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May 28, 2013

VIA ELECTRONIC MAIL AND FEDERAL EXPRESS

Ms. Dyan Whyte
Assistant Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Re: *Submittal of Site-Specific Ceriodaphnia TRE Workplan – January 22, 2013 Water Code section 13267 Order, Order No. R2-2013-1005, Directive 8*

Dear Ms. Whyte:

Enclosed, pursuant to the Regional Water Quality Control Board, San Francisco Bay Region's, ("Regional Water Board") January 22, 2013 Water Code section 13267 Order, Order No. R2-2013-1005, ("Order"), as modified per the parties' discussions, Lehigh Southwest Cement Company ("Lehigh") timely encloses the Toxicity Reduction Evaluation Work Plan for Ceriodaphnia Dubia in accordance with Directive 8 of the Order. If you or your staff have any questions regarding the enclosed Work Plan, or would like to discuss further, please do not hesitate to contact me or Greg Knapp at Lehigh, or Mike Bryan and Ben Giudice of RBI..

Very truly yours,

Nicole E. Granquist

Enclosure

Cc: Brian Thompson, Regional Water Quality Control Board, San Francisco Bay Region
Ellen Howard, Counsel, State Water Resources Control Board
Greg Knapp, Director Environmental Region West, Lehigh
Michael Hyer, General Counsel, Lehigh Hanson

GENERAL TOXICITY REDUCTION EVALUATION WORK PLAN
PERMANENTE QUARRY AND CEMENT PLANT
LEHIGH SOUTHWEST CEMENT COMPANY

Prepared for:

Regional Water Quality Control Board
San Francisco Bay Region

On Behalf of:

Lehigh Southwest Cement Company

Prepared by:

ROBERTSON - BRYAN, INC.
Solutions for Progress

May 2013

GENERAL TOXICITY REDUCTION EVALUATION WORK PLAN
PERMANENTE QUARRY AND CEMENT PLANT
LEHIGH SOUTHWEST CEMENT COMPANY

Prepared for:

Regional Water Quality Control Board
SAN FRANCISCO BAY REGION
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May 2013

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1 INTRODUCTION

1.1 Background

The Lehigh Southwest Cement Company (Lehigh) operates the Permanente Quarry and Cement Plant (Permanente Facility) within the drainage of Permanente Creek in southwestern Santa Clara County, California. The discharge of quarry water and other facility process and storm water is currently regulated by a general National Pollutant Discharge Elimination System (NPDES) permit for discharges from sand and gravel mining operations (San Francisco Bay Regional Water Quality Control Board (RWQCB) Order R2-2008-0011; NPDES general permit number CAG982001) and a general NPDES permit for stormwater discharges associated with an industrial activity (State Water Resources Control Board (SWRCB) Order No. 97-03-DWQ). In the near future, the Regional Water Board intends to regulate discharges at the Permanente Facility through a facility-specific individual NPDES permit. Most recently, the RWQCB has issued a 13267 Investigative Order directing Lehigh to compile and submit technical and monitoring reports pertaining to discharge and receiving water quality, including monitoring for chronic toxicity and a plan for conducting a toxicity reduction evaluation (TRE), should the need arise, based on toxicity monitoring findings.

1.1.1 Watershed Characteristics

The Permanente Creek watershed is located in the southern San Francisco Bay region. The watershed is relatively small, encompassing approximately 17 square miles. The main channel is about 13 miles long and flows from west to east, then north to San Francisco Bay. The watershed upstream of the Permanente Facility is relatively undeveloped. Downstream of the Permanente Facility, Permanente Creek enters suburban and urban areas of Los Altos and Mountain View, traveling through significant physical alterations, and eventually enters the South Bay through Mountain View Slough. In addition, due to reduced conveyance capacity in lower Permanente Creek, the Permanente Diversion Channel was constructed to divert high flood flows from Permanente Creek to Stevens Creek (Santa Clara County 2011).

The Permanente Facility is located in the upper portion of the watershed in the southern headwater area, which encompasses approximately 3.9 square miles of steep, upland terrain. Flow in Permanente Creek generally rises in the late fall or early winter and then recedes to base flow during the spring and summer. Permanente Creek is a perennial flowing stream in most years, but during particularly dry years, the creek has ceased to flow in the summer or early winter (Santa Clara County 2011).

In the reach adjacent to the Permanente Facility, the Permanente Creek alignment has been altered and straightened in some areas and portions of the creek are contained within a culvert or open concrete-lined channel. Permanente Creek is typically perennial at the upstream end of the property; however, over the middle section of the site (i.e., south of the quarry pit) the creek flows only intermittently. Downstream of the intermittent reach, discharges from the quarry supplement or provide entirely all Permanente Creek flow, which helps to keep the flow regime largely perennial.

1.1.2 Discharge Operations

Discharges from the Permanente Facility to Permanente Creek consist of quarry discharge (ground and storm water entering the quarry that is pumped out), process water, and storm water associated with industrial activities. The 13267 Investigative Order specifies chronic toxicity monitoring in four on-site ponds. The source and characteristics of water in these ponds is summarized in **Table 1**. Locations of the ponds are provided in **Appendix A**.

Table 1. Characteristics of Permanente Facility Ponds Subject to Chronic Toxicity Testing Provisions of 13267 Investigative Order.

Pond Name	Type of Water	Period / Frequency of Release
Pond 4A	Groundwater and storm water that enters the quarry and primary crusher wash water	Daily
Pond 13	Permanente Creek. During dry season water is primarily that released from upstream Pond 4A	Daily
Pond 9	Cement Plant process water from Pond 11 (intermittent) and stormwater	Intermittent in response to inflow
Pond 14	Permanente Creek. During dry season, water is primarily a mix of Pond 4A and Pond 9 proportional to their respective release volumes. Volume of Permanente Creek entering Pond 14 is regulated by an upstream diversion structure that bypasses the majority of flow around Pond 14.	Daily, depending on upstream flow diversion

Pond 4A is located off-stream and adjacent to Permanente Creek. This pond primarily receives drainage water from the quarry pit, but also receives an intermittent and small volume of water from the primary crusher. Pond 9 is similarly located off-stream and adjacent to Permanente Creek. This pond receives process and storm water from Pond 11 (now intermittently, if at all) at the cement plant and storm water from the areas immediately adjacent to Pond 9.

Low dams on the channel of Permanente Creek create Ponds 13 and 14. In the case of Pond 14, a diversion structure immediately upstream of Pond 14 diverts the majority of flow around Pond 14 via a bypass channel that is considered the mainstem of Permanante Creek. During the dry season, Permanente Creek immediately upstream of Pond 13 is dry except when Pond 4A is discharging. As such, during the dry season, Pond 13 water is similar in chemical composition to that of Pond 4A. Typical operations at Pond 4A include daily continuous releases of water. However, in cases of maintenance activities or power outages that affect pumping from the quarry pit, Pond 4A may not release for periods of several days or more.

When inflows are sufficient to cause Pond 9 to release water into Permanente Creek, this released water mixes with water released from Pond 4A into Permanente Creek and Pond 13. This combined water ultimately flows to Pond 14. As such, during the dry season when there is no or very low ambient upstream Permanente Creek flow, Pond 13 shares similar water chemistry to Pond 4A, and Pond 14 shares a blended water chemistry between Pond 4A and Pond 9.

1.2 Chronic Toxicity Provisions

The 13267 Investigative Order requires three-species chronic whole effluent toxicity (WET) testing at Pond 4A, Pond 9, Pond 13, and Pond 14. The three freshwater species consist of

fathead minnow (*Pimephales promelas*), water flea (*Ceriodaphnia dubia*), and algae (*Selenastrum capricornutum*). Routine monitoring for chronic WET is required on a once-per-quarter schedule, and a program of monthly accelerated monitoring and TRE activities is required in cases where chronic toxicity is observed. In addition, the 13267 Investigative Order requires semiannual sediment toxicity testing at certain locations, although no program of accelerated monitoring or TRE is associated with sediment toxicity testing.

During routine monitoring for WET, the WET "trigger" is set at a three-sample median of greater than one chronic toxicity unit (1 TUc) or a single sample maximum of 2 TUc, where a TUc is based on the no observable effect level (NOEL). When WET testing utilizes a 5 point dilution series, the NOEL is determined by point-estimation techniques, where the NOEL is equivalent to the 25% effective or inhibition concentration (EC/IC_{25}). When point-estimation techniques cannot be used to determine the EC/IC_{25}, the NOEL is determined by hypothesis testing, where the NOEL is equivalent to the no observable effect concentration (NOEC).

If toxicity testing during routine monitoring exceeds the WET trigger, monitoring with the affected species at the affected ponds is accelerated to monthly for three consecutive months. If, during accelerated monitoring, the WET trigger is exceeded again, a TRE is initiated. If, after three accelerated monitoring events, the WET trigger is not exceeded, monitoring for the affected species may return to a routine quarterly schedule.

1.3 Purpose and Need for TRE Work Plan

Provision 8.g of the 13267 Investigative Order directs Lehigh to prepare a general TRE Work Plan by May 31, 2013. The general TRE Work Plan is to provide an initial framework for investigating the causes and sources of chronic toxicity, if any, in Ponds 4A, Pond 9, Pond 13, and Pond 14. The 13267 Investigative Order also directs Lehigh to prepare a toxicity event-specific TRE Work Plan within 30 days of exceeding the WET trigger. Furthermore, exceedance of the WET trigger during accelerated monitoring obligates Lehigh to initiate a TRE within 30 days. In such a case, Lehigh is instructed to conduct its TRE specific to the triggering toxicity event, and in accordance with United States Environmental Protection Agency (USEPA) guidance, and consistent with its toxicity event-specific TRE Work Plan.

This general TRE Work Plan has been prepared to meet the requirements of provision 8 and the May 31, 2013 deadline. This general TRE Work Plan is broad in its scope, and is intended to generally guide activities related to effective execution of a TRE at the Permanente Facility. As such, this general TRE Work Plan has not been prepared in response to any specific observed toxicity. In accordance with Order provision 8.g, in a case where the WET trigger is exceeded, this general TRE Work Plan is to be modified such that its specific scope, instruction, and overall plan for toxicity resolution is tailored to the specific triggering toxicity event. Therefore, in a case of observed toxicity, a separate toxicity event-specific TRE Work Plan would be prepared specific to the nature and characteristics of the triggering event.

1.4 TRE Objectives and Intended Use of this Plan

A TRE is defined in the Technical Support Document for Water Quality-Based Toxics Control (USEPA 1991) as:

> "a site specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity"

The overall objectives for any TRE are to: (1) verify that toxicity is occurring at levels that could cause toxicity in the receiving water; (2) determine a viable control strategy to reduce toxicity, as needed; and (3) verify that, upon implementation of the control strategy, toxicity has been consistently reduced to levels that would not cause toxicity in the receiving water. The specific objective(s) of any TRE initiated under this Work Plan will need to be stated at TRE initiation, based on the bioassay result that triggered the TRE. The toxicity event-specific TRE Work Plan, prepared in response to a specific toxicity event, would be the formal document that defines the specific TRE objective(s).

The USEPA has prepared generic TRE implementation guidance for publicly owned treatment works and for industrial facilities (USEPA, 1989; USEPA, 1999). While neither of these specific guidance documents directly pertain to sand, gravel, and quarry operations, the specific steps and procedures outlined in these documents are broadly applicable to operations at a facility such as the Permanente Facility.

The components of a TRE Work Plan may include Information and Data Acquisition, Facility Operations and Performance Evaluation, Toxicity Identification Evaluation (TIE), Toxicity Source Evaluation (TSE), Toxicity Control Evaluation, and Toxicity Control Implementation. **Figure 1** shows the logical progression through as many of these components as is necessary to achieve the objectives of the TRE. Not every TRE needs to complete all steps of this conceptual process. As clarified by the USEPA in published guidance (2001):

> "A TRE may be implemented in several ways. A TRE is not necessarily a long-term study, and it does not necessarily require extensive research. Any activities that results in consistently reducing toxicity to an acceptable level may be considered TRE activities."

2 WORK PLAN

The headings in this section mirror the steps outlined in the Figure 1 flowchart. **Section 2.1** has been added as an additional step at the onset of, or prior to, a TRE. Section 2.1 is used to evaluate the validity of the bioassay results leading up to the TRE (including actions to be taken during accelerated monitoring) and to gain a preliminary understanding of possible toxicants based on past bioassay and monitoring results. **Section 2.1.1** addresses validity of bioassay review while **Section 2.1.2** evaluates the role of possible toxicants.

2.1 Step 1: Bioassay Evaluation, Initial Screening, and WET Testing

2.1.1 Bioassay Test Evaluation

All TRE work is predicated on valid bioassay results indicating persistent toxicity during WET testing over a period of time. A bioassay test evaluation process may include, but not be limited to the following:

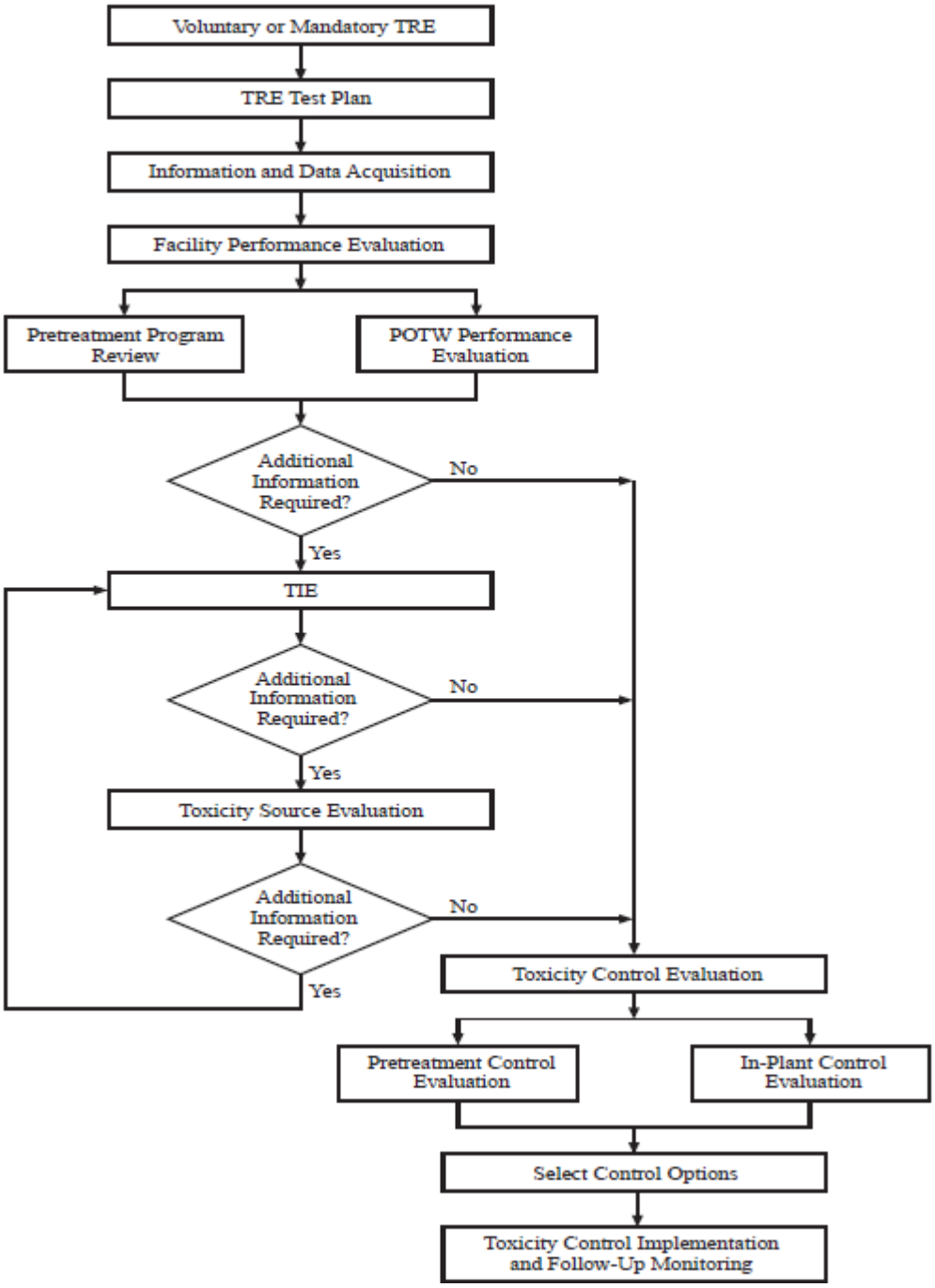

Figure 1. Phases of a model TRE process.

SOURCE: USEPA 1999.

- Review bioassay results for 100% site water and the serial dilutions to determine cause of the WET trigger exceedance. Evaluate dose-response relationships as suggested in USEPA guidance (USEPA 2000).
- Review bioassay results to ensure that all test acceptability criteria are met.
- Asses the sample collection process for sample integrity and lack of contamination.
- Review reference toxicant test results and compare to bioassay lab control charts.
- Evaluate test variability and percent minimum significant difference (PMSD) against USEPA test method guidelines (USEPA 2000).
- Review field observation logs, bioassay results, and water quality monitoring results to provide supplemental information on bioassay results.
- Review bioassay results for the laboratory control, receiving water control (if conducted), and undiluted site water relative to one another and previous results to determine the cause of WET trigger exceedance.
- Consider splitting the sample and sending to a secondary bioassay laboratory for review and confirmation of bioassay results.

It is a separate question to determine whether there are mitigating factors (e.g., receiving water dilution) that could refute the presumption that toxicity in the bioassay tests equates with toxicity in the receiving water.

2.1.2 Initial Site Water Toxicity Screening

Some potential toxicants to aquatic life can be screened, based on monitoring data, to determine whether levels are present at concentrations that could cause toxicity in site water during bioassay testing. The sand and gravel NPDES permit establishes routine monitoring for some constituents and aggregate properties of pond water. In addition, the 13267 Investigative Order requires routine monitoring for additional toxic constituents such as trace metals. A screening assessment for toxicants to aquatic life, based on available pond monitoring data, will include an evaluation of all recently collected monitoring data.

In addition, an initial review of facility performance will be made to assess the likelihood of an operational or treatment system upset or any significant operational deviations as a cause of site water toxicity. Operational upsets might include power failures that lead to loss of operational control of pumps and/or sediment filters or other treatment devices.

2.1.3 Additional WET Testing and TRE Process Decisions

If an exceedance of the monitoring trigger occurs during routine WET testing, after reviewing the bioassay test results and finding the sample collection and analytical processes valid, Lehigh will trigger the accelerated monitoring process for the species exhibiting toxicity. During the accelerated monitoring phase, Lehigh will evaluate the significance of the toxicity results relative to controls, and attempt to learn as much as possible about the nature of the toxicity if it is found to be persistent in the affected site water. Lehigh may also initiate Information and Data

Acquisition (Step 2), Facility Performance Evaluation (Step 3), and/or an initial TIE (See Step 4), during accelerated monitoring, if the routine monitoring sample showed toxicity of 4 TUc or greater (i.e., the toxicity persists despite 3:1 dilution) and/or the inhibition is greater than 50% in undiluted site water (i.e., the magnitude of the toxic effect is large), with the intent of finding the factor(s) that may be causing the toxicity. If the source(s) of toxicity are readily apparent, this may allow Lehigh to take immediate corrective action and use the accelerated monitoring period to verify that the toxicity is not persistent and/or has been removed by the employed corrective action.

If the source of toxicity cannot be readily identified and eliminated, or if the monitoring trigger is exceeded during accelerated monitoring, Lehigh will initiate the formal TRE process, including the submission of a toxicity event-specific TRE Work Plan. The scope of a toxicity event-specific TRE Work Plan will be contingent upon whether appropriate mitigation actions are readily apparent. The toxicity event-specific TRE Work Plan may recommend changing the frequency and/or location of sample collection to help identify sources of toxicity.

2.1.4 Additional WET Testing Procedures

In general, and in the event that facility mitigation actions may not be readily apparent, Lehigh will increase the typical sample collection volume for bioassay testing. The collection of additional sample volume will provide Lehigh with sufficient sample to facilitate TIE work, if the toxicity is persistent and if a TIE is warranted. Lehigh will consult with its contract bioassay lab to determine an appropriate additional sample volume based upon the species being tested, the magnitude of toxicity, and which endpoint(s) showed toxicity (i.e., survival, growth, or reproduction).

During accelerated monitoring (and any TRE, if needed), Lehigh will ask its contract bioassay laboratory to report preliminary results for each test as soon as available. This will allow Lehigh the opportunity, if toxicity is indicated, to initiate an additional test of the toxic sample to evaluate the stability of the toxicity. The decision to test toxicity stability will depend on the magnitude in TUc and the percent change in bioassay response at 100% site water relative to a control.

During the TRE study, Lehigh will consider whether to collect, store or test additional samples of affected site water. Appropriate testing on these samples would be specific to the particular events triggering the TRE. These samples would be available to perform WET tests, toxicity stability tests, chemical tests, and/or a TIE at a later date, as appropriate. Collected samples would be stored during the TRE study or until a determination is made that testing is not warranted.

Modifications to the above procedures may be made, depending on the circumstances surrounding the initiation of accelerated monitoring. Any modifications will be noted in the toxicity event-specific TRE Work Plan.

2.2 Step 2: Information and Data Acquisition

Acquiring complete and current information on Permanente Facility operations and monitoring results is critical to an investigation of toxicity. This section lists the sources of information to be used during the TRE. In general, the following information sources may be reviewed, as necessary, to assess site water toxicity, site water variability, and treatment system efficiency (if a treatment system is utilized).

- Acute (from sand and gravel NPDES permit) and chronic bioassay lab reports.
- Sand and gravel NPDES monitoring reports (i.e., self monitoring reports) and 13267 Investigative Order monitoring results.
- Operations and maintenance logs.
- Interviews with Lehigh staff or on-site consultants.

More detail on the utility of the information and data sources, referenced above, is found in Step 1 (for confirmation of toxicity) and Step 3 (for investigating toxicity, variability and treatment system efficiency).

2.3 Step 3: Facility Operations and Performance Evaluation

The facility operations and performance evaluation review will start with an assessment of site water variability, through a review of self monitoring reports and other collected pond water quality data and treatment system performance indicators. This review will serve as a readily available measure of overall facility performance (i.e., routine operations versus non-routine operations that could lead to differences in facility discharges and/or pre-treatment performance). Variability in facility operations will be evaluated for any potential link with observed toxicity (reviewed in Step 1, Section 2.1.2).

2.3.1 Pond Water Variability

Changes in pond water quality may relate to changes in pond water toxicity. For Permanente Facility operations, routine pond water monitoring data will provide the most complete information to profile pond water variability. Over time, a profile of pond water constituent and aggregate property characteristics can be generated and compared against toxicity testing results. An assessment of pond water variability may or may not include the following elements, depending on the nature of the toxicity.

- Review constituent and aggregate property monitoring reports for (1) exceedance of water quality criteria for aquatic organisms; (2) recent significant pH, temperature, EC, and hardness changes; and (3) comparison of more recent bioassay test results with historical monitoring data, to potentially identify a recent change that might cause site water toxicity.
- Identify non-routine facility activities such as maintenance, repair, spills, or construction activities (i.e., road or new process facilities construction) and evaluate the potential for these activities to adversely affect pond water quality.

- Identify if precipitation or other related weather events resulted in changed upstream ambient flow conditions in Permanente Creek, or resulted in changed facility operations or stormwater discharges.
- If any pest control activities occur at the facility, identify recent pesticide applications and evaluate the potential to adversely affect pond water quality.

2.3.2 Treatment System Efficiency

The operations review will evaluate current treatment system operation and efficiency, including an evaluation of process control procedures. For the quarry water discharge, the operation and efficiency of pre-treatment controls such as sediment filters will be evaluated.

An assessment of treatment system efficiency may or may not include the following elements, depending on the nature of the toxicity.

- Review operations and maintenance logs.
- Rule in/out the possibility of a treatment system upset.

2.4 Step 4: Toxicity Identification Evaluation (TIE)

2.4.1 Components of a Toxicity Identification Evaluation

A TIE is a potential component of a TRE. The TIE is employed, as needed, as the fourth step of a TRE study after review and verification of bioassay data/information (Step 1), acquisition of relevant data (Step 2), and a review of pond water quality data and facility performance (Step 3). Nevertheless, it should be noted that it may be appropriate to perform an initial TIE prior to completing Steps 2 and 3 in order to capitalize on a particular toxicity event.

In brief, a TIE relies upon observing statistically significant changes in bioassay response after samples have been manipulated to remove, isolate, and/or enhance toxicity, as a means of identifying the "class" or "category" of chemical likely causing the toxicity (e.g., metal, organic, etc.). A TIE may also employ ad hoc experiments, such as use of synthetic site waters to investigate the role of ionic imbalances in observed pond water toxicity. A TIE is a three-phase process: (1) toxicant characterization, (2) toxicant identification, and (3) toxicant confirmation.

The TIE process involves a series of techniques, using before and after comparisons, to attempt removal of toxicity and identify the extent to which toxicity, if any, has been reduced (U.S. EPA 1992, 1993a, 1993b). For each procedure that removed toxicity, something may be learned about the physical or chemical nature of the toxicant(s) based on the nature of the removal procedure or through analysis of what was removed. In this way, the TIE process can be very useful in identifying the chemical class or even the chemical identity of the toxicant(s) responsible for the initial toxicity. Either result can allow targeted control measures to reduce toxicity in the affected pond water to levels that assure that toxicity will not occur in the receiving water.

Having a sufficiently large initial toxic response (in TUc and percent inhibition) is critical to the success of the TIE process. Removal of specific constituents (e.g., via C18 columns, etc.) may be incomplete and/or several different toxicants may be contributing to the response such that the net change in toxicity may not be large enough to be significant. Thus, having a sample that is "sufficiently toxic" is necessary to expect success in tracking changes in toxicity through the TIE process. In fact, USEPA has noted (USEPA 1996):

> "[f]rom our experience, it may be difficult, but not impossible to conduct a TIE when the toxic units of a sample from the Initial Toxicity Test using the most sensitive species are <2 (i.e., LC_{50}>50%)."

2.4.2 TIE Trigger

As shown in **Figure 2**, evidence of significant toxicity relative to control is the first step in a TIE. WET testing and accelerated monitoring are performed to detect and confirm persistent toxicity. Assuming toxicity has been shown to be persistent and no readily apparent sources of toxicity have been identified in Steps 1–3, the question transitions to what magnitude of toxicity is sufficient, as a minimum threshold, to trigger a TIE with a reasonable chance of determining the class of toxicant.

If the affected site water were to show consistent, but low-level toxicity, it may be fruitful to perform a toxicity stability study and/or a Phase I TIE on one toxic sample to determine if that level of toxicity for that particular site water can be tracked successfully through a TIE. If, however, the toxicity is intermittent and variable in magnitude, it may be more fruitful to set the TIE trigger at a higher level of toxicity that has both been previously observed and where there would be better success in tracking toxicity through a TIE. Therefore, the TIE trigger decision is best made after reviewing the information gathered when implementing the initial steps of this general TRE Work Plan and upon obtaining input from Lehigh's contract bioassay laboratory. As such, the TIE trigger will be defined in the toxicity event-specific TRE Work Plan.

A model implementation protocol with a TIE trigger is given below.

- If TUc >1 in an accelerated monitoring bioassays (i.e., first accelerated test having > 1 TUc), hold sample for a week and re-test to determine if toxicity is stable.
- If the subsequent bioassay test confirms toxicity is stable, evaluate the magnitude of the inhibition to determine whether to immediately perform a TIE using the same sample used to confirm toxicity (i.e., greater than 50% inhibition in undiluted site water).
- If toxicity is not stable, then a newly collected sample should be tested and a TIE performed concurrently.
- If there is a persistent toxic effect at 2 TUc or less, then Lehigh would investigate further, including potential TIE work, if the magnitude of the effect is large (i.e., greater than 50% inhibition in undiluted site water).
- If TUc > 2 and the effect appears to be persistent and driven by site water toxicity, then one or more TIEs will be conducted in an effort to identify the causative constituent(s).

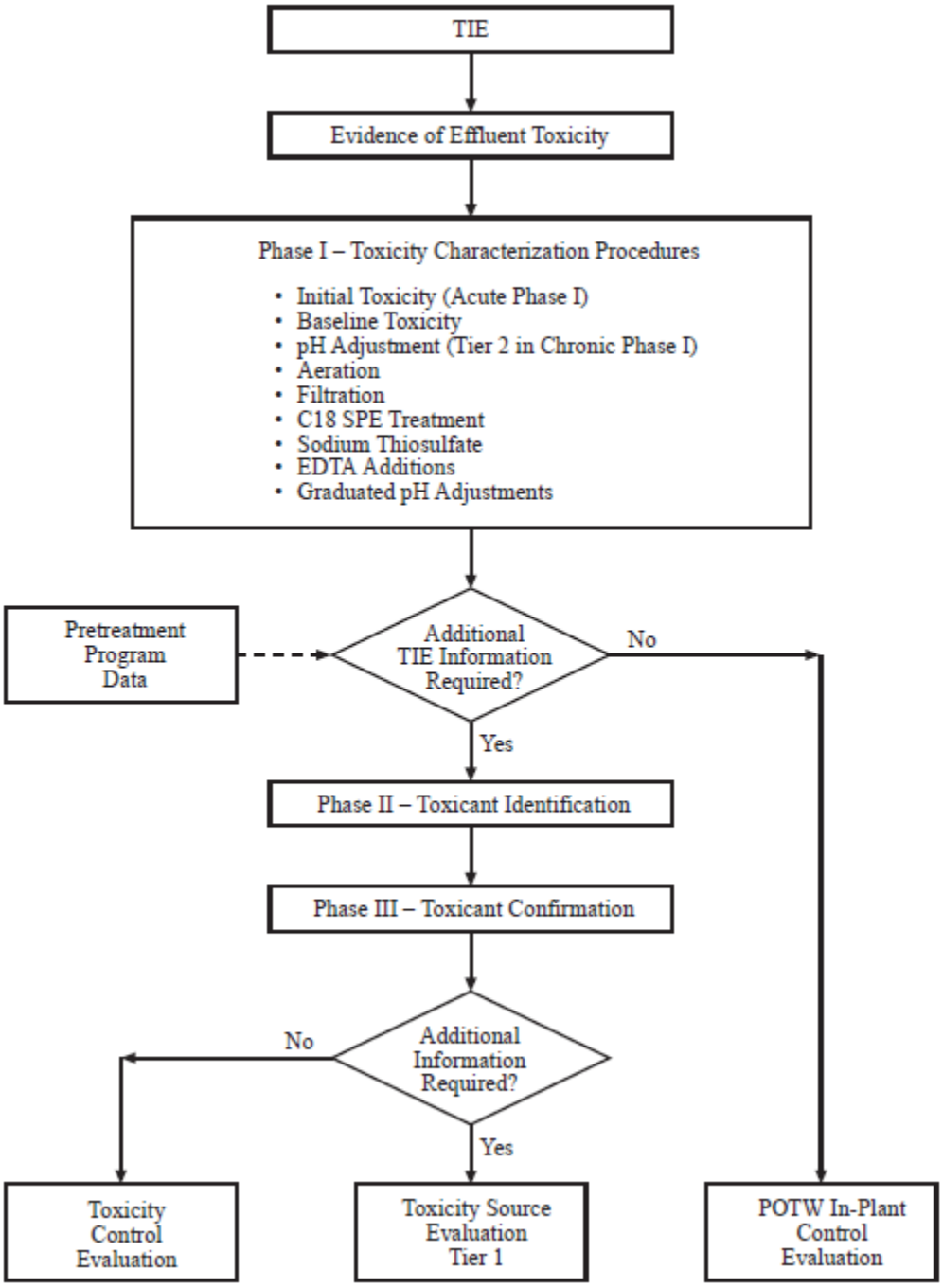

Figure 2. Phases of a model TIE process.

SOURCE: USEPA 1999.

2.4.3 Samples Used for TIEs

As discussed above, Pond 4A is the most upstream pond to be sampled for chronic WET testing. Ponds 13 and 14 (receiving waters) receive the majority of their water from Pond 4A during dry conditions, though Pond 14 can also receive water from Pond 9 when it is discharging. If results of the triggering toxicity event or accelerated monitoring events indicate that toxicity is present in multiple ponds (e.g., Pond 14, Pond 13, and Pond 4A) and that Pond 4A is the source of toxicity, TIEs may be performed only on Pond 4A in an attempt to characterize, isolate, and confirm the nature of the toxicant(s) at the source. If these early results indicate toxicity in Pond 14 and Pond 9 only, and that Pond 9 is the source of toxicity, TIEs may be performed only on Pond 9 for the same reasons indicated above. Once toxicity has been identified and controlled at its source, confirmatory tests will be conducted on other ponds in the TRE to verify that toxicity is no longer present.

2.4.4 TIE Procedures

During a TIE, the objectives of the bioassay testing are different from routine or accelerated monitoring. As such, several testing parameters may be different, including:

- duration of the tests may be less than standard duration if toxicity is observed rapidly (e.g., by day 4 of a 7-day bioassay); and
- the number and range of serial dilutions may be different or limited to 100% site water.

EPA guidance will be the primary basis for TIE manipulations (U.S. EPA 1992, 1993a, 1993b). However, Lehigh may also rely on bioassay laboratory-specific procedures, including ad hoc experimentation.

2.5 Step 5: Toxicity Source Evaluation

Based on the findings of the process control evaluation, facility performance evaluation, and/or any TIEs, a toxicity source evaluation (TSE) may need to be performed. In general, the TSE will seek to locate the source of toxicity or toxicants that are contributing to the demonstrated site water toxicity. A TSE is particularly relevant to Permanente Facility and the four ponds as the inputs to these ponds are different and varied. At any given pond, the approach to the TSE would likely be a tiered process, including discrete testing of each individual input, and logically working upstream in any particular input if discrete sources exist further upstream.

The TSE may identify the source of toxicity even though a particular toxicant(s) cannot be identified. The ultimate driving goal of the TRE is to control toxicity. If a particular source of toxicity can be controlled by means that do not require toxicant identification (i.e., process elimination), such a control will be considered as satisfactory attainment of this ultimate goal.

2.6 Step 6: Toxicity Control Evaluation

Toxicity may be controlled by direct treatment, facility or treatment operational changes, or source control. Criteria to select toxicity control options will include: (1) need to protect receiving water beneficial uses; (2) compliance with applicable toxicity limits; (3) compliance

with other permit limits; (4) capital, operational, and maintenance costs; and (5) ease of implementation and operational reliability. In order to demonstrate the toxicity control option's ability to reduce site water toxicity, the preferred option may undergo bench-scale and or pilot-scale treatability studies.

2.7 Step 7: Toxicity Control Implementation

Upon selection of a preferred toxicity control option, Lehigh will consult with RWQCB staff about the monitoring schedule to confirm the toxicity reduction and the potential need for an implementation schedule for installation of treatment facilities or that accommodates modifications of existing facilities. Upon further monitoring confirming toxicity reduction, Lehigh would consult again with RWQCB staff as to its findings.

3 REPORTING AND CONCLUDING TRE

3.1 Reporting

Lehigh will keep RWQCB staff apprised of the ongoing progress and results of the TRE through regular communications, amendments to the toxicity event-specific TRE Work Plan, and a final report.

Amendments to the toxicity event-specific TRE Work Plan may be necessary as TRE activities progress and new information is developed and assessed. When new information requires an amendment to an existing toxicity event-specific TRE Work Plan, the amendment will be prepared and submitted to RWQCB staff for review and comment.

The final report will include, but not necessarily be limited to, the following information.

- Introduction (background, receiving water objectives, and purpose of the report).
- Evaluation of toxicity test results, including additional WET testing proposed in this TRE work plan.
- Facility operations and performance evaluation findings and recommendations.
- Methods, results, and conclusions about toxicant class or identity achieved during facility review and TIE work, if conducted.
- Results and findings from other steps of the TRE process that were performed.
- Summary of actions taken to address the issue.
- Conclusions and recommendations.

3.2 Concluding the TRE

The TRE may be concluded at various points throughout the process based either on: (1) achieving a reduction in toxicity through processes or treatment options, or (2) by finding the toxicity is no longer persistent (i.e., not present in three consecutive samples), or (3) is not causing measurable toxicity in the receiving water. In the event that implementation of this

general TRE Work Plan, and the toxicity event-specific TRE work plan developed within the first 30 days after triggering the TRE, does not provide a sufficient reduction in toxicity, Lehigh will consult with RWQCB staff and EPA regional staff to identify further actions. Prior to conclusion of the TRE, Lehigh will consult with RWQCB staff to share its findings, including submittal of a final report to the RWQCB.

4 REFERENCES

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USEPA (United States Environmental Protection Agency). 2001. Clarifications regarding toxicity reduction and identification evaluations in the national pollutant discharge elimination system program. Office of Wastewater Management. Washington D.C. March 2001.

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———. 1992. Toxicity identification evaluations: Characterization of chronically toxic effluents, Phase I. EPA 600-6-91-005F. National Effluent Toxicity Assessment Center. Duluth, Minnesota. 1992.

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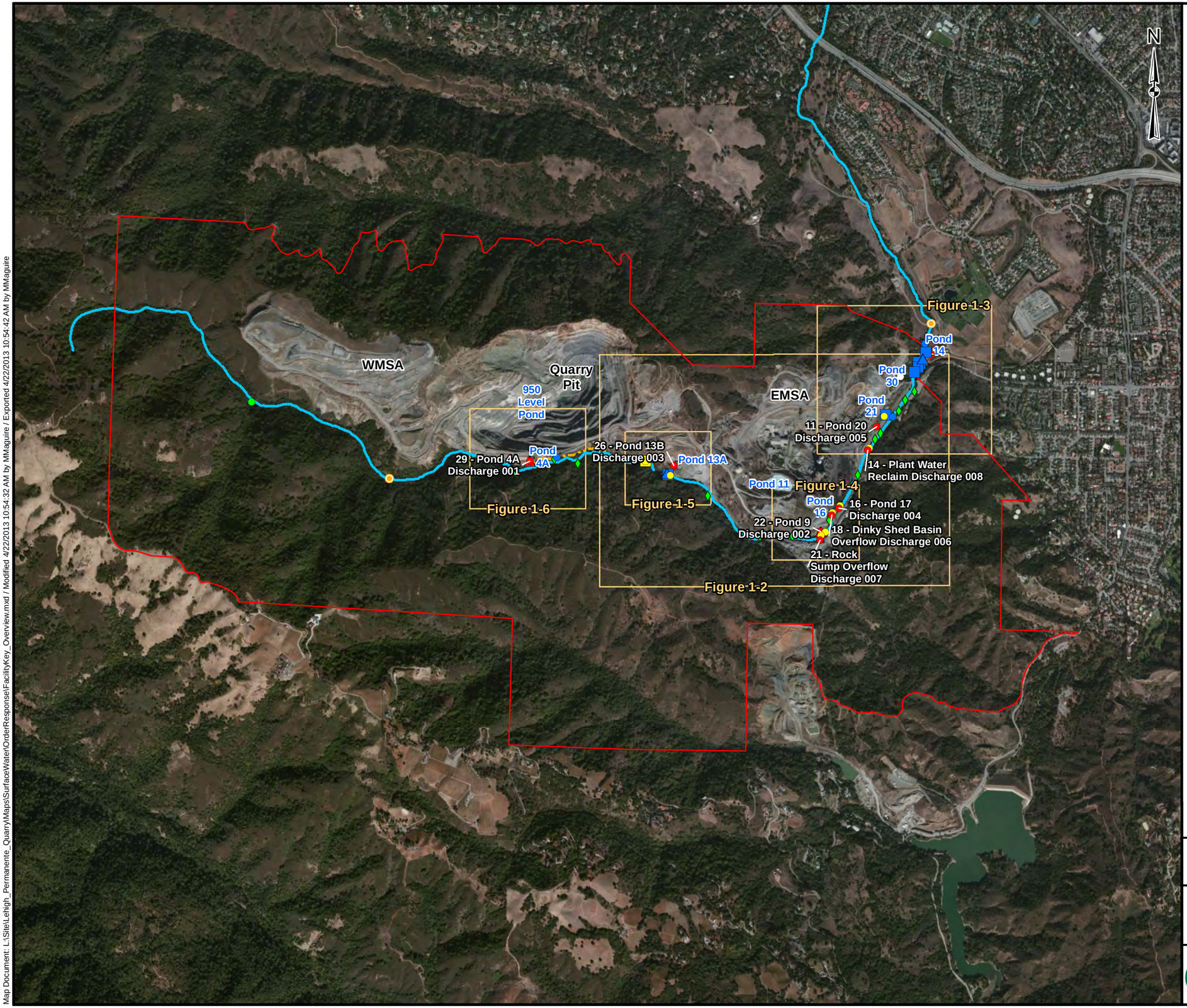
———. 1989. Generalized methodology for conducting industrial Toxicity Reduction Evaluations (TREs). EPA 600-2-88-070. Risk Reduction Engineering Laboratory. Cincinnati, Ohio. April 1989.

Appendix A

Locations of Monitoring Sites – Figures from Facility Key Provided to RWQCB on April 22, 2013 (Golder Associates 2013)



LEGEND

Item 7 Sample Locations
- Sand and Gravel Discharge Point (8)
- General Industrial Stormwater Discharge Point (1)
- Receiving Water Sample Location (8)
- Supplemental Monitoring Location (3)
- Proposed Background Location (1)

Item 8 Sample Locations
- Sand and Gravel Discharge Point (2)
- Supplemental Monitoring Location (2)

Item 11 Sample Locations
- Receiving Water Sample Location (1)
- Supplemental Monitoring Location (7)

- Additional Identified Pipe
- Former Sample Location
- Pond
- Permanente Creek
- Difficult Access
- Property Boundary

NOTES

RW = Receiving Water
DS = Downstream

Sample location 22 - Pond 9 Outfall is included under Order Items 7 and 8.
Sample location 27 - Creek Inflow to Pond 13 is included under Order Items 7 and 11.
Sample location 29 - Pond 4A Outfall 001 is included under Order Items 7 and 8.

REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
2) On site ponds, wetlands, and stream data compiled from WRA, Lehigh, and Golder Associates. Off site hydrography from USGS NHD.
3) Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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PROJECT
LEHIGH SOUTHWEST CEMENT COMPANY
PERMANENTE QUARRY
SAND AND GRAVEL PERMIT

TITLE
ORDER RESPONSE - APRIL 22, 2013
ORDER ITEM 1
FACILITY KEY

Golder Associates

PROJECT No.		063-7109-913	FILE No.	FacilityKey_Overview.mxd
DESIGN	MM	2/8/2013	SCALE: AS SHOWN	REV. 0
GIS	MM	4/22/2013		
CHECK	GW	4/22/2013		
REVIEW	WLF	4/22/2013		

FIGURE 1-1

Map Document: L:\Site\Lehigh_Permanente_Quarry\Maps\SurfaceWater\OrderResponse\FacilityKey_Overview.mxd / Modified 4/22/2013 10:54:32 AM by MMaguire / Exported 4/22/2013 10:54:42 AM by MMaguire

LEGEND

Item 7 Sample Locations
- Sand and Gravel Discharge Point (7)
- General Industrial Stormwater Discharge Point (1)
- Receiving Water Sample Location (8)
- Supplemental Monitoring Location (2)

Item 8 Sample Locations
- Sand and Gravel Discharge Point (1)
- Supplemental Monitoring Location (2)

Item 11 Sample Locations
- Receiving Water Sample Location (1)
- Supplemental Monitoring Location (7)

- Difficult Access
- Former Sample Location
- Additional Identified Pipe
- Pond
- Permanente Creek

NOTES

RW = Receiving Water
DS = Downstream

REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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3) Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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PROJECT LEHIGH SOUTHWEST CEMENT COMPANY
PERMANENTE QUARRY
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TITLE **ORDER RESPONSE - APRIL 22, 2013**
ORDER ITEM 1
FACILITY KEY

Golder Associates

PROJECT No.		063-7109-913	FILE No.	FacilityKey_Book.mxd
DESIGN	MM	2/8/2013	SCALE: AS SHOWN	REV. 0
GIS	MM	4/22/2013		
CHECK	GW	4/22/2013		
REVIEW	WLF	4/22/2013		

FIGURE 1-2

Map Document: L:\Site\Lehigh_Permanente_QuarryMaps\SurfaceWater\OrderResponse\FacilityKey_Book.mxd / Modified 4/22/2013 4:24:36 PM by DZelmanfahm / Exported 4/22/2013 4:47:53 PM by DZelmanfahm

LEGEND

Item 7 Sample Locations
- Sand and Gravel Discharge Point (2)
- General Industrial Stormwater Discharge Point (1)
- Receiving Water Sample Location (2)
- Supplemental Monitoring Location (2)

Item 8 Sample Locations
- Supplemental Monitoring Location (1)

Item 11 Sample Locations
- Supplemental Monitoring Location (6)

- Former Sample Location
- Additional Identified Pipe
- Pond
- Permanente Creek

NOTES

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REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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TITLE **ORDER RESPONSE - APRIL 22, 2013**
ORDER ITEM 1
FACILITY KEY

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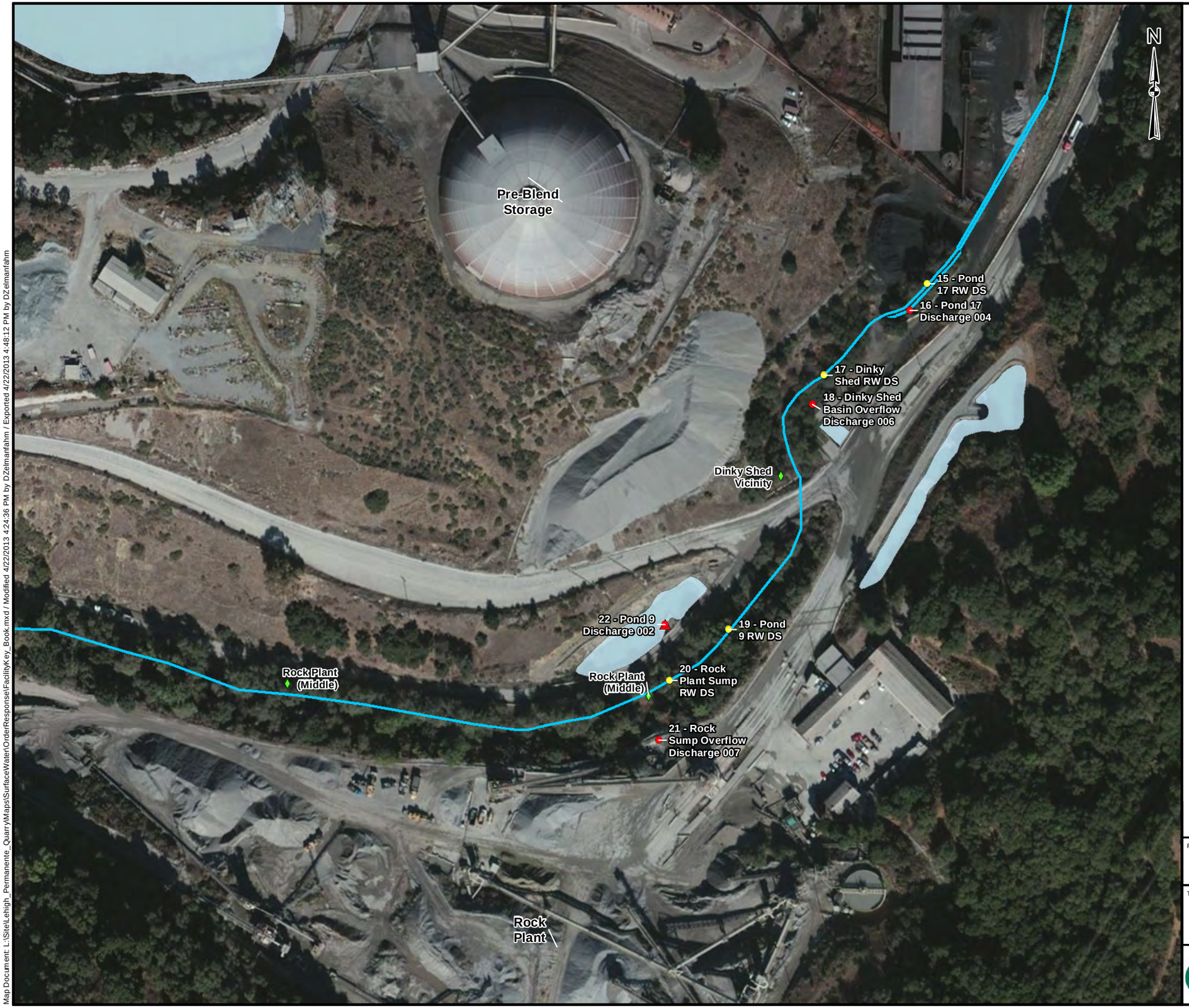
PROJECT No.		063-7109-913	FILE No.	FacilityKey_Book.mxd
DESIGN	MM	2/8/2013	SCALE: AS SHOWN	REV. 0
GIS	MM	4/22/2013		
CHECK	GW	4/22/2013		
REVIEW	WLF	4/22/2013		

FIGURE 1-3

Map Document: L:\Site\Lehigh_Permanente_Quarry\Maps\SurfaceWaterOrderResponse\FacilityKey_Book.mxd / Modified 4/22/2013 4:24:36 PM by DZelmanfahm / Exported 4/22/2013 4:48:03 PM by DZelmanfahm



LEGEND

Sample location 22 - Pond 9 Outfall is included under Order Items 7 and 8.

Item 7 Sample Locations
- Sand and Gravel Discharge Point (4)
- Receiving Water Sample Location (4)

Item 8 Sample Locations
- Sand and Gravel Discharge Point (1)

- Additional Identified Pipe
- Pond
- Permanente Creek

NOTES

RW = Receiving Water
DS = Downstream

REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
2) On site ponds, wetlands, and stream data compiled from WRA, Lehigh, and Golder Associates. Off site hydrography from USGS NHD.
3) Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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TITLE **ORDER RESPONSE - APRIL 22, 2013**
ORDER ITEM 1
FACILITY KEY

Golder Associates

PROJECT No.		063-7109-913	FILE No.	FacilityKey_Book.mxd
DESIGN	MM	2/8/2013	SCALE: AS SHOWN	REV. 0
GIS	MM	4/22/2013		
CHECK	GW	4/22/2013		
REVIEW	WLF	4/22/2013		

FIGURE 1-4

LEGEND

Sample location 27 - Creek Inflow to Pond 13 is included under Order Items 7 and 11.

Item 7 Sample Locations
- Sand and Gravel Discharge Point (1)
- Receiving Water Sample Location (2)

Item 8 Sample Locations
- Supplemental Monitoring Location (1)

Item 11 Sample Locations
- Receiving Water Sample Location (1)
- Supplemental Monitoring Location (1)

- Additional Identified Pipe
- Pond
- Permanente Creek

NOTES

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DS = Downstream

REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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3) Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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TITLE **ORDER RESPONSE - APRIL 22, 2013**
ORDER ITEM 1
FACILITY KEY

Golder Associates

PROJECT No.		063-7109-913	FILE No.	FacilityKey_Book.mxd
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GIS	MM	4/22/2013		
CHECK	GW	4/22/2013	**FIGURE 1-5**	
REVIEW	WLF	4/22/2013		

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LEGEND

Sample location 29 - Pond 4A Outfall 001 is included under Order Items 7 and 8.

Item 7 Sample Locations
- Sand and Gravel Discharge Point (1)
- Supplemental Monitoring Location (1)

Item 8 Sample Locations
- Sand and Gravel Discharge Point (1)

- Difficult Access
- Additional Identified Pipe
- Pond
- Permanente Creek

NOTES

RW = Receiving Water
DS = Downstream

REFERENCES

1) Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community
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3) Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet

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TITLE **ORDER RESPONSE - APRIL 22, 2013**
ORDER ITEM 1
FACILITY KEY

Golder Associates

PROJECT No.		063-7109-913	FILE No.	FacilityKey_Book.mxd
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GIS	MM	4/22/2013		
CHECK	GW	4/22/2013	**FIGURE 1-6**	
REVIEW	WLF	4/22/2013		

Map Document: L:\Site\Lehigh_Permanente_QuarryMaps\SurfaceWaterOrderResponse\FacilityKey_Book.mxd / Modified 4/22/2013 4:24:36 PM by DZelmanfahm / Exported 4/22/2013 4:48:28 PM by DZelmanfahm