CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-015 Rev. 1

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

FOR
FORMER JOHN TAYLOR FERTILIZERS CO.
1819 SOUTH ARGONAUT STREET, STOCKTON
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring the progress of enhanced in-situ bioremediation (EISB) at the former John Taylor Fertilizers Company (JTF) facility located at 1819 South Argonaut Street in Stockton (Site), shown in Figure 1. JTF is a wholly-owned subsidiary of Wilbur-Ellis Company (Discharger). The objective of this EISB is to reduce the concentrations of contaminants of concern (COCs): 1,2-dichloropropane (1,2-DCP) and 1,2,3-trichloropropane (1,2,3-TCP) in on-Site groundwater. The MRP will be used to monitor the effectiveness and efficiency of EISB both on- and off-Site, and to monitor compliance with the requirements of Order R5-2015-0012, *Waste Discharge Requirements General Order for In-situ Remediation and Discharge of Treated Groundwater to Land* (General Order).

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 the material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

REVISION

The Discharger has previously implemented the EISB in two sequential phases under MRP R5-2015-0012-015, issued on 12 April 2016. Phase 1 of the EISB work included the delivery of emulsified vegetable oil (Newman Zone®), a microbial consortium (KB-1® Plus), and a soluble electron donor (KB-1® Primer) into a portion of deeper groundwater using direct injection via one well. Phase 2 included the full-scale delivery of Newman Zone® and KB-1® Plus using both direct injection and recirculation approaches for shallow and remaining deeper on-Site groundwater, respectively. Details of Phase 1 and Phase 2 monitoring are not included in this revised MRP. The present phase, Phase 3, does not include additional injections, only monitoring, based on verification of the basis for the changes requested in Section 6.1 of the Discharger's *First Semi-Annual 2024 WDR and Groundwater Monitoring Report,* dated 1 May 2024. Constituent suites in Tables 1 and 2 have been revised and renamed per this revision.

GROUNDWATER MONITORING - PHASE 3

This section presents the groundwater monitoring program for Phase 3 monitoring, following the completion of Phase 2 EISB. Sample collection and analysis shall follow standard United States Environmental Protection Agency (USEPA) protocols and sample analyses shall be completed by a laboratory certified by the California State Environmental Laboratory Accreditation Program (ELAP).

Currently a separate MRP, Order R5-2010-0803, requires semi-annual groundwater monitoring and reporting in the 1st and 3rd Quarters for on and off-Site monitoring wells. The purpose of MRP R5-2010-0803 is to monitor the nature and extent of the COC plume. The Discharger needs to continue to comply with MRP R5-2010-0803 (or any subsequent MRPs) in addition to the activities presented herein. If duplicative sampling is required between the two monitoring programs, a single sample will suffice for both reporting objectives. Duplication of monitoring efforts is not intended.

The expected duration of Phase 3 is approximately 6 to 60 months. Locations of the groundwater monitoring wells included in the Phase 3 groundwater monitoring program are shown on Figure 2. These Phase 3 groundwater monitoring wells shall be sampled according to the schedule in Table 1, and the samples will be analyzed using the methods in Table 2. The monitoring objectives listed are as follows: compliance wells are used to evaluate compliance with groundwater limitations; treatment zone wells are sampled to evaluate remediation progress inside the treatment zone; transition zone wells are sampled to evaluate migration of constituents downgradient from the treatment zone; and the upgradient well is used to assess groundwater quality in the area upgradient of the treatment zone.

Table 1. Sampling Frequency and Constituents

Well Number	**Frequency** (note 1)	**Constituent suite** (note 2)	**Monitoring Objective**
MW-7	Annually	A1 & B1	Compliance (shallow zone)
MW-E, MW-F	Semi-Annually	A1 & B1	Treatment Zone (shallow zone)
MW-1,MW-2, MW-4, MW-5, MW-G	Semi-Annually	A1	Transition Zone (shallow zone)
	Annually	B1	
MW-6	Annually	A1 & B1	Upgradient (shallow zone)
MW-12	Annually	A1 & B1	Compliance (deeper zone)
MW-A, MW-B, MW-C, MW-D, MW-9, MW-10	Semi-Annually	A1 & B1	Treatment Zone (deeper zone)
MW-8	Semi-Annually	A1 & B1	Transition Zone (deeper zone)
MW-11	Annually	A1 & B1	Upgradient (deeper zone)

Well Number	**Frequency** (note 1)	**Constituent suite** (note 2)	**Monitoring Objective**
EW-A, EW-B	During extraction: quarterly	A1 (note 3)	Extraction monitoring
	Semi-Annually	B	

Table 1 Notes:

1. Annual monitoring shall occur in the third quarter. Semiannual monitoring shall occur in the first and third quarters. For wells and/or constituents scheduled to be monitored quarterly or semi-annually, the monitoring frequency may be reduced, contingent upon the following:
   a. trends are stable or predictably downward, and
   b. Central Valley Water Board staff concurrence.
2. Constituent suite components are listed in Table 2
3. Extraction wells will be sampled and analyzed for Suite A1 components on a quarterly basis during periods of groundwater extraction. The monitoring frequency may be reduced with Central Valley Water Board staff concurrence, when declining 1,2-DCP and 1,2,3-TCP concentrations are observed in the extracted groundwater.

Table 2. Analytical Methods and Constituent Suites

Constituent	**Analytical Method** (note 1)	**Practical Quantitation Limit (PQL)** (note 2)
Suite A1		
Volatile Organic Compounds (VOCs) including 1,2-DCP	EPA 8260B	Varies
1,2,3-TCP (low-level)	SRL 524M-TCP	0.005 µg/L
Sulfate	EPA 300.0	1 mg/L
Total Oxidized Nitrogen (TON)	EPA 350.1 or SM 4500-NO_3-E	0.1 mg/L
Suite B1		
Total Dissolved Solids (TDS)	SM 2540C	1 mg/L

Table 2 Notes:

1. An equivalent US EPA analytical method may be used which achieves the MPQL listed in this table.
2. All concentrations between the Method Detection Limit (MDL) and the PQL shall be reported as an estimated value.

FIELD SAMPLING

In addition to the above sampling and analysis, field sampling and analysis shall be conducted each time a well location is sampled. The sampling and analysis of field parameters shall be completed as specified in Table 3.

Table 3. Field Sampling Requirements

Parameters	Units	Sample Type
Groundwater Elevation	feet above mean sea level (ft amsl), to 0.1 ft amsl	Measurement
Oxidation-reduction potential (ORP)	millivolts (mV)	Field Meter
Electrical conductivity (EC)	microSiemens per centimeter (µS/cm)	Field Meter
Dissolved Oxygen (DO)	milligrams per liter (mg/L)	Field Meter
Temperature	°C or °F	Field Meter
pH	pH units (to 0.1 units)	Field Meter
Volume purged (monitoring wells only)	gallons	Measurement

Field test instruments may be used provided that each of these four conditions are met:

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 (c) of the Reporting section of this MRP.

IN SITU DISCHARGE AND EXTRACTION MONITORING

The Discharger shall monitor daily the discharge of water and amendments that are injected into the groundwater during injection phases (Phase 1 and Phase 2) of the EISB Program, according to the requirements specified in Table 4. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was injected into the aquifer.

Table 4. Discharge and Extraction Monitoring Requirements

Parameters	Units	Sample Type
Injected volume	gallons per day (GPD)	Totalizing Meter
Injection rate	gallons per minute (gpm)	Measured
Amendment(s) added	Pounds (lb)	Phase 1 – Measured Phase 2 – Meter Phase 3 – not applicable
Extracted volume	gallons per day (GPD)	Totalizing Meter
Extraction and Injection durations	hours (hr)	Not applicable

BACKGROUND CONCENTRATION VALUES

Groundwater concentrations at Compliance wells may not exceed the respective established background concentration values by more than 20 percent, unless the background concentration values are equal to or greater than the Basin Plan water quality objectives (WQOs), in which case no exceedance is acceptable.

Changes in background groundwater quality may occur over time due to environmental factors. In consultation with Central Valley Water Board staff, the Discharger may propose future studies to evaluate changes in background groundwater quality conditions. The Discharger may propose updates to background values for certain constituents based on the results of such studies.

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 the Monitoring and Reporting Program 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 registered professional Civil Engineer or Geologist or their subordinate and signed by the registered professional.

The Discharger shall submit semiannual electronic data reports which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. The semiannual monitoring 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 semiannual period (i.e. **1 May** for 1 October through 30 March **and 1 November** for 1 April through 30 September) until such time as the Executive Officer determines that the reports are no longer necessary.

Each **Semiannual** 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, by-products of the injectants, groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated.

(b) a discussion of groundwater quality at compliance wells, with respect to the applicable groundwater limitations;

(c) 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, field instrument calibration reports, etc.;

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

(e) the status of any ongoing remediation, such as system operating time, cumulative extraction and injection volumes/amounts, the effectiveness of the remediation system, and details pertaining to the operation and maintenance of the system; and

(f) 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 by **1 November** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation. The Annual Report may be substituted for the second semi-annual monitoring report as long as it contains all of the information required for that report plus that required for the Annual Report.

The **Annual Report** shall contain the following minimum information:

(a) both tabular and graphical summaries of all data obtained during the year;

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

(c) 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;

(d) a table showing historical lateral and vertical (if applicable) flow directions and gradients;

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

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

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

(h) 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;

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

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

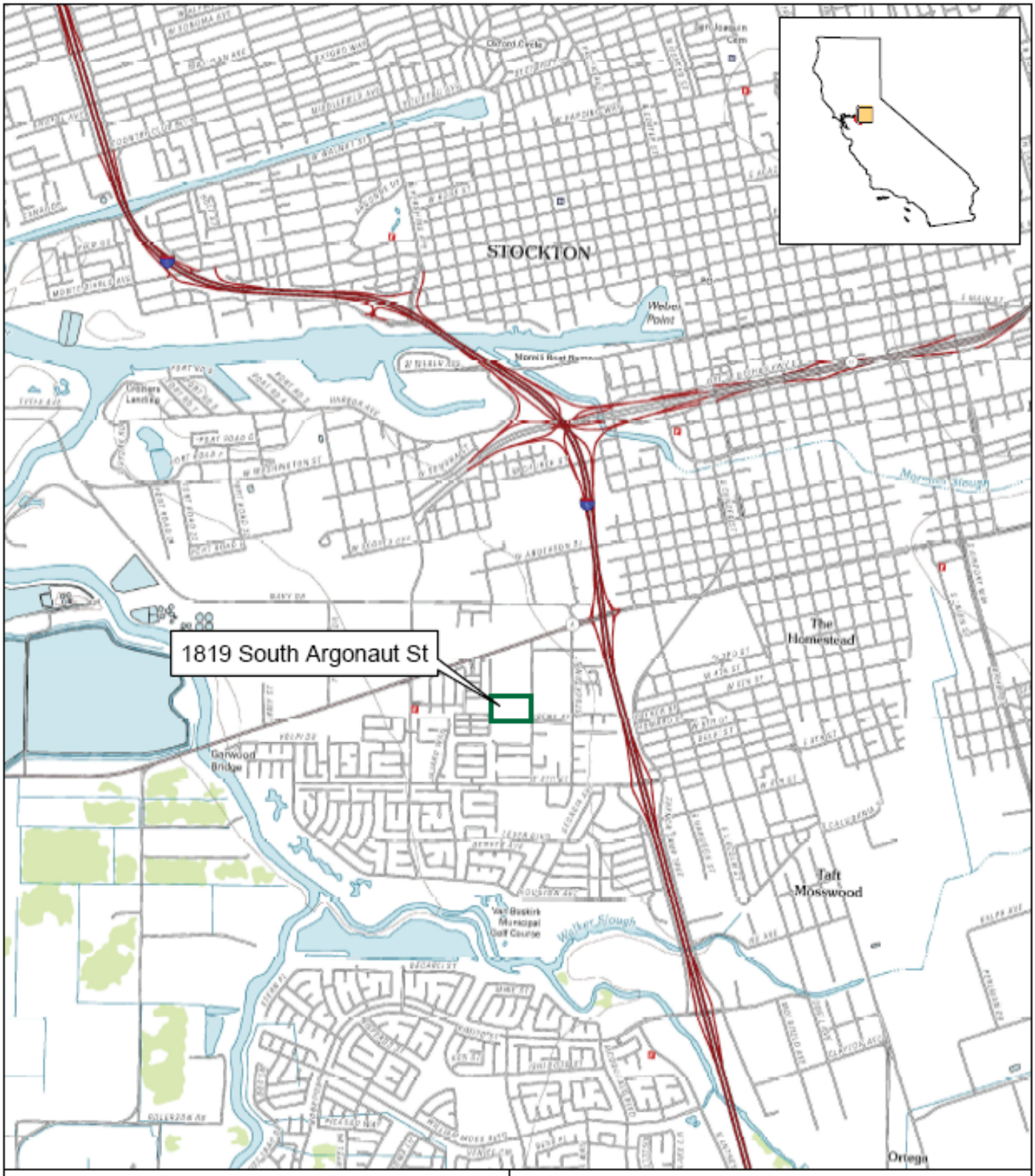
A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger 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 as of the date of signature.

Original ordered by Pamela C. Creedon, Executive Officer
on 12 April 2016

Ordered by: 

for Patrick Pulupa, Executive Officer



Base Map: 1:24,000 USGS Topographic, 2012
T1N R6E, Mt. Diablo Meridian

N
W E
S

0 750 1,500 3,000 Feet

Figure 1
Site Location Map

John Taylor Fertilizers Co., Inc.
Stockton, California

Project: SAC175	November 2015	Geosyntec consultants

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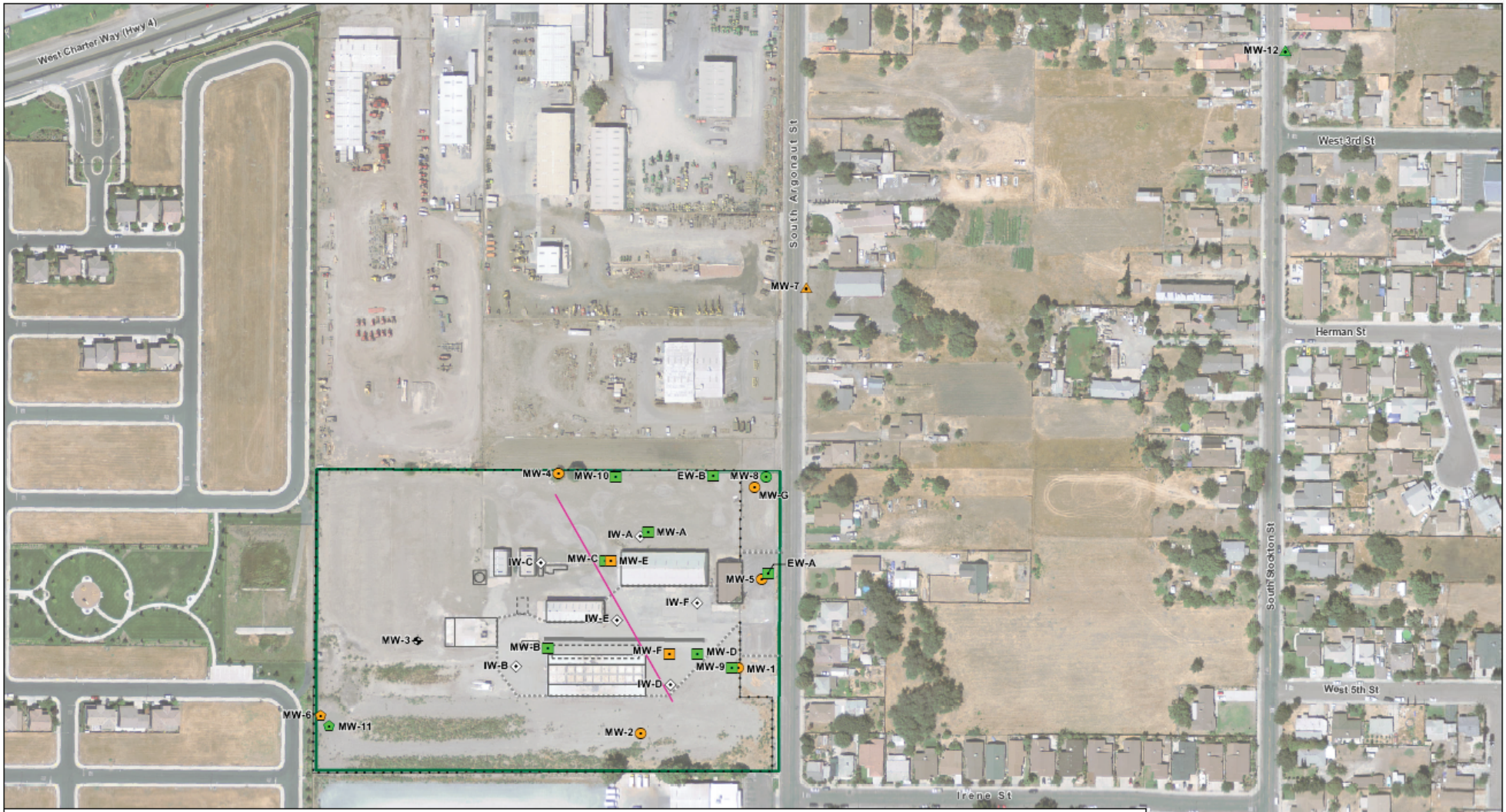

Legend

- Shallow Groundwater Well, Transition Zone
- Shallow Groundwater Well, Compliance Zone
- Shallow Groundwater Well, Background Zone
- Deeper Groundwater Well, Treatment Zone
- Deeper Groundwater Well, Transition Zone
- Deeper Groundwater Well, Compliance Zone
- Deeper Groundwater Well, Background Zone
- Shallow Groundwater Well, not included in PMP
- Proposed Deeper Vertical Injection Well
- Proposed Shallow Horizontal Injection Well
- Site Boundary
- Building or Structure Outline
- Former Building or Structure Outline
- Concrete Drainage Swale
- Fence
- Extent of Paved Area

Notes:
EW = Extraction Well
MW = Monitoring Well
* Monitoring well MW-A will be installed during Phase I.
Image Source - United States Geological Survey, High Resolution Orthoimagery, 25 August 2013.

N

0 35 70 105 140 175 Feet

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Figure 2
Proposed EISB Performance Monitoring Network
John Taylor Fertilizers Co., Inc.
Stockton, California

Project: SAC175	November 2015	Geosyntec consultants