Central Valley Regional Water Quality Control Board

20 December 2016

Mr. Greg Stevenson
Gladding McBean Company
601 7th Street
Lincoln, CA 95648-1828

NOTICE OF APPLICABILITY OF GENERAL ORDER NO. R5-2015-0012-022 GLADDING MCBEAN COMPANY COAL TAR LANDFILL, 601 7TH STREET, LINCOLN, PLACER COUNTY

Gladding McBean Company (Discharger) submitted the 17 July 2014 revised Notice of Intent (NOI) requesting revised coverage for expansion of its pilot study to a full-scale system. The pilot study system operated under General Order R5-2008-0149-011 for General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compounds, Perchlorate, Pesticides, Semi-Volatile Compounds and/or Petroleum Compounds. On 19 September 2014, California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff transmitted a draft Notice of Applicability and draft Monitoring and Reporting Program based on General Order No. R5-2008-0149. This General Order has been updated and reissued as R5-2015-0012. Although the updated General Order is less restrictive than the preceding General Order, the Monitoring and Reporting Program and this Notice of Applicability has been revised to align with the updated General Order. Based on information in the Discharger's submittal, it is our determination that this project meets the required conditions to be covered under the updated General Order for In-Situ Remediation, Order No. R5-2015-0012. All of the requirements contained in the General Order are applicable to your project. You are assigned Order No. R5-2015-0012-022.

Project Location:

The project is located in the City of Lincoln, Placer County, Latitude 38°54'4.81"N, Longitude 121°17'22.32"W, Assessor's Parcel No's. 008-010-026 & 27. In-situ treatment will be expanded to full-scale operation in the Gladding McBean Coal Tar Landfill located north of the Gladding McBean ceramics plant at 601 7th Street, Lincoln.

Project Description:

Operations at the Gladding McBean Coal Tar Landfill caused groundwater and soil pollution. The primary constituents of concern (COCs) are 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (TCE) and their breakdown products. Under the previous Notice of Applicability, the Discharger obtained favorable results using sucrose (table sugar) as a source of organic carbon and molecular hydrogen in its field pilot test study to evaluate the effectiveness of enhanced in-situ bioremediation in treating the 1,1,1-TCA, TCE, and their breakdown products.

For this full-scale treatment project expansion, the Discharger proposes to continue to inject sucrose (table sugar) as the source of organic carbon and molecular hydrogen for anaerobic reductive dechlorination of the contaminants of concern. This is described in the 16 June 2014 *Work Plan for Expansion of In-Situ Groundwater Remediation Program*, with additional detail in the 10 July 2015 *Addendum to Report of Waste Discharge*, both prepared by Tamalpais Environmental Consultants. In 2014, the Discharger installed 25 additional injection wells and three additional monitoring wells in the landfill. These locations were selected to directly address all of the areas of elevated concentrations of volatile organic compounds in groundwater and minimize the potential for impacted groundwater to migrate out of the landfill.

The Discharger will also be conducting sampling and reporting the results as described in the attached Monitoring and Reporting Program.

On 22 September 2011, the Discharger circulated a fact sheet describing the pilot project and providing interested parties with 30 days to submit comments or questions. No comments were received by 28 October 2011. Since the full scale project does not vary significantly from the pilot study and is a continuation of the methods and injections successfully utilized in the pilot study, the Discharger was not required to re-circulate the fact sheet and public notice.

General Information:

1. The project will be operated in accordance with the requirements contained in the General Order and in accordance with the information submitted in the July 2014 Notice of Intent.

2. The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially rescinded.

3. Injection of materials other than sugar, or with Central Valley Water Board staff concurrence, emulsified vegetable oil, into the subsurface is prohibited.

4. Failure to abide by the conditions of the General Order could result in an enforcement action as authorized by provisions of the California Water Code.

5. The project will implement the 25 October 2016 Contingency Plan within 30 days of it being triggered.

6. The Discharger shall comply with the attached Monitoring and Reporting Program, Order No. R5-2015-0012-022, and any revisions thereto as ordered by the Executive Officer.

If you have any questions regarding this matter, you may contact Ann M. Palmer by telephone at (916) 464-4825 or by email at ann.palmer@waterboards.ca.gov, or Amy Terrell by telephone at (916) 464-4680 or by email at amy.terrell@waterboards.ca.gov.

Andrew Altwegt For

PAMELA C. CREEDON
Executive Officer

Attachments: Monitoring and Reporting Program R5-2015-0012-022
General Order No. R5-2015-0012
Standard Provisions

cc: Mr. West Bourgault, Placer County Environmental Health Serv., Auburn (w/ MRP)
Ms. Della Kramer, Regional Water Quality Control Board, Sacramento (w/ MRP)
Mr. Jack Schwartz, Gladding McBean Co. (w all attachments)
Mr. Aaron O'Brien, Tamalpais Environmental Consulting, Fairfax (w all attachments)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-022

FOR
IN-SITU GROUNDWATER REMEDIATION
AND DISCHARGE OF TREATED GROUNDWATER TO LAND

GLADDING MCBEAN COAL TAR LANDFILL
PLACER COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring a groundwater remediation system at Gladding McBean Coal Tar Landfill at 601 7th Street, Lincoln. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. This MRP replaces MRP R5-2003-0803 and is a revision of MRP R5-2008-0149-011, which is being updated and issued pursuant to General Order No. R5-2015-0012.

GROUNDWATER MONITORING

As shown on Figure 1, there are 18 groundwater monitor wells (PW-1, PW-2, PW-3, MWS-1 through MWS-13, MW-2, MW-9), 3 extraction wells (EX-1, EX-2, EX-3), 4 gas monitor wells (GM-1 through GM-4), and 28 injection wells (IW-1 through IW-28) associated with this site. The groundwater monitoring program for these wells and any treatment system wells installed subsequent to the issuance of this MRP, shall follow the schedule below. The volume of extracted groundwater, if applicable, shall also be provided in quarterly monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

The monitor wells, extraction wells, and injection wells shall be sampled according to the schedule in Tables 1 and 2 and the samples analyzed by the methods in Table 3, as follows:

Table 1. Remediation Monitoring Schedule[1] (Analytical Methods are listed in Table 3)

	Monitoring Point	Dissolved metals Group 1 (Ba, Fe, Mn)	Dissolved metals Group 2 (As, Cr Pb, V)	Sulfate	Total Dissolved Solids	Alkalinity	Chemical Oxygen Demand	Volatile Organic Compounds	Soil Gas
Treatment Zone Monitoring[2]	PW-1	S	S	S	S	S	Q	Q	
	PW-2	S			S	S	Q	Q	
	PW-3	S			S	S	Q	Q	
	MWS-6	S	S	S	S	S	Q	Q	A
	MWS-11	S	S	S	S	S	Q	Q	
	MWS-10				S		Q	Q	
	GM-4				S		S	S	A
	EW-1				S		S	S	
	EW-2	S			S		S	S	
	IW-5, IW-14, IW-22, IW-24, IW-27						B	B	
Transition Zone Monitoring[3]	EW-3	S		S	S	S	S	S	
	MWS-12	S		S	S	S	S	S	
	MWS-13	S		S	S	S	S	S	
	MWS-8	S			S			S	
	MWS-7	S			S			S	
	MWS-2	S			S			S	
Compliance Zome[4]	MWS-4	S		S	S	S	S	S	
	MWS-5	S			S		S	S	
Back-ground[5]	MWS-1	S		S	S	S	S	S	
	MWS-9	S			S		S	S	
	MWS-3	S			S		S	S	

[1] Key to Abbreviations: A – Soil gas samples to be obtained annually in the 3rd quarter (July-Sept). S – Semi annual samples to be obtained in 1st and 3rd quarters (Jan-March, July-Sept). Q – Quarterly (Jan-Mar, April-June, July-Sept, Oct-Sept). B – Samples to be obtained within 2 months before an injection.
If water quantity is insufficient for sampling during the 3rd quarter, then sampling shall be conducted as early as is reasonable in the 4th Quarter.

[2] Wells sampled to evaluate in-situ bioremediation progress inside the treatment zone.

[3] Wells sampled to evaluate migration of pollutants within the treatment zone.

[4] Wells used to determine compliance with water groundwater limitations.

[5] Wells used to develop background concentrations.

Table 2. Peripheral Wells and Surface Water Monitoring Schedule[1]

	Monitoring Point	Dissolved Metals Group 1 (Ba, Fe, Mn)	Dissolved Metals Group 2 (As, Cr Pb, V)	Sulfate	Total Dissolved Solids	Alkalinity	Chemical Oxygen Demand	Volatile Organic Compounds	Soil Gas
Peripheral Wells	MW-2				S			A	
	MW-9				S			A	
	GM-1				S			S	A
	GM-2				S			A	A
	GM-3				S			A	A
Surface Water	SRF-1							S	
	SRF-2							S	
	SRF-3							S	

[1] Key to Abbreviations: A – Soil gas samples to be obtained annually in the 3rd quarter (July-Sept). S – Semi annual samples to be obtained in 1st and 3rd quarters (Jan-March, July-Sept). Q – Quarterly (Jan-Mar, April-June, July-Sept, Oct-Sept). B – Samples to be obtained within 2 months before an injection.
If water quantity is insufficient for sampling during the 3rd quarter, then sampling shall be conducted as early as is reasonable in the 4th Quarter.

Table 3: Analytical Methods

Constituent	Method[1]	Maximum Practical Quantitation Limit (ug/L)[2]
Dissolved Metals[3], Group 1 (Barium, Iron, Manganese)	EPA 200.7	
Dissolved Metals[3], Group 2 (Arsenic, Chromium, Lead, Vanadium)	EPA 200.7	
Sulfate	EPA 6500	200
Total Dissolved Solids	EPA 160.1	10,000
Field pH	Field instrumentation	0.1 pH units
Alkalinity	EPA 2310B	2,000
Chemical Oxygen Demand	EPA 410.4	10,000
Volatile Organic Compounds (water)	EPA 8260 B	Various
Soil Gas (oxygen, methane, volatile organic compounds)	TO-15	20 (methane) 2,000 (oxygen) Various (volatile organics)

Footnotes on following page

Footnotes to Table 3.

[1] Or an equivalent EPA or Standards Method that achieves the maximum Practical Quantitation Limit.
[2] All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.
[3] Samples to be analyzed for dissolved metals shall be filtered in the field or in the laboratory prior to analysis.

FIELD SAMPLING

In addition to the above sampling and laboratory analysis, field sampling and analysis shall be conducted each time a monitor well, injection well, or extraction well is sampled. The sampling and analysis of field parameters shall be as specified in Table 4.

Table 4: Field Sampling Requirements

Parameters	Units	Practical Quantitation Limit	Type of Sample
Groundwater Elevation	Feet, Mean Sea Level	0.01 feet	Measurement
Oxidation-Reduction Potential	Millivolts	10 millivolts	Field Meter
Electrical Conductivity	micro Siemens/cm^2	50 µS/cm^2	Field Meter
Dissolved Oxygen	mg/L	0.2 mg/L	Field Meter
pH	pH Units (to 0.1 units)	0.1 units	Field Meter
Temperature	°F/°C	0.1 °F/°C	Field Meter

All wells that are purged shall be purged until pH, temperature, conductivity and dissolved oxygen are within 10% of the previous value.

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in item (b) of the "Reporting" section of this MRP.

TREATMENT PLANT EFFLUENT MONITORING

A Site groundwater extraction and treatment system is designed to extract groundwater from wells EW-1, EW-2, EW-3, and MWS-6, located in the former pond area of the landfill. In 2016, only EW-2 is being actively used as an extraction well, although EW-1 and EW-3 may be used in the future if additional water is needed. Extraction well MWS-6 is no longer connected to the extraction system. Extracted groundwater is piped to an above-ground treatment system

consisting of two 1,000-pound carbon filters in series, and a stilling tank. This treatment system is located within the clay manufacturing portion of the complex, and the sole use of the treated groundwater is to supplement or replace potable water in the on-site manufacturing processes. Therefore, treatment plant effluent monitoring is not included in this remediation monitoring order.

If, however, the treated effluent is proposed to be used for any land application, such as irrigation, dust control, or reinjection, a revision to this permit is required, and will include a treatment plant operating manual and treatment plant monitoring provisions.

IN-SITU DISCHARGE MONITORING

The insitu treatment system includes periodically adding amendments to the groundwater by way of injection wells. The Discharger shall measure the discharge of water and amendments that are injected into the groundwater according to the requirements specified in Table 6. The quantity and concentration of amendment and dilution water shall be recorded for each injection point, including the time period in which the amendment was injected into the aquifer.

Table 6: Discharge Monitoring Requirements for each injection point.

Parameters	Units	Type of Sample
Injected Volume of liquid	gallons per event	Meter
Amendment(s) Added	pounds per event	Measured
Biocide, Macro, or Micro Nutrients	pounds per event	Measured
Elapsed time of amendment delivery	Minutes	Measured

AMENDMENT ANALYSIS

Central Valley Water Board staff received an analysis for the proposed sugar amendment in the 23 October 2009 *Addendum to Report of Waste Discharge with Additional Information Required for Implementation of In-Situ Bioremediation Pilot Test*, prepared by Tamalpais Environmental Consultants. The sugar amendment meets the requirements for use as an injectant at this Site. The use of Accelerite Bioremediation Nutrient to provide micro and macro nutrients is permitted as needed to support a healthy and robust microbial population.

Gladding McBean may consider using emulsified vegetable oil as an amendment. It must provide a workplan for injection along with an analysis of the product, which may be diluted to a concentration comparable to that as proposed to be added to groundwater. Analytes are illustrated in Table 7. With Central Valley Water Board staff concurrence, Gladding McBean may used an emulsified vegetable oil.

Table 7: Amendment Analytical Requirements

Constituent	Method[1]	Maximum Practical Quantitation Limit (µg/L)[2]
Volatile Organic Compounds	EPA 8020 or 8260B	0.5
General Minerals[3]	Various	Various
Metals, Total and Dissolved[4]	EPA 200.7, 200.8	Various
Semi-Volatile Organic Compounds	EPA Method 8270	5.0
Total Dissolved Solids	EPA 160.1	10,000
pH	meter	NA
Electrical Conductivity	meter	NA

[1] Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.
[2] All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value.
[3] General Minerals include: alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.
[4] Metals include arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium and silica.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger has developed a background concentration of zero ug/L for volatile organic compounds, which are the primary contaminants of concern at this site. Background concentrations of dissolved barium, iron, manganese and chemical oxygen demand were provided in the 25 October 2016 *Contingency Plan* prepared by Tamalpais Environmental Consulting.

REPORTING

When reporting the data, the Discharger shall arrange the information in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to illustrate clearly the compliance with this Order. In addition, the Discharger shall notify the Central Valley Water Board staff within 48 hours of any unscheduled shutdown of any groundwater extraction system. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to Central Valley Water Board staff.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional Civil Engineer or Geologist or their subordinate and signed by the registered professional.

The Discharger shall submit electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The reports shall be submitted electronically over the internet to the Geotracker database system by the 1st day of the second month following the end of each calendar quarter, i.e. by **1 February, 1 May, 1 August, or 1 November** or as otherwise indicated by Central Valley Water Board staff until such time as the Executive Officer determines that the reports are no longer necessary. The monitoring and reporting schedules are summarized in Table 8.

Quarterly Reports occuring between Semi-Annual reports are due **by 1 February and 1 August**. These quarterly reports may consist of a tabulated data submittal, laboratory analytical reports, and an email cover which may be submitted electronically to Central Valley Water Board staff. This is in addition to the electronic data submittals to the Geotracker database. The quarterly data shall be formally presented in the subsequent Semi-Annual Monitoring Report.

Each Semi-Annual Report shall include the following minimum information:

(a) a description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected, whether the pollutant plume is delineated, details of remediation actions and interpretation of results;

(b) field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc;

(c) groundwater contour maps for all groundwater zones, if applicable;

(d) pollutant concentration maps for all groundwater zones, if applicable;

(e) a table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;

(f) a table showing historical lateral and vertical (if applicable) flow directions and gradients.

(g) cumulative data tables containing the water quality analytical results and depth to groundwater;

(h) a copy of the laboratory analytical data report(s);

(i) the status of any ongoing remediation, including an estimate of the cumulative mass of pollutant removed from the subsurface, system operating time (if applicable), the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system;

(j) if applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

An Annual Report shall be submitted to the Central Valley Water Board staff by **1 November** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation, and may be substituted for the fourth quarter monitoring report. The Annual Report shall contain the detail included in the quarterly reports in addition to the following minimum information:

(a) graphical summaries of pollutant concentration data;

(b) groundwater contour maps and pollutant concentration maps containing all data obtained during the previous year;

(c) a discussion of the long-term trends in the concentrations of the pollutants and remediation indicators in the groundwater monitoring wells;

(d) an analysis of whether the pollutant plume is being effectively treated;

(e) a description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system effectiveness;

(f) an identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and

(g) if desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

Table 8: Summary of Monitoring Report Submittals

Type of Monitoring[1]	Monitoring Frequency	Monitoring Report Submittal Due Dates[2,3]	Required Method of Monitoring Report Submittal[4]
Groundwater	Quarterly	1 February, 1 May, 1 August, 1 November	Electronic upload of monitoring data to GeoTracker
Groundwater	Semi-Annually	1 May, 1 November	Electronic upload of data and report to GeoTracker
Surface Water, Soil Gas	Annually	1 November	Electronic upload of data and report to GeoTracker

Footnotes on following page

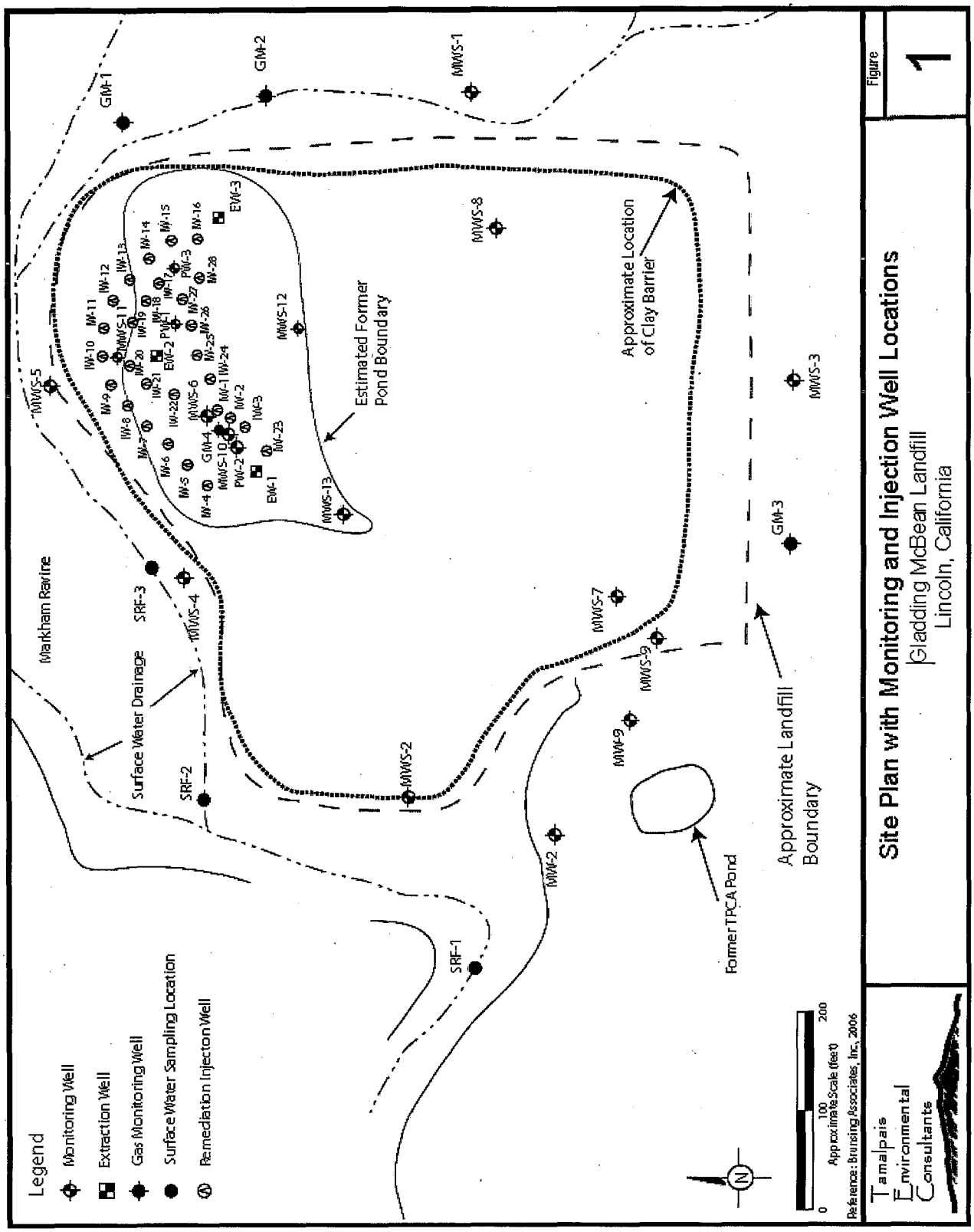
Footnotes to Table 8.

[1] Groundwater, surface water, and soil gas monitoring requirements are provided in Tables 1, 2, 3, and 4 above.
[2] 1st day of the second month following the end of each calendar period (i.e. quarterly, semi-annually, annually)
[3] Monitoring with the same report submittal due dates can be combined into single report for submittal.
[4] The GeoTracker database is an internet-based document depository managed by the State Water Resources Control Board.

A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, if any, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: Andrew Attwood
For PAMELA C. CREEDON, Executive Officer
12/23/16
(Date)


Legend
Monitoring Well
Extraction Well
Gas Monitoring Well
Surface Water Sampling Location
Remediation Injecton Well
Markham Ravine
Surface Water Drainage
SRF-1
SRF-2
SRF-3
MWS-1
MWS-2
MWS-3
MWS-4
MWS-5
MWS-6
MWS-7
MWS-8
MWS-9
MWS-10
MWS-11
MWS-12
MWS-13
MW-2
MW-9
GM-1
GM-2
GM-3
GM-4
EW-1
EW-2
EW-3
PW-1
PW-2
PW-3
Estimated Former Pond Boundary
Approximate Location of Clay Barrier
Approximate Landfill Boundary
Former TPCA Pond
N
0
100
200
Approximate Scale (feet)
Reference: Brunsing Associates, Inc., 2006
Tamalpais Environmental Consultants
Site Plan with Monitoring and Injection Well Locations
Gladding McBean Landfill
Lincoln, California
Figure
1