

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2013-0042

WASTE DISCHARGE REQUIREMENTS
FOR
NANCY C. CLEAVINGER, TRUSTEE OF THE NC CLEAVINGER FAMILY TRUST,
ET AL.
FLORIN PERKINS LANDFILL
UNCLASSIFIED LANDFILL UNITS
CLOSURE AND CORRECTIVE ACTION
SACRAMENTO COUNTY

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

1. The Florin Perkins Landfill is an unclassified landfill on Florin Perkins Road near the Jackson Highway about seven miles southeast of downtown Sacramento, as shown in Attachment A, which is incorporated herein and made part of this Order. The 210-acre property is in the southwest $\frac{1}{4}$ of Section 13 and the northwest $\frac{1}{4}$ of Section 24, T8N, R5E, MDB&M; and is comprised of Assessor's Parcel No. 061-0150-056 (in its entirety) and portions of Assessor's Parcel Nos. 061-0150-042, 061-0150-045, 061-0150-049, 061-0150-054, 061-0150-055, 061-0150-058, 078-0202-006, and 078-0202-016. The site's geographic coordinates are latitude 38.5421° N, longitude - 121.3867 ° W.
2. The landfill property is jointly owned and operated by the trustees of a group of family trusts and a revocable trust, including Nancy C. Cleavinger and Audrey A. Hunt, Trustees of the NC Cleavinger Family Trust; Audrey A. Hunt and Nancy C. Cleavinger, Trustees of the AA Hunt Family Trust; Janet E. Harvey and Nancy C. Cleavinger, Trustees of the JE Harvey Family Trust; Sally R. Davis and Martin M. Chorich, Co Trustees of the Sally R. Davis Trust; Audrey A. Hunt and Nancy C. Cleavinger, Trustees under a Testamentary Trust for Sally R. Davis under the terms of the will of Robert Earl Davis as established by Decree of Distribution entered on March 28, 1991; Gail Christine Brown, as successor Trustee of the VA Palmer Family Trust; Gail C. Brown, as Trustee of the GC Brown Family Trust. The trustees of these trusts are hereafter collectively referred to as "Discharger".
3. On 25 May 2012, the Discharger submitted a Report of Waste Discharge (RWD) describing significant changes at the facility since issuance of previous waste discharge requirements (WDRs) Order No. 95-196 in 1995. Such changes include, but are not limited to, the following:
 - a. Development of area fill cells along the north, south, and east sides of the unit;
 - b. Eviction of the landfill operator and cessation of landfill operations;

- c. Cleanup of stockpiled wastes in the central part of the site;
- d. Implementation of an Evaluation Monitoring Program to investigate landfill gas (LFG) and groundwater impacts at the site; and
- e. Development of corrective action and final closure plans for the site.

In light of the above, WDR Order No. 95-196 no longer adequately regulates the facility. This revised WDR Order includes updated findings, regulatory references, and requirements to reflect the above changes and plans.

- 4. The landfill began accepting wastes in 1993 shortly after the neighboring Jackson Road Landfill (also owned by trusts represented by Nancy C. Cleavinger) reached capacity and ceased accepting wastes. Florin Perkins Landfill, Inc. operated the landfill from start-up in 1993 to 2005. In February 2005, the property owners (Dischargers WDR Order No. 95-196) evicted Florin Perkins Landfill, Inc. from the site for noncompliance with Regional Board Orders and breaches of the operating agreement. Since then the landfill has been inactive.
- 5. Landfill-related facilities at the site include the landfill; a former materials stockpile area; gas and groundwater monitoring wells, precipitation and drainage controls, access roads; former buildings areas, and an onsite supply well. Other onsite facilities include a 10-acre transfer station/materials recovery facility; buffer land; a utility tower easement; quarry pit areas; and site perimeter ditches and berms. See Attachment B: Site Map, which is incorporated herein and made part of this Order.
- 6. The landfill was developed in the pit of a former gravel quarry, portions of which were backfilled with overburden soil prior to landfilling.
- 7. Approximately 56 acres of the 106-acre area authorized for disposal under previous WDRs were developed prior to cessation of waste disposal operations. Wastes were discharged to three unlined area fill cells along the north, south, and east sides of the unit referred to as the northern, southern and eastern fill areas. These waste disposal areas at the landfill may be summarized as follows:

<u>Cell</u>	<u>Active</u>	<u>Area (acres)</u>	<u>Waste Column (Feet)</u>	<u>Minimum Waste Elevation (Feet MSL)</u>
Southern Fill Area	1993-1995	13	26 to 38	4.5
Northern Fill Area	1995-2003	14	18 to 44	-2.5
Eastern Fill Area	2003-2005	12	23 to 33	7.8

1. Data based on test pit investigation conducted as part of 2011 evaluation monitoring program.

An additional area, referred to as the Central Processing Area, was used primarily for materials stockpiling and processing. A limited amount of inert material, primarily concrete, was historically buried in the Central Processing Area prior to initiation of processing and area fill operations. Another area of subsurface fill east of the transfer station was clean-closed in 2008. The average elevation of waste at the site

is about 25 feet MSL or about 25 feet below ground surface (bgs) based on surrounding street level grade.

8. In addition to WDRs, the landfill operated under a Conditional Use Permit issued by the City of Sacramento and a Solid Waste Facilities Permit (SWFP) exemption issued by the Sacramento County Environmental Management Department, (hereafter referred to as the Local Enforcement Agency or LEA) in 1997. In March 2004, the LEA rescinded the SWFP exemption after new solid waste regulations (i.e., 14 CCR Section 21565(b)(3)) were adopted requiring the facility to be permitted as a construction and demolition inert (CDI) waste disposal facility. No CDI permit was ever issued for the facility because the landfill ceased operations the following year.
9. The landfill had a history of noncompliance under the former operator and was the subject of various enforcement actions by the Central Valley Water Board and Local Enforcement Agency (LEA). Common WDR violations included discharging non-inert wastes to the landfill; inadequate precipitation and drainage controls; failure to adequately cover wastes; failure to remove unauthorized wastes; and various reporting violations. In April 2005, the Central Valley Water Board issued Administrative Civil Liability (ACL) Order R5-2005-0071 to Florin Perkins Landfill, Inc. for failure to submit and implement plans to investigate groundwater impacts at the site and other WDR violations. Florin Perkins Landfill, Inc. did not pay the fine (\$250,000) and the ACL Order was ultimately referred to the California Attorney General's Office for collection.
10. In October 2006, the Discharger entered into a land lease with Zanker Road Resources Management, Inc. (Zanker) whereby Zanker retained the right to develop and operate the landfill and onsite materials recycling facility. On 21 January 2011, the Executive Officer issued a Section 13267 Order requiring that the Discharger submit various reports, including a notice as to whether the Discharger planned to restart the landfill. The Discharger subsequently met with Zanker, which informed the Discharger that it did not intend to operate the landfill. The Discharger therefore reported to the Board that it planned to close the landfill.

WASTES AND UNIT CLASSIFICATION

11. The landfill accepted solid wastes defined as "inert" under the California Code of Regulations, Title 27 (Title 27), Section 20230.¹ The landfill was not authorized to accept wastes classified as hazardous, designated, or nonhazardous under Title 27. Previous WDRs further limited the discharge to non-water soluble, non-decomposable wastes consisting of the following:
 - a. Construction and demolition (C&D) debris (e.g., soil, rock, concrete, and cured asphalt);
 - b. Vehicle tires (shredded or unshredded);

1. Title 27 defined inert waste as *"that subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste."*

c. Inert industrial wastes (e.g., clay products, glass, rubber, and plastic).

A 2011 Evaluation Monitoring Program (EMP) investigation confirmed that wastes discharged to the landfill consisted primarily of C&D debris including asphalt composite roof shingles, concrete, dirt, wood, metal, plastic and other C&D debris.

12. Various materials stockpiles in the Central Processing Area (e.g., green waste, wood chips, rice hull ash, gypsum) also became the subject of Water Board and LEA enforcement after it was found that the piles constituted unauthorized waste disposal or violated the solid waste facilities permit exemption. In 2006, after eviction of Florin Perkins Landfill, Inc. from the site, most of these piles were removed from the site as part of a site cleanup action under Title 27. See Finding 45.
13. Previous WDRs described the entire 106-acre authorized disposal area as a single, unclassified waste management unit under Chapter 15 regulations. Under these WDRs, each of the three area fill cells and the Central Processing Area are considered separate unclassified waste management units consistent with the Discharger's final closure and postclosure maintenance plan. The Central Processing Area is considered low threat, however, and is not separately monitored under these WDRs.

SITE DESCRIPTION

14. The site is in the Sacramento Valley alluvial plain about 10 miles west of the Sierra Nevada foothills and 8 miles east of the Sacramento River. Topographic relief in the area is relatively flat with a natural grade of about 7 feet per thousand feet to the west toward the Sacramento River. Surface elevations range from about 55 feet MSL immediately east of the site to 45 feet MSL immediately west of the site.
15. Land uses within a one-mile radius of the site include industrial, residential, agricultural, and transportation. Industrial uses in the area include landfills to the north (ie. closed Jackson Road Landfill) and southeast (L and D Landfill); industrial park warehouses to the south and west; and aggregate operations (Teichert Aggregates) to the east and northeast. The nearest residential developments are to the north and east as are major transportation corridors in the area (i.e., Folsom Boulevard, Watt Avenue, Hwy 50). Quarry land immediately east of the site (e.g., Aspen I property owned by Teichert Land Company) is also planned for future residential development. See Attachment A: Location Map.
16. An October 2012 Department of Water Resources (DWR) well survey identified 10 groundwater supply wells within a one-mile radius of the site, including 7 supply wells (4 agricultural and 3 domestic) within 1,000 feet of the landfill. Locations of these wells relative to the facility are shown on Attachment C, which is incorporated herein and made part of this Order by reference.
17. The site is within the 100-year flood plain of the South Fork of the American River based on the Federal Emergency Management Agency's Flood Insurance Rate Map (Community-Panel No. 0602620195H, Map No. 06067C0195H) last revised in August

2012. Most of the site is, however, within an area (Zone X) shown as protected by levee.² No Base Flood Elevations (BFEs) or depths are shown in this zone, and purchase of insurance is not required. The map shows the southern buffer area and south and east margins of the landfill footprint outside of this protected area. The Discharger is not proposing any additional flood control measures for these areas given that the surface elevation of the landfill will be raised up to three feet by closure construction and the likelihood that onsite quarry pit areas would provide sufficient water storage capacity to buffer 100-year flood flows in the area not protected by levee.

18. The 100-year, 24-hour precipitation event for the site is about 4.23 inches based on the *Rainfall Depth Duration Frequency Data* provided on the Department of Water Resources (DWR)' Flood Management Division website for the Morrison Creek/S. WattP Station approximately 2.75 miles southeast of the site. The facility receives an average of 18.85 inches of precipitation per year as measured at this station. The mean pan evaporation rate is about 51 inches per year (4.25 inches per month) based on historical data collected at DWR's Fair Oaks California Irrigation Management Information System (CIMIS) Station about 11.5 miles northeast of the site.

Geology

19. The regional geology consists of alluvial, flood plain, and delta sediments from the Sacramento and San Joaquin Rivers and their tributaries deposited over geologic time. Such sediments resulted from erosion and/or glaciation of the Sierra Nevada and Coast Range Mountains and are estimated to be at least 2,500 feet deep in the Sacramento area.
20. The site is underlain by the following sedimentary formations:

<u>Formation</u>	<u>Age</u>	<u>Depth Range, bgs</u>	<u>Description</u>
Modesto/ Riverbank	Mid-to-late Pleistocene	0 to 125	Stream channel and flood basin deposits (e.g., cobble, gravel, coarse sand interspersed with silt, clay, and fine sand)
Laguna	Pliocene and early Pleistocene	125 – 375	Alluvium (e.g., silt, sand and clay interspersed with gravel lenses)
Mehrten	Miocene	>375	Alternating sequences of andesitic (dark-colored) alluvium confined by volcanic deposits (e.g., tuff-breccia)

2. Zone X designates areas with a ≤ 0.2% annual chance of flooding; ≤ 1.0% annual chance of flooding with average depths less than one foot; and areas of base flood stream flooding with a contributing drainage area of less than 1 square mile or protected from the base flood by levees.

21. The permeability of soils immediately underlying the landfill units is unknown, but has been estimated based on soil type. In areas where the sand/gravel/cobble layer was mined out prior to landfilling, or where overburden soil was backfilled or used as foundation material prior to landfilling, the permeability is estimated to range from about 10^{-5} to 10^{-7} cm/sec. In unmined areas of the facility, the permeability of the soil immediately underlying the landfill could be orders of magnitude higher.
22. The closest historically active fault to the site is the Cleveland Hill Fault Zone (Holocene) in the northern reach of the Foothills Fault System about 70 miles north of the site. In 1975, the Cleveland Hill fault produced an earthquake of 5.8 magnitude on the Richter scale that resulted in surface rupture. Other faults proximate to the site (all late Pleistocene) include the Dunnigan Hills Fault about 28 miles to the NW, the Rescue Fault about 31 miles to the NE, the Lone Fault about 31 miles to the SE, and the Vaca Fault (of the Coast Range-Sierra Block boundary zone) about 33 miles to the west.
23. A maximum magnitude earthquake of 6.4 and a peak horizontal ground acceleration of 0.184g were computed for the site using a probabilistic approach.³

Surface Drainage

24. Surface water drainage in the area is toward Morrison Creek, as seasonal stream about one mile south of the site. Morrison Creek flows to the southwest and empties into the Sacramento River
25. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
26. The designated beneficial uses of the Sacramento River are municipal and domestic supply; agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction and/or early development; wildlife habitat; and navigation.
27. Storm water runoff drains by sheet flow toward undeveloped areas of the original quarry pit on the north, northwest, northeast, and southwest sides of the site. Runoff from the Central Processing Area and Southern Fill Area generally flows to the southwest quarry pit, while runoff from the Eastern Fill Area flows to the northern quarry pit, and runoff from the Northern Fill Area flows to the northwest quarry pit. See Monitoring and Reporting Program (MRP) Section A.4.
28. Existing cover slopes generally exceed 1%, except for landfill crest areas, where the minimum slope is 0.8%. There is no storm water discharge to surface water at the

3. Maximum magnitude earthquake derived from probabilistic seismic hazard (PSH) de-aggregation analysis assuming an earthquake in the Foothill Fault System with a 475-year return period (10% chance in 50 years).

site, except for limited discharges to street drains from areas outside of the quarry pit. Additional precipitation and drainage controls will be installed as part of landfill closure construction, as described in Finding 58.

UNSATURATED ZONE CONDITIONS

- 29. In areas of the site undisturbed by mining (e.g., quarry pit rim and southern buffer area), the unsaturated zone typically consists of 10 to 15 feet of silt and/or clay soil underlain by 20 to 30 feet of sand, gravel, and/or cobble. In mined areas within the facility boundary (e.g., wells MW-D, DB-1, GP-9, and GP-12), most or all of the sand/gravel and/or cobble layers have been removed from the unsaturated zone and partially backfilled with overburden soil and/or landfill waste. In mined areas beyond the facility boundary, such as on the north and west sides of the site, the height of the soil column in the unsaturated zone soil has been reduced by the depth of the quarry pit.
- 30. Field monitoring of landfill gas vapor probes installed as part of the 2011 EMP investigation showed methane concentrations ranging from 24.9% to 37.5% in the Southern Fill Area; 6.0% to 22.0% in the Eastern Fill Area; and 9.2% to 45.0% in the Northern Fill Area. Limited VOC field monitoring conducted on Southern Fill Area vapor probes showed low to trace concentrations of VOCs, primarily acetone and Freon 11, in landfill gas. The vapor probe monitoring data may be summarized as follows:

<u>Gas Constituent</u>	<u>Vapor Probe Monitoring Results</u>							
	<u>Concentration (ppbv, except where noted)</u>							
	<u>Southern Fill Area</u>			<u>Eastern Fill Area</u>			<u>Northern Fill Area</u>	
Vapor Probe:	VP-1	VP-2	VP-4	VP-3	VP-5	VP-6	VP-7	VP-8
Methane, % ¹	29.7	34.0	37.5	10.0	22.0	17.1	45.0	15.8
Average:		33.7			16.4		30.4	
VOCs: ^{2,3}								
Acetone	110	---	4,600	---	---	---	---	---
Benzene	590	---	<50	---	---	---	---	---
Carbon disulfide	23	---	<15	---	---	---	---	---
Freon 11	<50	---	4,600	---	---	---	---	---
Freon 12	<50	---	210	---	---	---	---	---
Vinyl chloride	640	---	170	---	---	---	---	---

1. Results of December 2012 field monitoring.
 2. Results of September 2011 field testing using photoionization detector.
 3. "---" denotes probe not tested for VOCs.

- 31. There are 13 perimeter gas monitoring wells at the site, including five along the outside perimeter of the Southern Fill Area (GPs-1,2,3,8, and 13); one along the western perimeter of the site (GP-9); four along the northern perimeter of the Northern Fill Area (GPs-4, 10, 11, and 12); two along the eastern perimeter of the Eastern Fill Area (GPs-5 and 6); and one along the southeast site perimeter (GP-7). GPs-1 to 3 were installed by Florin Perkins Landfill, Inc. as part of a 2001 soil gas

investigation required by the LEA, while GPs-4 through -13 were installed by the Discharger (owner) as part of the 2011 EMP investigation. Seven of the gas wells (GPs-1, 2, 3, 7, 8, 11, and 13) were triple (shallow, middle, and deep) nested completions; one gas well was a double (shallow and deep) nested completion; and the other five gas wells (GPs-4, 6, 9, 10, and 12) were single (deep) completions. All wells were installed per Title 27, Section 20925, as approved by the LEA.⁴ See MRP, Section A.2.b.

32. The highest concentrations of landfill gas constituents detected in the perimeter soil-pore gas monitoring system at the site have been in the gas wells proximate to the Southern Fill Area. In these wells, methane has been historically detected up to 2.6% by volume (GP-13M in 2011) and Freon 11 up to 8,800 ppbv (GP-2D in 2006). Higher concentrations have generally been detected during the wet season compared to the dry season. Historical monitoring data through March 2013 for the Southern Fill Area perimeter gas probes may be summarized as follows:

<u>Perimeter Gas Probe Monitoring Results</u>							
<u>Constituent</u>	<u>Maximum Concentration (ppbv, except where noted)</u>						
	Well:	<u>GP-13¹</u>		<u>GP-3²</u>		<u>GP-2²</u>	
	Probe:	<u>M</u>	<u>D</u>	<u>M</u>	<u>D</u>	<u>M</u>	<u>D</u>
Fixed Gases:							
Methane, %		2.6	1.9	1.2	2.0	<0.5	0.9
VOCs, ppbv							
Carbon disulfide		<15	<15	39	349	174	997
Freon 11		74	84	2,100	2,300	1,200	1,630
Freon 12		<50	<50	91	127	348	422

1. Results based on monitoring since November 2011 per LEA directive.
 2. Results based on monitoring since November 2005 per LEA directive.

Soil-pore gas probes with the highest Freon 11 concentrations (i.e., GPs-2 and 3) were proximate to Freon 11-impacted groundwater monitoring wells (e.g., MWs C and F), indicating that the soil-pore gas may be a source or transport mechanism for the groundwater impacts. See Finding 38 and Attachment B: Site map. Concentrations of landfill gas constituents detected in the other perimeter gas probes at the site have generally been low or non-detect (e.g., <0.5% by volume).

GROUNDWATER CONDITIONS

33. Uppermost groundwater at the site occurs in Riverbank alluvium at an average depth of about 63 feet bgs (-13 feet MSL) sitewide. The groundwater table is unconfined. The groundwater elevation typically ranges from about -10 feet MSL in the northwest corner of the site (i.e., upgradient) to about -16.5 feet MSL in the southeast corner of the site (i.e., downgradient) with about 1 foot of seasonal variation from the seasonal

4. All wells except GPs-7; 11; and 13 were screened in previously mined areas with less than three feet of gravel in the soil column.

average. The groundwater flow direction is generally to the southeast at an average gradient of about 1.4 ft/1000 ft. No significant vertical gradients have been observed between zones in the uppermost aquifer.

34. Groundwater monitoring data indicates that background water quality at the site has about 795 $\mu\text{mhos/cm}$ specific conductivity; 510 mg/L total dissolved solids (TDS) and 200 mg/L bicarbonate alkalinity.
35. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.
36. The groundwater monitoring system consists of 11 onsite wells, including MWs-A through F; G(S) and G(D); H(S) and H(D); and MW-I, MWs-A through C were installed in 1993; MWs-D through F in 2002; and MWs-G through I were installed in 2011. MWs A and I; G(S) and G(D); and H(S) and H(D) are well pairs screened in upper and lower intervals of the uppermost aquifer, respectively. Maximum depths of these paired wells correspond to about -31 feet MSL and -78 feet MSL, respectively. Although historically monitored as background wells under previous WDRs, MWs-A and I are not included as background wells under the MRP for this Order because they are not hydraulically upgradient of any of the landfill units. They are, however, required to be monitored for groundwater elevation under the MRP.
37. The groundwater monitoring system also includes five offsite monitoring wells, including two north/northwest of the site at the Jackson Road Landfill and three east/southeast of the site on the neighboring Aspen I property owned by Teichert Land Company. The Discharger owns and monitors the Jackson Road Landfill monitoring wells under separate WDRs issued for that facility. The Aspen I wells are operated by Teichert Aggregates, Inc., which has been voluntarily monitoring these wells and providing semiannual monitoring reports to the Central Valley Water Board since 2001. The locations of the monitoring wells at the site relative to the landfill units are indicated in Section A.1 of the MRP.
38. Historical groundwater monitoring data for the site indicates that there has been a release from the landfill consisting of low to trace concentrations of volatile organic compounds (VOCs) and mildly elevated concentrations of general minerals. The release was discovered in 2002 upon confirmation of the VOC trichlorofluoromethane (Freon 11) in MW-F, a Point of Compliance well installed the same year along the southern perimeter of the Southern Fill Area. It is unknown how long the release preceded installation of that well. VOCs and/or elevated general minerals have since been detected in other Southern Fill Area compliance wells and immediately downgradient of the Northern Fill Area. No clear rising or falling trends have been historically evident in the Freon concentrations detected at either unit.
39. Groundwater monitoring data for the Second Half 2012 showed the following results for Southern Fill Area:

Constituent	<u>Concentration</u> (mg/L, except where noted)				
	<u>Upgradient</u>		<u>Point of Compliance</u>		
	<u>MW-E</u>	<u>MW-B</u>	<u>MW-C</u>	<u>MW-F</u>	<u>Aspen I MW-2</u>
Specific Conductance, µmhos/cm	751	762	1,526 ²	1,066 ²	1,000 ²
Bicarbonate	280	160	720 ²	500 ²	350
Sulfate	49	150	91	29	42
TDS	500	540	990 ²	700 ²	550
VOCs, µg/L					
Freon 11	<0.2 ³	<0.2 ³	<0.2 ^{1,3}	4.7 ¹	2.2 ¹

1. Confirmed (or previously confirmed) exceedance.
2. Potential exceedance.
3. Non-detect.

Low to trace concentrations of Freon 11 have also been intermittently detected in onsite wells MWs- G(S), G(D), and H(S) about 500 feet down gradient of the Southern Fill Area in the onsite buffer area. See Attachment B: Site Map.

40. Groundwater monitoring data for the Second Half 2012 showed the following results for the Northern Fill Area:

<u>Constituent</u>	<u>Concentration</u> (mg/L, except where noted)		
	<u>Upgradient</u>	<u>Sidegradient</u>	<u>Point of Compliance</u>
	<u>JRLF MW-2</u>	<u>MW-E</u>	<u>MW-D</u>
Specific Conductance. µmhos/cm	797	751	771
Bicarbonate	290	280	210
Sulfate	53	49	80
TDS	540	500	550
VOCs, µg/L			
1,1-DCE	0.8 ¹	<0.2 ²	<0.2 ²
Freon 11	<0.2 ²	<0.2 ²	1.9 ¹

1. Confirmed exceedance.
2. Non-detect.

Freon 11 concentrations in compliance well MW-D have ranged from about 1.0 µg/L to 4.5 µg/L since 2004. No other VOCs have been detected in MW-D or in any other monitoring wells downgradient or sidegradient of the Northern Fill Area. One VOC, 1,1-Dichloroethene, has also been historically detected upgradient of the unit in Jackson Road Landfill monitoring well JRLF MW-2), however.

41. No release to groundwater has been detected down gradient of the Eastern Fill Area, where Second Half 2012 groundwater monitoring results indicate the following concentrations:

<u>Constituent</u>	<u>Concentration</u> (mg/L, except where noted)		
	<u>Upgradient</u>		<u>Point of Compliance</u>
	<u>JRLF MW-1</u>	<u>MW-D</u>	<u>Aspen I MW-1</u>
Specific Conductance, µmhos/cm	587	771	1,100 ¹
Bicarbonate	260	210	510
Sulfate	41	80	69
TDS	380	550	650
VOCs, µg/L			
Freon 11	<0.5 ²	1.9	<1.0 ²

1. Potential exceedance.
2. Non-detect.

Because the down gradient perimeter of the Eastern Fill Area is located along the eastern site boundary, the Eastern Fill Area has no onsite Point of Compliance wells. Nearby offsite well Aspen I MW-1, owned and voluntarily monitored by the neighboring property owner (Teichert Land Company) is therefore used as the Point of Compliance well for the Eastern Fill Area.

EVALUATION MONITORING PROGRAM

42. In 2011, the Discharger implemented an Evaluation Monitoring Program investigation in response to a January 2011 CWC Section 13267 Order issued by the Central Valley Water Board's Executive Officer. The EMP included a geophysical survey of the site; an investigation of landfill wastes; installation and sampling of landfill vapor probes and perimeter soil-pore gas monitoring wells; installation and sampling of additional groundwater monitoring wells to delineate the extent of impacts; and various other activities. The EMP concluded that landfill gas in the Southern Fill Area was the primary source of Freon 11 impacts at the site and that unmined gravel in the unsaturated zone in the southern portion of the site was the likely pathway for LFG migration to groundwater. The complete EMP investigation, including Phases I and II, was documented in the December 2011 report *Evaluation Monitoring Program Report for the Florin Perkins Landfill*, prepared by the DE Team, comprised of Dunn Environmental, Inc.; Fujii Civil Engineering; and GeoChem Applications (DE Team). Additional details of the EMP investigation, including prior compliance history, are summarized in the Information Sheet attached to this Order.
43. The lateral extent of VOC impacts to groundwater were estimated to be as follows, in clockwise order:
- a. 200 feet east of the site;

- b. The southeast corner of the site about 300 feet northwest of Aspen I MW-3 (historically non-detect for VOCs);
 - c. Immediately west of MW-C, DB-1 and the western perimeter of the Northern Fill Area;
 - d. The northern site boundary about 850 feet north of the Northern Fill Area.
44. The EMP did not address the Northern Fill Area as a potential source of Freon 11 in groundwater, attributing the detection of low concentrations of Freon 11 in compliance well MW-D to likely migration of landfill gas from the Southern Fill Area. The study also did not address the detection of elevated levels of methane, a possible Freon carrier gas, in nearby Northern Fill Area vapor probe VP-7. Given the LFG and groundwater impacts detected at the Northern Fill Area, and potential for such impacts to occur in the future at the Eastern Fill Area, the Discharger plans to implement (and this Order requires that the Discharger implement) passive LFG controls at all three units as an interim corrective action measure.

CORRECTIVE ACTION

45. From February 2005 to October 2008, the Discharger implemented an extensive site cleanup in response to March 2006 and July 2007 Notice and Orders issued by the LEA. Most of the cleanup activity consisted of removing organic and inorganic materials stockpiled in the Central Processing Area. Construction and demolition debris buried east of the transfer station pad (Mather waste) and residual wood chips from the former chip and grind area in the southern part of the Central Processing Area were also excavated and removed. Testing of the piles and disposition of the piles was conducted in accordance with work plans approved by Regional Board staff and/or the LEA as applicable. Site cleanup of the Central Processing Area may be summarized as follows:

<u>Material/Waste</u>	<u>Estimated Quantity</u>		Disposition
	<u>CY</u>	<u>Tons</u>	
Concrete/Brick Piles	15,000	15,000	Reused On-Site
Concrete Forms	2,000	2,000	Reused On-Site
Sheetrock Pile	16,400	8,200	Sent to Recycling Facility
Rice Hulls Piles	6,290	2,500	Reused On-Site
Wood Shingles Piles	14,300	3,900	Offsite Disposal
Chip and Grind Piles	5,105	1,900	Sent to Co-Generation Plant
Wood Waste Piles	440	165	Sent to Recycling Facility
Sod Pile	14,000	14,000	Reuse On-Site
Mather Demolition Waste	30,744	21,521	Offsite Disposal
Levee Slurry Piles	4,460	4,460	Reuse On-Site
Metals	64	32	Sent to Recycling Facility
Tires	44	5	Sent to Recycling Facility
Misc. Trash	1,008	378	Offsite Disposal
<i>Estimated Totals:</i>	<i>109,855</i>	<i>74061</i>	

46. In response to the January 2011 CWC Section 13267 Order, the Discharger submitted an Engineering Feasibility Study/Corrective Action Plan (EFS/CAP) report (30 December 2011 *Engineering Feasibility Study and Phased Corrective Action Plan for the Florin Perkins Landfill*, prepared by the DE Team) that evaluated various corrective action alternatives for addressing VOC impacts at the site (e.g., groundwater pump and treat, active landfill gas extraction, landfill closure). Groundwater pump and treat was determined to be infeasible for a variety of reasons including a lack of hydraulic control, low VOC concentrations, and a risk of drawing impacted LFG into contact with the saturated zone. Active LFG extraction was also considered to be infeasible due to the relatively low methane concentrations in waste at the site. The EFS/CAP recommended phased landfill closure, passive landfill gas controls, and monitored natural attenuation as the most effective and feasible corrective action options for addressing impacts at the site. The report also suggested soil vapor extraction as a possible future corrective action measure at the site.

Interim Landfill Gas Controls

47. The Discharger proposes installation of passive LFG controls at each unit prior to landfill closure as an interim corrective action measure to address landfill gas concerns (see *Final Closure and Postclosure Maintenance Plan*, Appendix D, *Landfill Gas Monitoring and Control Plan for the Florin Perkins Landfill*, prepared by the DE Team). The LFG controls will consist of passive LFG vents and associated monitoring probes installed in two phases over a three year period in advance of landfill closure, beginning with the Southern Fill Area.
48. The first phase of the interim LFG controls at each unit will be installed in areas where existing vapor probes indicate the highest concentrations of methane (see Finding 30). The second phase will be installed, as necessary, based on the results of monitoring the first phase for a one-year period. The second phase will consist of any additional vents and monitoring probes necessary for interim LFG control prior to closure of the landfill unit. LFG monitoring will be conducted in accordance with the Landfill Gas Monitoring and Control Plan (LGMCP) as approved by the LEA and incorporated into the MRP under this Order. Upon installation of final cover per the landfill closure schedule, the interim vents would be incorporated into a long term LFG control system constructed in accordance with the final closure plan. See Finding 61.
49. Construction and operation of the passive LFG vents will be subject to local approvals and/or permits, including those from the Sacramento Air Quality Management District, which may require that the Discharger obtain a permit to construct and operate the vents, depending on the results of air emissions testing. The schedule in WDR Provision I.8 incorporates the Discharger's anticipated timeline for obtaining local permits and approvals.

50. All gas vents would consist of 4 inch diameter, Schedule 80 PVC vertical risers with wind-driven turbines on top. The depths of the gas vents would range from about 18 to 40 feet below existing cover grade and average about 25 feet below the existing cover grade. Screen heights will range from about 5 to 15 feet.
51. MRP Order No. R5-2013-0042 requires that the Discharger monitor the landfill gas control system, including existing and future vents and LFG probes, to evaluate its effectiveness as a corrective action measure. The MRP also requires soil-gas monitoring of the perimeter probes for LFG constituents (methane and VOCs).

Final Closure Plan

52. Title 27 does not specify prescriptive closure requirements for an unclassified landfill, however, in the event of a release, landfill closure can be required as a corrective action measure. Additionally, CWC Section 13360(a)(1) allows the Regional 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.
53. On 14 December 2012, the Discharger submitted a Final Closure and Postclosure Maintenance Plan for the landfill (December 2012 *Final Closure and Postclosure Maintenance Plan for the Florin Perkins Landfill*, prepared by the DE Team) in response to the January 2011 CWC Section 13267 Order. Proposed closure activities include site preparation; stockpiling of cover soil, re-grading/buttressing landfill slopes; relocation of wastes along utility tower footings; placement of final cover; construction of precipitation and drainage and LFG controls; establishment of vegetative cover; and installation of survey monuments. Closure activities would be conducted over a 10 year period beginning with the Southern Fill Area in 2013 and ending with the Northern Fill Area and Eastern Fill Area in 2022. Each cell would be closed as a separate landfill unit. The Southern Fill Area would be closed first because it was found to be the most likely source of Freon 11 detected in groundwater at the site.
54. The Final Closure Plan proposes installation of a non-prescriptive final cover on each cell, as follows, from top to bottom:
 - a. Vegetative cover – ½ foot of compacted soil seeded with native grass mix;
 - b. Engineered soil layer – 1½ feet of compacted soil;
 - c. Foundation layer -- 1 foot of compacted soil and/or inert waste.

Existing landfill cover and soil diverted from the onsite transfer station/MRF (approximately 35,000 cubic yards per year) will be used for cover soil.⁵ Additional soil will be mined from the quarry pits, if needed.

5. Approximately 340,000 cubic yards of imported soil is anticipated to be needed for cover construction, including 110,000 cubic yards for the Southern Fill Area, 91,000 cubic yards for the Eastern Fill Area, and 130,000 cubic yards for the Northern Fill Area.

55. The top decks of the units will be graded with slopes ranging from a minimum of 1% (Eastern Fill Area) to a maximum of 3.3% (Northern Fill Area). In proposing less than 3% minimum slopes, the plan includes a demonstration that the design will meet the performance standard under Section 21090(b)(1)(B) (i.e., diversion of drainage from laterally adjacent areas, prevention of ponding) such that the top decks will be adequately drained. The demonstration was largely based on the fact that top deck areas should receive minimal drainage from laterally adjacent areas and that settlement in these areas should be minimal given that the landfill accepted a relatively small percentage of decomposable waste compared to a Class III landfill. Therefore ponding should be less of a concern.
56. Landfill side slopes steeper than 3H:1V will be re-graded to a maximum of 3H:1V, the prescriptive standard under Title 27 absent a demonstration of slope stability under Title 27, Section 21090(a). Such slopes will include areas along the western slope of the Northern Fill Area, the northern slope of the Northern Fill Area, and northern slope of the Eastern Fill Area. Re-grading of such slopes will involve relocation of wastes from the upper portion of the slope to the toe area, extending the unit footprints up to 30 feet on the west side of the facility and from 8 to 20 feet on the north side of the facility. Where re-grading steeper slopes to achieve 3H:1V is infeasible due to physical constraints (i.e., utility tower footings, waste orphaned by access road), wastes will be re-located, or if re-location is not feasible, buttressed with fill soil.
57. A technical report demonstrating the stability of the cover slopes per Title 27, section 21750(f)(5) is not required for the facility because none of the final cover slopes will exceed 3H:1V and the landfill is unclassified.
58. Storm water runoff from the landfill units will be discharged to the quarry pits on the north and/or west sides of the facility, as follows:
 - a. Eastern Fill Area

Runoff will be directed away from the Aspen I property, toward the north and west pits. Runoff from the eastern side slope will be captured in a triangular swale (6 feet wide and 2 feet deep) constructed along the eastern perimeter of the unit and conveyed to the north pit. Top deck runoff will be directed by means of berm and swale to over-side (O/S) drains on the north, west, and south sides of the unit. Runoff from the north side of the unit (including O/S drain) will flow to the north pit via the eastern perimeter swale. Runoff from the south and west sides of the unit (including O/S drains) will be discharged to the Central Processing Area, which drains by sheet flow to the southwest pit.
 - b. Northern Fill Area

Top deck runoff will be captured by O/S drains on each side of the unit. Runoff from the north and east sides of the unit (including O/S drains) will be discharged directly to the north pit, while runoff from the west side of the unit (including O/S drains) will be discharged directly to the northwest pit. Runoff from the south side of the unit will be discharged to the Central Processing Area.

c. Southern Fill Area

The top deck will be flush with the southern perimeter and graded to drain to the north. Top deck runoff will be captured by O/S drains on the north side of the unit. All side slope (including O/S drain) runoff will be discharged to the Central Processing Area.

59. The Final Closure Plan includes a demonstration that discharges to the quarry pits are unlikely to cause or contribute to groundwater mounding based on the lack of any evidence of historical mounding and the site geology, which includes significant clay sequences in the unsaturated zone underlying the pits that should impede groundwater recharge from the pits.
60. Per Title 27, Section 21090(b)(3), all landfill precipitation and drainage facilities (e.g. O/S drains, swales, culverts, outfall, and, quarry pits) will have sufficient capacity to handle a 24-hour, 100-year storm event.
61. Landfill closure will include the installation of long term LFG controls. Prior to final cover construction at a given unit, the interim LFG vents would be capped flush with the landfill surface to allow placement of cover soil. The vents would then be either extended with vertical risers up above the final cover or connected to subsurface manifold piping tied into a centralized passive vent system. Up to 16 wind turbine-driven vents are anticipated to be installed at each landfill unit, depending on the effectiveness of the venting system. Design modifications such as carbon absorption may also be necessary to meet local air district requirements and conversion to an active LFG extraction system may become necessary if the passive controls prove to be inadequate for LFG control.
62. Provision I.12 requires that the Discharger submit a revised Final Closure and Post-Closure Maintenance Plan that reflects the requirements under these WDRs (including MRP No. R5-2013-0042) and any other planned changes in the closure plan for the landfill not requiring revision of this Order.

FINANCIAL ASSURANCES

63. According to the Final Closure and Postclosure Maintenance Plan, the total estimated cost for landfill closure, including installation of final cover, precipitation and drainage controls, landfill gas vents, reporting and contingency costs, is \$2,196,240 in 2012 dollars. (This cost estimate does not include installation of gas and groundwater monitoring systems already in place.) The total estimated cost for landfill postclosure maintenance, including gas and groundwater monitoring, is \$77,700 per year or \$2,361,000 for 30 years in 2012 dollars.
64. Title 27 does not require the operator of an unclassified landfill to provide financial assurances for closure, postclosure maintenance, and/or corrective action. See Sections 22205(b), 22210(b), 22207(a), 22220(b) and 22222.

CEQA AND OTHER LEGAL REFERENCES

65. The City of Sacramento prepared a Negative Declaration and filed a Notices of Determination for this facility with the Sacramento County Recorder 20 August 1979, in accordance with Section 15083 of the California Administrative Code and City of Sacramento environmental regulations. The City also issued a Special Use Permit for the project containing required mitigation measures, including a condition that the project conform to the requirements of the Regional Board.
66. The action to revise the WDRs is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.), in accordance with Title 14, California Code of Regulations (CCR) Section 15301 for existing facilities.
67. Section 13267(b) of California Water Code (CWC) 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." The technical reports and monitoring and reporting program required by this Order (MRP No. R5-2013-0042, attached) 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.
68. This Order implements:
 - a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition;*
 - b. *Chapters 1 through 7, Subdivision 1, Division 2, Title 27, of the California Code of Regulations, effective 18 July 1997, and subsequent revisions;*
 - c. *The Porter-Cologne Water Quality Control Act (as amended January 1, 2002), Division 7, California Water Code.*
 - d. *State Water Resources Control Board Resolution No. 68-16, Statement of Policy With Respect to Maintaining High Quality of Waters in California.*

PROCEDURAL REQUIREMENTS

69. 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.
70. The Regional 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.

71. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.
72. 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 Water Code section 13320 and title 23, CCR, sections 2050 et seq. 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 Internet at:

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

or will be provided upon request.

IT IS HEREBY ORDERED, pursuant to Sections 13263 and 13267 of the California Water Code, that Regional Board Order No. 95-196 is rescinded except for purposes of enforcement, and that Nancy C. Cleavinger and Audrey A. Hunt, Trustees of the NC Cleavinger Family Trust; Audrey A. Hunt and Nancy C. Cleavinger, Trustees of the AA Hunt Family Trust; Janet E. Harvey and Nancy C. Cleavinger, Trustees of the JE Harvey Family Trust; Sally R. Davis and Martin M. Chorich, Co Trustees of the Sally R. Davis Trust; Audrey A. Hunt and Nancy C. Cleavinger, Trustees under a Testamentary Trust for Sally R. Davis under the terms of the will of Robert Earl Davis as established by Decree of Distribution entered on March 28, 1991; Gail Christine Brown, as successor Trustee of the VA Palmer Family Trust; Gail C. Brown, as Trustee of the GC Brown Family Trust, their agents, assigns and successors, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of non-inert wastes to any of the landfill closure units, including wastes defined as "hazardous", "designated" or "nonhazardous", as defined under Title 27, is prohibited.
2. The discharge of new waste, or new discharge of existing waste, to any of the landfill closure units, or portion thereof, is prohibited, except for the following:
 - a. Wastes being relocated as part of final cover re-grading or buttressing under the Final Closure and Postclosure Maintenance Plan;
 - b. The stockpiling of inert wastes for future use in final cover construction;
 - c. The use of inert wastes for final cover foundation layer construction.

3. The discharge of wastes outside of a closure unit is prohibited, except for the stockpiling of inert wastes for future use in final cover construction.
4. The discharge of liquid or semi-solid waste (i.e., waste containing less than 50 percent solids) to the landfill is prohibited.
5. The discharge of solid waste containing free liquid or moisture in excess of the waste's moisture holding capacity to the landfill is prohibited.
6. The discharge of wood or other decomposable waste or material at the site (i.e., outside of the transfer station/MRF), including any of the landfill units, is prohibited.
7. With the exception of storm water infiltration, the discharge of solid or liquid waste or leachate to groundwater is prohibited.
8. The landfill shall not cause pollution or a nuisance, as defined by the California Water Code, Section 13050, and shall not cause degradation of any water supply.

B. DISCHARGE SPECIFICATIONS

1. The discharge shall remain within the designated disposal area at all times.
2. The discharge of inert wastes at the facility allowed under Discharge Prohibition A.2 shall be subject to the following restrictions:
 - a. Wastes used in construction of final cover layers shall meet the project specifications. See Construction Specification F.4.
 - b. Only clean soil shall be used in buttressing landfill slopes and the construction of landfill precipitation and drainage controls.
3. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order.

C. CORRECTIVE ACTION SPECIFICATIONS

1. Methane and other landfill gases, if present, shall be adequately vented, removed from the Unit, or otherwise controlled to prevent the danger of adverse health effects, nuisance conditions, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.
2. Consistent with the EFS/CAP and Provisions of this Order, the Discharger shall implement the following corrective action measures to mitigate LFG impacts at the site:
 - a. Install interim LFG controls (i.e., passive vents) at the landfill units prior to closure in accordance with Provision I.8;

- b. Close the landfill units, including install final cover and long term LFG controls to the extent necessary to remove LFG as a source of impacts to groundwater;
 - c. Maintain the landfill cover, including interim and final cover in accordance with the Final Closure and Postclosure Maintenance Plan to promote runoff and reduce infiltration.
3. Any proposal to install active LFG controls at the site shall require revision of the Final Closure and Post-Closure Maintenance Plan and compliance with Construction Specifications F.9 and F.10 of this Order.
4. Installation, repairs, or modifications to LFG control systems, interim or otherwise, shall be conducted so as not to damage landfill cover or expose landfill waste to the elements. Boots shall be installed around LFG vents extended through landfill cover to prevent infiltration of run-on/runoff into wastes.
5. Monitoring of LFG controls installed as corrective action measures under this Order shall be conducted in accordance with MRP No. R5-2013-0042.

D. STORM WATER SPECIFICATIONS

1. The disposal area shall be protected from any washout or erosion of wastes or covering material, and from inundation, which could occur as a result of floods having a predicted frequency of once in 100 years.
2. Annually, prior to the anticipated rainfall period, all necessary storm water controls, including runoff diversion channels, shall be in place to prevent:
 - a. Erosion of the landfill cover,
 - b. Sedimentation and clogging of storm drains, and
 - c. Flooding of the site.
3. Storm water run-on shall be diverted around the site to the extent feasible. Any storm water run-on flowing onto the site shall be diverted around the closure units into onsite drainage facilities. See Title 27, § 20365(e).
4. Collection and holding facilities associated with landfill precipitation and drainage control systems shall be managed to maintain the design capacity of the system [Title 27, § 20365(d)].
5. All storm water runoff shall be discharged to the onsite quarry pits as described in the Final Closure and Post-Closure Maintenance Plan. Runoff shall not be allowed to pond anywhere at the site except for within the quarry pits.
6. Cover materials shall be graded to divert precipitation from the waste management unit, to prevent ponding of surface water over wastes, and to resist erosion as a result of precipitation [Title 27, § 20365(f)].

E. CLOSURE AND POSTCLOSURE SPECIFICATIONS

Closure

1. The landfill final cover shall be designed, graded, and constructed consistent with the Findings and requirements of this Order, including the updated Final Closure and Post-Closure Maintenance Plan required under Provision I.12, as approved by the Executive Officer.
2. Closure activities shall be implemented in accordance with the schedule in the Provisions of this Order.
3. The final cover grade shall not be less than one percent in any area.
4. Final cover slopes shall not be steeper than a horizontal to vertical ratio of one and three quarters to one and designs having any slopes steeper than a horizontal to vertical ratio of three to one, or having a geosynthetic component, shall have these aspects of their design specifically supported in the slope stability report required in Title 27, § 21750(f)(5) [Title 27, § 21090(a)].
5. All landfill precipitation and drainage control systems shall be designed, constructed, operated and maintained to:
 - a. Convey peak flows from a 100-year, 24-hour storm event; and
 - b. Accommodate the anticipated volume of precipitation and peak flows from surface runoff under 100-year, 24-hour event conditions.
6. The landfill closure units shall be designed, constructed, and maintained to prevent inundation or washout due to floods with a 100-year return period [Title 27, § 20250(c)].
7. The landfill cover shall be designed, constructed, and maintained to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, and washout under the precipitation conditions for the unit [Title 27, § 20365(a)].
8. Any drainage layer in the final cover shall be designed and constructed to intersect with the final drainage system for the waste management unit in a manner promoting free drainage from all portions of the drainage layer [Title 27, §20365(f)].
9. Any revisions to the Final Closure and Post-Closure Maintenance Plan applicable to a given landfill unit shall be submitted at least one year prior to the anticipated date of closure of that unit.
10. Closure of each waste management unit shall be under the direct supervision of a registered civil engineer or certified engineering geologist [Title 27, § 20950(b)].

11. The Discharger shall incorporate into the Final Closure and Post-Closure Maintenance Plan a cover-integrity monitoring and maintenance program which includes at least the following: a periodic leak search, periodic identification of other problem areas, prompt cover repair, and vegetation maintenance [Title 27, § 21090(a)(4)].
12. The Discharger shall complete a final cover survey upon completion of closure activities for that portion of the landfill. The final cover surveys shall include an initial survey and map [Title 27, § 21090(e)(1)]. Every five years, the Discharger shall conduct a survey of the closed landfill cover and submit an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's engineered soil layer [Title 27, § 21090(e)(2)].
13. Within 60 days of completion of all closure activities, the Discharger shall certify that all closure activities were performed in accordance with the most recently approved final closure plan and CQA Plan, and in accordance with all applicable regulations. The Discharger shall also certify that closed landfill units shall be maintained in accordance with and approved post-closure maintenance plan [Title 27, § 21710(c)(6)].

Postclosure

14. The post-closure maintenance period shall continue until the Central Valley Water Board determines that wastes remaining in the landfill unit(s) no longer pose a threat to water quality [Title 27, § 20950(a)(1)].
15. The Discharger shall conduct a periodic leak search to monitor of the integrity of the final cover in accordance with the schedule in the approved final post-closure maintenance plan [Title 27, § 21090(a)(4)(A)].
16. The Discharger shall periodically inspect and identify problems with the final cover including areas that require replanting, erosion, areas lacking free drainage, areas damaged by equipment operations, and localized areas identified in the required five-year iso-settlement survey [Title 27, § 21090(a)(4)(B)].
17. The Discharger shall repair the cover promptly in accordance with a cover repair plan to be included in the final post-closure maintenance plan [Title 27, § 21090(a)(4)(C)].
18. Throughout the post-closure maintenance period, the Discharger shall maintain the structural integrity and effectiveness of all containment structures, maintain the final cover as necessary to correct the effects of settlement and other adverse factors, maintain the monitoring systems, prevent erosion and related damage of the final cover due to drainage, and protect and maintain surveyed monuments [Title 27, § 21090(c)].

F. CONSTRUCTION SPECIFICATIONS

1. For the purposes of this Order, provisions of Title 27 and the SPRR pertaining to containment structures, features, or systems; or to WMU design or construction, shall include landfill final cover unless otherwise indicated by the provision.
2. The final cover constructed over each closure unit shall be constructed in accordance with the Final Closure and Postclosure Maintenance Plan, as follows, from bottom to top:
 - a. Foundation layer -- one foot of compacted soil and/or inert waste.
 - b. Engineered soil layer - 1½ feet of compacted soil
 - c. Vegetative cover – ½ feet of compacted soil seeded with native grass mix
3. The materials used for the foundation layer shall have appropriate engineering properties for a foundation layer in accordance with Section 21090(a)(1). The foundation layer shall be engineered to minimize the potential for differential settlement so as not to affect the structural integrity of the final cover.
4. The foundation and engineered soil layers of the final cover shall be constructed in accordance with the following specifications per the Final Closure Plan:
 - a. Both layers
 - 1) Materials
 - i. Shall have sufficient clay and/or silt content to allow compaction to project specifications (e.g., CL or ML under the Unified Soil Classification System).
 - ii. When compacted, be sufficiently smooth and free of rocks and debris so as not to impair overlying layer(s) (i.e., engineered soil and vegetative cover layers).
 - 2) Compaction
 - i. Lifts of 8 inches or less;
 - ii. 90% of maximum dry density
 - iii. 1×10^{-5} cm/sec maximum hydraulic conductivity;
 - b. Foundation Layer
 - 1) Materials
 - i. Clean soil or inert waste
 - ii. 3 to 4-inch maximum particle size
 - 2) Compaction
 - i. Coarse-grained materials: +/- 3% of optimum moisture content;
 - ii. Fine-grained materials: 0 to 4% wet of optimum moisture content;
 - c. Engineered Soil Layer
 - 1) Materials

- i. Clean soil only;
 - ii. 3/8-inch maximum particle size
 - iii. Minimum 33% passing No. 200 U.S. Standard sieve;
 - iv. Minimum 12% passing 5 microns.
 - 2) Compaction
 - i. +/- 1% of optimum moisture content
5. The soil used in the vegetative cover layer shall support growth of the vegetative cover to the extent necessary to prevent erosion.
6. The Discharger shall ensure that the vegetative cover layer receives necessary seed, binder, and nutrients to establish the vegetation proposed in the Final Closure Plan. The Discharger shall install necessary erosion and sedimentation controls to prevent erosion and sediment in runoff from the closed landfill during the period the vegetation is being established.
7. The vegetative cover layer shall be planted with native or other suitable vegetation so as to provide effective erosion resistance. Vegetative cover shall be:
 - a. Resistant to foreseeable adverse environmental factors (*e.g., climate, disease, and pests*);
 - b. Tolerant of the vegetative layer's soil conditions;
 - c. Germinate rapidly and have a high percentage of surface coverage;
 - d. Sufficiently persistent and self-propagating to prevent surface erosion; and
 - e. Compatible and harmonize with the proposed postclosure land use.
8. Final grading plans for each landfill unit shall be prepared and approved by a registered civil engineer or certified engineering geologist [Title 27, § 21090(b)(1)(C)].
9. The Discharger may propose changes to the landfill cover design before or after construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed cover system results in the protection of water quality equal to or greater than the design prescribed by this Order. The proposed changes may be made following approval by the Executive Officer. Substantive changes to the design may need to be approved by the Regional Board.
10. At least **90 days** prior to initiation of any closure construction activities under the Final Closure Plan, the Discharger shall submit for review and approval all applicable plans and reports, including, but not necessarily limited to, the following:
 - a. An amended Final Closure and Post-Closure Maintenance Plan, as necessary, to describe any proposed design modifications under Construction

Specification E.9.

- 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.

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

11. A third party independent of both the Discharger and the construction contractor shall perform all of the construction quality assurance monitoring and testing during closure construction of the landfill.
12. After completion of closure construction, the Discharger shall submit final documentation to the Executive Officer for review and approval in accordance with Section 20324(d)(1)(C) of Title 27 and the schedule in Provisions I.9 through I.11 herein. The report shall be certified by a registered civil engineer or a certified engineering geologist and shall contain sufficient information and test results to verify that construction was in accordance with the approved project plans and specifications, including the design report, CQA report, and Final Closure and Post-Closure Maintenance Plan. The Discharger shall also certify that closed landfill units shall be maintained in accordance with an approved postclosure maintenance plan [Title 27, § 21710(c)(6)].
13. Notwithstanding the 180-day timeline specified in Title 27, § 21880(c) for submission of closure certification reports, the Discharger shall submit these reports to the Central Valley Water Board within **60 days** of completion of all closure construction activities at each landfill unit at the facility per Provisions I.9 through I.11 and the updated Final Closure and Post-Closure Maintenance Plan required under Provision I.12 of this Order. The closure documents shall include a final CQA report and any other documents necessary to support the certification [Title 27, § 21880].

G. FACILITY SPECIFICATIONS

1. The Discharger shall immediately notify the Regional Board of any flooding, unpermitted discharge of waste off-site, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
2. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements. All storm water controls, including drainage facilities and quarry pit discharge areas, shall be maintained so that they function effectively during precipitation events.

3. Water used for facility maintenance shall be limited to the minimum amount necessary for dust control and maintenance of vegetative cover.
4. The Discharger shall lock all groundwater monitoring wells with a lock on the well cap or monitoring well box. All monitoring devices shall be clearly labeled with their designation including all monitoring wells, LCRS risers, and lysimeter risers and shall be easily accessible for required monitoring by authorized personnel. Each monitoring device shall be clearly visible and be protected from damage by equipment or vehicles.

H. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection and corrective action monitoring program provisions of Title 27, MRP No. R5-2013-0042, and the September 2003 SPRRs (see Section IX, PROVISIONS FOR MONITORING).
2. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, MRP No. R5-2013-0042, and the September 2003 SPRRs.
3. The Discharger shall comply with all standard monitoring and response to release provisions of the September 2003 SPRRs listed in Sections IX (PROVISIONS FOR MONITORING) and X (RESPONSE TO RELEASE).
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 No. R5-2013-0042 and the September 2003 SPRRs.
5. The water quality protection standard shall consist of the constituents of concern (COC), concentration limits, and the point of compliance. The water quality protection standard shall apply during the active life of the waste management unit, closure period, post-closure maintenance period, and any compliance period under Title 27, section 20410 [Title 27, § 20390].
6. The point of compliance at which the water quality protection standard applies is a vertical surface located at the hydraulically down gradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit [Title 27, § 20405].
7. The compliance period is the minimum period of time during which the Discharger shall conduct a water quality monitoring program and is the number of years equal to the active life of the waste management unit plus the closure period [Title 27, § 20410(a)].
8. 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 No. R5-2013-0042.

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

Detection Monitoring

10. A surface water monitoring system shall be established to monitor each surface water body that could be affected by a release from the waste management unit [Title 27, § 20415(c)].
11. An unsaturated zone monitoring system shall be established for each waste management unit [Title 27, § 20415(d)].
12. A sufficient number of monitoring points shall be installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater passing the point of compliance to allow the detection of a release from the waste management unit [Title 27, § 20415(b)(1)(B)1.].
13. Additional monitoring points shall be added as necessary to provide the best assurance of the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)2.].
14. The Detection Monitoring Program shall also include a sufficient number of monitoring points installed at appropriate depths and locations to yield groundwater samples from other aquifers or perched zones not already monitored to provide the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)3. and 4., and §20420(b)].
15. 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 SPRR, Section IX (*PROVISIONS FOR MONITORING*).

Corrective Action Monitoring

16. Corrective action monitoring shall be conducted for the purposes of monitoring the effectiveness of corrective action measures in returning to the Water Quality Protection Standard.
17. Corrective action monitoring shall include one or more of the following data analysis methods, as appropriate:
 - a. Statistical and nonstatistical data analysis methods used to quantify release;

- b. Evaluation of trends associated with release
 - i. Statistical methods (e.g., least squares fit, Sens slope)
 - ii. Graphical methods (i.e., time series plots, comparison of concentration contour maps). and
- c. Water quality chemistry analysis

General

18. Sample collection and analysis shall be in accordance with an approved Sample Collection and Analysis Plan that includes the following elements:

- a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
- b. Sample preservation information and shipment procedures;
- c. Sample analytical methods and procedures;
- d. Sample quality assurance/quality control (QA/QC) procedures; and
- e. Chain of custody control.

See also SPRR, Section IX, *PROVISIONS FOR MONITORING*.

19. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples [Title 27, § 20415(b)(4)(B)]. Groundwater samples shall not be field-filtered prior to laboratory analysis [40 C.F.R. § 258.53(b)]. Groundwater samples needing filtering (e.g., samples to be analyzed for dissolved metals) shall be filtered by the laboratory prior to analysis.
20. Groundwater elevations shall be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator shall determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction.
21. Monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program. Monitoring devices that cannot be operated and maintained to perform to design specifications shall be replaced after review and approval of a report (i.e., work plan) for the proposed replacement devices.
22. All borings are to be logged during drilling under the direct supervision of a registered geologist or registered civil engineer with expertise in stratigraphic well logging [Title 27, § 20415(e)(2)].
23. Soils are to be described according to the Unified Soil Classification System [Title

27, § 20415(e)(2)(A)]. Rock is to be described in a manner appropriate for the purpose of the investigation [Title 27, § 20415(e)(2)(B)].

24. The Discharger shall submit a work plan for review and approval at least **60 days** prior to installation or abandonment of groundwater monitoring wells.
25. The Discharger shall provide Central Valley Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation or abandonment of monitoring devices.
26. Driller's logs for all monitoring wells shall to be submitted to the Central Valley Water Board and the Department of Water Resources [CWC § 13751 and Title 27, § 20415(b)(3)].
27. Groundwater elevation, temperature, electrical conductivity, turbidity, and pH are to be accurately measured at each well each time groundwater is sampled [Title 27, § 21415(e)(13)].
28. The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [Title 27, § 20415(e)(15)].
29. The Discharger shall graph all analytical data from each monitoring point and background monitoring point and shall submit the graphs to the Central Valley Water Board annually [Title 27, § 20415(e)(14)].

I. PROVISIONS:

1. The Discharger shall maintain a copy of this Order at the facility, including the MRP No. R5-2013-0042 and the SPRRs dated September 2003, 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, including those not specifically referred to in this Order.
3. The Discharger shall comply with MRP No. R5-2013-0042, 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 Industrial Facilities, dated September 2003, which are attached hereto and made part of this Order by reference.
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.
7. By **31 January 2014**, the Discharger shall submit the following reports for review and approval:
 - a. An updated Sample Collection and Analysis Plan including the information listed in Monitoring Specification H.18 herein;
 - b. Pursuant to the monitoring specifications of these WDRS and Section C.1 of the MRP, an updated Water Quality Protection Standard Report consistent with the requirements of this Order, including the MRP and SPRR. The updated Water Quality Protection Standard Report shall include the following:
 - i. Pursuant to Section 20415(e)(7)(B) and Monitoring Specifications H.15 and H.17, a technical report proposing updated statistical and non-statistical monitoring data analysis methods for the groundwater monitoring programs under this Order, including background, detection, and corrective action monitoring.
 - ii. An updated list of Constituents of Concern, Concentration Limits, Point of Compliance, Monitoring Points, and the Compliance Period each landfill unit under this Order.
 - iii. A contingency plan for ensuring that the Eastern Fill Area and Southern Fill Area will continue to be monitored in accordance with this Order and Title 27 requirements, given that some of the compliance wells for these units are located offsite and are not owned by the Discharger (i.e., Aspen I MWs-1, 2 and 3). At a minimum, the contingency plan shall address how long these wells will continue to be voluntarily maintained and monitored by their owner and the data reported; the need for an offsite access agreement for these wells; the feasibility of installing additional or replacement wells in the event that these wells are no longer available for monitoring; and any other relevant issues.
8. As proposed in the Landfill Gas Monitoring and Control Plan (LGMCP) under the EFS/CAP, the Discharger shall install passive LFG vents at the landfill units as an interim corrective action measure prior to landfill closure. These interim LFG controls shall be installed consistent with the following schedule:

	Task	Due Date	
		<u>Southern Fill Area</u>	<u>Northern and Eastern Fill Areas</u>
a.	Submit report documenting installation of initial set of interim LFG vents per LGMCP	1 September 2013	30 September 2016

b.	Obtain project permits and approvals, as required	31 July 2014	31 October 2016
c.	Monitor existing vapor probes and interim vents per LGMCP and MRP	1 August 2014 – 31 July 2015	1 November 2016 – 31 October 2017
d.	Submit plans for any additional vents and/or monitoring probes, as indicated by monitoring data	15 September 2015	30 December 2017
e.	Complete installation of interim LFG vents and probes	15 July 2016	1 February 2018
f.	Submit certification report for interim LFG controls	30 September 2017	1 February 2019

9. Consistent with Phase I of the Final Closure Plan/Corrective Action Plan, the Discharger shall close the Southern Fill Area in accordance with the following schedule:

	Task	Due Date
a.	Stockpile cover soil	1 June 2013 - 15 June 2016
b.	Submit Phase I construction and design plans for review and approval	15 February 2015
c.	Begin final cover construction at Southern Fill Area	15 June 2015
d.	Submit construction progress report showing that at least 30,000 yd ³ of soil has been stockpiled per year	15 October 2015
e.	Complete final cover at Southern Fill Area	15 October 2016
f.	Submit Phase I construction report	15 December 2016

10. Consistent with Phase II of the Final Closure Plan/Corrective Action Plan, the Discharger shall install long term LFG controls on the Southern Fill Area and final cover on the Northern and Eastern Fill Areas (excluding steep side slope regrading) in accordance with the following schedule:

	Task	Due Date
a.	Stockpile cover soil for the Northern and Eastern Fill Areas	1 June 2016 - 15 June 2022
b.	Submit Phase II construction and design plans for review and approval	15 February 2017
c.	Begin installation of long term LFG controls at Southern Fill Area and cover construction at other units	15 June 2017

d.	Submit report documenting installation of long term LFG controls at Southern Fill Area	1 October 2019
e.	Submit progress reports for cover construction at the northern and eastern fill areas showing that at least 30,000 yd ³ of soil has been stockpiled per year	15 November each year of construction
f.	Complete final cover on the Northern and Eastern Fill Area decks	15 October 2020
g.	Submit Phase II construction report	15 December 2020

11. Consistent with Phase III of the Final Closure Plan/Corrective Action Plan, the Discharger shall complete closure of the Northern and Eastern Fill Areas, including installation of long term gas controls and regrading of steep side slopes, in accordance with the following schedule:

	Task	Due Date
a.	Submit Phase III construction and design plans for review and approval	15 February 2021
b.	Begin installation of long term LFG controls and side slope re-grading per Findings 61 and 56.	15 June 2021
c.	Submit report documenting installation of long term LFG controls at both units	15 October 2021
d.	Complete side slope re-grading per Finding 56	15 October 2022
e.	Submit Phase III construction report and landfill closure certification	15 December 2022

12. By **1 February 2014**, the Discharger shall submit for approval the following updated plans to reflect the corrective action and closure requirements of these WDRs, including MRP No. R5-2013-0042, and any anticipated changes to these plans within the scope of this Order:
- a. An updated Final Closure and Postclosure Maintenance Plan; and
 - b. An updated Landfill Gas Monitoring and Control Plan.
13. In the event of any change in landowner or the operator of the waste management facility, the Discharger shall notify the succeeding owner or operator in writing of the existence of this Order. A copy of that notification shall be sent to the Central Valley Water Board.
14. In the event of any change of ownership or responsibility for construction, operation, closure, or post-closure maintenance of the waste discharge facilities described in this Order, the Discharger shall notify the Central Valley Water Board prior to the effective date of the change and shall include a statement by the new Discharger that construction, operation, closure, or post-closure

maintenance will be in compliance with this Order and any revisions thereof [Title 27, § 21710(c)(1)].

15. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within 14 days of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory requirements contained in Reporting Requirement VIII.A.8 of the SPRR and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. Transfer of this Order shall be approved or disapproved by the Central Valley Water Board.
16. The Discharger shall also notify the Regional Board of any proposed land use or closure plan changes. This notification shall be given 90 days prior to the effective date of the change and shall be accompanied by an amended Report of Waste Discharge and any technical documents that are needed to demonstrate continued compliance with these waste discharge requirements.

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 30 May 2013.

Original signed by

PAMELA C. CREEDON, Executive Officer

Attachments
JDM

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2013-0042
FOR

NANCY C. CLEAVINGER, TRUSTEE OF THE NC CLEAVINGER
FAMILY TRUST, ET AL.
FLORIN PERKINS LANDFILL
UNCLASSIFIED LANDFILL UNITS
CLOSURE AND CORRECTIVE ACTION
SACRAMENTO COUNTY

This monitoring and reporting program (MRP) is issued pursuant to California Water Code section 13267 and incorporates requirements for groundwater, surface water, and unsaturated zone monitoring and reporting; facility monitoring, maintenance, and reporting contained in California Code of Regulations, title 27, section 20005, et seq. (hereafter Title 27), Waste Discharge Requirements (WDRs) Order No. R5-2013-0042, and the Standard Provisions and Reporting Requirements for Industrial Facilities (SPRRs) dated September 2003. Compliance with this MRP is ordered by the WDRs and the Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Water Board or the Executive Officer.

A. MONITORING

The Discharger shall comply with the detection and corrective action monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with the monitoring and response to release provisions (i.e., Sections IX and X) of the SPRRs and monitoring specifications (i.e., Section H) of the WDRs. All compliance monitoring wells established for the detection monitoring program shall constitute Monitoring Points under the Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water Monitoring Points shall be sampled and analyzed for monitoring parameters and Constituents of Concern (COCs) as indicated and listed in Tables I through VI.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program. The monitoring program of this MRP includes:

<u>Section</u>	<u>Monitoring Program</u>
A.1	Groundwater Monitoring
A.2	Unsaturated Zone Monitoring
A.3	Leachate Seep Monitoring
A.4	Surface Water Monitoring
A.5	Facility Monitoring
A.6	Additional Corrective Action Monitoring

1. Groundwater Monitoring

The Discharger shall operate and maintain groundwater detection and corrective action monitoring systems that comply with the applicable provisions of Title 27, sections 20415 through 20430. These groundwater monitoring systems shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The current groundwater monitoring network for the landfill units shall consist of the following wells:

a. Southern Fill Area (SFA)

<u>Well</u>	<u>Program</u>	<u>Zone</u>	<u>Location</u>
MW-B	Background	Upper	Onsite
MW-E			
MW-C	Detection & Corrective Action		
MW-F			
MW-G(S)	Corrective Action	Upper	Onsite (Buffer Area)
MW-H(S)			
MW-G(D)		Lower	
MW-H(D)			
Aspen MW-2	Detection & Corrective Action	Upper	Offsite (southeast)
Aspen MW-3			

b. Northern Fill Area (NFA)

<u>Well</u>	<u>Program</u>	<u>Zone</u>	<u>Well Location</u>
JRLF MW-2	Background	Upper	Offsite (northwest)
JRLF MW-1			Offsite (north)
MW-D	Detection & Corrective Action		Onsite
MW-A	Groundwater Elevation Only	Upper	
MW-I		Lower	

c. Eastern Fill Area (EFA)

<u>Well</u>	<u>Program</u>	<u>Zone</u>	<u>Well Location</u>
JRLF MW-1	Background	Upper	Offsite (north)
MW-D	Background		Onsite
Aspen MW-1	Detection		Offsite (east)

Groundwater monitoring shall be conducted on all background, detection, and corrective action monitoring wells specified above that are either owned by the Discharger or (in the case of offsite wells) for which the Discharger has legal access for sampling. **Once per quarter**, the Discharger shall measure

the groundwater elevation in each of these wells, determine groundwater flow direction, and estimate groundwater flow rates in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored. The results shall be reported semiannually, including the times of expected highest and lowest elevations of the water levels in the wells, pursuant to Title 27, section 20415(e)(15).

The Discharger shall collect, preserve, and transport groundwater samples in accordance with the Sample Collection and Analysis Plan submitted under WDR Provision I.7.a (or a modified version thereof), as approved by Central Valley Water Board staff. Samples shall be collected and analyzed for the parameters and constituents listed in Table I in accordance with the specified methods and frequencies. Samples collected for the COCs specified in Table I shall be collected and analyzed in accordance with the methods listed in Table V every 2½ years beginning with the First Half 2015 monitoring period under this Order.

For all monitoring wells named under this Order not owned by the Discharger, or for which the Discharger does not have legal access for monitoring, the Discharger shall acquire the required monitoring data from, and with the permission of, the offsite well owner (or its authorized representative per the SPRR) or from the public records. If the information cannot be obtained, the Discharger shall document its attempts to obtain the information.

Detection and corrective action monitoring data analysis shall be conducted consistent with the statistical and non-statistical data analysis methods contained in the updated Water Quality Protection Standard Report submitted under WDR Provision I.7.b, as approved by Central Valley Water Board staff. The results of monitoring (including acquired data) for quarterly field parameters, semiannual monitoring parameters, and 2½-year COCs, shall be reported in the monitoring report for the semiannual period in which the samples were collected.

2. **Unsaturated Zone Detection Monitoring**

Monitoring of soil pore water beneath the landfill units is infeasible because each unit is unlined. The unsaturated zone detection monitoring program is therefore limited to landfill gas and soil gas monitoring.

a. **Soil-Pore Gas**

The unsaturated zone detection monitoring network shall include the 13 soil-pore gas monitoring wells (28 probes) installed along the facility perimeter as described in WDR Finding 31, as follows:

<u>Unit</u>	<u>Monitoring Point</u>	<u>Program</u>
Southern Fill Area	GP-1 ¹	Corrective Action
	GP-2 ¹	
	GP-3 ¹	
	GP-8 ¹	
	GP-7 ¹	Detection
	GP-13 ¹	
Eastern Fill Area	GP-5 ²	Detection
	GP-6 ³	
Northern Fill Area	GP-4 ³	Detection
	GP-10 ³	
	GP-11 ³	
	GP-12 ³	
Central Processing Area	GP-9 ³	Detection

1. Triple-nested (shallow, middle, and deep) completion relative to landfill waste.
2. Double-nested (shallow and deep) completion relative to landfill waste.
3. Single (deep) completion relative to landfill waste.

Soil-pore gas monitoring shall also be conducted on any new or replacement monitoring probes installed outside of or beneath the landfill units to monitor LFG migration and the effectiveness of landfill gas control measures. Soil pore gas samples shall be collected from the perimeter wells listed above, including each nested probe in each well.

b. Landfill Gas

The unsaturated zone detection monitoring network shall also include all vapor probes installed in landfill waste that showed relatively low concentrations of methane (i.e., <20%) prior to installation of landfill gas vents. The current landfill gas detection monitoring network shall consist of the following:

<u>Unit</u>	<u>Monitoring Point</u>	<u>Program</u>
Eastern Fill Area	VP-3	Detection
	VP-5	
	VP-6	
Northern Fill Area	VP-8	Detection

In the event a vapor probe shows methane concentrations equal to or exceeding 20% on two or more consecutive monitoring events, that vapor

probe shall be moved to the Additional Corrective Action Monitoring Program under Section A.6.b herein. LFG detection monitoring shall also be conducted on any new or replacement vapor probes satisfying the above criteria.

All soil-pore gas and LFG samples collected under this section shall be analyzed for the parameters and constituents listed in Table II.A in accordance with the specified methods and frequencies. The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the approved Sample Collection and Analysis Plan. Monitoring results for the unsaturated zone shall be included in the monitoring reports submitted under this Order and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

3. Leachate Seep Monitoring

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

4. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. The current surface water monitoring points for the landfill are:

<u>Monitoring Point</u>	<u>Status</u>	<u>Location</u>
SW-1	Detection	Quarry Pit (northwest)
SW-2	Detection	Quarry Pit (north)
SW-3	Detection	Quarry Pit (west)
SW-4	Detection	Quarry Pit (northwest)
SW-5	Background	Buffer area (south)

For surface water detection monitoring, a sample shall be collected at each monitoring point location or the closest location to that monitoring point where there is ponded water. A background storm water sample shall also be collected from a representative location in the Buffer Area south of the facility for comparison purposes. Samples shall be analyzed for the monitoring parameters and constituents in accordance with the methods and frequency specified in Table IV.

5. Facility Monitoring

a. Annual Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess repair and maintenance needed for drainage control systems, cover systems, and groundwater monitoring wells; and shall assess preparedness for winter conditions (including but not limited to erosion and sedimentation control). The Discharger shall take photos of any problems areas before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by **31 October**. Annual facility inspection reporting shall be submitted as required in Section B.4 of this MRP.

b. Major Storm Events

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

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

Prior to June 2017, and every five years thereafter, the Discharger shall conduct an iso-settlement survey for closed landfill units and produce an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's engineered soil layer. For each portion of the landfill, this map shall show the total lowering of the surface elevation of the final cover, relative to the baseline topographic map [Title 27, section 21090(e)(1 & 2)]. Reporting shall be in accordance with Section B.6 of this MRP. All final cover surveys shall be conducted in accordance with WDR Closure and Postclosure Specification E.12.

d. Standard Observations

The Discharger shall conduct Standard Observations at the landfill in accordance with this section of the MRP. Standard observations shall be conducted monthly during the wet season (1 October to 30 April) and quarterly during the dry season (1 May to 30 September). Results of Standard Observations shall be submitted in the semiannual monitoring reports required in Section B.1 of this MRP.

6. Additional Corrective Action Monitoring

a. Landfill Gas Vents

The Discharger shall monitor vented gas from all passive landfill gas vents installed at the landfill units described in WDR Findings 48 and 61. Vent monitoring shall be conducted to assess the effectiveness of the vents in removing LFG from the landfill as a corrective action measure (both interim and long term) under Title 27 and this MRP. Gas samples shall be collected from each vent and analyzed for all parameters and constituents listed in Table II.B at their listed frequencies.

b. Landfill Vapor Probes

The unsaturated zone corrective action monitoring network shall include all vapor probes installed in landfill waste that showed methane concentrations equal to or exceeding 20% on two or more consecutive monitoring events prior to the installation of landfill gas vents. LFG corrective action monitoring shall also be conducted on any new or replacement vapor probes satisfying these criteria. The current landfill gas corrective action monitoring network shall consist of the following:

<u>Unit</u>	<u>Monitoring Point</u>	<u>Program</u>
SFA	VP-1	Corrective Action
SFA	VP-2	Corrective Action
SFA	VP-4	Corrective Action
NFA	VP-7	Corrective Action

Gas samples shall be collected from each of the above vapor probes and analyzed for all parameters and constituents listed in Table II.B (except air flow rate and vent pressure) at their listed frequencies.

c. Active LFG Extraction

In the event that Discharger proposes or is required to install an active LFG extraction system at the facility and that system is approved and installed under this Order, that system shall be monitored consistent with the following schedule:

LFG EXTRACTION SYSTEM MONITORING (If Applicable)			
LFG			
<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>

See Table II.B ¹	---	---	---
Total VOCs removed during year	lbs/yr	Annually ²	Annually
Cumulative VOCs removed	lbs	Annually ²	Annually

1. Monitoring shall include all Table II.B field and monitoring parameters, as applicable to active extraction system.
2. Amounts shall be calculated or estimated per approved monitoring plan.

B. REPORTING

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

Reporting Schedule			
<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.1	Semiannual Monitoring Report	30 June, 31 December	1 August, 1 February
B.2	Annual Monitoring Report	31 December	1 February
B.3	Seep Reporting	Continuous	Immediately & 7 Days
B.4	Annual Facility Inspection Report	31 October	15 November
B.5	Major Storm Event Reporting	Continuous	7 days from damage discovery
B.6	Survey and Iso-Settlement Map for Closed Landfills	Every Five Years	Upon closure and every 5 years thereafter

Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this Monitoring and Reporting Program and as required in WDRs Order No. R5-2013-0042 and the SPRR, particularly the monitoring and response to release provisions (i.e., WDR Section H and SPRR Sections IX and X). In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format, such as a computer disk.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the Central Valley Water Board in accordance with the above schedule for the calendar period in which samples were taken or observations made. In addition, the Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27.

The results of **all monitoring** conducted under this Order, and all required monitoring data acquired from offsite well owners, shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

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

1. Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
2. Date, time, and manner of sampling;
3. Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;
4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
5. Calculation of results; and
6. Results of analyses, and the MDL and PQL for each analysis. All peaks shall be reported.

Required Reports

1. Semiannual Monitoring Report

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

- a. For each groundwater monitoring point addressed by the report, a description of:
 - 1) The time of water level measurement;

- 2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
 - 3) The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;
 - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - 5) A statement that the sampling procedure was conducted in accordance with the approved Sample Collection and Analysis Plan.
- b. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
 - c. The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report [Title 27, section 20415(e)(15)].
 - d. Cumulative tabulated monitoring data for all monitoring points and constituents for groundwater, unsaturated zone, leachate, and surface water. Concentrations below the laboratory reporting limit shall not be reported as "ND" unless the reporting limit is also given in the table. Otherwise they shall be reported "<" the reporting limit (e.g., <0.10). Units shall be as required in Tables I through IV unless specific justification is given to report in other units. Refer to the SPRRs Section I "Standard Monitoring Specifications" for requirements regarding MDLs and PQLs.
 - e. Laboratory statements of results of all analyses evaluating compliance with requirements.
 - f. An evaluation of the concentration of each monitoring parameter (or 5-year COC when five year COC sampling is conducted) as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit. Report any actions taken under Section J: Response to a Release for verified exceedances of a concentration limit.
 - g. An evaluation of the effectiveness of run-off/run-on control facilities.
 - h. A summary of all Standard Observations for the reporting period required in Section A.5.d of this MRP.
 - i. A summary of inspection, leak search, and repair of final covers on any

closed landfill units in accordance with an approved final post-closure maintenance plan as required by Standard Closure and Post-Closure Maintenance Specifications G.26 through G.29 of the SPRRs.

- j. Copies of monitoring reports or monitoring data legally acquired from offsite well owners or public records.

2. **Annual Monitoring Report**

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

- a. All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. If a 5-year COC event was performed, then these parameters shall also be graphically presented. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
- b. An evaluation of the monitoring parameters with regards to the cation/anion balance, and a graphical presentation using a Stiff diagram, a Piper graph, or a Schoeller plot.
- c. All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file format such as a computer disk. The Central Valley Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27, section 20420(h)], that facilitates periodic review by the Central Valley Water Board.
- d. Hydrographs of each well showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.
- e. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
- f. A map showing the area and elevations in which filling has been

completed during the previous calendar year and a comparison to final closure design contours, and include a projection of the year in which each discrete landfill module will be filled.

- g. A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.
- h. The results of the annual testing of leachate collection and removal systems required under Standard Facility Specification E.14 of the SPRRs.
- i. Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.
- j. A comprehensive discussion of any Corrective Action Program required by this MRP under Section A.6.

3. **Seep Reporting**

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

- a. A map showing the location(s) of seepage;
- b. An estimate of the flow rate;
- c. A description of the nature of the discharge (e.g., all pertinent observations and analyses);
- d. Verification that samples have been submitted for analyses of the Field Parameters and Monitoring Parameters listed in Table III of this MRP, and an estimated date that the results will be submitted to the Central Valley Water Board; and
- e. Corrective measures underway or proposed, and corresponding time schedule.

4. **Annual Facility Inspection Reporting**

By **15 November** of each year, the Discharger shall submit a report describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A. **5.a** of this MRP, above.

5. **Major Storm Event Reporting**

Following major storm events capable of causing damage or significant erosion, the Discharger **immediately** shall notify Central Valley Water Board

staff of any damage or significant erosion upon discovery and report subsequent repairs within **14 days** of completion of the repairs, including photographs of the problem and the repairs. Refer to Section A.5.b of this MRP, above.

6. **Survey and Iso-Settlement Map for Closed Landfills**

The Discharger shall conduct a survey and submit an iso-settlement map for each closed area of the landfill every five years pursuant to Title 27, section 21090(e). Refer to Section A.5.c of this MRP, above. The first report is due by **30 June 2017** (i.e., after closure of the SFA) and the next report is due by **30 June 2022** (i.e., after closure of the NFA and EFA).

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. **Water Quality Protection Standard Report**

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

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

- a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management unit or portion of a unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27, section 20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).
- d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).

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

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

The Water Quality Protection Standard used under previous WDRs is not relevant under this Order because the three area fill cells at the site are being closed and monitored as separate landfill units. The Water Quality Protection Standard under this Order shall therefore be as set forth in the updated Water Quality Protection Standard Report submitted under WDR Provision H.7.b, as approved by Central Valley Water Board staff. Once approved, the Water Quality Protection Standard shall be updated annually as warranted, using new and historical background monitoring data and approved data analysis methods.

2. **Monitoring Parameters**

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

3. **Constituents of Concern (COCs)**

The COCs include a larger group of waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit, and are required to be monitored at least every five years [Title 27, sections 20395 and 20420(g)]. The COCs for all waste management units at the facility are those listed in Tables I through IV for the specified monitored medium, and Table V. The Discharger shall monitor all COCs every 2½ years (or more frequently if required in a Corrective Action Program). The last COC monitoring event under previous WDRs was conducted in October 2012 and reported in the *2012 Annual Monitoring Report* submitted to the Central Valley Water Board in January 2013. The first 2½-year COC monitoring event under this Order shall therefore be conducted by April 2015 and reported in the First Half 2015 monitoring report due by **1 August 2015**.

4. Concentration Limits

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

- a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or
- b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

The data analysis methods used for calculating concentration limits under this Order shall be those set forth in the updated Water Quality Protection Standard Report submitted under WDR Provision H.7.b, as approved by Central Valley Water Board staff.

5. Retesting Procedures for Confirming Evidence of a Release

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

- a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Monitoring Provision X.B.10 of the SPRRs.
- b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedure as required in Monitoring Provision X.B.12 of the SPRRs.

6. Point of Compliance

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

<u>Unit</u>	<u>Point of Compliance Monitoring Wells</u>
Southern Fill Area	C, F, and Aspen MW-2
Northern Fill Area	MW-D
Eastern Fill Area	Aspen MW-1

7. Compliance Period

The compliance period for each waste management unit shall be the number of years equal to the active life of the unit plus the closure period. The compliance period is the minimum period during which the Discharger shall

conduct a water quality monitoring program subsequent to a release from the waste management unit. The compliance period shall begin anew each time the Discharger initiates an evaluation monitoring program [Title 27, section 20410].

8. Monitoring Points

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

D. TRANSMITTAL LETTER FOR ALL REPORTS

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

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

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

30 May 2013

JDM

TABLE I
GROUNDWATER MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameter			
Groundwater Elevation	Ft. & 100ths, M.S.L.	Quarterly	Semiannually
Temperature	°F	Semiannually	Semiannually
Electrical Conductivity	µmhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Turbidity	Turbidity units	Semiannually	Semiannually
Monitoring Parameter			
General Minerals ¹			
Bicarbonate	mg/L ¹	Semiannually	Semiannually
Calcium	mg/L	Semiannually	Semiannually
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L	Semiannually	Semiannually
Nitrate - nitrogen	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sodium	mg/L	Semiannually	Semiannually
Sulfate	mg/L	Semiannually	Semiannually
Total Dissolved Solids	mg/L	Semiannually	Semiannually
Volatile Organic Compounds ² (USEPA Method 8260B)	µg/L ²	Semiannually	Semiannually
Constituents of Concern (see Table V)			
Inorganics (dissolved)	µg/L	Every 2½ years ³	Every 2½ years ³

1. Milligrams per liter

2. Micrograms per liter

3. The first 2½-year COC monitoring event under this Order shall be conducted in the First Half 2015.

TABLE II. A			
UNSATURATED ZONE DETECTION MONITORING PROGRAM			
SOIL-PORE GAS			
<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameter			
Methane	%	Quarterly ¹	Semiannually
Volatile organic compounds (USEPA Method TO-15)	µg/cm ³	Quarterly ^{2,3}	Semiannually

1. Methane monitoring shall be conducted by field meter.
2. VOC sampling required in all probes in which detected methane concentration exceeds 1% by volume.
3. VOC sampling of probe may be discontinued after one year of quarterly monitoring if detected methane concentration falls and remains below 1% by volume during that period.

TABLE II. B			
UNSATURATED ZONE CORRECTIVE ACTION MONITORING PROGRAM			
LANDFILL GAS			
<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameter¹			
Air flow rate	cu ft/min	Quarterly	Semiannually
Vent pressure ²	psi	Quarterly	Semiannually
Temperature	oF	Quarterly	Semiannually
Carbon dioxide	%	Quarterly	Semiannually
Hydrogen sulfide	ppmv	Quarterly	Semiannually
Methane	%	Quarterly	Semiannually
Monitoring Parameter			
Volatile organic compounds (USEPA Method TO-15)	µg/cm ³	Semiannually ³	Semiannually

1. Field monitoring shall be conducted using appropriate measuring device for each parameter,
2. Vent pressure shall be measured with the wind turbine gate valve open and closed.
3. VOC sampling required for all vents in which detected methane concentration exceeds 20% by volume during either quarterly field monitoring event.

**TABLE III
 LEACHATE SEEP MONITORING**

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameter			
Total Flow ¹	Gallons	Each occurrence	Within 7 days
Flow Rate ¹	Gal/Day	Each occurrence	Within 7 days
Electrical Conductivity	µmhos/cm	Each occurrence	Within 7 days
pH	pH units	Each occurrence	Within 7 days
Monitoring Parameter			
Bicarbonate	mg/L	Each occurrence	Within 7 days
Calcium	mg/L	Each occurrence	Within 7 days
Carbonate	mg/L	Each occurrence	Within 7 days
Chloride	mg/L	Each occurrence	Within 7 days
Magnesium	mg/L	Each occurrence	Within 7 days
Nitrate - nitrogen	mg/L	Each occurrence	Within 7 days
Potassium	mg/L	Each occurrence	Within 7 days
Sodium	mg/L	Each occurrence	Within 7 days
Sulfate	mg/L	Each occurrence	Within 7 days
Total Dissolved Solids	mg/L	Each occurrence	Within 7 days
Volatile organic compounds (USEPA Method 8260B)	µg/L	Each occurrence	Within 7 days

^{1.} The quantity of leachate seepage shall be estimated and reported in gallons/day or total gallons if flow is non-continuous. Also, refer to Section B.3

TABLE IV
SURFACE WATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u> ¹	<u>Reporting Frequency</u> ²
Field Parameter			
Water depth	Feet	Semiannually	Semiannually
Electrical Conductivity	µmhos/cm	Semiannually	Semiannually
pH	pH units	Semiannually	Semiannually
Turbidity		Semiannually	Semiannually
Flow to Waters of U.S.		Semiannually	Semiannually
Monitoring Parameter			
Bicarbonate	mg/L	Semiannually	Semiannually
Calcium	mg/L	Semiannually	Semiannually
Carbonate	mg/L	Semiannually	Semiannually
Chloride	mg/L	Semiannually	Semiannually
Magnesium	mg/L	Semiannually	Semiannually
Nitrate - nitrogen	mg/L	Semiannually	Semiannually
Potassium	mg/L	Semiannually	Semiannually
Sodium	mg/L	Semiannually	Semiannually
Sulfate	mg/L	Semiannually	Semiannually
Total Dissolved Solids	mg/L	Semiannually	Semiannually
Volatile organic compounds (USEPA Method 8260B)	µg/L	Semiannually	Semiannually

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

TABLE V
CONSTITUENTS OF CONCERN
& APPROVED USEPA ANALYTICAL METHODS

General Minerals	
	USEPA Method
Bicarbonate	2320B
Calcium	200.7/600
Carbonate	2320B
Chloride	300
Magnesium	200.7/600
Nitrate – Nitrogen	300
Potassium	200.7/600
Sodium	200.7/600
Sulfate	300
Total Dissolved Solids	2540C

Volatile Organic Compounds:

USEPA Method 8260B

Acetone
 Acetonitrile (Methyl cyanide)
 Acrolein
 Acrylonitrile
 Allyl chloride (3-Chloropropene)
 Benzene
 Bromochloromethane (Chlorobromomethane)
 Bromodichloromethane (Dibromochloromethane)
 Bromoform (Tribromomethane)
 Carbon disulfide
 Carbon tetrachloride
 Chlorobenzene
 Chloroethane (Ethyl chloride)
 Chloroform (Trichloromethane)
 Chloroprene
 Dibromochloromethane (Chlorodibromomethane)
 1,2-Dibromo-3-chloropropane (DBCP)
 1,2-Dibromoethane (Ethylene dibromide; EDB)
 o-Dichlorobenzene (1,2-Dichlorobenzene)
 m-Dichlorobenzene (1,3-Dichlorobenzene)
 p-Dichlorobenzene (1,4-Dichlorobenzene)
 trans- 1,4-Dichloro-2-butene
 Dichlorodifluoromethane (CFC 12)
 1,1 -Dichloroethane (Ethylidene chloride)

1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1, 1-Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans- 1,2-Dichloroethylene (trans- 1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
1,3-Dichloropropane (Trimethylene dichloride)
2,2-Dichloropropane (Isopropylidene chloride)
1,1 -Dichloropropene
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
Ethyl methacrylate
Hexachlorobutadiene
2-Hexanone (Methyl butyl ketone)
Isobutyl alcohol
Methacrylonitrile
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl ethyl ketone (MEK; 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
Methyl methacrylate
4-Methyl-2-pentanone (Methyl isobutyl ketone)
Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Naphthalene
Propionitrile (Ethyl cyanide)
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE)
Toluene
1,2,4-Trichlorobenzene
1,1,1 -Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene; TCE)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride (Chloroethene)
Xylene (total)

Inorganics (dissolved):

USEPA Method

Aluminum	6010
Antimony	7041
Barium	6010
Beryllium	6010
Cadmium	7131A
Chromium	6010
Cobalt	6010
Copper	6010
Silver	6010
Tin	6010
Vanadium	6010
Zinc	6010
Iron	6010
Manganese	6010
Arsenic	7062
Lead	7421
Mercury	7470A
Nickel	7521
Selenium	7742
Thallium	7841
Cyanide	9010C
Sulfide	9030B

INFORMATION SHEET

ORDER NO. R5-2013-0042
NANCY C. CLEAVINGER, TRUSTEE, ET AL.
FLORIN PERKINS LANDFILL
SACRAMENTO COUNTY

Background Information

The Florin Perkins Landfill is an inactive, unclassified landfill on Florin Perkins Road near the Jackson Highway about seven miles southeast of downtown Sacramento. The landfill operated from 1993 to 2005 under waste discharge requirements (Order Nos. 89-202 and 95-196) that limited the discharge to inert wastes. In February 2005, the property owner (Discharger under this Order) evicted the former landfill operator Florin Perkins Landfill, Inc. for noncompliance with Regional Board Orders and breaches of the operating agreement. Since then the landfill has been inactive.

The landfill was sited in a quarry pit that was mined to a maximum depth of about 52.5 feet below ground surface (bgs) or -2.5 feet MSL. Previous WDRs authorized a 106-acre unit area within the quarry pit area for landfilling. Three area fill cells totaling about 39 acres were ultimately developed on the north, south, and east sides of the authorized disposal area. Up to 11 feet of concrete and other inert debris was also buried in the central part of the unit (referred to as the Central Processing Area or CPA). This area was subsequently used for materials stockpiling and processing. Other onsite features include ancillary landfill facilities (e.g., ditches, monitoring wells, and access roads); a 10-acre transfer station/materials recovery facility (MRF); buffer land south of the unit (19 acres); a utility tower easement; and undeveloped areas of the quarry pit.

Uppermost groundwater at the site occurs in Riverbank alluvium at an average depth of about 63 feet bgs corresponding to -13 feet MSL. The shallow aquifer is unconfined. The groundwater flow direction is generally to the southeast at an average gradient of about 1.4 ft./1000 ft. No significant vertical gradients have been observed between upper and lower zones in the uppermost aquifer. Background water quality at the site has about 795 μ mhos/cm specific conductivity; 510 mg/L total dissolved solids (TDS) and 200 mg/L bicarbonate alkalinity. Groundwater impacts consisting of low concentrations of the volatile organic compound (VOC) trichlorofluoromethane (Freon 11) and mildly elevated general minerals have been historically detected at the site since 2002, primarily down gradient of the Southern Fill Area. For example, concentrations of Freon 11 detected in compliance well MW-F at the Southern Fill Area have historically ranged from about 1 to 22 μ g/L and averaged about 8 μ g/L. Lower average concentrations of Freon 11 have also been detected down gradient of the Northern Fill Area. No clear rising or falling trends have been historically evident in the Freon concentrations detected at either unit. The water quality limit for Freon 11 is the 150 μ g/L California Maximum Contaminant Level.

Evaluation Monitoring Program

In February 2003, Florin Perkins Landfill, Inc. (the former landfill operator and a

discharger under previous WDRs Order No. 95-196) submitted an Evaluation Monitoring Program (EMP) work plan under Title 27 to investigate the release per a 9 December 2002 Regional Board staff request.¹ The work plan proposed the following EMP tasks:

- Sampling of a nearby gas probe to assess whether the impacts detected in MW-F may been caused by VOCs in landfill gas (LFG);
- Semiannual monitoring of all six groundwater monitoring wells for VOCs; extended development of Wells D, E and F prior to sampling (i.e., to verify the wells were free of sediments from completion activities);
- Review of available well information and historical water quality data for offsite wells immediately east of the site; and
- Sampling of the latter wells after obtaining well access to assess the down gradient extent of the release and spatial changes in the groundwater chemistry.

In a 6 March 2003 letter, Regional Board staff approved the proposed EMP requesting that the former operator submit the following items by specified due dates:

- An addendum addressing staff's comments on the plan,
- An Engineering Feasibility Study, and
- A proposed corrective action plan.²

Florin Perkins Landfill, Inc. failed to implement the EMP and submit the above reports; and subsequently failed to respond to an August 2003 California Water Code (CWC) Section 13267 Order for the reports issued by the Executive Officer. On 21 January 2011, the Executive Officer issued a CWC Section 13267 Order to the owner requesting various items by specified due dates, including, but not limited to, the following:

- By 30 March 2011, a report as to whether or not the owner planned to restart the landfill, and if not, by 30 December 2011, a final closure and postclosure maintenance plan for the landfill;
- By 30 May 2011, an addendum to the 2003 EMP including:
 - a response to Board staff's March 2003 comments on the EMP;
 - an evaluation of gas and groundwater monitoring data collected from onsite and offsite wells since 2003; and
 - proposed changes to the EMP to fully define the lateral and vertical extent of gas and groundwater impacts, both onsite and offsite; and
- By 30 December 2011, an Engineering Feasibility Study (EFS) report, including EMP Report and Corrective Action Plan (CAP) prepared in accordance with Title 27 regulations.

1. See 10 February 2003 *Proposed Work Plan for Evaluation Monitoring Program*, prepared by Alisto Engineering.

2. The letter provided comments on the plan, including, but not limited to, the need to identify the source of the release (e.g., southern, northern or eastern fill area); define the lateral and vertical extent of impacts onsite and offsite; and include implementation dates for each task in the project schedule.

The LEA also ordered the Discharger to conduct a site investigation so as to bring the site into compliance with state minimum standards under solid waste regulations. Specifically, a 25 February 2011 LEA directive requested a plan for determining the depth and extent of landfill waste; a gas sampling plan (including methane and trace gases); and an evaluation of all gas monitoring results since 2003. The directive was issued based on findings of an 8 December 2010 joint site inspection conducted with CalRecycle.

On 27 May 2011, in response to both the Water Board and LEA orders, the Discharger submitted an addendum proposing a multi-phase EMP site investigation. The proposed EMP had the following objectives:

- Phase I
 - Identify landfill units
 - Characterize and delineate extent of landfill waste;
 - Screen for landfill gas and leachate
 - Identify source of impacts
 - Map geologic controls
 - Develop site conceptual model
 - Prepare and submit Phase I results (i.e., interim memo)
- Phase II
 - Adjust monitoring well locations and designs, as necessary, based on Phase I results
 - Delineate the lateral and vertical extent of landfill gas, including VOCs
 - Delineate lateral and vertical extent of groundwater impacts
 - Identify contaminant fate and transport mechanism(s)
 - Review current and historical monitoring data
 - Refine site conceptual model
 - Develop corrective action alternatives
- Phase III
 - Prepare and submit EMP report
 - Prepare and submit EFS and CAP reports.

Phase I of the EMP, implemented during the summer of 2011, included the following activities:

- A subsurface geophysical survey of the landfill area (7 profiles);
- Cone penetrometer (CPT) testing (23 test holes);
- Excavation of test pits to characterize landfill waste (20 test pits);
- Auger borings through waste (DWs-1 to 6) and native material (DBs-1,2,3 & 5);
- Field screening of samples for methane and VOCs;
- Conversion of eight CPT test holes to vapor probes and two auger borings to dual completion leachate-gas wells; and
- Laboratory testing to identify sources and impacts closest to landfill.

The Phase I investigation indicated that landfill gas from the Southern Fill Area was the most likely source of groundwater impacts at the site and that unmined gravel in the unsaturated zone in this area was the most likely transport pathway for landfill gas migration to groundwater. The investigation included the Central Processing Area (CPA) as a potential source of the Freon 11 (e.g., foam insulation or white goods handling), but did not find any evidence of a release in this area. The Phase I EMP results were documented in a 22 September 2011 Interim Memo (*Evaluation Monitoring Program (EMP) Phase I Investigation – Interim Memo for the Florin Perkins Landfill*, prepared by the DE Team).

The Phase II scope included the following activities:

- Installation and sampling of the 10 perimeter gas monitoring wells described in Findings 31 and 32 (GPs-4 through 13);
- Installation and sampling of five groundwater monitoring wells, including two upper zone wells (MWs-G(S) and H(S)) and three lower zone wells (MWs-G(D), H(D), and I), as described in Finding 36.
- Development of various maps in support of the hydrogeologic contaminant transport model, including:
 - Trilinear plots of water chemistry;
 - Isopach maps showing sand and gravel thickness in the unsaturated and saturated zones;
 - Contour plots showing distribution and lateral extent of Freon 11 in soil gas and shallow groundwater; and
 - Geologic cross-sections based on well logs showing well completion information, soil type, and geologic controls
 - Geologic cross sections showing vertical distribution of Freon 11 in unsaturated and saturated zones based on test results

The Phase II results provided additional evidence supporting Phase I's conclusion that the Southern Fill Area was the most likely source of Freon 11 detected in soil gas and groundwater at the site. It also concluded that (based on the detection of leachate in only one waste boring) landfill leachate was not likely a source of the VOC impacts. For example, up to 30 feet of high permeability sand and gravel was logged in wells MW-F and MW-H(S) south of the SFA, where Freon 11 impacts to groundwater were estimated to extend vertically to about -45 feet MSL or 30 feet below the water table. The study did not address the Northern Fill Area as a potential source, attributing the detection of low concentrations of Freon 11 in compliance well MW-D to likely migration of landfill gas from the Southern Fill Area. Notwithstanding this conclusion, it is noteworthy that significant sand and gravel intervals were logged in the unsaturated and uppermost saturated zones in MW-D immediately south of the NFA, where Freon 11 was estimated to extend to about -38 feet MSL or about 25 feet below the water table.

The EMP investigation also concluded that such permeable unsaturated zone media could help to vent LFG to the surface, attenuating LFG impacts. In addition, low permeability (i.e., silt and clay) areas in the unsaturated zone (e.g., GP-8) could serve to

impede LFG migration and in the saturated zone attenuate LFG impacts to groundwater (e.g., DB-1). See WDR Finding 42.

Phase III -- The complete EMP investigation was documented in the December 2011 report *Evaluation Monitoring Program Report for the Florin Perkins Landfill*, prepared by the DE Team.

Corrective Action

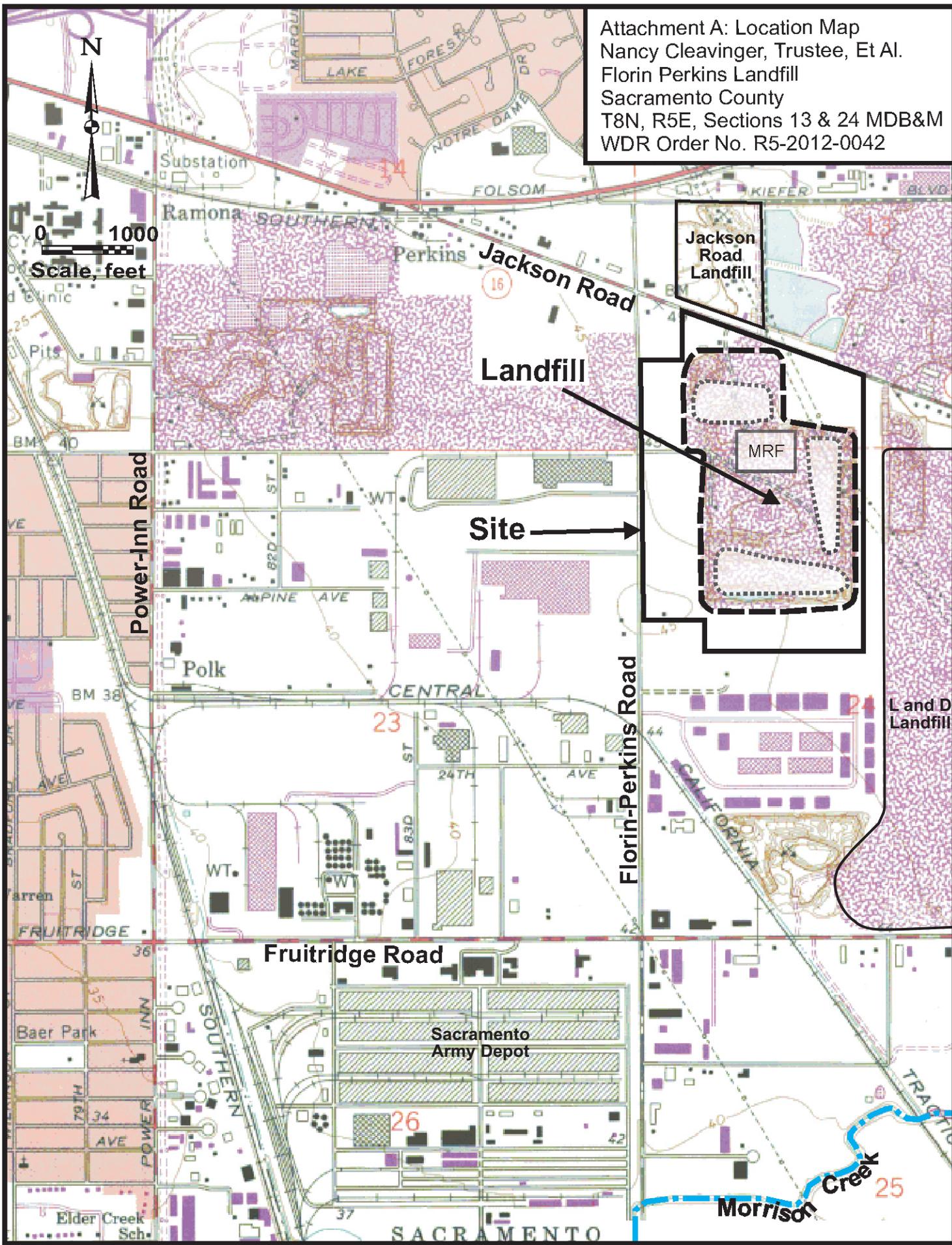
The EFS/CAP submitted by the Discharger under the January 2011 Section 13267 Order evaluated various corrective action options and recommended passive landfill gas controls and landfill closure as the primary corrective action measures at the site. Also under the Section 13267 Order, the Discharger subsequently submitted a December 2012 Landfill Gas Monitoring and Control Plan and a Final Closure and Postclosure Maintenance Plan for implementation of these recommended corrective action measures.

Revised WDRs

These revised WDRs incorporate and prescribe requirements for landfill closure and corrective action, including the installation of passive landfill gas controls (i.e., vents) at each unit as an interim corrective action measure; phased cover construction (including side slope regrading and installation of permanent gas controls); and postclosure monitoring of landfill gas, groundwater, and surface water runoff.

Surface water runoff at the site is discharged to onsite quarry pits. Street-level drainage in the area generally flows toward Morrison Creek, a tributary to the Sacramento River.

Attachment A: Location Map
Nancy Cleavinger, Trustee, Et Al.
Florin Perkins Landfill
Sacramento County
T8N, R5E, Sections 13 & 24 MDB&M
WDR Order No. R5-2012-0042



0 1000
Scale, feet

Jackson Road Landfill

Landfill

MRF

Site

L and D Landfill

Fruitridge Road

Sacramento Army Depot

Morrison Creek

Attachment B: Site Map
 Nancy C. Cleavinger, Trustee, Et Al.
 Florin Perkins Landfill
 Sacramento County
 WDR Order No. R5-2013-0042

Florin Perkins Road

Jackson Road

Northern Fill Area

Material Recovery Facility

Historic Central Processing Area

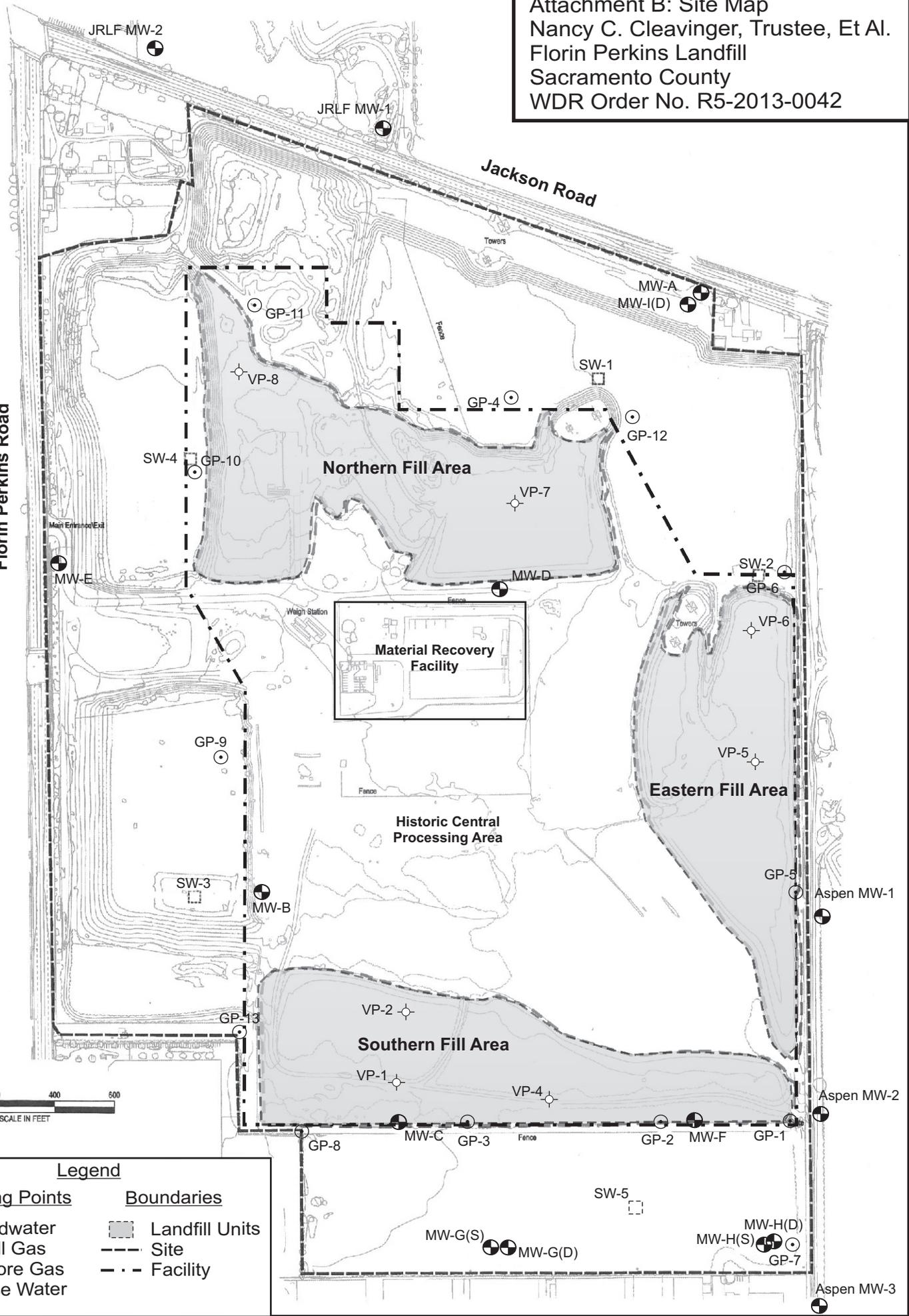
Eastern Fill Area

Southern Fill Area



Legend

Monitoring Points	Boundaries
Groundwater	Landfill Units
Landfill Gas	Site
Soil-Pore Gas	Facility
Surface Water	

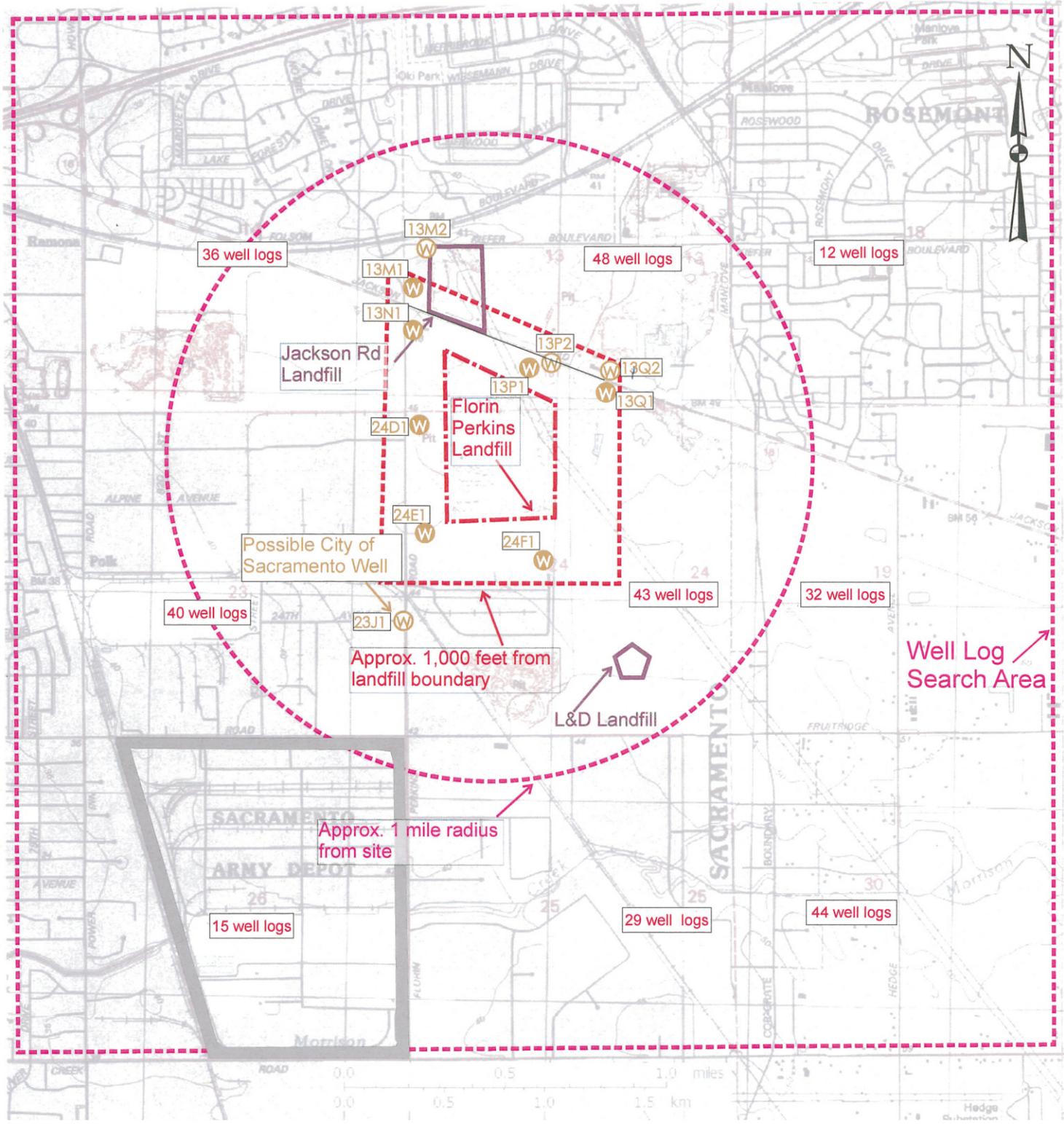


Aspen MW-3

Aspen MW-2

Aspen MW-1

Attachment C: Supply Wells
 Nancy C. Cleavinger, Trustee, Et Al.
 Florin Perkins Landfill
 Sacramento County
 WDR Order No. R5-2013-0042



- Legend**
- Water Well Location (Possibly Abandoned)
 - Known Supply Well (Approximate Location)
 - Number of DWR Well Logs in Section