CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

CENTRAL VALLEY REGION

ORDER R5-2016-XXXX

WASTE DISCHARGE REQUIREMENTS FOR RECOLOGY HAY ROAD RECOLOGY HAY ROAD, DBA JEPSON PRAIRIE ORGANICS RECOLOGY HAY ROAD LANDFILL CLASS II, III LANDFILLS, CLASS II WASTE PILE, CLASS II LAND TREATMENT UNIT AND COMPOSTING FACILTY CONSTRUCTION, OPERATION, CLOSURE, POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION SOLANO COUNTY

The California Regional Water Quality Control Board, Central Valley Region (hereafter Central Valley Water Board) finds that:

1. Recology Hay Road owns and operates the Recology Hay Road Landfill facility in Solano County. The facility is an active, municipal solid waste (MSW) landfill on Hay Road about eight miles east of Vacaville, as shown in Attachment A: Location Map. The facility is regulated under the California Water Code, section 13000 et seq.; California Code of Regulations, title 27, section 20005 et seq. (Title 27); and the Code of Federal Regulations, title 40, section 258, et seq. (40 CFR 258 or "Subtitle D"). Applicable Subtitle D regulations are implemented though State Water Resources Control Board (State Water Board) Resolution 93-62.

2. The following documents are attached to this Order and hereby incorporated into and made a part of this Order by reference:
   a. Attachment A – Location Map
   b. Attachment B – Area Map
   c. Attachment C – Facility Map
   d. Attachment D – Groundwater Monitoring
   e. Attachment E – Leachate & Soil Pore Liquid Monitoring
   f. Attachment F – Landfill Gas Controls & Monitoring'
   g. Attachment G – Drainage Controls & Surface Water Monitoring
   h. Attachment H – Compost Facility Map
   i. Attachment I – Nitrate-N Plume Map
   j. Table 1 – Maximum Allowable Groundwater Elevation
   k. Information Sheet
   l. December 2015 *Standard Provisions and Reporting Requirements for Nonhazardous Solid Waste Discharges Regulated by Subtitle D and/or Title 27* (Landfill SPRRs)
   m. April 2016 *Standard Provisions and Reporting Requirements for Industrial Facilities*

Regulated by Title 27 (Industrial SPRRs)

3. The facility is on a 640-acre site in Section 2, T5N, R1E, Mount Diablo Base and Meridian, corresponding to Assessor Parcel Numbers 42-020-02, 42-020-06, and 42-020-28. The geographic coordinates of the site are Latitude 38.312° north, Longitude -121.837 ° west. The facility address is 6426 Hay Road, Vacaville, CA 95687. See Attachment B: Area Map.

4. On 29 June 2015, the Discharger submitted an amended Joint Technical Document (JTD) describing or referencing significant changes at the facility since adoption of previous WDRs Order R5-2008-0188 in December 2008, including, but not limited to, the following:

   a. A name change to the facility operator and property owner;
   b. Submission of various technical reports to address WDR compliance issues as required by the Board's Water Code Section 13301 Order (e.g., composting, groundwater separation, drainage controls, flood controls, and slope stability);
   c. Implementation of in-situ groundwater remediation to address nitrate-N impacts from composting, sludge, or other discharges at the site;
   d. Construction of additional landfill expansion modules/phases;
   e. Installation of landfill gas controls;
   f. Installation of additional perimeter gas monitoring wells;
   g. Leachate recirculation;
   h. Monitoring data indicating low-level VOC impacts to soil pore liquid and groundwater;
   i. A revised Preliminary Closure and Postclosure Maintenance Plan; and
   j. Updated financial assurances information.

   Due to the above changes, previous WDR R5-2008-0188 no longer adequately regulates the facility and is rescinded by this Order. These revised WDRs include updated findings and requirements for the facility based on information in the amended JTD and in accordance with California Code of Regulations (CCR), title 27, division 2 (Title 27) regulations.

5. The landfill facility has been in operation since 1964, accepting household, commercial, industrial, construction and demolition, and/or special wastes from San Francisco, Vacaville, Fairfield, and other incorporated and unincorporated areas of Solano County and areas in Northern California. A portion of the facility previously operated as a burn dump from 1967 to 1972. The facility is owned and operated by Recology Hay Road.

6. The existing and future waste management units authorized by this Order are described as follows:

Unit	Class	Module	Area (acres)	Status	Liner/LCRS[1] Components
LF-1	Class III	DM-1A	29.7	Active	Unlined
		DM-1B	14.8	Active	Approximately 8.8 acres is constructed with a gravel LCRS over compacted subgrade The remaining approximately 6 acres constructed as follows: Operations layer – one foot of soil Geotextile filter LCRS – 12 inches of gravel 60-mil HDPE liner Compacted earthfill
LF-2	Class III	DMs-2.1A & 2.1B	14.7	Active	Operations layer – one foot of soil Geotextile filter LCRS – one foot of gravel HDPE liner[2] Compacted clay[3] Compacted earthfill
LF-3	Class II	DMs-2.2 & 11	26.4	Active	Operations layer – one foot of soil Geotextile LCRS –gravel[4] Geotextile cushion[8] 60-mil HDPE liner Gundseal GCL One foot of compacted clay ($k \leq 1 \times 10^{-7}$cm/sec) Six inch soil foundation layer Gravel[5] Compacted earthfill
		DMs-2.3, 10 & 11.3	55.6	Future	
LF-4	Class II	DMs-3, 4, 5[6], 6 & 7.1	77.9	Active	Operations layer – one foot of soil Geotextile LCRS – six inches of gravel Geotextile cushion[8] 60-mil HDPE liner Two feet of compacted clay ($k \leq 1 \times 10^{-7}$cm/sec) Six inch soil foundation layer Geocomposite 60-mil HDPE liner Compacted earthfill
		DMs- 7.2[7], 8 & 9	41	Future	

Unit	Class	Module	Area (acres)	Status	Liner/LCRS[1] Components
WP-9.1	Class II	NA	7	Active[9]	Operations layer – one foot of soil Geotextile LCRS – six inches of gravel 60-mil HDPE liner Gundseal GCL One foot of compacted clay ($k \leq 1 \times 10^{-7}$cm/sec) Six inch soil foundation layer Six inches of gravel Compacted earthfill
LTU	Class II	NA	3.2	No waste discharge; clean closure planned in 2016	5-feet of native soil

1. LCRS – leachate collection and recovery system.
2. DM-2.1A was constructed with an 80-mil HDPE liner in the sump and a 60-mil HDPE liner outside of the sump. DM-2.1B was constructed with a 60-mil HDPE liner.
3. DM-2.1A has one foot of CCL ($k \leq 1 \times 10^{-6}$cm/sec) outside of the sump and three feet of CCL ($k < 1 \times 10^{-6}$ cm/sec) beneath the sump. DM-2.1B, Phase 2 has two feet of CCL ($k \leq 1 \times 10^{-7}$cm/sec).
4. DM-2.2 contains one foot of LCRS gravel. DM-11 and future LF-3 modules contain six inches of LCRS gravel.
5. DM-2.2 contains one foot of gravel. DM-11 and future LF-3 modules contain six inches of gravel.
6. All LF-4 modules except DM-5.1 constructed with secondary geomembrane underlying primary composite liner.
7. First phase (DM 7.1) of module constructed in 2015. Second phase (DM 7.2) scheduled for completion in 2018.
8. Future disposal modules may be constructed with a geotextile cushion if rounded gravel is not used for the LCRS layer.
9. The current WP-9.1A area in service for sludge storage measures 2.7 acres. The remainder of the 4.3 acres of WP-9.1 is undergoing clean closure in 2016.

7. Onsite facilities at the Recology Hay Road Landfill include: monitoring and control systems (e.g., groundwater, landfill gas, leachate); storm water retention ponds; flood control berms; groundwater dewatering facilities; a borrow pit; materials handling and processing areas; access roads; structures; and other features. The site also includes a composting facility, acreage for future landfill expansion, and a habitat preservation (i.e., Bird Sanctuary Pond) area. See Attachment G: Drainage Controls & Surface Water Monitoring.

8. The onsite composting facility is located on the north side of the site east of LF-1. The facility includes a 22-acre, engineered composting pad; leachate collection ditches and sumps, two leachate ponds (see table below), leachate storage tanks, and storm water controls. The composting facility will ultimately be decommissioned to make room for construction of future disposal modules (i.e., LF-4, DM-9 and LF-3, DM-10) in the area. See Attachment H: Compost Facility Map.

Compost Leachate Ponds		
Pond	Unit Classification[1]	Volume (gallons)[2]
A	n/a	389,000
B	n/a	15,500,000

1. Compost ponds not classified under Title 27 regulations.
2. Excludes the 1.2 feet of freeboard in Pond A and two feet of freeboard in Pond B.

9. Title 27 contains regulatory standards for discharges of solid waste promulgated by the State Water Board and the California Department of Resources Recovery and Recycling (CalRecycle). In certain instances, this Order cites CalRecycle regulatory sections. Title 27, section 20012 allows the Central Valley Water Board to cite CalRecycle regulations from Title 27 where necessary to protect water quality, provided it does not duplicate or conflict with actions taken by the Local Enforcement Agency (LEA) in charge of implementing CalRecycle regulations.

10. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated MSW landfill regulations under the Resource Conservation and Recovery Act (RCRA), Subtitle D. These regulations are under 40 Code of Federal Regulations section 258, and are hereafter referred to as either "Subtitle D" in reference to the RCRA federal law that required the regulations or "40 C.F.R. section 258.XX". These regulations apply to all California Class II and Class III landfills that accept MSW on or after the effective date of Subtitle D (9 October 1993). *State Water Resources Control Board Resolution 93-62* (Resolution 93-62) requires the Central Valley Water Board WDRs for MSW landfills to implement the applicable provisions of the federal MSW regulations that are necessary to protect water quality, and in particular the containment provisions and the provisions that are either more stringent or that do not exist in Title 27.

11. This Order implements the applicable regulations for discharges of solid waste to land through Prohibitions, Specifications, Provisions, and monitoring and reporting requirements. Prohibitions, Specifications, and Provisions are listed in Sections A through I of these WDRs below, and in the Landfill SPRRs and Industrial SPRRs dated December 2015 and April 2016 which are part of this Order. Monitoring and reporting requirements are included in the Monitoring and Reporting Program (MRP) R5-2016-XXXX and in the Landfill and Industrial SPRRs. In general, requirements that are either in regulation or otherwise apply to a classified unit are considered to be "standard" and are therefore in the SPRRs. Any site-specific changes to a requirement in the SPRRs are included in the applicable section (Sections A through I) of these WDRs, and such requirement in the WDRs supersedes the requirement in the SPRRs.

12. On 4 August 2015, the State Water Resources Control Board adopted *General Waste Discharge Requirements for Composting Operations Order No. WQ 2015-0121-DWQ* (Composting General Order or CGO) applicable to various types of composting operations, including, but not limited to, facilities that compost green waste and food waste. One of the purposes of the CGO was to prescribe uniform and consistent waste

discharge requirements for similar types of composting operations consistent with the Water Code, Title 27, and applicable regulations in order to protect water quality. The CGO required that new and existing composting operations submit a technical report describing their composting operations along with a Notice of Intent to comply with the CGO.

13. Listed exceptions to the CGO include composting operations located at a landfill regulated under WDRs. Such composting operations do not need to be covered under CGO if the landfill facility's WDRs include requirements for the composting operation, as determined by the Regional Water Board. These WDRs prescribe waste discharge requirements for both the landfill and composting facility at the Recology Hay Road Landfill. The Discharger is therefore not required to obtain coverage under the CGO.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

14. The Discharger proposes to discharge nonhazardous wastes including MSW in Class III LF-2 and inert and nonhazardous construction and demolition debris (C&D) in the Class III landfills (i.e., LF-1 and LF-2). Since September 1992, waste discharges to LF-1 have been limited to inert wastes (e.g., concrete, asphalt, and tires). LF-1 also accepts friable and non-friable asbestos. Up to 11,000 tons (3,667 tons/year) of asbestos containing waste (ACW) are estimated to have been discharged to LF-1 since January 2013. These classified wastes may be discharged only in accordance with Title 27, Resolution No. 93-62, and the Code of Federal Regulations, Title 40, Part 258 as required by this Order.

15. The Discharger proposes to continue to discharge inert wastes, nonhazardous wastes including MSW, and asbestos-containing wastes to Class II waste management units at the facility. The Discharger also proposes to continue to discharge designated waste to Class II landfill units (i.e., LF-3 and LF-4) including household, commercial, and industrial (H/C/I) wastes; de-watered sewage sludge; industrial sludges; treated wood waste; dredge debris; slab/construction/demolition debris; commercial/industrial waste; glass cullet; asbestos containing waste and other non-hazardous or designated wastes. Wastes requiring special handling ("special wastes", as defined in Title 27) (e.g., triple-rinse pesticide containers; tires; large dead animals; medical wastes; incinerator ash; and agricultural wastes) are also discharged to the Class II landfill units. These classified wastes may be discharged only in accordance with Title 27, Resolution 93-62, and Subtitle D as required by this Order.

16. Contaminated soil (C-Soil) discharged to the landfill are typically classified as designated waste and generally include petroleum-impacted soil; metals-impacted soil; pesticide or PCB-impacted soil; and/or soil mixed with incinerator ash. Class II landfill modules may accept C-Soil for disposal, as alternative daily cover (ADC), and as foundation layer for final cover. These WDRs authorize the discharge of special wastes such as C-Soil to Class II units LF-3 and LF-4, but no new C-Soils may be discharged to units LF-1 or LF-2.

17. Lead-contaminated soil (LC-soil) previously accepted from the City of San Francisco Metro Muni project, and re-classified as "nonhazardous" by the Department of Toxic Substances Control (pursuant to Section 66260.200(f), Title 22), and approved by the Central Valley Water Board on 28 September 1993 is stockpiled on Unit LF-2, module DM-2.1 beneath the DM-2.2 eastern side slope liner. Although DM-2.1 is a Class III unit and the LC-soil is a designated waste, the Discharger received approval from the Central Valley Water Board to stockpile LC-Soils on DM-2.1 from the Islais Creek Contract B Project and the Embarcadero Roadway project on 16 November 1994 and 25 February 1994, respectively. The LC-Soil stockpiles include long term stockpiles for future beneficial reuse as foundation soil for final cover and operational stockpiles for beneficial reuse such as ADC.

18. Approximately 593,000 cubic yards of C-Soil and sludge are estimated to have been discharged to/stockpiled at LF-2 and LF-3 since January 1993. These WDRs authorize the existing C-Soil stockpiles to remain on the disposal modules where they exist today, and authorize LC-soil to be used as a foundation cover for LF-2. These WDRs also authorize the discharge of special wastes such as C-Soil to Class II units LF-3 and LF-4, but no new C-Soils may be discharged to units LF-1 or LF-2. See Prohibition A.1.b.

19. The Discharger also proposes to continue to discharge de-watered (i.e., all free liquids removed) wastewater treatment plant (WWTP) sludge for discharge to the landfill and for beneficial reuse in landfill operations (e.g., alternative daily cover, soil admix). Sludge accepted at the landfill during the wet season is either discharged directly to the landfill with solid waste (i.e., co-disposal) or stored in an onsite waste pile (WP-9.1A). At the end of the wet season, the sludge is moved to, and temporarily stockpiled on, active module(s) where it will be beneficially reused as alternative daily cover (ADC) and/or admixed with clean soil for use as operations layer. Any sludge not dried and/or used during a dry season is winterized with intermediate cover for future beneficial use.

    These WDRs allow the stockpiling of dewatered sludge on landfill modules that are Class II units and requires that all such operations be conducted consistent with the applicable O&M plans (e.g., Waste Materials Re-Use O&M Plan) required under Facility Specification C.2. See Prohibition A.4.d. These WDRs allow the Discharger to continue discharging these semi-solid wastes to WP-9.1A and LFs-3 and 4 provided that the discharge complies with the applicable co-disposal provisions of this Order and Title 27 and Subtitle D regulations.

20. Under previous WDRs, sludge drying operations were also historically conducted at an onsite landfill treatment unit (LTU) immediately east and south of WP-9.1. The LTU is no longer accepting sludge and is in the process of clean closure. Additionally, the eastern portion of WP-9.1 is also in the process of clean closure.

21. Water Code section 13173 defines "Designated Waste" as either of the following:

a. Hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Health and Safety Code section 25143.

b. Nonhazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the appropriate state water quality control plan.

Designated waste can be discharged only at Class I waste management units, or at Class II waste management units which comply with Title 27 and have been approved by the Regional Board for containment of the particular kind of waste to be discharged.

22. The Discharger proposes to continue to discharge wastes containing greater than one percent (>1%) friable asbestos to LF-1 (DM-1A and DM-1B). The Discharger also proposes to discharge wastes containing greater than one percent (>1%) friable asbestos to LF-3 and LF-4. These wastes are classified as 'hazardous' under California Code of Regulations, title 22 (Title 22). However, these wastes do not pose a threat to groundwater quality and California Health and Safety Code, section 25143.7 permits their disposal in any landfill that has WDRs that specifically permit the discharge, provided that the wastes are handled and disposed of in accordance with applicable statutes and regulations.

23. The Discharger proposes to continue to discharge treated wood waste in the composite-lined modules DM-2.2 and DM-3 through DM-11. Treated wood waste is not allowed in modules DM-1 or DM-2.1 (i.e., in Units LF-1 or LF-2). Title 22 defines "treated wood" to mean wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).

24. Title 22, section 67386.11 allows treated wood waste to be discharged to a composite-lined portion of a MSW landfill that is regulated by WDRs issued pursuant to the Water Code provided that the landfill owner/operator:

a. Comply with the prohibitions in Title 22, section 67386.3, which are:

i. Treated wood waste shall not be burned, scavenged, commingled with other waste prior to disposal, stored in contact with the ground, recycled without treatment (except as in iii, below), treated except in compliance with Title 22,

section 67386.10, or disposed to land except in compliance with Title 22, section 67386.11.

ii. Any label or mark that identifies the wood and treated wood waste shall not be removed, defaced, or destroyed.

iii. Treated wood waste many be recycled only by reuse when all of the following apply:

1) Reuse is on-site.

2) Reuse is consistent with FIFRA approved use of the preservative.

3) Prior to reuse, treated wood waste is handled in compliance with Title 22, division 4.5, chapter 34.

b. Ensure treated wood waste is managed at the landfill according to Title 22, division 4.5, chapter 34 prior to disposal.

c. Monitor the landfill for a release and if a verified release containing one or more TWW constituents is detected from module where treated wood is discharged, the disposal of treated wood will be terminated at the module with the verified release until corrective action ceases the release.

d. Handle treated wood waste in a manner consistent with the applicable sections of the California Occupational Safety and Health Act of 1973.

25. Title 27, section 20690 allows the use of alternative daily cover (ADC) at MSW landfills upon approval by the Local Enforcement Agency (LEA) and concurrence from CalRecycle. Title 27, section 20705 provides the Water Board's regulations for all daily and intermediate cover including that it shall minimize the percolation of liquids through waste and that the cover shall consist of materials that meet the landfill unit classification (Class II or Class III). The regulations also require that for non-composite lined portions of the landfill, that any contaminants in the daily or intermediate cover are mobilized only at concentrations that would not adversely affect beneficial uses of waters of the state in the event of a release. For composite-lined portions of the landfill, the regulations require that constituents and breakdown products in the cover material are listed in the water quality protection standard.

26. The Discharger proposes to use the following materials for ADC: dried sewage sludge/biosolids; C-Soil; dredge spoils, foundry sands, & contaminated sediment; green waste materials/compost; ground wood, C&D fines, shredded tires, moisture-conditioned ash and/or cement kiln dust, and mixtures of these wastes. Geosynthetic fabric, blankets, and foam products are also used as ADC. All ADC materials are stockpiled at or near the working face prior to use. The Discharger does not use any ADC materials for intermediate cover, except for biosolids as a soil amendment. The Discharger has

demonstrated that these materials will minimize percolation of liquids through waste, that they meet the unit classification where they will be discharged, and that the constituents and breakdown products are included in the water quality protection standard. These WDRs allow the Discharger to use these materials as ADC.

27. The Discharger also proposed to continue to use soil admix for ADC and construction operations and as foundation soil for closure. The soil admix operations are conducted during the dry season on covered portions of LF-3 and/or LF-4 proximate to active landfill modules. The admix soil typically consists of a mixture of dried sludge (60%), compost overs (20%) and onsite soil (20%), or only dried sludge (70%) and soil (30%). Once mixed, the soil is stockpiled next to the module where it is needed for construction operations. For modules not scheduled for construction that year, the stockpiles are winterized prior to the wet season by grading and capping them (with a one-foot thick layer of interim cover) for drainage and erosion control. These WDRs prohibit the stockpiling of wastes on landfill modules, with certain exceptions, including, but not limited to, C-Soil and soil admix operations for closure and construction purposes.

28. Landfills propose new ADC materials regularly in order to preserve landfill air space and to beneficially reuse waste materials. Title 27, section 20686 includes regulations for beneficial reuse, including use of ADC. Approval of ADC is primarily handled by the LEA and CalRecycle under Title 27, section 20690. This Order allows any ADC proposed for use at the facility after the adoption of this Order to be approved by Central Valley Water Board staff provided the Discharger has demonstrated it meets the requirements in Title 27, section 20705. The approved ADC materials should then be listed in the facility's WDRs during the next regular update or revision with information about the Discharger's demonstration. This Order also includes a requirement that ADC only be used in internal areas of the landfill unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality. The demonstration can take sedimentation basins into account.

29. About 2.4 million gallons of leachate are pumped from the landfill units and waste pile each year. The average daily pumping rate for leachate over the Second Half 2014 and First Half 2015 was 337 gpd at DM-1B, 283 gpd at LF-2, 1,040 gpd at LF-3, 1,510 gpd at LF-4, and 669 gpd at WP-9.1 The highest average daily pumping rates occurred at LF-3, DM-11 in December 2014 (3,981 gpd).

30. Based on the historical leachate monitoring data, shown in the tables below, leachate is considered a designated waste.

Min-Max Historical Leachate Concentration (ug/L, except where noted)									
Unit:	LF-1						LF-2[2]		
	DM-1A[1]			DM-1B[2]					
Constituent:	Min	Max	Median	Min	Max	Median	Min	Max	Median
Ammonia (mg/L):	50	920	540	6.4	70	13	15	36	20
General Minerals (mg/L):									
Bicarbonate	710	5,500	3,300	595	2,100	1,000	1,030	2,100	1,700
Chloride	61	6,900	3,300	380	2800	634	490	6,300	3,100
Nitrate	ND	2	0.22	ND	7.79	0.1	ND	11	0.19
Sulfate	ND	130*	6	0.48	220	6.35	ND	2,300	76
Total Dissolved Solids	500	15,000	7,500	810	8,610	1,960	2,900	13,400	7,000
VOCs (ug/L):									
Alcohols and ethers	ND	760	0.61	ND	320	0.6	ND	840	1.8
BTEX Compounds	ND	35	3.05	ND	3.7	0.24	ND	16	0.70
Freon Compounds	ND	5.1	0.16	ND	2	0.16	ND	2	0.16
Halogenated VOCs									
1,1-Dichloroethane	ND	1	0.12	ND	2.2	0.5	ND	2.3	0.93
1,2-Dichloroethane	ND	0.88	0.17	ND	1	0.16	ND	1.4	0.355
Methylene Chloride	ND	1.7	0.28	ND	5	0.27	ND	6.5	0.3
Vinyl Chloride	ND	10	1	ND	1	0.16	ND	2.5	0.91
Other	ND	49	0.18	ND	25	0.17	ND	50	0.24
Ketones	ND	91*	7.10	ND	280	2.50	ND	31	4.10
Other VOCs	ND	500	1.15	ND	500	0.57	ND	500	0.8
Dissolved Metals (mg/L):									
Arsenic	ND*	0.2	0.028	0.00563	0.1	0.012	ND	0.1	0.015
Chromium (total)	0.00092	0.038	0.01	ND	0.01	0.01	ND	0.49	0.01
Chromium (Hex)	NA	NA	NA	ND	ND	ND	ND	0.0069	NA
Iron	1.3	11*	7	ND	17	6.2	0.29	4.90	1.40
Lead	ND	0.2*	0.012	ND	0.1	0.005	ND	0.1	0.005
Manganese	0.11	2.30	0.21	0.14	6.58	2.50	0.71	27.00	2.66
Mercury	ND	0.0002	0.000017	ND	0.00015	0.0002	ND	0.001	0.0002
Semi-VOCs (ug/L):	ND	83	0.34	ND	810	3	ND	800	4.8
Organo-Pesticides (ug/L):	ND	0.075	0.012	ND	40	0.48	ND	40	0.48

1. Based on leachate monitoring well data, 1996-2015 (unit has no LCRS).
2. Based on LCRS sump monitoring data, 1996-2015.

*. Outlier removed.
Min = minimum, Max = maximum
ND – (Non-detect) – detection limits are variable
NA – not applicable, too few detections

Min-Max Historical Leachate Concentration (ug/L, except where noted)									
Unit:	LF-3[1]			LF-4[1]			WP-9[1]		
Constituent:	Min	Max	Median	Min	Max	Median	Min	Max	Median
Ammonia (mg/L):	0.05	160	22	0.91	6,600	1,300	3.1	830	335
General Minerals (mg/L):									
Bicarbonate	430	2,400	1,200	360	19,000	4,200	440	4,300	1,500
Chloride	70	3,000	1,200	15	6,700	1,600	440	2,180	940
Nitrate	ND	170	0.096	ND	260	.22	ND	950	17.5
Sulfate	ND	2,600	41	ND	1,800	20	180	4,280	868
Total Dissolved Solids	630	7,200	3,540	44	22,000	4,800	1,900	16,300	5,200
VOCs (ug/L):									
Alcohols and ethers	ND	890	3.2	ND	8,600	3	ND	180*	1.2
BTEX Compounds	ND	350	0.61	ND	170*	9.10	ND	30*	0.50
Freon Compounds	ND	250	0	ND	90	0.22	ND	9	0.45
Halogenated VOCs									
1,1-Dichloroethane	ND	10.9	0.76	ND	18	0.75	ND	5.0	0.2
1,2-Dichloroethane	ND	5.0*	0.32	ND	29	2	ND	8	0.4
Methylene Chloride	ND	5.0*	0.31	ND	8.5*	0.48	ND	9.1	0.6
Vinyl Chloride	ND	7.3*	0.87	ND	17*	1.2	ND	6.8	0.31
Other	ND	550*	0.24	ND	300	0.24	ND	200	0.5
Ketones	ND	16,600*	6.50	ND	3,700	17.50	ND	180	13.00
Other VOCs	ND	2500	0.8	ND	5800	1.1	ND	5000	2
Dissolved Metals (mg/L):									
Arsenic	ND	0.235	0.012	ND	0.82	0.046	ND	46	0.033
Chromium (total)	ND	0.49	0.01	ND	1.7	0.03	ND	11	0.01
Chromium (Hex)	ND	0.0069	NA	ND	0.016	NA	ND	0.0068	NA
Iron	0.06	261.00	4.90	0.23	23.00	4.50	0.30	12.00	3.00
Lead	ND	0.662	0.005	ND	0.2	0.005	ND	12	0.005
Manganese	2.60	40.00	6.50	0.035	26.00	1.60	4.50	27.00	11.50
Mercury	ND	0.0018	0.0002	ND	0.0055	0.0001	ND	0.00028	0.002
Semi-VOCs (ug/L):	ND	1,000	4.9	ND	1700	3.8	ND	800	10
Organo-Pesticides (ug/L):	ND	100	0.48	ND	50	0.074	ND	50	0.48

1. Based on LCRS sump monitoring data, 1996-2015.
*. Outlier removed.
Min = minimum, Max = maximum
ND – (Non-detect) – detection limits are variable
NA – not applicable, too few detections

The MRP under these WDRs requires that the Discharger monitor leachate monthly for flow, semi-annually for monitoring parameters, and every 5 years for all constituents of concern.

31. The Discharger proposes to return leachate and landfill gas condensate to the composite-lined landfill units from which they came. Title 27, section 20340(g) requires that leachate be returned to the unit from which it came or be discharged in a manner approved by the regional board. This section of Title 27 also references State Water Board Resolution 93-62 regarding liquids restrictions in 40 C.F.R. section 258.28 for MSW landfills. 40 C.F.R. section 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and the unit is designed with a composite liner and an LCRS. Therefore, leachate and landfill gas condensate from composite lined units with an LCRS may be returned to the unit from which they came. This Order includes requirements for

returning leachate and landfill gas condensate back to composite-lined units such that the liquid waste is not exposed to surface water runoff, will not cause instability of the landfill, and will not seep from the edges of the units.

32. Currently leachate pumped from the LCRS sumps of the landfill units is either disposed of offsite or returned to the unit from which it came using a recirculation system. LFG condensate recovered from the LFG extraction system of a unit is either pumped into the landfill LCRS sump(s) of that unit for recirculation with leachate or stored in tanks with leachate for offsite disposal. Currently, LF-3, DM-11 is the only unit/module undergoing leachate/condensate recirculation.

33. Leachate from the LCRS sumps on the west half of the site destined for offsite disposal is piped to a tank farm located on the northwest side of LF-3, DM-2.2, while leachate collected from LCRS sumps on the east half of the site is piped to a tank farm west of WP-9.1. See Attachment E: Leachate & Soil Pore Liquid Monitoring. The tanks are periodically pumped and the leachate hauled by tanker truck to the Easterly Wastewater Treatment Plant in Elmira. The MRP under these WDRs requires that the Discharger monitor and report the volume of leachate (including any commingled LFG condensate) pumped from storage and hauled offsite each month.

34. In January 2009, the Discharger completed installation of a leachate recirculation system at LF-3, DM-11 in accordance with a design report approved by Central Valley Water Board staff.[1] The system included construction of a 300-foot long, 13-foot deep infiltration trench on top of the module and associated valves and piping. One foot of tire chips were placed on the bottom of the trench overlain by the leachate injection pipe and another 3 feet of tire chips. The trench was then backfilled with waste and capped with intermediate cover. PVC piping was also installed to convey leachate from the module's LCRS sumps to the infiltration trench. Each sump was equipped with a flow meter and shut-off valve to track the quantity of liquid re-circulated back into the unit and switch flows back to the leachate storage tanks when desired. No re-circulation system has been installed or is currently proposed for installation at LF-4.

35. The Discharger proposes to continue discharging leachate and LFG condensate to the existing recirculation operations at LF-3. These WDRs allow the Discharger to return landfill leachate and/or LFG condensate to the active MSW landfill unit from where it was generated, provided such MSW landfill unit was constructed with a composite liner system and LCRS.

    These WDRs also require that the Discharger submit a LFG Controls O&M Plan for the LFG extraction system, including a plan for the separate handling of LFG from any unit to which condensate is being returned, so that condensate removed from other units

1. See August 2008 report *Leachate Recirculation, Norcal Waste Systems Hay Road Landfill*, prepared by Golder Associates, Inc..

can be appropriately disposed of at an authorized facility. See Provision I.11.c.

36. Liquid wastes consisting of leachate and LFG condensate derived from LF-3, Module DM-11 are returned to the unit via a recirculation trench constructed on top of DM-11 in accordance with Title 27 and Subtitle D liquids handling regulations. Historically, up to 600,000 gallons of liquids was recovered and returned to DM-11 per year. Leachate from LF-4 is currently piped to storage tanks for offsite disposal at a wastewater treatment plant.

    These WDRs prohibit the discharge of leachate and/or LFG condensate from one unit to another and require that the Discharger submit a Landfill Liquids Management Plan to ensure that landfill liquids returned to a unit are properly handled. See Facility Specification C.2.c.

Composting Facility

37. Feedstock accepted at the onsite composting facility consists of green waste, manure, and food wastes, as defined in Title 14 CCR. The composting facility may also accept feedstocks defined in the CGO, which include agricultural material, paper material, and vegetative and non-vegetative material. Green waste is used as feedstock in both turned windrow and aerated static pile composting operations conducted at the site, while food waste is used as feedstock only in aerated static pile composting. Additives used in composting include, but are not limited to, crab shells (for pH control) and lime (for odor control). No agricultural wastes are accepted at the facility. Finished compost is temporarily stockpiled on the compost pad in a separate area from the active composting, pending sale as a commercial product. Some of the finished compost is also used onsite as a soil amendment for landfill cover.

38. The composting facility is also regulated under a composting permit issued by the LEA (Compostable Materials Handling Facility Permit), which currently authorizes the facility to accept an average of 600 tons per day within a 7-day period but no more than 750 tons per day on any given day of composting materials; and to store up to 225,000 cubic yards of feedstock, active compost, and/or finished compost at any one time. Recyclable materials used for beneficial re-use are not counted towards the permitted tonnage limit.

39. Feedstock materials may be processed with a grinder for size reduction and mixing. The grinding process, when used, results in a blending of the incoming feedstock materials. In addition to grinding, material passes over a series of screens to separate oversized material and contaminants. Blending is also accomplished using a front-end loader or windrow turner. After blending, the compost material is moisture conditioned on an on-going basis, as necessary. Water for moisture conditioning may come from the compost ponds, borrow pit, or on-site water wells.

40. The onsite Composting Facility employs two different composting methods, as follows:

    a. Turned Windrow Composting -- utilizes primarily green material (e.g., tree trimmings,

plant wastes, untreated wood wastes, paper products, and natural fiber products) as feedstock. Wood chips or similar materials also used as an additive to adjust carbon/nitrogen ratio or as an amendment to the final product. After processing, the feedstock blend is arranged in windrows approximately 8 feet apart. The windrows are periodically turned using a windrow turner or front-end loader to aerate the active compost material.

b. Aerated Static Pile Composting -- used to help minimize the release of organic vapors, nuisance odors, and other gases to the atmosphere. The method utilizes blended green material and food waste as feedstock. After blending, the material is placed in windrows overlying an engineered aeration system consisting of perforated pipes. Air is then drawn through the windrows using a blower motor plumbed to the underlying perforated pipes and exhausted into an engineered bio-filter comprised of wood chips, overs, and/or other processed organic material.

41. Both turned windrows and aerated static piles can utilize various covers, such as bio-covers or tarps. During active composting, the turned windrows and aerated static piles are monitored for moisture and temperature. Additional moisture is added, if required, to maintain the moisture content within an acceptable range. Temperature is also monitored to document that pathogen reduction has occurred. After completion of the composting process, the composted material is allowed to cure for approximately 30 days to allow the material to stabilize. After curing, the composted material is screened to size the material prior to marketing.

SITE DESCRIPTION

42. The site slopes gently from west to east consistent with the regional topography. Topographic relief is generally limited to small swales, depressions, and mounds or ridges formed from drainage; wind erosion; and creek overflows. Surface elevations in the area range from about 20 to 30 feet above mean seal level (MSL) and with maximum drainage grades of about 2 percent to the southeast. Vegetation in the area consists primarily of farmed livestock feed crops (i.e., grains) and native grasses, forbs, and oak trees. Land uses within one mile of the site include irrigated and non-irrigated agriculture, livestock grazing, open space, and transportation (roads).

43. A 2015 Department of Water Resources (DWR) well survey identified at least 5 supply wells within a one-mile radius of the site, including one domestic well, one agricultural well, and three industrial wells. The wells ranged in depth from about 50 to 180 feet below ground surface (bgs). Three of the wells were within 1,000 feet of the landfill facility boundary, including the domestic well and two onsite industrial wells. Several additional supply wells were identified immediately west of the survey area. Estimated yields for these wells ranged from 30 to 100 gallons per minute (gpm).

44. The site receives an average of about 20.5 inches per year of precipitation based on DWR's Rainfall Depth Duration Frequency data for the Dixon Station about 6 miles north of the site. The 25-year, 24-hour precipitation event for this station is 3.3 inches, the 100-year, 24-hour precipitation event for this station is 4.0 inches, and the 1,000-year,

24-hour precipitation event for this station is 5.1 inches. The mean annual evaporation at the site is about 55.1 inches per year based on monthly average historical data from DWR's CIMIS Weather Station Dixon 121, also in Dixon about six miles north of the site. Mean monthly evaporation typically exceeds mean monthly precipitation in all months of the year, except January, February, November, and December. Net average annual evaporation at the site is estimated to be about 34.6 inches.

GEOLOGY

45. The Sacramento Valley is part of the Great Valley sedimentary basin, a 22,500 square mile area comprising California's Central Valley. The Great Valley area is bounded by the Coast Range to the west, the Sierra Nevada to the east, the Tehachapi Mountains to the south, and the Klamath Mountains to the north. Continental deposits in the Sacramento Valley consist of alluvial, fluvial, delta, and flood plain sediments generated by glaciation processes in the Sierra Nevada, and by weathering and erosion in the surrounding mountain ranges. Deposited over geologic time by the Sacramento and San Joaquin Rivers and their tributaries, such sediments are estimated to be thousands of feet thick in some areas. Underlying the continental deposits are ancient marine deposits.

46. The site is in the Putah Plain in the southwestern part of the Sacramento Valley. The Putah Plain is a late Pliocene to Recent age alluvial plain formed by Putah Creek and various meandering streams. Soils underlying the Putah Plan are classified as Stream Channel Deposits (Recent); Younger Alluvium (Holocene); Older Alluvium (late Pleistocene); and the Tehama formation (Pliocene-Pleistocene). Younger Alluvium is found primarily in the northeast part of the site and generally consists of fine-grained sandy silts up to 20 feet thick. Older Alluvium is found at the ground surface over most of the remainder of the site. The Older Alluvium consists of silts and clays interspersed with sand and gravel lenses ranging from 60 to 130 feet thick and are characterized by a dense, clay-rich B-Horizon. The Tehama formation underlies the Older Alluvium and consists primarily of silts and clays with a moderate degree of calcium carbonate cementation and fine sand in the matrix. Tehama deposits vary in thickness from about 100 feet thick west of the site to 2,500 feet thick east of the site.[2]

47. Quaternary fault zones within 62 miles (100 km) of the site include, but are not limited to, the following:
    a. Midland Fault Zone (4.3 miles to the east);
    b. Vaca Fault Zone (4.5 miles to the SW);
    c. Green Valley/Cordelia Fault Zone (14 miles to the west);
    d. Concord Fault Zone (22 miles to the SW);

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2. A 2014 soil survey conducted by the Natural Resources Conservation Service (NRCS) describes onsite soils as moderately-to-poorly drained sandy clay and clay loam soils (e.g., Pescadero, San Ysidro, and Solano series). See *September 2014 Soil Survey data for Solano County*, U.S. Department of Agriculture, NRCS website at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

e. Greenville Fault Zone (24 miles to the south);
f. West Napa Fault Zone (25 miles to the west);
g. Dunnigan Hills Fault Zone (26 miles to the north);
h. Rodgers Creek Fault Zone (29 miles to the SW);
i. Calaveras Fault Zone (34 miles to the SW);
j. Hayward Fault (35 miles to the west-SW);
k. San Andreas Fault Zone (50 miles to the southwest); and
l. Foothills Fault Zone (55 miles to the northwest).

All of the above fault zones have Holocene components (faults or fault segments) and at least five (Midland and/or Vaca, West Napa, Hayward, San Andreas, and Foothill) are known to have been historically active during the past 150 years. An additional potentially significant fault zone proximate to the site is the Great Valley Thrust Zone (Segment 4), a submerged, NW-SE trending fault system along the eastern foothills of the Coast Range. Little is currently known about this fault system and it is possible that it may include the Vaca and/or Midland Fault zones. There are no known Holocene faults within 1,000 feet of the facility.

48. The maximum credible earthquake (MCE) for the site was estimated to be 6.9 on the Richter scale based on a seismic event occurring along the Midland Fault about 4.3 miles west of the site.[3] Peak ground acceleration (PGA) of 0.58g was calculated for this event.[4]

SURFACE WATER CONDITIONS

49. The site is drained by the A-1 Channel, an unlined agricultural canal fed by New Alamo Creek and a small network of canals north of the site. The A-1 Channel was created from an older portion of Alamo Creek that once flowed diagonally across the eastern part of the site, but was re-routed north of the site in the early 1960s.[5] In 1994, the A-1 Channel was re-routed along the north and east sides of the site and deepened. At the southeast corner of the landfill site, the A-1 Channel resumes the southeasterly course of the former Alamo Creek section, ultimately emptying into Ulatis Creek about 3 miles southeast the site. Ulatis Creek then empties into the Cache Slough, which is tributary to the Sacramento-San Joaquin Delta. See Attachment A: Location Map.

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3. MCE values for above faults calculated using applicable empirical magnitude scaling regressions recommended by Stirling et al. (2013). MCE for fault with highest median PGA (i.e., Midland Fault) selected as MCE for site.

4. Median PGA values for above faults calculated using a weighted average of four Next Generation Attenuation functions (Abraham and Silva 2008; Boore and Atkinson 2008; Campbell and Borzognia 2008; and Chiou and Youngs 2008) that predict ground accelerations as a function of earthquake magnitude, fault type, source-to-site distance, and site soil conditions (Vs30 = 380 meters/sec).

5. In the early 1960's, Alamo Creek was re-directed to flow directly east into Ulatis Creek about 1.8 miles north of the site. The bypassed portion of Alamo Creek became the "A-1 Channel".

50. The site is in the Elmira Hydrologic Area of the Valley Putah-Cache Hydrologic Unit in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986).

51. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses; establishes water quality objectives; contains implementation plans and policies for protecting waters of the basin; and incorporates by reference, plans and policies adopted by the State Water Resources Control Board.

52. The beneficial uses of the A-1 Channel, by application of the tributary rule, are the same as those of the Sacramento San Joaquin Delta specified in the Basin Plan.[6] These existing and potential designated uses include municipal and domestic supply, agricultural supply (stock watering and irrigation), industrial service supply, industrial process supply, water contact recreation, non-contact water recreation, warm freshwater habitat; cold fresh water habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; wildlife habitat; and navigation.

53. About 80% of the landfill facility area (i.e., all but the southwest portion) is within a 100-year flood plain of Ulatis Creek based on the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map, Map No. 06095C0325E (Community - Panel Number 060631-0325E), effective date May 4, 2009. This area corresponds to about two-thirds of LF-1, one-half of LF-2 and LF-3, all of LF-4, and most of the area planned for future landfill development (e.g., composting area).

54. Title 27 requires that Class II and Class III landfills be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100 year return period. See Sections 20250(c) and 20260(c). Subtitle D regulations (40 CFR 258.11) further require that the Discharger demonstrate that any new, existing, or lateral expansion MSW landfill units located in 100-year floodplain will not restrict the flow of a 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 and the environment. The owner or operator is required to place the above demonstration in the operating record. The following such demonstration was included in the JTD.

    a. Flow Restriction - The FEMA map indicates that maximum 100-year flood depths adjacent to the site would be about 5 feet. The landfill facility would therefore be unlikely to significantly impede flood waters.

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6. In 2010, the Central Valley Water Board adopted a basin plan amendment (Order R5-2010-0047) that re-designated certain beneficial uses of a section of Alamo Creek (renamed "Old Alamo Creek") downstream of the Easterly WWTP between Vacaville and its closest point north of the site. The order did not affect the beneficial uses of downstream surface waters such as Sweany Creek. Also, the basin plan amendment did not affect a new section of Alamo Creek (referred to as "New Alamo Creek") created to the south to bypass discharges from the Easterly WWTP.

b. Temporary Floodplain Storage Capacity – Realignment and deepening of the A-1 Channel along the northern and eastern sides of the site in 1994 more than offset the 1,350 acre-feet estimated volume of the 100-year floodplain displaced by the landfill. The onsite borrow pit is also plumbed to the 100-year flood plain via surface drains, providing additional buffering capacity in the event of a 100-year flood. It is therefore unlikely that the landfill will reduce the temporary water storage capacity of the 100-year floodplain.

c. Washout - All landfill units that would be exposed to a 100-year flood have exterior perimeter berms exceeding 28 feet MSL, the maximum estimated 100-year flood elevation at the site, including waves. Specifically, LF-1 and LF-2 have a 30-foot high perimeter berm and LF-3 and LF-4 each have 40-foot high perimeter berms. Future LF-3 and LF-4 expansion modules located within the 100-year floodplain will be constructed with exterior perimeter berms of at least 28 feet NGVD 29 as necessary for 100-year flood protection.

These WDRs require that all classified units at the site be constructed and maintained with at least 28 feet NGVD 29 exterior perimeter berms to prevent inundation from a 100-year flood. See Construction Specification E.13.

55. Storm water runoff from the landfill units drains by sheet flow, or is directed to, an unlined ditch along the facility perimeter that discharges via two outfalls to the onsite Bird Sanctuary Pond immediately southeast of the landfill. Runoff from LFs-2 and 3 generally flows counterclockwise to this pond via an unlined ditch along the southern perimeter of the facility, while runoff from LFs-1 and 4 generally flows clockwise to this pond via an unlined ditch along the northern and eastern perimeter of the facility. Runoff from the composting facility is captured and contained in separate facilities within the composting area, as described in Finding 141. A small amount of storm water from LF-2 is also captured in an onsite sedimentation basin immediately south of the onsite composting facility. Storm water discharges from the Bird Sanctuary Pond to the A-1 Channel are sampled under Water Quality Order 2014-0057-DWQ, the Statewide Industrial Storm Water General Permit. See Attachment G: Drainage Controls & Surface Water Monitoring.

56. LF-1 was designed to handle a 100 year, 24-hour storm event. LFs-2 through 4 were designed to handle a 1,000 year, 24-hour storm event. At final closure of LFs-1 through 4, all landfill units and drainage facilities, including overside drains, perimeter ditch, culverts, and sedimentation basin will be designed to handle a 1,000-year, 24-hour storm event consistent with the Class II designation of LFs-3 and 4. All compost drainage facilities, including the ponds, were designed to handle a 25-year, 24-hour peak storm event.

57. In addition to storm water, groundwater pumped from the onsite borrow pit is discharged to the Bird Sanctuary Pond via the southern perimeter drain. Discharges from the borrow pit to surface water at the site are regulated under General WDR Order R5-2013-0073-01/NPDES NO. CAG995002 (*General Waste Discharge Requirements for*

Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Super chlorination Projects, and Other Limited Threat Wastewaters to Surface Water, adopted on 6 June 2014).

UNSATURATED ZONE CONDITIONS

58. The thickness of the unsaturated zone at the site varies depending on various factors such as surface elevation, groundwater elevation, and depth of fill. Outside of the landfill units, the thickness of unsaturated zone ranges from about 36 feet on the western side of the facility where the groundwater table has been pumped down to about eight feet on the eastern side of the facility where the water table is not affected by pumping. Beneath the landfill units, the unsaturated zone consists of the vertical space between the bottom of the landfill unit and top of the water table or capillary break or barrier layer, as applicable. The unsaturated zone thickness below the landfill ranged from 3.9 feet to 27.6 feet in 2014 as detailed in Finding 90 and 91.

59. The capillary rise in the water table at the site is estimated to range seasonally from about two to six feet depending on soil type. Capillarity may also be present in some areas near the ground surface from surface water infiltration.

Soil Gas

60. In 2003, as part of a corrective action program for LF-3 the Discharger installed seven landfill gas monitoring probes (GP-2 through GP-8) along the perimeter of the landfill units (about 50 feet from the facility perimeter) on the western side of the site to define LFG concentrations in the unsaturated zone and the potential for LFG migration. Subsequent monitoring showed relatively high methane concentrations along the western perimeter of LF-1 and southwestern perimeter of LF-3. Prior to landfill gas extraction at the site, in probe GP-8 along the northwestern corner of LF-1, for example, methane was detected up to 88% at an average concentration of about 57%. Probe GP-8 was subsequently found to have been installed in waste; the probe was destroyed and replaced by GP-9, which has not had methane since it was installed in 2005. Similarly, in probe GP-3B along the southern perimeter of DM-2.2, methane was detected once at 58% in 2005 with an average concentration of 6%; GP-3B has been 0% methane since 2012 and 0.1% methane or lower since 2010.

61. In 2008, the Discharger installed several landfill gas monitoring probes along the facility perimeter to comply with new landfill gas monitoring regulations (Title 27, Section 20917 et seq), but continued to monitor GPs-2, 3, 4, and 5, as required under previous WDRs. The facility's perimeter gas monitoring system currently consists of 18 gas monitoring probes at locations spaced approximately 1,000 feet apart per solid waste regulations (Title 27, section 20919 et seq.), including 16 shallow gas probes (GPs-1, 6, 7, 9 through 19, 20S and 21S) and two deep probes (20D and 21D). The shallow probes were installed to average depths of about 11 feet bgs and the deep probes to average depths of about 27 feet bgs. See Attachment F: Landfill Gas Controls & Monitoring.

62. The Discharger conducted quarterly monitoring of soil gas probes installed along the

perimeter of the facility in accordance with Title 27 solid waste regulations and previous WDRs. Historical monitoring of the gas probe generally indicated non-detect methane concentrations along the facility perimeter and elevated methane concentrations along the landfill unit perimeters prior to start-up of the LFG extraction system in 2010. LFG concentrations generally declined to non-detects along the unit perimeters by 2014. Only one of the perimeter gas monitoring wells, GP-21S, installed in 2009 west of LF-1, has indicated elevated historical methane concentrations (up to about 33%), and since 2011, this well has been non-detect for methane.

63. To ensure that soil pore gas is being adequately monitored for the presence of LFG and to monitor the effectiveness of the LFG extraction system, these WDRs require that the Discharger install a sufficient number of gas monitoring probes along the landfill unit boundaries. See Provisions I.9.a and I.9.c. The MRP further requires that the Discharger conduct soil pore gas monitoring on all existing and future facility gas probes, unit perimeter gas probes, and pan lysimeters installed within the capillary break layer beneath the LCRS sumps of the units at the site. As in previous WDRs, the MRP requires that the Discharger conduct field monitoring for total organic vapors, and sample for VOCs if such vapors exceed a given trigger level (i.e., ≥1% methane and/or ≥1 ppmv total organic vapors).

Soil Pore Liquid

64. The Discharger does not conduct soil pore liquid monitoring at LF-1 because no soil pore liquid monitoring device was installed at the partially-lined unit when it was constructed and it is not feasible to retrofit the unit's LCRS sump with a pan lysimeter. Soil pore liquid monitoring of LF-2 is performed using a suction lysimeter that underlies the LCRS sump. Soil pore liquid monitoring at the site also includes the pan lysimeters installed at LFs-3, 4, and WP-9.1. Pressure transducers installed in the pan lysimeters allow for measurement of the amount of liquid in each pan lysimeter. The volume of liquid pumped from the pan lysimeters is also recorded.

65. The soil pore liquid monitoring systems at the classified units at the site may be summarized as follows:

    a. LF-1 – No lysimeter installed beneath unit's LCRS sump.

    b. LF-2 – Suction lysimeter installed beneath unit.

    c. LF-3 – DMs-2.2 and 11 -- Pan Lysimeters installed within capillary break beneath LCRS sumps

    d. LF-4

        i. DM-5.1 -- Pan Lysimeters installed within capillary break beneath LCRS sumps.

        ii. DMs-3, 4, 5.2, and 6 -- Pan Lysimeters welded to the bottom of the secondary LCRS sumps.

    e. WP-9.1 – Pan Lysimeter installed within capillary break beneath LCRS sump.

66. VOC-impacted liquid has been historically detected beneath the primary LCRS sumps at all of the classified units at the site, including LF-2; LF-3 (DMs-2.2 and 11); LF-4 (DMs-3, 4, and 5) and WP-9.1. The highest concentrations of total VOCs in such liquid were detected at LF-3, DM-11 (185 µg/L) and LF-4, DM-3.3 (178 µg/L), while the most liquid was recovered from DM-2.2A (11,350 gal/year). Some of these detections are associated with confirmed releases investigated and addressed under previous WDRs, while others are recent and/or intermittent detections. The history and status of these releases at the site are summarized in the Corrective Action section of these WDRs.

67. The monitoring and reporting program (MRP) under these WDRs requires that the Discharger monitor all existing and future pan lysimeters installed beneath LCRS sumps as part of soil pore water monitoring, and all pan lysimeters welded to the base of overlying sumps as part of leak detection monitoring. See Attachment E: Leachate & Soil Pore Liquid Monitoring.

GROUNDWATER CONDITIONS

68. Shallow groundwater at the site generally occurs in the underlying fluvial sediments consisting of interbedded sands, silts, and clays. . The depth to groundwater at the site varies from about 5 to 36 feet below ground surface (bgs), averaging about 10 feet bgs or 10 feet above MSL. The greatest depth to groundwater occurs in the western portion of the site, where the water table has been artificially depressed by the dewatering of the borrow pit.

69. Groundwater flow at the site is believed to be greatest in localized, permeable layers that are interconnected by direct contact or through sandy silt and clay layers. These layers have been confirmed to be one hydrogeological unit.. The average hydraulic conductivity for these sediments range from $5x10^{-3}$ cm/sec to $9.4x10^{-7}$ cm/sec[7]. The known thickness of the monitored saturated zone is about 80 feet, based on monitoring well screen elevations.

70. In the western portion of the site, the natural groundwater flow direction is to the southwest, due to the borrow pit de-watering, which creates a radial gradient of about 0.013 ft/ft toward the borrow pit on the western half of the site. The onsite borrow pit west of LF-1 has been excavated below the water table and must be de-watered in the wet season to allow further soil removal. Groundwater pumped from the borrow pit is used in various site operations, including irrigation, dust control, and composting. Groundwater pumped from the borrow pit is also discharged to surface water (under an NDPES permit) via the onsite drainage system. The rate of groundwater pumped from the onsite borrow pit has historically averaged about 85 million gallons per year (about 233,000 gpd).

[7] Source: 2015 Annual Monitoring Report

71. In the middle of the site, a transition between the west and east flow regimes may exist. In this area, groundwater flows to the south and the gradient is relatively flat (about 0.001 ft/ft). The average groundwater elevation in this area is about 16.5 feet MSL (or 7 feet bgs). This flow boundary is not well defined, due to a lack of monitoring devices in this area.

72. On the eastern half of the site, groundwater resumes its natural course to the southeast at about 0.0013 ft/ft consistent with the regional flow direction and gradient. Groundwater elevations on the eastern half of the site range from about 18.5 feet MSL (9 feet bgs) northwest of WP-9.1 to about 13.5 feet MSL (8 feet bgs) southeast of LF-4.

73. Background groundwater quality in the uppermost aquifer at the site is relatively hard, and exceeds secondary drinking water MCLs for chloride, TDS, and sulfate. The following background data is based on Second Half 2014 sampling data reported for wells G-6 (west half of site) and G-4R, G-17, and/or G-18 (east half of site).

Background Groundwater Quality – Uppermost Aquifer	Units	East Half of Site	West Half of Site
TDS	mg/L	1,770	1,000
Specific Conductance	µmhos/cm	2,430	1,370
Chloride	mg/L	420	120
Sulfate	mg/L	320	110
Bicarbonate Alkalinity[8]	mg/L	495	570

74. The beneficial uses of underlying groundwater stated in the Basin Plan are municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply.

75. The groundwater monitoring system at the landfill units currently includes ten LF-1 monitoring wells (G-6, G-7, G-8, G-9, G-10, G-10R, G-10M, P-1, MW-4, and 4BR), nine LF-2 & LF-3 monitoring wells (4BR, G-1, G-2, G-11, G-11R, G-11M, G-12, G-13, and G-27), and ten LF-4 monitoring wells (D-7. G-16, G-17, G-18, G-20, G-25, G-26, G-28, G-29 and G-30). About 23 of these wells are along the Point of Compliance of each unit, while the remaining wells are background monitoring wells. Additional groundwater monitoring wells monitor WP-9.1 (i.e., G-4R, G-19R, G-21, G-22, G-23, and G-38) and the LTU (G-19R and G-26). Currently, five of these wells are corrective action wells: G-21, G-22, G-23, G-8 and G-9. See Attachment D: Groundwater Monitoring.

76. Several monitoring wells, including many of the wells used to monitor the landfill units, WP-9.1 and/or LTU also monitor remediation of a nitrate-N plume on the western and eastern halves of the site under a separate General Order. Eleven of these wells (i.e.,

8. Some of the bicarbonate alkalinity detected upgradient of LF-1 could also be associated with landfill gas impacts from LF-1.

D-4, 4BR, and G-2, G-10R, G-10M, G-11M, G-11R, G-27, G-35, G-36, G-37) monitor the portion of the plume on the west side of the site and eleven of the wells (i.e., G-16, G-19R, G-20, G-25, G-26, G-28, G-29, G-30, G-32, G-33, G-34) monitor the portion of the plume on the east half of the site, See Attachments D & I. It is noted that the extent of the nitrate-N plume has not yet been fully defined; the Discharger will be conducting that action outside of the requirements of this Order.

77. Historical groundwater monitoring data prior to 2010 for the western half of the site indicates the intermittent detection of several VOCs in landfill Point of Compliance wells. The source of the VOCs has not been determined. Some of the VOC detections were not verified by resampling in accordance with Title 27 CCR Section 20415(e)(8)(E). Some detections were single trace detections, the result of the use of contaminated well construction materials, and/or the result of sample or lab contamination, as shown by equipment blank and method blank analyses. VOC types intermittently detected in the highest concentrations included alcohols & ethers (e.g., tert-Butyl Alcohol and Methyl tert-Butyl Ether (MTBE)), ketones (e.g., acetone), Freon compounds (e.g., Dichlorodifluoromethane or Freon 12), and various halogenated VOCs (e.g., Vinyl chloride, Chloromethane, and Idomethane). The data also indicated sporadic detections of a few semi-VOCs (e.g., Bis-2-ethylhexyl Phthalate). Since 2010, however, significantly fewer VOC detections occurred, and VOCs have been non-detect in most of the wells.

78. WP-9.1 has been in corrective action monitoring program since 2001 due to a leachate release that caused nitrate-N and other nitrogen compound impacts to groundwater and the unsaturated zone. In 2015, for example, nitrate-N was detected up to 18 mg/L in groundwater extraction well G-22 along the downgradient perimeter of WP-9.1, compared to its concentration limit of 5 mg/L. Similar nitrate-N impacts have also been detected in monitoring well G4R immediately west of WP-9.1. In addition, WP-9.1, the LTU, and the composting facility have been noted as possible sources of two other nitrate-N plumes currently undergoing remediation at the site. In addition to the foregoing nitrate-N exceedances, barium has been detected immediately downgradient of LF-1 (i.e., in well G-8) at average concentrations exceeding its concentration limit and is in corrective action monitoring.

79. Volatile organic compounds (VOCs) are often detected in a release from a MSW landfill and are often associated with releases of landfill gas rather than leachate. Since VOCs are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 for the determination of a release of wastes from a landfill unit. Title 27, sections 20415(e)(8) and (9) allow the use of a non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a landfill unit in accordance with Title 27, sections 20415(b)(1)(B)(2 - 4).

80. The Central Valley Water Board may specify a non-statistical data analysis method pursuant to Title 27, section 20080(a)(1). Water Code section 13360(a)(1) allows the

Central Valley Water Board to specify requirements to protect groundwater or surface waters from leakage from a solid waste site, which includes a method to provide the best assurance of determining the earliest possible detection of a release. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a landfill unit, the SPRRs specify a non-statistical method for the evaluation of monitoring data for non-naturally occurring compounds.

The MRP under these WDRs specifies the data analysis methods applicable to monitoring data for the site based on information provided in the JTD and other relevant file information. For VOCs and other organic compounds (as well as for inorganic compounds not present in background) a non-statistical method is specified for detection monitoring consistent with Title 27, section 20080(a)(1).

81. For a naturally occurring constituent of concern (i.e., inorganic constituents present in background), Title 27 requires concentration limits for each constituent of concern be determined either by calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8) or by an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

82. Title 27 specifies the prescriptive requirements and performance standards applicable to monitoring data analysis and requires that such methods be implemented as follows:

    a. As specified in the existing MRP under the WDRs; or
    b. In accordance with a technical report (certified by an appropriately registered professional) documenting such methods, submitted to, and approved by, the Central Valley Water Board; or
    c. In accordance with any water quality data analysis software deemed appropriate for such use by either the Central Valley Water Board or SWRCB.

    See Title 27, section 20415, subparagraphs (e)(7) and (e)(10).

83. In April 2002, the Discharger submitted a *Sampling and Analysis Plan* (SAP) under previous WDRs proposing statistical and nonstatistical detection monitoring methods for the facility. (The SAP also details the field and laboratory procedures for the collection and analysis of samples.) For naturally occurring inorganic constituents (i.e., general minerals) on the western half of the site, the SAP proposed an intrawell detection monitoring approach (i.e., each well functioning as its own background well). The report stated that lower quality background water from younger alluvium on the east side of the site was being drawn into wells on the west side of the site by borrow pit pumping, making it infeasible to detect a release from partially-lined unit LF-1 and other modules on the west half of the site. Water Board staff subsequently approved the SAP and the proposed intrawell detection monitoring method was incorporated into subsequent WDRs. In a 7 April 2016 Notice of Violation, Board staff found that the Discharger was

deviating from its SAP[9] during monitoring events in 2014 and 2015. Among other items, the Discharger was to submit an amendment to the SAP by 1 May 2016.

84. Title 27, section 20390 requires that the Central Valley Water Board establish a Water Quality Protection Standard (WQPS) in the WDRs for each unit, including Constituents of Concern (COCs), Concentration Limits, Point of Compliance, and Monitoring Points. The current WQPS does not reflect the revised unit designations under these WDRs. Also, several of the elements of the WQPS for the facility (e.g., monitoring points, concentration limits) were submitted and approved under previous WDRs as separate documents rather than as a single WQPS report.

    These WDRs require that the Discharger develop and submit for Water Board staff approval a revised WQPS Report that describes each element of the WQPS for each classified unit at the site consistent with the requirements of this Order, including a demonstration that the use of intrawell monitoring is consistent with Title 27, Section 20080(b) and (c), and if not consistent with Title 27, proposes to change the detection groundwater monitoring to interwell comparisons using hydraulically upgradient wells as background. These WDRs also require that the Discharger submit an updated Sample Collection and Analysis Plan consistent with the revised WQPS Report and other relevant requirements of these WDRs.

85. For corrective action monitoring, the monitoring program specifies intrawell statistical and/or nonstatistical procedure (e.g., time series plots, trend analysis) to evaluate the effectiveness of corrective action. To demonstrate that corrective action has been completed (i.e., concentrations along Point of Compliance returned to compliance with the water quality protection standard), Monitoring Specification H.7 specifies a "proof" period. As required by Title 27, Section 20430(g), during this period, the Discharger must demonstrate that all constituents of the release have been reduced to concentration limits for at least eight monitoring events during one year. The monitoring events may occur as frequently as once per month.

GROUNDWATER SEPARATION

86. Title 27, section 20240(c) requires that all new landfills and waste piles be "sited, designed, constructed, and operated", and that all existing landfills be "operated", to ensure that wastes will be a minimum of five feet above the highest anticipated elevation of underlying ground water (i.e., Title 27 prescriptive standard for groundwater separation). Section 20260(a) further requires that Class III landfills be located where site characteristics provide adequate separation between nonhazardous solid waste and waters of the state (i.e., Title 27 performance standard for groundwater separation).

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[9] The last Sample Collection and Analysis Plan submitted under previous WDRs was the March 2013 report *Sample Collection and Analysis Plan. Recology Hay Road Landfill*, prepared by Golder Associates, Inc..

87. Previous WDRs approved and/or prescribed requirements for engineered alternative designs for groundwater separation (EAD/S) allowing for less than the 5-foot minimum prescriptive standard groundwater separation required under Title 27, section 20240(c), as summarized below.

    a. WDRs Order No. 89-178 allowed for a 3-foot minimum separation provided that the module design included a composite base liner (geomembrane overlying CCL) that satisfied Chapter 15 (now Title 27) engineered alternative design criteria and was approved by the Board under revised WDRs. The western portion of DM-1 (DM-1B) and all of DM-2.1 (DMs-2.1A and -2.1B) were subsequently constructed in accordance with this EAD/S, as approved under WDRs Order No. 95-202.

    b. WDRs Order No. 95-202 also approved a 2½ foot minimum EAD/S for Class II expansion modules that specified a one-foot gravel capillary break layer beneath the base liner system. WDRs Order No. 97-145 subsequently reduced the required capillary break thickness to 1/2-foot, effectively reducing the EAD/S to 2 feet, but retained a requirement that at least 2.5 feet of separation be maintained at the modules. The modified EAD/S included geocomposite capillary break layer designs for the perimeter levee side-slopes.

    c. WDRs Order No. R5-2003-0118 approved a modified 2½ foot minimum EAD/S that included a geomembrane capillary barrier layer in lieu of a gravel capillary break layer.

    In each of the above designs, the Discharger demonstrated, to the satisfaction of the Central Valley Water Board, that the siting, design, and construction of a containment system meeting Title 27 prescriptive standards for a minimum of 5 feet of groundwater separation was infeasible due to naturally high groundwater at the site; that the proposed EAD/S was consistent with the performance goal addressed by the prescriptive standard; and that it afforded equivalent or better protection against water quality impairment associated with a release.

88. No EAD/S was approved for LF-1 under previous WDRs and the unit was required to be operated (i.e., de-watered) in accordance with Title 27 prescriptive requirements (i.e., 5 feet minimum separation between wastes and groundwater). In the mid-1990s, the Discharger initiated pumping of the borrow pit west of LF-1 in an attempt to de-water both contiguous units. Pumping of the borrow pit subsequently lowered the water table below the elevation of the base of the dewatering trench rendering the dewatering trench dry.

89. These WDRs require that all new LF-3 and new LF-4 landfill modules, with the exception of DM-7.2, be designed and constructed with additional containment features and a minimum of 5 feet of groundwater separation. The Discharger is also required to operate all new LF-3 and LF-4 landfill modules, with the exception of DM-7.2, so as to maintain at least 5 feet of separation from the lowest elevation of the waste (e.g., primary LCRS sump) to the highest anticipated elevation of underlying groundwater, including capillary fringe, at that location. The Discharger is also required to install

piezometers outside the liner limit adjacent to each LCRS sump that allow for measurement of the groundwater table.

90. Quarterly groundwater elevation monitoring conducted on the west half of the site in 2014 indicated the following groundwater separation distances at each LCRS sump of each unit/module.

Unit	Module	Required GW Separation (feet)		LCRS Sump Elevation (feet NGVD29)	Avg. GW Elevation (feet NGVD29)	Approx. Separation (feet)	Avg. GW Elevation (feet NGVD29)	Approx. Separation (feet)
		Design	Operational[1]					
West Half of Site					**First Half 2014[4]**		**Second Half 2014[4]**	
LF-1	DM-1A	5		n/a[2]				
	DM-1B	5		5.6	-0.5	5.5	-0.2	5.2
LF-2	DM-2.1A/B	3	3	24.9[3]	13.5	11.4	11.2	13.7
LF-3	DM-2.2A	2.5	2.5	26.1	-1.5	27.6	-0.2	26.3
	DM-2.2B	2.5	2.5	25.7	10.5	15.2	8.4	17.4
	DM-11.1	2.5	2.5	25.3	17.0	8.3	13.5	11.9
	DM-11.2	2.5	2.5	24.7	17.0	7.7	14.3	10.4
	Future	5	5	---	---	---	---	---

1. Required minimum operational separation under this Order.
2. DM-1A not constructed with LCRS sump -- bottom of waste defined in Facility Specification C.1.a.
3. Both modules drain to common sump. See Finding 108.
4. Average of reported quarterly groundwater elevations and corresponding separation from waste.

The above data indicates that in the First and Second Half of 2014, minimum groundwater separation on the western half of the site, was about 5.5 feet at DM-1B (DM-1B), 11.4 feet at LF-2, and 7.7 feet at LF-3, DM-11.2. Based on the above-listed minimum required operational separation distances under this Order for existing modules (equal to the EAD/Ss approved under previous WDRs), adequate separation appeared to exist during this period at all landfill units/modules on the western half of the site, with the exception of DM-1. As described in the Amended 13301 Order, the Discharger had been reporting separation to groundwater at sump S-1. However, previous investigations had indicated that, based on three borings by EMCON in 1984 (borings S-19, S-20, and S-21), the lowest elevation of the waste is in the north-central side (in the unlined portion of the unit), and a review of the groundwater maps in the monitoring reports shows between 2009 and 2013, groundwater was consistently reported by the Discharger to be approximately 15 feet above the waste. The Amended 13301 Order requires that the Discharger implement its proposal to lower the groundwater to at least five feet below the waste and conduct monitoring to demonstrate effectiveness. The Discharger prepared an Engineering Feasibility Study (Golder November 2015), which proposed, among other items, to remove the waste in the vicinity of the 1984 borings.

91. The eastern half of the site is not influenced by pumping from the borrow pit and no de-

watering of modules on the eastern half of the site has been historically conducted. Quarterly groundwater elevation monitoring conducted on the east half of the site in 2014 indicated the following groundwater separation distances at each LCRS sump of each unit/module:

Unit	Module	Required GW Separation (feet)		LCRS Sump Elevation (feet NGVD29)	Avg. GW Elevation (feet NGVD29)	Approx. Separation (feet)	Avg. GW Elevation (feet NGVD29)	Approx. Separation (feet)
		Design	Operational[1]					
East Half of Site					**First Half 2014[4]**		**Second Half 2014[4]**	
LF-4	DM-3.1	2.5	2.5	20.3	14.0	6.3	13.6	6.7
	DM-3.2	2.5	2.5	19.9	14.0	5.9	13.7	6.2
	DM-3.3	2.5	2.5	20.9	17.0	3.9	15.5	5.4
	DM-4.1	2.5	2.5	20.4	13.5	6.9	13.7	6.7
	DM-5.1A	2.5	2.5	21.5	15.5	6.0	13.9	7.6
	DM-5.1B	2.5	2.5	21.3	14.0	7.3	14.5	6.9
	DM-5.2	2.5	2.5	22.1	17.0	5.1	15.8	6.3
	DM-6	2.5	2.5	23.1	17.0	6.1	16.6	6.5
	DM-7[2]	2.5	2.5	---	---	---	---	---
	Future[5]	5	5	---	---	---	---	---
WP-9.1	WP-9.1A	2.5	2.5	25.3	19.0	6.3	18.3	7.0
	WP-9.1B[3]	2.5	2.5	25.3	17.0	8.3	17.5	7.8
LTU-1	---	5		23.0	17.0	6.0	17.0	6.3

1. Required minimum operational separation under this Order.
2. DM-7 is composed of two phases designed with an EAD/S of 2.5 feet. DM-7.1 was constructed in 2014 and is operating with a temporary, shallow LCRS sump. The permanent LCRS sump will be installed during construction of DM-7.2. Upon completion of construction of both phases, DM-7 will operate with the approved EAD/S of 2.5 feet.
3. Units/modules currently undergoing clean closure in preparation for construction of LF-4, DM-9 in this area.
4. Average of reported quarterly groundwater elevations and corresponding separation from waste.
5. Future LF-4 modules include DM-2.3, DM-8, DM-9, DM-10, and DM-11.3.

The above data indicates that in the First and Second Half of 2014 the minimum groundwater separation, was about 3.9 feet MSL at LF-4 (DM-3.3), 6.3 feet MSL at WP-9.1, and 6.0 feet MSL at the LTU. Based on the above-listed minimum required separation distances under this Order for existing modules, adequate separate appeared to exist at all existing classified units/modules on the eastern half of the site. However, as described in the Amended 13301 Order, the Prosecution Team contends that the Discharger had been using the wrong point at which to measure the separation for module DM 3.3, and that between 2011 and 2014, separation ranged between 0.35 feet and 1.1 feet, which is less than the required 2.5 feet of separation. The Prosecution Team's groundwater separation calculations used the bottom of the leak detection layer to calculate groundwater separation. This Order clarifies that the groundwater separation is measured between the lowest elevation of wastes (i.e. leachate in the primary LCRS sump) and the elevation of the underlying groundwater.

The Discharger has agreed to take actions to lower the groundwater under DM 3.3 and to monitor for effectiveness.

92. In response to the October 2014 13301 Order issued under previous WDRs, the Discharger submitted a 15 May 2015 *Revised Groundwater Separation Delineation Workplan* to the Central Valley Water Board describing the methods it planned to use to determine the amount of separation of waste to groundwater at LF-1 and LF-4, DM-3.3 per the EAD/Ss approved under previous WDRs. The data developed from the Workplan was then used to prepare an Engineering Feasibility Study to evaluate alternatives to achieve compliance with the separation criteria. The Discharger submitted the EFS on 13 November 2015 and the corrective action proposals proposed therein were approved and incorporated into the October 2014 13301 Order, as amended by the Central Valley Water Board on 19 February 2016.

    The amended 13301 Order requires, among other items, that the Discharger install six new piezometers to monitor groundwater separation at DM-1A and a French drain along the northern border of DM-1A to help dewater the module. The Order also requires that the Discharger lower the outlet on the Bird Sanctuary in the southeast corner of the site to maintain the required separation for DM 3.3[10]. The amended Order also requires that the Discharger operate and maintain the French Drain and Bird Sanctuary, once installed, in a way that maintains the separation of waste to groundwater in DM-1 and DM 3.3. The amended 13301 Order also includes various monitoring and reporting requirements associated with these tasks.

UNIT DESIGN AND CONSTRUCTION

93. On 17 June 1993, the State Water Board adopted Resolution 93-62 implementing a State Policy for the construction, monitoring, and operation of MSW landfills that is consistent with the federal municipal solid waste regulations promulgated under 40 Code of Federal Regulations section 258 (Subtitle D). Resolution 93-62 requires the construction of a specified composite liner system at new MSW landfill units that receive wastes after 9 October 1993. Resolution 93-62 also allows the Central Valley Water Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b of Resolution 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.

94. Title 27, section 20080(b) allows the Central Valley Water Board to consider the approval of an engineered alternative design (EAD) to the Title 27 prescriptive standard. In order to approve an engineered alternative in accordance with Title 27, sections 20080(c)(1) or (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27, section 20080(b), or would

[10] The Discharger has recently stated that permitting requirements by other agencies make it not possible to lower the outlet, and therefore the Discharger will take other actions to lower the groundwater under DM 3.3.

be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27, section 20080(b)(2).

95. Water Code section 13360(a)(1) allows the Central Valley Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.

Liner Performance Demonstration

96. On 15 September 2000 the Central Valley Water Board adopted Resolution No. 5-00-213 *Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27*. The State Board responded, in part, that "a single composite liner system continues to be an adequate minimum standard" however, the Board "should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater."

97. In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that "the Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 CCR performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double and triple composite liners will likely be necessary."

98. The Discharger submitted a *Liner Performance Demonstration Report for DM-4.1 and Future Class II Liner Systems* dated 15 April 2003. The base liner design for Disposal Module 4.1 (DM-4.1) and future Class II disposal modules at Recology Hay Road Landfill was proposed as follows (from top to bottom):

- 12-inch thick operations layer;
- 8-oz. Geotextile filter layer;
- LCRS gravel layer at least 6 inches thick;
- 60-mil HDPE geomembrane;
- 2-foot thick compacted clay liner with a permeability of $1x10^{-7}$ cm/s or less;
- 6-inch thick foundation soil layer;
- Leak detection geocomposite;
- 60-mil high density polyethylene (HDPE) geomembrane liner; and
- Compacted subgrade comprised of fined-grained soils.

The side-slope liner system was proposed as follows (from top to bottom):

- 1.5-foot minimum operations layer;

- LCRS geocomposite;
- 60-mil HDPE geomembrane;
- A geosynthetic clay liner (GCL) with 30-mil geomembrane; and
- Compacted subgrade comprised of fined-grained soils.

The Discharger proposed to provide comprehensive construction quality control during the liner system construction, complete an electrical leak location survey to verify the integrity of the primary liner system, and install LFG collection pipes within the LCRS to control LFG in the future, if necessary.

99. The demonstration compared efficiencies and leakage potential of six different liner system designs. A total leakage potential of 1.04 gallons was calculated throughout the life of the landfill (operations and 30-year post-closure period) for the 14-acre (DM-4.1) cell. In addition, a cost-benefit analysis was performed which showed that additional liner components would cost significantly more without significantly less leakage potential. As such, the demonstration concluded that a more stringent liner system is not warranted since the proposed system will meet the performance requirements of Title 27 CCR because it exemplifies the prescriptive standard with an additional leak detection component.

Landfill 1

100. Landfill 1 is an "existing unit" under Title 27 and currently consists of DM-1A and DM-1B. No additional LF-1 modules are planned for the unit given that it will ultimately be surrounded by LF-3.

101. DM-1A is a 29.7-acre, unlined landfill unit in the northwest portion of the site. The rectangular-shaped unit is about 1,000 feet wide (east-west) and 1,550 feet long (north-south). The unit does not have an LCRS. The average base of waste elevation is about 20 feet MSL, with a potentially deeper waste area in the northern portion of DM-1 near the entrance road. The maximum elevation of the unit is currently about 130 feet MSL, corresponding to about 100 feet above surrounding grade. The maximum height of the waste column in DM-1A is estimated to be about 100 feet. The upper and lower side slopes of the unit (i.e., north, east, and south) average about 2.5H:1V and 4.5H:1V, respectively, while the top deck is graded at about 3 percent toward the perimeter. The western side of the unit is contiguous with DM-1B.

102. By 1982, groundwater intrusion into the pit at DM-1A had become an operational problem. In an attempt to create an inward-gradient landfill for the DM-1A area, the Discharger constructed a slurry wall around the permitted disposal area on the western half of the site (i.e., LFs-1, 2 & 3 areas). The slurry wall was constructed using low permeability soil excavated from a borrow area within the slurry wall immediately west of

DM-1A (i.e., future DM-1B area) and admixed with bentonite.[11] A de-watering trench was then installed within the slurry wall along the west side of the permitted area to de-water the pit. See Attachments C & D. Subsequent de-watering operations did not prevent groundwater intrusion into the pit, however, and by 1987, the Discharger had abandoned attempts to expand DM-1A's subsurface disposal pit by dewatering.[12]

103. DM-1B is a 14.8-acre, Class III landfill unit constructed in the former borrow area immediately west of DM-1A.[13] The unit consists of a single, rectangular shaped (about 500 feet wide and 1,550 feet long) disposal module referred to as DM-1B. The unit/module was constructed with a compacted clay base liner and an overlying, 6-inch gravel LCRS. Additional containment system components were constructed along the western portion of the unit to create a 175-foot wide, 6-acre lined area.

104. DM-1B's waste containment system may be summarized as follows, from top to bottom:

Module:	DM-1B	
Phase:	Compositely-Lined Portion	Clay-Lined Portion (MSW)
Area (acres)	6	8.8
Operations Layer	12 inches soil[1]	
Filter Fabric	Geotextile[2]	
LCRS	6-inches gravel[1]	
Base Liner	60-mil HDPE Geomembrane	none
	12-Inch Compacted Clay Liner (CCL)[1] ($k < 1x10^{-6}$ cm/sec)	
Foundation Layer	Compacted soil[1]	
Underdrain	De-watering Trench[3]	none

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. Geotextile consists of 8 oz/yd^2 non-woven fabric.
3. De-watering trench filled with drainage gravel.

105. The LCRS layers for both portions of the unit (i.e., DM-1A and DM-1B) drain to a single LCRS sump located along the western side of the unit. The de-watering trench was also included in the design to allow for groundwater de-watering to meet groundwater separation requirements. In 1996, the Discharger initiated groundwater pumping from

11. Well logs indicated that the excavation was within a perched shallow aquifer underlain by a clay layer extending from about 4 bgs on the east side of DM-1A to about 30 feet bgs on the west side of the borrow area. The slurry wall was keyed about 4 feet into the underlying clay layer.

12. The failure of the slurry wall to prevent groundwater intrusion into the pit indicated that the slurry wall was not an effective barrier to groundwater and/or that the aquifer underlying the unit may not have been perched as had been assumed.

13. Taken together, LFs-1A & 1B formed an approximate square with 1,550 foot long sides.

the large borrow pit immediately west of DM-1B, eliminating the need for operation of DM-1B's de-watering trench.

106. The maximum elevation of DM-1B, occurring along its interface with DM-1A, is about 110 feet MSL and the maximum thickness of the waste column at the unit is about 115 feet. The upper side slopes of the unit average about 2:5H:1V, except for the lower portion of the southern slopes, which average about 4:5H:1V.

Landfill 2

107. LF-2 is a Class III landfill unit constructed in 1992 in the southwestern part of the site. The Title 27 landfill unit consists of disposal modules DM-2.1A and DM-2.1B. No additional LF-2 modules are planned for the unit given that it will ultimately be surrounded by LF-3.

108. The base of LF-2 (DM-2.1A) was graded in the shape of an inverse pyramid draining to a central LCRS sump. A composite base liner was installed to qualify for a 3-foot minimum EAD/S approved under previous WDRs Order No. 89-178. The thickness of the CCL component was increased to three feet at the LCRS sump.

DM-2.1A's containment system components may be summarized as follows, from top to bottom:

	Base Liner	
	Sump Area	Floor
Operations Layer	12 inches soil[1]	
Filter Fabric	Geotextile	
LCRS	5 feet gravel[1]	1-foot gravel
Base Liner	80-mil HDPE Geomembrane[2]	60-mil HDPE Geomembrane[2]
	36-inch CCL[1,3]	12-inch CCL[1,3]
Foundation Layer	Re-compacted native soil[1]	

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. Single side textured geomembrane used with textured side down.
3. $K < 1x10^{-6}$ cm/sec.

The base sections for both phases were graded to a 2 percent grade toward the central LCRS sump, which was plumbed to an 18-inch riser pipe extending along the top of the base liner to an access point/collection tank along the southern perimeter of the unit. The LCRS also included perforated 6-inch diameter leachate collection pipes placed diagonally and across the module at the base of the pea gravel. No capillary break layer was included in the design because the module was constructed with greater than the requisite 3-feet minimum separation from high groundwater at the LCRS sump.

109. DM-2.1B is 7.1-acres and was constructed in two phases in 1993 and 1994, respectively. DM-2.1B's containment system components may be summarized as follows, from top to bottom:

	Base Liner		Perimeter Levee	
	Phase 1 (as constructed DM-2.1, Phase 2)	Phase 2 (as constructed DM-2.1, Phase 3)	Phase 1 (as constructed DM-2.1, Phase 2)	Phase 2 (as constructed DM-2.1, Phase 3)
Operations Layer	12 inches soil[1]			
Filter Fabric	Geotextile			
LCRS	12 inches gravel[1,2]		Not applicable	
Base Liner	60-mil HDPE Geomembrane[3]			
	12-inch CCL[1,4]	24-inch CCL[1,5]	12-inch CCL[1,4]	24-inch CCL[1,5]
Foundation Layer	Re-compacted native soil[1]		Re-compacted berm soil[1]	

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. K > 1 cm/sec per project specifications.
3. Single side textured geomembrane used with textured side down.
4. K < $1x10^{-6}$ cm/sec per project specifications.
5. K < $1x10^{-7}$ cm/sec per project specifications.

No capillary break layer was included in the design because the module was constructed with greater than the requisite 3-feet minimum separation from high groundwater.

Landfill 3

110. LF-3 is a Class II landfill unit currently consisting of two disposal modules -- DM-2.2 and DM-11. Additional LF-3 expansion modules are planned for future construction north of the existing LF-3 modules, including, but not necessarily limited to, DM-10 in the area presently used for composting.

111. DM-2.2 was constructed in 1995 in the southwest corner of the site immediately west of DM-2.1B. The 11.8-acre expansion module was constructed in accordance with engineered alternative designs for groundwater separation (EAD/S) and waste containment (EAD/L) approved under previous WDR Order No. 95-269. The EAD/S included a minimum separation of 2½ feet from the bottom of the primary LCRS (including primary LCRS sumps) to the highest anticipated elevation of groundwater, including capillary fringe. The EAD/L included the substitution of geosynthetic clay liner (GCL) for one foot of compacted clay in the composite base liner and two feet of clay in the composite side slope liner. Sideslope containment was required along perimeter levee slopes and slopes abutting Class III landfill LF-2.

112. DM-2.2's containment system components may be summarized as follows, from top to bottom:

	Base Liner	Side Slopes	
		Perimeter Levee	DM-2.1B Interface
Operations Layer	12 inches soil[1]	18 inches soil[1]	
Filter Fabric	Geotextile	---	
LCRS	12 inches gravel[1,2]	---	Geocomposite drainage strips[3]
Cushion Layer	Geotextile Cushion[4]		
Base Liner	60-mil HDPE Geomembrane[5]		
	GCL[6]		
	12-inch CCL[1]	---	
Foundation Layer	6-inches soil[1]	---	6-inches soil[1]
Capillary Break	12-inches gravel[1,2]	Geocomposite[2]	---
Subgrade	Re-compacted native soil[1]		---

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. K > 1 cm/sec per project specifications.
3. Geocomposite consists of geonet bonded to geotextile filter layer.
4. Geotextile cushion layer consists of 16 oz/yd^2 non-woven fabric.
5. Single side textured geomembrane used with textured side down.
6. K < 5x10^{-9} cm/sec per project specification...

The base of each module phase was graded with a 2 percent cross slope toward central LCRS header pipes (sloped at one percent) draining to LCRS sumps located on the southern and western perimeters of the module.

113. DM-11 was constructed in two phases in 1997 (DM-11.1) and 1998 (DM-11.2), respectively. Both phases of the 14.6-acre module were constructed consistent with modified EADs for groundwater separation and liner (i.e., modified EAD/S and EAD/L) approved under WDR Order No. 97-145, which reduced the required thickness of the capillary break and LCRS layers to six inches each. The modified EAD/L also reduced the containment system requirements for side slopes abutting portions of Class III LF-2. Notwithstanding the reduced EAD/S, WDR Order No. 97-145 retained the requirement that the Discharger maintain 2.5 feet of operational separation at the module.

114. DM-11's containment system components may be summarized as follows, from top to bottom:

	Base Liner	Side Slopes	
		Perimeter Levee	DM-2.1B Interface
Operations Layer	12 inches soil[1]	18 inches soil[1]	
Filter Fabric	Geotextile	Geocomposite	---
LCRS	6-inches gravel[1,2]		
Base Liner	60-mil HDPE Geomembrane[4]		
	GCL[5]		---
	12-inch CCL[5]	---	
Foundation Layer	6-inches soil[1]	---	6-inches soil[1]
Capillary Break	6-inches gravel[1,2]	Geocomposite	n/a
Subgrade	Re-compacted native soil[1]	---	n/a

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. K > 1 cm/sec per project specifications.
3. Cushion layer eliminated on levee sideslope to increase interface shear strength of base liner.
4. Single side textured geomembrane used with textured side down.
5. K < $5x10^{-9}$ cm/sec per project specifications.

The base of each module phase was graded with a 2 percent cross slope toward central LCRS header pipes (sloped at one percent) draining to two LCRS sumps located on the southern perimeter of the module. See Attachment E: Leachate & Soil Pore Liquid Monitoring.

115. The Discharger has proposed to construct future LF-3 modules consistent with previous WDR approvals for LF-3. These WDRs specify a design for constructions of new LF-3 modules that includes a double liner like LF-4, an increase in design separation to 5 feet, and a capillary break layer in those areas where the base elevation of the liner will be below the calculated capillary rise plus the required five feet of separation from groundwater. See Construction Specifications E.1 through E.7.

Landfill 4

116. LF-4 is a Class II landfill unit and currently consists of 5 disposal modules -- DMs-3 through -7. Additional LF-4 modules are planned for future construction west of the existing LF-4 modules, including, but not necessarily limited to, DM-9 in the area presently used for stockpiling and drying sludge (i.e., WP-9 and LTU-1).

117. DM-5 was constructed in two phases, including DM-5.1 (2001) and DM-5.2 (2004), respectively. DM-5.1 (11.9 acres) was constructed in accordance with the design for LF-3, DM-11 approved under previous WDRs (see Finding 113), except that no interface containment system was necessary because the module was not adjacent to a Class III unit. The base of DM-5.1 was graded with a 2 percent cross slope toward central LCRS header pipes (sloped at one percent) draining to two LCRS sumps located on the eastern perimeter of the module. DM-5.2 (8 acres) was constructed in accordance with

the design for DM-4.1 described below and similarly graded to drain to a single LCRS sump located on the northern perimeter of the module.

118. DM-4 was constructed immediately south of DM-5 along the eastern side of the facility. The 18.4-acre module was constructed in three phases over a 10-year period, including DM-4.1 (2003). DM-4.2 (2006) and DM-4.3 (2013), respectively. All three phases were constructed in accordance with the 2½-foot minimum EAD/S approved under previous WDR Order No. 95-269 and the revised EAD/L approved under previous WDR Order No. R5-2003-0118. The approved EAD/L consisted of a double composite base liner system and a single composite perimeter sideslope liner system. The thickness of the containment system was used to satisfy the minimum 2½-foot separation requirement under the EAD/S.

119. DM-4's containment system components may be summarized as follows. from top to bottom:

<table>
<tr><td></td><td>Base Liner</td><td>Perimeter Levee Sideslope</td></tr>
<tr><td>Operations Layer</td><td>12 inches[1]</td><td>18 inches[1]</td></tr>
<tr><td>Filter Fabric</td><td>Geotextile</td><td rowspan="2">Geocomposite</td></tr>
<tr><td>LCRS</td><td>6-inches gravel[1,2]</td></tr>
<tr><td rowspan="2">Base Liner</td><td colspan="2">60-mil HDPE Geomembrane[3]</td></tr>
<tr><td>24-inch CCL[4]</td><td>GCL[4]</td></tr>
<tr><td>Foundation Layer</td><td>6-inches soil[1]</td><td>---</td></tr>
<tr><td>Secondary LCRS</td><td>Geocomposite</td><td>---</td></tr>
<tr><td>Secondary Liner/ Capillary Barrier Layer</td><td>60-mil HDPE Geomembrane[3]</td><td>---</td></tr>
<tr><td>Subgrade</td><td colspan="2">Re-compacted native soil[1]</td></tr>
</table>

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. K > 1 cm/sec per project specifications.
3. Geomembrane double-side textured over base liner and single side textured (textured side down) on side slopes.
4. K < $5x10^{-9}$ cm/sec per project specifications.

The base of DM-4.1 was graded with a 2 percent cross slope toward central LCRS header pipes (sloped at one percent) draining to an LCRS sump installed on the eastern perimeter of the facility. Consistent with the approved revised EAD/L, LFG collection pipes were also installed within the LCRS layer to allow for future connection to LFG control system, as needed. An electrical leak location survey was also conducted as part of the construction CQA to verify the integrity of the primary liner system.

120. No LCRS sumps were constructed at either module phase DM-4.2 or DM-4.3, which were graded to rely on other modules/module phases for leachate drainage. The northern part of DM-4.2's LCRS was graded to drain north into DM-5.2's LCRS, while

the remainder of DM-4.2's LCRS was graded to drain east into DM-4.1's LCRS. DM-4.3's LCRS was graded to drain east into DM-4.2's LCRS.

121. DM-3 was constructed immediately south of DM-4 in the southeast corner of the facility, The 21.6-acre module was constructed in three phases, including DM-3.1 (2008), DMs-3.2 (2010), and DM-3.3 (2010), respectively. All three phases of the module were constructed in accordance with the EADs approved for DM-4 and subsequent modules under previous WDRs (e.g., double liner, secondary LCRS, 2½-foot minimum separation). The LCRS for each phase was also graded and constructed similarly to DM-4, except that each of the three phases of the module was constructed with its own LCRS sump located along the southeast corner of the facility. See Attachment E: Leachate & Soil Pore Liquid Monitoring.

122. DM-6 was constructed immediately west of DM-5 in the eastern part of the former LTU-1 area clean-closed in 2011. The 12.1-acre module was constructed in two phases in 2012 (DM-6.1) and 2013 (DM-6.2), respectively. Both phases of the module were constructed with the same double-lined containment system design as that for DMs-3 and 4, as approved under previous WDRs. Both phases were contiguously graded to drain to a single LCRS sump located on the northern perimeter of the facility/DM-6.1.

123. The LCRS sumps for the LF-3 and LF-4 landfill modules were generally constructed to a maximum depth of 1.5 feet with 3H:1V side slopes. Each sump was equipped with a dedicated submersible pump, including liquid level sensor and 18" HDPE riser pipe for sump access and pumping. External pump controls with electronic displays were also installed to allow for monitoring the sumps and adjusting the pump controls. The system also included level switches set at minimum and maximum allowable liquid levels to ensure safe pump operation and to prevent head buildup on the liner beyond the sump. Volume pumped is also automatically recorded. All pump control systems are powered by solar cells installed near each module/sump. For modules with a secondary LCRS, a secondary riser pipe was also installed to allow for pumping any liquid detected.

124. All components of the LCRS layers at DM-1B and LFs-2 through 4, including gravel or geocomposite blanket layers, lateral and/or header piping, LCRS sump, control systems, and handling facilities were designed to meet Title 27 performance standards using appropriate engineering methods and models (e.g., Hydraulic Evaluation of Landfill Performance (HELP) Model Version 3.07, pipe flow calculations).

125. DM-7 is being constructed in two phases along the southern perimeter of the site immediately south of DM-4 and west of DM-3. The first phase of the module, DM-7.1 (5.9 acres), was constructed in 2015 immediately south of DM-4.3 with the same double-lined containment system design as DMs-3, 4, and 6 described above. The base of the module was graded to drain to the south at a 1% slope with a 2% cross slope toward a central leachate header pipe. The second phase of the module, DM-7.2 (3.5 acres), anticipated to be constructed in 2018, will continue the 1% base grade of DM-7.1, allowing for at least 2½ feet of groundwater separation at an LCRS sump to be

constructed at the toe of the module consistent with previous approvals.

126. No LCRS sump was constructed at the toe of DM-7.1 to avoid the need to abandon and relocate the sump when DM 7.2 is constructed and tied into the module. Instead, the module was equipped with a temporary leachate extraction system consisting of an 18-inch HDPE riser pipe plumbed directly into the module's LCRS blanket layer. The riser pipe was installed along a temporary, lined soil berm constructed along the southern side of DM 7.1. An automatic, submersible pump capable of detecting leachate pressure and liquid level was installed in the riser to pump and convey the leachate via pipeline to LF-4's tank farm west of WP-9. One 2-inch HDPE water injection pipes will also be installed in the north end of the LCRS to enable annual LCRS testing.

127. The Discharger has proposed to construct future LF-4 modules consistent with previous WDR approvals for LF-4. These WDRs specify a containment system design for new LF-4 modules that is the same as for those described for LF-3 for the base liner and side-slope liner. Additional liner components are required beneath the sumps for new LF-4 modules. See Finding 115 and Construction Specifications E.1 through E.7.

Slope Stability

128. On 13 March 2015, in response to a requirement under 13301 Order R5-2014-0117, the Discharger submitted a technical report providing updated slope stability analysis of the landfill's temporary fill slopes (see 13 March 2015 *Temporary Fill Slope Stability Technical Report, Recology Hay Road Landfill*, prepared by Golder Associates, Inc.). The report included an updated seismic hazard assessment, a review of the liner design and shear test parameters for each landfill module, identification of the temporary fill slopes associated with the modules consistent will the landfill's fill plan, and analysis of the stability of these slopes under both static and dynamic conditions, as required under previous WDRs and Title 27 regulations. The temporary fill slopes included the southern and eastern slopes of LF-1, which the Discharger plans to regrade to 4H:1V; the northern slope of LF-2; the northern and eastern slopes of LF-3; and the western (DM-4.3 and 7.1), southern (DM-7.2), and eastern (DM-4.1) slopes of LF-4. A total of eight critical cross-sections were evaluated along these slopes, including two at LF-1, one at LF-2, two at LF-3, and three at LF-4.

129. Slope stability analysis was performed on the above cross sections using the SLIDE© (Version 6.029) software program developed by Rocscience, Incorporated. The program performs two-dimensional limit equilibrium analysis using the method of slices to compute factors of safety based on various analysis procedures. Spencer's Method of Slices was used to compute the static safety factors. Critical interface failure envelopes were developed for the modules based on the laboratory shear results from module CQA testing and other factors. Computed minimum static safety factors for the interim fill slopes included 3.1 at LF-1, 3.4 at LF-2, 1.6 at LF-3 (DM-2.2), and 1.8 at LF-4 (DM-7.1), indicating stable interim slopes under static conditions.

130. To evaluate the dynamic stability of the interim slopes, the yield acceleration was

determined by applying a seismic coefficient until the factor of safety equaled 1.0. A seismic coefficient of 0.58 g was used in the analysis based on the design earthquake for the site. Once the yield acceleration was determined, the method of Bray et. al (1998) was used to estimate the seismic displacements. Maximum calculated seismic displacements using this method were <1 at LFs-1 and -2, 15.3 inches at LF-3 (DM-2.2), and 5.1 inches at LF-4.

131. The 15.3-inch calculated displacement for LF-3 exceeded the 12-inch maximum allowable displacement recommended under EPA guidelines for dynamic slope stability. To address this issue, the report included a work plan to widen and/or increase the height of the existing soil buttress along the northern side of LF-3, DM-2.2 to increase its seismic stability. The work plan proposed installation of soil borings and geotechnical testing of the berm to determine its shear strength and other parameters. Once this information was obtained, additional dynamic slope stability analysis would be performed to determine the necessary dimensions for the berm. The Discharger has since completed the geotechnical investigation, as approved, and determined, based on revised geotechnical parameters, that northern side of LF-3, DM-2.2 is stable and that improvement of the buttress is not necessary.

132. Precipitation and drainage controls installed on the landfill units include:

    a. Top decks graded at 5% minimum for drainage.
    b. Soil berms along top deck perimeter to direct runoff to corner drop inlets.
    c. Overside drains to capture top deck and side slope bench drain flows.
    d. Ditches installed alongside slope benches to intercept and convey sheet flow runoff to overside drains. Benches also graded for sheet flow runoff.
    e. Landfill perimeter ditches to convey collected runoff to onsite storm water basins.
    f. Velocity controls (e.g., erosion control blanket, rip rap) at appropriate locations in bench drains and landfill perimeter ditches to reduce erosion.

    Construction reports historically submitted for the landfill units certified that the module designs (including precipitation and drainage controls) meet Title 27 requirements.

Waste Pile 9.1

133. WP-9.1 was originally constructed as disposal module DM-9.1 in 1997, the first LF-4 disposal module constructed on the eastern half of the site immediately east of the composting area. The 7-acre module represented the first phase of a 22.4-acre module (DM-9) planned for that area. In 1998, the module was converted for use as a sludge storage facility and in 2001 was reclassified (under previous WDRs Order No. 5-01-101) as a Class II waste pile. The east half of WP 9.1 is currently undergoing clean closure and upon completion DM-9.1 will be constructed as part of Unit LF-4.

134. WP-9.1 was constructed with the same engineered alternative designs as DM-11, including minimum groundwater separation and base liner and perimeter levee

sideslopes. See Findings 113 and 114. As with DM-11, WP-9.1 was graded with a 2 percent cross slope toward central LCRS header pipes (sloped at one percent) draining to two LCRS sumps located along the northern perimeter of the module. See Attachment E: Leachate & Soil Pore Liquid Monitoring.

135. Three engineered, 9-to-12 foot high soil berms tied into the operations layer were also constructed along the south, east, and west sides of the module, respectively, for additional sludge containment. The berms were constructed using C-Soil capped with one-foot of borrow clay and graded with 2H:1V interior and exterior side slopes. Calculations in the JTD indicate that the berms would be stable under both static and dynamic loading conditions. The failure surface was the interface between the underlying LCRS and geosynthetic liner.

    As described in the 18 November 2015 WP 9.1 CQA report, partial clean closure activities began in 2015. The liner components in the eastern portion of WP-9.1 were removed. A new perimeter berm was constructed within the remaining western portion of WP-9.1. A new 60-mil high-density polyethylene (HDPE) geomembrane was installed on the outer portion of the containment berm. The purpose of this geomembrane is to seal the edge of the leachate collection and removal system (LCRS) gravel layer consistent with the existing WP-9.1 design. This project has reduced the footprint of WP 9.1 by more than 50%. The remaining western portion of WP 9.1 is now designated WP 9.1A.

136. An access road and tipping pad was constructed on the southern side of WP-9.1 for offloading de-watered sewage sludge. Prior to reconfiguring the unit as part of the clean closure effort, the capacity of WP-9.1 was estimated to be 54,000 cubic yards of wet sludge, with three feet of freeboard from the top of the sludge to the top of the perimeter berms. The capacity of WP-9.1A is currently 18,300 cubic yards. All contact storm water collected within the waste pile berms is treated as leachate per Title 27 CCR Section 20365(b). All storm water diverted by the berms is directed to a perimeter storm water ditch along the northern side of the module, sized for a 1,000-year 24-hour storm.

Land Treatment Unit

137. The LTU was sited on a 20-acre area between DM-9 and DM-5 in the northeast corner of the site in the summer of 2000; however, LTU operations did not exceed a combined area of about 13 acres. The design included a 5-foot treatment zone below ground surface in which sludge constituents would be degraded, transformed, or demobilized. A field pilot to demonstrate the feasibility of the LTU in treating wastes per Title 27 CCR Section 20250(b)(5) was conducted prior to construction of the unit. De-watered WWTP sludge was applied to the test area to dry during the summer and lysimeters were placed immediately below the treatment zone to detect the possible migration of sludge constituents. The project results indicated that no sludge COCs were detected in samples collected below the treatment zone.

138. A soil pad was constructed within the LTU to facilitate placement and removal of sludge. The pad was graded for perimeter collection and drainage in the event of a design storm. All contact storm water is treated as leachate (i.e., collected in a sump in a corner of the unit and pumped to a leachate holding tank). A soil berm was also constructed around the LTU area for storm water diversion. Diverted storm water was directed to the perimeter ditch along the northern site boundary.

139. To date, all but 3.2 acres of the LTU area have been closed. The Discharger plans to clean close the remainder of the LTU in 2016 to make room for construction of LF-4, DM-9.

Composting Facility

140. The 22-acre compost facility pad, completed in 2006, consists of an all-weather working surface comprised of sections of concrete and foamed asphalt constructed over compacted subgrade. The subgrade was compacted to a maximum hydraulic conductivity of 1×10^{-5} cm/sec. The surface materials were selected to resist damage from heavy equipment, withstand the loads of compost piles, and prevent infiltration. The pad was designed for active composting and for the storage of finished compost.

Leachate Collection System

141. The composting pad was constructed with a leachate drainage system designed to capture and collect all compost leachate from the pad, including commingled storm water and/or wash water from dust and odor control operations. Leachate drainage controls installed at the facility included berms and swales, concrete-lined perimeter ditches, two leachate sumps, two leachate storage ponds, leachate storage tanks, and other drainage controls.

142. The asphalt-concrete-lined collection ditches were installed on the eastern end and concrete-lined collection ditches were installed on western ends of the pad to direct leachate from interior areas of the pad to lined sumps on the western and eastern ends of the pad.[14] Drainage swales and/or concrete curbs were also installed in perimeter areas of the pad to help direct leachate to the concrete-lined perimeter ditches and prevent storm water run-on onto the pad. Both concrete-lined collection ditches were designed to handle flows from a 25-year, 24-hour storm event.

143. The leachate sumps at each end of the pad are equipped with pumps activated during

[14] Contact storm water runoff from the green waste composting area historically drained to the sedimentation basin (i.e., former green waste pond) immediately south of the compost pad. However, this was not allowed by the previous WDRs. In 2014 (in partial response to the 13301 Order), the Discharger implemented various storm water drainage improvements at the composting facility, including construction of the concrete-lined ditch and sump on the western side of the facility to capture and contain drainage from the green waste composting area and prevent discharges from the pad to surrounding areas. See January 2015 *Amended Compost Area Storm water Modification Technical Report*, prepared by Golder Associates.

either low flow (e.g., minor storms) or higher flow periods (e.g., major storms). Each pump includes a float switch set at the appropriate low flow (≤ 2.75 feet) or high flow (≥ 3 feet) liquid level in the sump. One low flow pump is installed in both the east and west sumps, while a series of four high flow pumps are installed in the west sump and two in the east sump. The western sump and pump system is designed to handle flows from a 25-year, 24-hour storm event consistent with the General Composting Order, while the JTD indicates that the eastern sump and pump system needs to be upgraded with additional capacity to meet this standard.

These WDRs require that the compost leachate collection and pond systems are sized for a 25-year, 24-hour storm event, at a minimum. See Construction Specifications E.17.

144. During low flow storm events when the depth of liquid in both leachate sumps reaches 2.75 feet, the low flow pump in each sump activates. Leachate from the eastern sump is then pumped via a 4-inch line directly to Pond A (alternately referred to as the “low flow” pond), while leachate from the western sump is pumped via a 3- inch diameter pipe to the southeast corner of the eastern collection ditch. From there, the western sump leachate drains to the eastern perimeter sump from which it is pumped to Pond A. During higher flow storm events when the depth of liquid in each sump is at least 3 feet, leachate is pumped directly to Pond B (also referred to as “high flow” pond) via separate 12-inch diameter lines from each sump.

145. Leachate sampling of the compost facility conducted in 2010 indicated the following results:

Compost Facility Leachate Monitoring Data			
Inorganic Compounds			
Constituent	East Sump[1]	Pond A[2]	Pond B[3]
General Minerals (mg/L):			
Total Dissolved Solids	---	---	6,900
Chloride	---	---	1,600
Nitrate-N	---	---	14
Sulfate	---	---	320
Specific Conductance (µmhos/cm)	10,445	3,815	9,395
Nitrogen Compounds (mg/L)			
Total Kjeldahl Nitrogen	---	---	320
Ammonia	895	145	11
Nitrite	---	---	0.66
Other Parameters (mg/L)			
Total Suspended Solids	1,362	330	---
Biochemical Oxygen Demand	15,750	2,150	---
Chemical Oxygen Demand	32,000	3,900	---
Phosphorous	---	---	150
Dissolved Metals (µg/L)			
Lead	---	---	150

1. Average values from samples collected in February and April 2010.
2. Average of values from samples collected in February and April 2010.
3. Samples collected in November 2013
4. "---" denotes no sample collected at this monitoring point.

Leachate Pond System Design & Operation

146. Both Pond A and Pond B have been in operation since 2008. Pond A was constructed with a 40-mil HDPE geomembrane liner and has an estimated storage capacity of 389,000 gallons, excluding 1.2 feet of freeboard. Pond B was constructed with an 80-mil HDPE geomembrane and has a storage capacity of approximately 15.5 million gallons, excluding 2 feet of freeboard. Neither pond was constructed with an unsaturated zone monitoring device under the liner; however, Pond B is designed to store storm water run-off from a 25-year wet year. Aerators were also installed in Ponds A and B to maintain dissolved oxygen concentrations and to help prevent anaerobic conditions.

147. Pond A was also equipped with a float-controlled pump set to maintain a 1.2-foot minimum freeboard by pumping any excess flows to Pond B. For back-up overflow protection, Pond A was also constructed with a gravity discharge pipe placed at an elevation of 28.9 feet NGVD29, 0.5 feet below the minimum berm crest elevation of Pond A (29.4 feet NGVD29). The gravity discharge pipe discharges any excess liquid back to the eastern sump (15.6 feet NGVD29) from which it is pumped to either Pond B or into onsite storage tanks. Neither Pond A nor Pond B is plumbed to discharge to any surface water or sedimentation basin. (Pond B was formerly equipped with a gravity discharge pipe (3.0 feet below the berm crest) that discharged to the Compost Facility

sedimentation basin, but the pipe has since been capped).

148. Item 2 of Water Code Section 13301 Order R5-2014-0117 required that the Discharger submit either of the following:

    a. A Compost Ponds Re-configuration Technical Report documenting the implementation of sufficient facility modifications to ensure that compost area leachate is stored in Pond A and that storm water runoff is stored in Pond B such that they are not commingled, as described in previous WDRs; or

    b. An amended RWD including a request that revised WDRs be issued that allow the current configuration of the ponds (e.g., commingling of compost leachate with storm water) and an interim technical report describing how the ponds will be inspected and managed to prevent pond overflows and unauthorized discharges to surface water.

149. In January 2015, the Discharger submitted an amended RWD for the composting facility requesting that the current pond configuration be incorporated into revised WDRs. The RWD included a January 2015 *Compost Pond Interim Overflow Management Plan*, prepared by Golder Associates per Item 2 of the Section 13301 Order. Key elements of the interim plan included the following:

    a. Action Level 0 – Normal pond operations, weekly inspections during wet season to check pond levels, no intervention.

    b. Action Level 1 – When the liquid level in Pond A reaches an elevation of **28.5** feet NGVD29 (i.e., 0.9 feet below the minimum elevation of the berm crest), then:

        i. Stop pumping leachate from the eastern sump to Pond A;

        ii. Start pumping leachate from Pond A to Pond B (or to the onsite storage tanks, if necessary) until the liquid level in Pond A drops to **28.2** feet NGVD29 (i.e., 1.2 feet below the berm crest) or lower; and

        iii. When completed, return to Action Level 0.

    c. Action Level 2 – When/if the liquid level in Pond B reaches an elevation of **30** feet NGVD29 (i.e., 5.0 feet below the minimum berm crest elevation (35 feet NGVD29), then

        i. Increase drawdown of Pond B by beneficial reuse of Pond B liquid (e.g., compost moisturizing, dust control within compost pad area);

        ii. Increase inspection frequency to daily and immediately after storm events;

        iii. Contact wastewater treatment plants to arrange for offsite disposal, and/or stage temporary storage tanks at the site; and

        iv. When completed, return to Action Level 1 or 0, as appropriate.

    d. Action Level 3 -- When/if the liquid level in Pond B reaches an elevation of **32.5** feet NGVD29 (i.e., 2.5 feet below the minimum berm crest elevation), then;

        i. Same as c.i above;

ii. Same as c.ii above;

iii. Commence hauling Pond B liquid to a WWTP or pump liquid to temporary storage tanks for future on-site use or offsite disposal; and

iv. When completed, return to Action Level 2 or lower, as appropriate.

These WDRs require that the Discharger manage the composting facility's leachate collection/pond system in accordance with the above interim O&M plan pending submission and Board staff approval of a finalized O&M plan for the system (Composting Facility Leachate Collection System/Pond O&M Plan) reflecting any modifications to the interim O&M plan and all facility improvements implemented under the Compost Facility Leachate Collection/Pond System Improvement Plan. Action level reporting under the plans is required.

CORRECTIVE ACTION

150. Several units/areas at the site are currently in concurrent corrective action programs (CAPs) to address releases of specific waste constituents to groundwater and/or the unsaturated zone, including LF-1, LF-2, LF-3, LF-4, WP-9.1, LTU, and an area of the site impacted by a historical nitrate-N release. These impacted units/areas and corresponding corrective action measures are described below.

Nitrate-N Plume

151. In 2012, the Discharger installed groundwater monitoring well G-31 as a replacement for well G-14, which had been destroyed to allow for construction of DM-6. The groundwater sampling following installation indicated a nitrate-N concentration of 29 mg/l in the well, which is above the 5 mg/l concentration limit for nitrate. Nitrate-N exceedances (17 mg/L) were also detected on the west side of the site in well 4BR also installed and sampled in 2012. In response to this detection, the Discharger evaluated the feasibility of a permeable reactive barrier trench for remediation of nitrate in this area.. On 8 March 2013, Water Board staff issued a Notice of Violation (NOV) to the Discharger for the nitrate-N violations in these and other nearby wells. The NOV required, in part, that the Discharger perform a site investigation to delineate the nitrate-N releases and to establish a corrective action program.

152. In response to the NOV, the Discharger conducted a June 2013 investigation to delineate the nature and extent of the nitrate-N release, and defined elongated, nitrate-N plumes on the east and west sides of the site oriented in the direction of groundwater flow. See Attachment I: Nitrate-N Plume Map. Both identified nitrate-N plumes were downgradient of the Composting Area, WP-9.1, and LTU areas which were identified as possible sources given that they handle wastes/materials containing high concentrations of nitrogen compounds and that previous leaks and/or spills were documented from these units, including holes in the compost pond liners. Another possible source of the nitrate-N plumes noted in the report is the A-1 Channel, which runs along the north and east sides of the site and conveys irrigation tail water containing agricultural irrigation runoff, including nitrate. Note that the A-1 channel previously ran diagonally through DM-9.1 and DM-3. Well G-31 was subsequently

abandoned in June 2013, to allow for construction of DM-4.3.

153. Water Board staff subsequently approved a revised CAP proposing in-situ bioremediation for the nitrate-N releases via subsurface injection of an amendment to stimulate bioremediation based on a September 2013 EFS. The CAP required the Discharger to obtain coverage under General Order R5-2008-0149-056 (*General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-volatile Organic Compounds and/or Petroleum Compounds*). A Notice of Applicability for the corrective action under General Order R5-2008-0149-056 was issued by the Executive Officer on 17 December 2014.

154. The Discharger initiated groundwater remediation under the above General Order in May 2015. The groundwater remediation program included the injection of 20% sodium lactate into shallow groundwater in the affected areas to biologically degrade the nitrate. Injection points were spaced at approximately 70-foot intervals within rows spaced approximately 50 feet apart. The sodium lactate injections were performed over a two-month period using temporary, push-probe (i.e., Geoprobe) borings, which were grouted after extraction. The injection process was completed in May 2015. Six groundwater monitoring wells (G-32 through G-37) were also installed in treatment, transition, and compliance monitoring zones to monitor the effectiveness of the corrective action under MRP R5-2008-0149-056 of the General Order. See Attachments D & I.

    The nitrate-N plume has not yet been fully defined, and the Discharger is required to continue investigations outside of the purview of this Order. These WDRs require that the Discharger continue active remedial measures necessary to cleanup the nitrogen-N release as required by General Order R5-2008-0149-056 or other corrective action measures until such time as the Discharger is able to complete the requisite proof period under Title 27/Subtitle D demonstrating that all release constituents have been reduced to concentration limits.

WP-9.1 & LTU Areas

155. In July 2000, nitrate-N-impacted soil pore liquid (about 395 mg/L) was detected in both pan lysimeters beneath WP-9.1 and subsequently confirmed as a release from the module. An electrical leak location survey conducted under a June 2001 EMP found a liner leak (about 4 inches by 6 inches) on the eastern side of the module that may have allowed leachate to enter the capillary break layer and/or the pan lysimeters.[15] Interim corrective action measures included removal of the liquid from both pan lysimeters (about 6,900 gallons total), repair of the liner leak, and covering the exposed edges of the landfill module liner system with plastic sheeting to reduce the possibility of surface

15. See June 2001 *Amendment to Report of Waste Discharge and Establishment of Evaluation Monitoring Program, Pan Lysimeters PL-9.1A and PL-9.1B, B&J Drop Box Sanitary Landfill*, prepared by Conor Pacific/EFW.

water from entering the capillary break layer. Additional investigation was recommended.

156. An April 2002 follow-up EMP investigation (i.e., to define the nature and extent of the release) found nitrate-impacted soil below the landfill capillary break layer and in an area of erosion along the northeast corner of the module. The findings indicated that leachate had likely overflowed out of the module after exceeding the elevation of the WP-9.1 liner along the northeast and northwest perimeters. Additional corrective action measures included excavation of approximately 1,500 cubic yards of leachate-impacted soil and lining the module containment berms to seal off the LCRS layer so as to prevent future overflow of leachate from the module.

157. Concentrations of waste constituents historically detected in soil pore liquid at WP-9.1 since detection of the above leachate release are summarized in the following table:

WP-9.1 Historical Pan Lysimeter Data		
	WP-9.1A	WP-9.1B[1]
VOCs (ug/L)	2001-2006	2001-2008
Alcohols & Ethers	2.9	15.2
BTEX Compounds	1.3	0.4
Freon Compounds	0.6	0.1
Halogenated VOCs	3.8	1.4
Ketones	3.1	5.6
Other VOCs	5.1	1.9
Total VOCs:	16.8	24.6
General Minerals (mg/L)	2000-2015	2000-2008
Bicarbonate	406	502
Chloride	180	192
Nitrate	67	68
Sulfate	293	327
Total Dissolved Solids	1,464	1,508
Ammonia	---	25
Dissolved Metals (ug/L)[2]	2000-2015	1999-2005
Arsenic	44.1	29.9
Chromium (total)	10.0	7.4
Iron	21,368	9,060
Lead	14.7	7.4
Manganese	533	240
Semi-VOCs (ug/L)[2]	---[3]	---
Herbicides (ug/L)[2]	---	---

1. Year or year ranges correspond to periods when constituents were continuously or intermittently detected. Note that since 2008, there has not been sufficient water to obtain a sample from PL-9.1B.
2. 5-year constituents of concern.
3. --- = not detected.
4. Note that average concentrations may not include non-detections and may not be representative.

158. The 2002 EMP also confirmed nitrate-N impacts to groundwater up to 30 mg/L in monitoring well G-21, which had recently been installed. In response, the Discharger installed new pumps, larger leachate storage tanks, additional LCRS pipes in the operation layer, and improved off-site leachate disposal capabilities. Grab groundwater samples obtained from temporary probes installed downgradient of well G-21 and adjacent to the northeast corner of WP-9.1 indicated lower, but still elevated, nitrate-N concentrations compared to background concentrations. The grab groundwater analytical results indicated that the area of nitrate-N impacts to groundwater is limited to the area immediately surrounding and approximately 150 feet downgradient of G-21.

159. Long term corrective action measures implemented at WP-9.1 in response to the groundwater release included installation of groundwater extraction well G-22 (about 10 feet downgradient of G-21) to remediate the release and two additional monitoring

wells, G-23 (adjacent to G-21, but screened in the next lower sand layer) and G-24 (about 200 feet downgradient of G-21) to monitor the effectiveness of the corrective action. Extraction of groundwater from well G-22 started up in June 2003. Between July 2014 and July 2015, approximately 1.07 million gallons of impacted groundwater was pumped from G-22 at an average extraction rate of about 2.0 gpm, which was close to the design extraction rate. Groundwater extracted from G-22 is either stored/used onsite for dust control or hauled to an offsite WWTP for disposal.

160. Under previous WDRs, wells G-21, G-22, G-23 and G-24 (abandoned in 2010) were sampled quarterly for specified field parameters and nitrate-N, the primary release constituent. Well G-21 was also monitored semi-annually for the routine detection monitoring parameters. Since 2011, the average Nitrate-N concentrations detected in wells monitoring WP-9.1 have decreased (i.e., from approximately 29 mg/L to 2.6 mg/L) in downgradient well G-21, remained relatively steady in monitoring well G-23 (1.8 mg/L) and extraction well G-22 (6.4 mg/L), and increased in downgradient well G-19R (4.1 mg/L). Nitrate-N concentrations have also increased during this period in well G-26 (5.2 mg/L) immediately downgradient of the adjacent LTU.

161. In light of above monitoring data, the Discharger submitted an 8 January 2016 work plan to improve delineation of the nitrate plume in the WP-9.1 and LTU areas. The work plan proposed the installation of a total of 22 temporary soil borings on grid patterns on the eastern half of WP-9.1 (i.e., WP-9.1B) and in the LTU area. Each boring would be advanced to first encountered groundwater and cased with 1-inch PVC. Grab groundwater samples would then be collected from each boring and analyzed for Nitrate-N and Nitrite-N. Step-out boring installation and sampling would then be conducted from all unbounded borings showing Nitrate-N exceedances to delineate the plume. Depending on the results of the investigation, a work plan proposing in-situ bioremediation under General Waste Discharge Requirements Order R5-2008-0149-056 similar to that described in Finding 153 would be submitted. Board staff conditionally approved the groundwater investigation for the eastern portion of WP 9.1 and the LTU in a letter dated 12 April 2016. The Discharger will soon be submitting a second workplan to delineate the nitrate-N plume in the remainder of the site.

LF-2 & LF-3

162. VOC-impacted soil pore liquid was detected in LF-2's suction lysimeter (VZ-2.1) during numerous monitoring events conducted from 1994 through June 2010, after which attempts to obtain samples from the lysimeter have failed. Total VOC concentrations detected during this period averaged about 74 µg/L, consisting primarily of alcohols & ethers (45 µg/L) and ketones (21.3 µg/L), and low to trace concentrations of other VOCs (7.6 µg/L). Previous (1997) WDRs required that the Discharger investigate the release and gas controls were ultimately installed at the module as the primary corrective action measure.

163. VOC-impacted pan lysimeter liquid was first detected in 1999 and subsequently confirmed at DM-2.2 (PL-2.2A) and DM-11 (PLs-11.1 & 11.2). In May 2001, the

Discharger submitted an *Engineering Feasibility Study* (EFS) for these modules in accordance with Title 27 CCR Section 20420(k)(6), based on the results of an Evaluation Monitoring Program (EMP) under previous WDRs Order No. 5-01-101. The EFS concluded that the VOC-impacted liquid detected in the pan lysimeters was likely contact surface/storm water that infiltrated the gravel capillary break layer from the interior sides of the modules or similar infiltrated surface water impacted by LFG[16].

164. Interim corrective action measures to address the releases at LF-2 and LF-3 have included covering exposed edges of the module during the rainy season, improved surface runoff controls, and pumping the pan lysimeter liquid back into the overlying LCRS sump. To eliminate the possibility of overcharging the LCRS sumps, the added pan lysimeter liquids were then immediately pumped from the LCRS sumps (by manually over-riding the liquid level controls) into the leachate tank farm storage.[17] Long term corrective action measures implemented at the units have included the installation of several additional LFG monitoring probes in the LF-3 area (GP-2 through GP-8), borrow pit pumping to maintain groundwater separation in LF-1 area, and, in 2009, a site wide LFG extraction system in accordance with a May 2005 CAP approved in August 2005 by Central Valley Water Board staff.[18]

    These WDRs require that any liquid detected in a leak detection sump or pan lysimeter be handled in accordance with response measures described in the LCRS Sump O&M Plan required to be submitted under WDR Facility Specification C.2.b, as approved. Additional corrective action measures may also be required in response to confirmation of a release. See Corrective Action Specifications D.1. through D.5.

165. Since the implementation of the above remedial measures, including LFG extraction in 2009, PLs-2.2A and 11.1 have been non-detect for VOCs, while VOCs have been intermittently detected in PL-11.2, generally at lower concentrations with less frequent detections. The concentrations of VOCs and other semiannual and 5-year constituents historically detected in pan lysimeter liquid recovered from LFs-2 and 3, including relevant time periods, are summarized in the following table:

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16 The Water Code Section 13301 Order required the Discharger to evaluate its runoff and drainage controls to ensure that there were an appropriate number of downspouts to drain storm water away from the units. The Discharger's evaluation stated that the current runoff and drainage controls were sufficient.

17. The volume of pan lysimeter liquids discharged into and pumped out of the LCRS sumps was recorded to confirm that the volumes are comparable. In addition, the liquid level in the pan lysimeter is checked after pumping and recorded to aid in identifying future discharges into the pan lysimeter.

18. See 31 May 2005 report *Amended Report of Waste Discharge Proposing Corrective Action for Disposal Modules 2.1, 2.2 and 11 (DM-2.1, 2.2 and DM-11), Norcal Waste Systems Hay Road Landfill Inc.*, prepared by Golder Associates, Inc.

LF-2 & LF-3 Historical Lysimeter Liquid Data				
	Average Constituent Concentration[1]			
Unit:	LF-2[1]	LF-3[1]		
Lysimeter:	VZ-2.1[2]	PL-11.1[3]	PL-11.2	PL-2.2A[3]
VOCs (ug/L)	1994-2010	1999-2008	2000-2015	2002-2006
Alcohols & Ethers	44.9	106.3	3.6	3.3
BTEX Compounds	1.1	3.1	3.5	0.5
Freon Compounds	0.8	1.2	0.5	---
Halogenated VOCs	3.9	---	---	---
Ketones	21.3	42.7	94.2	4.4
Other VOCs	1.8	19.9	5.9	0.6
Total VOCs:	73.8	184.6	109.7	11.1
General Minerals (mg/L)	1994-2010	1999-2015	2000-2015	1999-2006
Bicarbonate	1,272	704	1,012	1,138
Chloride	741	255	325	443
Nitrate	---	7	5	1
Sulfate	398	251	305	97
Total Dissolved Solids	2,962	1,606	1,951	1,854
Dissolved Metals (ug/L)[4]	1994-2010	1999-2015	2000-2015	1999-2005
Arsenic	---	5.7	10.4	7.5
Iron	---	---	3,580.0	760.0
Manganese	---	2,535.0	2,995.0	4,100.0
Semi-VOCs (ug/L)[4]	---	9.7	98.0	---
Herbicides (ug/L)[4]	---	---	592.5	---

1. Year or year ranges correspond to period during which constituent was continuously or intermittently detected,
2. Suction lysimeter
3. Pan lysimeter
4. 5-year constituents of concern.
5. Note that average concentrations may not include non-detections and many not be representative.

LF-4

166. VOC-impacted liquid has also been historically detected in pan lysimeters at several modules of LF-4, including DM-3, PLs-3.1 (since 2015) & 3.3 (since 2013); DM-4, PL-4.1 (since 2006); and DM-5, PLs-5.1A (since 2001), 5.1B (since 2004), and 5.2 (since 2014). In a follow-up investigation of the release at DM-5, the Discharger concluded that the pan lysimeter liquid was not likely leachate or leachate-impacted based on differences in constituent concentrations and water chemistry. The Discharger attributed the source of the liquid detected in the pan lysimeters to possible surface water infiltration[19] and implemented similar corrective action measures to those

19 The Water Code Section 13301 Order required the Discharger to evaluate its runoff and drainage controls to ensure that there were an appropriate number of downspouts to drain storm water away from the units. The Discharger's evaluation stated that the current runoff and drainage controls were sufficient.

implemented at LF-3 (e.g., remove liquid from pans, covering exposed edges of module liner, LFG extraction).[20] The Discharger has made similar findings based on investigations of the releases at the other LF-4 modules, although the investigation of PL-3.1 is still ongoing. The concentrations of VOCs and other semiannual and 5-year constituents historically detected in pan lysimeter liquid recovered from LF-4, including relevant time periods, are summarized in the following table:

LF-4
Historical Leak Detection Sump & Pan Lysimeter Liquid Data

	Average Constituent Concentration[1]					
Lysimeter:	PL-3.1[2]	PL-3.3[2]	PL-4.1[2]	PL-5.1A[3]	PL-5.1B[3]	PL-5.2[2]
VOCs (ug/L)	2015	2013 -2015	2006	2001-2015	2004-2011	2014
Alcohols & Ethers	1.4	95.2	2.3	3.1	8.6	---
BTEX Compounds	0.5	2.8	1.4	---	0.5	---
Freon Compounds	---	4.7	---	0.1	1.9	1.8
Halogenated VOCs	0.7	12.6	2.6	5.0	4.2	---
Ketones	---	50.3	26.5	5.9	11.2	---
Other VOCs	1.4	12.1	1.9	1.2	10.1	-
Total VOCs:	4.1	177.7	34.7	15.3	36.5	1.8
General Minerals (mg/L)	2015	2015	2006-2014	2001-2015	2004-2014	
Bicarbonate	870	940	560	619	715	---
Chloride	82	100	116	131	149	---
Nitrate	0	---	0	22	1	---
Sulfate	4	2	92	274	342	---
Total Dissolved Solids	1,000	1,000	915	1,324	1,507	---
Dissolved Metals (ug/L)[4]	2015	2013		2001-2006	2004-2010	
Arsenic	---	---	---	150.0	69.7	----
Chromium (total)	---	---	---	26.0	---	---
Iron	4,700	---	---	---	210.0	---
Lead	---	---	---	---	13.0	---
Manganese	7,100	---	---	555	2,750	---
Semi-VOCs (ug/L)[4]	---	5.9	---	---	80.8	---

1. Year or year ranges correspond to period during which constituent was continuously or intermittently detected,
2. Leak detection sump/device (welded pan lysimeter)
3. Pan lysimeter
4. 5-year constituents of concern.
5. Note that average concentrations may not include non-detections and many not be representative.

20. See July 2005 report *Investigation for Pan Lysimeters PL-2.2A, PL-5.1A, and PL-5.1B, Norcal Waste Systems Hay Road Landfill Inc.*, July 18, 2005.

The corrective action specifications of these WDRs specify actions that the Discharger must take in response to the detection/confirmation of liquids in a leak detection device or pan lysimeter.

Landfill Gas Controls

167. On 24 August 2005, Water Board staff issued a letter to the Discharger requesting that the Discharger submit design plans for installation of a landfill gas (LFG) extraction system to control LFG from LFs-2, 3 and 4 (DMs-2.1, 2.2, 11, and 5.1) at the facility. The letter was issued in response to evaluation monitoring reports confirming the presence of LFG in the unsaturated zone and LFG impacts to groundwater and/or pan lysimeter liquid at these units, The letter approved a work plan for a further corrective action investigation to design the system and specified a 15 September 2006 due date (ultimately extended to February 2008) for installation and startup of LFG extraction.

168. Water Board staff approved design plans for the proposed LFG extraction system submitted by the Discharger in a 2 November 2007 letter. The approved design included installation of nine LFG extraction wells, lateral and header piping, condensate sumps, a candlestick flare station, and other facilities. Carbon filtration canisters to remove VOCs from the gas stream were subsequently added to the design and constructed. The carbon filtration system was subsequently replaced with a gas-to-energy (GTE) plant, as described below.

169. The LFG extraction system started up in March 2009 and was subsequently expanded to address LFG issues at LF-1 and additional module development at LFs-3 & 4. At present, the LFG extraction system includes a total of 66 LFG extraction wells (11 at LF-1, four at LF-2, 19 at LF-3, and 30 at LF-4), five LFG condensate sumps, and associated collection piping. The LFG collection lines are also tied into the 3 leachate monitoring wells at DM-1A and 13 LCRS sump risers at the units. The system is drive by blower motors in a 1.5 megawatt onsite gas-to-energy (GTE) plant where extracted LFG is converted to electrical energy for offsite export. The GTE plant also includes a gas combustion engine, electrical generators, and an enclose flare. The flare is used for stand-by purposes and has its own 30 HP, 1,500 SCFM blower. The GTE plant's blower has a variable frequency drive set to operates at a maximum flow of about 580 SCFM. Additional LFG collection facilities will be installed at the site, as necessary, to meet landfill development and corrective action needs. See Attachment F: Landfill Gas Controls & Monitoring.

170. The current landfill gas extraction rate at the site is approximately 900 SCFM. Proportionately higher LFG extraction rates are anticipated as the landfill expands. Previous WDRs predated installation of the LFG system at the site and therefore did not require LFG extraction monitoring. Given that an LFG extraction system has since been installed at the site, the monitoring program in these WDRs requires that the Discharger conduct semiannual LFG extraction monitoring for parameters and constituents, including VOCs. The Discharger is also required to adjust or improve the LFG extraction system, as necessary, if monitoring data indicates that it is not

preventing gas migration from a unit/module.

ENFORCEMENT

171. Various directives (e.g., Notices of Violation, Executive Officer Orders) have been historically issued to the Discharger in response to the releases described above and other violations of existing or previous WDRs. Discharger responses to such directives have typically included implementing investigations and monitoring, repairs or improvements, corrective action, or responses to compliance schedules in revised WDRs.

172. On 9 October 2014, the Board issued Water Code Section 13301 Order R5-2014-0117 (amended on 19 February 2016) to the Discharger for various WDR violations and compliance issues, including composting operations, groundwater separation, precipitation and drainage controls, flood protection, and interim slope stability. Technical reports required under the 13301 Order included, but were not limited to, the following:

    a. Composting
        i. A Compost *Area Storm Water Modification Technical Report*;
        ii. *A Co*mpost Ponds Reconfiguration Technical Report; and
        iii. A Food Waste In-Vessel Composting Technical Report, and
        iv. A Compost *Leachate Dust Control Technical Report;* or (in lieu of ii, iii and iv)
        v. *A*n Amended *RWD* requesting revision of composting requirements in the WDRs
    b. Groundwater Separation
        i. Quarterly groundwater separation reports;
        ii. CQA reports, including as-built drawings showing the bottom elevation of all units;
        iii. A Groundwater Separation Delineation Workplan;
        iv. An Engineering Feasibility Study to address groundwater separation at DM-1 and DM-3.1;
        v. A Groundwater *Separation Implementation Report*
    c. Other Reports
        i. A *Runoff and Drainage Controls Technical Report*;
        ii. A *Temporary Fill Slope Stability Technical Report*;
        iii. A Flood Protection Technical Report; or, in lieu of iii, *A*n *Amended RWD* requesting revision of flood control requirements in the WDRs

    Discharger responses to the 13301 Order, including technical reports submitted under the 13301 Order, are described or referenced in the applicable Findings of this Order.

CLOSURE AND POSTCLOSURE MAINTENANCE

Landfill Units

173. The Title 27 prescriptive standard for MSW landfill final cover includes the following components, from top to bottom:

    a. Erosion Resistant Layer -- at least one foot of vegetative cover soil;

    b. Barrier Layer (compositely-lined landfills only) – Geomembrane equivalent to geomembrane in composite base liner.

    c. Low Hydraulic Conductivity (LHC) Layer -- Minimum one foot of compacted clay soil with a permeability less than or equal to the lesser of $1x10^{-6}$ cm/s or the permeability of underlying clay soil liner or natural geologic materials, as applicable;

    d. Foundation Layer - at least two feet of materials (soil and/or waste) with appropriate engineering properties to support the overlying cover.

    In lieu of the prescriptive cover design, the Discharger may construct an EAD provided that it meets the requisite demonstration under Title 27, section 20080(a) and is authorized under WDRs adopted by the Central Valley Water Board.

174. On 29 June 2015, the Discharger submitted a Preliminary Closure and Postclosure Maintenance Plan (PC/PCMP) for the landfill as part of the JTD. The PC/PCMP contained a conceptual plan for closure of the existing landfill disposal modules (i.e., DMs-1 through 11) as a single unit. The proposed closure activities would include grading and final cover installation; modifications and improvements to the landfill's monitoring systems and LFG control facilities; and various site improvements associated with landfill closure (e.g., drainage controls, demolition/decommissioning, survey monuments, site security). The PC/PCMP proposed an engineered alternative final cover design as follows:

Component	Top Deck	Exterior Slopes
Erosion Resistant Layer	1 foot vegetative cover soil[1]	
Barrier Layer	Geotextile Cushion[2]	Geocomposite[3]
	60-mil HDPE Geomembrane[4]	
Low Hydraulic Conductivity (LHC) Layer	GCL[5]	---
Foundation Layer	1 foot soil or appropriate materials[1]	

1. All cover soils/materials prepared/compacted in accordance with applicable project specifications.
2. Geotextile cushion layer consists of 10 oz/yd2 non-woven fabric.
3. Geocomposite consists of geonet bonded to geotextile filter layer.
4. Geomembrane textured on both sides.
5. $K < 5x10^{-9}$ cm/sec per project specifications.

175. The PC/PCMP included a preliminary demonstration under Title 27 that construction of a prescriptive final cover on the landfill would be infeasible due a significant shortage of

cover soil at the site, which would need to be imported for project construction. Construction of a prescriptive clay component would therefore result in significantly higher project costs than the use of GCL. The demonstration also noted that the use GCL eliminated the need to compact the cover and reduced the strain on the foundation layer. As a result, only one foot of foundation soil was needed for the proposed EAD.

176. The PC/PCMP also included a hydraulic performance equivalency demonstration using USEPA's Hydrologic Evaluation of Landfill Performance (HELP) model (v. 3.07). The analysis assumed the use of drought-resistant annual grasses (i.e., grasses that would not require irrigation) as vegetative cover; a geomembrane installation defect frequency of 2 holes per acre (considered in the range of good industry practice) and other assumptions. The results of the analysis indicated a hydraulic infiltration rate through the final cover on the top deck of 0.14 gallons per acre per day (gpad) for the proposed EAD compared to 0.35 gpad for the prescriptive standard design. Calculated infiltration rates for the final cover on the side slopes were the same for both designs (0.01 gpad).

177. The proposed final cover would be graded at 4H:1V with the possible option of increasing the slope to 3.5H:1V on the lower 50 feet of the unit. Side slope benches (25 feet wide each) would be cut every 50 feet of vertical height per Title 27 requirements. The top deck of the unit would be graded at a 5% minimum slope to promote drainage and account for cover settlement, which could differentially reduce the drainage grade. The maximum elevation of the final cover would be 215 feet MSL.

178. The PC/PCMP also included slope stability analysis of the proposed final cover, including the potential for a failure surface to develop within the cover, landfill refuse, and/or underlying liner or foundation/subsurface soil. The analysis assumed an MCE of 6.9 for all modules consistent with previous analysis and shear strengths measured for the modules constructed to date. The results of the stability analysis indicated minimum static safety factors greater than 1.5 for all three failure modes under static conditions and permanent displacements of less than 1, 3, and 4 inches, respectively, for the foundation, refuse, and final cover failure modes.

179. LF-1 is nearing final grades for closure and will be required to stop accepting waste in 2021. These WDRs require the Discharger to submit a Final Closure and Postclosure Maintenance Plan (FC/PCMP) for LF-1, including plans and a schedule for closure of DM-1A and DM-1B. The FC/PCMP is due by 15 October 2019 and closure of LF-1 is required to be completed by 15 October 2021. See Closure and Postclosure Specifications F.1 & F.2.

180. For LF-1 cover slopes overlapped by the LF-3 sideslope liner as LF-3 is developed, these WDRs allow the Discharger to install a single containment system that functions as both LF-1 final cover and LF-3 side slope liner, provided that Title 27 performance standards are met.

181. In 1997 and 1999 the sideslope interface liner of LF-3 (DM-11.1) over LF-3 (DM-2.1B) and LF-2 (DM-2.1A) was constructed and approved for waste placement (see correspondence from CVRWQCB dated 19 December 1997, 7 June 1999 and 27 July 1999). In 2000 the sideslope interface liner of LF-3 (DM-2.2) over LF-3 (DM2.1B) and LF-2 (DM-2.1A) was constructed and approved for waste placement (see correspondence for CVRWQCB and dated 20 March 2001). For LF-2 cover slopes overlapped by LF-3 sideslope liner as LF-3 is developed, these WDRs allow the Discharger to install a single containment system that functions as both LF-2 final cover and LF-3 side slope liner, provided that Title 27 performance standards are met.

182. A Partial FC/PCMP is required to be submitted any time a portion of a unit has been sufficiently developed to constitute a closable phase.

183. Proposed landfill postclosure maintenance and monitoring activities included final cover maintenance; leachate management; maintenance and monitoring of LFG facilities; groundwater, vadose zone, and surface water monitoring; maintenance of precipitation and drainage controls; and other postclosure related activities. The PC/PCMP included plans to develop the areas currently occupied by LTU, WP-9.1, the Composting Area, and other undeveloped area on the eastern and western sides of the site.

184. Once every five years during the post-closure maintenance period, aerial photographic maps of the closed landfill area will be made to identify and evaluate landfill settlement. Iso-settlement maps will be prepared to determine the amount of differential settlement occurring over the previous five years. Pursuant to Title 27, section 21090(e)(2), this Order requires iso-settlement maps to be prepared and submitted every five years.

185. The completed final cover will be periodically tested for damage or defects by monitoring surface emissions pursuant to California Code of Regulations, Title 17, section 95471(c) and Title 27, section 21090(a)(4)(A). Defects will be repaired and tested for adequacy based on the closure CQA Plan.

WP-9.1 & LTU

186. Previous WDRs required that WP-9.1 be clean-closed at the end of its operating life prior to constructing DM-9.1 in that area. The LTU was also required to be clean closed at the end of its operating life. In 2011, the Discharger clean closed the portion of the LTU between WP-9.1 and LF-4, DM-5 (approximately 12 acres) in order to make room for construction of DM-6. The remaining 3.2-acre portion of the LTU immediately south of WP-9.1B continued to be operated.

187. In 2015, the Discharger ceased sludge discharges to the east half of WP-9.1 (WP-9.1B) in preparation to clean close the area. A berm separating the west and east halves of the unit was also constructed to provide containment for wastes discharged to the remainder of WP-9.1 (WP-9.1A). The decommissioning of WP-9.1B reduced sludge storage capacity of WP-9.1 to about 18,300 cubic yards.

188. On 10 June 2015, the Discharger voluntarily submitted a work plan for clean closure of WP-9.1B and the remaining portion of the LTU (*Workplan for Partial Clean-Closure of the Eastern Portion of Waste Pile (WP-9.1) and the Adjacent Land Treatment Unit*), stating that the Discharger planned to permanently discontinue sludge storage and drying operations in these areas. A 6 November 2015 revised version of the work plan was subsequently submitted in response to Water Board staff comments on the original plan. The revised clean closure work plan included plans for soil boring and collection of soil samples at intervals of approximately 100 feet to identify impacts; background sampling; and removal of any waste materials or impacted soil underlying the units.

189. In an 11 January 2016 letter, Water Board staff conceptually approved the above revised clean closure work plan on the condition that it address various concerns, including, but not limited to, the following:

    a. The need for advancement of the soil borings to underlying groundwater;
    b. Grab groundwater sampling (i.e., at the corners and center of each unit);
    c. Additional sampling along the southern perimeter of WP-9.1 and western, eastern, and northern perimeters of the LTU;
    d. Angle boring and sampling beneath the soil berm separating WP-9.1A & B;
    e. A decision tree/protocol for determining the lateral and vertical extent of impacted soil and what soil needs to be removed; and
    f. A revised project schedule.

    These WDRs require that the Discharger complete clean closure of WP-9.1B and the LTU in accordance with the above revised clean closure work plan, as conditionally approved by Water Board staff. Prior to beginning construction of the DM-9 geosynthetics, the Discharger shall remove impacted vadose zone materials and show one year of decreasing groundwater trends in the footprint of the proposed disposal module. The Discharger is also required to continue corrective action of Nitrate-N groundwater impacts in these areas.

FINANCIAL ASSURANCES

190. The Discharger is required to demonstrate financial assurances for closure and postclosure maintenance to the California Department of Resources Recycling and Recovery (CalRecycle) pursuant to Title 27, sections 22205 and 22210 (i.e., the landfill operated on or after January 1, 1988).

191. Title 27, sections 21820 and 22206 require a cost estimate for landfill closure. The cost estimate must be equal to the cost of closing the landfill at the point in its active life when the extent and manner of operation would make closure the most expensive. When closing units in phases, the estimate may account for closing only the maximum area or unit of a landfill open at any time. The 15 June 2015 PC/PCMP provided a lump sum cost estimate for closure of the entire landfill (i.e., the largest future area needing closure at any one time absent phased closure) consistent with Title 27, section 21820(a)(1)(b). The total estimated cost of landfill closure, including 20%

contingency, was $26,724,439 in 2015 dollars. These WDRs require that the Discharger provide revised closure cost estimates in the appropriate closure plans required under this order for each landfill unit at the site. See Financial Assurance Specification G.1.

192. Title 27, sections 21840 and 22211 require a cost estimate for landfill post-closure maintenance. The 15 June 2015 PC/PCMP included a cost estimate for landfill post-closure maintenance/monitoring. The total estimated annual cost for post-closure maintenance/monitoring provided in the PC/PCMP, including 20% contingency, was $252,496 in 2015 dollars. The corresponding 30-year cost was $7,523,752 in 2015 dollars. These WDRs require that the Discharger provide revised post-closure cost estimates in the appropriate closure plans required under this order for each landfill unit at the site. See Financial Assurance Specification G.1.

193. Title 27 requires that the Discharger provide and maintain financial assurances to CalRecycle in at least the amount of the closure and postclosure cost estimates (i.e., in the currently approved PC/PCMP submitted under previous WDRs or this Order), as annually adjusted for inflation. The Discharger has established a Trust Fund approved by CalRecycle for closure and postclosure financial assurances per Title 27, section 22240. As of 2015, the balance of this trust fund was $9,131,424 in 2015 dollars.

194. Title 27, section 22221 requires a cost estimate for corrective action of all known or reasonably foreseeable releases. On 14 July 2015, the Discharger submitted a cost estimate of $1,546,311 in 2015 dollars for corrective action of all known or reasonably foreseeable releases at the landfill. (See 14 July 2015 report *Updated Corrective Action Cost Estimate for a Release to Water, Recology Hay Road Landfill*, prepared by EBA Engineering). The cost estimate was based on the costs of investigating and remediating a hypothetical release of VOCs to groundwater from a disposal module on the eastern half of the site (i.e., LF-4) where there is no groundwater dewatering. The VOC plume was assumed to be 1,600 feet long, 600 feet wide, and 10 feet deep with an average total VOC concentration of 50 µg/L. The treatment system would include liquid-phase granular activated carbon and an advanced oxidation or HiPOx reactor unit to treat alcohols and ethers (i.e., MTBE, tert- butyl alcohol) detected in landfill leachate. Treated groundwater would be discharged to a series of aboveground storage tanks (ASTs) for subsequent use for dust control, spray irrigation and/or composting operations. The proposed cost estimate was approved by Water Board staff on11 January 2015.

195. The Discharger has established a Trust Fund approved by CalRecycle for corrective action financial assurances per Title 27, section 22240. As of 2015, the balance of this trust fund was $868,158 in 2015 dollars. This Order requires that the Discharger maintain financial assurance with the CalRecycle in at least the amount of the approved corrective action cost estimate, as adjusted annually for inflation. See Finding G.3.

CEQA AND OTHER CONSIDERATIONS

196. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code section 21000, et seq., and the CEQA guidelines, in accordance with Title 14, section 15301.

197. This Order implements:
   a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*;
   b. The prescriptive standards and performance goals of California Code of Regulations, title 27, section 20005 et seq., effective 18 July 1997, and subsequent revisions;
   c. State Water Board Resolution 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993, and revised on 21 July 2005.
   d. The applicable provisions of Title 40 C.F.R. section 258 “Subtitle D” federal regulations as required by State Water Board Resolution 93-62.

198. The *Statement of Policy With Respect to Maintaining High Quality of Waters in California*, SWRCB Order WQ 68-16 (hereinafter "Anti-Degradation Policy") was adopted by the State Water Board in October 1968. Anti-Degradation Policy limits the Board’s discretion to authorize the degradation of "high-quality waters." This policy has been incorporated into the Board’s Basin Plans. "High-quality waters" are defined as those waters where water quality is more than sufficient to support beneficial uses designated in the Board’s Basin Plan. Whether or not a water is a high-quality water is established on a constituent-by-constituent basis, which means that an aquifer can be considered a high-quality water with respect to one constituent, but not for others. (SWRCB Order No. WQ 91-10.)

199. Anti-Degradation Policy applies when an activity discharges to high quality waters and will result in some degradation of such high quality waters. When it applies, the Policy requires that WDRs reflect best practicable treatment or control (BPTC) of wastes and that any degradation of high quality waters (a) will be consistent with the maximum benefit to the people of the State, and (b) will not result in an exceedance of water quality objectives. If the activity will not result in the degradation of high quality waters, Anti-Degradation Policy does not apply, and the Discharger need only demonstrate that it will use "best efforts" to control the discharge of waste.

200. Anti-Degradation Policy does not apply to the discharge of waste to Recology Hay Road Landfill. The requirements of this Order are designed to ensure that any such wastes remain contained at the facility and will not reach waters of the State. The requirements of this Order reflect the Discharger’s best efforts to control such wastes.

201. Facilities under WDRs are classified for the purposes of determining the annual permit fee and WDR update cycle. These classifications are based on threat to water quality and complexity associated with the discharge. The Recology Hay Road Landfill was

classified as a "1A" discharge under the previous WDR Order R5-2008-0188. These revised WDRs maintain the "1A" designation. The following fee criteria were used:

Threat to Water Quality:

Category "1" – "Those discharges of waste that could cause the long-term loss of a designated beneficial use of the receiving water. Examples of long-term loss of a beneficial use include the loss of drinking water supply, the closure of an area used for water contact recreation, or the posting of an area used for spawning or growth of aquatic resources, including shellfish and migratory fish."

Complexity:

Category "A" – "Any discharge of toxic wastes; any small volume discharge containing toxic waste; any facility having numerous discharge points and groundwater monitoring; or any Class 1 waste management unit."

The WDR review cycle for 1A discharges is 5 years from the date of adoption of the WDRs, or, if granted a continuance by the Executive Officer, from the continuance date. The WDR fee schedule may be found on the State Water Resource Control Board website at: http://www.waterboards.ca.gov/.

202. Water Code Section 13267(b) provides that: "In conducting an investigation specified in subdivision (a), the Central Valley Water Board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposed to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who had discharged, discharges, or is suspected of discharging, or who proposed to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Central Valley Water Board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports."

203. The technical reports required by this Order and the attached "Monitoring and Reporting Program R5-2016-XXXX" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

204. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.

205. The Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

206. The Board, in a public meeting, heard and considered all comments pertaining to the

discharge.

207. Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of the Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the State Water Resource Control Board website at: http://www.waterboards.ca.gov/. or will be provided upon request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Order R5-2008-0188 is rescinded, and that Recology Hay Road and Recology Hay Road, DBA Jepson Prairie Organics, their agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted there under, shall comply with the following:

A. PROHIBITIONS

Landfill Units

1. The discharge of “hazardous waste”, as defined under Title 27, section 20164, to any classified unit at the site, is generally prohibited. The following exceptions apply to specific units;

    a. Hazardous asbestos-containing wastes (ACW) may be discharged to LF-1 (DM-1A and DM-1B) to bring that portion of the unit up to final grade for closure and to any LF-3 or LF-4 module.

    b. Wastes authorized under Title 22 to be managed as nonhazardous at a Class II landfill, and/or wastes granted a variance or reclassified under Title 22 regulations may be discharged to, or beneficially reused in, LF-3 and/or LF-4 (e.g., C-Soil, treated wood waste). The discharge or reuse of such wastes at Class III units (i.e., LF-1 and LF-2) is prohibited except that the existing stockpile of LC-soil at module DM-2.1 may remain in place until used as foundation cover at DM 2.1 or removed and reused at LF-3 or LF-4.

    c. Wastes that have been treated or transformed in accordance with applicable regulations so as to be no longer hazardous. (e.g., medical wastes) may be discharged to LF-3 and/or LF-4.

2. The discharge of “designated waste”, as defined under Title 27, section 20164, to any Class III landfill units (LF-1 and LF-2) at the site is prohibited, with the exception of LC-Soil previously approved by the Central Valley Water Board for use as foundation soil on LF-2.

3. The discharge of new or additional waste to LF-1 is prohibited, except for the following:

   a. The discharge of hazardous ACW to LF-1 noted in Prohibition A.1.a.

   b. The discharge of inert wastes (see Title 27, section 20230), nonhazardous C&D, or relocation of existing wastes within LF-1, as necessary, to establish final grades for closure consistent with an approved FC/PCMPs for those units submitted under this Order.

   c. The stockpiling or beneficial reuse of inert materials in final cover construction or repair (e.g., foundation layer, side slope buttresses, berms) consistent with Discharge Specification B.7;

   d. The beneficial reuse of inert liquids for final cover construction or maintenance purposes consistent with Discharge Specification B.7.c; and

   e. The use of compost or dried sewage sludge as a soil amendment in final cover to promote vegetative growth, if applied at agronomic rates and there is no threat to water quality from storm water runoff.

   All discharges to LF-1 above shall be terminated by **15 October 2021**. See Closure and Postclosure Specifications F.1.

4. The stockpiling of wastes or materials on landfill modules is generally prohibited, with the following exceptions

   a. Inert wastes discharged to units for closure or postclosure maintenance purposes, as identified in Prohibition A.3 above;

   b. The maintenance of temporary soil, C-Soil, or soil-waste admix operations stockpiles on Class II modules for landfill closure or construction purposes (e.g., operations layer, foundation layer for final cover, perimeter berms);

   c. The stockpiling of approved materials on Class II units for interim cover/ADC operations (e.g., see Discharge Specification B.9);

   d. Seasonal stockpiles of de-watered sludge on Class II modules for drying (e.g., dry season) or storage (e.g., wet season) purposes.

   e. LC-soil re-classified as “nonhazardous” by the Department of Toxic Substances Control and as approved by Central Valley Water Board in 1993 and 1994 may be stockpiled on LF-2 and LF-3;

   f. LF-3 stockpiles may be placed on top of the LF-3 interface liner where the location is vertically above LF-1 or LF-2.

   All operations stockpiles on landfill modules shall be conducted consistent with the approved plan(s) applicable to those operations.

5. The discharge or co-disposal of bulk, non-containerized liquid wastes (including semi-solid wastes containing free liquids) can be accepted to LF-3 and LF-4, which

are underlain by a Title 27 composite base liner, except as described in Discharge Specification B.5. The use of liquid from Pond B for dust control is allowed: (a) on landfill units underlain by a Title 27 composite liner system, (b) only between 15 April and 15 October, and (c) only after Water Code Section 13301 Order R5-2014-0117-01 has been rescinded or revised to allow the use of Pond B liquid as dust control.

6. The following discharges of leachate and/or LFG condensate are prohibited:
   a. The return of leachate and/or LFG condensate to an MSW landfill unit that does not have a composite liner system and LCRS (i.e., LF-1).
   b. The discharge of leachate and/or LFG condensate from one MSW landfill unit to another, including from LF-1 to LFs-2, 3 or 4; from LF-2 to LFs-1, 3 or 4; from LF-3 to LFs-1, 2 or 4; and/or from LF-4 to LFs-1, 2 or 3. See Discharge Specification B.5.
   c. The return or discharge of leachate and/or LFG condensate to closed units or closed portions of active units.
   d. The return of leachate and/or LFG condensate to LF-2.

   See 40 CFR 258.28(a)(2) and Title 27, sections 20705(f), 20090(e)(2), 20200(d), 20340(g), and 20190(a)(5).

7. Treated Wood Waste (TWW) may only be discharged to LF-3 and LF-4, and shall not be discharged to landfill modules that have a confirmed leachate leak that contains TWW constituents. Upon confirmation of a leachate leak or release from the landfill to the unsaturated zone and/or groundwater, or fluid in an unsaturated zone or a leak detection device containing one or more TWW constituents, all TWW discharges to that module shall be ceased until such time as corrective action measures result in cessation of the leak/release.

8. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Landfill SPRRs.

Class II Waste Pile (WP 9.1A) & LTU

9. A Class II waste pile shall not be used for disposal of wastes.

10. Wastes containing free liquids, as determined by the paint filter test, shall not be discharged to a Class II waste pile.

11. The discharge of new or additional wastes, including, but not limited to, de-watered WWTP sludge, to the LTU is prohibited. Existing wastes and impacted soil in the LTU shall be removed and properly disposed of in accordance with the revised clean closure work plan for that unit, as approved.

12. No facility operations or construction stockpiles shall be maintained in the LTU area

prior to clean closure, except as necessary for conducting clean closure activities.

13. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Industrial SPRRs.

Composting Facility

14. The discharge, processing, or storage of any of the following wastes at the composting facility is prohibited:
    a. Hazardous or designated wastes, as classified under Title 27, section 20164;
    b. TWW or wood containing lead-based paint or wood preservatives;
    c. Ash from wood described in A.14.b above;
    d. Free liquids other than compost leachate, runoff, and/or liquids in authorized feedstock;
    e. Medical wastes as defined in the Health and Safety Code section 117690;
    f. Radioactive wastes;
    g. Septage, sewage sludge; and
    h. Water treatment plant and/or industrial sludge.

15. The discharge of compost materials, including feedstock, additives, amendments, and/or finished product outside of the 22-acre compost pad is prohibited.

16. The discharge of compost facility leachate within MSW landfill units is prohibited except for use as dust control on Class II landfill units per Discharge Specification B.27, and only after Water Code Section 13301 Order R5-2014-0117-01 is rescinded or revised to allow the use of Pond B liquid as dust control. See Prohibition A.5.

17. The discharge of compost facility leachate to surface water, the unsaturated zone, and/or groundwater is prohibited.

18. The discharge of liquid from Pond A or Pond B to any surface drain or sedimentation basin (including the adjacent pond formerly referred to as the “green waste pond”) is specifically prohibited.

19. Except for runoff captured in the facility’s leachate collection system, the commingling of compost facility leachate with surface water or storm water is prohibited. The commingling of compost facility leachate or runoff with pumped groundwater is also prohibited.

20. Use of WWTP sludge, or anaerobic digestate derived from WWTP sludge, in composting operations is prohibited.

21. Evapo-concentration of constituents in any compost facility pond that results in

hazardous constituent concentration levels, as defined in California Code of Regulations, Title 22, section 66261.3 is prohibited.

General

22. The cessation of any corrective action measure (e.g. landfill gas extraction, groundwater extraction) is prohibited without approval from Board staff. If routine maintenance or breakdown results in cessation of corrective action for greater than 24 hours, the Discharger shall notify Board staff.

B. DISCHARGE SPECIFICATIONS

Landfill Units

1. The Discharger shall only discharge the wastes listed in the table below.

WASTE ACCEPTANCE BY LANDFILL UNITS				
Title 27 Waste Type	**LF-1**	**LF-2**	**LF-3[4] and LF-4**	**Waste Pile 9.1A**
MSW	No	Yes	Yes	No
Inert C&D (e.g., concrete, cured asphalt, brick)	Yes	Yes	Yes	No
Nonhazardous C&D, commercial, & industrial	Yes	Yes	Yes	No
Designated C&D, commercial, & industrial	No	No	Yes	No
Contaminated Soil (C-Soil)	No	Limited[1]	Yes	No
Leachate and LFG Condensate	No	No	Recirculation[2]	No
Asbestos containing wastes	Yes	No	Yes	No
Treated Wood Waste	No	No	Yes	No
Semi-solids and industrial sludges	No	No	Yes	De-watered WWTP sludge only
Dredge debris	No	No	Yes	No
Special Wastes[3]	No	No	Yes	No

1. LC-soil re-classified as "nonhazardous" by the Department of Toxic Substances Control and as approved by Central Valley Water Board in 1993 and 1994 may be used as foundation cover soil.
2. Leachate and landfill gas condensate recirculation may occur in compositely lined modules following written approval by the Central Valley Water Board staff.
3. Special wastes as defined by Title 27 (e.g. triple-rinse pesticide containers, tires, large dead animals, medical wastes. Incinerator ash, and agricultural wastes)
4. LF-3 wastes may be placed on top of the LF-3 interface liner where the disposal location is vertically above LF-1 or LF-2

2. The discharge of "designated waste", as defined under Title 27, section 20164, shall be limited to Class II landfill units (i.e., LF-3 and LF-4).

3. The discharge of Title 22 special wastes, including, but not limited to C-Soil, shall be limited to Class II landfill units (i.e., LF-3 and LF-4).

4. The discharge of Title 22 hazardous wastes granted a variance; reclassified; or otherwise authorized to be disposed of at a Title 27-regulated landfill (e.g., C-Soil,

TWW) shall be limited to Class II landfill units equipped with a composite liner system and LCRS (i.e., LF-3 and LF-4) including on top of the LF-3 interface liner where the disposal location is vertically above LF-1 or LF-2. An exception is made for the LC-soil currently stockpiled on LF-2; that stockpile may remain but no additional LC-soil may be added.

5. The discharge of liquids to the landfill shall be limited to the following:

   a. Landfill leachate and/or LFG condensate returned to, or used for dust control on, the active MSW landfill unit from it was generated, provided such MSW landfill unit was constructed with a composite liner system and LCRS.

   b. The beneficial reuse of inert liquids for construction or maintenance purposes (e.g., dust control).

   c. Small containers of household liquids consistent with 40 CFR 258.28.

   d. The beneficial reuse of compost Pond B liquid for dust control on Class II landfill units constructed with a composite liner system and LCRS, and only after the Water Code Section 13301 Order R5-2014-0117-01 is rescinded or revised to allow the use of Pond B liquid as dust control.

   See Prohibitions A.6. Leachate and LFG condensate derived from LF-1 and LF-2 shall therefore be discharged at an authorized offsite facility or appropriately handled for such discharge (e.g., stored in tanks pending pick-up) in accordance with the Landfill Liquids Management Plan required under Facility Specification C.2.c.

6. The co-disposal of semi-solid wastes with solid wastes shall be limited to de-watered WWTP sludge and/or water treatment plant sludge (i.e., sludge from which all free liquids have been removed) discharged to LF-3 and/or LF-4.

7. The beneficial reuse of wastes in final cover construction, repair or maintenance at unlined or partially-lined MSW landfill units (i.e., LF-1 and LF-2) per Prohibition A.3.c shall be subject to the following restrictions:

   a. Inert wastes used in construction or repair of landfill final cover shall meet the project specifications contained in the approved construction documents described in, or submitted under, this Order and shall be applied consistent with the approved FC/PCMP for that unit submitted under this Order. See Construction Specifications E.9 and E.14.

   b. Only clean soil (i.e., soil not containing any waste) may be used in the construction/repair of the landfill cover; the erosion resistant and low hydraulic conductivity layers of prescriptive cover; cover berms and drains; side slope benches; landfill buttresses, and detention basin walls.

   c. Inert liquids (i.e., unimpacted groundwater, surface water, or storm water) may be applied to landfill cover for construction or maintenance purposes (e.g., dust control, limited irrigation of vegetative cover) consistent with Title 27, section

21090(a)(5)(B).

d. LC-soil re-classified as "nonhazardous" by the Department of Toxic Substances Control and as approved by Central Valley Water Board in 1994 may be used as foundation cover soil on LF-2.

8. Consistent with Prohibition A.6.b, LFG extracted from an MSW landfill unit (e.g., LF-3) shall not, prior to removing LFG condensate, be comingled with LFG extracted from another MSW landfill unit (e.g., LF-4), if such condensate is to be returned to the former MSW landfill unit (e.g., LF-3).

9. Consistent with Prohibition A.4.c, daily cover and ADC stockpile operations shall be limited to active MSW landfill units LFs-3 and 4, with the exception of the existing LC-soil stockpile on LF-2 consisting of LC-soil reclassified as "nonhazardous" by the Department of Toxic Substances Control and as approved by Central Valley Water Board in 1994. The use of ADC at these units shall be limited to the wastes/materials that have either been designated acceptable in Title 27 or wastes/material for which the Discharger has prepared a site-specific demonstration project and obtained approval consistent with Title 27, Section 20690. The following wastes/materials are currently approved for use as ADC based on information in the JTD and demonstrations under previous WDRs:

   a. Dried sewage sludge/biosolids;
   b. Dredge spoils, foundry sands, and/or contaminated sediment;
   c. Green waste material, compost-overs, ground wood, and/or C&D fines;
   d. Shredded tires;
   e. Moisture-conditioned ash, cement kiln dust, and/or mixtures of these wastes; and/or,
   f. Geosynthetic fabric, blankets, and/or foam products.

   The Discharger shall not use any new waste/material (i.e., item not included in the above list) as ADC, or any material other than clean soil as intermediate cover (except for biosolids as a cover soil amendment per Prohibition A.3.e), unless it has been designated acceptable in Title 27 or the Discharger has prepared a site-specific demonstration project demonstrating that the proposed alternative material meets the requirements in Title 27, section 20690 and the demonstration has been approved by the Local Enforcement Agency and Water Board staff.

10. The Discharger shall use approved ADC only in internal areas of the landfill that do not drain outside of the limits of the contiguous landfill units, unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality and the demonstration has been approved in writing. This demonstration may take removal of sediment or suspended solids into account for landfills where surface water drains to a sedimentation basin.

11. Storm water contacting non-inert wastes, including any stockpiled wastes on landfill modules or wastes used in interim cover/ADC operations, shall be handled and disposed of as leachate.

12. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order. If the Discharger is unable to remove and relocate the waste, the Discharger shall submit a report to the Central Valley Water Board explaining how the discharge occurred, why the waste cannot be removed, and any updates to the waste acceptance program necessary to prevent re-occurrence. If the waste is a hazardous waste, the Discharger shall immediately notify the Department of Toxic Substances Control.

13. The Discharger shall discharge treated wood wastes only to landfill modules equipped with a composite liner system and a leachate collection and removal system (i.e., Landfill Units LF-3 and LF-4 modules). If a verified release is detected from the waste management unit module where treated wood is disposed and the release has been confirmed to contain one or more TWW waste constituents, the disposal of treated wood shall be terminated at the module with the verified release until corrective action ceases the release.

14. The Discharger shall manage treated wood waste in accordance with California Health and Safety Code sections 25143.1.5 and 250150.7 and shall comply with all prohibitions listed in Title 22, section 67386.3.

15. Consistent with the engineered alternative design options specified in Construction Specification E.1.a, all future landfill expansion units/modules, with the exception of DM-7.2, shall be sited, designed, and constructed to ensure at least 5 feet of separation between the lowest elevation of wastes (i.e., leachate in primary LCRS sump) and the highest anticipated elevation of underlying groundwater in the absence of groundwater pumping. The approved EAD/S for DM-7.2 is 2.5 feet of separation between the lowest elevation of wastes (i.e., leachate in primary LCRS sump) and the highest anticipated elevation of underlying groundwater in the absence of groundwater pumping.

16. The Discharger shall comply with all Standard Discharge Specifications listed in Section D, and all Standard Storm Water Provisions listed in Section L, of the Landfill SPRRs.

Class II Waste Pile (WP 9.1A) & LTU

17. The discharge of wastes to a Class II waste pile shall be limited to designated, nonhazardous, and/or inert solid and/or semi-solid wastes.

18. Sewage sludge discharges to a Class II waste pile shall contain at least 20 percent solids (by weight) if primary sludge, or at least 15 percent solids if secondary sludge, or a mixture of primary and secondary sludges.

19. A minimum freeboard of 3 feet shall be maintained at a Class II waste pile between the highest elevation of wastes (including any ponded storm water) and the lowest elevation of the surrounding containment berm.

20. Storm water ponded on top of a Class II waste pile shall be removed within 24 hours and disposed of as leachate.

21. The LTU area shall be covered and graded during the wet season to minimize the potential for storm water runoff to come into contact with wastes or infiltrate into LTU wastes. All storm water runoff coming into contact with LTU wastes shall be handled and disposed of as leachate.

22. The Discharger shall comply with all Standard Discharge Specifications listed in Section D, and all Standard Storm Water Provisions listed in Section L, of the Industrial SPRRs.

Composting Facility

23. Materials used for compost feedstock shall be limited to green wastes, food wastes, manure, agricultural material, paper material, and vegetative and non-vegetative material as defined in the CGO.

24. The following additives shall comprise no more than 30 percent combined, on a total volume basis, of the total feedstocks for any given batch of compost:
    a. Fertilizing material applied at rates that will be consumed or fixed/immobilized during active composting;
    b. Liquid food material;
    c. Anaerobic digestate (solid); and/or
    d. Lime;
    e. Crab shells; and/or
    f. Any other additive(s) approved by the LEA and Water Board staff.

25. Compost facility ponds shall be:
    a. Designed, constructed, operated, and maintained to prevent conditions contributing to, causing, or threatening to cause contamination, pollution, or nuisance;
    b. Managed as described in the approved Compost Facility Leachate Collection/Pond System O&M Plan. Prior to submission and approval of this plan, the ponds shall be managed as described in Finding 149.
    c. Designed, constructed, operated and maintained to maintain a minimum freeboard of 0.9 feet in Pond A and 2.0 feet in Pond B. See Construction Specifications E.17.

d. Managed to maintain a dissolved oxygen concentration in the upper zone (one foot) of at least 1.0 milligrams per liter (mg/L) in each pond.

e. Managed to prevent conditions of pollution, nuisance or vectors (e.g., mosquitos).

26. All compost liquids handling facilities, including the leachate collection system, leachate sumps, pump systems, and leachate/wastewater ponds shall be operated and maintained in accordance with an operations and maintenance plan (Compost Facility Leachate Collection System/Pond O&M Plan) approved by Central Valley Water Board staff. The approved plan shall demonstrate that leachate, contact storm water, and other compost facility liquids are appropriately handled, stored, and disposed of to prevent an unauthorized discharge to surface water, groundwater, and/or the unsaturated zone at the site. The plan shall be submitted as specified in Provision I.12.c herein. Pending submission and approval of this finalized O&M plan, the Discharger shall implement the Interim Compost Pond O&M Plan described in Finding 149.

    Within four weeks of adoption of this Order, the Discharger shall notify Central Valley Water Board staff by letter as to the current action level of the compost ponds. Thereafter, the Discharger shall, within 24-hours, notify Central Valley Water Board staff by telephone or email of a change in the compost pond operations action level under these plans, and within 7-days, submit a written report describing the reasons for the change; (e.g., liquid level, freeboard); relevant facility conditions; and response measures implemented/triggered under the plans, including any further action level changes implemented since the initial telephone/email notification (i.e., additional 7-day written reports not required for latter).

27. The use of compost facility leachate for dust control shall be limited to the area of the compost facility pad drained by Ponds A and B and to Class II landfill units with a composite liner system and LCRS under the following conditions:
    a. It is applied only between May 15th and October 15th each year.
    b. It is applied only at rates necessary for dust control and shall not result in migration of leachate through landfilled waste.
    c. It is applied using a water truck that is dedicated only for dust control on the Class II Landfill Units. Water trucks applying compost facility leachate may not be used for dust control outside of the lined Class II Landfill Unit unless they are properly cleaned prior to such use.
    d. Compost leachate may only be applied to Class II landfill units after Water Code Section 13301 Order R5-2014-0117-01 is rescinded or revised to allow the use of Pond B liquid as dust control.

C. FACILITY SPECIFICATIONS

All Classified Units

1. All existing classified units at the site and DM-7.2, except for LF-1 and the LTU (i.e., LF-2, WP-9.1, and all LF-3 and LF-4 modules predating this Order) shall be operated consistent with the engineered alternative designs for groundwater separation (EAD/S) approved for these units/modules under previous WDRs, while all future classified units/modules at the site shall be operated consistent with Title 27 prescriptive standards (i.e., a minimum of 5 feet of separation between the lowest elevation of wastes and the highest anticipated elevation of underlying groundwater, including capillary fringe unless a capillary break is engineered into the liner system. A minimum of 5 feet of separation shall be maintained at LF-1 and the LTU. The required groundwater separation is listed for each landfill unit in the table below:

Unit	Modules	Required GW Separation (feet)
LF-1	DM-1A, 1B	5
LF-2	DM-2.1A, 2.1B	3
LF-3	DM-2.2A, B, 11.1, 11.2	2.5
	Future	5
LF-4	DMs-3.1, 3.2. 3.3, 4.1, 5.1A, 5.1B, 6, 7.1 and 7.2	2.5
	Future	5
WP-9.1	WP-9.1A, 9.1B	2.5
LTU-1	---	5

For the purposes of this specification, the following shall apply:

a. The lowest elevation of wastes in lined units shall be the lowest elevation of leachate in the unit's primary LCRS sump and in unlined units shall be the lowest elevation of wastes.

b. The highest anticipated elevation of underlying groundwater shall be the seasonally highest level that is expected to occur in the presence or absence of groundwater pumping, as applicable, including capillary fringe unless a capillary break is engineered into the liner system;

c. The groundwater elevation beneath each module shall be monitored using dedicated piezometers installed outside the liner system and adjacent to the primary LCRS sump at a location that allows for measurement of the groundwater table. These WDRs include a schedule for submission of a work plan and installation of these devices; and

d. The maximum groundwater elevation beneath each module of each classified unit at the site, including capillary fringe unless a capillary break is engineered into the liner system, shall not be allowed to exceed the value listed for that module in Table 1 attached to this Order, corresponding to the location of the lowest elevation of waste in the module under normal operations.

2. Per Title 27, section 21760(b), the Discharger shall develop and implement the following operations and maintenance (O&M) plans:

   a. A LFG Controls O&M plan for the LFG extraction system to ensure that LFG is being sufficiently controlled at each landfill unit to prevent LFG migration from the unit that could impact or threaten water quality, and that extracted LFG is being handled appropriately in accordance with the requirements of this Order and Title 27 regulations. The plan shall include, but not be limited to, a plan for the installation of additional LFG extraction wells and/or capacity, as necessary, if LFG is not currently adequately controlled and the separate handling of LFG collected from a unit to which condensate from that LFG is being returned per Discharge Specification B.8. See Provision I.11.c.

   b. An LCRS Sump O&M Plan to ensure that LCRS sumps are properly operated and that appropriate short term and long term response measures are timely implemented in response to foreseeable events such as a sump leak, the detection of fluid other than leachate in a sump, and/or a release from the unit under Title 27. The LCRS Sump O&M Plan shall include a description of the operation and maintenance procedures for all LCRS sumps at the site including landfill and waste pile modules. For each type of sump (e.g., primary, secondary/leak detection, welded pan lysimeter) at each unit, the plan shall describe the sump's design, purpose, operating parameters; monitoring facilities; action leak rate; short term and long term response plans in the event of a sump leak; notification of a release procedure; and the handling and disposition of any collected liquid (e.g., tanks, returned to landfill or primary LCRS). See Provision I.11.a.

   c. Landfill Liquids Management Plan to ensure that liquids (leachate and LFG condensate) returned to a landfill unit does not include liquids derived from another unit in violation of Subtitle D liquids restrictions. The plan shall include, but not be limited to, a plan for the separate handling, removal of liquids destined to be returned to a landfill unit. See Provision I.11.b.

3. By **30 September** of each year, the Discharger shall submit an **Annual Winterization Plan** describing measures planned to prepare the site for operations during the wet season consistent with the requirements of this Order. All classified units at the site (i.e., landfills, waste pile, LTU), including associated operations stockpiles, and the onsite composting facility (including ponds) shall be winterized in accordance with the Annual Winterization Plan. All repairs and winterization

measures implemented under the approved plan shall be completed by **31 October** of each year.

4. In the event of an interruption of greater than 24 hours of any corrective action measures, the Discharger shall notify the Board staff via e-mail, fax, or telephone within 24 hours of discovery of the interruption and shall provide weekly status updates until the corrective action measure are back on-line.

5. The Discharger shall comply with all Standard Facility Specifications listed in Section E, and all General Provisions listed in Section K, of both the Landfill SPRRs and Industrial SPRRs.

Composting Facility

6. Areas used for receiving, processing, or storing feedstocks, additives, amendments, or compost (active, curing, or final product) shall, at a minimum, be designed, constructed, and maintained to control and manage all run-on, runoff, and precipitation which falls onto or within the boundaries of these areas, from a 25-year, 24-hour peak storm event of 3.3 inches, as measured at DWR's CIMIS Weather Station Dixon 121.

7. All lined areas of the composting facility, including, but not limited to, active composting area; feedstock and finished compost storage areas; leachate collection system; and storage ponds shall be inspected, maintained, and repaired, as necessary to ensure adequate drainage and prevent infiltration.

8. The Discharger shall maintain all compost facility containment structures (e.g. berms, pads, detention ponds, tanks, run-on/run-off control structures, etc.) and monitoring systems in good working order.

9. The Discharger shall regularly inspect and maintain all containment structures and monitoring systems to prevent feedstocks, additives, amendments, compost (active, curing, or final product), or wastewater from creating, threatening to create, or contributing to conditions of contamination, pollution, or nuisance.

10. Composting operations shall be setback at least 100 feet from the nearest surface water body and/or the nearest water supply well.

11. All compost facility drainage ditches must be properly sloped to minimize ponding and kept free and clear of debris to allow for continuous flow of liquid. Ditches must be adequately protected from erosion, and must not cause, threaten to cause, or contribute to conditions resulting in contamination, pollution, or nuisance. Ditches must be inspected and cleaned out prior to the wet season every year.

D. CORRECTIVE ACTION SPECIFICATIONS

Landfill Units & Class II Waste Pile

1. For classified units at which the presence of LFG, LFG-impacted liquid, or LFG condensate-impacted liquid is (or has previously been) confirmed in an unsaturated zone or leak detection monitoring device (including a soil gas probe), the Discharger shall, in addition to any other necessary corrective action measures, make necessary adjustments/improvements to the LFG extraction system (e.g., increase extraction rate, upgrade extraction facilities) to remove LFG from the unsaturated zone at the unit. All such measures shall be implemented consistent with the approved LFG Controls O&M Plan submitted under Facility Specification C.2.a, and, in the case of a confirmed release, either the previously approved Corrective Action Plan for the unit submitted under the previous WDRs, or the work plan for implementation of measures in response to the non-leachate fluid.

2. For classified units in which the presence of contact-surface or storm water is (or has been previously) confirmed in an unsaturated zone or leak detection monitoring device, the Discharger shall, in addition to any other necessary corrective action measures, (a) investigate and make necessary repairs to the liner edge to prevent such future breach of the landfill's waste containment system, and (b) enhance the runoff and drainage controls for that portion of the landfill.

3. For the purpose of identifying the source of liquid detected in a leak detection monitoring device, the Discharger shall, for each classified unit so equipped, develop sample analysis profiles of all fluids that could potentially enter the leak detection monitoring device, including, for example, landfill leachate; impacted or unimpacted storm water, surface water, or groundwater; LFG; and LFG condensate. The sample analysis profiles shall be developed using both current and historical monitoring data. The sample analysis profiles shall include profiles of any liquid previously detected in a sump overlying the device in which the liquid to be identified has been detected. The results shall be provided in the updated Sample Collection and Analysis Plan submitted under Provision I.8, and annual updates thereto provided in the Annual Monitoring Report.

4. Liquids detected in a leak detection monitoring devices shall be investigated as follows:

    a. Fluid Identification

        If liquid is detected in a leak detection monitoring device, the Discharger shall follow the procedures set forth under MRP, section A.4.c.i. to confirm the identity of the liquid.

            1. If the liquid is confirmed to constitute measurably significant evidence of a leachate release, the Discharger shall implement the leachate release response described below, or another response as directed by Central Valley Water Board staff.

2. If the liquid is confirmed to constitute measurably significant evidence of a non-leachate fluid, the Discharger shall implement the non-leachate release response described below, or another response as directed by Central Valley Water Board staff.

b. Leachate Release Response

If the liquid is confirmed to constitute measurably significant evidence of a landfill leachate release, the discharger shall follow: (1) the procedures set forth in the "response to release" provisions contained in Title 27,Sections 20425 and 20430, Landfill SPRRs, Provision J.1, and Industrial SPRRs, Provision J.1, as applicable to the unit; and (2) those procedures set forth in the LCRS Sump O&M Plan relating to operating parameters and the handling, removal, and disposition of leachate, or (3) any of additional procedures directed by Central Valley Water Board Staff.

c. Non-Leachate Fluid Response

If the liquid is confirmed to constitute measurably significant evidence of a non-leachate fluid, the Discharger shall respond as follows or as otherwise directed by Central Valley Water Board staff:

i. Short Term Measures

Appropriate short term response measures may include, but not necessarily be limited to, those specified in MRP, section A.4.b (e.g., Central Valley Water Board notification, sampling, removal of fluid, monitoring of ongoing leak); feasible short-term measures under Corrective Action Specifications D.1 and D.4 if relevant (e.g., increase gas extraction rate, check liner edge for infiltration, enhance the runoff and drainage controls); and other appropriate short term measures. Documentation of short term measures shall be provided in the semiannual monitoring report(s) for the relevant time period submitted under the MRP. Any short term measures continuing six months after the date of first detection of fluid in the leak detection monitoring device shall be proposed as long term measures.

ii. Long Term Measures – Appropriate long term measures may include any short term measures continuing (or that need to be continued) more than six months from the date of discovery of the leak/fluid (e.g., removal of fluid,); investigation of the source of the leak/fluid; leak detection testing of liner; and repairs to the containment system. For leaks that exceed the sump's action leak rate (ALR), such repairs shall include all necessary measures to stop the leak or reduce the leakage rate to below the ALR,

iii. O&M Plans – All short term and long term measures shall be consistent with the LCRS Sump O&M Plan and other relevant O&M plans based on the nature or type of leak or identified fluid (e.g., Landfill Liquids Management Plan, LFG Controls O&M Plan) and/or the previously approved Corrective Action Plan for the unit submitted under the previous WDRs.

iv. Implementation Schedule – A work plan for the implementation of measures in response to the detection of non-leachate fluid in a leak detection monitoring device shall be submitted **within 30 days** of approval of the liquid identification profile report. If necessary, construction reports proposing or documenting repairs to the landfill's containment system to address the leak (or other cause of the detected fluid) shall be prepared and submitted consistent with Construction Specification E.9 and the Standard Construction Specifications listed in Section F of the Landfill SPRRs, as applicable. All response measures necessary to fix and prevent reoccurrence of the leak (or other cause of the detected fluid) shall be completed **within 18 months** of the date it was originally detected, or sooner if directed by Board staff.

5. For all units/modules in a corrective action program to address a release from the unit/module, the Discharger shall implement all corrective measures necessary to remediate the release and prevent a continued or subsequent release from the Unit, including, but not necessarily limited to, repairs, cleanup, and source control. Additional measures shall be implemented, as appropriate, if monitoring data indicates that cleanup is not being achieved in a reasonable timeframe and/or if waste constituent concentrations are increasing. To demonstrate cleanup of all water-bearing media affected by the release, the Discharger shall complete the applicable proof period under Title 27, section 20430(g) described in Monitoring Specification H.7 for each such media.

Class II Waste Pile & LTU

6. The Discharger shall complete clean closure of WP-9.1B and the LTU in accordance with the revised clean closure work plan, as documented in a certification report approved by Water Board staff. Prior to beginning construction of the DM-9.1 geosynthetics, the Discharger shall remove impacted vadose zone materials and show one year of decreasing groundwater trends in the footprint of the proposed disposal module.

7. By **15 October 2016**, the Discharger shall install a sidegradient detection monitoring well on the northern perimeter of the landfill boundary adjacent to WP-9.1 (i.e., WP-9.1A). See Provisions I.9.b and I.9.c and Attachment D: Groundwater Monitoring.

8. The Discharger shall comply with all Response to a Release specifications listed in Section J of the Industrial SPRRs.

E. CONSTRUCTION SPECIFICATIONS

Liner Systems

1. Future LF-3 and LF-4 modules shall, at a minimum, be constructed in accordance

with one of the following EAD/L options, from top to bottom:[21]

a. Base Liner

Component	Option 1	Option 2
Operations Layer	≥ 12 inches soil[1]	
Filter Fabric	Geotextile[2]	
LCRS	6 inches gravel[1,3]	
Cushion Layer	Geotextile Cushion[4]	
Primary Liner	60-mil HDPE Geomembrane[5]	
	GCL and a minimum 30-mil geomembrane backing[6,8,9]	24-inch CCL[1]
	12-inch CCL[1]	
Foundation Layer	≥ 6-inches soil[1, 11]	
Secondary LCRS	Geocomposite[7]	
Secondary Liner	60-mil HDPE Geomembrane[5]	
	12-inch CCL[1]	–––
Filter Fabric	Geotextile[2]	Geotextile Cushion[4]
Capillary Break[10, 11]	6-inches gravel[1,3] or geocomposite	
Subgrade	Re-compacted native soil or compacted soil fill[1]	

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. Geotextile consists of non-woven fabric per project specifications.
3. K > 1 cm/sec per project specifications.
4. Cushion layer used only if the LCRS gravel is crushed, angular gravel, or greater than ½-inch in diameter. Cushion layer not required above the capillary break if a geocomposite or the secondary geomembrane is used as the capillary break. Cushion layer consists of non-woven fabric per project specifications.
5. Single or double-side textured (textured side down).
6. K < $5x10^{9}$ cm/sec per project specification.
7. Geocomposite consists of geonet bonded to geotextile filter layer on both sides.
8. GCL shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface, long-term creep, shear, and bearing capacity.
9. 30-mil geomembrane backing placed below the GCL and maybe part of the GCL or provided separate from the GCL.
10. Capillary break only required in the portions of the landfill where it necessary to provide 5 feet of separation between groundwater, including capillary rise, and the bottom of the liner.
11. Foundation layer thickness may be increased to 3 feet as a means to establish the required separation between groundwater and the bottom of the primary liner. In this case, the secondary geomembrane also acts as a capillary break.

21. Incorporates EAD approved under previous WDRs and Title 27 containment system requirements for side slope extensions overlapping an existing MSW landfill (i.e. LF-1) or Class III landfill (i.e. LF-2).

b. Sideslope Liner

	Interface Areas[1]		Perimeter Levee
	LF-3/LF-1	LF-3/LF-2	
Operations Layer	18 inches soil[2]		
LCRS	Geocomposite[4]		
Base Liner	60-mil HDPE Geomembrane[5]		
	GCL and a minimum 30-mil HDPE geomembrane backing[6]		
Secondary LCRS[7]	Geonet (optional)		
Secondary Liner[7]	60-mil HDPE Geomembrane (optional)		
Capillary Break	Geocomposite[4]		
Subgrade	LF-1 cover soil[1]	LF-2 cover soil[2]	Berm soil[2]

1. Refers to areas where LF-3 sideslope liner overlaps LF-1 and LF-2 sideslope cover.
2. Liner component soils and gravels prepared/compacted in accordance with project specifications.
3. K > 1 cm/sec per project specifications.
4. Geocomposite consists of geonet bonded to geotextile filter layer on both sides.
5. Single side textured geomembrane used with textured side down.
6. $K < 5x10^{-9}$ cm/sec per project specification. 30-mil geomembrane backing placed below the GCL and maybe part of the GCL or provided separate from the GCL.
7. Secondary LCRS and liner optional on sideslopes.

LCRS

2. The LCRS for LF-3 and LF-4 expansion modules shall, at a minimum, be constructed in accordance with the following, from top to bottom:

   a. Blanket Drainage Layer –

      1) Minimum 6-inch thick layer of gravel over base liner

      2) Geocomposite (or equivalent combination of geonet and filter fabric) over side slopes, including LF-1 and LF-2 overlap areas.

   b. Collection Piping

      1) Optional - Perforated 4-inch HDPE laterals installed in collection troughs (or directly on base liner) and plumbed to header pipe(s) along perimeter of module. Laterals shall be equipped with pipe risers at each end to allow for video camera inspection (by wire rope or robot) and cleaning, as necessary

      2) LFG collection pipes installed within the LCRS layer to allow for connection to LFG control system.

   c. Grading – The base of each module/phase shall be graded with a 2 percent cross slope toward a central LCRS sump or header pipe plumbed to the LCRS sump. LCRS pipes shall be constructed with a minimum 1 percent slope.

3. LCRS sumps for LF-3 and LF-4 modules shall be constructed consistent with the following design, from top to bottom:

<table>
<tr><th colspan="2">Component</th><th colspan="2">Specification</th></tr>
<tr><td colspan="2"></td><td>Option 1</td><td>Option 2</td></tr>
<tr><td colspan="2">Filter Fabric</td><td colspan="2">Geotextile</td></tr>
<tr><td rowspan="2">Primary Sump[3,4,8]</td><td>Gravel</td><td colspan="2">Sump gravel[1,2]</td></tr>
<tr><td>Pump</td><td colspan="2">Automatic with high and low alarms, flow meter</td></tr>
<tr><td colspan="2">Cushion</td><td colspan="2">Geotextile</td></tr>
<tr><td colspan="2" rowspan="2">Primary Composite Liner</td><td colspan="2">60-mil HDPE Geomembrane[5]</td></tr>
<tr><td>GCL and a minimum 30-mil HDPE geomembrane backing[6]</td><td>24-inch CCL[6]</td></tr>
<tr><td colspan="2">Foundation Layer</td><td colspan="2">≥ 6-inches soil[1]</td></tr>
<tr><td colspan="2">Secondary Sump[3]</td><td colspan="2">Geocomposite</td></tr>
<tr><td colspan="2" rowspan="2">Secondary Composite Liner</td><td colspan="2">60-mil HDPE Geomembrane[5]</td></tr>
<tr><td>24-inch CCL[6]</td><td>GCL and a minimum 30-mil geomembrane backing[7]</td></tr>
<tr><td colspan="2">Filter Fabric</td><td colspan="2">Geotextile</td></tr>
<tr><td colspan="2">Capillary Break Layer</td><td colspan="2">12-inches gravel[1,2]</td></tr>
</table>

1. Liner component soils and gravels prepared/compacted in accordance with project specifications.
2. K > 1 cm/sec per project specifications.
3. Sump shall be equipped with an automatic pump, flow meter, and recording device, allowing instantaneous measurement of rate and volumes removed. High and low liquid level sensors and associated alarms shall also be included in design.
4. Design shall include appropriately-sized HDPE riser pipes for leachate monitoring and removal.
5. Single or double-side textured (textured side down).
6. $K < 1x10^{-7}$ cm/sec per project specification.
7. 30-mil geomembrane backing placed below the GCL and maybe part of the GCL or provided separate from the GCL.
8. For sump depths of 12-inches or less, the maximum depth of leachate in the sump shall be 12-inches. For sump depths greater 12-inches, the maximum depth of leachate in the sump shall be the sump depth plus 3-inches.

4. A pan lysimeter consisting of a layer of geocomposite overlying 60-mil HDPE geomembrane shall be placed on the base of the capillary break layer directly beneath the secondary LCRS sump and plumbed to a perforated riser pipe. The thickness of the capillary break layer may be increased beneath the LCRS sump to accommodate the pan lysimeter and riser pipe, as necessary.

Final Cover

5. Final cover shall, at a minimum, be constructed in accordance with one of the following designs:

   a. Title 27 Prescriptive Standard, from top to bottom:

Component	Top Deck	Sideslopes[1]
Erosion Resistant Layer	≥ 1 feet vegetative cover soil	
Geosynthetic Layer	60-mil HDPE Geomembrane or Equivalent[2]	
Low Hydraulic Conductivity (LHC) Layer	≥ 1 foot compacted clay soil[3] ($k \leq 1x10^{-6}$ cm/sec)[2]	
Foundation Layer	≥ 2 feet soil or appropriate waste materials[4]	

1. Includes exterior slopes and areas where LF-1 and LF-2 cover underlaps LF-3 sideslope liner...
2. Geosynthetic component not required over unlined units (i.e., DM-1A).
3. Minimum relative compaction of 90%.
4. Appropriate waste materials include materials approved for the use as foundation soil, such as C-soil, LC-soil, soil admixed with sludge.

   b. One or more of the following Title 27 Engineered Alternative Designs (EADs), as applicable, from top to bottom:

      1) GCL (All slopes)

Component	Sideslopes		
	Exterior	Interfaces	
		LF-3/LF-2[1]	LF-3/LF-1[1]
Erosion Resistant Layer	≥ 1 feet vegetative cover soil		
Geosynthetic Layer	60-mil HDPE Geomembrane		
Low Hydraulic Conductivity (LHC) Layer	Geosynthetic Clay Liner (GCL)[2]		
Foundation Layer	≥ 2 feet soil or appropriate waste materials[3]		

1. Refers to areas where LF-1 and LF-2 sideslope cover underlap LF-3 sideslope liner.
2. GCL shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface, long-term creep, shear, and bearing capacity.
3. Appropriate waste materials include materials approved for the use as foundation soil, such as C-soil, LC-soil, soil admixed with sludge.

2) ET Cover (Exterior slopes only)

Component	Side Slopes		
	Exterior	Interfaces	
		LF-3/LF-2	LF-3/LF-1
Evapotranspirative Layer	≥ 3 feet soil	n/a[1]	

1. ET cover not authorized in areas where LF-3 overlaps LF-1 and LF-2 (use prescriptive design or other approved EAD in these areas).
2. Minimum ET cover thickness shall be the greater of 3 feet and that required to meet Title 27 performance standards per the EAD demonstration per FC/PCMP.

3) Topdeck and Exterior Slopes:

Component	Top Deck	Sideslopes
Erosion Resistant Layer	< 1 foot vegetative cover soil	
Drainage Layer/Cushion	Min. 10oz/sy geotextile	Geocomposite[3]
Geosynthetic Layer	60-mil HDPE Geomembrane[3]	
Low Hydraulic Conductivity (LHC) Layer	GCL[1]	
Foundation Layer	≥ 1 foot soil or appropriate waste materials[2]	

1. GCL shall exhibit appropriate strength characteristics (hydrated) to accommodate stresses associated with specific landfill design parameters, with particular attention to interface, long-term creep, shear, and bearing capacity.
2. Appropriate waste materials include materials approved for the use as foundation soil, such as C-soil, LC-soil, soil admixed with sludge.
3. The geocomposite and geomembrane may be replaced with a 60-mil HDPE structured geomembrane and overlying filter layer.

4) Liner-Cover Combination System (Sideslope Interface Areas Only)

For areas where LF-3 sideslope liner overlaps LF-1 or LF-2 sideslope cover, a combined liner-cover system that incorporates, but does not necessarily duplicate, elements specified above for LF-3 and LF-2 overlap liner (Construction Specification E.1) and LF-3 underlap final cover (Construction Specification E.5), provided that the combined containment system meets Title 27 performance standards for both final cover and Class III (non-composite) landfill liner.

The FC/PCMP or partial FC/PCMP submitted for each of the above landfill units shall include an appropriate EAD demonstration per Title 27, section 20080(b) for each of the above designs, as proposed.

7. The Discharger may propose changes to a containment system design (e.g., liner, cover, berm, compost pad or pond) prior to construction provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner/final cover system results in the protection of water quality equal to or greater than the design prescribed by Title 27

and this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Central Valley Water Board in revised WDRs.

8. The design and construction of all landfill module LCRS and containment system components shall incorporate adequate factors of safety to handle the increased vertical loads associated with vertical expansion.

9. **At least 90 days** prior to initiation of construction of any new landfill modules; containment system modifications or repairs to an existing classified unit or the compost facility; or closure/cover construction activities (e.g., per an FC/PCMP, Partial FC/PCMP), as approved by the Executive Officer, the Discharger shall submit for review and approval all applicable plans and reports, including, but not necessarily limited to, the following:

   a. Any proposed design modifications pertaining to construction or closure of the unit, module, or phase per Construction Specification E.7.

   b. A construction design report, including project specifications, drawings, grading and design plans; and

   c. A Construction Quality Assurance (CQA) Plan which satisfies the requirements of Section 20324 of Title 27 as it applies to the construction of the erosion-resistant and foundation layers.

   Module/closure construction shall proceed only after the above (and any other applicable) reports have been approved by Executive Officer.

10. LFG extraction facilities necessary to control LFG shall be installed within landfill waste as each new module is constructed and developed within 36 months of the first placement of wastes in each module or sooner as needed to control landfill gas. New modules shall be tied into the existing LFG extraction system in order to help control LFG.

11. Expansion of LF-3 or LF-4 may occur in an area where corrective actions are being performed provided the Central Valley Water Board has approved a plan for performing the corrective actions concurrent with a specific landfill expansion.

12. All interim landfill slopes shall be constructed in accordance with minimum safety factor of 1.5 or greater under static and dynamic conditions. Pursuant to Title 27, Section 21750(f)(5)(D), in lieu of achieving a factor of safety of 1.5 under dynamic conditions, the discharger may utilize a more rigorous analytical method that provides a quantified estimate of the magnitude of movement. In this case, the report shall demonstrate that this amount of movement can be accommodated without jeopardizing the integrity of the Unit's foundation or the structures which control leachate, surface drainage, erosion or gas.

13. All existing classified units and future expansion modules shall be constructed and maintained with exterior perimeter berms at least 28 feet NGVD29 in height for 100-year flood protection. Higher and/or wider berms may be required for slope stability. Future LF-3 and LF-4 modules that are constructed within the 100-year floodplain that have areas below 28 feet NGVD will be protected from 100-year flood with 28 feet NGVD 29 berms prior to the placement of waste within the module.

14. The Discharger shall comply with all Standard Construction Specifications listed in Section F of the Landfill SPRRs.

Compost Facility

15. Compost facility working surfaces must be capable of resisting damage from the movement of equipment and weight of piles. Working surfaces shall consist of one of the following:
    a. Compacted soils, with a minimum thickness of one foot, and have a hydraulic conductivity of 1.0×10^{-5} cm/sec or less; or
    b. Asphaltic concrete or Portland cement concrete; or
    c. An equivalent engineered alternative approved by the Regional Water Board

16. Compost facility working surfaces and containment structures must be designed, constructed, operated and maintained to:
    a. Facilitate drainage and minimize ponding by sloping or crowning pads to reduce infiltration of liquids;
    b. Reliably transmit free liquid present during storage, treatment, and processing of materials to a containment structure to minimize the potential for waste constituents to enter groundwater or surface water; and
    c. Prevent conditions that could contribute to, cause, or threaten to cause a condition of contamination, pollution, or nuisance.

17. All components of the compost facility leachate collection and storage system, including ditches, sumps, pumps, storage ponds and tanks shall, at a minimum, be designed, constructed, and maintained to handle leachate and runoff flows from a 25-year, 24-hour peak storm event. Pond A shall maintain a 0.9-foot freeboard and Pond B shall maintain a 2-foot minimum freeboard.

18. Leachate pond berms shall be designed, constructed, and maintained to prevent run-on and run-off from a 25-year, 24-hour peak storm event at a minimum. Berms must be adequately protected from erosion, and must not cause, threaten to cause, or contribute to conditions resulting in contamination, pollution, or nuisance.

19. Compost facility drainage ditches must be designed, constructed, and maintained to convey all precipitation and runoff from a 25-year, 24-hour peak storm event and be lined with one of the following:

a. Compacted soils, with a minimum thickness of one foot and a hydraulic conductivity of $1.0x10^{-5}$ cm/sec or less; or
b. Asphaltic concrete or Portland cement concrete; or
c. An equivalent engineered alternative approved by the Regional Water Board.

20. The Discharger must submit a technical report with design information at least **90 days** prior to any new compost facility construction of any working surfaces, detention ponds, berms, ditches, or any other water quality protection containment structure for approval by the Regional Water Board. The design information must include water balance calculations for detention ponds, design of wastewater conveyance features, liner materials and thicknesses, and rationale for liner system design. The technical report must ensure testing and quality assurance of liner materials and compacted soils in accordance with commonly accepted engineering practices, American Society for Testing and Materials test methods, and/or other appropriate material standards. See Construction Specification E.9.

21. The Discharger must submit a post-construction report to the Regional Water Board **within 60 days** of completing all compost facility construction activities associated with all applicable containment and monitoring structures, as required for compliance with this Order, including the MRP. The post-construction report must contain as-built plans and specifications to document that containment and monitoring structures were properly constructed and tested.

F. CLOSURE AND POST-CLOSURE MAINTENANCE SPECIFICATIONS

Landfill Units

1. By **15 October 2019**, the Discharger shall submit a FC/PCMP for LF-1 consistent with the construction specifications (e.g., Construction Specification E.5) and other applicable requirements of this Order. The FC/PCMP shall include plans for closure, or phased closure, of all portions of the unit, including top deck and sideslopes of DM-1A and DM-1B. The FC/PCMP shall include a landfill final cover design (consistent with the construction specifications of these WDRs), description of closure activities, a schedule, closure and postclosure cost estimates, slope stability analysis, and all other information required under Title 27, section 21769(c). See Provision I.10.b;

2. By **15 October 2021**, the Discharger shall complete closure of existing MSW landfill unit LF-1 and within 30 days thereafter submit a certification that the landfill has been closed consistent with Standard Closure and Postclosure Specification G.23, Landfill SPRRs.

3. The operator shall to the extent feasible, based on site specific factors, implement partial and/or partial final closure activities as the site operation progresses, consistent with the closure of the entire site, in accordance with Title 27, section 21120(a).

4. Landfill final cover designs proposed in preliminary or final closure plans submitted under this Order shall be consistent with the prescriptive standard or engineered alternative design (EAD) options specified in Construction Specification E.5 Any proposal for an EAD final cover included in a FCP or Partial FCP shall be accompanied by the requisite demonstration under Title 27, section 20080(b) and (c), including, but not limited to, a demonstration that construction of the prescriptive standard is infeasible and that the proposed EAD meets or exceeds Title 27 performance standards for final cover. Such demonstration may require a field pilot project or test pad.

5. Any proposal for final cover included in a preliminary, final, or partial final closure plan for a landfill unit shall meet the requirements of Title 27 and Subtitle D, including the requirement that that the permeability of the LHC layer (or percolation rate through a proposed ET cover) be no greater than that of the base liner or underlying natural geologic materials (whichever is less). See Title 27, section 21090(a)(2) and 40 CFR 258.60(a)(1).

6. Closed or partially closed landfill unit side slopes shall be no steeper than 2.5H:1V, and closed top deck areas shall be sloped at three percent or greater. Interim slopes steeper than 2.5H:1V are permissible, provided they are supported by a slope stability analysis.

7. The Discharger shall install and maintain an active landfill gas extraction system appropriately sized to remove LFG from closed landfill units throughout the postclosure period. Landfill gas shall be extracted from closed landfill units until such time that the landfill gas is no longer a threat to water quality as documented by the Discharger and approved by the Executive Officer.

8. For closure designs including geomembrane and/or GCL, the Discharger shall seal the edges of the final cover by connecting its components to the base liner, as necessary and feasible.

9. The Discharger shall test the critical interfaces of the final cover in a laboratory to ensure minimum design shear strengths are achieved and include the results in the final documentation report.

10. The Discharger shall ensure that the vegetative/erosion resistant layer receives necessary seed, binder, and nutrients to establish the vegetation proposed in the final closure plan. The Discharger shall install necessary erosion and sediment controls during the period the vegetation is being established.

11. The completed final cover will be periodically tested for damage or defects by monitoring surface emissions pursuant to California Code of Regulations, title 17, section 95471(c) and Title 27, section 21090(a)(4)(A). Defects will be repaired and tested for adequacy based on the closure CQA Plan.

12. The Discharger shall comply with all Standard Closure and Post-Closure Specifications listed in Section G, and all closure-related Standard Construction Specifications listed in Section F, of the Landfill SPRRs.

WP-9.1 & LTU

13. Existing units/modules in the area of each phase (i.e., WP-9.1A, WP-9.1B, LTU, compost pond) shall be clean closed, as documented in a clean closure certification report approved by Central Valley Water Board staff. Prior to beginning construction of the DM-9 geosynthetics, the Discharger shall remove impacted vadose zone materials and show one year of decreasing groundwater trends in the footprint of the proposed disposal module. See also Corrective Action Specification D.6.

14. At least 90 days prior to cessation of operations at WP-9.1A, the Discharger shall submit a clean closure work plan for the unit. All clean closure plans for Class II waste piles shall be prepared in accordance with Title 27 CCR Section 21410.

15. No clean closure activities may be conducted at a unit in the absence of a clean closure work plan approved by Central Valley Water Board staff.

16. No clean closure excavation activities shall be conducted at a Class II waste pile or LTU during the wet season.

17. The Discharger shall comply with all Standard Closure and Postclosure Specifications listed in Section G, and all Standard Storm Water Provisions listed in Section L of the Industrial SPRRs.

Compost Facility

18. At least **90 days** prior to cessation of composting operations, the Discharger shall submit a Clean Closure Plan for the composting facility (including composting pad and Ponds A and B) to the Water Board for Water Board staff approval. No composting facility closure construction activities may be initiated at the site absent an approved Clean Closure Plan for the facility.

19. Clean closure of the composting facility shall meet the performance standards for cleanup set forth in Title 27, section 21090(f).

20. If construction of future landfill modules will impact the footprint of the existing compost facility, composting operations on those impacted portions shall be terminated and shall be clean-closed prior to initiating construction of landfill modules (i.e., portions of DM-9 and/or 10) in that area.

G. FINANCIAL ASSURANCE SPECIFICATIONS

1. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for closure and post-closure maintenance of the landfill units at the site in at least the amounts of the cost estimates in the most recently approved PC/PCMP(s) submitted under this Order or previous WDRs, as adjusted for inflation annually. As of 15 June 2015, these amounts were, in 2015 dollars, $26,724,439 for closure and $7,523,752 for postclosure maintenance. A report regarding financial assurances for closure and post-closure maintenance shall be submitted to the Central Valley Water Board by 1 June of each year. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.

2. The Discharger shall update the most recently approved PC/PCMP any time there is a change that will increase the amount of the closure and/or post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Central Valley Water Board, the Local Enforcement Agency, and CalRecycle. The PC/PCMP shall meet the requirements of Title 27, section 21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. Reports regarding financial assurance required in G.1 above shall reflect the updated cost estimate.

3. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in at least the amount of $1,546,311 in 2015 dollars including the annual inflation-adjusted cost estimate.

   A report regarding financial assurances for corrective action shall be submitted to the Central Valley Water Board by **1 June of each year**. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.

4. The Discharger shall comply with all Standard Financial Assurance Specifications listed in Section H of the Landfill SPRRs.

H. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection and corrective action monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with these WDRs and MRP R5-2016-XXXX.

2. The Discharger shall comply with the Water Quality Protection Standard specified in the Water Quality Protection Standard Report submitted under Provision I.7 of this Order, as approved.

3. The concentrations of the constituents of concern in waters passing the Point of Compliance (defined pursuant to Title 27, section 20164 as a vertical surface located at the hydraulically downgradient limit of the landfill unit that extends through the uppermost aquifer underlying the unit) shall not exceed the concentration limits established pursuant to MRP R5-2016-XXXX.

4. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in MRP R5-2016-XXXX and the Landfill SPRRs.

5. Detection monitoring data analysis methods, including those used for analysis of background data, shall be in accordance with Title 27, Section 20415(e)(7) through (e)(10) and the MSW Landfill or Industrial SPRRs, as applicable.

6. In the event of a release, the data analysis methods shall also include trend analysis; an evaluation of the water chemistry; and preparation of contaminant contour plots to monitor the nature of the release and effectiveness of corrective action measures, as specified in the MRP.

7. As permitted by Title 27, Section 20430(f) and 40 CFR 258.58(e)(2), corrective action may be terminated when the Discharger demonstrates that the constituents of the release have been reduced to levels at or below their respective concentration limits throughout the entire zone affected by the release. The Discharger may make this demonstration by satisfying a “proof period.” The “proof period” shall consist of at least eight sampling events for each monitoring point that are approximately evenly distributed over a minimum of a one-year period in which the concentration of the constituents of the release remain at or below their respective sampling limit. The term “monitoring point” shall mean either a point of compliance or an alternative monitoring location proposed by the Discharger and approved by Water Board staff that adequately monitors groundwater quality while still enabling sequenced landfill development. The Discharger may make this demonstration while corrective action measures are either continuing or have been suspended or modified as approved by Water Board staff.

8. The Discharger shall adequately monitor soil pore gas along the perimeter of each landfill unit for the presence of LFG in concentrations that may threaten water quality or otherwise warrant adjustments or improvements to the LFG extraction system, including the installation of additional gas extraction or monitoring wells.

9. Any proposal for concentration limits greater than background (CLGBs) shall be accompanied by the requisite demonstration under Section 20400(c) (i.e., that it is technologically or economically infeasible to achieve the background value for that constituent and that the constituent will not pose a substantial present or potential hazard to human health or the environment). Approval of CLGBs shall require approval of revised WDRs by the Central Valley Water Board.

10. The Discharger shall comply with all Standard Monitoring Specifications listed in Section I of both the Landfill SPRRs and Industrial SPRRs, as applicable to the unit.

I. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility, including the MRP R5-201X-XXXX, the Landfill SPRRs dated December 2015, and the Industrial SPRRs dated April 2016, which are part of this Order, and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.

2. The Discharger shall comply with all applicable provisions of Title 27 and Subtitle D that are not specifically referred to in this Order.

3. The Discharger shall comply with MRP R5 2016-XXXX, which is incorporated into and made part of this Order by reference.

4. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Subtitle D and/or Title 27, dated April 2016.

5. If there is any conflicting or contradictory language between the WDRs, the MRP, or the SPRRs, then language in the WDRs shall supersede either the MRP or the SPRRs, and language in the MRP shall supersede the SPRRs.

6. All reports required by this Order shall be submitted pursuant to Water Code section 13267, and shall be prepared by a California-registered Civil Engineer or Certified Engineering Geologist.

7. By **30 November 2016**, the Discharger shall submit a revised Water Quality Protection Standard (WQPS) Report describing the WQPS for each classified unit (i.e., LFs-1 to 4, WP-9.1A and LTU) and each water-bearing media under this Order (i.e., soil pore water, groundwater, and surface water). The revised WQPS report shall specify the Constituents of Concentration, Concentration Limits, Monitoring

Points, Points of Compliance, and Compliance Periods, consistent with the requirements of this Order and Title 27 regulations. The revised WQPS Report shall adequately demonstrate that the use of intrawell monitoring is consistent with Title 27, Section 20080(b) and (c), and if not consistent with Title 27, propose to change the detection groundwater monitoring to interwell comparisons using hydraulically upgradient wells as backgrounds. In addition, the WQPS shall evaluate whether monitoring wells are appropriately placed and screened, including in zone(s)with the highest hydraulic conductivity, to detect the earliest possible release from a unit to the uppermost aquifer.

8. By **30 November 2016**, the Discharger shall submit an updated Sample Collection and Analysis Plan containing proposed sampling and analysis methods and protocols for monitoring all units at the site consistent with the revised WQPS Report required under Provision I.7 above, the sample profiling requirements of Corrective Action Specification D.3, other requirements of these WDRs, and the 7 April 2016 Notice of Violation.

9. Pursuant to Section 13267 of the California Water Code, the Discharger shall submit the following technical reports relevant to corrective action/monitoring at the site:

	Report	Due Date
a.	A work plan for the installation of a sufficient number of soil gas probes along the perimeter of each landfill unit to monitor the effectiveness of the LFG extraction system per Monitoring Specification H.8.	**30 August 2016**
b.	A combination work plan for: 1) the installation of piezometers adjacent to each LCRS sump of each classified unit to measure the groundwater elevation per Facility Specification C.1.c; 2) the installation of a detection monitoring well sidegradient of WP-9.1A per Corrective Action Specification D.7.	**30 August 2016**
c.	An installation report demonstrating installation and operability for the soil gas probes installed under I.9.a above, and the piezometers and detection monitoring well installed under I.9.b above.	**30 December 2016 or 90 days after approval of work plan in I.9.a. and b. above, weather permitting**
d.	A work plan for the installation necessary modifications and/or improvements to the LFG extraction system associated with corrective action activities, under the approved LFG Controls O&M Plan. See Corrective Action Specification D.1.	**15 May 2017**
e.	An installation report documenting installation of necessary modifications and/or improvements to the LFG extraction system associated with corrective action, per the gas controls work plan submitted under I.9.d above.	**15 March 2018 or 90 days after approval of work plan in I.9.d. above**

10. Pursuant to Section 13267 of the California Water Code, the Discharger shall submit the following technical reports relevant to completing closure of Landfill 1 (LF-1):

	Report	Due Date
a.	Closure Status Report (e.g., interested agency permitting/approvals; project schedule; site preparation and construction progress).	**Quarterly, beginning 15 November 2019 and until Certification Report submitted**
b.	Final Closure and Postclosure Maintenance Plans (FC/PCMPs) per Closure and Postclosure Maintenance Specification F.1.	**15 October 2019**
c.	Closure construction plans per Construction Specification E.9.	**At least 90 days prior to initiation of closure construction**
d.	Letter certifying completion of closure per Closure and Post-closure Maintenance Specification F.2.	**15 November 2021**
e.	Certification Report documenting completion of landfill closure construction per Standard Closure and Postclosure Specification G.24, SPRR.	**15 May 2022**

11. Pursuant to Section 13267 of the California Water Code, the Discharger shall submit the following technical reports relevant to landfill operations at the site:

	Report	Due Date
a.	A Landfill LCRS Sump O&M Plan, including, but not limited to, short term and long term response plans in the event of a sump leak per Facility Specification C.2.b.	**30 October 2016**
b.	A Landfill Liquids Management Plan to ensure that leachate & LFG condensate returned to landfill units are appropriately handled per Facility Specification C.2.c.	**15 October 2016**
c.	A LFG Controls O&M Plan to ensure that LFG is being sufficiently controlled at each landfill unit and is being appropriately handled per Facility Specification C.2.a.	**15 March 2017**

12. Pursuant to Section 13267 of the California Water Code, the Discharger shall submit the following technical reports relevant to composting operations at the site:

	Report	Due Date
a.	A work plan and schedule for the installation of three compost pond monitoring wells screened in the uppermost saturated interval upgradient and downgradient of Pond B per MRP Section A.9.b.i.	**30 July 2016**
b.	A Monitoring Well Installation Report for the above compost pond wells.	**15 October 2016 or 90 days after approval of work plan in I.12.a. above**
c.	A Compost Facility Leachate Collection/Pond System O&M Plan to ensure that all compost facility wastewater is appropriately handled to prevent an unauthorized discharge to surface water, groundwater or the unsaturated zone per Discharge Specification B.26.	**15 January 2017**

13. The Discharger shall comply with all General Provisions listed in Section K of the MSW Landfill SPRRs (landfill units only) and Section K of the Industrial SPRRs (WP-9.1, LTU units only).

14. The Central Valley Water Board has converted to a paperless office system. All project correspondence and reports required under this Order shall therefore be submitted electronically rather than in paper form, as follows:

    a. All project correspondence previously submitted in paper form (e.g., letters, short reports) shall be converted to Portable Document Format (PDF) and 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
Discharger name:	Recology Hay Road Landfill, Inc. & Jepson Prairie Organics
Facility name:	Recology Hay Road Landfill
County:	Solano
CIWQS place ID:	244435

    Unit staff and senior shall also be cc'd on the email.

    b. All technical reports and monitoring reports required under this Order shall be converted to PDF and uploaded via internet to the State Water Board's GeoTracker database at http://geotracker.waterboards.ca.gov, as specified in

California Code of Regulations, title 23, section 3892, subdivision (d) and section 3893. Project-associated analytical data shall be similarly uploaded to the GeoTracker database in an appropriate format specified under this Order under a site-specific global identification number. Information on the GeoTracker database is provided at:

http://www.swrcb.ca.gov/ust/electronic_submittal/index.shtm

Notification of the Geotracker upload shall be emailed to the Central Valley Water Board at: centralvalleysacramento@waterboards.ca.gov, as described above.

I, PAMELA C. CREEDON, 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 24 June 2016.

_____
PAMELA C. CREEDON, Executive Officer

WMH