MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-080

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

FOR
QUICK-N-SAVE #2
2057 SOUTH EL DORADO STREET, STOCTKON
SAN JOAQUIN COUNTY
LUST CASE #391086
GEOTRACKER GLOBAL ID #T0607700901

This Monitoring and Reporting Program (MRP) describes requirements for monitoring the effects on groundwater quality from the injection of ozone or the re-injection of treated groundwater into the subsurface at Quick-N-Save #2 at 2057 South El Dorado Street in Stockton (Site). The Alzghoul Family Trust (herein referred to as "the Discharger"), is a Responsible Party for the Quick-N-Save #2 case. The Discharger's consultant, Stratus Engineering Associates. (Stratus), prepared a Notice of Intent (NOI), NOI Amendment, and a draft MRP. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) prepared and is issuing this MRP pursuant to Water Code Section 13267 and based on Attachment C of Waste Discharge Requirements General Order R5-2015-0012. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer of the Central Valley Water Board. As appropriate, 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 sample shall be recorded on the legal chain of custody form.

GROUNDWATER MONITORING

The proposed remediation course of action is intended to address remaining hydrocarbons in Site soil, soil gas, and groundwater, while accounting for previous remediation difficulty encountered with tertiary butyl alcohol (TBA) at the Site. The Discharger shall implement the remediation in two phases: Phase 1 includes implementation of in-situ ozone injection; and Phase 2 includes implementation of groundwater extraction, ex-situ treatment, and re-injection of treated groundwater into upgradient re-injection wells. The Discharger shall implement Phase 2 in conjunction

with Phase 1, only if Stratus and Central Valley Water Board staff determine that Phase 1 alone is not sufficient to remediate remaining petroleum hydrocarbons. Remediation monitoring requirements discussed herein are separated by phase.

As shown on Figure 1, Site wells currently include eight monitoring wells, two groundwater extraction wells, and four soil vapor extraction wells. Discharger will install two additional monitoring wells, two additional new and one replacement groundwater extraction wells, five pairs of nested dual-depth ozone injection wells, and two groundwater re-injection wells. The Discharger shall follow the groundwater monitoring program schedule below for these wells. Monitoring wells with non-aqueous phase liquid (NAPL) or visible sheen shall be monitored, at a minimum, for NAPL thickness and depth to water. The volume of extracted groundwater, if applicable, shall also be provided in quarterly monitoring reports. Sample collection and analysis shall follow standard EPA protocol.

For the purpose of the proposed remediation, the Discharger plans to utilize 16 wells for remediation, as detailed in Table 1 below.

Table 1 – Summary of Remediation Wells to be Utilized

Phase	Purpose	Well		Location	Casing Dia. (in)	Screen Interval (ft bgs)
1	Ozone Injection	IW-1	A Well	SW of MW-1	1	20-21.5[1]
			B Well		1	40-41.5[1]
		IW-2	A Well	E of MW-1	1	20-21.5[1]
			B Well		1	40-41.5[1]
		IW-3	A Well	NW of MW-1	1	20-21.5[1]
			B Well		1	40-41.5[1]
		IW-4	A Well	SW of VW-2	1	20-21.5[1]
			B Well		1	40-41.5[1]
		IW-5	A Well	N of VW-1	1	20-21.5[1]
			B Well		1	40-41.5[1]
2	Groundwater Extraction	EW-1		S of VW-2	4	30-50
		EW-2		N of MW-1	4	30-50
		EW-3		S of MW-1	4	30-50
		EW-4[2]		E of MW-3	4	30-50
	Groundwater Re-Injection	RE-1		NW of MW-3	4	10-50
		RE-2		SW of MW-3	4	10-50

in= inch; ft bgs= feet below ground surface; SW= southwest; E= east; NW=northwest; N= north; S= south

[1] Microporous ceramic diffusers

[2] Existing well VW-4 will be replaced as EW-4.

For the purpose of monitoring remedial progress and efficacy, 12 Site wells (8 existing and 4 proposed) have been identified and divided as Background Zone wells (MW-5), Treatment Zone Wells (MW-1, MW-2, MW-3), Transition Zone wells (MW-4, MW-9, MW-9B, MW-10, MW-10B), and Compliance Zone wells (MW-6, MW-7, MW-8). The Discharger shall sample theses monitoring wells according to Tables 2A and 2B and analyze the samples by the methods in Table 3 below. The requirements of Table 2A are related to pre-remediation baseline sampling, and thus are applicable to both Phase 1 and Phase 2 remediation. As Phase 2 remediation is to be implemented only as needed, the requirements of Table 2B are separated into two sections: "Phase 1 Only", and "Phase 1 and Phase 2". If Phase 2 remediation is not implemented, then only the "Phase 1 Only" requirements shall be met. If Phase 2 is implemented, then the "Phase 1 and Phase 2" requirements shall be met.

Table 2A: Sampling Frequency (Prior to Implementation)

Monitoring Zone	Well Number[1]	Monitoring Objective	Constituent[2]	Frequency
Treatment Zone[4]	MW-1, MW-2, MW-3	Evaluation of treatment area	Suite A & Suite B & Field Measurements[8]	2x Baseline[3]
Transition Zone[5]	MW-4, MW-9, MW-9B, MW-10, MW-10B	Evaluation of adverse contaminant migration		
Compliance Zone[6]	MW-6, MW-7, MW-8	Evaluation of adverse contaminant migration		
Background Zone[7]	MW-5	Evaluation of background conditions		

1 Well Numbers and location as shown on Figure 1.
2 Analytical suites and constituent analytical methods are listed in Table 3.
3 Two baseline samples to be collected at least 30 days apart.
4 Well used to evaluate in-situ remediation progress inside the treatment zone, to gauge effectiveness of ozone injection and groundwater extraction and treatment in reducing the dissolved petroleum hydrocarbon concentrations, and to monitor potential changes in groundwater geochemistry that could be attributed to the injection of ozone and re-injection of treated groundwater.
5 Well used to monitor migration of pollutants from the treatment zone.
6 Well used to monitor compliance and for the presence of breakdown byproducts of the treatment migrating beyond the expected treatment area.
7 Wells used to monitor changes in natural background groundwater geochemistry in area unaffected by ozone injection and groundwater extraction/treatment/re-injection.
8 Field Parameters are listed in Table 4.

Table 2B: Sampling Frequency (Following Implementation)

Monitoring Zone	Well Number[1]	Monitoring Objective	Constituent[2] & Frequency[3]
Phase 1 Only			
Treatment Zone	MW-1, MW-2, MW-3	Evaluation of treatment area	Suite A: Semi-annual Suite B: Monthly for 3 months, then quarterly Field parameters: As frequent as the most frequent sampling for Suite A or Suite B
Transition Zone	MW-4, MW-9, MW-9B, MW-10, MW-10B	Evaluation of adverse contaminant migration	
Compliance Zone[4]	MW-6, MW-7, MW-8	Evaluation of adverse contaminant migration	
Background Zone	MW-5	Evaluation of background conditions	
Phase 1 & Phase 2			
Treatment Zone	MW-1, MW-2, MW-3	Evaluation of treatment area	Suite A: Monthly for 3 months, then quarterly Suite B:M Monthly for 3 months, then quarterly[5] Field parameters: As frequent as the most frequent sampling for Suite A or Suite B
Transition Zone	MW-4, MW-9, MW-9B, MW-10, MW-10B	Evaluation of adverse contaminant migration	
Compliance Zone[4]	MW-6, MW-7, MW-8	Evaluation of adverse contaminant migration	
Background Zone	MW-5	Evaluation of background conditions	

1 Well Numbers and location as shown on Figure 1.
2 Constituent analytical methods are listed in Table 3.
3 i.e. weekly, monthly, quarterly, semi-annually, annually, or other. Semi-annual sampling occurs 1st and 3rd quarters; annual sampling occurs 1st quarter.
4 Should adverse water quality conditions be observed in Compliance Zone wells as a result of ozone injections or re-injection of treated groundwater, the Discharger shall implement the Contingency Plan detailed below.
5 If prior to implementation of Phase 2, Phase 1 has already been implemented and the associated sampling frequency already reduced to quarterly, then Suite B and Field Parameters analysis shall only be required on a quarterly basis.

Table 3 Analytical Methods

Constituent		Method[1]	Maximum Practical Quantitation Limit[2, 3] (ug/L)
SUITE A			
TPH	TPHg	EPA 8015B	50
	TPHd	EPA 8015B	100
VOCs	Benzene	EPA 8260B	0.5
	Toluene	EPA 8260B	0.5
	Ethylbenzene	EPA 8260B	0.5
	Total Xylenes	EPA 8260B	1.0
	MTBE	EPA 8260B	0.5
Oxygenates	TBA	EPA 8260B	10
	DIPE	EPA 8260B	1.0
	TAME	EPA 8260B	1.0
	ETBE	EPA 8260B	1.0
Lead Scavengers	EDB	EPA 8260B	1.0
	1,2-DCA	EPA 8260B	2.0
SVOCs	Naphthalene	EPA 8260B	1.0
SUITE B			
Metals	Metals, dissolved[4]	EPA 6010	Various
	Total chromium	EPA 6010	5
	Hexavalent chromium	EPA 7199	1.0
Dissolved Solids	Total dissolved solids	EPA 2540	10,000
Anions	Bromide	EPA 300.0	300
	Bromate	EPA 300.1	5.0

VOCs= volatile organic compounds; SVOCs= semi-volatile organic compounds; TPH= total petroleum hydrocarbons; TPHg= TPH as gasoline; TPHD= TPH as diesel; MTBE= methyl tert butyl ether; TBA= tert butyl alcohol; DIPE= di-isopropyl ether; TAME= tert amyl methyl ether; ETBE= ethyl tert butyl ether; EDB= ethylene dibromide; 1,2-DCA= 1,2-dichloroethane

1 Or an equivalent EPA method that achieved the Maximum Practical Quantitation Limit.

2 All concentration between the Method Detection Limit and the Maximum Practical Quantitation Limits shall be reported as an estimated value (“J value”).

3 The Maximum Practical Quantitation Limit is commonly referred to as the Reporting Limits.

4 Dissolved metals include: arsenic (Ar), iron (Fe), and manganese (Mn) and are collected in laboratory-supplied non-preserved containers, relinquished to the lab for filtering and preservation prior to analysis.

FIELD MONITORING

In addition to the above sampling and laboratory analyses, each time a monitoring well or remedial well is sampled, monitoring of field parameters shall be monitored as specified in Table 4.

Table 4: Field Monitoring Parameters

Parameters	Units	Practical Quantitation Limit	Analytical Method
Depth to Groundwater	ft	0.01	Measurement
Groundwater Elevation	Ft (Mean Sea Level)	0.01	Calculation
Dissolved Oxygen	mg/L	0.2	Field Meter
Oxidation-Reduction Potential	mV	10	Field Meter
Electrical Conductivity	µS/cm^2	50	Field Meter
Temperature	°F/°C	0.1	Field Meter
pH	pH Units (to 0.1 units)	0.1	Field Meter

ft= feet; mg/L= milligrams per liter; mV= millivolts; µS/cm^2= microsiemens per square centimeter; °F= degrees Fahrenheit; °C= degrees Celsius

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:

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

ACTION LEVELS

In a subsequent directive letter, Central Valley Water Board staff will establish Action Levels following collection of baseline groundwater samples, prior to commencement of ozone injection and groundwater extraction/treatment/re-injection. Action Levels will be established separately for Phase 1 and Phase 2 remediation. For Phase 1, Action Levels will apply only to Suite B analytes (Table 3) and will be set at 120% of maximum baseline concentrations. For Phase 2, Action Levels will apply only to Suite A analytes (Table 3) and will be set at 120% of the maximum concentration over the past five years (2018-2022). Should concentrations of these constituents exceed the established Action Levels in Compliance Zone wells, the Discharger will implement the Contingency Plan detailed below.

Central Valley Water Board staff may revise Action Levels if background concentrations change significantly over the course of remediation.

CONTINGENCY PLAN

The Discharger will implement the Contingency Plan in the event that concentrations of potential deleterious remedial byproducts (Suite B) or hydrocarbons (Suite A) exceed established Action Levels in Compliance Zone wells. The Contingency Plan consists of the following steps:

(1) Report exceedance of Action Levels to the Central Valley Water Board staff immediately via email.
   a. If ozone injection is being implemented by itself, then Action Levels for only Suite B apply.
   b. If groundwater extraction and re-injection is being implemented in conjunction with ozone injection, then Action Levels for both Suite A and Suite B apply.

(2) Immediately shutdown the remediation equipment and discontinue active remediation.
   a. If Action Level exceedances are for Suite B analytes, the ozone injection system is to be shutdown.
   b. If Action Level exceedances are for Suite A analytes, the groundwater extraction and re-injection system is to be shutdown.
   c. If Action Levels exceedances are for both Suite A and B, then both systems are to be shutdown.

(3) 30 days following initial exceedance of Action Levels, collect confirmation samples from each Compliance Zone well containing concentrations in excess of applicable Action Levels.
   a. Confirmation sampling analysis shall include only the analytical suite(s) which includes the analyte(s) initially in excess of Action Levels.

(4) If exceedance remains after confirmation sampling, a batch extraction of a total of 1,500 gallons of groundwater shall be performed. Each batch extraction event will consist of 500 gallons removed per day for 3 consecutive days, per the following:
   a. If ozone injection is being implemented by itself, extraction will be performed utilizing exiting Site extraction wells EW-1 and EW-2, and proposed wells EW-3 and VW-4R.
   b. If groundwater extraction and re-injection is being implemented in conjunction with ozone injection, extraction will be performed utilizing the wells noted in 4a above, as well as existing Site Transition Zone monitoring wells MW-9 and MW-10.
   c. Extracted groundwater will be disposed of offsite each day.

(5) Confirmation samples shall be collected from all Compliance Zone wells 7 days after completion of the batch extraction event.

(6) If exceedances do not remain following confirmation sampling, remediation may recommence with Central Valley Water Board staff concurrence.
(7) If exceedances remain in Compliance Zone wells 7 days after completion of batch extraction, repeat Steps 2 through 5 as needed.
(8) If exceedances remain in Compliance Zone wells after 3 batch extraction events, batch extraction will cease, and alternative measures will be evaluated.

IN-SITU DISCHARGE MONITORING

The Discharger shall record the discharge of ozone and treated groundwater that is injected or re-injected into the subsurface according to the requirements specified in Table 5.

Table 5: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Ozone		
Total Mass of Ozone Injected	Pounds[1]	Measured
Treated Groundwater		
Total Volume of Treated Groundwater Re-Injected	Gallons[2]	Measured

[1] The mass of ozone injected per individual injection well, and the total cumulative mass of ozone injected into all injection wells shall be recorded and reported.
[2] The volume of treated groundwater re-injected per individual re-injection well, and the total cumulative volume of treated groundwater re-injected into all re-injection wells shall be recorded and reported.

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. The results of any monitoring done more frequently than required at the locations specified in this MRP shall also be reported to the Central Valley Water Board.

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

The Discharger shall submit quarterly electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. All reports shall be submitted electronically over the internet to the GeoTracker database system. Quarterly reports shall be submitted by the 1st day of the second month following the end of each calendar quarter: **1 May, 1 August, 1 November, and 1 February**. Semi-annual reports shall be submitted by the 1st day of the second month following each calendar semi-annual period: **1 May** and **1 November**. Annual reports shall be submitted by the 1st day of the second month following the end of each annual

period year: **1 May**. Reporting frequency shall be in alignment with the sampling frequencies specified in Tables 2A and 2B of this MRP until such time as the Executive Officer determines that the reports are no longer necessary.

Each quarterly, semi-annual, or 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, and whether the pollutant plume(s) is delineated;

(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;

(d) pollutant concentration maps for all groundwater zones;

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

(f) a copy of the laboratory analytical data report, which may be submitted in an electronic format;

(g) information as required by Table 4 of this MRP;

(h) tabular and graphical summaries of all data obtained;

(i) a discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;

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

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

(l) discussion of any exceedances of established Action Levels and/or the implementation of the Contingency Plan, and recommendations for modifications to limit breakdown/byproduct production if necessary;

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

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

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, 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.

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 CCR, Title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., within 30 calendar days of the date of adoption of this Order at the following address, 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:

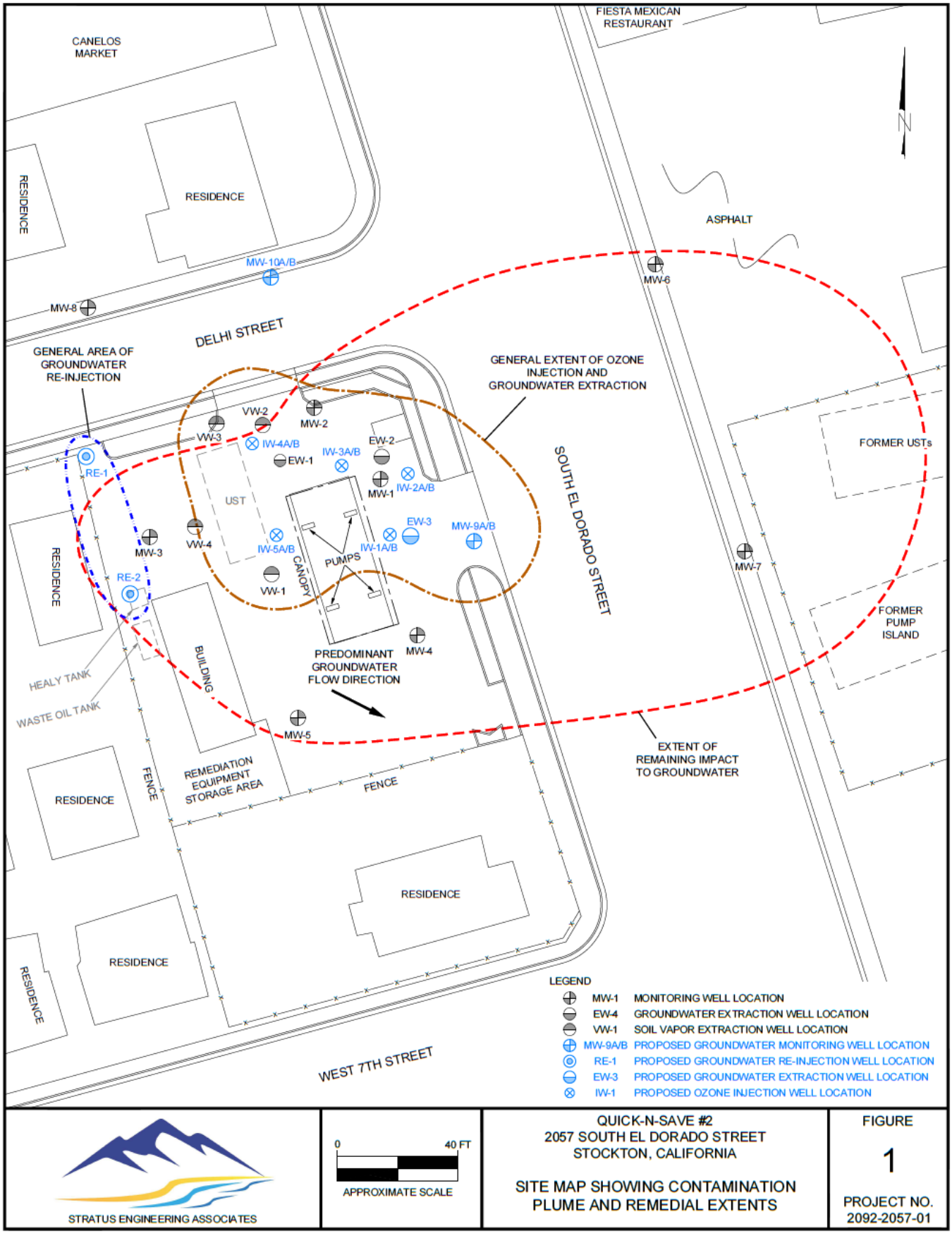
State Water Resources Control Board Office of Chief Counsel
P.O. Box 100, 1001 I Street Sacramento, CA 95812-0100

Or by email at waterqualitypetitions@waterboards.ca.gov

Instructions on how to file a petition for review are available on the Internet. (http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml)

Ordered by: *Original signed by John. J. Baum, Assistant Executive Officer for*
PATRICK PULUPA, Executive Officer

29 March 2023
(Date)


CANELOS MARKET
FIESTA MEXICAN RESTAURANT
RESIDENCE
RESIDENCE
ASPHALT
MW-10A/B
MW-8
MW-6
DELHI STREET
GENERAL AREA OF GROUNDWATER RE-INJECTION
GENERAL EXTENT OF OZONE INJECTION AND GROUNDWATER EXTRACTION
VW-2
MW-2
VW-3
IW-4A/B
EW-2
EW-1
IW-3A/B
RE-1
MW-1
IW-2A/B
UST
SOUTH EL DORADO STREET
FORMER USTs
MW-3
VW-4
IW-5A/B
EW-3
MW-9A/B
IW-1A/B
MW-7
RE-2
VW-1
CANOPY
PUMPS
FORMER PUMP ISLAND
PREDOMINANT GROUNDWATER FLOW DIRECTION
MW-4
HEALY TANK
WASTE OIL TANK
BUILDING
MW-5
EXTENT OF REMAINING IMPACT TO GROUNDWATER
REMEDIATION EQUIPMENT STORAGE AREA
FENCE
FENCE
RESIDENCE
RESIDENCE
RESIDENCE
RESIDENCE
WEST 7TH STREET
LEGEND
MW-1 MONITORING WELL LOCATION
EW-4 GROUNDWATER EXTRACTION WELL LOCATION
VW-1 SOIL VAPOR EXTRACTION WELL LOCATION
MW-9A/B PROPOSED GROUNDWATER MONITORING WELL LOCATION
RE-1 PROPOSED GROUNDWATER RE-INJECTION WELL LOCATION
EW-3 PROPOSED GROUNDWATER EXTRACTION WELL LOCATION
IW-1 PROPOSED OZONE INJECTION WELL LOCATION
STRATUS ENGINEERING ASSOCIATES
0
40 FT
APPROXIMATE SCALE
QUICK-N-SAVE #2
2057 SOUTH EL DORADO STREET
STOCKTON, CALIFORNIA
SITE MAP SHOWING CONTAMINATION PLUME AND REMEDIAL EXTENTS
FIGURE
1
PROJECT NO.
2092-2057-01