Table III upon detection. The quantity of leachate shall be estimated and reported as Leachate Flow Rate (in gallons/day). Reporting for leachate seeps shall be conducted as required in Section B.3 of this MRP, below.

c. Gas Condensate Monitoring

Gas condensate from a landfill unit shall be sampled and analyzed for the Field and Monitoring Parameters listed in Table III. The quantity of gas condensate shall be estimated and reported as Gas Condensate Flow Rate (in gallons/month). Reporting for gas

condensate shall be conducted as required in Section B.1 of this MRP, below.

d. Underdrain Monitoring (Not Applicable)

e. Annual LCRS Testing

All LCRSs shall be tested annually pursuant to Title 27, section 20340, subdivision (d) to demonstrate proper operation. The results of these tests shall be reported to the Central Valley Water Board in the Annual Monitoring Report and shall include comparisons with earlier tests made under comparable conditions.

f. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system for any landfill facility where runoff from landfill areas flows or could flow to waters of the United States. The monitoring system shall comply with the applicable provisions of Title 27, sections 20415 and 20420. Currently, surface water drainage is routed to onsite stormwater detention ponds. On rare occasions the Discharger may discharge off-property to drainage courses that discharger to Putah Creek. These discharges do not originate from areas where stormwater has comingled with discharges from an adjacent UC Davis facility that is prohibited from discharging to waters of the United States.

The current surface water monitoring points for the landfill are:

Mon Pt.	Status
SW-1	Background or Upstream in Putah Creek
SW-2	Downstream in Putah Creek

For surface water detection monitoring, a sample shall be collected at each monitoring point location and analyzed for the monitoring parameters and constituents in accordance with the methods and frequency specified in Table IV. All surface water monitoring samples shall be collected and analyzed for the 5-year COCs specified in Table IV every five years, beginning again in 2019.

4. Facility Monitoring

a. Annual Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess repair and maintenance needed

for assuring the integrity and proper operation of drainage control systems, cover systems, and groundwater monitoring wells; and shall assess preparedness for winter conditions (including but not limited to erosion and sedimentation control). The Discharger shall take photos of any problem areas before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. Annual facility inspection reporting shall be submitted as required in Section B.4 of this MRP.

a. Major Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities and all landfill side slopes for damage **within 7 days** following major storm events capable of causing damage or significant erosion. The Discharger shall take photos of any problem areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in Section B.5 of this MRP.

b. Five-Year Iso-Settlement Survey for Closed Units

For closed landfill units, the Discharger shall conduct a five-year iso-settlement survey and produce an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer. For each portion of the landfill, this map shall show the total lowering of the surface elevation of the final cover, relative to the baseline topographic map. (See Title 27, § 21090, subds. (e)(1)-(2).) Reporting shall be in accordance with Section B.6 of this MRP.

c. Standard Observations

The Discharger shall conduct Standard Observations at the landfill in accordance with this section. Standard observations shall be conducted in accordance with the following schedule:

Landfill Unit Type	Frequency	Season
Active	Weekly	Wet: 1 Oct. to 30 April
Active	Monthly	Dry: 1 May to 30 Sept.
Inactive/Closed	Monthly	Wet: 1 Oct. to 30 April
Inactive/Closed	Quarterly	Dry: 1 May to 30 Sept.

The Standard Observations shall include:

i. Landfill Units

(A) Evidence of ponded water at any point on the landfill outside of any contact storm water/leachate diversions structures on the active face (show affected area on map); and

(B) Evidence of erosion and/or of day-lighted refuse.

ii. Landfill Unit Perimeters

(A) Evidence of leachate seeps, estimated size of affected area, and flow rate (show affected area on map); and

(B) Evidence of erosion and/or of day-lighted refuse.

iii. Receiving Water

(A) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area; and

(B) Discoloration and turbidity - description of color, source, and size of affected area.

Results of Standard Observations shall be submitted in the semiannual monitoring reports required in Section B.1 of this MRP.

5. Corrective Action Monitoring

The Discharger shall conduct corrective action monitoring to demonstrate the effectiveness of corrective action in accordance with Title 27, section 20430 and this Order. Groundwater monitoring wells and unsaturated zone monitoring points that are in a corrective action monitoring program shall be monitored in accordance with the groundwater and unsaturated zone monitoring requirements in parts A.1 and A.2 of this Order, except as modified

in this part of the MRP for any additional constituents or modified monitoring frequencies.

d. Groundwater Corrective Action

The Discharger shall monitor the groundwater monitoring wells identified in part A.1 as being part of a corrective action program (CAP) as required in part A.1 and Table I of this Order.

e. Unsaturated Zone Corrective Action

The Discharger shall monitor the unsaturated zone monitoring points identified in part A.2 as being part of a corrective action program (CAP) as required in part A.2 and Table II of this MRP, with the following alternant sampling frequency of Quarterly for all Field and Monitoring Parameters listed in Table II.

f. Groundwater Extraction System

The Discharger shall monitor the groundwater extraction system used as corrective action for the release of VOCs from the WMUs. The Discharger shall monitor appropriately to obtain monthly results and report on a Semiannual basis the following:

i. Extraction Well ID

ii. Operational Status (% Time Operational)

iii. # Gallons Extracted (Monthly)

iv. VOC Concentrations (sampled once per month)

v. # lbs of VOCs Removed (monthly Basis)

g. Landfill Gas Corrective Action System

The Discharger shall continue to operate its active landfill gas extraction system as corrective action for a release of volatile organic compounds (VOCs) to the unsaturated zone or groundwater due to landfill gas.

The landfill gas (LFG) control system and LFG control system influent shall be sampled and analyzed for the Monitoring Parameters listed in Table VII and shall be summarized and tabulated in the semiannual reports.

All shutdowns of the landfill gas extraction system, regardless of the type of restart, shall be summarized and tabulated in the

semiannual reports. The summary shall include the start/stop dates, and the cause of the shutdown. In addition, the LFG plant run-time per month and percent down-time per month shall be reported and tabulated in each semiannual report.

i. Extraction Well Field

The Discharger shall monitor all landfill gas extraction wells installed in unlined WMU-1 and WMU-2 identified in the Discharger's corrective action program for addressing a release of volatile organic compounds (VOCs) to the unsaturated zone or groundwater due to landfill gas. Landfill gas extraction well samples shall be collected from the LFG extraction network used for corrective action shall be analyzed for the parameters and constituents listed in Table VII in accordance with the specified methods and frequencies and shall be reported and tabulated in each semiannual report.

ii. Gas Probes

The Discharger shall monitor any gas probes installed for the purpose of evaluating the effectiveness of corrective action for a release of volatile organic compounds (VOCs) to the unsaturated zone or groundwater due to landfill gas. If landfill gas probes are used to monitor the effectiveness of corrective action measures landfill gas probe samples shall be collected from the monitoring probes used for corrective action and shall be analyzed for the parameters and constituents listed in Table VII in accordance with the specified methods and frequencies and shall be reported and tabulated in each semiannual report.

B. Reporting

The Discharger shall submit the following reports in accordance with the required schedule:

1. Reporting Schedule

Section	Report	End of Reporting Period	Due Date
B.1	Semiannual Monitoring Report	30 June, 31 Dec.	**1 August, 1 February**

Section	Report	End of Reporting Period	Due Date
B.2	Annual Monitoring Report	31 Dec.	**1 February**
B.3	Seep Reporting	Continuous	**Immediately & 7 Days**
B.4	Annual Facility Inspection Report	31 Oct.	**15 November**
B.5	Major Storm Event Reporting	Continuous	**7 days from damage discovery**
B.6	Survey and Iso-Settlement Map for Closed Landfills	Every 5 Years	**At Closure Completion and Every 5 Years**
B.7	Financial Assurances Report	31 Dec.	**1 June**

The Discharger shall enter all monitoring data in electronic data format (EDF) and reports into the online Geotracker database as required by Division 3 of Title 27 and Chapter 30, Division 3 of Title 23. Notification of the Geotracker upload shall be emailed to the Central Valley Water Board at: centralvalleysacramento@waterboards.ca.gov . To ensure that the submittal is routed to the appropriate staff as quickly as possible, the following information shall be included in the body of the email:

Attention:	Title 27 Compliance & Enforcement Unit Or Title 27 Permitting Unit
Report Title	
Geotracker Upload ID	
Discharger name:	University of California, Davis
Facility name:	UC Davis Class III Landfill
County:	Yolo
CIWQS place ID:	CW-268925

2. Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this MRP, and as required in the WDRs and Landfill SPRRs (see § I [Std. Monitoring Specifications] and

§ J [Response to a Release]). In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format, such as a computer disk.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the Central Valley Water Board in accordance with the above schedule for the calendar period in which samples were taken or observations made.

The results of **all monitoring** conducted at the site shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the post-closure period. Such records shall be legible and shall show the following for each sample:

a. Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;

b. Date, time, and manner of sampling;

c. Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;

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

e. Calculation of results; and

f. Results of analyses, and the MDL and PQL for each analysis. All peaks shall be reported.

3. Required Reports

a. Semiannual Monitoring Report

Monitoring reports shall be submitted semiannually and are due on **1 August** and **1 February**. Each semiannual monitoring report shall contain at least the following:

i. For each groundwater monitoring point addressed by the report, a description of:

(A) The time of water level measurement;

(B) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;

(C) The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;

(D) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and

(E) A statement that the sampling procedure was conducted in accordance with the approved Sample Collection and Analysis Plan.

ii. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.

iii. The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report. (Title 27, § 20415, subd. (e)(15).) The Discharger shall provide a map showing the potentiometric surface showing groundwater elevation relative to the bottom of waste e.g., waste in the bottom of the partial LCRS for Area I and bottom of LCRS in Area II and make a determination whether the Discharger has

maintained adequate separation between the waste and the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored including the capillary fringe as required in the WDRs.

iv. Cumulative tabulated monitoring data for all monitoring points and constituents for groundwater, unsaturated zone, underdrain, leachate, gas condensate, and surface water. Concentrations below the reporting limit shall not be reported as non-detect "ND" unless the concentration is below the method detection limit (MDL) and the method detection limit is also given in the table. Laboratory results indicating trace values of COCs between the MDL and PQL (Reporting Limit or RL) shall be reported as estimated values (flagged and estimated value reported). Laboratory results of COCs at or above the PQL shall be reported and indicated clearly as exceeding the PQL relative to laboratory results reported below the PQL. Laboratory results shall clearly distinguish on time series graphs data that is reported as non-detect versus data that was reported at or above MDL (trace) levels. Units shall be as required in Tables I through IV unless specific justification is given to report in other units. See Section I of the Landfill SPRRs (Standard Monitoring Specifications) for requirements regarding MDLs and PQLs.

v. Laboratory statements of results of all analyses evaluating compliance with requirements.

vi. An evaluation of the concentration of each monitoring parameter (or 5-year COC when five-year COC sampling is conducted) as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit. Report any actions taken under Section J of the Landfill SPRRs (Response to a Release) for verified exceedances of a concentration limit for wells/constituents not already in corrective action monitoring.

vii. An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities. Include a summary of any instances where leachate depth on an MSW landfill liner system exceeded 30 cm (excluding the leachate sump), and information about

the required notification and corrective action in Standard Facility Specification E.13 of the Landfill SPRRs.

viii. A summary of all Standard Observations for the reporting period required in Section A.4.c of this MRP.

ix. A tabulation of the results of leachate, gas condensate, underdrain, and Class II surface impoundment monitoring as specified in Section A.3 above.

x. A summary of inspection, leak search, and repair of final covers on any closed landfill units in accordance with an approved final post-closure maintenance plan as required by Standard Closure and Post-Closure Maintenance Specifications G.26 through G.29 of the Landfill SPRRs.

xi. A comprehensive discussion of any Corrective Action Program required by this MRP under Section A.5.

b. Annual Monitoring Report

The Discharger shall submit an Annual Monitoring Report to the Central Valley Water Board by **1 February** covering the reporting period of the previous monitoring year. If desired, the Annual Monitoring Report may be combined with the second semiannual report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. Each Annual Monitoring Report shall contain the following information:

i. A table including all current and historical data for every monitoring device with exceedances clearly highlighted (bolded), and a second table with the current sample results only with exceedances clearly highlighted (bolded).

ii. All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. If a 5-year COC event was performed, then these parameters shall also be graphically presented. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. Graphical analysis of monitoring data may be used to provide significant evidence of a release. The concentration limit from the Water Quality Protection

Standard shall be included on each graph for the applicable constituent.

iii. An evaluation of the monitoring parameters with regards to the cation/anion balance, and a graphical presentation using a Stiff diagram, a Piper graph, or a Schoeller plot.

iv. All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file format such as portable document format (PDF) where the data in tabular form is readably extractible for statistical analysis. The Central Valley Water Board regards the submittal of data in digital format as "...the form necessary for..." statistical analysis (see Title 27, § 20420, subd. (h)), that facilitates periodic review by the Central Valley Water Board.

v. Hydrographs of each well showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.

vi. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.

vii. A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours and include a

projection of the year in which each discrete landfill module will be filled.

viii. A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.

ix. An annual summary of the leachate, seeps, gas condensate, underdrain, and Class II surface impoundment monitoring results as reported in Section B.1 above.

x. The results of the annual testing of leachate collection and removal systems required under Standard Facility Specification E.14 of the Landfill SPRRs.

xi. Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.

xii. The Discharger shall provide a map showing the potentiometric surface showing groundwater elevation relative to the bottom of waste e.g., waste in the bottom of the partial LCRS for Area I and bottom of the LCRS in Area II and make a determination whether the Discharger has maintained adequate separation between the waste and the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored including the capillary fringe as required in the WDRs.

c. Seep Reporting:

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

i. A map showing the location(s) of seepage;

ii. An estimate of the flow rate;

iii. A description of the nature of the discharge (e.g., all pertinent observations and analyses);

iv. Verification that samples have been submitted for analyses of the Field Parameters and Monitoring Parameters listed in

Table III of this MRP, and an estimated date that the results will be submitted to the Central Valley Water Board; and

v. Corrective measures underway or proposed, and corresponding time schedule.

d. Annual Facility Inspection Reporting

By 15 November of each year, the Discharger shall submit a report describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A.4.a of this MRP, above.

e. Major Storm Event Reporting

Following major storm events capable of causing damage or significant erosion, the Discharger immediately shall notify Central Valley Water Board staff of any damage or significant erosion upon discovery and report subsequent repairs within 14 days of completion of the repairs, including photographs of the problem and the repairs. Refer to Section A.4.a of this MRP, above.

f. Survey and Iso-Settlement Map for Closed Landfills

The Discharger shall conduct a survey and submit an iso-settlement map for each closed area of the landfill every five years pursuant to Title 27, section 21090(e). Refer to Section A.4.b of this MRP, above.

g. Financial Assurances Report

By 1 June of each year, the Discharger shall submit a copy of the annual financial assurances report due to CalRecycle that updates the financial assurances for closure, post-closure maintenance, and corrective action. Refer to Financial Assurances Specifications F.1 through F.3 of the WDRs.

C. Water Quality Protection Standard (WQPS) and Compliance Period

1. WQPS Report

For each waste management unit, the Water Quality Protection Standard shall consist of all COCs, the concentration limit for each constituent of concern, the verification retesting procedure to confirm measurably significant evidence of a release, the point of compliance, and all water quality monitoring points for each monitored medium.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the COCs, the concentration limits, and the point of compliance and all monitoring points. Any proposed changes to the Water Quality Protection Standard other than a biennial update (every two years) of the concentration limits shall be submitted in a report for review and approval.

The report shall:

a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management unit or portion of a unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.

b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27, section 20405.

c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).

e. Include a retesting procedure to confirm or deny measurably significant evidence of a release pursuant to Title 27, section 20415(e)(8)(E) and section 20420(j)(1-3).

The Water Quality Protection Standard shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

The Discharger proposed the methods for calculating concentration limits in the Discharger's 2019 Report of Waste Discharge. The proposed limits were calculated using Intrawell tolerance limits. The WDRs order finds using the intrawell statistical method for determining concentration limits at each well inappropriate for a facility where a release of constituents of

concern had already occurred prior to establishing concentration limits for each monitoring point. The WDRs require the Discharger to resubmit a WQPS using interwell statistical methods based on background water quality unaffected by the release of constituents of concern.

The Water Quality Protection Standard shall be updated annually for each monitoring well using new and historical monitoring data.

2. Monitoring Parameters

Monitoring parameters are a select group of constituents that are monitored during each monitoring event that are the waste constituents, reaction products, hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables I through V for the specified monitored medium.

3. Constituents of Concern (COCs)

The COCs include a larger group of waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit and are required to be monitored every five years. (See Title 27, §§ 20395, 20420(g).) The COCs for all units at the facility are those listed in Tables I through IV for the specified monitored medium, and Table VI. The Discharger shall monitor all COCs every five years, or more frequently as required in accordance with a Corrective Action Program. The last 5-year COC report was submitted to the Central Valley Water Board in the 2011 *Annual Monitoring Report*, and 5-year COCs are due to be monitored again in **2019**.

4. Concentration Limits

For a naturally occurring constituent of concern, the concentration limit for each constituent of concern shall be determined as follows:

a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or

b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

In the Discharger's 2019 ROWD the Discharger proposed a Water Quality Protection Standard (WQPS) using an intrawell statistical method for determining earliest detection of a release. Review of the proposed WQPS determined that intrawell statistical method proposed in the 2019 ROWD should not be used when a release has already occurred or for VOCs. This method should only be used at a facility when (1) waste has not been

placed in any WMU and 8 quarters of data has been collected to determine background water quality, or (2) if the Central Valley Water Board has granted concentration limits greater than background (CLGB) and now the monitoring system will be used to detect a new release.

The WDRS requires the Discharger to submit Water Quality Protection Standards (WQPS) and associated concentration limits that protect background water quality taking into account groundwater conditions prior to a release from a WMU or propose CLGBs in accordance with Title 27 section 20400.

Until the Discharger submits appropriate Water Quality Protection Standards and associated concentration limits that meet the requirements of Title 27 section 20390 interim concentration limits shall be used based on the interwell statistical method using upgradient groundwater monitoring well MW-8A as the monitoring point for determining background groundwater quality.

Interim concentration limits were calculated for select parameters using historical groundwater quality monitoring results from MW-8A as follows:

Table 1. Constituent Interim Concentration Limits (Interwell using data from background monitoring wells MW-8A)

Constituent	**Units**	**Interim Concentration Limits[10]**
TDS[1]	(mg/L)[2]	985
Chloride	(mg/L)	54
Sulfate	(mg/L)	57
NO3[3]	(mg/L)	To Be Determined
pH	(pH units)	6.5–8.5[7]
EC[4]	(umhos)[5]	1618
Turbidity	(NTU)[6]	See Note 8
Bicarbonate	(mg/L)	651
Volatile Organic Compounds (VOCs)[9]	ug/L	Non-Detect

[1]TDS: total dissolved solids
[2]mg/L: milligrams per liter
[3]NO_3: nitrate/nitrogen
[4]EC: electrical conductance

[5]umhos: micromhos
[6]NTU: nephelometric turbidity units
[7]Concentration limit based on Sacramento/San Joaquin Basin Plan limitations
[8]Turbidity- Turbidity above 10 NTU indicates potential problems with sampling well screen and sand pack which prevents the Discharger from obtaining representative samples of background water quality. The Discharger shall clearly indicate in the Discharger's self-monitoring report exceedances of turbidity requirements and corrective action measures taken to ensure that representative samples are taken. The Discharger shall also revise its Sampling and Analysis Plan to ensure that representative samples are taken per Title 27 section 20415(b).
[9]VOCs include semi-volatile organic compounds, chlorophenoxy herbicides, and organophosphorus compounds.
[10] Interim Concentration Limits based on 95% coverage, Alpha=.01 unless otherwise noted.

5. Retesting Procedures for Confirming Evidence of a Release

If monitoring results indicate measurably significant evidence of a release, as described in Standard Monitoring Specification I.45 of the Landfill SPRRs, then:

a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Standard Monitoring Specification I.46 of the Landfill SPRRs.

b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedures as required in Standard Monitoring Specification I.47 of the Landfill SPRRs.

6. Point of Compliance

The point of compliance for the water standard at each waste management unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the unit. The following are monitoring locations at the point of compliance:

Cell or Module	Point of Compliance Monitoring Wells
Unlined WMU-1	MW-4A, MW-9A, MW-14A, MW-15A, MW-2A, MW-10A, MW-10B
Lined WMU-2	MW-34A, MW-35A, MW-12A

7. Compliance Period

The compliance period for each waste management unit shall be the number of years equal to the active life of the unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the waste management unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program [Title 27, section 20410].

8. Monitoring Points

A monitoring point is a well, device, or location specified in the waste discharge requirements, which monitoring is conducted and at which the water quality protection standard applies. The monitoring points for each monitored medium are listed in Section A of this MRP.

D. Transmittal Letter for All Reports

A transmittal letter explaining the essential points shall accompany each report. At a minimum, the transmittal letter shall identify any violations found since the last report was submitted, and if the violations were corrected. If no violations have occurred since the last submittal, this shall be stated in the transmittal letter. The transmittal letter shall also state that a discussion of any violations found since the last report was submitted, and a description of the actions taken or planned for correcting those violations, including any references to previously submitted time schedules, is contained in the accompanying report. The transmittal letter shall contain a statement by the discharger, or the discharger's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate, and complete.

The Discharger shall implement the above monitoring program on the effective date of this Program.

I, PATRICK PULUPA, 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, Central Valley Region, on 7 June 2019.

PATRICK PULUPA, Executive Officer

bss/vkj

TABLE I

GROUNDWATER DETECTION MONITORING PROGRAM

Parameter	Geotracker Code	Units	Sampling Frequency	Reporting Frequency
Field Parameters				
Groundwater Elevation	GWELEV	Ft. & 100ths, NAVD88	Quarterly	Semiannual
Temperature	TEMP	^{o}F	Semiannual	Semiannual
Electrical Conductivity	SC	umhos/cm	Semiannual	Semiannual
pH	PH	pH units	Semiannual	Semiannual
Turbidity	TURB	Turbidity units	Semiannual	Semiannual
Monitoring Parameters				
Total Dissolved Solids (TDS)	TDS	mg/L[1]	Semiannual	Semiannual
Chloride	CL	mg/L	Semiannual	Semiannual
Carbonate	CACO3	mg/L	Semiannual	Semiannual
Bicarbonate	BICACO3	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	NO3N	mg/L	Semiannual	Semiannual
Sulfate	SO4	mg/L	Semiannual	Semiannual
Calcium	CA	mg/L	Semiannual	Semiannual
Magnesium	MG	mg/L	Semiannual	Semiannual
Manganese	MN	mg/L	Semiannual	Semiannual
Potassium	K	mg/L	Semiannual	Semiannual
Sodium	NA	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table V)	See Table V	ug/L[2]	Semiannual	Semiannual
5-Year Constituents of Concern (see Table VI)				
Total Organic Carbon	TOC	mg/L	5 years	**2019**
Inorganics (dissolved)	See Table VI	ug/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	See Table VI	ug/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C or D)	See Table VI	ug/L	5 years	‘’ ‘’
Chlorophenoxy Herbicides (USEPA Method 8151A)	See Table VI	ug/L	5 years	‘’ ‘’
Organophosphorus Compounds (USEPA Method 8141B)	See Table VI	ug/L	5 years	‘’ ‘’

1. Milligrams per liter
2. Micrograms per liter

TABLE II

UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS[1]

Parameter	Geotracker Code	Units	Sampling Frequency	Reporting Frequency
Monitoring Parameters				
Volatile Organic Compounds[2] (USEPA Method TO-15)	See Table V	ug/m^3	Annual	Annual
Methane	CH4	%	Semiannual	Semiannual
PAN LYSIMETERS[3] (or other vadose zone monitoring device where liquid and gas may be present)				
Field Parameters				
Electrical Conductivity	SC	umhos/cm	Semiannual	Semiannual
pH	PH	pH units	Semiannual	Semiannual
Volume of liquid removed	--	gallons	Monthly	Semiannual
Monitoring Parameters				
Total Dissolved Solids (TDS)	TDS	mg/L	Semiannual	Semiannual
Chloride	CL	mg/L	Semiannual	Semiannual
Carbonate	CACO3	mg/L	Semiannual	Semiannual
Bicarbonate	BICACO3	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	NO3N	mg/L	Semiannual	Semiannual
Sulfate	SO4	mg/L	Semiannual	Semiannual
Calcium	CA	mg/L	Semiannual	Semiannual
Magnesium	MG	mg/L	Semiannual	Semiannual
Manganese	MN	mg/L	Semiannual	Semiannual
Potassium	K	mg/L	Semiannual	Semiannual
Sodium	NA	mg/L	Semiannual	Semiannual
Arsenic (dissolved)	AS	ug/L	Semiannual	Semiannual
Copper (dissolved)	CU	ug/L	Semiannual	Semiannual
Chromium (dissolved)	CR	ug/L	Semiannual	Semiannual
Volatile Organic Compounds[1](in liquid matrix) (See Table V)	See Table V	ug/L	Semiannual	Semiannual
Volatile Organic Compounds in gas matrix[2] (Use USEPA Method TO-15)	See Table V	ug/m^3	Semiannual	Semiannual
Methane	CH4	%	Semiannual	Semiannual
Carbon Dioxide	CO2	%	Semiannual	Semiannual
Oxygen	OXYGEN	%	Semiannual	Semiannual
5-Year Constituents of Concern (see Table VI)				
Total Organic Carbon	TOC	mg/L	5 years	**2019**
Inorganics (dissolved)	See Table VI	ug/L	5 years	and every 5 years

Volatile Organic Compounds (USEPA Method 8260B, extended list)	See Table VI	ug/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C or D)	See Table VI	ug/L	5 years	‘’ ‘’
Chlorophenoxy Herbicides (USEPA Method 8151A)	See Table VI	ug/L	5 years	‘’ ‘’
Organophosphorus Compounds (USEPA Method 8141B)	See Table VI	ug/L	5 years	‘’ ‘’

1. Soil-pore gas samples collected from landfill gas probes are only subject to the VOC (USEPA Method TO-15) and methane sampling (not the other parameters listed for pan lysimeters).

2. Gas samples may be prescreened to determine if laboratory analysis using Method TO-15 is required. A gas analyzer for methane concentrations or a Photo Ionization Detector (PID) for total VOCs concentrations may be used. If methane concentrations exceeding 1.0 percent by volume OR organic vapors (total VOCs) are detected at a concentration greater than 1.0 ppm then a gas sample shall be obtained and analyzed for VOCs using EPA Method TO-15. Both the screening results and laboratory analysis results shall be reported. Otherwise, the Discharger shall report the methane or total VOC screening results and no further laboratory analysis is required.

3. Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed in Table II.

TABLE III

LEACHATE[1], LEACHATE SEEP[2], GAS CONDENSATE, AND ANNUAL LCRS TESTING[3]

Parameter	Geotracker Code	Units	Sampling Frequency	Reporting Frequency
Field Parameters				
Total Flow	--	Gallons	Monthly	Semiannual
Flow Rate	FLOW	Gallons/Day	Monthly	Semiannual
Electrical Conductivity	SC	umhos/cm	Quarterly	Semiannual
pH	PH	pH units	Quarterly	Semiannual
Monitoring Parameters				
Total Dissolved Solids (TDS)	TDS	mg/L	Annually	Annually
Chloride	CL	mg/L	Annually	Annually
Carbonate	CACO3	mg/L	Annually	Annually
Bicarbonate	BICACO3	mg/L	Annually	Annually
Nitrate - Nitrogen	NO3N	mg/L	Annually	Annually
Sulfate	SO4	mg/L	Annually	Annually
Calcium	CA	mg/L	Annually	Annually
Magnesium	MG	mg/L	Annually	Annually
Manganese	MN	mg/L	Annually	Annually
Potassium	K	mg/L	Annually	Annually
Sodium	NA	mg/L	Annually	Annually
Arsenic (dissolved)	AS	ug/L	Annually	Annually
Copper (dissolved)	CU	ug/L	Annually	Annually
Chromium (dissolved)	CR	ug/L	Annually	Annually
Volatile Organic Compounds[1](in liquid matrix) (See Table V)	See Table V	ug/L	Annually	Annually
5-Year Constituents of Concern (see Table VI)				
Total Organic Carbon	TOC	mg/L	5 years	**2019**
Inorganics (dissolved)	See Table VI	ug/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	See Table VI	ug/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C or D)	See Table VI	ug/L	5 years	‘’ ‘’
Chlorophenoxy Herbicides (USEPA Method 8151A)	See Table VI	ug/L	5 years	‘’ ‘’
Organophosphorus Compounds (USEPA Method 8141B)	See Table VI	ug/L	5 years	‘’ ‘’

LCRS Testing [3]	--	---	Annually	Annually

1. If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table III. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table III whenever liquid is present.
2. Leachate seeps shall be sampled and analyzed for the Field and Monitoring Parameters in this table upon detection. The quantity of leachate shall be estimated and reported in gallons/day. Also, refer to Section B.3
3. The Discharger shall test each LCRS annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions.

TABLE IV

SURFACE WATER DETECTION MONITORING PROGRAM

Parameter	Geotracker Code	Units	Sampling Frequency[1]	Reporting Frequency
Field Parameters				
Electrical Conductivity	SC	umhos/cm	Semiannual	Semiannual
pH	PH	pH units	Semiannual	Semiannual
Turbidity	TURB	Turbidity units	Semiannual	Semiannual
Flow to Waters of U.S.	--	Yes or No	Semiannual	Semiannual
Monitoring Parameters				
Total Dissolved Solids (TDS)	TDS	mg/L	Semiannual	Semiannual
Carbonate	CACO3	mg/L	Semiannual	Semiannual
Bicarbonate	BICACO3	mg/L	Semiannual	Semiannual
Chloride	CL	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	NO3N	mg/L	Semiannual	Semiannual
Sulfate	SO4	mg/L	Semiannual	Semiannual
Calcium	CA	mg/L	Semiannual	Semiannual
Magnesium	MG	mg/L	Semiannual	Semiannual
Manganese	MN	mg/L	Semiannual	Semiannual
Potassium	K	mg/L	Semiannual	Semiannual
Sodium	NA	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table V)	See Table V	ug/L	Semiannual	Semiannual
5-Year Constituents of Concern (see Table VI)				
Total Organic Carbon	TOC	mg/L	5 years	**2019**
Inorganics (dissolved)	See Table VI	ug/L	5 years	and every 5 years
Volatile Organic Compounds (USEPA Method 8260B, extended list)	See Table VI	ug/L	5 years	thereafter
Semi-Volatile Organic Compounds (USEPA Method 8270C or D)	See Table VI	ug/L	5 years	'' ''
Chlorophenoxy Herbicides (USEPA Method 8151A)	See Table VI	ug/L	5 years	'' ''
Organophosphorus Compounds (USEPA Method 8141B)	See Table VI	ug/L	5 years	'' ''

1. Semiannual surface water monitoring is required twice per year when there is water present at the designated surface water monitoring point any time during the reporting period (1 January to 30 June or 1 July to 31 December). Reporting shall include whether there was flow from the facility to waters of the U.S. when the samples were collected.

TABLE V

MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

COC Description	Geotracker Code
pH	PH
Total Dissolved Solids	TDS
Electrical Conductivity	SC
Chloride	CL
Sulfate	SO4
Nitrate nitrogen	NO3N

Volatile Organic Compounds, short list (USEPA Method 8260B):

Acetone	ACE
Acrylonitrile	ACRAMD
Benzene	BZ
Bromochloromethane	BRCLME
Bromodichloromethane	BDCME
Bromoform (Tribromomethane)	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane (Ethyl chloride)	CLEA
Chloroform (Trichloromethane)	TCLME
Dibromochloromethane (Chlorodibromomethane)	DBCME
1,2-Dibromo-3-chloropropane (DBCP)	DBCP
1,2-Dibromoethane (Ethylene dibromide; EDB)	EDB
o-Dichlorobenzene (1,2-Dichlorobenzene)	DCBZ12
m-Dichlorobenzene (1,3-Dichlorobenzene)	DCBZ13
p-Dichlorobenzene (1,4-Dichlorobenzene)	DCBZ14
trans- l ,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane (CFC-12)	FC12
1,1-Dichloroethane (Ethylidene chloride)	DCA11
1,2-Dichloroethane (Ethylene dichloride)	DCA12
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)	DCE11
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)	DCE12C
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)	DCE12T
1,2-Dichloropropane (Propylene dichloride)	DCPA12
cis- 1,3-Dichloropropene	DCP13C
trans- 1,3-Dichloropropene	DCP13T
Di-isopropylether (DIPE)	DIPE
Ethanol	ETHANOL
Ethyltertiary butyl ether	ETBE
Ethylbenzene	EBZ
2-Hexanone (Methyl butyl ketone)	HXO2
Hexachlorobutadiene	HCBU
Hexachloroethane	HCLEA
Methyl bromide (Bromomethene)	BRME
Methyl chloride (Chloromethane)	CLME

TABLE V

MONITORING PARAMETERS FOR DETECTION MONITORING

(Continued)

COC Description	Geotracker Code
Methylene bromide (Dibromomethane)	DBMA
Methylene chloride (Dichloromethane)	DCMA
Methyl ethyl ketone (MEK: 2-Butanone)	MEK
Methyl iodide (Iodomethane)	IME
Methyl t-butyl ether	MTBE
4-Methyl-2-pentanone (Methyl isobutylketone)	MIBK
Naphthalene	NAPH
Styrene	STY
Tertiary amyl methyl ether	TAME
Tertiary butyl alcohol	TBA
1,1,1,2-Tetrachloroethane	TC1112
1,1.2,2-Tetrachloroethane	PCA
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)	PCE
Toluene	BZME
1,2,4-Trichlorobenzene	TCB124
1,1,1-Trichloroethane (Methylchloroform)	TCA111
1,1,2-Trichloroethane	TCA112
Trichloroethylene (Trichloroethene)	TCE
Trichlorofluoromethane (CFC- 11)	FC11
1,2,3-Trichloropropane	TCPR123
Vinyl acetate	VA
Vinyl chloride	VC
Xylenes	XYLENES

TABLE VI

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

Inorganics (dissolved):	**USEPA Method**	**Geotracker Code**
Aluminum	6010	AL
Antimony	7041	SB
Barium	6010	BA
Beryllium	6010	BE
Cadmium	7131A	CD
Chromium	6010	CR
Cobalt	6010	CO
Copper	6010	CU
Silver	6010	AG
Tin	6010	SN
Vanadium	6010	V
Zinc	6010	ZN
Iron	6010	FE
Manganese	6010	MN
Arsenic	7062	AS
Lead	7421	PB
Mercury	7470A	HG
Nickel	7521	NI
Selenium	7742	SE
Thallium	7841	TL
Cyanide	9010C	CN
Sulfide	9030B	S

Volatile Organic Compounds, extended list (USEPA Method 8260B):

COC Description	**Geotracker Code**
Acetone	ACE
Acetonitrile (Methyl cyanide)	ACCN
Acrolein	ACRL
Acrylonitrile	ACRAMD
Allyl chloride (3-Chloropropene)	CLPE3
Benzene	BZ
Bromochloromethane (Chlorobromomethane)	BRCLME
Bromodichloromethane (Dibromochloromethane)	DBCME
Bromoform (Tribromomethane)	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane (Ethyl chloride)	CLEA
Chloroform (Trichloromethane)	TCLME
Chloroprene	CHLOROPRENE
Dibromochloromethane (Chlorodibromomethane)	DBCME
1,2-Dibromo-3-chloropropane (DBCP)	DBCP

TABLE VI

Volatile Organic Compounds, extended list (USEPA Method 8260B): (Continued)

1,2-Dibromoethane (Ethylene dibromide; EDB)	EDB
o-Dichlorobenzene (1,2-Dichlorobenzene)	DCBZ12
m-Dichlorobenzene (1,3-Dichlorobenzene)	DCBZ13
p-Dichlorobenzene (1,4-Dichlorobenzene)	DCBZ14
trans- 1,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane (CFC 12)	FC12
1,1 -Dichloroethane (Ethylidene chloride)	DCA11
1,2-Dichloroethane (Ethylene dichloride)	DCA12
1,1 -Dichloroethylene (1, l-Dichloroethene; Vinylidene chloride)	DCE11
cis- l ,2-Dichloroethylene (cis- 1,2-Dichloroethene)	DCE12C
trans- l ,2-Dichloroethylene (trans- 1,2-Dichloroethene)	DCE12T
1,2-Dichloropropane (Propylene dichloride)	DCPA12
1,3-Dichloropropane (Trimethylene dichloride)	DCPA13
2,2-Dichloropropane (Isopropylidene chloride)	DCPA22
1,1 -Dichloropropene	DCP11
cis- 1,3-Dichloropropene	DCP13C
trans- l ,3-Dichloropropene	DCP13T
Di-isopropylether (DIPE)	DIPE
Ethanol	ETHANOL
Ethyltertiary butyl ether	ETBE
Ethylbenzene	EBZ
Ethyl methacrylate	EMETHACRY
Hexachlorobutadiene	HCBU
2-Hexanone (Methyl butyl ketone)	HXO2
Isobutyl alcohol	ISOBTOH
Methacrylonitrile	METHACRN
Methyl bromide (Bromomethane)	BRME
Methyl chloride (Chloromethane)	CLME
Methyl ethyl ketone (MEK; 2-Butanone)	MEK
Methyl iodide (Iodomethane)	IME
Methyl t-butyl ether	MTBE
Methyl methacrylate	MMTHACRY
4-Methyl-2-pentanone (Methyl isobutyl ketone)	MIBK
Methylene bromide (Dibromomethane)	DBMA
Methylene chloride (Dichloromethane)	DCMA
Naphthalene	NAPH
Propionitrile (Ethyl cyanide)	PACN
Styrene	STY
Tertiary amyl methyl ether	TAME
Tertiary butyl alcohol	TBA
1,1,1,2-Tetrachloroethane	TC1112
1,1,2,2-Tetrachloroethane	PCA
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)	PCE
Toluene	BZME
1,2,4-Trichlorobenzene	TCB124
1,1,1 -Trichloroethane (Methylchloroform)	TCA111
1,1,2-Trichloroethane	TCA112
Trichloroethylene (Trichloroethene; TCE)	TCE

TABLE VI

Volatile Organic Compounds, extended list (USEPA Method 8260B): (Continued)

Trichlorofluoromethane (CFC- 11)	FC11
1,2,3-Trichloropropane	TCPR123
Vinyl acetate	VA
Vinyl chloride (Chloroethene)	VC
Xylene (total)	XYLENES

Semi-Volatile Organic Compounds (USEPA Method 8270C or D - base, neutral, & acid extractables):

Acenaphthene	ACNP
Acenaphthylene	ACNPY
Acetophenone	ACPHN
2-Acetylaminofluorene (2-AAF)	ACAMFL2
Aldrin	ALDRIN
4-Aminobiphenyl	AMINOBPH4
Anthracene	ANTH
Benzo[a]anthracene (Benzanthracene)	BZAA
Benzo[b]fluoranthene	BZBF
Benzo[k]fluoranthene	BZKF
Benzo[g,h,i]perylene	BZGHIP
Benzo[a]pyrene	BZAP
Benzyl alcohol	BZLAL
Bis(2-ethylhexyl) phthalate	BIS2EHP
alpha-BHC	BHCALPHA
beta-BHC	BHCBETA
delta-BHC	BHCDELTA
gamma-BHC (Lindane)	BHCGAMMA
Bis(2-chloroethoxy)methane	BECEM
Bis(2-chloroethyl) ether (Dichloroethyl ether)	BIS2CEE
Bis(2-chloro-1-methyethyl) ether (Bis(2-chloroisopropyl) ether; DCIP)	BIS2CIE
4-Bromophenyl phenyl ether	BPPE4
Butyl benzyl phthalate (Benzyl butyl phthalate)	BBP
Chlordane	CHLORDANE
p-Chloroaniline	CLANIL4
Chlorobenzilate	CLBZLATE
p-Chloro-m-cresol (4-Chloro-3-methylphenol)	C4M3PH
2-Chloronaphthalene	CNPH2
2-Chlorophenol	CLPH2
4-Chlorophenyl phenyl ether	CPPE4
Chrysene	CHRYSENE
o-Cresol (2-methylphenol)	MEPH2
m-Cresol (3-methylphenol)	MEPH3
p-Cresol (4-methylphenol)	MEPH4
4,4'-DDD	DDD44
4,4'-DDE	DDE44
4,4'-DDT	DDT44

TABLE VI

Semi-Volatile Organic Compounds (USEPA Method 8270C or D - base, neutral, & acid extractables

(Continued)

Diallate	DIALLATE
Dibenz[a,h]anthracene	DBAHA
Dibenzofuran	DBF
Di-n-butyl phthalate	DNBP
3,3'-Dichlorobenzidine	DBZD33
2,4-Dichlorophenol	DCP24
2,6-Dichlorophenol	DCP26
Dieldrin	DIELDRIN
Diethyl phthalate	DEPH
p-(Dimethylamino)azobenzene	PDMAABZ
7,12-Dimethylbenz[a]anthracene	DMBZA712
3,3'-Dimethylbenzidine	DMBZD33
2,4-Dimehtylphenol (m-Xylenol)	DMP24
Dimethyl phthalate	DMPH
m-Dinitrobenzene	DNB13
4,6-Dinitro-o-cresol (4,6-Dinitro-2-methylphenol)	DN46M
2,4-Dinitrophenol	DNP24
2,4-Dinitrotoluene	DNT24
2,6-Dinitrotoluene	DNT26
Di-n-octyl phthalate	DNOP
Diphenylamine	DPA
Endosulfan I	ENDOSULFANA
Endosulfan II	ENDOSULFANB
Endosulfan sulfate	ENDOSULFANS
Endrin	ENDRIN
Endrin aldehyde	ENDRINALD
Ethyl methanesulfonate	EMSULFN
Famphur	FAMPHUR
Fluoranthene	FLA
Fluorene	FL
Heptachlor	HEPTACHLOR
Heptachlor epoxide	HEPT-EPOX
Hexachlorobenzene	HCLBZ
Hexachlorocyclopentadiene	HCCP
Hexachloroethane	HCLEA
Hexachloropropene	HCPR
Indeno(1,2,3-c,d)pyrene	INP123
Isodrin	ISODRIN
Isophorone	ISOP
Isosafrole	ISOSAFR
Kepone	KEP

TABLE VI
Semi-Volatile Organic Compounds (USEPA Method 8270C or D - base, neutral, & acid extractables

(Continued)

Methapyrilene	MTPYRLN
Methoxychlor	MTXYCL
3-Methylcholanthrene	MECHLAN3
Methyl methanesulfonate	MMSULFN
2-Methylnaphthalene	MTNPH2
1,4-Naphthoquinone	NAPHQ14
1-Naphthylamine	AMINONAPH1
2-Naphthylamine	AMINONAPH2
o-Nitroaniline (2-Nitroaniline)	NO2ANIL2
m-Nitroaniline (3-Nitroaniline)	NO2ANIL3
p-Nitroaniline (4-Nitroaniline)	NO2ANIL4
Nitrobenzene	NO2BZ
o-Nitrophenol (2-Nitrophenol)	NTPH2
p-Nitrophenol (4-Nitrophenol)	NTPH4
N-Nitrosodi-n-butylamine (Di-n-butylnitrosamine)	NNSBU
N-Nitrosodiethylamine (Diethylnitrosamine)	NNSE
N-Nitrosodimethylamine (Dimethylnitrosamine)	NNSM
N-Nitrosodiphenylamine (Diphenylnitrosamine)	NNSPH
N-Nitrosodipropylamine (N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine)	NNSPR
N-Nitrosomethylethylamine (Methylethylnitrosamine)	NNSME
N-Nitrosopiperidine	NNSPPRD
N-Nitrosospyrrolidine	NNSPYRL
5-Nitro-o-toluidine	TLDNONT5
Pentachlorobenzene	PECLBZ
Pentachloronitrobenzene (PCNB)	PECLNO2BZ
Pentachlorophenol	PCP
Phenacetin	PHNACTN
Phenanthrene	PHAN
Phenol	PHENOL
p-Phenylenediamine	ANLNAM4
Polychlorinated biphenyls (PCBs; Aroclors)	PCBS
Pronamide	PRONAMD
Pyrene	PYR
Safrole	SAFROLE
1,2,4,5-Tetrachlorobenzene	C4BZ1245
2,3,4,6-Tetrachlorophenol	TCP2346
o-Toluidine	TLDNO
Toxaphene	TOXAP
2,4,5-Trichlorophenol	TCP245
0,0,0-Triethyl phosphorothioate	TEPTH
sym-Trinitrobenzene	TNB135

Chlorophenoxy Herbicides (USEPA Method 8151A):

2,4-D (2,4-Dichlorophenoxyacetic acid)	24D
Dinoseb (DNBP; 2-sec-Butyl-4,6-dinitrophenol)	DINOSEB
Silvex (2,4,5-Trichlorophenoxypropionic acid; 2,4,5-TP)	SILVEX
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)	245T

Organophosphorus Compounds (USEPA Method 8141B):

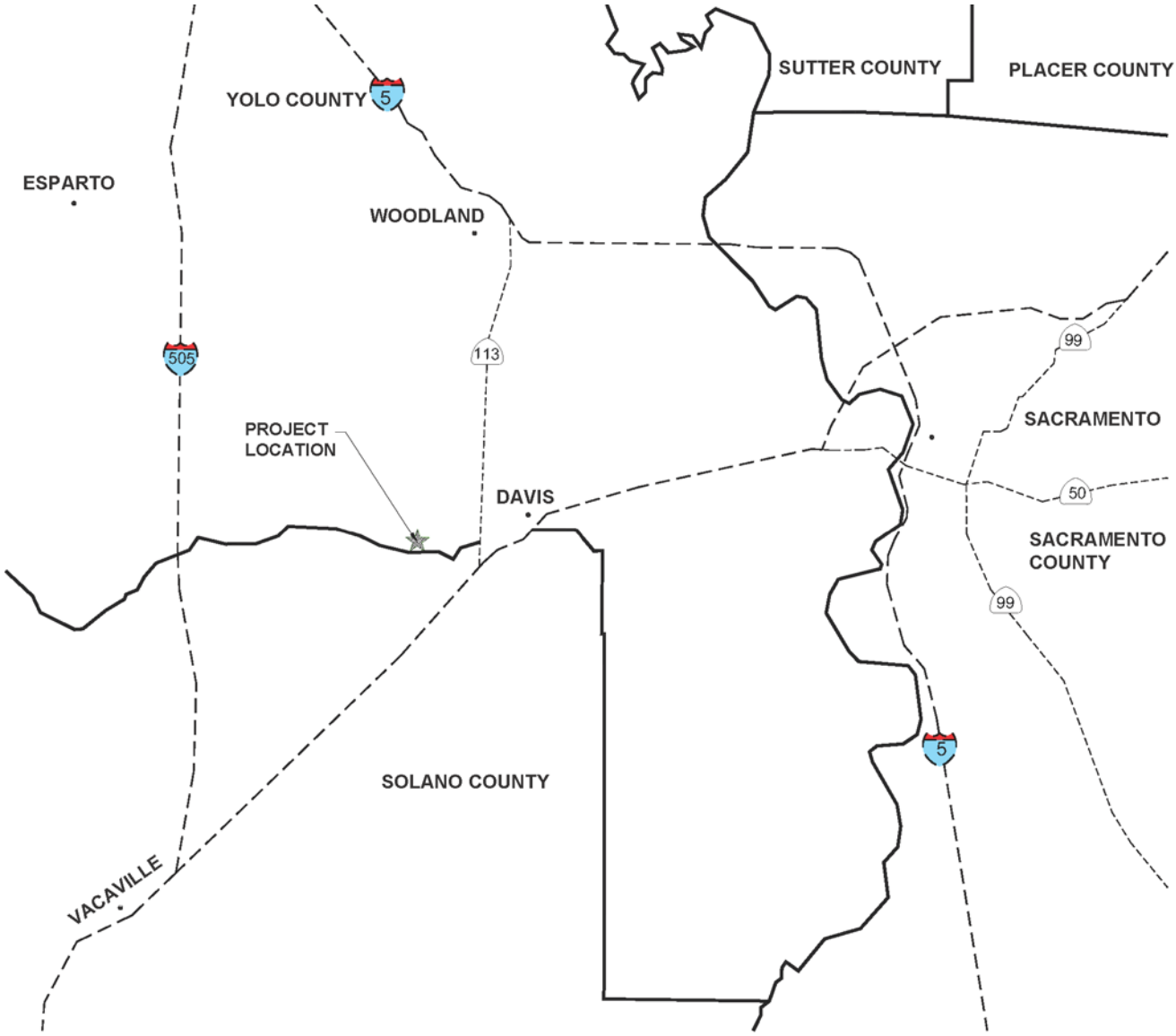
Atrazine	ATRAZINE
Chlorpyrifos	CLPYRIFOS
0,0-Diethyl 0-2-pyrazinyl phosphorothioate (Thionazin)	ZINOPHOS
Diazinon	DIAZ
Dimethoate	DIMETHAT
Disulfoton	DISUL
Ethion	ETHION
Methyl parathion (Parathion methyl)	PARAM
Parathion	PARAE
Phorate	PHORATE
Simazine	SIMAZINE

TABLE VII

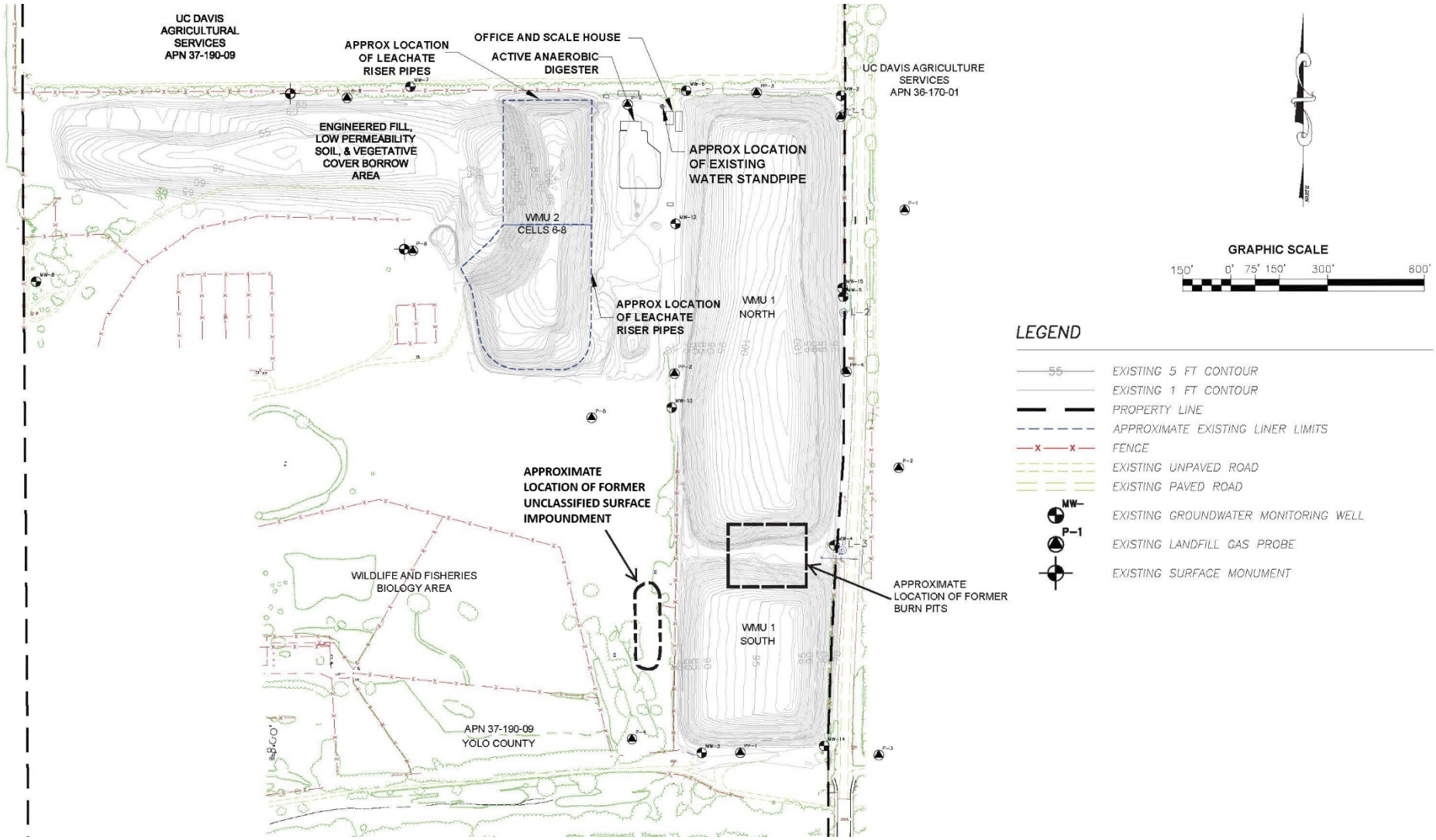
LANDFILL GAS CORRECTIVE ACTION MONITORING PROGRAM

Parameter	Geotracker Code	Units	Sampling Frequency	Reporting Frequency
LFG Control System				
Control System Run-time	--	Hours	Quarterly	Semiannual
Control System Down-time	--	%	Quarterly	Semiannual
Temperature into Plant	--	^{0}F	Quarterly	Semiannual
Flare Combustion Temperature	--	^{0}F	Quarterly	Semiannual
System Vacuum	--	mm Hg vacuum	Quarterly	Semiannual
Totalized flow into Plant	--	Cubic Feet	Quarterly	Semiannual
Totalized flow rate into Plant	--	CFM	Quarterly	Semiannual
LFG Control System Influent				
Volatile Organic Compounds[1] (USEPA TO-15)	--	ug/m^3	Quarterly	Semiannual
Methane	--	%	Quarterly	Semiannual
LFG Extraction Wells				
Atmospheric Temperature	--	^{0}F	Quarterly	Semiannual
Atmospheric Pressure	--	inches Hg	Quarterly	Semiannual
Methane	--	% by volume	Quarterly	Semiannual
Carbon Dioxide	--	% by volume	Quarterly	Semiannual
Oxygen	--	% by volume	Quarterly	Semiannual
Remainder gas	--	% by volume	Quarterly	Semiannual
Gas temperature at each well	--	^{0}F	Quarterly	Semiannual
Initial static pressure in wellhead	--	inches H20	Quarterly	Semiannual
Adjusted static pressure in Wellhead	--	inches H20	Quarterly	Semiannual
LFG Probes				
Atmospheric Temperature	--	^{0}F	Quarterly	Semiannual
Atmospheric Pressure	--	inches Hg	Quarterly	Semiannual
Methane	--	% by volume	Quarterly	Semiannual
Carbon Dioxide	--	% by volume	Quarterly	Semiannual
Oxygen	--	% by volume	Quarterly	Semiannual
Remainder gas	--	% by volume	Quarterly	Semiannual
Probe pressure/vacuum	--	inches H20	Quarterly	Semiannual
Volatile Organic Compounds[1] (USEPA TO-15)	--	ug/m^3	Quarterly	Semiannual

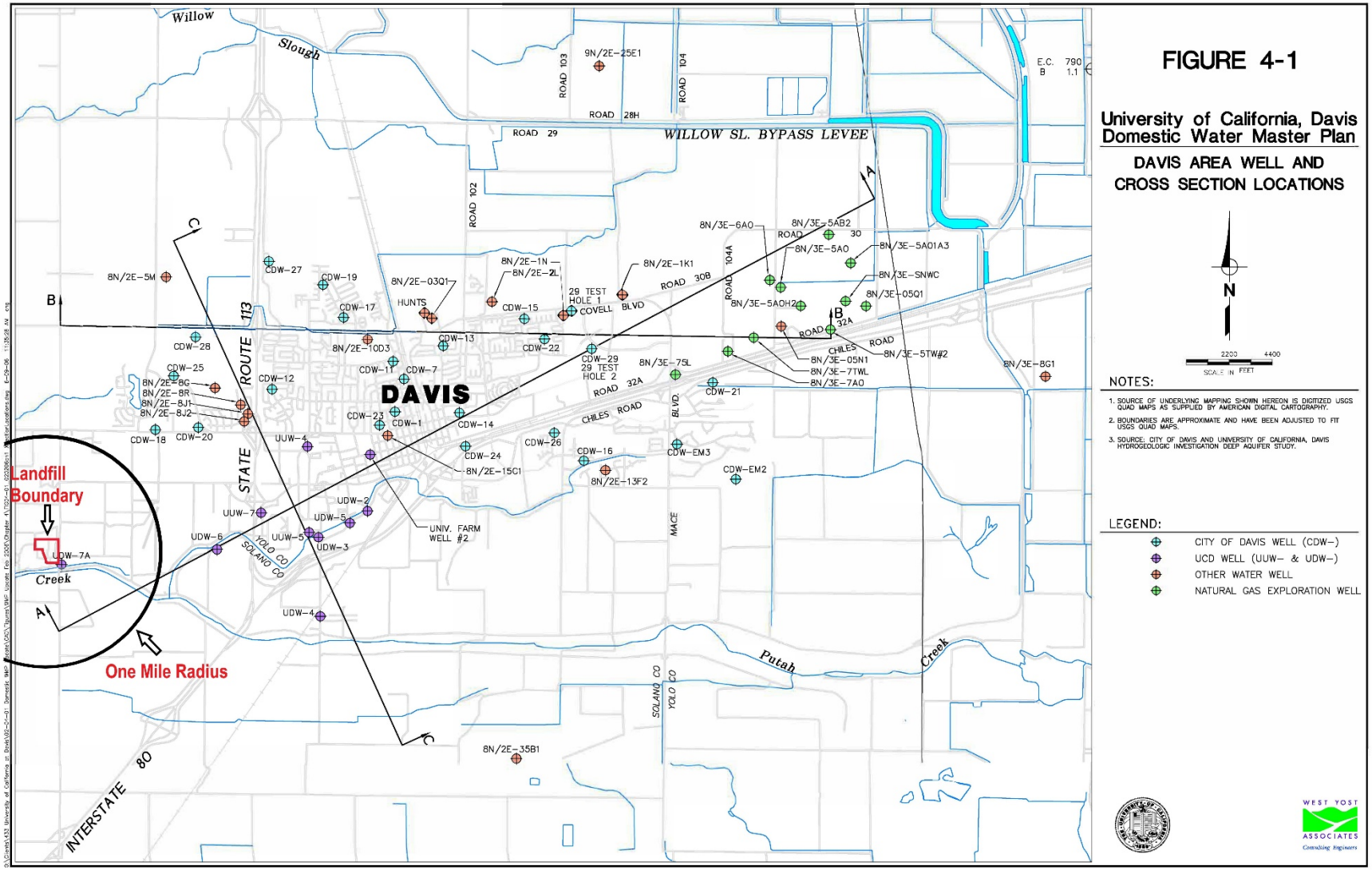
[1.] Gas samples may be prescreened to determine if laboratory analysis using Method TO-15 is required. A gas analyzer for methane concentrations or a Photo Ionization Detector (PID) for total VOCs concentrations may be used. If methane concentrations exceeding 1.0 percent by volume OR organic vapors (total VOCs) are detected at a concentration greater than 1.0 ppm then a gas sample shall be obtained and analyzed for VOCs using EPA Method TO-15. Both the screening results and laboratory analysis results shall be reported. Otherwise, the Discharger shall report the methane or total VOC screening results and no further laboratory analysis is required.



Drawing Reference: 2019 ROWD Attachment 11, Figure 1	**Site Location Map** University of California, Davis UC DAVIS CLASS III LANDFILL YOLO COUNTY	N W E S

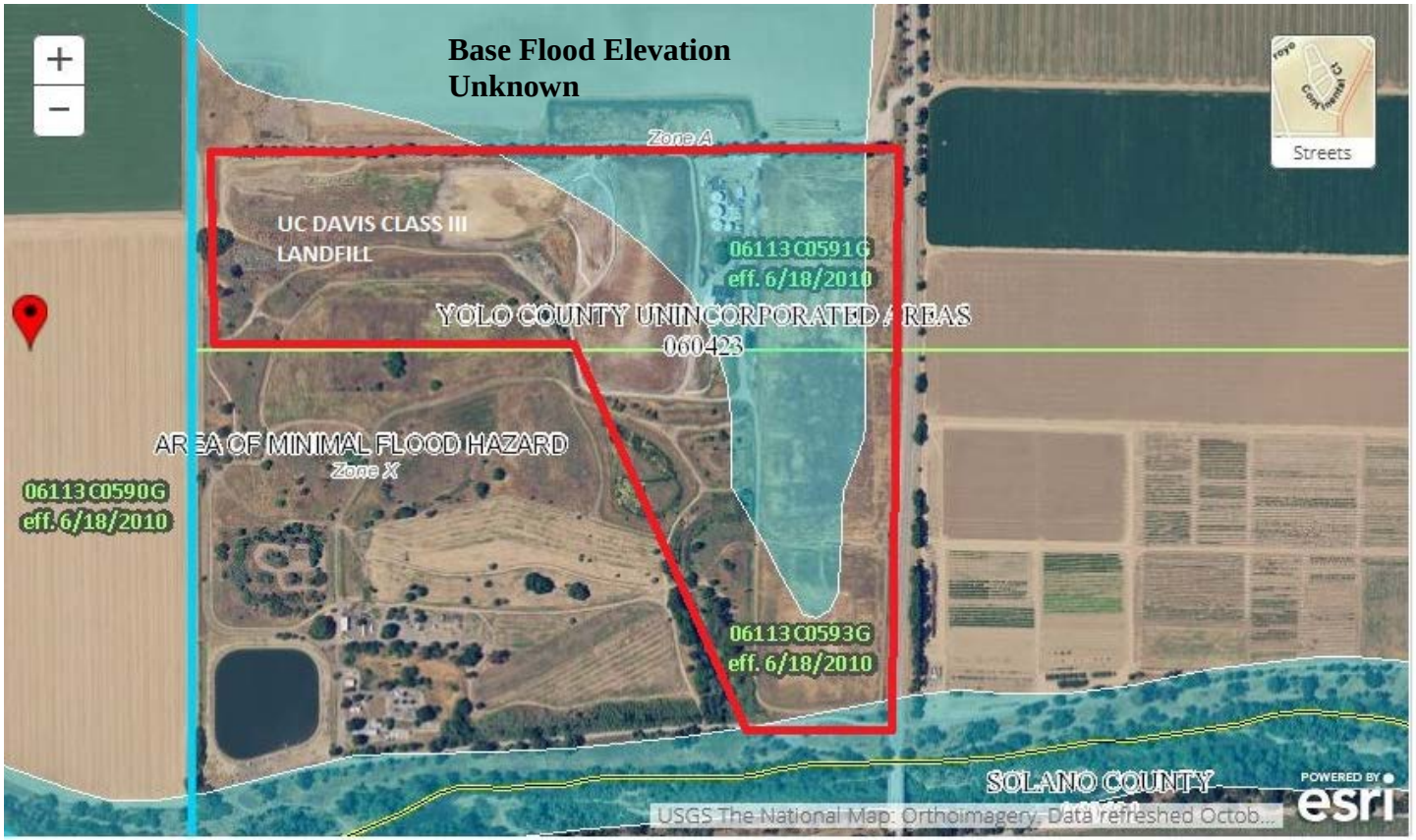


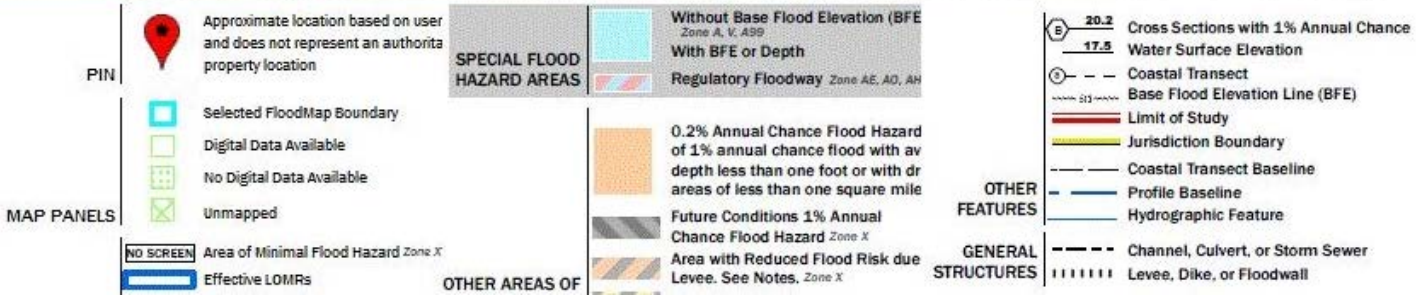
DRAWING REFERENCE	**FACILITY MAP**
2019 ROWD Attachment 11 (Figure 2), Attachment 4 (Figure 2), Attachment 5A WDR 94-66 Att B	UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY



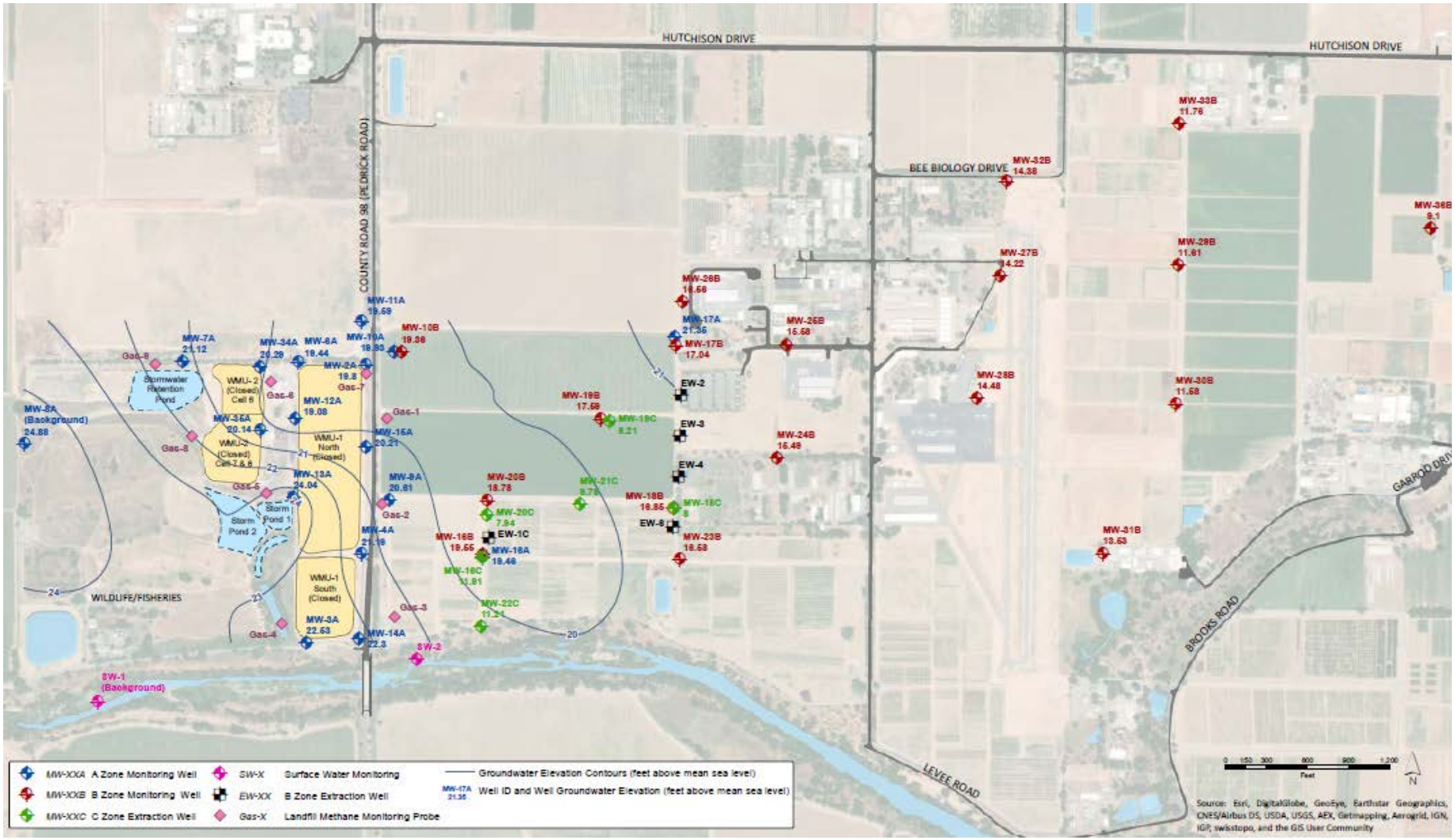
DRAWING REFERENCE
2019 ROWD
Attachment 4B

NEARBY WATER SUPPLY Wells
UNIVERSITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
YOLO COUNTY



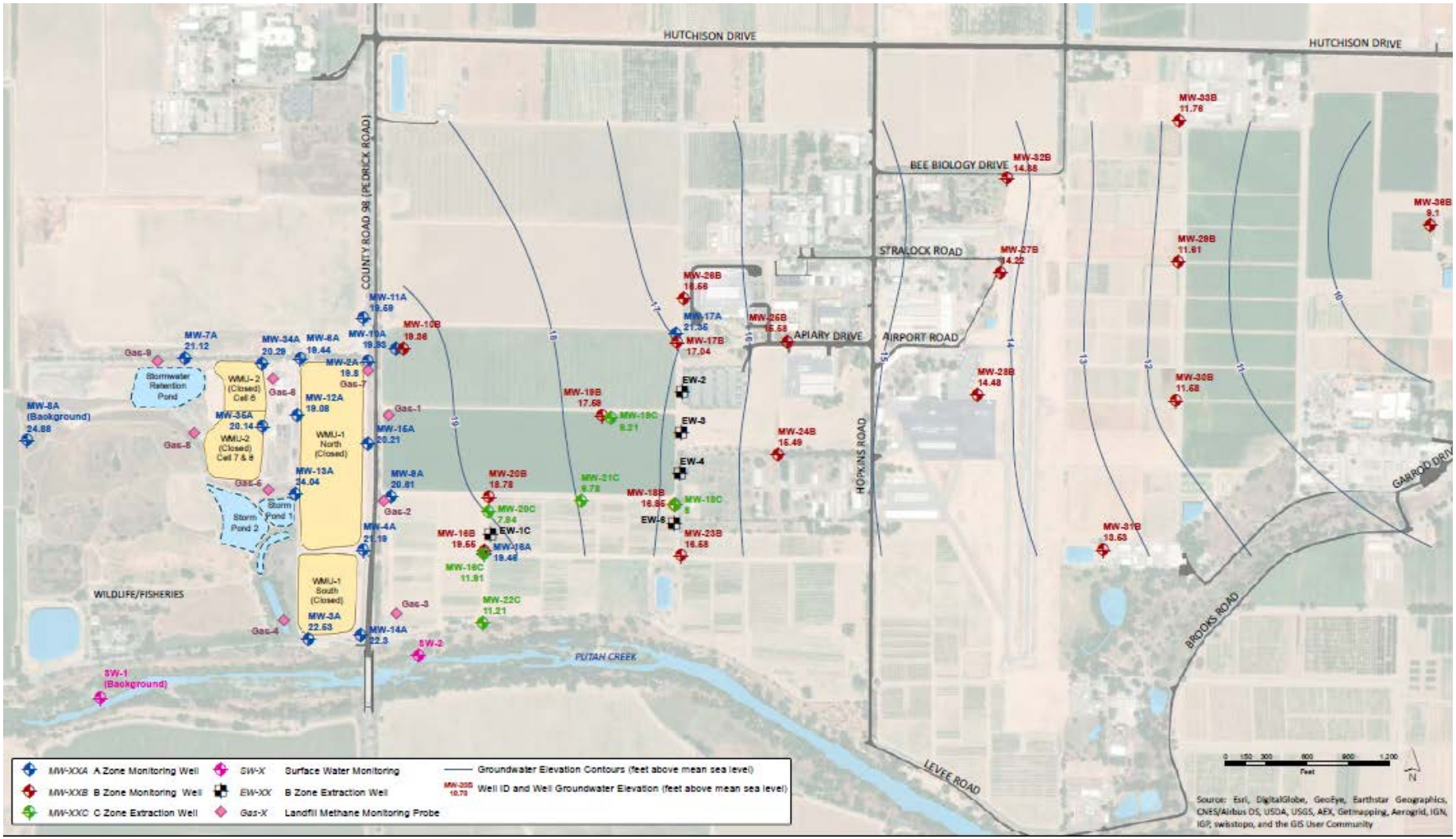


Drawing Reference: **FEMA Flood Map Service**	**FEMA 100-YEAR FLOOD ZONE MAP** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	



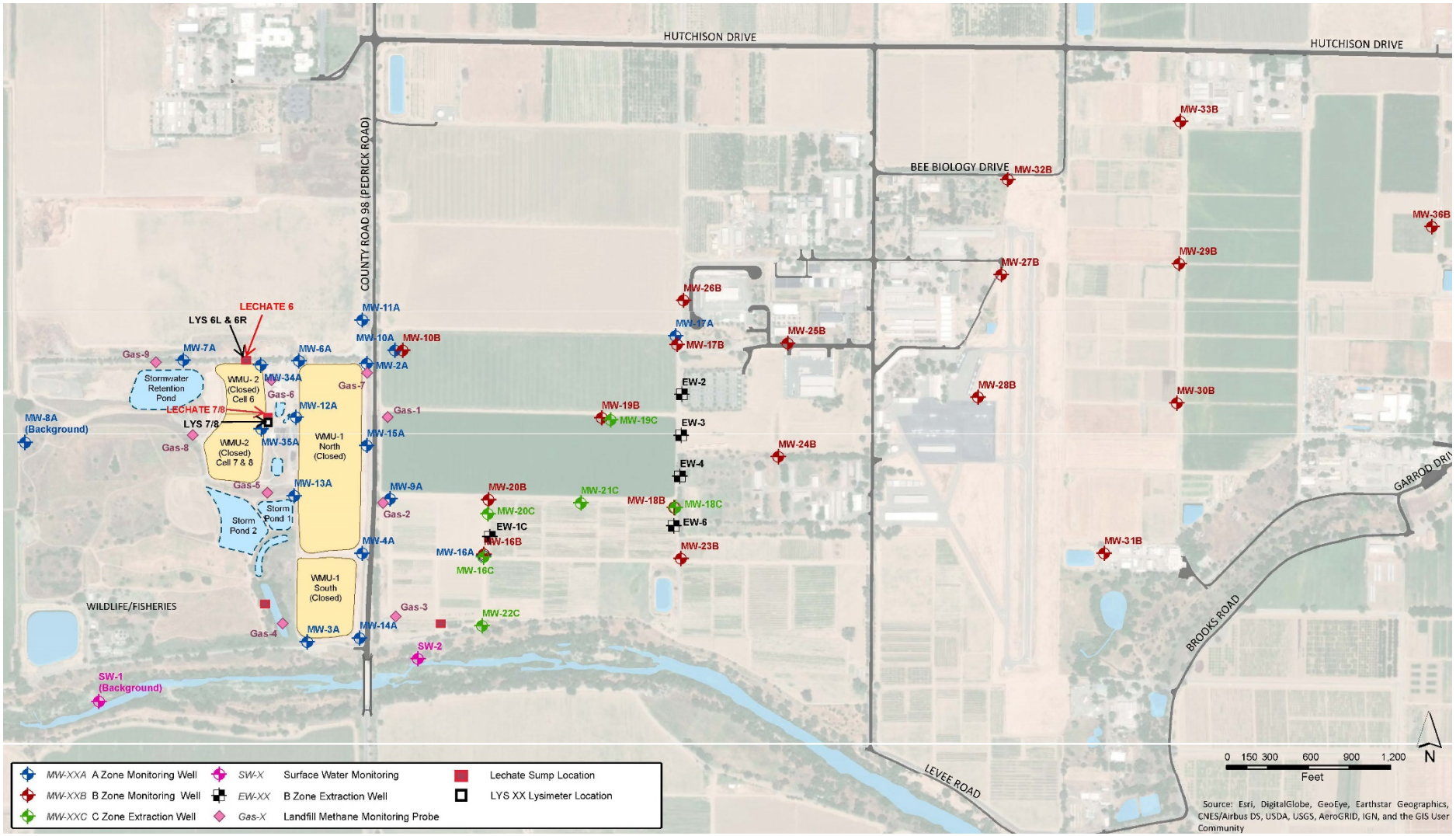
3rd Quarter 2018 Groundwater Monitoring Results

Drawing Reference: 2019 ROWD Attachment 4C (Figure 2-1)	**GROUNDWATER FLOW AND DIRECTION (A-ZONE)** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	



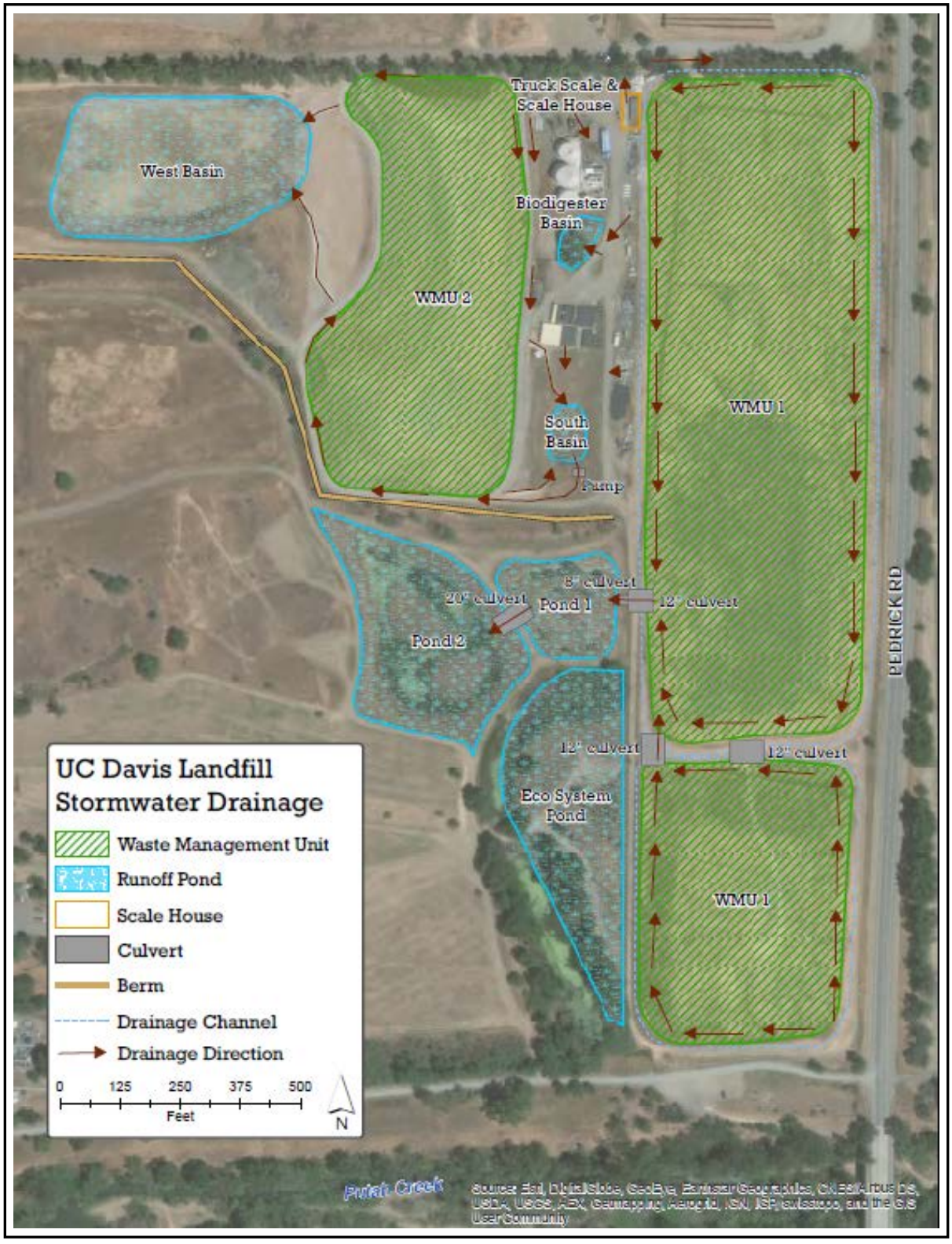
3rd Quarter 2018 Groundwater Monitoring Results

Drawing Reference: 2019 ROWD Attachment 4C, (Figure 2-2)	**GROUNDWATER FLOW AND DIRECTION (B-ZONE)** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	

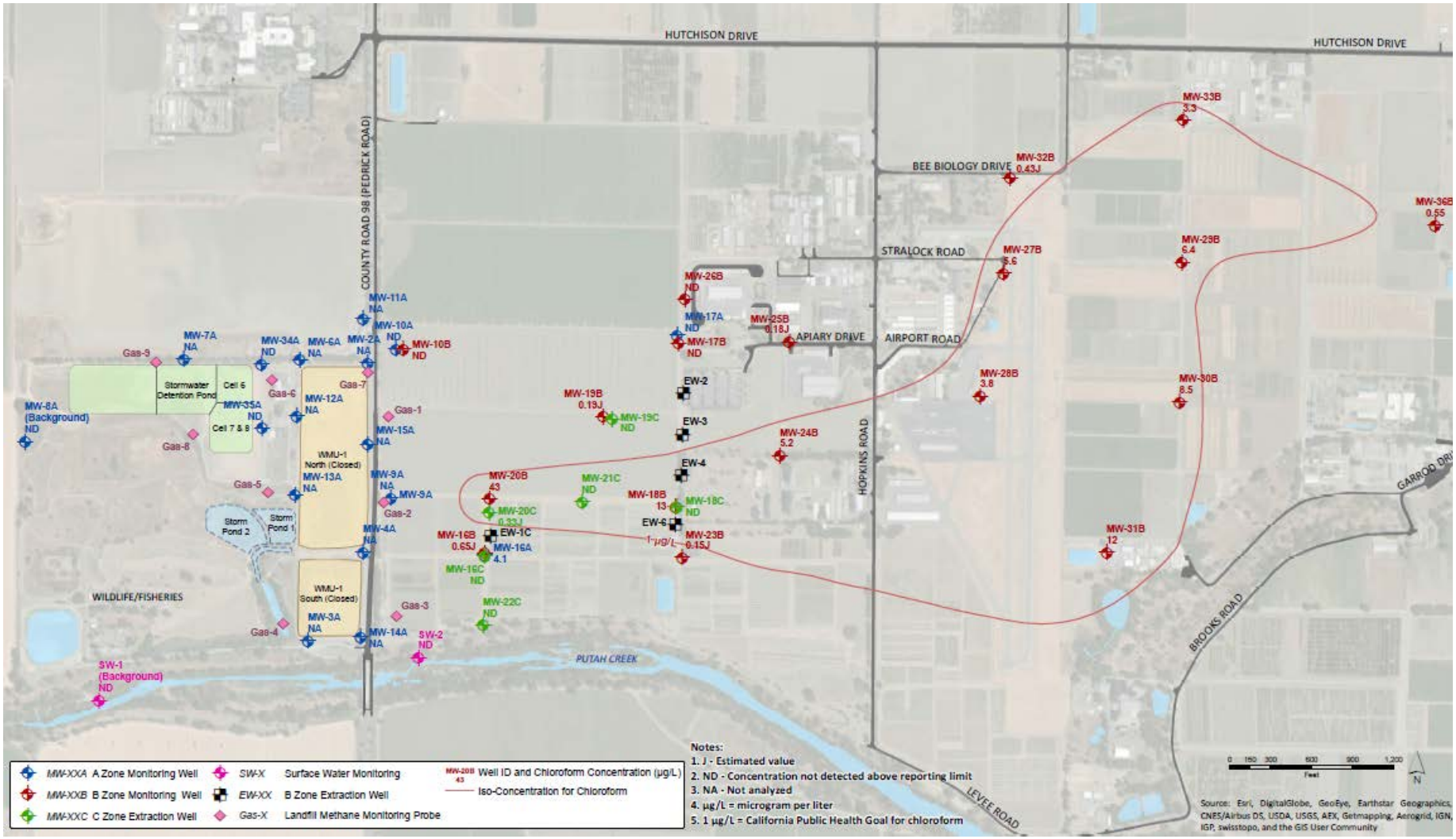


DRAWING REFERENCE
2019 ROWD
Attachment 7 (Figure 1)

FACILITY MONITORING POINTS
UNIVERSITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
YOLO COUNTY



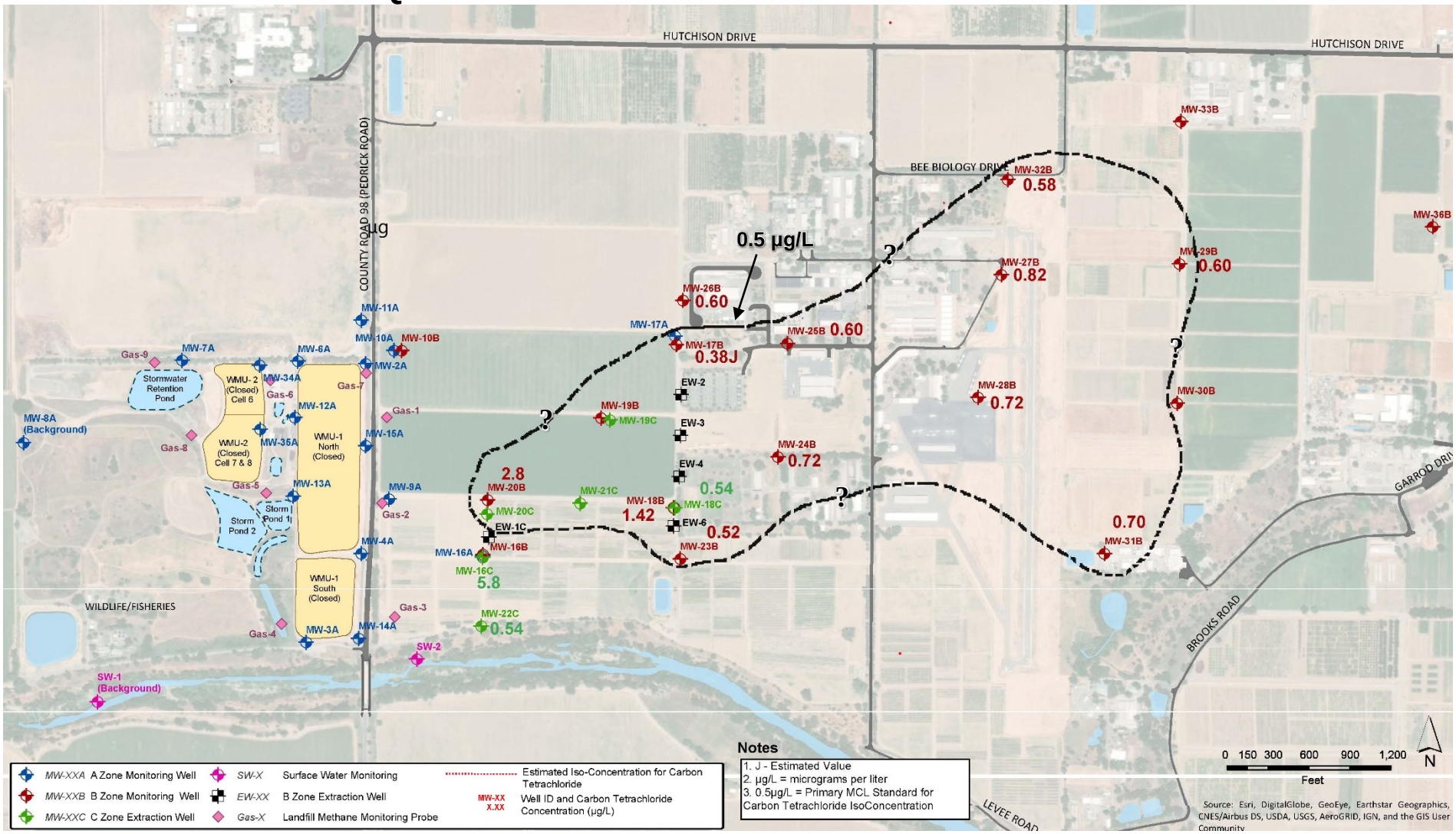
Drawing Reference: 2019 ROWD Attachment 8	**FACILITY STORMWATER MANAGEMENT MAP** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY



1st Quarter 2018 B-Zone Chloroform Iso-Concentration Map

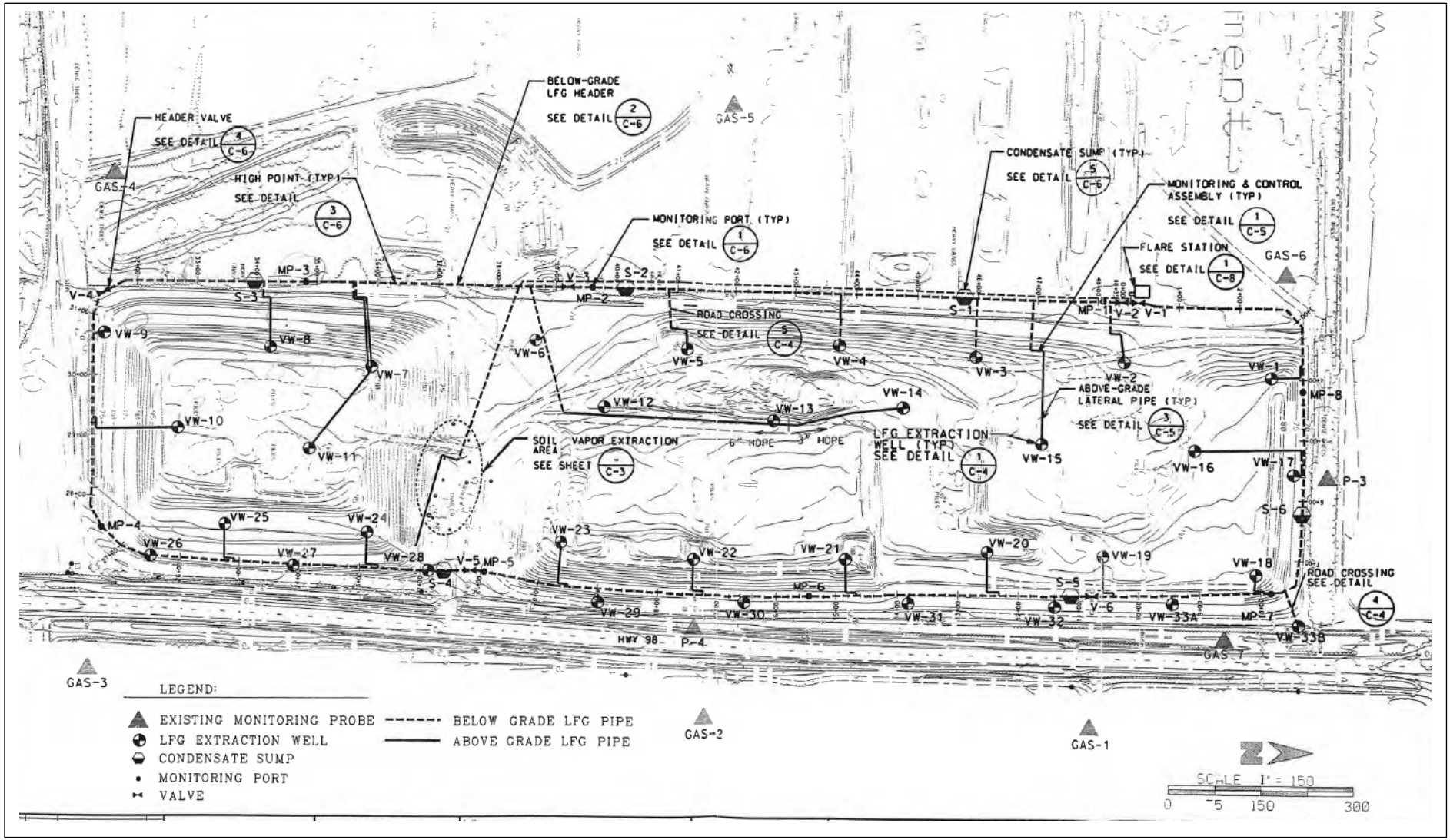
Drawing Reference: 2019 ROWD Attachment 4F (Figure 3)	**CHLOROFORM GROUNDWATER CONTAMINATION PLUME** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	

1ST Quarter 2018 B-Zone and C-Zone Concentrations

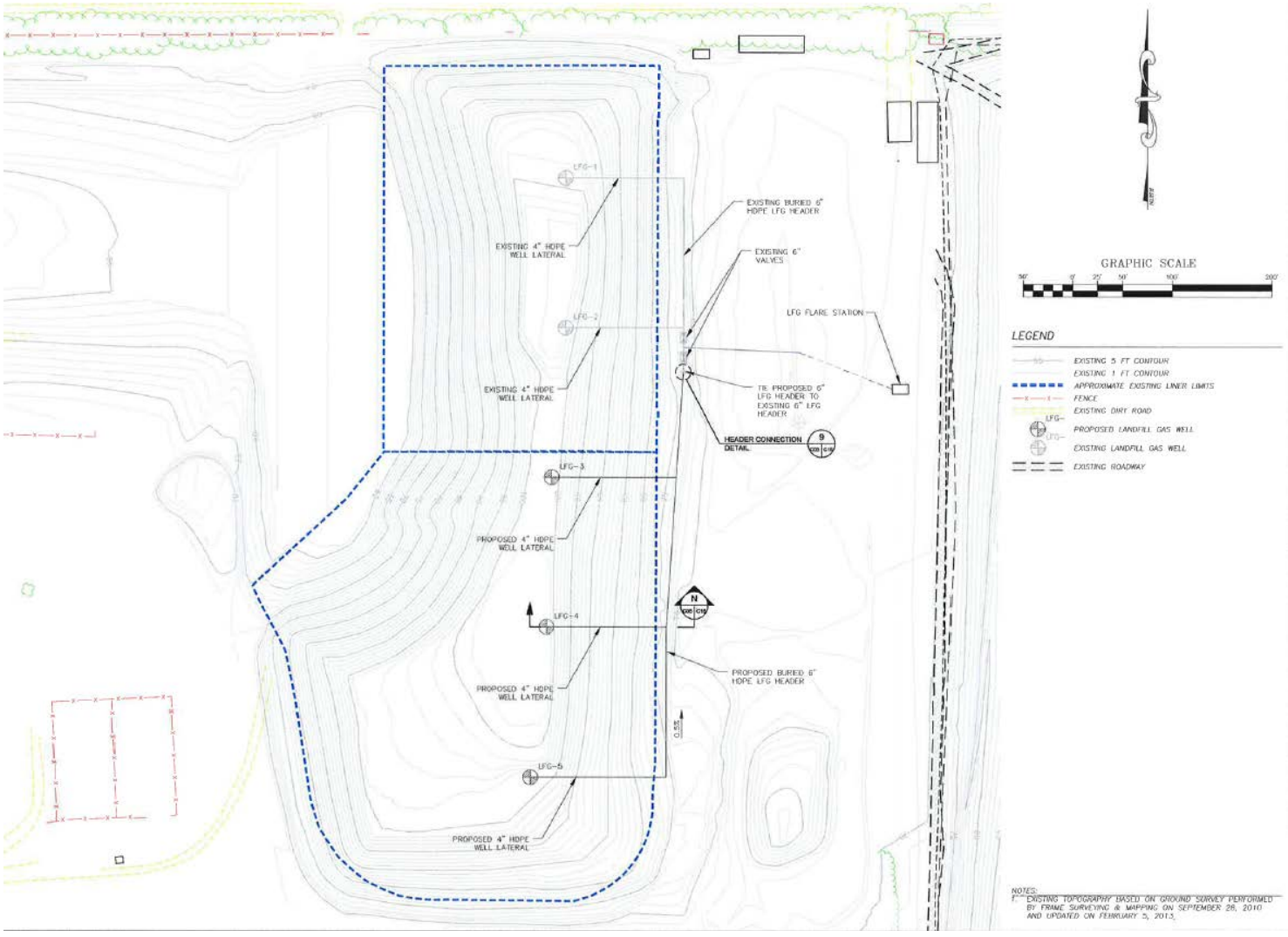


Drawing Reference:
Attachment G with Carbon Tetrachloride Concentrations
1st MCL IsoConcentration boundary estimated

Carbon Tetrachloride Groundwater Concentrations
UNIVSERITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
YOLO COUNTY



Drawing Reference: 2019 ROWD Attachment 6 (Drawing C-2)	**WMU-1 LANDFILL GAS EXTRACTION NETWORK** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	



Drawing Reference: 2019 ROWD Attachment 6 (Drawing C-05)	**WMU-2 LANDFILL GAS EXTRACTION NETWORK** UNIVERSITY OF CALIFORNIA, DAVIS UC DAVIS CLASS III LANDFILL YOLO COUNTY	

INFORMATION SHEET

ORDER R5-2019-0060
UNIVERSITY OF CALIFORNIA, DAVIS
UC DAVIS CLASS III LANDFILL
POST-CLOSURE MAINTENANCE AND CORRECTIVE ACTION

UNIVERSITY OF CALIFORNIA, DAVIS; UC DAVIS CLASS III LANDFILL; YOLO COUNTY

The closed landfill facility is a municipal solid waste (MSW) landfill regulated pursuant to Water Code section 13000 et seq., California Code of Regulations, title 27 (Title 27), section 20005 et seq. and Code of Federal Regulations, title 40, part 258; and in accordance with State Water Resources Control Board Resolution 93 62.

The Regents of the University of California (UC) owns and University of California, Davis operates the UC Davis Class III Landfill (Facility), which is located approximately 3 ½ miles west of the City of Davis in Yolo County, Section 24, T8N, R1E, Mount Diablo Base and Meridian (MDB&M).

The landfill began operation in approximately 1966, although the exact date that landfill operations began is unknown. The Facility has a 23-acre unlined waste management unit WMU-1 that received municipal solid wastes, agricultural wastes, green wastes, animal wastes, construction/ demolition wastes, and inert materials. Additionally, chemical burn pits were located near WMU-1 that were used until the late 1970's. An unclassified surface impoundment was also located immediately west of WMU-1. Groundwater impacts were identified in groundwater samples collected as part of the Solid Waste Assessment Test (SWAT) in 1987. As a result of the impacts, WDRs Order No. 96-228 required the early closure of WMU-1 due to significant groundwater impacts from the unlined Unit. Unlined WMU-1 was closed in April 2001.

The Facility also has a lined WMU-2 was to consist of eight cells totaling 16 acres. However, only three cells 6, 7, and 8 totaling 8 acres were ultimately constructed. WMU-2 stopped accepting waste on 28 August 2011 and WMU-2 was closed in 2015. The landfill is currently operating per an approved Post-Closure Maintenance Plan.

After the issuance of WDRs R5-2003-0077 on 25 April 2003, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) reviewed technical reports, existing operations, and historical monitoring results. The Central Valley Water Board has determined that revision of existing WDRs is necessary to address the following items, *inter alia*:

1. Address the release of volatile organic compounds (VOCs) including carbon tetrachloride, chloroform, cis-1,2-dichloroethene, and vinyl chloride from the Facility.
2. Determine the lateral and vertical extent of the VOC plume(s);
3. Continue to operate, maintain, and expand as necessary the Discharger's groundwater extraction system as corrective action to mitigate the release of VOCs;
4. Provide a technical report on whether background water quality can ever be attained and if not evaluate additional technically and economically feasible corrective action measures;
5. Provide Water Quality Protection Standards (WQPS) and associated concentration limits that protect water quality which existed prior to a release from a WMU.

The revised WDRs address these items as well as others in order to ensure compliance with existing laws and regulations related to protection of water quality.
RDB/VKJ

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS FOR WASTE DISCHARGE REQUIREMENTS FOR NONHAZARDOUS SOLID WASTE DISCHARGES REGULATED BY SUBTITLE D AND/OR TITLE 27

(40 C.F.R. section 258 and Title 27, § 20005 et seq.)

December 2015

TABLE OF CONTENTS

A. APPLICABILITY

1. These Standard Provisions and Reporting Requirements (SPRRs) are applicable to nonhazardous solid waste disposal sites that are regulated by the Central Valley Regional Water Quality Control Board (hereafter, Central Valley Water Board) pursuant to the provisions of California Code of Regulations, title 27 ("Title 27"), section 20005 et seq., and municipal solid waste (MSW) landfills that are subject to the Federal Subtitle D regulations contained in 40 Code of Federal Regulations section 258 (hereafter, "Subtitle D" or "40 C.F.R. § 258.XX") in accordance with State Water Resources Control Board (State Water Board) Resolution 93-62. The Subtitle D regulations are only applicable to MSW landfills and therefore any requirements in these SPRRs that are referenced as coming from Subtitle D are not applicable to non-MSW waste management units such as Class II surface impoundments, Class II waste piles, and non-MSW landfill units. All Subtitle D requirements in these SPRRs are referenced with "[40 C.F.R. § 258.XX]" after the requirement.

2. "Order," as used throughout this document, means the Waste Discharge Requirements (WDRs) to which these SPRRs are incorporated.

3. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, and do not protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.

4. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.

5. If there is any conflicting or contradictory language between the WDRs, the Monitoring and Reporting Program (MRP), or the SPRRs, then language in the WDRs shall govern over either the MRP or the SPRRs, and language in the MRP shall govern over the SPRRs.

6. If there is a site-specific need to change a requirement in these SPRRs for a particular landfill facility, the altered requirement shall be placed in the appropriate section of the WDRs and will supersede the corresponding SPRRs requirement. These SPRRs are standard and cannot be changed as part of the permit writing process or in response to comments, but they will be periodically updated on an as-needed basis.

7. Unless otherwise stated, all terms are as defined in Water Code section 13050 and in Title 27, section 20164.

B. TERMS AND CONDITIONS

1. Failure to comply with any waste discharge requirement, monitoring and reporting requirement, or Standard Provisions and Reporting Requirement, or

other order or prohibition issued, reissued, or amended by the Central Valley Water Board or the State Water Board, or intentionally or negligently discharging waste, or causing or permitting waste to be deposited where it is discharged into the waters of the state and creates a condition of pollution or nuisance, is a violation of this Order and the Water Code, which can result in the imposition of civil monetary liability [Wat. Code, § 13350(a)]

2. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to [Wat. Code, § 13381]:

   a. Violation of any term or condition contained in this Order;

   b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;

   c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or

   d. A material change in the character, location, or volume of discharge.

3. Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall file a new report of waste discharge (ROWD), or other appropriate joint technical document (JTD), with the Central Valley Water Board [Wat. Code, § 13260(c) and § 13264(a)]. A material change includes, but is not limited to, the following:

   a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;

   b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);

   c. A change in the type of waste being accepted for disposal; or

   d. A change to previously-approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.

4. Representatives of the Central Valley Water Board may inspect the facilities to ascertain compliance with the waste discharge requirements. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is refused, with a duly issued warrant. However, in the event of an emergency affecting the public health or safety, an inspection may be made without consent or the issuance of a warrant [Wat. Code, §13267(c)].

5. The Central Valley Water Board will review this Order periodically and will revise these waste discharge requirements when necessary [Wat. Code, § 13263(e) and Title 27, § 21720(b)].

6. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Central Valley Water Board [Wat. Code, § 13267(b)]. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.

7. A discharge of waste into the waters of the state is a privilege, not a right. No discharge of waste into waters of the state, whether or not the discharge is made pursuant to waste discharge requirements, shall create a vested right to continue the discharge [Wat. Code, § 13263(g)].

8. Technical and monitoring reports specified in this Order are requested pursuant to the Water Code [§13267(b)]. Failure to furnish the reports by the specified deadlines or falsifying information in the reports, are misdemeanors that may be liable civilly in accordance with §13268(b) of the Water Code [Wat. Code, §13268(a)].

C. STANDARD PROHIBITIONS

1. The discharge of liquid or semi-solid waste (waste containing less than 50 percent solids) is prohibited, except for the following when proposed in the ROWD/JTD and approved by this Order:

    a. Dewatered sewage or water treatment sludge as described in Title 27, section 20220(c) provided it is discharged above a composite liner with a leachate collection and removal system (LCRS) [Title 27, § 20200(d)(3)].

    b. Leachate and/or landfill gas condensate that is returned to the composite-lined waste management unit (with an LCRS) from which it came [Title 27, § 20340(g) and 40 C.F.R. § 258.28].

2. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:

    a. require a higher level of containment than provided by the unit; or

    b. are ‘restricted wastes’; or

    c. impair the integrity of containment structures;

    is prohibited [Title 27, § 20200(b)].

3. The discharge of wastes outside of a waste management unit or portions of a unit specifically designed for their containment is prohibited.

4. The discharge of solid waste containing free liquid or which may contain liquid in excess of the moisture holding capacity as a result of waste management operations, compaction or settlement is prohibited.

5. The discharge of waste to a closed landfill unit is prohibited.

6. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.

7. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

D. STANDARD DISCHARGE SPECIFICATIONS

1. The Discharger is responsible for accurate characterization of wastes, including a determination of whether or not wastes will be compatible with containment features and other wastes at the waste management unit and whether or not the wastes are required to be managed as a hazardous waste [Title 27, § 20200(c)] or designated waste [Title 27, § 20210].

2. Leachate and landfill gas condensate collected from a waste management unit shall be discharged to the unit from which it came, or discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the waste classification of the liquid [Title 27, § 20200(d) and § 20340(g)].

3. The discharge of leachate or landfill gas condensate is restricted to those portions of a waste management unit that has a composite liner system and LCRS meeting the Federal Subtitle D requirements [40 C.F.R. § 258.28].

4. Leachate and condensate returned to a composite-lined landfill unit (when approved by this Order) shall be discharged and managed such that it does not cause instability of the waste, does not cause leachate seeps, does not generate additional landfill gas that is not extracted from the landfill by an active landfill gas extraction system, does not cause contaminants to enter surface water runoff, and does not cause leachate volumes to exceed the maximum capacity of the LCRS.

5. Any discharge of waste outside the portion of the landfill that was already covered with waste as of the landfill unit's respective Federal Deadline constitutes a "lateral expansion" and requires the installation of an approved composite liner system and LCRS [40 C.F.R. § 258.40(b)].

6. Wastes shall be discharged only into waste management units specifically designed for their containment and/or treatment, as described in this Order.

7. The discharge shall remain within the designated disposal area at all times.

8. The discharge of waste shall not cause a nuisance condition [Wat. Code, § 13050(m)].

E. STANDARD FACILITY SPECIFICATIONS

1. All waste management units shall be designed, constructed, and operated to ensure that wastes, including leachate, will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater [Title 27, § 20240(c)], including the capillary fringe.

2. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].

3. Interim cover is daily and intermediate cover [Title 27, § 20750(a)]. Interim cover over wastes discharged to a landfill shall be designed and constructed to minimize percolation of liquids through the wastes [Title 27, § 20705(b)].

4. Intermediate cover consisting of compacted earthen material of at least twelve (12) inches shall be placed on all surfaces of the fill where no additional solid waste will be deposited within **180 days** [Title 27, § 20700(a)].

5. During wet weather conditions, the facility shall be operated and graded to minimize leachate generation.

6. The Discharger shall **immediately** notify the Central Valley Water Board staff of any slope failure occurring at a waste management unit. Any failure which threatens the integrity of containment features or the waste management unit shall be promptly corrected in accordance with an approved method [Title 27, § 21710(c)(2)].

7. The Discharger shall **immediately** notify Central Valley Water Board staff of any flooding, unpermitted discharge of waste off-site or outside of waste management units, equipment failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

8. The Discharger shall limit water used for facility maintenance within landfill areas to the minimum amount necessary for dust control and construction.

9. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.

10. The Discharger shall lock all groundwater monitoring wells with a lock on the well cap or monitoring well box. All monitoring devices shall be clearly labeled with their designation including all monitoring wells, LCRS risers, and lysimeter risers and shall be easily accessible for required monitoring by authorized personnel. Each monitoring device shall be clearly visible and be protected from damage by equipment or vehicles.

11. The Discharger shall ensure that methane and other landfill gases are adequately vented, removed from landfill units, or otherwise controlled to prevent the danger of adverse health effects, nuisance conditions, degradation, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.

12. The Discharger shall maintain the depth of the fluid in the sump of each landfill unit at the minimum needed for efficient pump operation (the depth at which the pump turns on given the pump intake height and maximum pump cycle frequency).

13. The depth of fluid on the landfill liner shall not exceed **30 centimeters** (cm) [40 C.F.R. § 258.40(a)(2)]. This regulation is interpreted by the Central Valley Water Board to exclude the leachate sump. The Discharger shall **immediately** notify the Central Valley Water Board staff by telephone, and follow up in writing within **seven** days if monitoring reveals that the depth of fluid on any portion of the liner (excluding the sump) exceeds 30 cm (approximately 12 inches). The written notification shall include a timetable for remedial or corrective action necessary to achieve compliance with the leachate depth limitation.

14. Each LCRS shall be tested at least annually to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions [Title 27, § 20340(d)].

15. The Discharger shall maintain a *Storm Water Pollution Prevention Plan* and *Monitoring Program and Reporting Requirements* in accordance with State Water Board Order No. 2014-0057-DWQ (Industrial General Permit) or most recent general industrial storm water permit), or retain all storm water on-site.

16. Internal site drainage from surface or subsurface sources shall not contact or percolate through wastes.

17. New MSW landfill units or lateral expansions of existing units shall not be sited in a “wetland” [as defined in 40 C.F.R. § 232.29(r)] unless there is no practical alternative; steps have been taken to assure no net loss of wetland; the landfill unit will not degrade the wetland; the unit will not jeopardize threatened or endangered species or produce adverse modification of a critical habitat or violate any requirement of the Marine Protection, Research, and Sanctuaries Act of 1972 [40 C.F.R. § 258.12].

F. STANDARD CONSTRUCTION SPECIFICATIONS

1. The Discharger shall submit for review and approval at least **90 days** prior to proposed construction, design plans and specifications for new landfill modules that include the following:

    a. Detailed construction drawings showing all required liner system components, the LCRS, leachate sump, unsaturated zone monitoring system, any proposed landfill gas monitoring and extraction points, and access to the LCRS for required annual testing.

    b. A Construction Quality Assurance (CQA) Plan prepared by a California-registered civil engineer or certified engineering geologist, and that meets the requirements of Title 27, section 20324.

    c. A geotechnical evaluation of the area soils, evaluating their use as the base layer or reference to the location of this information in the ROWD/JTD [Title 27, § 21750(f)(4)].

    d. Information about the seismic design of the proposed new module (or reference to the location of this information in the ROWD/JTD) in accordance with Title 27, section 20370.

    e. A revised water quality monitoring plan for groundwater detection monitoring (or information showing the existing plan is adequate) in accordance with Title 27, section 20415.

    f. An Operation Plan (or reference to the location of this information in the ROWD/JTD) meeting the requirements of Title 27, section 21760(b).

2. All containment structures shall be designed by, and construction shall be supervised by, a California registered civil engineer or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards, or approved engineered alternative design, in accordance with this Order prior to waste discharge.

3. The Discharger shall not proceed with construction until the construction plans, specifications, and all applicable construction quality assurance plans have been approved. Waste management units shall receive a final inspection and approval of the construction by Central Valley Water Board staff before use of the unit commences [Title 27, § 20310(e)].

4. Any report, or any amendment or revision of a report, that proposes a design or design change that might affect a waste management unit's containment features or monitoring systems shall be approved by a California registered civil engineer or a certified engineering geologist [Title 27, § 21710(d)].

5. Materials used in containment structures shall have appropriate chemical and physical properties to ensure that such structures do not fail to contain waste because of pressure gradients, physical contact with waste or leachate, chemical reactions with soil or rock, climatic conditions, the stress of installation, or because of the stress of daily operations [Title 27, § 20320(a)].

6. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping [Title 27, § 20365(a)].

7. The Discharger shall design storm water conveyance systems for Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].

8. All Class III landfill units shall be designed to withstand the maximum probable earthquake and Class II waste management units shall be designed to withstand maximum credible earthquake without damage to the foundation or to the structures that control leachate, or surface drainage, or erosion, or gas [Title 27, § 20370(a)].

9. The Discharger shall perform stability analyses that include components to demonstrate the integrity of the landfill foundation, final slopes, and containment systems under both static and dynamic conditions throughout the landfill's life including the closure period and post-closure maintenance period [Title 27, § 21750(f)(5)].

10. New waste management units and expansions of existing units shall not be located on a known Holocene fault [Title 27, § 20260(d)].

11. Liners shall be designed and constructed to contain the fluid, including landfill gas, waste, and leachate [Title 27, § 20330(a)].

12. Hydraulic conductivities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice. The results of laboratory tests with both water and leachate, and field tests with water, shall be compared to evaluate how the field permeabilities will be affected by leachate. It is acceptable for the Discharger to use appropriate compaction tests in conjunction with laboratory hydraulic conductivity tests to determine field permeabilities as long as a reasonable number of field hydraulic conductivity tests are also conducted [Title 27, § 20320(c)].

13. Hydraulic conductivities specified for containment structures other than the final cover shall be relative to the fluids (leachate) to be contained. Hydraulic conductivities for the final cover shall be relative to water [Title 27, § 20320(b)].

14. A test pad for each barrier layer and final cover shall be constructed in a manner duplicating the field construction. Test pad construction methods, with the designated equipment, shall be used to determine if the specified density/moisture-content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness [Title 27, § 20324(g)(1)(A)].

15. Performance requirements for geosynthetic membranes shall include, but are not limited to, a need to limit infiltration of water, to the greatest extent possible; a need to control landfill gas emissions; mechanical compatibility with stresses caused by equipment traffic, and for final covers the result of differential settlement over time and durability throughout the post-closure maintenance period [Title 27, § 20324(i)(1)].

16. The Discharger shall ensure proper preparation of the subgrade for any liner system that includes a GCL so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.

17. The Discharger shall propose an electronic leak location survey of the top liner for any new landfill module in the construction quality assurance plan unless the Discharger demonstrates that a leak location survey is not needed.

18. Leachate collection and removal systems are required for Class II landfills and surface impoundments, MSW landfills, and for Class III landfills which have a liner or which accept sewage or water treatment sludge [Title 27, § 20340(a)].

19. All new landfill units or lateral expansions of existing units that require a LCRS shall have a blanket-type LCRS that covers the bottom of the unit and extends as far up the sides as possible. The LCRS shall be of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and by any equipment used at the unit [Title 27, § 20340(e)].

20. The LCRS shall be designed, constructed, maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the waste management unit [Title 27, § 20340(b)].

21. Leachate collection and removal systems shall be designed and operated to function without clogging through the scheduled closure of the landfill unit and during the post-closure maintenance period.

22. The LCRS shall be designed to maintain the depth of fluid over any portion of the LCRS of no greater than 30 cm [40 C.F.R. § 258.40(a)(2)], excluding the leachate sump. The leachate sump, leachate removal pump, and pump controls shall be designed and set to maintain a fluid depth no greater than the minimum needed for efficient pump operation [Title 27, § 20340(c)].

23. All construction of liner systems and final cover systems shall be performed in accordance with a Construction Quality Assurance Plan certified by a registered civil engineer or a certified engineering geologist [Title 27, § 20323].

24. The Construction Quality Assurance program shall be supervised by a registered civil engineer or a certified engineering geologist who shall be designated the CQA officer [Title 27, § 20324(b)(2)].

25. The Discharger shall ensure that a third party independent of both the Discharger and the construction contractor performs all of the construction quality assurance monitoring and testing during the construction of a liner system.

26. The Discharger shall notify Central Valley Water Board staff at least **14 days** prior to commencing field construction activities including construction of a new lined cell or module, construction of a final cover, or any other construction that requires Central Valley Water Board staff approval under this Order.

27. The Discharger shall submit for review and approval at least **60 days** prior to proposed discharge, final documentation required in Title 27 Section 20324(d)(1)(C) following the completion of construction of a new lined landfill module. The report shall be certified by a registered civil engineer or a certified engineering geologist and include a statement that the liner system was constructed in accordance with the approved design plans and specifications, the CQA Plan, the requirements of the WDRs, and that it meets the performance goals of Title 27. The report shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, the construction quality assurance plan, and the performance goals of Title 27.

28. The Discharger shall not discharge waste onto a newly constructed liner system until the final documentation report has been reviewed and an acceptance letter has been received.

29. Prior to placement of waste in a new landfill unit, the Discharger shall monitor any pan lysimeter for the unit that has received enough rainfall to flood the LCRS sump. If liquid is detected in the pan lysimeter, the Discharger shall verify that the liquid is not from a leak in the primary liner system before waste can be accepted to the new module.

G. STANDARD CLOSURE AND POST-CLOSURE SPECIFICATIONS

1. The Discharger shall submit a final or partial final closure and post-closure maintenance plan at least **two years** prior to the anticipated date of closure [Title 27, § 21780(d)(1)].

2. The Discharger shall notify the Central Valley Water Board in writing that a landfill unit or portion of a unit is to be closed either at the same time that the California Department of Resources Recycling and Recovery (CalRecycle) is notified or **180 days** prior to beginning any final closure activities, whichever is sooner [Title 27, § 21710(c)(5)(A)]. The notice shall include a statement that all closure activities will conform to the most recently approved final or partial final closure plan and that the plan provides for site closure in compliance with all applicable federal and state regulations [Title 27, § 21710(c)(5)(C)].

3. Initiation of closure activities shall begin within **30 days** of final waste receipt, or within **one year** of receipt of most recent waste if additional capacity remains [40 C.F.R. § 258.60(f)].

4. Closure activities shall be completed within **180 days** of the beginning of closure activities unless an extension is granted by the Executive Officer [40 C.F.R. § 258.60(g)].

5. The Discharger shall carry out both mandatory closure and normal closure of a waste management unit or a portion of a unit in accordance with a closure and post-closure maintenance plan approved by the Central Valley Water Board [Title 27, § 20950(a)(1)] through the issuance of closure waste discharge requirements.

6. The Discharger shall notify the Central Valley Water Board that a preliminary closure and post-closure maintenance plan has been prepared and placed in the operating record by the date of initial receipt of waste at any new MSW landfill unit or lateral expansion of any existing unit [40 C.F.R. § 258.60(d)]. This notification shall be included in the cover letter transmitting the preliminary closure and post-closure maintenance plan.

7. In addition to the applicable provisions of Title 27, the preliminary closure and/or the post-closure maintenance plans for MSW landfill units shall include the following:

    a. A description of the steps necessary to close all MSW landfill units at any point during their active life in accordance with the cover design requirements [40 C.F.R. § 258.60(c)];

    b. An estimate of the largest area of the landfill unit(s) ever requiring a final cover at any time during the active life of the unit(s) [40 C.F.R. § 258.60(c)(2)];

    c. An estimate of the maximum inventory of wastes ever on-site over the active life of the waste management facility [40 C.F.R. § 258.60(c)(3)]; and

    d. A schedule for completing all activities necessary to satisfy the closure criteria in 40 C.F.R. section 258.60 [40 C.F.R. § 258.60(c)(4)].

8. The final closure and post-closure maintenance plan for the waste management unit shall include at least the following: an itemized cost analysis, closure schedule, any proposed final treatment procedures, map, changes to the unit description presented in the most recent ROWD, federal requirements for a MSW facility, land use of the closed unit, and a construction quality assurance plan [Title 27, § 21769(c) & (d)].

9. Closure of each waste management unit shall be under the direct supervision of a registered civil engineer or certified engineering geologist [Title 27, § 20950(b)].

10. The final cover of closed landfills shall be designed, graded, and maintained to prevent ponding and soil erosion due to high run-off velocities [Title 27, § 21090(b)(1)(A)].

11. The final grading design shall be designed and approved by a registered civil engineer or certified engineering geologist [Title 27, § 21090(b)(1)(C)].

12. All final cover designs shall include a minimum 1-foot thick erosion resistant layer [Title 27, § 21090(a)(3)(A)].

13. The Discharger shall close the landfill with minimum 15-foot wide benches every 50 vertical feet [Title 27, § 21090(a)].

14. Final cover slopes shall not be steeper than a horizontal to vertical ratio of one and three quarters to one and designs having any slopes steeper than a horizontal to vertical ratio of three to one, or having a geosynthetic component, shall have these aspects of their design specifically supported in the slope stability report required in Title 27, section 21750(f)(5) [Title 27, § 21090(a)].

15. For any portions of the final cover installed after July 18, 1997, for which the Central Valley Water Board has not approved a slope and foundation stability report on or before that date, the Discharger shall meet the requirements of Title 27, section 21750(f)(5) [Title 27, § 21090(a)(6)].

16. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion [Title 27, § 21090(b)(2)].

17. The Discharger shall design storm water conveyance systems for closed Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for closed Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].

18. Closed landfill units shall be provided with at least two permanent surveying monuments, installed by a licensed land surveyor or by a registered civil engineer, from which the location and elevation of all wastes, containment

structures, and monitoring facilities can be determined throughout the post-closure maintenance period [Title 27, § 20950(d)].

19. Following closure of any MSW landfill units, the Discharger shall notify the Executive Officer that the deed to the landfill facility property, or some other instrument that is normally examined during a title search, has been recorded and a copy placed in the operating record. The notation on the deed shall in perpetuity notify any potential purchaser of the property that the land has been used as a landfill facility and that use of the land is restricted to the planned use described in the post-closure maintenance plan [Title 27, § 20515(a)(4) and §21170, and 40 C.F.R. § 258.60(i)].

20. Construction or repair of the final cover system's low-hydraulic conductivity layer is to be carried out in accordance with an approved construction quality assurance plan [Title 27, § 21090(b)(1)(E)].

21. The Discharger shall incorporate into the closure and post-closure maintenance plan a cover-integrity monitoring and maintenance program which includes at least the following: a periodic leak search, periodic identification of other problem areas, prompt cover repair, and vegetation maintenance [Title 27, § 21090(a)(4)].

22. The Discharger shall complete a final cover survey upon completion of closure activities for that portion of the landfill. The final cover surveys shall include an initial survey and map [Title 27, § 21090(e)(1). Every **five years**, the Discharger shall conduct a survey of the closed landfill cover and submit an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer [Title 27, § 21090(e)(2)].

23. Within **30 days** of completion of <u>all</u> closure activities, the Discharger shall certify that all closure activities were performed in accordance with the most recently approved final closure plan and CQA Plan, and in accordance with all applicable regulations. The Discharger shall also certify that closed landfill units shall be maintained in accordance with and approved post-closure maintenance plan [Title 27, § 21710(c)(6)].

24. Within **180 days** of completion of closure construction activities, the Discharger shall submit final documentation of closure, including the Certification of Closure. The closure documents shall include a final construction quality assurance report and any other documents necessary to support the certification [Title 27, § 21880].

25. The post-closure maintenance period shall continue until the Central Valley Water Board determines that wastes remaining in the landfill unit(s) no longer pose a threat to water quality [Title 27, § 20950(a)(1)].

26. The Discharger shall conduct a periodic leak search to monitor of the integrity of the final cover in accordance with the schedule in the approved final post-closure maintenance plan [Title 27, § 21090(a)(4)(A)].

27. The Discharger shall periodically inspect and identify problems with the final cover including areas that require replanting, erosion, areas lacking free drainage, areas damaged by equipment operations, and localized areas identified in the required five-year iso-settlement survey [Title 27, § 21090(a)(4)(B)].

28. The Discharger shall repair the cover promptly in accordance with a cover repair plan to be included in the final post-closure maintenance plan [Title 27, § 21090(a)(4)(C)].

29. Throughout the post-closure maintenance period, the Discharger shall maintain the structural integrity and effectiveness of all containment structures, maintain the final cover as necessary to correct the effects of settlement and other adverse factors, continue to operate the LCRS as long as leachate is generated and detected, maintain the monitoring systems, prevent erosion and related damage of the final cover due to drainage, and protect and maintain surveyed monuments [Title 27, § 21090(c)].

30. Post-closure maintenance shall be conducted for a minimum period of **30 years** or until the waste no longer poses a threat to environmental quality, whichever is greater [Title 27, § 21180(a) and Title 27, § 21900(a)].

H. STANDARD FINANCIAL ASSURANCE PROVISIONS

1. The Discharger shall establish an irrevocable fund for closure and post-closure maintenance to ensure closure and post-closure maintenance of each classified unit in accordance with an approved closure and post-closure maintenance plan [Title 27, § 20950(f) and § 22207(a)].

2. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known and reasonably foreseeable releases from the waste management unit [Title 27, §20380(b), § 22221, and § 22222].

I. STANDARD MONITORING SPECIFICATIONS

1. The water quality monitoring program shall include appropriate and consistent sampling and analytical procedures and methods designed to ensure that monitoring results provide a reliable indication of water quality at all monitoring points and background monitoring points [Title 27, § 20415(e)(4) and 40 C.F.R. § 258.53(b)].

2. All monitoring systems shall be designed and certified by a registered geologist or a registered civil engineer [Title 27, § 20415(e)(1)].

3. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport [Title 27, § 20415(b)(4)(A)].

4. All sample chemical analyses of any material shall be performed by a laboratory certified by the California Department of Health Services [Wat. Code, § 13176(a)].

5. A Detection Monitoring Program for a new landfill facility shall be installed, operational, and one year of monitoring data collected from background monitoring points prior to the discharge of wastes [Title 27, § 20415(e)(6)].

6. Background for water samples or soil-pore gas samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point).

7. The Discharger shall submit for approval, establish, and maintain an approved Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:

    a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;

    b. Sample preservation information and shipment procedures;

    c. Sample analytical methods and procedures;

    d. Sample quality assurance/quality control (QA/QC) procedures;

    e. Chain of Custody control; and

    f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

    If required by the Executive Officer, the Discharger shall modify the Sample Collection and Analysis Plan to conform with this Order.

8. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that

ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan. Appropriate sample preparation techniques shall be used to minimize matrix interferences.

9. If methods other than USEPA-approved methods or Standard Methods are used, or there is a proposed alternant USEPA method than the one listed in the MRP, the proposed methodology shall be submitted for review and approval prior to use, including information showing its equivalence to the required method.

10. The **methods of analysis and the detection limits** used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90% non-numerical determinations (i.e., “trace” or “ND”) in data from background monitoring points for that medium, the analytical method having the lowest MDL shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences.

11. The laboratory reporting limit (RL) for all reported monitoring data shall be set no greater than the practical quantitation limit (PQL).

12. **“Trace” results** - results falling between the MDL and the PQL - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run.

13. Laboratory data shall not be altered or revised by the Discharger. If the Discharger observes potential lab errors, it shall identify the issue in the monitoring report and shall describe steps that will be taken to prevent similar errors in the future.

14. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs. MDLs and PQLs shall be reported.

15. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged in the laboratory report accordingly, along with estimates of the detection limit and quantitation limit actually achieved. The **MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result**. The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.

16. All **QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and signature of a responsible person from the laboratory. **Sample results shall be reported unadjusted for blank results or spike recoveries**. In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged, but the analytical results shall not be adjusted.

17. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.

18. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples [Title 27, § 20415(b)(4)(B)]. Groundwater samples shall not be field-filtered prior to laboratory analysis [40 C.F.R. § 258.53(b)]. Groundwater samples needing filtering (e.g., samples to be analyzed for dissolved metals) shall be filtered by the laboratory prior to analysis.

19. Groundwater elevations shall be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator shall determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction [40 C.F.R. § 258.53(d)].

20. Monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design

specifications throughout the life of the monitoring program [40 C.F.R. § 258.51(c)(2)]. Monitoring devices that cannot be operated and maintained to perform to design specifications shall be replaced after review and approval of a report (i.e., work plan) for the proposed replacement devices.

21. All borings are to be logged during drilling under the direct supervision of a registered geologist or registered civil engineer with expertise in stratigraphic well logging [Title 27, § 20415(e)(2)].

22. Soils are to be described according to the Unified Soil Classification System [Title 27, § 20415(e)(2)(A)]. Rock is to be described in a manner appropriate for the purpose of the investigation [Title 27, § 20415(e)(2)(B)].

23. The Discharger shall submit a work plan for review and approval at least **60 days** prior to installation or abandonment of groundwater monitoring wells.

24. The Discharger shall provide Central Valley Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation or abandonment of monitoring devices.

25. The water quality protection standard shall consist of the constituents of concern (COC), concentration limits, and the point of compliance. The water quality protection standard shall apply during the active life of the waste management unit, closure period, post-closure maintenance period, and any compliance period under Title 27, section 20410 [Title 27, § 20390].

26. The point of compliance at which the water quality protection standard applies is a vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit [Title 27, § 20405).

27. The compliance period is the minimum period of time during which the Discharger shall conduct a water quality monitoring program and is the number of years equal to the active life of the waste management unit plus the closure period [Title 27, § 20410(a)].

28. The groundwater monitoring system shall include a sufficient number of monitoring points, installed at appropriate locations, to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater that has not been affected by a release from the waste management unit [Title 27, § 20415(b)(1)(A)].

29. The Detection Monitoring Program shall include a sufficient number of monitoring points, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of

groundwater passing the point of compliance to allow the detection of a release from the waste management unit [Title 27, § 20415(b)(1)(B)1.].

30. Additional monitoring points shall be added as necessary to provide the best assurance of the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)2.].

31. The Detection Monitoring Program shall also include a sufficient number of monitoring points installed at appropriate depths and locations to yield groundwater samples from other aquifers or perched zones not already monitored to provide the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)3. and 4., and §20420(b)].

32. A surface water monitoring system shall be established to monitor each surface water body that could be affected by a release from the waste management unit [Title 27, § 20415(c)].

33. An unsaturated zone monitoring system shall be established for each waste management unit [Title 27, § 20415(d)].

34. The Discharger shall notify Central Valley Water Board staff within **seven days** if fluid is detected in a previously dry LCRS, unsaturated zone monitoring system, or if a progressive increase is detected in the volume of fluid in a LCRS [Title 27, § 21710(c)(3)].

35. Driller's logs for all monitoring wells shall to be submitted to the Central Valley Water Board and the Department of Water Resources [Wat. Code, § 13751 and Title 27, § 20415(b)(3)].

36. Groundwater elevation, temperature, electrical conductivity, turbidity, and pH are to be accurately measured at each well each time groundwater is sampled [Title 27, § 21415(e)(13)].

37. The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [Title 27, § 20415(e)(15)].

38. The Discharger shall graph all analytical data from each monitoring point and background monitoring point and shall submit the graphs to the Central Valley Water Board annually [Title 27, § 20415(e)(14)].

39. For each waste management unit, the Discharger shall collect all data necessary for selecting appropriate data analysis methods for establishing background values for each constituent of concern and for each monitoring parameter [Title 27, § 20420(c)]. The Discharger shall propose a data analysis method that includes a detailed description of the criteria to be used for

determining “measurably significant” (as defined in Title 27, section 20164) evidence of a release from the waste management unit and determining compliance with the water quality protection standard [Title 27, § 20415(e)(6) and (7)].

40. For statistical analysis of data, the Discharger shall use one of the methods described in Title 27, section 20415(e)(8)(A)-(E). A non-statistical data analysis method can be used if the method can achieve the goal of the particular monitoring program at least as well as the most appropriate statistical method [Title 27, § 20415(e)(8)]. The Discharger shall use a statistical or nonstatistical data analysis method that complies with Title 27, section 20415(e)(7, 8, 9, and 10), to compare the concentration of each constituent of concern or monitoring parameter with its respective background concentration to determine whether there has been a measurably significant evidence of a release from the waste management unit. For any given monitoring point at which a given constituent has already exhibited a measurably significant indication of a release at that monitoring point, the Discharger may propose to monitor the constituent, at that well, using a concentration-versus-time plot.

41. The Discharger may propose an alternate statistical method [to the methods listed under Title 27, section 20415(e)(8)(A-D)] in accordance with Title 27, section 20415(e)(8)(E), for review and approval.

42. The statistical method shall account for data below the practical quantitation limit (PQL) with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27, section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be reliably achieved** within limits of precision and accuracy specified in the WDRs or an approved Sample Collection and Analysis Plan for routine laboratory operating conditions that are available to the facility. The Discharger’s technical report (Sample Collection and Analysis Plan and/or Water Quality Protection Standard Report), pursuant to Title 27, section 20415(e)(7), shall consider the PQLs listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a “trace” detection) shall be identified and used in appropriate statistical or non-statistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory’s concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of “ties”.

43. The water quality protection standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall

be taken as the detection limit of the analytical method used (e.g., USEPA methods 8260 and 8270).

44. Alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) if part of an approved water quality protection standard. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Central Valley Water Board staff.

45. **Confirmation of Measurably Significant Evidence of a Release.** Whenever a constituent is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the water quality protection standard, the Discharger shall conduct verification sampling to confirm if the exceedance is due to a release or if it is a false-positive (unless previous monitoring has already confirmed a release for that constituent at that monitoring point). An exceedance of the concentration limit from the water quality protection standard is considered measurably significant evidence of a release that must be either confirmed or denied. There are two separate verification testing procedures:

    a. Standard Monitoring Specification I.46 provides the procedure for analytes that are detected in less than 10% of the background samples such as non-naturally occurring constituents like volatile organic compounds; and

    b. Standard Monitoring Specification I.47 provides the procedure for analytes that are detected in 10% or greater of the background samples such as naturally occurring constituents like chloride.

46. **Verification Procedure for Analytes Detected in Less than 10% of Background Samples**. The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:

    a. **Initial Determination of Measurably Significant Evidence of a Release**. Identify each analyte in the **current** detection monitoring point sample that exceeds either its respective MDL or PQL, and for which a release has not been previously confirmed. The Discharger shall conclude that the exceedance provides a preliminary indication of a release or a change in the nature or extent of the release, at that monitoring point, if ***either:***

        1) The data contains two or more analytes that equal or exceed their respective MDLs; or

        2) The data contains one or more analyte that equals or exceeds its PQL.

b. **Discrete Retest** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)]:

1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.46.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** of such indication, shall collect two new (retest) samples from the monitoring point where the release is preliminarily indicated and analyze them for the constituents that caused the need for the retest.

2) **Confirmation of a Release**. As soon as the retest data are available, the Discharger shall conclude that measurably significant evidence of a release is confirmed if (not including the original sample) two or more analytes equal or exceed their respective MDLs or if one or more analyte equals or exceeds its PQL. The Discharger shall then:

a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and

b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.

c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

47. **Verification Procedure for Analytes Detected in 10% or Greater of the Background Samples.** The Discharger shall use either a statistical or non-statistical method pursuant to Title 27, section 20415(e)(8)(E) for all analytes that are detected in 10% or greater of the background samples. The Discharger shall use one of the statistical methods required in Title 27, section 20415(e)(8)(E) unless another method has been proposed by the Discharger in a Water Quality Protection Standard Report (or equivalent report) and approved by the Central Valley Water Board in a Monitoring and Reporting Program pursuant to Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E). The method shall be implemented as follows:

a. **Initial Determination of Measurably Significant Evidence of a Release**. The Discharger shall compare the value reported by the laboratory for each analyte to the statistically-derived concentration limit from the most recent report (Annual Monitoring Report or Water Quality Protection Standard Report) that uses the approved statistical procedure. If the value exceeds the concentration limit for that constituent, the Discharger shall conclude that there in measurably significant evidence of a release [Title 27, § 20420(i)].

b. **Retest Method** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)].

1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.47.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** [Title 27, § 20415(e)(3)] of such indication, the Discharger shall implement a verification procedure/retest option, in accordance with Title 27, sections 20415(e)(8)(E) and 20420(j)(2). The verification procedure shall include either a single "composite" retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release) or shall consist of at least two "discrete" retests (i.e., statistical analyses each of which analyzes only newly-acquired data from the monitoring point that indicated a release) [Title 27, § 20415(e)(8)(E)]. The Discharger may use an alternate method previously approved by the Central Valley Water Board and included in the Monitoring and Reporting Program. The verification procedure shall comply with the requirements of Title 27, section 20415(e)(8)(E) in addition to the performance standards of Title 27, section 20415(e)(9). The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. For any indicated monitoring parameter or constituent of concern, if the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release has been confirmed.

2) **Confirmation of a Release**. As soon as the retest data are available, the Discharger shall evaluate the results pursuant to paragraph I.47.b.1, above and shall:

a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and

b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.

c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

48. **Physical Evidence of a Release**. If the Discharger determines that there is a significant **physical** evidence of a release, the Discharger shall immediately

verbally notify Central Valley Water Board staff and provide written notification **by certified mail within 7 days** of such determination, and within **90 days** shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program [Title 27, § 20385(a)(3) and § 20420(l)(1) & (2)].

J. RESPONSE TO A RELEASE

1. Measurably Significant Evidence of a Release Has Been Confirmed. If the Discharger has confirmed that there is measurably significant evidence of a release from a waste management unit pursuant to Standard Monitoring Specification I.46 or I.47, then the Discharger shall:

   a. **Immediately** sample all monitoring points in the affected medium at that waste management unit and determine the concentration of all monitoring parameters and constituents of concern for comparison with established concentration limits. Because this constituent of concern scan does not involve statistical testing, the Discharger will need to collect and analyze only a single water sample from each monitoring point in the affected medium [Title 27, § 20420(k)(1)].

   b. **Within 14 days** of confirming measurably significant evidence of a release, the Discharger shall (for releases from MSW landfill units) notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination if contaminants have migrated off-site if indicated by sampling of detection monitoring wells [40 C.F.R. § 258.55(g)(1)(iii)].

   c. **Within 90 days** of confirming measurably significant evidence of a release, the Discharger shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program meeting the requirements of Title 27, sections 20420(k)(5)(A-D), including but not limited to the results of sampling pursuant to paragraph J.1.a, above. The Evaluation Monitoring Program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone affected by the release [Title 27, § 20420(k)(5) and § 20425(b)]. For releases from MSW landfill units, the Evaluation Monitoring Program shall also include any additional proposals necessary to comply with 40 C.F.R. § 258.55, particularly the additional monitoring well required by 40 C.F.R. § 258.55(g)(1)(ii).

   d. **Within 180 days** of confirming measurably significant evidence of a release, the Discharger shall submit to the Central Valley Water Board an <u>initial</u> engineering feasibility study for a Corrective Action Program necessary to meet the requirements of Title 27, section 20430. At a minimum, the initial engineering feasibility study shall contain a detailed

description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern [Title 27, § 20420(k)(6)].

e. If the Discharger confirms that there is measurably significant evidence of a release from the waste management unit at any monitoring point, the Discharger may attempt to demonstrate that a source other than the waste management unit caused the evidence of a release or that the evidence is an artifact caused by an error in sampling, analysis, or statistical evaluation or by natural variation in groundwater, surface water, or the unsaturated zone. The Discharger may make a demonstration pursuant to Title 27, section 20420(k)(7) in addition to or in lieu of submitting both an amended report of waste discharge or an engineering feasibility study; however, the Discharger is not relieved of the requirements and due dates of Title 27, sections 20420(k)(6) & (7) unless Central Valley Water Board staff agree that the demonstration successfully shows that a source other than the waste management unit caused the evidence of a release or that the evidence resulted from error in sampling, analysis, or statistical evaluation or from natural variation in groundwater, surface water, or the unsaturated zone. In order to make this demonstration, the Discharger shall notify the Central Valley Water Board by certified mail of the intent to make the demonstration **within seven days** of determining measurably significant evidence of a release, and shall submit a report **within 90 days** of determining measurably significant evidence of a release [Title 27, § 20420(k)(7)].

f. **Within 90 days** of the date that the Evaluation Monitoring Program from paragraph J.1.c is approved (the date is it established), the Discharger shall complete and submit the following:

i) **Results and Assessment for the Evaluation Monitoring Program.** A report with the results and assessment based on the approved Evaluation Monitoring Program [Title 27, § 20425(b)].

ii) **Updated Engineering Feasibility Study.** An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under Title 27, section 20425(e) [Title 27, § 20425(c)].

iii) **Amended ROWD for a Corrective Action Program.** An amended report of waste discharge to establish a Corrective Action Program meeting the requirements of Title 27, section 20430 based on the data collected to delineate the release and based on the updated engineering feasibility study [Title 27, § 20425(d)].

g. The Discharger shall (for releases from MSW landfill units) discuss the results of the updated engineering feasibility study, prior to the final selection of a remedy, in a public meeting with interested and affected parties [40 C.F.R. § 258.56(d)].

K. GENERAL PROVISIONS

1. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Central Valley Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.

2. All reports and transmittal letters shall be signed by persons identified below:

   a. For a corporation: by a principal executive officer of at least the level of senior vice-president.

   b. For a partnership or sole proprietorship: by a general partner or the proprietor.

   c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.

   d. A duly authorized representative of a person designated in a, b or c above if:

      1) The authorization is made in writing by a person described in a, b, or c of this provision;

      2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position); and

      3) The written authorization is submitted to the Central Valley Water Board.

e. Any person signing a document under this Section shall make the following certification:

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

3. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.

4. The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and post-closure maintenance period of the waste management units and during subsequent use of the property for other purposes.

5. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger's violations of this Order.

6. The Discharger shall notify the Central Valley Water Board of a material change in; the types, quantity, or concentrations of wastes discharged; site operations and features; or proposed closure procedures, including changes in cost estimates. This notification shall be given a reasonable time before the changes are made or become effective. No changes shall be made without Central Valley Water Board approval following authorization for closure pursuant to the site Notification of Closure [Title 27, § 21710(a)(4)].

7. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit or portion of a unit, and the manner and location of discharge. Such records shall be maintained by the Discharger until the beginning of the post-closure maintenance period. These records shall be on forms approved by the State Water Board or Central Valley Water Board and shall be maintained at the waste management facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the State Water Board or Central Valley Water Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Central Valley Water Board [Title 27, § 21720(f)].

8. In the event of any change in landowner or the operator of the waste management facility, the Discharger shall notify the succeeding owner or

operator in writing of the existence of this Order. A copy of that notification shall be sent to the Central Valley Water Board.

9. In the event of any change of ownership or responsibility for construction, operation, closure, or post-closure maintenance of the waste discharge facilities described in this Order, the Discharger shall notify the Central Valley Water Board prior to the effective date of the change and shall include a statement by the new Discharger that construction, operation, closure, or post-closure maintenance will be in compliance with this Order and any revisions thereof [Title 27, § 21710(c)(1)].

10. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within **14 days** of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory requirements contained in General Provision K.2 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. Transfer of this Order shall be approved or disapproved by the Central Valley Water Board.

L. STORM WATER PROVISIONS

1. New and existing Class III landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [Title 27, § 20260(c)].

2. New and existing Class II landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [Title 27, § 20250(c)].

3. The Discharger shall design storm water conveyance systems for Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].

4. MSW landfills located in a 100-year floodplain shall demonstrate that the landfill unit will not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health or the environment [40 C.F.R. § 258.11(a)].

5. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding,

infiltration, inundation, erosion, slope failure, washout, and overtopping under the precipitation conditions for the unit [Title 27, § 20365(a)].

6. Precipitation on landfills or waste piles which is not diverted by covers or drainage control systems shall be collected and managed through the LCRS, which shall be designed and constructed to accommodate the precipitation conditions for each class unit [Title 27, § 20365(b)].

7. Diversion and drainage facilities shall be designed, constructed, and maintained to [Title 27, § 20365(c)]:

    a. accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the waste management unit:

    b. effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities;

    c. prevent surface erosion;

    d. control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste;

    e. take into account:

        i) for closed waste management units and for closed portions of units, the expected final contours of the closed unit, including its planned drainage pattern;

        ii) for operating portions of waste management units other than surface impoundments, the unit's drainage pattern at any given time;

        iii) the possible effects of the waste management unit's drainage pattern on and by the regional watershed;

        iv) the design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of discharge if there were no waste management facility; and

    f. preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or detention basins as needed to preserve the design capacity of the system.

8. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system [Title 27, § 20365(d)].

9. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].

10. Cover materials shall be graded to divert precipitation from the waste management unit, to prevent ponding of surface water over wastes, and to resist erosion as a result of precipitation [Title 27, § 20365(f)].

11. Any drainage layer in the final cover shall be designed and constructed to intersect with the final drainage system for the waste management unit in a manner promoting free drainage from all portions of the drainage layer [Title 27, §20365(f)].