

APPENDIX I
AIS OSHA TRENCHING PERMIT

No: **2015-904781**

ANNUAL PERMIT

Permit Issued To

(Insert Contractor/Project Administrator's Name, Address and Telephone No.)

American Integrated Services Inc
 Attn: Safety Mgr or Paul Herrera
 PO Box 92316
 Long Beach CA 90809-2316

(310) 522-1168

No. _____
 Date 2/3/2015
 Region 3
 District 5
 Tel. (310) 516-3734

Type of Permit T1-ANNUAL TRENCH/EXCAVATION

Pursuant to Labor Code Sections 6500 and 6502, this Permit is issued to the above-named employer for the projects described below.

State Contractor's License Number		757133		Permit Valid through		February 03, 2016	
Description of Project		Location Address		City and County		Anticipated Dates	
Various Conditions of Issuance:		Statewide				Starting Completion	
						Feb 3, 2015 Feb 03, 2016	

This Permit is issued upon the following conditions:

1. That the work is performed by the same employer. If this is an annual permit the appropriate District Office shall be notified, in writing, of dates and location of job site prior to commencement.
2. The employer will comply with all occupational safety and health standards or orders applicable to the above projects, and any other lawful orders of the Division.
3. That if any unforeseen condition causes deviation from the plans or statements contained in the Permit Application Form the employer will notify the Division immediately.
4. Any variation from the specification and assertions of the Permit Application Form or violation of safety orders may be cause to revoke the permit.
5. This permit shall be posted at or near each place of employment as provided in 8 CCR 341.4

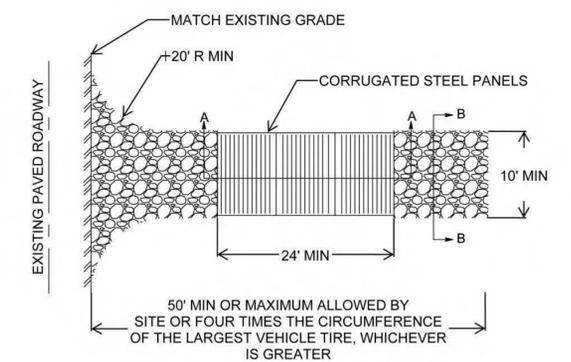
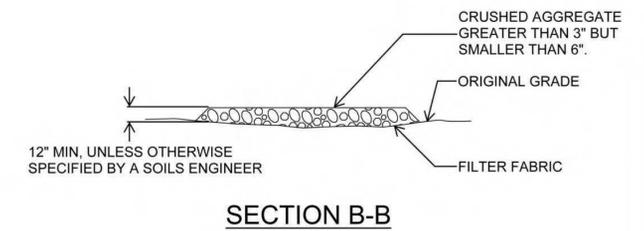
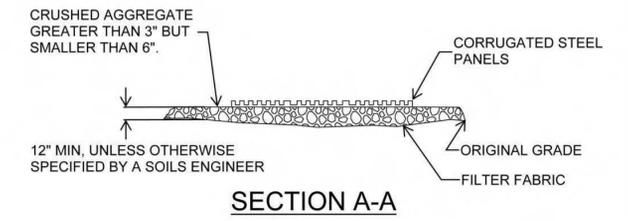
Received From		Received By	
Paul Herrera		Permit Unit	
<input type="checkbox"/> Cash	Amount	Date	
<input checked="" type="checkbox"/> Check 19434	\$100.00	2/3/15	

Investigated by _____ Date _____
 Approved by Robert E. Law ^{Safety Engineer} 2/3/2015
 District Manager/Permit Unit Date

APPENDIX J
LAYDOWN YARD PLANNING SUBMITTAL



- NOTES:**
- 1) STABILIZED CONSTRUCTION ENTRANCE / EXIT SHOULD BE INSTALLED PER CASQA TC-1.
 - 2) STABILIZED CONSTRUCTION ENTRANCE / EXIT SHOULD BE USED IN CONJUNCTION WITH STREET SWEEPING (CASQA SE-7) ON ADJACENT PUBLIC RIGHT OF WAY.



**STABILIZED CONSTRUCTION
01 ENTRANCE/ EXIT**

SCALE: N.T.S.

LEGEND:

- x — x — x — TEMP CHAIN LINK FENCE 6' H
- — — — LOT LINE
- - - - - EQUIPMENT AND MATERIAL LAYDOWN BOUNDARY
- CRUSHED MISCELLANEOUS BASE (CMB)
- ← INGRESS / EGRESS

CONCEPTUAL



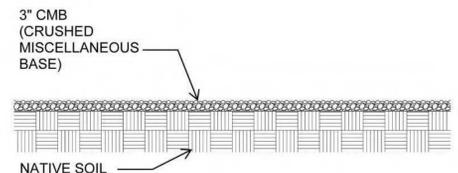
PROJECT DESCRIPTION:
SUPPORT LAYDOWN YARD FOR SHELL KAST
REMEDIAL ACTION PLAN IMPLEMENTATION
PROJECT.



SHELL - FORMER KAST PROPERTY
LACSD (FORCO) PROPERTY
TEMPORARY CONSTRUCTION TRAILER AND
LAYDOWN YARD

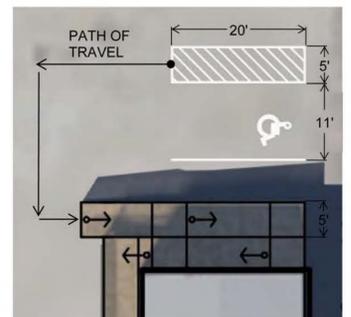


APN# 7406026918
 AREA = 748,360 +/- S.F.



05 ACCESS ROAD SECTION

SCALE: N.T.S.



04 ADA PATH OF TRAVEL

SCALE: N.T.S.

EQUIPMENT LIST:

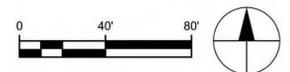
- (4) MINI EXCAVATORS
- (3) SKID STEERS
- (3) WATER TRAILERS
- (2) 2,000 GALLON WATER TRUCKS
- (2) 185 CFM AIR COMPRESSORS
- (1) SKID LOADER
- (1) 410 BACKHOE
- (1) EXTENDED REACH FORKLIFT
- (1) SMALL STREET SWEEPER
- (2) EQUIPMENT TRAILERS
- (1) 40 YARD LOCKABLE STORAGE CONTAINER
- (3) PORTABLE TOILETS / WASH STATIONS ON TRAILERS
- (5) DRUMS EACH OF ODEX, RUSMAR FOAM, AND BIOSOLVE
- PVC PIPE
- SOIL
- CEMENT
- MISCELLANEOUS CONSTRUCTION MATERIAL

LEGEND:

- x x x x - TEMP CHAIN LINK FENCE
- - - - - LOT LINE
- - - - - EQUIPMENT AND MATERIAL LAYDOWN BOUNDARY
- [Hatched Box] - CRUSHED MISCELLANEOUS BASE (CMB)
- [Arrow] - SLOPE OF GRADE

03 SITE PLAN

SCALE: 1"=40'



SHELL - FORMER KAST PROPERTY
 LACSD (FORCO) PROPERTY
 TEMPORARY CONSTRUCTION TRAILER AND LAYDOWN YARD

CONCEPTUAL



11 | EAST ELEVATION

SCALE: N.T.S.



09 | SOUTH ELEVATION

SCALE: N.T.S.



07 | PERSPECTIVE VIEW

SCALE: N.T.S.



10 | WEST ELEVATION

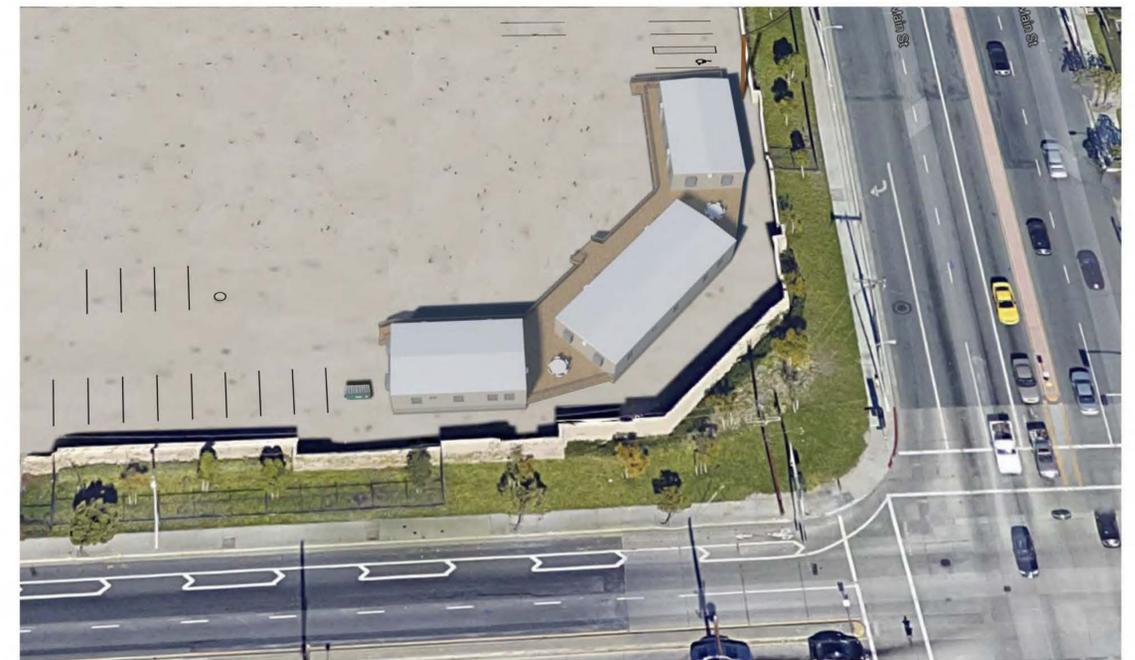
SCALE: N.T.S.

NEW (6'H) CHAINLINK FENCE



08 | NORTH ELEVATION

SCALE: N.T.S.



06 | PERSPECTIVE VIEW

SCALE: N.T.S.

NEW (6'H) CHAINLINK FENCE

CONCEPTUAL



SHELL - FORMER KAST PROPERTY
 LACSD (FORCO) PROPERTY
 TEMPORARY CONSTRUCTION TRAILER AND
 LAYDOWN YARD

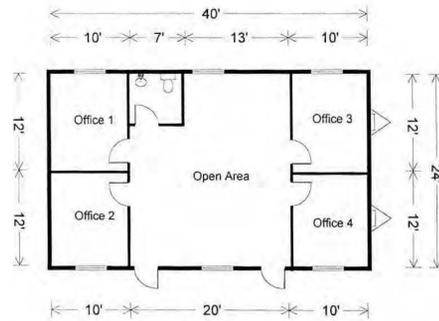
Standard Models (Model 2440)

Revised 8/26/15

Standard Specifications

- Chassis** Outrigger chassis w/ detachable hitch, axles and tires
- Floors** 1/8" Vinyl composition tile w/prefinished base molding
- Exterior Walls** 2"x4" Wood stud construction w/ 5/8" T-11 siding (or equal) grooved 8" o.c. painted tan with brown trim
- Interior Walls** 1/4" Minnesota birch paneling, FRP (or equal) in restroom
- Roof** 30 Ga. galvanized metal (or equal)
- Ceiling** 8' Nominal high, 2"x4" acoustical tile w/ t-grid
- Lighting** 2"x4" 4-tube T-12 recessed troffer
- Exterior Doors** 3"x6" 8" Metal clad hollow core (RLC1 type) with dead bolt
- Interior Doors** 3"x6" 8" Prefinished woodgrain hollow core with non-locking lever (except R/R)
- Windows** 46"x39" Sliding windows w/ aluminum frames and screens
- Electrical** 120/240 V 1-phase exterior mounted 125 amp sub panel (no main breaker) 110 V duplex receptacles
- HVAC** Electric heating and cooling, (approx. 12,000 BTU per 250 sq. ft.) w/ return air wall grill at HVAC
- Insulation** Floor : R-11, Exterior Walls : R-11, Roof : R-19
- Building Code** California HCD/DOH, type VN, B-2 occupancy commercial coach

Model 2440
AIS



Specifications and floor plans subject to change. Dimensions are approximate. Options available on request.

14 PLAN - AIS MODEL 2440

SCALE: N.T.S.

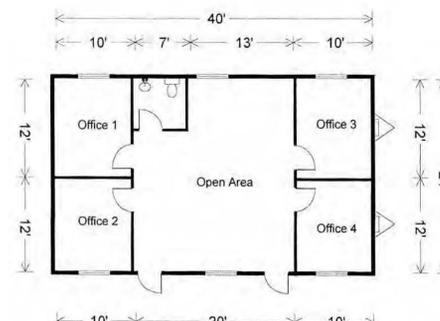
Standard Models (Model 2440)

8/26/15

Standard Features

- Chassis** Outrigger chassis w/ detachable hitch, axles and tires
- Floors** 1/8" Vinyl composition tile w/prefinished base molding
- Exterior Walls** 2"x4" Wood stud construction w/ 5/8" T-11 siding (or equal) grooved 8" o.c. painted tan (body) /brown (trim)
- Interior Walls** 1/4" Minnesota birch paneling, FRP (or equal) in restroom
- Roof** 30 Ga. galvanized metal (or equal)
- Ceiling** 8' Nominal high, 2"x4" acoustical tile w/ t-grid
- Lighting** 2"x4" 4-tube T-12 recessed troffer
- Exterior Doors** 3"x6" 8" Metal clad hollow core (RLC1 type) with dead bolt
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- HVAC** Electric heating and cooling, (approx. 12,000 BTU per 250 sq. ft.) w/ return air wall grill at HVAC
- Insulation** Floor : R-11, Exterior Walls : R-11, Roof : R-19
- Building Code** California HCD/DOH, type VN, B-2 occupancy commercial coach

Model 2440
Owner



Specifications and floor plans subject to change. Dimensions are approximate. Options available on request.

12 PLAN - OWNER MODEL 2440

SCALE: N.T.S.

Option 1

Standard Models (Model 2460)

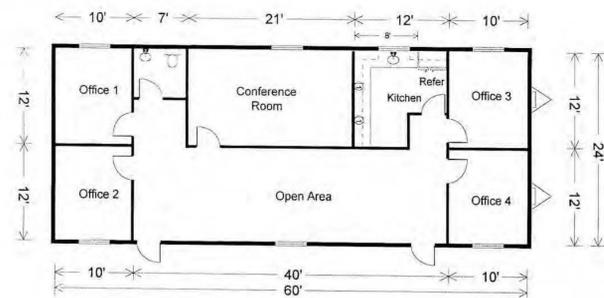
8/31/15

Standard Specifications

- Chassis** Outrigger chassis w/ detachable hitch, axles and tires
- Floors** 1/8" Vinyl composition tile w/prefinished base molding
- Exterior Walls** 2"x4" Wood stud construction w/ 5/8" T-11 siding (or equal) grooved 8" o.c. painted tan with brown trim
- Interior Walls** 1/4" Minnesota birch paneling, FRP (or equal) in restroom
- Roof** 30 Ga. galvanized metal (or equal)
- Ceiling** 8' Nominal high, 2"x4" acoustical tile w/ t-grid
- Lighting** 2"x4" 4-tube T-12 recessed troffer
- Exterior Doors** 3"x6" 8" Metal clad hollow core (RLC1 type) with dead bolt
- Interior Doors** 3"x6" 8" Prefinished woodgrain hollow core with non-locking lever (except R/R)
- Windows** 46"x39" Sliding windows w/ aluminum frames and screens
- Electrical** 120/240 V 1-phase exterior mounted 125 amp sub panel (no main breaker) 110 V duplex receptacles
- HVAC** Electric heating and cooling, (approx. 12,000 BTU per 250 sq. ft.) w/ return air wall grill at HVAC
- Insulation** Floor : R-11, Exterior Walls : R-11, Roof : R-19
- Building Code** California HCD/DOH, type VN, B-2 occupancy commercial coach

Model 2460
Engineer

Revised 8/31/15 11:30 AM
 Revised 8/31/15 12:45 PM
 Revised 8/31/15 2:00 PM



GFI receptacle above base cabinet (Typical 2)

Specifications and floor plans subject to change. Dimensions are approximate. Options available on request.

13 PLAN - ENGINEER MODEL 2460

SCALE: N.T.S.



AECOM SHELL KAST PROJECT
 MAIN ST AND LOMITA BLVD
 CARSON, CA

09/16/2015



COUNTY OF LOS ANGELES FIRE DEPARTMENT
 5823 Rickenbacker Road
 Commerce, California 90040

DATE: October 8, 2015

ATTENTION: PLANNING SECTION SUBJECT: CUP 985-15

CITY: Carson LOCATION: North West Corner of Lomita Boulevard and Min Street

- The Fire Department has no additional requirements for this permit.
- The required fire flow for public fire hydrants at this location is 1500 gallons per minute at 20 psi for a duration of 9 hours, over and above maximum daily domestic demand. 1 Hydrant(s) flowing simultaneously may be used to achieve the required fire flow.
- Public fire hydrant(s): Install Upgrade Verify (flow test) existing public fire hydrant(s). Private on-site fire hydrant(s): Install Upgrade Verify (flow test) existing private on-site fire hydrants. All hydrants shall measure 6" x 4" x 2-1/2" brass or bronze, conforming to current AWWA standard C503 or approved equal. All on-site hydrants shall be installed a minimum of 25' feet from a structure or protected by a two (2) hour rated firewall.

Water: Per California Water Service, the Fire Flow Availability form dated September 29, 2015, indicates adequate public fire hydrant spacing and flow requirements for the proposed development. Additional water system requirements may be required when this land is further subdivided and/or during the building permit process.

Access: Access is accepted as shown on the site plan dated 10/8/15 (FD)

Special Requirements: _____

Comments: This project is cleared to proceed to public hearing.

Fire Protection facilities, including access, must be provided prior to and during construction. Should any questions arise regarding this matter, please feel free to call our office @ (323) 890-4243.

Inspector: Nancy Rodeheffer

City: CUP 01/2008 Land Development Unit - Fire Prevention Division - (323) 890-4243, Fax (323) 890-9783

Sincerely,
Noelle Peterson
 Customer Service Planner
 SCE Dominguez Hills Service Center
 O: 310-608-5162
 C: 310-612-8628

Disclaimer:
 SCE provides this information on an "as is" basis without warranty of any kind, either express or implied. This disclaimer of liability applies to any claim or cause of action for damages or injuries occurring as a result of any error, omission, deletion or defect in the content of the information provided, including, but not limited to, negligence, breach of contract, or tort. Under no circumstances shall SCE or any of its parent or affiliate companies, employees, directors or shareholders be liable to any party for (i) any direct, indirect, special, punitive, incidental, exemplary, consequential, or any other damages arising in a way out of the availability, use or reliance on the information provided; or (ii) any claim attributable to errors, omissions or other inaccuracies in the information provided herein.

INTERNAL MEMORANDUM		CITY OF CARSON	
TO: <i>McKina Alexander</i> Associate Planner	FROM: <i>Julio Gonzalez</i> A/Water Quality Administrator	DATE: October 13, 2015	DOR/CUP: CUP No.985-15
SUBJECT: NW Corner of Lomita & Main Street APN:7406-026-918 Temp Construction Trailer and Laydown yard			

The Department of Public Works recommends approval of the proposed project subject to the following conditions:

Prior to issuance of **Building Permit**, the proposed development is subject to the following:

- Per City of Carson ordinance 5809 developer shall comply with all applicable Low Impact Development (LID) requirements and shall include Best Management Practices necessary to control storm water pollution from construction activities and facility operations to the satisfaction of City of Carson City Engineer.
- Developer shall provide contact information of the Qualified Storm Water Developer (QSD) and/or Qualified SWPPP (Storm Water Pollution Prevention Plan) Developer (QSP) of the site.

Prior to issuance of **Certificate of Occupancy**, the proposed development is subject to the following:

- For any structural and/or treatment control device installed. Developer shall record a maintenance covenant pursuant to Section 106.4.3 of the County of Los Angeles Building Code and title 12, Chapter 12.80 of the Los Angeles County Code relating to the control of pollutants carried by storm water runoff. In addition, an exhibit shall be attached to identify any structural and/or treatment control device installed.

CONCEPTUAL



SHELL - FORMER KAST PROPERTY
LACSD (FORCO) PROPERTY
TEMPORARY CONSTRUCTION TRAILER AND LAYDOWN YARD

APPENDIX M
SVE SYSTEM O&M PLAN

**OPERATIONS AND
MAINTENANCE PLAN**

**SOIL VAPOR EXTRACTION/BIOVENTING AND
TREATMENT SYSTEMS**

**FORMER KAST PROPERTY
CARSON, CALIFORNIA**

Prepared for

Shell Oil Products US
20945 S. Wilmington Avenue
Carson, California 90810

October 15, 2015

Prepared by



999 Town and Country Road
Orange, California 92868

OPERATIONS AND MAINTENANCE PLAN SOIL VAPOR EXTRACTION/BIOVENTING AND TREATMENT SYSTEMS

**FORMER KAST PROPERTY
CARSON, CALIFORNIA**

This Operations and Maintenance Plan provides information regarding operations and maintenance of a soil vapor extraction/bioventing and treatment system installed to address petroleum hydrocarbon impacts associated with crude oil storage during the period prior to residential redevelopment at the former Kast Property located in Carson, California.

No express or implied representation or warranty is included or intended in this plan except that the work was performed within the limits prescribed by Shell Oil Products US with the customary thoroughness and competence of professionals working in the same area on similar projects.

AECOM

Christian Osterberg, PG
Project Manager

Peter Stumpf, PE
Principal Engineer

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TABLES

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- 2 Summary of Planned Laboratory Testing

FIGURE

- 1 Site Vicinity Map

APPENDICES

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- B Permits
- C Preventative Maintenance and Periodic Inspections
- D Forms for Monthly Maintenance Reporting
- E Standard Operating Procedure for Sampling Using Tedlar bags
- F Activity Hazard Analysis for System Startup

LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BHC	Barclay Hollander Corporation
Btu/hr	British thermal unit per hour
CAO	Cleanup and Abatement Order
COC	constituent of concern
CSD	critical safety device
CWC	California Water Code
Dole	Dole Food Company, Inc.
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
HSP	Health and Safety Plan
in-Hg	inches of mercury
MM	Mitigation Measure
MMRP	Mitigation Monitoring and Reporting Program
O&M	operations and maintenance
PDF	project design feature
PID	photoionization detector
PLC	programmable logic controller
PM	Program Manager
ppmv	parts per million by volume
PTC	Permit to Construct
PTO	Permit to Operate
PVC	polyvinyl chloride
RAP	Remedial Action Plan
RAO	Remedial Action Objective
Regional Board	Regional Water Quality Control Board
ROVI	radius of vacuum influence
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
scfm	standard cubic feet per minute
Shell	Shell Oil Company
Site	former Kast Property
SOPUS	Shell Oil Products US
SSCG	Site-specific cleanup goal
SVE	soil vapor extraction
TPH	total petroleum hydrocarbons
URS	URS Corporation
USEPA	United States Environmental Protection Agency
VFD	variable frequency drive
VOC	volatile organic compound

1.0 INTRODUCTION

AECOM prepared this Operations and Maintenance (O&M) Plan on behalf of Equilon Enterprises LLC, doing business as Shell Oil Products US (SOPUS or Shell) for Shell Oil Company, to provide the information necessary to operate and maintain the soil vapor extraction (SVE)/bioventing system being installed as part of the implementation of the Revised Remedial Action Plan (RAP) for the former Kast Property (Site), which is now the Carousel housing tract in Carson, California (Figure 1). The SVE/bioventing system will address petroleum hydrocarbon impacts associated with crude oil storage prior to residential redevelopment at the Site. The lead regulatory oversight agency is the California Regional Water Quality Control Board, Los Angeles Region (Regional Board or RWQCB).

On July 10, 2015, the Regional Board certified the Final Environmental Impact Report (EIR) for Implementation of the RAP and adopted a Statement of Overriding Considerations and Mitigation Monitoring and Reporting Program (MMRP). Along with certification of the Final EIR, the Regional Board approved the Revised RAP dated June 30, 2014 (URS and Geosyntec, 2014a), as modified by the Addendum to Revised RAP dated October 15, 2014 (URS and Geosyntec, 2014b), and issued Amended Cleanup and Abatement Order (CAO) R4-2011-0046 to Shell and Barclay Hollander Corporation (BHC), a wholly-owned subsidiary of Dole Food Company, Inc. (Dole). The Amended CAO directed Shell and BHC to implement the Revised RAP, as modified by the Addendum, consistent with the certified Final EIR and to implement the project design features (PDFs) and Mitigation Measures (MMs) and comply with the MMRP set forth in the Amended CAO.

Following this introduction, this O&M Plan contains objectives for operation of the SVE/bioventing system and includes the following:

- **Section 2** presents the Site background;
- **Section 3** describes the remedial action systems;
- **Section 4** presents the system O&M plan;
- **Section 5** presents the monitoring, sampling, and reporting procedures; and
- **Section 6** lists references cited in this plan.

Complete copies of O&M observations, inspections, and records are to be kept at the project field office and electronic versions to be stored at the AECOM office.

1.1 PROJECT ORGANIZATION

AECOM was contracted by Shell to perform O&M of the SVE system. The O&M responsibilities are anticipated to remain with AECOM throughout the operation of the system and will be funded by Shell. The following sections describe the organization and responsibilities of the project team.

1.1.1 Regional Water Quality Control Board Remedial Project Manager

The RWQCB remedial Project Manager will have overall regulatory responsibility for the long-term response action.

1.1.2 Operation and Maintenance Project Managers

The Shell Senior Principle Program Manager (PM) will be responsible for the overall project and will be authorized to allocate resources to meet project requirements. The Shell PM has authority to make commitments to the RWQCB on Shell's behalf and will serve as the major point of contact and control for project matters.

The AECOM PM will be responsible for implementation of the Site O&M Plan. Responsibilities of the AECOM PM include:

- Assigning technical resources to meet budget and schedule constraints;
- Ensuring compliance with the RAP;
- Performing O&M activities in a manner that will satisfy the Remedial Action Objectives (RAOs) established in the RAP;
- Orienting project team members concerning project goals and special considerations including safety requirements;
- Monitoring and directing project team members;
- Developing and meeting ongoing project staffing requirements;
- Reviewing the work performed to ensure quality, responsiveness, and timeliness;
- Reviewing and analyzing overall project performance with regard to the planned schedule and budget;
- Reviewing reports (deliverables) before submission to RWQCB; and
- Accepting responsibility for the preparation and quality of interim and final reports.

The AECOM PM will store and maintain a complete copy of this O&M Plan, along with field observation, inspection, and maintenance records.

1.1.3 Operations Technician(s)

The operations technician(s) are responsible for the system's O&M in accordance with this plan. Each operations technician will have previous experience with SVE systems. Specifically, the technicians will be familiar with, or possess, skills to complete the following:

- Simple plumbing repair;
- Soil vapor and process vapor monitoring;
- Data collection; and
- Sample collection and processing.

2.0 SITE BACKGROUND

Site background information is included in the Revised Remedial Action Plan (Revised RAP) and Remedial Design and Implementation Plan (RDIP) and is briefly summarized here. The reader should consult the Revised RAP and RDIP for more complete information.

2.1 SITE DESCRIPTION

The Site has been residential since the construction of 285 single-family homes from 1967 to the early 1970s. The Site came under the attention of the Regional Board in 2008 when environmental investigations for the neighboring former Turco Products Facility, located directly west of the Site, discovered contamination by petroleum hydrocarbons at sample locations within the Site. The Department of Toxic Substances Control (DTSC) communicated these findings to the Regional Board in March 2008, and in April 2008 the Regional Board sent an inquiry to Shell regarding the status of any environmental investigations at the Site. This inquiry was followed by the Regional Board's California Water Code (CWC) Section 13267 Order to Conduct an Environmental Investigation at the former Kast Property issued to Shell on May 8, 2008. Shell has conducted a series of investigations, pilot studies, and other environmental evaluations of the Site in response to that Order and subsequent CWC section 13267 Orders, CWC Section 13304 Order, and CAO R4-2011-0046 dated March 11, 2011, as amended.

2.2 SITE HISTORY

The Site is a former petroleum storage facility that was operated by a Shell Oil Company predecessor from the mid-1920s to the mid-1960s. The property was sold to real estate developers who redeveloped it into the Carousel Community residential housing tract in the late 1960s and early 1970s. Today, the Site consists of approximately 44 acres occupied by 285 single-family residential properties and City streets collectively referred to as the Carousel Tract. The Site is located in the City of Carson in the area inclusive of Marbella Avenue on the west, Panama Avenue on the east, East 244th Street on the north, and East 249th Street on the south (Figure 1).

Detailed Site background information was provided in the Plume Delineation Report (URS, 2010) and the Site Conceptual Model (Geosyntec, 2010). The Site was first developed in 1923, when Shell Company of California constructed three oil storage reservoirs. The two central and southern reservoirs had capacities of 750,000 barrels each, and the third northern reservoir had a capacity of 2 million barrels. The reservoirs were partially in-ground and partially aboveground with earthen berms constructed using soils excavated from the belowground portions of the reservoirs. The oil storage reservoirs were primarily used to store crude oil. Historical records cited in the Plume Delineation Report (URS, 2010) indicate that bunker oil or heavier intermediate refinery streams may also have been stored in the reservoirs at one time, but the time and quantity of bunker oil storage is unknown. There is no indication that the reservoirs were used to store any other chemicals or compounds (SOPUS, 2010).

In 1966, BHC and its contractors conducted geotechnical site investigations, removed the remaining residual oil and water from the reservoirs, demolished the reservoirs and graded the Site. The Site

was rezoned from industrial to residential in October 1966, and in the same month, title was transferred to Lomita Development Company under the Purchase Option Agreement with Shell Oil Company. Construction of homes began in 1967 and was apparently completed by the early 1970s. The Site has remained residential since that time. More detailed information on the site background is included in the Site Conceptual Model (Geosyntec, 2010) and the Plume Delineation Report (URS, 2010), Revised RAP (URS and Geosyntec, 2014a) and RDIP to which this O&M Plan is appended.

Since 2008, URS (now AECOM) and Geosyntec have conducted extensive multimedia sampling at the Site during multiple investigations. All of Shell's work at the Site has been conducted with RWQCB approval and oversight following work plans reviewed and approved by the RWQCB. Discussion of previous investigation is included in the Revised RAP (URS and Geosyntec, 2014a).

3.0 SELECTED REMEDIAL ACTION

SVE/bioventing is one of the selected remedial actions for the Site. The SVE/bioventing system was selected to address petroleum hydrocarbons, volatile organic compounds (VOCs), and methane in soil vapor and to promote degradation of residual hydrocarbon concentrations in soil that do not meet RAOs. Use of SVE/bioventing will address impacted areas beneath existing paved areas, City sidewalks, and concrete foundations of the homes, in addition to addressing reduction of constituent of concern (COC) concentrations below excavated areas with the goal of achieving Site-specific cleanup goals (SSCGs) over time. The SVE/bioventing system will also address impacted media that may occur beneath residual concrete reservoir slabs and below the depth of excavation. The record drawings to be included in Appendix A will provide details of the extraction and treatment system components and layout after construction is completed.

3.1 REMEDIAL ACTION DESCRIPTION

SVE and bioventing are the approved remedial technologies to address petroleum hydrocarbons, VOCs, and methane in soil vapor and to promote degradation of residual hydrocarbon concentrations that do not meet RAOs, or are not removed by excavation. SVE is recognized as an effective technology for removal and treatment of VOCs from impacted soils. The process involves inducing airflow in the subsurface with an applied vacuum, enhancing in-situ volatilization of VOCs, and effecting movement of the VOCs to vapor extraction wells for removal from the subsurface. SVE is also effective at removing methane from deeper subsurface soils and has been used for this application at other hydrocarbon-impacted sites and at landfills. SVE would effectively remediate the lighter volatile-range petroleum hydrocarbons, VOCs, and methane.

Bioventing is an in-situ technology generally applicable to the remediation of petroleum hydrocarbons in shallow soils. In this process, air is introduced into the subsurface to provide oxygen to enhance biodegradation of petroleum compounds. Based on findings from bioventing pilot testing at the Site, bioventing was found to be effective at reducing hydrocarbon concentrations in Site soils over time. SVE working in concert with bioventing will promote microbial degradation of longer-chain petroleum hydrocarbons and, over the long term, reduce concentrations of these less-volatile compounds in the subsurface.

3.2 PERMIT REQUIREMENTS

Permits from the City of Carson and South Coast Air Quality Management District (SCAQMD) will be required.

3.2.1 City of Carson

Building and electrical permits will be required from the City of Carson for installation of the electrical system and the manifold and remediation compound buildings. An Encroachment and Excavation Permit will be required from the City of Carson for installation of wells and conveyance piping in the streets; installation of conveyance piping will be done under the site-specific Rule 1166 Plan and Permit, and the work will be covered under the project Storm Water Pollution Protection

Plan (SWPPP). Copies of the Permits will be included in Appendix B once obtained. The SWPPP is included as an appendix to the RDIP.

3.2.2 South Coast Air Quality Management District

A Permit to Construct (PTC) the SVE system is pending and will be obtained from the SCAQMD prior to the commencement of SVE system installation. The permit will allow for installation and operation of the SVE system. The PTC will include system operating conditions and monitoring requirements. The SCAQMD will issue a PTO upon completion of the system install. The permit will contain conditions required for system operation. Any deviations from these conditions may result in a notice of violation from the SCAQMD. Key operating parameters of the SCAQMD permit will be included in an addendum upon receipt.

3.3 HEALTH AND SAFETY

All field work will be conducted under a detailed Health and Safety Plan (HSP). The AECOM HSP is included as Appendix B to the RDIP. Subcontractors will work under their own HSPs.

3.4 REMEDIATION WELL INSTALLATION

A total of 726 remediation wells are included in the planned remediation system. The actual number of residential wells may change during preparation of Property-Specific Remediation Plans as implementation of the RAP progresses. The three existing triple-nested SVE wells from the SVE Pilot Test will be used in the full-scale system, so an additional 717 wells will be installed as described below.

3.4.1 Street Wells

The SVE/bioventing wells in the streets will be constructed either as triple-nested vertical wells in a single borehole separated by cement/bentonite seals, or as single-depth wells. SVE/bioventing wells will be constructed in borings drilled using a drilling rig with 8-inch outside diameter hollow-stem augers for single-depth wells and 11¾-inch outside diameter hollow-stem augers for triple-nested wells. All extraction wells will be constructed with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) casings. A total of 63 triple-nested wells will have screen intervals of 5 to 10 feet below ground surface (bgs), 15 to 25 feet bgs, and 30 to 40 feet bgs for the shallow, intermediate, and deep zones, respectively. A total of 65 shallow single wells with a screen interval of 5 to 10 feet bgs will be installed. Actual screen length/depth intervals may be revised based on subsurface stratigraphy encountered during well installation. However, a minimum separation of 5 feet will be maintained between each screen interval. All wells will be completed within a flush-mount traffic-rated well vault surrounded by a concrete skirt.

3.4.2 Residential Wells

There are 224 properties identified for treatment with SVE/bioventing. A total of 472 shallow SVE/bioventing wells are currently planned to be installed at residences, where required, and will be screened from approximately 5 to 10 feet bgs or to the depth of the former reservoir concrete slabs if present at less than 10 feet bgs. Residential wells will be constructed in borings advanced by hand auger or using a small Bobcat skid steer (or similar equipment) with a power auger attachment. All

wells will be constructed with 2-inch diameter Schedule 40 PVC casings. Residential wells will be completed entirely below ground and not visible from the surface. A landscape valve box will be installed at the back of sidewalk that contains a shut-off valve and sampling port.

3.5 SOIL VAPOR EXTRACTION AND TREATMENT SYSTEMS

An SVE system will be installed to treat petroleum hydrocarbon, VOCs, and methane from soil vapor and the subsurface soil. The overall SVE system consists of two identical SVE blowers with gas-fired thermal oxidizer off-gas treatment (with option to transition to catalytic operation). Each SVE unit is designed to deliver a flow rate of 1,500 standard cubic feet per minute (scfm) and maximum vacuum of 15 inches of mercury (in-Hg). The SVE system will likely not extract the maximum air flow rate from the soil, but will utilize dilution air to reduce the inlet concentration to the vapor treatment system for optimal operation.

The SVE system will operate under a permit to operate (PTO) issued by the SCAQMD.

3.5.1 Conveyance Piping

The extraction wells will be connected to the remediation compound via underground piping. The underground conveyance pipe sizes vary from 2 to 14 inches in diameter and will be constructed using Schedule 40 PVC piping. A total of 16 pipe headers will be distributed in the main trenches. Each main trench contains separate headers for (i) residential wells, (ii) combined shallow street and shallow nested wells, (iii) intermediate nested wells, and (iv) deep nested wells. The number of wells connected to each header varies. The 16 pipe headers transition to steel piping above ground and converge into a 14-inch diameter steel manifold header located inside the manifold building.

3.5.2 Piping Manifold

The underground conveyance piping transitions to above ground piping at the SVE manifold, which in turn converges into a 14-inch diameter steel manifold header inside the manifold building. Then, the 14-inch diameter steel header transitions below ground to the remediation compound. Once in the remediation compound, the stub up is connected to the air/water separator tank. Manifold legs vary from 10 to 14 inches in diameter and will be constructed using steel pipe and flow upwards to the header pipe. In each leg, in order, will be a port for a pitot tube to measure flow, a vacuum gauge, a sample port, a manual butterfly valve; and motor operated wafer butterfly valve. A condensate collection line will be installed at the bottom of each manifold leg and supplemented with a conductivity water sensor, a normally-closed solenoid valve, and a diaphragm pump to remove condensate water. The extracted water will be discharged into a double-walled holding tank located adjacent to the remediation building.

3.5.3 Skid-Mounted Equipment

The SVE system consists of an extraction blower mounted on an elevated skid and gas-fired thermal oxidizer (with option to transition to catalytic operation) mounted on a separate skid both connected by a 12-inch diameter steel pipe. A rotary blower will be used to extract vapors from the subsurface. The blower (CycloBlower 11CDL23, 150 horsepower, 460-volt, three-phase or equivalent) is capable of producing up to 1,500 scfm of air at 15 in-Hg. The SVE blower and motor are housed in an enclosure with insulation to reduce sound emitted from the skid. The off-gas from each SVE

blower passes through a gas-fired thermal oxidizer heated by a 2 million British thermal unit per hour (Btu/hr) burner to destroy VOCs. A heat exchanger module on the oxidizer inlet pre-heats the incoming vapors prior to combustion and lowers supplementary energy consumption of the oxidizer. Treated vapors are discharged to the atmosphere via a discharge stack extending 15 feet minimum above grade. The skid has the following equipment:

- Flow measuring device;
- Flame arrestor to prevent flames from travelling back from the oxidizer;
- Temperature switch to prevent the oxidizer from operating below 1400°F (when operating in thermal mode);
- Low pressure switch to shut the system down in the event of loss of flow to the oxidizer;
- Manual shutoff valve;
- Manual dilution valve;
- Motor operated shutoff valve;
- Motor operated dilution valve;
- Vacuum gauge to monitor the influent vacuum; and
- Effluent sample port to monitor effluent VOCs.

Additional equipment will be integrated into the SVE system and installed within the remediation compound including:

- Approximately 400 gallon capacity air/water separator; and
- Variable frequency drive (VFD) to automatically/manually adjust vacuum blower motor speed.

3.5.4 Instrumentation and Control Equipment

The control panel for the SVE system is located in the SVE building control room. VFDs are located in the electrical room inside the SVE building. All instrument inputs are routed to the programmable logic controller (PLC), and the PLC is programmed with all required data processing algorithms and equipment control and alarm thresholds. A main disconnect switch located on the front of the SVE control panel controls power to the system. An autodialer and telemetry system connected to the PLC provides remote access to the system controls and notifies the technician or Lead Engineer in case the system shuts down.

3.5.5 Critical Safety Devices

Critical safety devices (CSDs) for safe operation of the SVE system identified and installed on the SVE units and associated equipment, along with activation conditions and methods to test proper function of the CSDs are as follows:

CSD ID	Description	Activation Conditions	Testing Method
CSD-1	High/High Level Switch (vapor/liquid separator)	Shuts off systems if vapor/liquid separator is full.	Remove level switch from sight glass and manually trip.

CSD ID	Description	Activation Conditions	Testing Method
CSD-2	Pressure (Vacuum) Relief Valve	Relieves vacuum if vacuum reaches 15 in-Hg.	Adjust vacuum relief valve to below piping vacuum.
CSD-3	Flame Arrestor	Will block the flame in the event of a back flash.	Remove flame arrestor and inspect for damage or obstruction.
CSD-4	Pressure Switch Low	Shuts down the system if low air pressure is detected at the inlet to the combustion chamber.	Adjust pressure switch to below piping pressure.
CSD-5	UV Scanner	Shuts down the system if no flame is detected in the burner.	Remove from burner, system should shut down.
CSD-6	High Temperature Switch	Measures temperature at outlet of burner to ensure the SVE burner does not overheat.	Adjust temperature set points to below current temperatures.
CSD-7	Gas Pressure Switch Low	Shuts down the system if low air pressure is detected in the natural gas line.	Adjust pressure switch to below piping pressure.
CSD-8	Gas Pressure Switch High	Shuts down the system if high air pressure is detected in the natural gas line.	Adjust pressure switch to above piping pressure.
CSD-9	High/High Level Switch (containment sump)	Shuts off pumps if the secondary containment around knock out pot and holding tank fills with water	Remove level switch from sight glass and manually trip.
CSD-10	SVE Emergency Stop	Shuts down system when manually depressed.	Depress button.
CSD-11	Exterior Emergency Stop	Shuts down system when manually depressed.	Depress button.
CSD-12	Low Temperature Switch	Measures temperature at outlet of exhaust to ensure soil vapors can be sufficiently destroyed.	Adjust temperature set points to above current temperatures.

3.5.6 Alarms

The SVE system is equipped with alarms that either shut down the system or initiate system operation. The SVE system has the following alarms:

- Gas pressure switch low;
- Gas pressure switch high;
- Air pressure switch low;
- Water in vapor/liquid separator high;

- Water in sump high-high;
- Water in holding tank high;
- SVE burner high temperature;
- SVE burner no flame detected; and
- SVE burner low temperature.

4.0 SYSTEM OPERATION AND MAINTENANCE

4.1 STANDARD OPERATING CONDITIONS

The systems are designed to operate 24 hours per day, 7 days per week. During initial startup, the SVE system will extract from all extraction wells that have been installed and connected to the system at that time. Due to the phased implementation of the remedial actions, not all 726 wells will have been installed by initial SVE system startup, so initial extraction may be cycled through up to 8 of the 16 vapor collection headers. Vapor will be extracted from each header for 7 days, followed by a bioventing period of approximately 30 to 60 days. Adjustments to SVE/bioventing cycling frequencies may be made after 1 year of operation. System monitoring details are provided in Section 5.

4.2 SYSTEM STARTUP AND SHUTDOWN

The SVE system is controlled by a PLC. The PLC controls the operation of the system including setting the cycle times and which wells operate during which cycle. Under normal operations, the SVE system is started by pressing the start button and stopped by pressing the stop button. If an emergency shutdown is required, depressing the emergency stop button on the SVE panel, or inside the control room in the remediation building, will immediately shut down the SVE system. A telemetry system is integrated into the SVE PLC to provide remote access to the system controls.

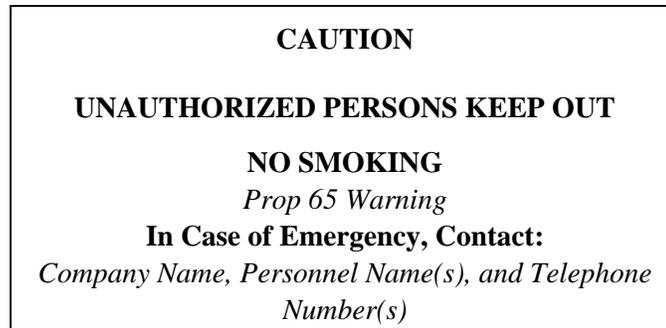
4.3 SYSTEM ALARMS

The SVE system is designed to operate continuously without operator attention. If the SVE system shuts down due to an alarm condition, the auto-dialer or telemetry system calls the operations technician to report the alarm. The operations technician will restart the system once the alarm condition has been resolved. Occasional short-term shutdowns of the SVE system are not expected to have a significant impact to the effectiveness of the system.

4.4 ROUTINE INSPECTION AND MAINTENANCE

The SVE system should be inspected weekly during normal operations. A work control and maintenance record system to manage and document the accomplishment of preventive and corrective maintenance work performed will be established and recorded in an annual preventative maintenance plan. A list of preventive maintenance and periodic inspections is provided in Appendix C. Forms that are required to be completed during the inspections are provided in Appendix D.

Preventive maintenance and repair work, including service call work, will be accomplished during the normal work day. The necessary public information and signage posted on the exterior of the remediation building. Specifically, the sign will state the following:



4.5 WATER DISPOSAL

Water collected in the air/water separator on the SVE system will be manually transferred to a double-walled storage tank on site. The water will be profiled and removed from the Site for proper treatment (if needed) and disposal.

4.6 EMERGENCY RESPONSE

Any emergency action or release will be communicated immediately to the AECOM PM ensure all proper notifications are performed. The Shell PM will contact the RWQCB Project Manager, as required.

In the unlikely event of oil, gasoline, or other liquid release from the system or from maintenance equipment, the following procedures will be followed:

1. If release is from system, shut system down via emergency stop button.
2. Take such *immediate* action as necessary to dam, block, restrain, or otherwise *act to most effectively* prevent a spill from entering waters of the state or minimize damage to waters of the state from a spill.
3. Evaluate and report release. All releases of oil, gasoline, or other liquids from the system or any equipment on site to the ground surface must be reported immediately to the AECOM Project Manager who is responsible for evaluation of appropriate next steps, AECOM incident communication protocols, and determination of whether the release is reportable to the United States Environmental Protection Agency (USEPA) or the Federal National Response Center.

All releases must be reported to the AECOM PM and Shell PM; however, the following will not require reporting to USEPA or the Federal National Response Center:

- Spills of less than 1 pound or 1 pint; and

- Spills of integral operating fluids, in the use of motor vehicles or other equipment, the total volume of which is less than or equal to 55 gallons and that do not damage waters of the state.
4. Perform repairs to the system.

The following procedures will be followed in the unlikely event of a condensate water release from the system:

1. Shut system down.
2. Take such *immediate* action as necessary to dam, block, restrain, or otherwise *act to most effectively* prevent a spill from entering waters of the state or minimize damage to waters of the state from a spill.
3. Evaluate and report release. All releases of any liquid from the system to the ground surface must be reported immediately to the AECOM Project Manager, who will follow AECOM incident communication protocols.
4. Perform repairs to the system.

5.0 SYSTEM MONITORING AND REPORTING

System performance will be monitored by sampling a series of multi-depth soil vapor monitoring wells/probes and soil vapor extraction wells. The results of the sampling will be used both to optimize system performance (vapor recovery) as well as evaluate the overall effectiveness of the remediation system. Table 1 includes a complete list of field measurements for the SVE system. Table 2 includes a list of laboratory sampling to be completed during remediation. Samples will be collected and analyzed per the standard operating procedure provided in Appendix E.

5.1 BASELINE SAMPLING

In order to establish baseline conditions, samples will be collected from soil vapor probes and SVE wells. All samples will be screened in the field and sent offsite for laboratory analysis. Details for baseline sampling programs are presented in the following sections.

5.1.1 Soil Vapor Probes

Sixteen multi-depth soil vapor probes (each with five vapor points at approximate depths of 1.5, 5, 7.5, 20 and 35 feet bgs) will be installed and sampled prior to starting the SVE system. Samples will be screened in the field using portable instruments (photoionization detector [PID] for VOCs and a landfill gas meter for oxygen, carbon dioxide, and methane). Samples will also be sent to a NELAP-certified laboratory and analyzed for VOCs by EPA Method TO-15 and fixed gases (including methane) by ASTM Method D-1946.

5.1.2 Soil Vapor Extraction Wells

Baseline samples will be collected from each SVE well prior to initial extraction from that well. For residential wells, a combined sample from wells on each property will be collected from the sample port located in the valve box installed at the back of the sidewalk. Samples will be screened in the field using portable instruments (PID for VOCs and a landfill gas meter for oxygen, carbon dioxide, and methane). Samples will also be sent to a NELAP-certified laboratory and analyzed for total petroleum hydrocarbons (TPH) by EPA Method TO-3 and VOCs by EPA Method TO-15.

5.2 CORRELATION OF FIELD READINGS TO LABORATORY DATA

Using the initial round of soil vapor sample data collected from probes and wells, field PID readings will be correlated to laboratory results for primary Site COCs (benzene, polycyclic aromatic hydrocarbons, ethylbenzene, 1-methylnaphthalene, naphthalene, tetrachloroethene, and TPH). For example, the correlation for benzene will be made by comparing field PID readings with laboratory data and plotting those field readings versus site-specific COCs and determining the slope of the line (the slope being the ratio between the two values) using the equations below:

$$C_{PID} = slope C_{Ben}$$

$$\text{Trigger Concentration (ppmv)} = 42\mu\text{g}/\text{m}^3 \left(\frac{0.024 \text{ m}^3/\text{mole}}{78\text{g}/\text{mole}} \right) \times \text{slope}$$

where,

Trigger Concentration = PID field reading where laboratory sample will be taken to confirm COC concentration;

C_{PID} = field reading in sample where benzene was detected; and

C_{Ben} = benzene concentration from lab sample where benzene was detected.

Should the slope of the line not be uniform, the slope of the line near the SSCG will be used. Once this correlation is made, laboratory samples will only be collected when field PID readings drop below a trigger concentration. The trigger concentration will be equal to the field PID reading corresponding to the onsite resident SSCG for the key Site COC (i.e. benzene soil vapor concentration of $42 \mu\text{g}/\text{m}^3$). If PID readings are above this trigger concentration, a sample will not be collected for laboratory analysis and the well will remain in active SVE cyclic operation mode.

5.3 SYSTEM MONITORING, OPTIMIZATION, AND REPORTING

The purpose of system monitoring and optimization will be to focus SVE efforts on wells with elevated concentrations of COCs and methane and to discontinue extraction from, or operate on a reduced frequency, wells with low concentrations.

5.3.1 Soil Vapor Probes

Following SVE/bioventing system startup, soil vapor samples will be collected from the 16 multi-depth soil vapor probes quarterly for a period of 2 years, semi-annually for a period of 3 years, annually for a period of 5 years, and once every 5 years thereafter through the projected 30-year operating life of the system in accordance with the Addendum to the Revised RAP (URS and Geosyntec, 2014b). Samples will be screened in the field using portable instruments (PID for VOCs and a landfill gas meter for oxygen, carbon dioxide, and methane). Samples will also be sent to a NELAP-certified laboratory and analyzed for VOCs by EPA Method TO-15 and fixed gases (including methane) by ASTM Method D-1946.

Periodic measurements of vacuum at the soil vapor probes will be performed to evaluate and confirm the radius of vacuum influence (ROVI) of the system. If the design ROVI is not confirmed by these vacuum readings, system operating parameters may be adjusted or the need for installation of additional wells will be evaluated.

Periodic monitoring and sampling will be used to optimize system operations. Combined with baseline sampling, periodic sampling will be used to assess and evaluate overall system effectiveness at reducing COC concentrations and degradation of longer-chain hydrocarbons. Results of baseline and periodic sampling will be reported in an initial 5-year review report and subsequent reports submitted on a 5-year basis.

5.3.2 Soil Vapor Extraction Wells

Following startup of the SVE/bioventing system, SVE wells will be screened in the field once per quarter using portable instruments (PID for VOCs and a landfill gas meter for oxygen, carbon dioxide and methane). If the PID concentration drops below a trigger concentration (defined above in Section 5.2) and methane is below 1,000 parts per million by volume (ppmv), samples will be collected and sent to a NELAP-certified laboratory and analyzed for TPH by EPA Method TO-3 and VOCs by EPA Method TO-15. If laboratory results show vapor concentrations below all trigger concentrations, the well will be isolated from the system, allowing the system to focus on higher-concentration wells. Once a well is offline, it will be resampled two additional times over the next 6 months to confirm the concentrations remain low. If the concentrations rebound, the well will be placed back online until the concentrations again drop below all action levels. If the concentrations remain below the action levels, the well will remain offline and be removed from the sampling program for up to 1 year. At the end of 1 year, the well will be placed back online in SVE/bioventing mode and the periodic field screening process repeated.

Regular measurements of vacuum at the SVE wells will be performed to confirm the ROVI and evaluate the integrity of the system. If the design ROVI is not confirmed by these vacuum readings, system operating parameters may be adjusted or the need for installation of additional wells will be evaluated. If integrity of the system appears to have been compromised (i.e. apparent breaks in pipe or water/condensate accumulation), action will be taken to correct the specific situation.

5.3.3 Soil Vapor Extraction and Treatment System

Appendix F includes the activity hazard analysis for startup of the SVE system. The SVE system will be operated continuously, initially extracting from up to eight of the 16 manifold legs. During the first 7 days of operation, the SVE system will be monitored daily to comply with SCAQMD permit conditions. Parameters to be collected and recorded on the O&M field sheet include, but are not limited to, the following:

- SVE system flow rates;
- SVE system process temperatures; and
- SVE influent (pre- and post-dilution) and effluent VOC concentrations using PID or other SCAQMD-approved field instrument.

Subsequent to the initial 7 days of operation, O&M will be performed weekly in accordance with SCAQMD permit conditions.

5.3.4 Reporting

Results of soil vapor monitoring (including both laboratory and field data) will be summarized in monitoring reports and submitted to the supervising engineer for review. A summary of SVE system operations (incorporating the forms in Appendix D) will be included in quarterly Remediation Progress Reports to the RWQCB. The forms include a description of well performance, and maintenance logs present details of alarms and corrective actions taken during the monitoring period.

5.4 5-YEAR SITE REVIEWS

Data collected during the monitoring program will be used to evaluate overall system effectiveness and will be reported in an initial 5-year review report and subsequent 5-year review reports submitted for RWQCB review.

6.0 REFERENCES

Geosyntec (Geosyntec Consultants, Inc.), 2010. *Site Conceptual Model*, Former Kast Property, Carson, California, Site Cleanup No. 1230, Site ID 2040330, September 2010.

SOPUS (Shell Oil Products US), 2010. Completed RWQCB Chemical Storage and Use Questionnaire, August 31, 2010.

URS (URS Corporation), 2010. *Plume Delineation Report*, Former Kast Property, Carson, California, September 29, 2010.

URS and Geosyntec (URS Corporation and Geosyntec Consultants, Inc.), 2014a. *Revised Remedial Action Plan*, Former Kast Property, Carson, California, Site Cleanup No. 1230, Site ID 2040330, June 30, 2014.

URS and Geosyntec, 2014b. Addendum to Revised Remedial Action Plan, Former Kast Property, Carson, California, Site Cleanup No. 1230, Site ID 2040330, October 15, 2014.

Tables

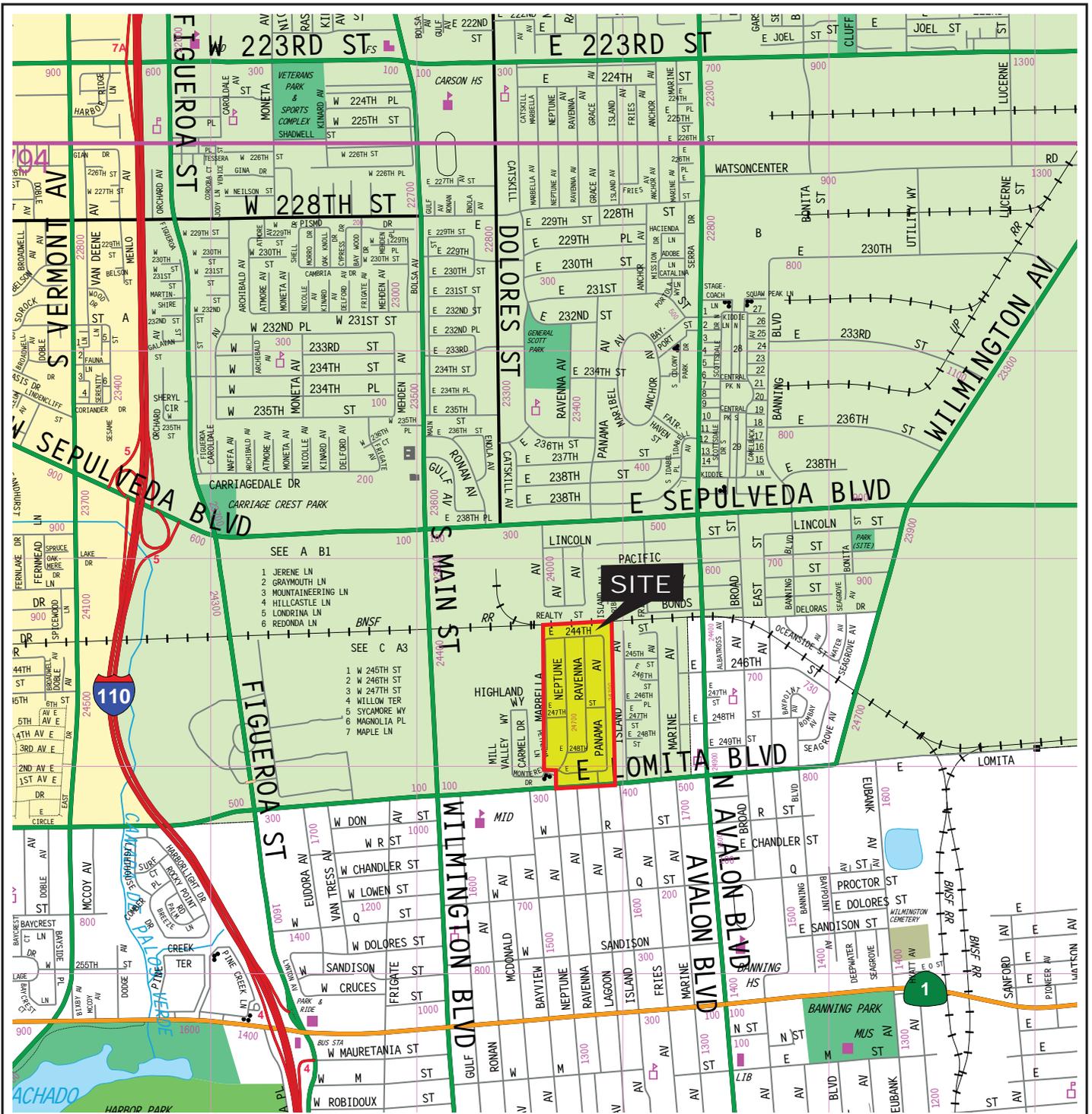
Table 1
Field Sampling Table
 FORMER KAST PROPERTY
 Carson, California

Parameter	Locations	Measurement Device	Frequency	Rationale
Baseline Sampling				
Well pressure, VOCs, methane, oxygen and carbon dioxide	16 Multi-Depth Soil Vapor Probes	Dwyer digital manometer or pressure gauge; photoionization detector (PID) or equivalent monitoring device; and landfill gas meter	Prior to starting the SVE system	Establish baseline pressure and concentrations of VOCs, methane, oxygen and carbon dioxide
Well pressure, VOCs, methane, oxygen and carbon dioxide	726 Extraction Wells	Dwyer digital manometer or pressure gauge; PID or equivalent monitoring device; and landfill gas meter	Prior to initial extraction from each well	Establish baseline pressure and concentrations of VOCs, methane, oxygen and carbon dioxide
SVE System Operation				
Probe vacuum, VOCs, methane, oxygen and carbon dioxide	16 Multi-Depth Soil Vapor Probes	Dwyer digital manometer or pressure gauge; PID or equivalent monitoring device; and landfill gas meter	Quarterly for 2 years, then semi-annually for 3 years, annually for 5 years, and once every 5 years thereafter	To evaluate SVE system performance and optimize system operations
Well vacuum, VOCs, methane, oxygen and carbon dioxide	726 Extraction Wells	Dwyer digital manometer or pressure gauge; PID or equivalent monitoring device; and landfill gas meter	Quarterly	To evaluate SVE system performance and optimize system operations
Header vacuum, VOCs, methane, oxygen and carbon dioxide	Manifold	Dwyer digital manometer or pressure gauge; PID or equivalent monitoring device; and landfill gas meter	Daily first 7 days, weekly first four weeks, monthly first quarter and quarterly thereafter or as required	To evaluate SVE system performance and optimize system operations
VOCs, total flow	SVE Inlet	PID or equivalent monitoring device; and anemometer	Weekly or per permit requirements	Monitor SVE performance and estimate mass removed from subsurface
VOCs	SVE Outlet	PID or equivalent monitoring device	Weekly or per permit requirements	Monitor SVE performance

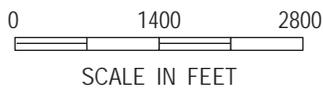
Table 2
Summary of Planned Laboratory Testing
 FORMER KAST PROPERTY
 Carson, California

Parameter	Locations	Method(s)	Frequency	Rationale
SVE System				
VOCs and fixed gases	16 Multi-Depth Soil Vapor Probes	EPA TO-15 and ASTM D-1946	Prior to starting SVE system and then quarterly for 2 years, semi-annually for 3 years, annually for 5 years, and once every 5 years thereafter	To establish baseline concentrations and monitor system effectiveness over time
TPH and VOCs	726 Extraction Wells	EPA TO-3 and EPA TO-15	Prior to initial extraction from well and once per quarter thereafter	To establish baseline concentrations and monitor TPH and VOC trends over time
VOCs	SVE System Inlet	EPA TO-15	Monthly	To comply with SCAQMD permit and calculate mass removal
VOCs	SVE System Outlet	EPA TO-15	Monthly	To comply with SCAQMD permit

Figures



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SITE VICINITY MAP

Project No.: 49194119	Date: June 2014	Project: Former KAST Property	Figure 1
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Appendix A

Soil Vapor Extraction and Treatment System
Record Drawings
(PENDING)

Appendix B

Permits
(PENDING)

Appendix C

Preventative Maintenance and Periodic Inspections

**Weekly Operations and Maintenance Logs
Former KAST PROPERTY
SVE Systems**

Maintenance Item	Preventative Action	Completed (date/initial)	Comments
Soil Vapor Extraction System			
Oxidizer	Regular weekly O&M duties (per O&M Field Sheet)		
	Check for damage, heat marks, etc.		
SVE Manifold Legs	Measure/record hydrocarbon concentrations with PID or equivalent, well vacuum, flow rate, and % open (per O&M Field Sheet)		
Blower	Check for excessive noise		
	Check temperature, flow rates, vacuum leaks, drive shafts, outer seal, vibration		
Vapor liquid separator	Check fluid level and excessive differential pressure		
Remediation and Manifold Buildings			
Buildings	Visually inspect the building for potential biological hazards, lighting, and ventilation system. General housekeeping		
SVE Blower Enclosure	Check for excessive noise, visually inspect ventilation system and blower temperature		
Holding Tank	Inspect holding tank for damage, biofouling buildup in the water level and on the tank wall		
Sump	Check and drain sumps and or compound if excessive rainwater is collected and complete documentation. Notify engineer and		

**Monthly Operations and Maintenance Logs
Former KAST PROPERTY
SVE Systems**

Maintenance Item	Preventative Action	Completed (date/initial)	Comments
Monthly (Second Week of Each Month)			
Soil Vapor Extraction System			
SVE System	Collect undiluted influent, diluted influent, and effluent vapor samples for laboratory testing		
Blowers	Check blower bearings, clean inlet filter - replace as needed		
	Check for oil leaks and level; add oil as needed		
	Check for biological hazards within blower enclosure		
	Clean Silencer filter - replace if needed, clean protecting flange screen		
Vacuum Filter	Check vacuum filter differential pressure - replace filter when differential pressure exceeds 10-15" WC; Check water buildup		
Vapor liquid separator	Check for sediment buildup		
	Inspect transfer pump motor, clean vents		
	Test flow meter operation - disassemble and clean if dirt or particles are preventing proper functioning		
	Drain and flush out tank		
	Test high-level switch		
Remediation and Manifold Buildings			
Buildings	Check fan outlet pressure; Check for obstructions at intake, check for corrosion, check lighting and room temperature, check condition of signs		
Holding Tank Level Switch	Test holding tank high-high level switch		
Fire Extinguishers (3)	Conduct monthly visual inspection, check pressure gauge		
Conveyance Piping	Check for trip hazards, reapply paint as needed		
LEL Sensor	Calibrate LEL sensor		
Vegetation	Check around compound and wellheads, trim and remove as needed		
Bi-Monthly (Every Other Month)			
Soil Vapor Extraction System			
Blowers	Replace filter Silencer filter (as needed)		

Quarterly Operations and Maintenance Logs
Former KAST PROPERTY
SVE Systems

Maintenance Item	Preventative Action	Completed (date/initial)	Comments
Soil Vapor Extraction System			
Vapor liquid separator	Check discharge pump for excessive noise/vibration. Check alignment if needed.		
	Clean site glass - as needed		
	Clean wye strainer		
Blowers	Test temperature and pressure switches		
	Add oil to the blower if needed		
	Clean solenoid valve		
Remediation and Manifold Buildings			
Buildings	Check the integrity of blower enclosures		
	General housekeeping		
	Check integrity of doors and locking system		
	Clean cooling fan blades		
Main Control Panel	Check for leaks in panel		
	Check that wire terminals are tight and that no screw terminals have vibrated loose		
Secondary Containment	Test berm switch		
	Clean out sump		

Semi-Annual Operations and Maintenance Logs
Former KAST PROPERTY
SVE Systems

Maintenance Item	Preventative Action	Completed (date/initial)	Comments
Soil Vapor Extraction System			
Gauges	Check vacuum/pressure gauge accuracy		
	Clean temperature gauge accuracy		
Solenoid Valves	Check and clean seals and replace with seal kit if necessary		
Remediation and Manifold Buildings			
Buildings	General housekeeping		
	Check integrity of hitch		
	Check integrity of doors and locking system		
	Check lighting		
Main Control Panel	Check for leaks in panel		
	Check that wire terminals are tight and that no screw terminals have vibrated loose		
Secondary Containment	Test berm switch		
	Clean out sump		
Emergency Stop	Test emergency shutoffs are functioning appropriately		

Annual Operations and Maintenance Logs
Former KAST PROPERTY
SVE Systems

Maintenance Item	Preventative Action	Completed (date/initial)	Comments
Soil Vapor Extraction System			
Blowers	Lubricate tapered roller bearings		
Remediation and Manifold buildings			
Main Control Panel	Check for proper grounding of panel		
	Check for moisture and condensation		
Fire Extinguishers	Annual inspection and testing at qualified facility DUE DATE IS:		

Appendix D

Forms for Monthly Maintenance Reporting



FORMER KAST PROPERTY - SVE O&M FIELD SHEET

Site Information		Calibration Record	
Project Name and Location	FORMER KAST PROPERTY - CARSON, CALIFORNIA	Instrument (PID/FID)	Serial or ID Number
Remediation System Location	FORMER KAST PROPERTY - CARSON, CALIFORNIA		
Project Manager	Christian Osterberg 714-689-7316 / Peter Stumpf 714-648-2750	Instrument Make and Model	
Date			
Arrival Time / Departure Time		Calibration Gas and Concentration - ppmv	
Field Technician and Company			
Oxidizer Equipment Model Number		Calibration Reading - ppmv	
Oxidizer Serial Number			

Routine O&M	
Non Routine O&M	
Parts Needed	
Parts Installed	
Malfunctioning Instrumentation	
Signs of Leaks	

Miscellaneous System Data	Soil Vapor Extraction System 1	Soil Vapor Extraction System 2
System Hour Meter Reading - hours		
Volume of Water in Holding Tank - gallons		
Volume of Water in Knockout - gallons		

Thermal Oxidizer Data	Arrival		Departure		Comments
	SVE 1	SVE 2	SVE 1	SVE 2	
Oxidizer Operating? (Yes or No)					
Oxidizer Operating Mode (Thermal or Catalytic)					
Extraction Wells - Online					
Extraction Wells - Offline					
Adding Dilution Air? (Yes or No)					
Vacuum at inlet to blower - in. w.c.					
System Undiluted Influent Concentration - ppmv					
System Diluted Influent Concentration - ppmv					
Inlet temperature (combustion temp.) - °F					
Outlet temperature (stack temp.) - °F					
Predilution Air Flow (scfm)					
Total Flow Rate - scfm (≤ 3,000 scfm)					
SVE Blower Discharge Temperature - °F					
System Effluent Concentration - ppmv (< 50 ppmv)					

Individual Header Data

Extraction Header ID	Header Valve Open (%)	Vacuum (inWC)	Flow Rate (scfm)	VOC Conc. (ppmv)	O2 (%)	CO2 (%)	CH4 (%)	Extraction Header ID	Header Valve Open (%)	Vacuum (inWC)	Flow Rate (scfm)	VOC Conc. (ppmv)	O2 (%)	CO2 (%)	CH4 (%)
CS-MARB								CS-RAVE							
IN-MARB								IN-RAVE							
DE-MARB								DE-RAVE							
RE-MARB								RE-RAVE							
CS-NEPT								CS-PANA							
IN-NEPT								IN-PANA							
DE-NEPT								DE-PANA							
RE-NEPT								CS-PANA							

Comments:

FLOW RATES Vs. DIFFERENTIAL PRESSURES

SVE SYSTEM

FORMER KAST PROPERTY

CARSON, CALIFORNIA

FLOW RATE CALCULATION (SCFM)															
PIPE SIZE	10-INCHES					12-INCHES					14-INCHES				
DIFFERENTIAL PRESSURE (IN-WC)	VACUUM (IN-WC)														
	10	30	50	70	90	10	30	50	70	90	10	30	50	70	90
0.005	103	105	108	110	112	150	153	157	160	163	208	213	218	223	227
0.01	145	149	152	156	159	212	217	221	226	231	294	301	308	315	321
0.015	178	182	186	190	194	259	265	271	277	283	360	369	377	385	393
0.02	206	210	215	220	224	299	306	313	320	327	416	426	436	445	454
0.025	230	235	241	246	251	334	342	350	358	365	465	476	487	498	508
0.03	252	258	264	269	275	366	375	384	392	400	510	522	534	545	556
0.035	272	278	285	291	297	396	405	414	423	432	550	564	576	589	601
0.04	291	298	304	311	317	423	433	443	452	462	588	602	616	629	642
0.045	308	316	323	330	337	449	459	470	480	490	624	639	653	668	681
0.05	325	333	340	348	355	473	484	495	506	516	658	674	689	704	718
0.055	341	349	357	365	372	496	508	519	531	542	690	706	722	738	753
0.060	356	365	373	381	389	518	530	542	554	566	721	738	755	771	787
0.065	371	379	388	396	405	539	552	565	577	589	750	768	785	802	819
0.070	385	394	403	411	420	560	573	586	599	611	778	797	815	833	850
0.075	398	408	417	426	435	579	593	606	620	632	806	825	844	862	880
0.080	411	421	431	440	449	598	612	626	640	653	832	852	871	890	909
0.085	424	434	444	453	463	617	631	646	660	673	858	878	898	918	937
0.090	436	447	457	467	476	635	650	664	679	693	883	904	924	944	964
0.095	448	459	469	479	489	652	667	683	697	712	907	928	949	970	990
0.10	460	471	481	492	502	669	685	700	715	730	930	953	974	995	1016
0.15	563	576	590	602	615	819	839	858	876	894	1140	1167	1193	1219	1244
0.20	650	666	681	695	710	946	968	990	1012	1033	1316	1347	1378	1407	1437
0.25	727	744	761	778	794	1058	1083	1107	1131	1155	1471	1506	1540	1574	1606
0.30	796	815	834	852	869	1159	1186	1213	1239	1265	1612	1650	1687	1724	1760
0.35	860	881	900	920	939	1251	1281	1310	1338	1366	1741	1782	1822	1862	1900
0.40	920	941	963	983	1004	1338	1370	1401	1431	1461	1861	1905	1948	1990	2032
0.45	975	998	1021	1043	1065	1419	1453	1486	1518	1549	1974	2021	2066	2111	2155
0.50	1028	1052	1076	1100	1122	1496	1531	1566	1600	1633	2081	2130	2178	2225	2272
0.55	1078	1104	1129	1153	1177	1569	1606	1642	1678	1713	2182	2234	2284	2334	2382
0.60	1126	1153	1179	1205	1230	1639	1677	1715	1752	1789	2279	2333	2386	2438	2488
0.65	1172	1200	1227	1254	1280	1705	1746	1785	1824	1862	2372	2429	2483	2537	2590
0.70	1216	1245	1273	1301	1328	1770	1812	1853	1893	1932	2462	2520	2577	2633	2688
0.75	1259	1289	1318	1347	1375	1832	1875	1918	1959	2000	2548	2609	2668	2725	2782
0.80	1300	1331	1361	1391	1420	1892	1937	1981	2024	2066	2632	2694	2755	2815	2873
0.85	1340	1372	1403	1434	1463	1950	1996	2042	2086	2129	2713	2777	2840	2901	2962
0.90	1379	1412	1444	1475	1506	2007	2054	2101	2146	2191	2791	2858	2922	2986	3048
0.95	1417	1451	1484	1516	1547	2062	2111	2158	2205	2251	2868	2936	3002	3067	3131
1.00	1454	1488	1522	1555	1587	2115	2165	2214	2262	2309	2942	3012	3080	3147	3212
1.50	1781	1823	1864	1905	1944	2591	2652	2712	2771	2828	3604	3689	3773	3854	3934
2.00	2056	2105	2153	2199	2245	2992	3062	3132	3200	3266	4161	4260	4356	4451	4543
2.50	2299	2353	2407	2459	2510	3345	3424	3501	3577	3652	4652	4763	4870	4976	5079
3.00	2518	2578	2636	2693	2749	3664	3751	3836	3919	4000	5096	5217	5335	5451	5564
3.50	2720	2785	2848	2909	2970	3957	4051	4143	4233	4321	5505	5635	5763	5888	6010
4.00	2908	2977	3044	3110	3175	4231	4331	4429	4525	4619	5885	6024	6161	6294	6425
4.50	3084	3157	3229	3299	3367	4487	4594	4698	4799	4899	6242	6390	6534	6676	6815
5.00	3251	3328	3403	3477	3549	4730	4842	4952	5059	5164	6579	6735	6888	7037	7183

Appendix E

Standard Operating Procedure for Sampling Using Tedlar Bags

Standard Operating Procedure for Sampling Using
Tedlar Bags

Former Kast Property
Carson, California

Prepared by Fouad Nasraddine Date

Reviewed by Peter Stumpf (AECOM- Technical Lead) Date

Approved by Christian Osterberg (AECOM- Project Manager) Date

Standard Operating Procedure (SOP) for Sampling Sub-Surface Probes Using Tedlar bags

Scope and Application:

EPA method TO-15 is used to identify Volatile Organic Compounds present in gas. Tedlar™ bags are used to obtain vapor samples from sub-surface probes and/or manifold for laboratory and field use to determine the concentration of volatile organic compounds in the soil vapor.

Interferences and Potential Problems

Cross-contamination can occur if improper materials are used in sampling. Thus, the gas should not be sampled after going through a pump as that would contribute to cross-contamination.

Equipment

Tedlar bags

4-gas or multi meter (if needed)

RKI Eagle or Landtec GEM™ 5000 or equivalent devices

Photo Ionization Detector (PID) or Flame Ionization Detector (FID)

Vacuum pump and vacuum box Teflon tubing

Method Summary for soil vapor extraction system lines:

- I. **Calibrate and/or check calibration of monitoring equipment and record on equipment calibration form. Recalibrate or discontinue use of instruments that do not meet manufacturer's specified tolerances. Note the expiration date of the calibration gas on the calibration log. Check that the instruments are charged and FID is fueled.**
- II. Verify that sampling train valves and connections have been decontaminated and record on field report.
- III. Review data obtained during well installation. Notify AECOM Field Manager and Project Manager if the wellheads appear damaged or cap is missing. Inspect the manifold, system inlet, individual wells, and system outlet.
- IV. Record the Well ID and label the Tedlar bag.
- V. Record field measurements and information.

- VI. For each well location:
 - a. Check newly cut Teflon tubing with PID and record reading.
 - b. Check initial vacuum or pressure at the manifold; record reading.
 - c. Set up sampling train.

The sampling train is made up of a decontaminated probe plug and isolation valve, Teflon field tubing, Tedlar bag, vacuum box and portable vacuum pump.
 - d. Make sure connections are tight

Replace components if connections are loose or if worn threads are observed on connection fittings.
- VII. Insert probe plug into sample port and begin initial purge into a Tedlar bag with a 200 mL/min vacuum pump.
- VIII. Screen the Tedlar bag contents for LEL, oxygen, and carbon dioxide using a 4-gas or multi-meter or equivalent, VOCs using a PID or equivalent, and methane using a Landtec GEMTM or equivalent. Readings shall be recorded on the form.
- IX. Record the barometric pressure (in inches of mercury, in-Hg) using the Landtec GEMTM 5000 or other barometer.
- X. Use the vacuum box and vacuum pump to take another sample with 1 L Tedlar bag.
 - a. After obtaining a sufficient volume in the Tedlar bag (after approximately 5 minutes using a 200 mL/min pump), seal and mark the bag with the appropriate information, and give it to the mobile lab or ALS for testing.
- XI. Clean work area to remove all traces of sampling activities when sampling is complete and well vault lids are secured.

Appendix F

Activity Hazard Analysis for System Startup

Activity Hazard Analysis							
Job/Task:	Startup and Initial Operation of Soil Vapor Extraction System	Overall Risk Assessment Code (RAC) (Use highest code)					
Work Area:	Former KAST Property, Carson, CA	Risk Assessment Code (RAC) Matrix					
Date Prepared:	September 15, 2015	Severity	Probability				
			Frequent	Likely	Occasional	Seldom	Unlikely
Prepared By:	Fouad Nasraddine/Project Engineer	Catastrophic	E	E	H	H	M
Reviewed By:	Peter Stumpf/Principal Engineer	Critical	E	H	H	M	L
Notes:	Marginal	H	M	M	L	L	
	Negligible	M	L	L	L	L	
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.					RAC CHART	
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible					E = Extreme Risk	
						H = High Risk	
					M = Moderate Risk		
					L = Low Risk		

Hazard Assessment			
Major Steps of Task:	Recognized/ Unanticipated Hazards:	Tools:	RAC:
Pre-Start Procedures	Orientation to work area-slip/trip/fall General Site Requirements Heat stress Biological	--	L
Circuit Breaker Panel	Electric shock	--	L
Start Up Procedures	Electric shock Noise Fire	--	M
Sample/Gauging ports	Pinch points Hot surfaces Slip/trip/fall Working with Chemicals Biological	Sample pump Hand tools	L

Adjacent Work/Processes and/or co-occupancy

Yes

No

Other workers adjacent, above, below

Notified them of our presence

Coordinated with adjacent work supervisor/customer operator

Can work safely

TEAM MEMBERS SIGNATURES

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The signature of the Site Safety Officer certifies the completion of the Hazard Assessment and Safe Plan of Action Checklist by the crew.

SSO's Signature:

Date

Instructions: 1. Write the name of the job or task in the space provided as needed. 2. Conduct a walk-through survey of work area. 3. Write the steps of the task in a safe sequence as needed. 4. Mark and add to all hazards involved in each step as well as reaction to failure as needed. 5. In the Safe Plan column, provide the corrective actions that will be taken to keep the hazard from becoming an accident or injury as needed. 6. In Tools column list tools needed to do the job, additional safety equipment, etc. 7. Have each team member that helped develop and will use this AHA sign in the spaces provided at the bottom. 8. Review the AHA at the end of the task for improvements. **(NOTE: THE WORK SHALL STOP IF CONDITIONS CHANGE, JOB CHANGES, OR DEFICIENCY IN PLAN IS NOTED.)**

Safe Plan of Action Checklist (Check the items that apply)

Permits/Clearances		Hazards		Safe Plan	
<input type="checkbox"/>	Utility Clearance Obtained			<input type="checkbox"/> Power de-energization required	<input type="checkbox"/> Insulation blankets required <input type="checkbox"/> Wire watcher required
<input type="checkbox"/>	Confined Space	<input type="checkbox"/>	Overhead Utilities	<input type="checkbox"/> Required clearance distance = _____ ft.	<input type="checkbox"/> Safe work zone marked
<input type="checkbox"/>	Critical Lift	<input type="checkbox"/>	Crane or other Lifting Equipment	<input type="checkbox"/> Signalman assigned <input type="checkbox"/> Tag lines in use	<input type="checkbox"/> Area around crane barricaded
<input type="checkbox"/>	Hoisting & Rigging Safety Review	<input type="checkbox"/>	Underground Utilities	<input type="checkbox"/> Lifting equipment inspected	<input type="checkbox"/> Personnel protected from overhead load
<input type="checkbox"/>	Boom Assembly and Breakdown	<input type="checkbox"/>	Electrical	<input type="checkbox"/> Reviewed as-builts	<input type="checkbox"/> Subsurface surveys <input type="checkbox"/> Received dig permit
<input type="checkbox"/>	Boom Proximity	<input type="checkbox"/>	Excavations	<input type="checkbox"/> Required clearance distance = _____ ft.	<input type="checkbox"/> Safe work zone marked
<input type="checkbox"/>	Concrete Structure Penetration	<input checked="" type="checkbox"/>	Fire Hazard	<input type="checkbox"/> Lock Out/Tag Out/Try Out?	<input type="checkbox"/> Permit required <input type="checkbox"/> Confirm that equipment is de-energized
<input type="checkbox"/>	Soil Excavation	<input type="checkbox"/>	Vehicular Traffic or Heavy Equipment	<input checked="" type="checkbox"/> Reviewed electrical safety procedures	<input type="checkbox"/> Additional info below
<input type="checkbox"/>	Pneumatic Test	<input type="checkbox"/>	Noise > 85 dB	<input type="checkbox"/> Permits <input type="checkbox"/> Inspected prior to entering	<input type="checkbox"/> Proper sloping/shoring
<input type="checkbox"/>	Hot Work	<input checked="" type="checkbox"/>	Hand & Power Tools:	<input type="checkbox"/> Barricades provided <input type="checkbox"/> Access/egress provided	<input type="checkbox"/> Protection from accumulated water
<input type="checkbox"/>	Scaffolding Erection Plan	<input type="checkbox"/>	Hand Hazards	<input type="checkbox"/> Permit <input checked="" type="checkbox"/> Fire Extinguishers	<input type="checkbox"/> Fire watch <input type="checkbox"/> Adjacent area protected
<input type="checkbox"/>	Steel Erection/Decking/Flooring/ Grating Checklist	<input type="checkbox"/>	Manual Lifting	<input type="checkbox"/> Unnecessary flammable material removed	<input type="checkbox"/> Additional info below
<input type="checkbox"/>	Request for Shutdown	<input type="checkbox"/>	Ladders	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs	<input type="checkbox"/> Flagmen <input type="checkbox"/> Lane closure
<input type="checkbox"/>	Electrically Hazardous Work	<input type="checkbox"/>	Scaffolds	<input type="checkbox"/> Communication with equipment operator	<input type="checkbox"/> Additional information below
<input type="checkbox"/>	Radiation Work Permit for Visitors	<input checked="" type="checkbox"/>	Slips, Trips, Falls	Hearing protection is required: <input checked="" type="checkbox"/> Ear plugs <input type="checkbox"/> Ear muffs	<input type="checkbox"/> Both <input type="checkbox"/> Additional info below
<input checked="" type="checkbox"/>	Required PPE	<input checked="" type="checkbox"/>	Pinch Points	<input checked="" type="checkbox"/> Inspect general condition <input checked="" type="checkbox"/> GFCI in use	<input type="checkbox"/> Identified PEP required for each tool
<input checked="" type="checkbox"/>	Hard Hat	<input checked="" type="checkbox"/>	Pressurized System	<input checked="" type="checkbox"/> Reviewed safety requirements in operators manual(s)	<input type="checkbox"/> Guarding OK <input type="checkbox"/> Additional info below
<input checked="" type="checkbox"/>	Ear Plugs/Ear Muffs (if needed)	<input checked="" type="checkbox"/>	Working w/Chemicals	<input type="checkbox"/> List sharp tools, material, equipment	<input type="checkbox"/> Protected sharp edges as necessary
<input checked="" type="checkbox"/>	Eye Protection	<input checked="" type="checkbox"/>	Heat Stress Potential	Hand Probe	<input checked="" type="checkbox"/> Additional info below
<input checked="" type="checkbox"/>	Safety Glasses	<input checked="" type="checkbox"/>	Cold Stress Potential	<input checked="" type="checkbox"/> PPE gloves (hi-vis), etc.	
<input type="checkbox"/>	Face Shield	<input type="checkbox"/>	Environmental	<input type="checkbox"/> Reviewed proper lifting tech.	<input type="checkbox"/> Identified material requiring lifting equipment
<input type="checkbox"/>	Chemical Goggles	<input type="checkbox"/>	Natural or Site Hazards	<input type="checkbox"/> Hand protection required <input type="checkbox"/> Back support belts	<input type="checkbox"/> Additional information below
<input type="checkbox"/>	Welding Hood	<input type="checkbox"/>	Elevated Work	<input type="checkbox"/> Inspect general condition before use	<input type="checkbox"/> Ladder inspected within last quarter
<input type="checkbox"/>	Hand Protection (Hi-Vis)	<input type="checkbox"/>	Additional Information	<input type="checkbox"/> Ladder tied off <input type="checkbox"/> Proper angle and placement	<input type="checkbox"/> Reviewed ladder safety
<input type="checkbox"/>	Cut Resistant Gloves	<input type="checkbox"/>		<input type="checkbox"/> Inspect general condition before use	<input type="checkbox"/> Tags in place <input type="checkbox"/> Properly secured
<input type="checkbox"/>	Welders Gloves	<input type="checkbox"/>		<input type="checkbox"/> Toe boards used <input type="checkbox"/> Footings adequate	<input type="checkbox"/> Materials properly stored on scaffold
<input type="checkbox"/>	Nitrile Gloves	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Inspect for trip hazards <input type="checkbox"/> Hazards marked	<input checked="" type="checkbox"/> Tools & material properly stored
<input type="checkbox"/>	Surgical Gloves	<input checked="" type="checkbox"/>		<input type="checkbox"/> Extension cords properly secured <input checked="" type="checkbox"/> Work zone free of debris	<input checked="" type="checkbox"/> Additional information below
<input type="checkbox"/>	Rubber Gloves	<input checked="" type="checkbox"/>		List potential pinch points: swinging doors, well vaults, valves	<input checked="" type="checkbox"/> Hand/Body positioning
<input checked="" type="checkbox"/>	Task Specific Gloves	<input checked="" type="checkbox"/>		<input type="checkbox"/> Working near operating equipment	<input type="checkbox"/> Additional information below
<input type="checkbox"/>	Arm Sleeves	<input type="checkbox"/>		<input checked="" type="checkbox"/> Eye protection required	<input checked="" type="checkbox"/> Hand/Body positioning when opening valves, wellheads, etc.
<input checked="" type="checkbox"/>	Foot Protection	<input type="checkbox"/>		<input checked="" type="checkbox"/> Working near operating equipment	<input type="checkbox"/> Additional information below
<input checked="" type="checkbox"/>	Safety Toe Boots	<input checked="" type="checkbox"/>		<input type="checkbox"/> The task creates potential for direct contact with hazardous chemicals	<input checked="" type="checkbox"/> Have identified proper PPE (respirators, clothing, gloves, etc.)
<input type="checkbox"/>	Rubber Boots	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Reviewed MSDS hazards and precautions	<input checked="" type="checkbox"/> Have proper containers and labels
<input type="checkbox"/>	Rubber Boot Covers	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Heat stress monitoring (>85° F; 29.4° C) <input checked="" type="checkbox"/> Liquids available	<input type="checkbox"/> Cool down periods
<input type="checkbox"/>	Dielectric Footware	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Sun Screen <input checked="" type="checkbox"/> Reviewed Heat Stress symptoms	<input type="checkbox"/> Additional info below
<input type="checkbox"/>	Respiratory Protection	<input type="checkbox"/>		<input type="checkbox"/> Proper clothing (i.e., gloves, coat, coveralls)	<input type="checkbox"/> Wind chill (<32° F; 0° C)
<input type="checkbox"/>	Dust Mask (NIOSH)	<input type="checkbox"/>		<input type="checkbox"/> Reviewed Cold Stress symptoms <input type="checkbox"/> Warm up periods	<input type="checkbox"/> Additional information below
<input type="checkbox"/>	Air Purifying Respirator	<input type="checkbox"/>		<input type="checkbox"/> Air emissions <input type="checkbox"/> Water discharge	<input type="checkbox"/> Hazardous wastes <input type="checkbox"/> Other wastes
<input type="checkbox"/>	Supplied Air Respirator	<input type="checkbox"/>		<input type="checkbox"/> Pollution prevention	<input type="checkbox"/> Waste minimization
<input type="checkbox"/>	SCBA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Weather <input checked="" type="checkbox"/> Terrain	<input type="checkbox"/> Adjacent operations or processes
<input type="checkbox"/>	Emergency Escape Respirator	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Animals/reptiles/insects hazards	<input checked="" type="checkbox"/> Biological hazards
<input type="checkbox"/>	Special Clothing	<input type="checkbox"/>		<input type="checkbox"/> Caution barricade tape required <input type="checkbox"/> Fall protection required	<input type="checkbox"/> Danger barricade tape required
<input type="checkbox"/>	Tyvek®	<input type="checkbox"/>		<input type="checkbox"/> Rigid railing required <input type="checkbox"/> Covers over opening	<input type="checkbox"/> Warning signs required
<input type="checkbox"/>	Poly Coated Tyvek®	Additional Information 100% glove use is required while working on site with the outer glove being hi-vis. Inspect work area for natural hazards, remove trip hazards prior to beginning work if possible.			
<input type="checkbox"/>	Snake Chaps				
<input type="checkbox"/>	High Visibility Vest/Clothing				
<input type="checkbox"/>	Fall Protection				
<input type="checkbox"/>	Harness				
<input type="checkbox"/>	Double Lanyard Required				
<input type="checkbox"/>	Anchorage Point Available				

APPENDIX N

VAPOR MITIGATION SYSTEM CONCEPTUAL DESIGN

VAPOR MITIGATION SYSTEM CONCEPTUAL DESIGN

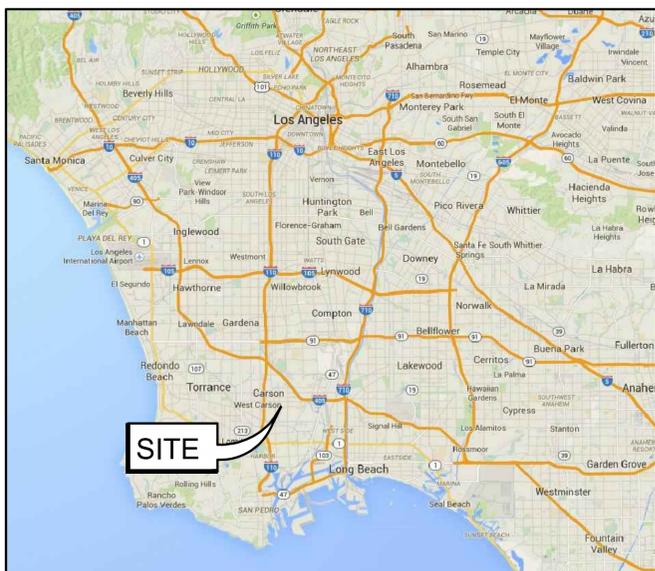
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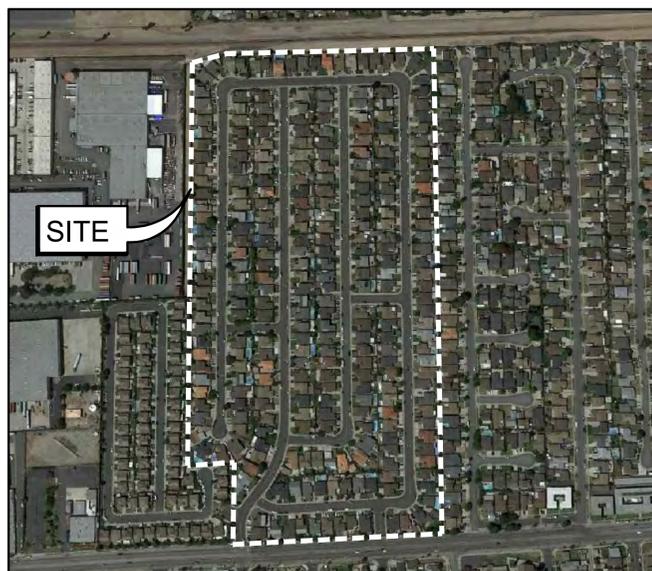
OCTOBER 2015



REGIONAL MAP



VICINITY MAP



SITE LOCATION MAP

INDEX OF DRAWINGS

DRAWING NO.	TITLE
GENERAL:	
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PREPARED FOR:
SHELL OIL PRODUCTS US

20945 S. WILMINGTON AVENUE
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SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

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COVER AND INDEX DRAWING
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CONCEPTUAL DRAWINGS	
DES BY: EL	DATE: OCTOBER 2015
DRN BY: MC	SCALE:
CHK BY: EL	PROJECT: SB0700
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DRAWING NO.
G-1

A. GENERAL

- THE CONCEPTUAL VAPOR MITIGATION SYSTEM DESIGN AND THESE DRAWINGS HAVE BEEN PREPARED ACCORDING TO THE STANDARD LEVEL OF CARE NORMALLY EXERCISED BY MEMBERS OF THE ENVIRONMENTAL CONSULTING PROFESSION PRACTICING IN THE UNITED STATES AT THIS TIME. THEY ASSUME THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR WHO HAS A WORKING KNOWLEDGE OF APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS OR CAN BE EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
- THESE DRAWINGS REPRESENT THE FINISHED MITIGATION SYSTEM FOR A TYPICAL STRUCTURE. EACH INDIVIDUAL STRUCTURE WILL VARY TO SOME DEGREE FROM THIS CONCEPTUAL DESIGN. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, ETC.
- ALL WORK SHALL BE IN COMPLIANCE WITH FEDERAL, STATE, AND LOCAL BUILDING, FIRE, AND ELECTRICAL CODES.
- FOR EACH STRUCTURE THE CONTRACTOR SHALL CONFER WITH AND SEEK THE APPROVAL OF GEOSYNTEC FOR THE FINAL LOCATIONS OF MITIGATION SYSTEM COMPONENTS, SUCH AS THE POINTS OF FOUNDATION PENETRATION, SUCTION POINTS, PIPE RUNS (FOR EXAMPLE, WHETHER INTERIOR OR EXTERIOR), AND EXHAUST POINTS ON THE ROOF.
- NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES, PROVIDED THE NOTES AND DETAILS ARE IN ACCORDANCE WITH ALL APPLICABLE CODES.
- ALL INSPECTIONS, IF REQUIRED BY BUILDING CODES, SHALL BE PROVIDED BY THE BUILDING DEPARTMENT OR AN INDEPENDENT INSPECTION COMPANY AS APPROPRIATE. SITE VISITS BY THE SYSTEM DESIGN ENGINEER DO NOT CONSTITUTE AN INSPECTION.
- WITH HOMEOWNER APPROVAL, THE SUCTION POINTS WILL BE COMPLETED ON THE INSIDE OF THE BUILDING.
- IF SOILS ARE EXCAVATED OUTSIDE THE BUILDING AS PART OF REMEDIAL MEASURE, THE REPLACEMENT SOIL PLACED NEAR THE BUILDING FOUNDATIONS SHOULD HAVE EQUAL OR LOWER AIR PERMEABILITY THAN THE EXISTING SOIL AND BE AND OTHERWISE SUITABLE.
- DUE TO THE VARIOUS SURFACES THAT THE PIPE AND EQUIPMENT SUPPORT BRACKETS WILL BE ATTACHED TO, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING APPROPRIATE BRACKETS AND ANCHORS FOR EACH INDIVIDUAL SURFACE ENCOUNTERED. THE BRACKETS SHALL BE INSTALLED IN A MANNER THAT PROVIDES THE NECESSARY STRUCTURAL REQUIREMENTS TO SUPPORT THE PIPE AND EQUIPMENT. THE INSTALLATIONS WILL MEET ALL BUILDING CODES, SEISMIC REQUIREMENTS, MAINTAIN A WATER TIGHT SURFACE AND WILL NOT CREATE A MEANS TO ALLOW FUTURE DAMAGE OR FAILURE TO THE EXISTING STRUCTURES OR SURFACES. THE PIPELINE ROUTING MAY NEED TO BE ALTERED IN THE FIELD IN ORDER TO PROVIDE THE BEST LOCATION TO ATTACH THE PIPE AND EQUIPMENT SUPPORT BRACKETS.

B. VAPOR MITIGATION SYSTEM

- THE INTENT OF THE WORK IS TO CREATE A NEGATIVE AIR PRESSURE AT ALL POINTS BELOW THE BUILDING FLOOR SLAB UNDER TYPICAL METEOROLOGICAL AND HOUSE HEATING AND VENTILATION CONDITIONS BY WITHDRAWING AIR FROM SUCTION PITS BELOW THE SLAB AS DEMONSTRATED BY DIFFERENTIAL PRESSURE MEASUREMENTS MADE BY THE CONTRACTOR AND VERIFIED BY THE ENGINEER IN REPRESENTATIVE AREAS OF THE SLAB. BASED ON BUILDING-SPECIFIC CONDITIONS AND AS APPROVED BY THE ENGINEER, IT MAY BE NECESSARY TO VARY THE LOCATION, NUMBER, AND SIZE OF THE SUCTION PITS FROM THOSE SHOWN ON THE DRAWINGS TO MEET THIS OBJECTIVE.
- THE MITIGATION SYSTEM PIPING CONSISTS OF PIPES THAT 1) PENETRATE THE EXISTING CONCRETE FOOTING WALL, AND 2) RISE VERTICALLY AND, AS NECESSARY, RUN HORIZONTALLY OUTSIDE THE BUILDING TO ROOF PENETRATION POINTS, AND 3) EXHAUST VAPORS TO THE ATMOSPHERE ABOVE THE ROOF. ALL VENT PIPES, AND FANS SHALL BE INSTALLED IN THE MANNER SHOWN ON THE DETAILS SHEET, AND AS REQUIRED BY THESE NOTES.
- VENT PIPE SHALL BE SCHEDULE 80 PVC WITH CLASS A FIRE RATING AND FLAME/SMOKE INDEX OF AT MOST 25/50 BY METHOD ASTM E84 OR AS REQUIRED BY APPLICABLE CODES AND SHALL BE 2, 3, OR 4 INCH I.D. UNLESS OTHERWISE INDICATED ON THE DRAWINGS. OTHER PIPE MATERIALS, E.G., CAST IRON, SHALL BE USED INSTEAD OF SCHEDULE 80 PVC WHEN REQUIRED BY CODE. CONTRACTOR SHALL USE LONG OR SHORT SWEEP ELBOWS WHERE POSSIBLE BASED ON FIELD CONDITIONS.
- THE MITIGATION SYSTEM PIPING IS CONNECTED TO INLINE ELECTRIC FAN.
- ALL PIPING CONNECTIONS SHALL BE SOLVENT CEMENTED AND PERMANENTLY SEALED USING A PRIMER MEETING ASTM F656 AND SOLVENT MEETING ASTM D2564. JOINTS SHALL BE MADE WHILE SOLVENT IS WET AND SHALL BE IN ACCORDANCE WITH ASTM 2855 AND ASTM F402.
- ALL FLOOR, WALL, CEILING AND ROOF PENETRATIONS SHALL MEET ALL APPLICABLE FIRE AND BUILDING CODES. HORIZONTAL PIPE RUNS AND THE NUMBER OF ELBOWS SHOULD BE MINIMIZED TO THE EXTENT PRACTICABLE TO MINIMIZE FRICTION TO AIR FLOW. HORIZONTAL PIPE RUNS SHALL BE SLOPED TO ENSURE THAT ANY RAIN WATER THAT ENTERS THE TOP OF THE PIPE AND ANY CONDENSATION THAT FORMS IN THE PIPE WILL DRAIN TOWARD THE FLOOR PENETRATION. HORIZONTAL RUNS SHALL BE SUPPORTED AT LEAST EVERY 5 FEET WITH CODE APPROVED HANGERS. ALL PIPING SHALL BE INSTALLED IN COMPLIANCE WITH BUILDING AND FIRE CODES.
- EXHAUST POINTS SHALL BE: AT LEAST 10 FEET ABOVE GRADE; AT LEAST 10 FEET AWAY FROM ANY OPENING THAT IS LESS THAN 2 FEET BELOW THE DISCHARGE; AT LEAST 10 FEET FROM ANY PRIVATE OR PUBLIC ACCESS; AT LEAST 10 FEET FROM ANY ADJACENT BUILDING; ABOVE THE EAVE OF THE ROOF; AND AWAY FROM ANY AIR INTAKE.
- CONTRACTOR SHALL USE THE SMALLEST FAN ABLE TO MEET MITIGATION OBJECTIVE, AS DIRECTED BY GEOSYNTEC.
- ELECTRIC SERVICE SHALL BE INSTALLED TO THE FANS USING A LICENSED LOCAL ELECTRICIAN.
- FANS SHALL BE INSTALLED ON VENT PIPES ACCORDING TO MANUFACTURER RECOMMENDATIONS. TO MINIMIZE VIBRATION NOISE, PIPING SHALL NOT COME IN DIRECT CONTACT WITH THE FAN HOUSING.

C. FOOTING WALL AND FLOOR SLAB PENETRATIONS

- THE INTENT OF THIS WORK IS TO ENSURE THAT THE EXISTING FOOTING WALL AND FLOOR SLAB IS SEALED AT ALL LOCATIONS, TO PREVENT THE LEAKAGE OF AIR.
- URETHANE CAULK OR SEALANT SHALL COMPLY WITH FEDERAL SPECIFICATION TT-S-00230C (E.G. PECORA CORPORATION'S DYNATROL 1-XL, OR TREMCO'S VULKEM 116) AND FIRE CODES AS APPLICABLE.
- ALL CONTROL JOINTS, CONSTRUCTION JOINTS, AND SIMILAR FEATURES SHALL BE SEALED USING URETHANE CAULK ACCORDING TO MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE FIRE CODES.
- ALL UTILITIES, PIPES, AND OTHER CONDUITS THAT PENETRATE THE EXISTING SLAB, INCLUDING VENT PIPES, SHALL BE WRAPPED AND SEALED WITH A URETHANE GROUT ACCORDING TO MANUFACTURER'S RECOMMENDATIONS AND IN A MANNER MEETING APPLICABLE FIRE CODES, TO PREVENT THE MOVEMENT OF AIR ALONG THE ANNULUS BETWEEN THE PIPE, CONDUIT, BOX, OR OTHER FEATURE AND THE CONCRETE.
- VISIBLE CONCRETE CRACKS EVIDENT NEAR THE SUCTION POINTS SHALL BE SEALED USING EXPANDING FOAM SEALANTS OR URETHANE CAULK TO ENSURE THAT THE SLAB IS SEALED FROM THE INDOOR SPACE.
- ALL SEALANT APPLICATIONS WILL BE MADE AT THE FINISHED CONCRETE SURFACE.
- TUB AND SHOWER DRAIN CUTOUT IN SLAB (IF PRESENT) SHALL BE SEALED USING FLOW-ABLE CONCRETE OR EXPANDABLE FOAM.

EQUIPMENT SCHEDULE

VAPOR VENT PIPING
 2, 3, OR 4 INCH PVC SCHEDULE 80 PIPE AND FITTINGS (ASTM D-2665) "WHITE COLOR".
 HOLLOW CORE PVC IS NOT PERMISSIBLE.
 PVC CEMENT PRIMER SHALL COMPLY WITH ASTM F-656.
 PVC CEMENT ADHESIVE SHALL COMPLY WITH ASTM D-2564.
 VARMIT GUARD, PIPE DAMPERS, PIPE LABELS

VAPOR SAMPLING PORT
 5/16" DIAMETER PORT, THREADED AND CAPPED WITH 5/16" x 3/8" STAINLESS STEEL SOCKET HEAD CAP SCREW AND O-RING SEAL

PIPING SUPPORTS
 2, 3, OR 4 INCH HANGING PIPE SUPPORTS.
 SWIVEL RING OR STANDARD BOLT TYPE CLEVIS
 ADJUSTABLE BAND HANGAR.
 DOUBLE DROP IN ANCHORS.
 ASSORTED BOLTS, STUCCO ANCHORS, NUTS AND WASHERS.
 2, 3, OR 4 INCH PIPE SECURED TO CONCRETE FLOOR OR WALL.
 SLOTTED CONDUIT CHANNEL.
 CONDUIT CLAMPS.
 PIPE ACCESS PANELS

SYSTEM FANS (SPECIFIED BY GEOSYNTEC ON A CASE BY CASE BASIS)
 RADON AWAY RP145, RADON AWAY RP265 FAN COVER (RADON AWAY #28387),
 AMG EAGLE WITH WHITE HOUSING
 SIZE APPROPRIATE RUBBER BOOTS WITH MARINE GRADE STAINLESS STEEL HOSE CLAMPS.

CRACKS & SEALING MATERIALS
 URETHANE SEALANT SHALL COMPLY TO FEDERAL SPECIFICATION TT-S-00230C, SUBJECT TO COMPLIANCE WITH CONTRACT REQUIREMENTS.
 VISUAL EXPANSION JOINTS OR SLAB CRACKS IN THE AREAS BEING MITIGATED THAT HAVE A 1/16 INCH OR GREATER OPENING SHOULD BE SEALED. SILICONE SEALANT SHALL COMPLY TO FEDERAL SPECIFICATION TT-S 001 543A.

VAPOR MITIGATION SYSTEM

INSTALLATION - ALL WORK SHALL BE IN COMPLIANCE WITH FEDERAL, STATE AND LOCAL BUILDING AND ELECTRICAL CODES.

LABELING - PIPING SHOULD BE LABELED NEAR THE TERMINATION POINT AND AT FIVE FOOT INTERVALS USING TWO-INCH LETTERING AS "POTENTIALLY HAZARDOUS VOLATILE COMPOUNDS". A PLACARD SHALL ALSO BE PLACED NEXT TO THE MAGNAHELIC GAUGE INDICATING THE NAME AND PHONE NUMBER OF A PERSON TO CONTACT IN THE EVENT OF SYSTEM FAILURE. RED PIN STRIPPING SHALL BE PLACED ON THE MAGNAHELIC GAUGE (AS DIRECTED BY GEOSYNTEC) TO INDICATE ACCEPTABLE VACUUM LEVELS.

PIPE SIZING AND ELBOWS - THE MAXIMUM PIPE RUN WILL NOT EXCEED 250 FEET. EACH 90 DEGREE ELBOW SUBTRACTS 10 FEET OF AVAILABLE PIPE LENGTH. CONTRACTOR SHALL USE LONG OR SHORT SWEEP ELBOWS WHERE POSSIBLE BASED ON FIELD CONDITIONS.

PIPE FITTINGS - ALL ELBOWS AND BEND FITTINGS SHALL BE DRAIN WASTE VENT (DWV). ALL "T" FITTINGS SHALL BE SANITARY "T" INSTALLED IN DIRECTION OF AIR MOVEMENT TO REDUCE FRICTION LOSSES.

VOLUME DAMPER - FOR SYSTEMS WITH MULTIPLE SUCTION POINTS, A SCH 80 PVC VOLUME DAMPER (BALL VALVE OR BLAST GATE) SHALL BE PLACED WITHIN EACH RISER PIPE AT A HEIGHT OF APPROXIMATELY FIVE FEET ABOVE GRADE. THE DAMPER CONTROL LEVER SHALL BE LOCKED AND POSITIONED SO TECHNICIANS CAN EASILY ACCESS AND ADJUST DAMPER.

PIPING SUPPORT AND INSTALLATION - ALL VERTICAL PIPING RUNS SHALL BE SUPPORTED AT LEAST EVERY 4 FEET AND AT EVERY PENETRATION THROUGH FOUNDATION WALLS AND SLABS, CEILING OR ROOF DECKS. HORIZONTAL RUNS SHALL BE SUPPORTED EVERY 5 FEET WITH CODE APPROVED HANGERS. ALL HORIZONTAL RUNS SHALL HAVE A SUPPORT WITH APPROPRIATE DEVICE WITHIN 2 FEET OF EACH FITTING. PLACE MAGNETIC TAPE OVER SUB-GRADE PIPING WITH A LABEL THAT READS "CAUTION - ENVIRONMENTAL PIPE BURIED BELOW". PENETRATIONS IN EXTERIOR WALLS OF STRUCTURES SHOULD BE SEALED WITH EXTERIOR GRADE SILICONE SEALANT. ALL PIPING SHALL BE INSTALLED IN COMPLIANCE WITH CA PLUMBING CODE.

PIPING CONNECTIONS - ALL PIPING CONNECTIONS SHALL BE SOLVENT CEMENTED USING A CLEAR PRIMER MEETING ASTM F656 AND NON-PURPLE SOLVENT MEETING ASTM D2564. JOINTS WILL SHALL BE MADE WHILE SOLVENT IS WET AND SHALL BE IN ACCORDANCE WITH ASTM 2855 ASTM F402.

ELECTRIC SERVICE - PROVIDE ELECTRIC SERVICE TO FAN FROM SELECTED ELECTRIC PANEL. PROVIDE AND INSTALL DESIGNATED 20 AMP BREAKER IN PANEL AND LABEL "SSD FAN". OUTDOORS, PROVIDE AN EXTERIOR GRADE, WEATHER TIGHT TUBING AND TERMINATE AT FAN WITH FLEXIBLE TUBING. USE APPROPRIATELY SIZED WIRING IN LENGTHS UP TO 120 LINEAR FEET. OVER 120 LINEAR FEET INCREASE WIRE SIZE 1 GAUGE. ALL ELECTRICAL WORK SHALL BE COMPLETED BY LICENSED ELECTRICIAN AND IN COMPLIANCE WITH NATIONAL ELECTRIC CODE AND STATE CODES.

ROOF PENETRATIONS AND REPAIRS - ALL ROOF FLASHING AND RELATED ROOF WORK SHALL BE MADE BY THE CONTRACTORS ROOFER THAT IS CERTIFIED BY THE ROOFING MATERIAL MANUFACTURER AND IS PERMITTED BY MANUFACTURER TO PERFORM ROOF WORK ON WARRANTED ROOFS. ROOFER MUST CERTIFY THE WORK MEETS MANUFACTURERS WARRANTY AFTER THE WORK IS COMPLETE.

FAN FAN (AND PIPING) SHOULD BE MOUNTED IN A WAY THAT MINIMIZES SOUND AND THE TRANSFER OF VIBRATIONS TO THE BUILDING, AS RECOMMENDED BY THE FAN MANUFACTURER.

FIRE PROTECTION
 MINERAL WOOL
 2, 3, OR 4 INCH FIRE COLLARS
 FIRE STOPPING CAULK

VISUAL PRESSURE INDICATOR
 MAGNEHELIC (DWYER, 0-5" WATER COLUMN)

VISUAL ALARM INDICATOR
 RADONAWAY CHECKPOINT II MITIGATION SYSTEM ALARM MOUNTED IN A WEATHER RESISTANT ENCLOSURE (NOMINAL 10 INCH BY 10 INCH) WITH VIEWING WINDOW.

VOLUME DAMPER
 PVC BALL VALVE WITH LOCKOUT

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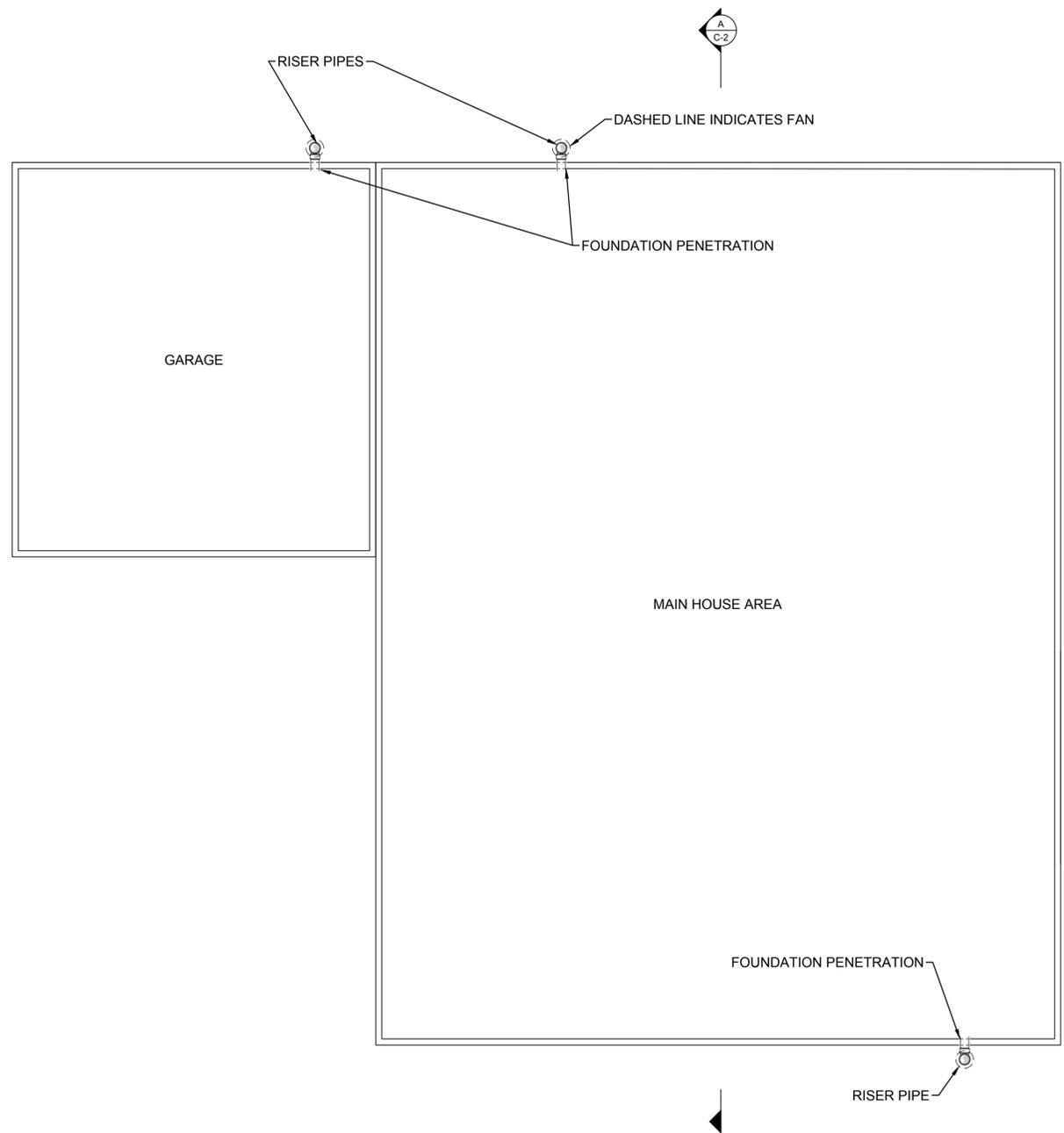
GENERAL NOTES AND SYSTEM SPECIFICATIONS

 FORMER KAST PROPERTY
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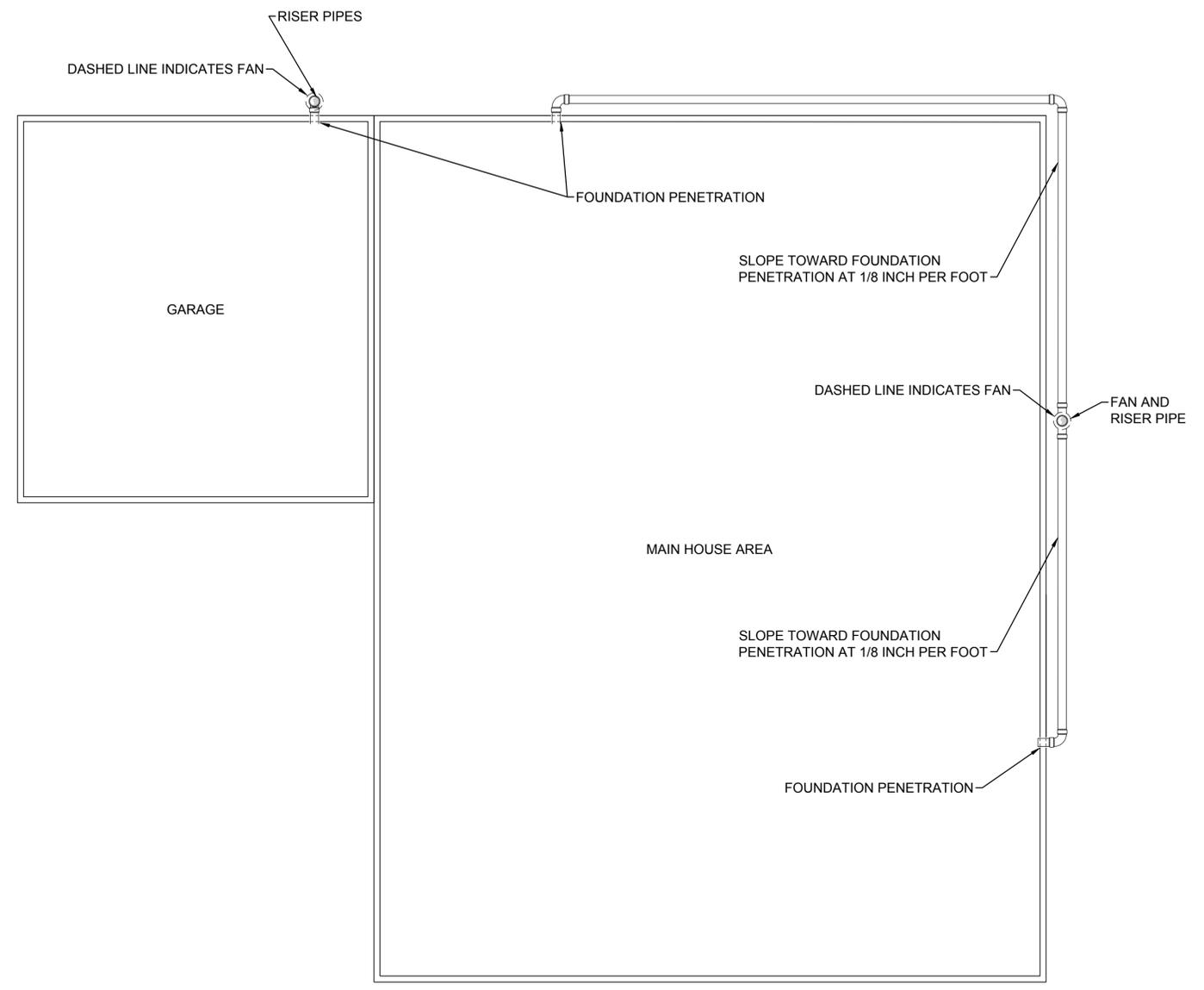
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CHK BY: EL	PROJECT: SB0700
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APP BY: JBL	FILE: SB0700 - G2.DWG

DRAWING NO.
G-2

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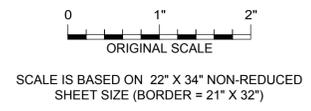


PLAN VIEW
OPTION A - DEDICATED FANS



PLAN VIEW
OPTION B - MANIFOLDED FANS

- NOTE:**
- FOUNDATION PENETRATIONS AND FAN LOCATIONS ARE CONCEPTUAL, AND MAY VARY TO CONFORM TO THESE DESIGN SPECIFICATIONS, AND SITE-SPECIFIC CONDITIONS SUCH AS BUILDING LAYOUT, ACCESS CONSTRAINTS, CODE REQUIREMENTS, AND OWNER PREFERENCES. MAIN HOUSE PENETRATIONS SHOULD GENERALLY BE LOCATED ON OPPOSITE SIDES OF THE BUILDING TO MAXIMIZE THE EXTENT OF THE SUCTION FIELD BELOW THE BUILDING.
 - AVOID LOCATING FANS NEAR BEDROOM WINDOWS OR OTHER LOCATIONS WHERE FAN NOISE MAY BE OF CONCERN.



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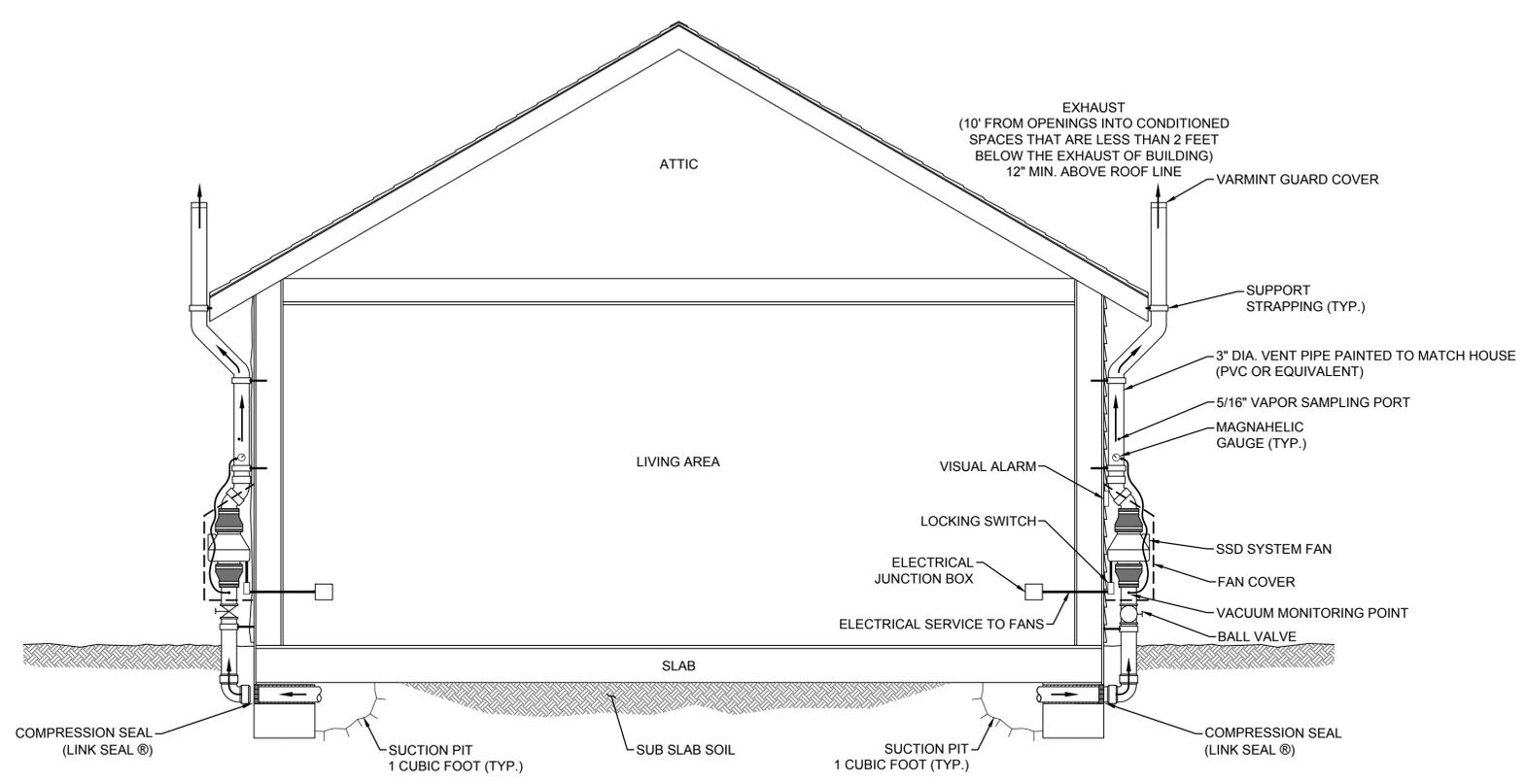
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TYPICAL VAPOR MITIGATION SYSTEMS -
ATTACHED GARAGE (PLAN)

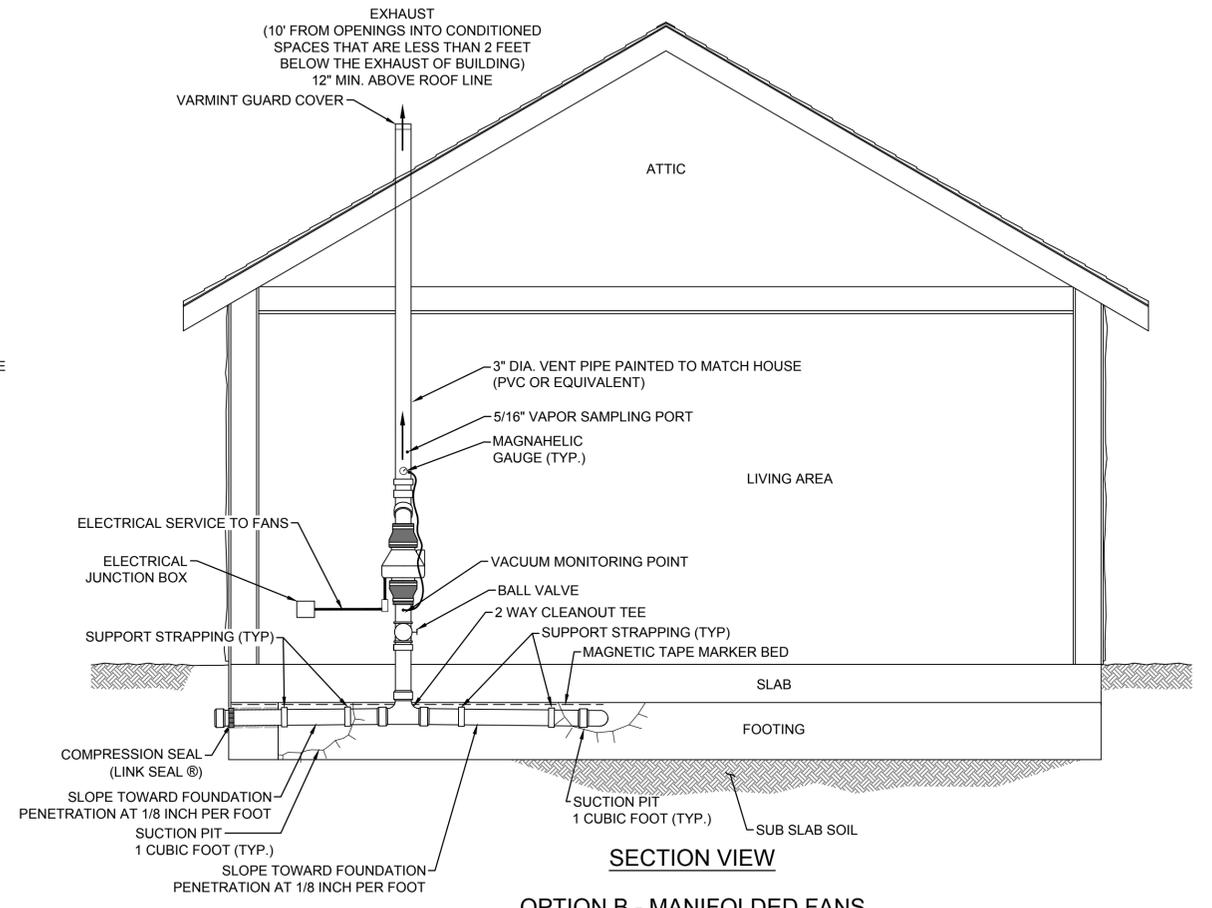
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C-1

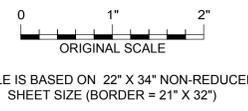


SECTION VIEW
OPTION A - DEDICATED FANS



SECTION VIEW
OPTION B - MANIFOLDED FANS

NOTE:
1. VISUAL ALARM INDICATOR WILL LIGHT UP RED WHEN THE FAN IS OFFLINE. A PLACARD SHALL BE PLACED BENEATH THE VISUAL ALARM INDICATOR WITH SERVICE CONTACT INFORMATION AND INSTRUCTIONS TO NOTIFY IF LIGHT IS RED.



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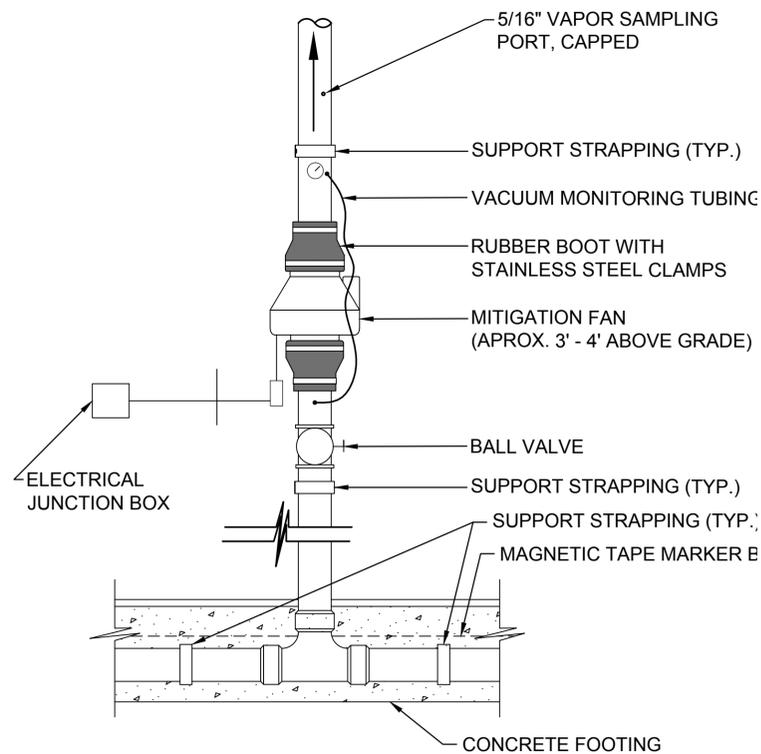
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TYPICAL VAPOR MITIGATION SYSTEM-A
(SECTION VIEW)
FORMER KAST PROPERTY
CARSON, CALIFORNIA

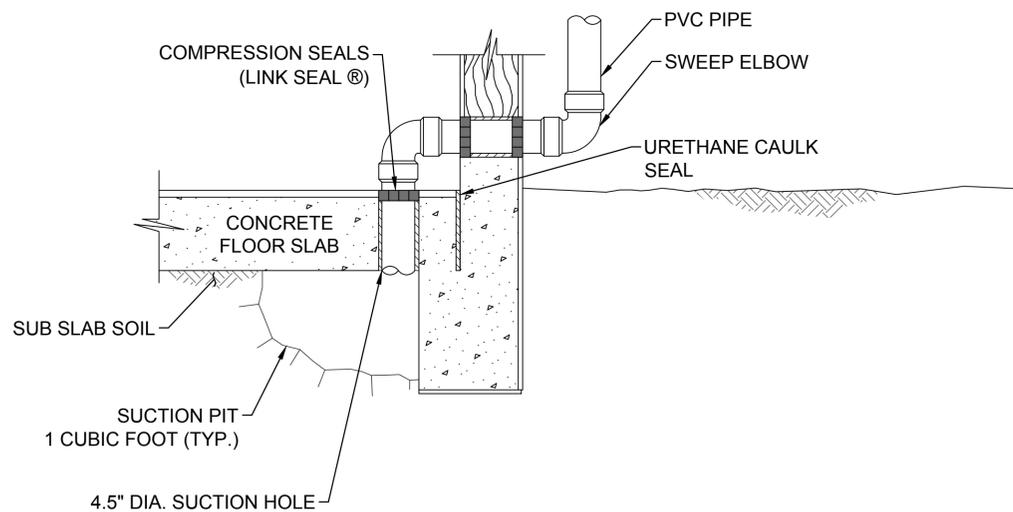
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C-2

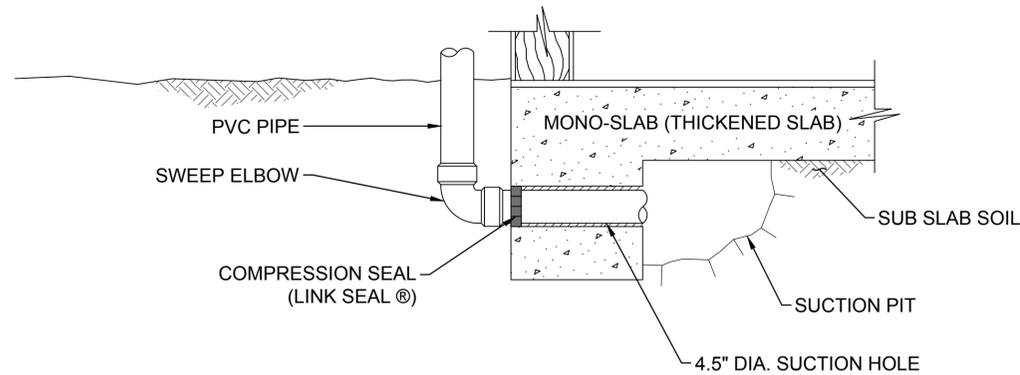
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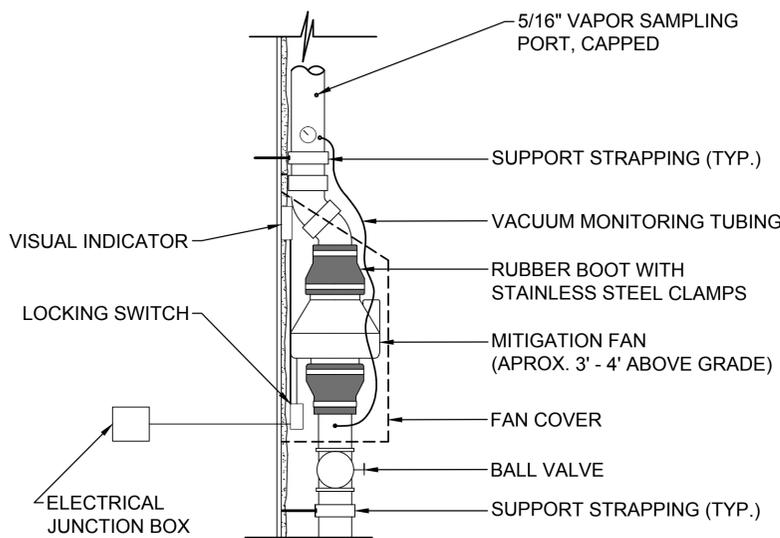
1 DETAIL
C-3
MULTIPLE SUCTION POINT MANIFOLD
SCALE: N.T.S.



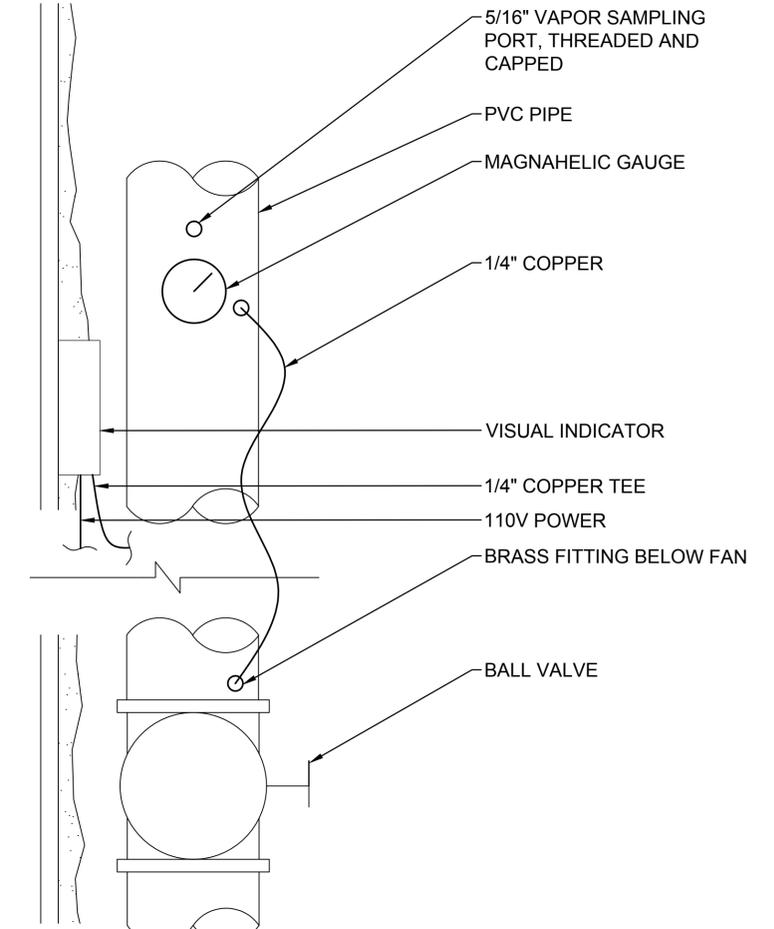
4 DETAIL
C-3
INTERIOR SUCTION POINT
SCALE: N.T.S.



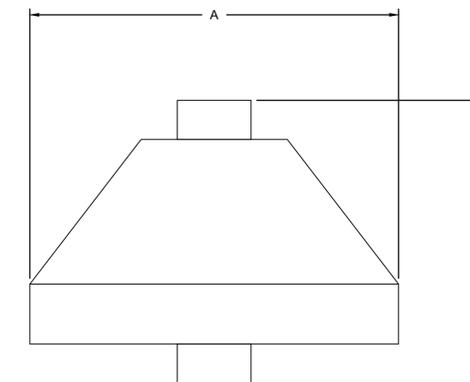
2 DETAIL
C-3
EXTERIOR SUCTION POINT DETAIL - MONOSLAB
SCALE: N.T.S.



5 DETAIL
C-3
FAN MOUNT DETAIL
SCALE: N.T.S.



3 DETAIL
C-3
MAGNAHELIC MOUNTING DETAIL
SCALE: N.T.S.

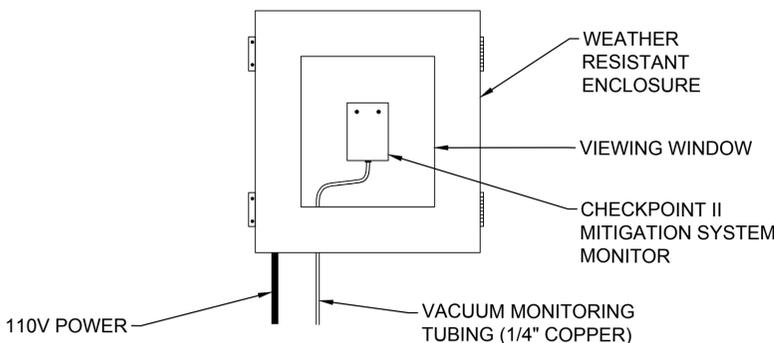


6 DETAIL
C-3
FAN SIZE DETAIL
SCALE: N.T.S.

MODEL	A	B
RP-145	9.7"	8.5"
RP-265	11.75"	8.6"
EAGLE	12.1"	9.25"

NOTES

- IN THE EVENT THAT A HORIZONTAL PIPE PENETRATION WILL BE INSTALLED THROUGH AN EXTERIOR/INTERIOR WALL THE PENETRATION WILL BE COMPLETED BY INSTALLING A STEEL SLEEVE IN WHICH THE PVC PIPE WILL BE INSTALLED AND SEALED. ADDITIONAL FRAMING, SHEET ROCK AND STUCCO REPAIR MAY BE REQUIRED TO ADEQUATELY SUPPORT THE SLEEVE. THE EXTERIOR STUCCO REPAIR WILL BE COMPLETED USING A WATER PROOF BACKING MATERIAL THAT IS SEALED TO THE STEEL PIPE. THE STUCCO REPAIR WILL BE COMPLETED TO MATCH THE EXISTING. THE INTERIOR SHEET ROCK REPAIR WILL BE COMPLETED TO MATCH THE EXISTING.
- THE PVC PIPE PENETRATION WILL BE HELD IN PLACE WITH-IN THE STEEL SLEEVE WITH LINK-SEALS INSTALLED AT EACH SIDE OF THE SLEEVE. THE LINK SEALS WILL BE INSTALLED WITH-IN THE STEEL SLEEVE WITH ENOUGH SET BACK SPACE TO ALLOW FOR THE INSTALLATION OF A FIRE RATED CAULKING/SEALER TO COVER THE LINK SEAL. THE WORK WILL BE COMPLETED IN ACCORDANCE WITH ALL LOCAL AND STATE BUILDING AND FIRE CODES.



7 DETAIL
C-3
VISUAL ALARM INDICATOR
SCALE: N.T.S.



SCALE IS BASED ON 22" X 34" NON-REDUCED SHEET SIZE (BORDER = 21" X 32")

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DRAWING NO.

C-3

APPENDIX O
MITIGATION MONITORING AND REPORTING PROGRAM CROSS-REFERENCE
TABLE

**APPENDIX 0
MITIGATION MONITORING AND REPORTING PROGRAM**

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Addressed in RDIP Section
				Initial	Date	
5.1 Air Quality						
PDF AQ-1 All off-road diesel construction equipment remaining on-site for more than 15 work days will meet USEPA Tier 3 off-road emission standards, if commercially available locally. Use of Tier 3 engines results in a substantial reduction in NO _x emissions compared to similar Tier 2 or lower engines, and has been shown to increase fuel economy over similar Tier 2 engines. Documentation of all off-road diesel construction equipment on-site including Tier 3 certification will be maintained and made available to the Regional Board for inspection upon request.	Written verification, including documentation from the equipment manufacturer or retrofit contractor/installer for Tier 3 equipment. Maintenance of a written log with model, serial number, equipment owner/operator, and any unique visible identifier of all equipment used on-site; the log will demonstrate compliance with Tier 3 emission standards and will be available for inspection upon request by the Regional Board.	Regional Board	Prior to commencement of construction activities and continuously during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			9.15
PDF AQ-2 All on-road waste haul trucks exporting soil to the appropriate receiver facility will be model year 2007 or newer or retrofitted to comply with USEPA Year 2007 on-road emissions standards. Documentation of all on-road trucks exporting soil will be maintained and made available to the Regional Board for inspection upon request.	Written verification that all on-road vehicles used for hauling export materials are engine model year 2007 or newer; engines manufactured prior to 2007 will be allowed if retrofitted to 2007 emission standards or better; this requirement does not apply to trucks hauling municipal, universal, or "green" waste from the	Regional Board	Prior to commencement of activities and during all construction and remediation phases Periodic inspections will be conducted by Responsible Party; Inspections of truck logs will be conducted no less than quarterly by the Regional Board during project activities.			9.15

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Address in	
	<p>site</p> <p>Hauling contractor(s) will provide written record demonstrating availability or absence of 2007 or newer model year trucks in its fleet;</p> <p>Maintenance of a written log with truck engine model year or retrofit certification, Vehicle Identification Number (VIN), and license plate number; the log will be updated as needed and will be available for inspection upon request by the Regional Board. Copies of the certification with the information specified will be acceptable in place of the log.</p>					9.15
<p>PDF AQ-3 The contractor will prohibit the idling of on- and off-road heavy duty diesel vehicles for more than five minutes at a time. This project design feature is consistent with California regulations and laws as well as CARB ATCM requirements.</p>	<p>Hauling and remediation contractors will inform all operators of on- and off-road heavy duty diesel equipment of ATCM requirements as well as noise requirements (see PDF NOISE-2) associated with idling and monitor on-site compliance</p> <p>Contractor will post signs with idling limits at the entrance(s) to the work area</p>	Regional Board	<p>Continuously by Responsible Party during all construction and remediation phases</p> <p>Inspections will be conducted no less than quarterly by the Regional; frequency may be modified as warranted Board</p>			9.15

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Address in	
PDF AQ-4 The contractor will install SVE and bioventing systems to address petroleum hydrocarbons, VOCs, and methane in soil vapor and to promote degradation of residual hydrocarbon concentrations that do not meet Remedial Action Objectives (RAOs), or are not removed by excavation. The SVE and bioventing systems will require a permit from the SCAQMD. Periodic monitoring will be conducted as specified in the SCAQMD Permit.	Issuance of permit	SCAQMD and Regional Board	Prior to and during operation of SVE/bioventing systems by the RP Inspections will be conducted no less than quarterly by Regional Board; frequency may be modified as warranted			4.2; 7.2; 10.4; 10.5; 15.8
PDF AQ-5 Sub-slab vapor mitigation system will be installed at 28 identified properties (27 based on RAO exceedance for potential vapor intrusion and 1 based on SSCG exceedance for methane). Sub-slab vapor mitigation system will also be installed at any additional properties within the Carousel Tract where the homeowner requests a sub-slab mitigation system. The system will use sub-slab depressurization (SSD), which will create a negative pressure below the slab of the residence using a fan to remove air from below the slab and exhausting it above the building.	Post installation of the SSD system at individual properties, periodic sub-slab soil vapor probes sampling will be performed and results will be included in the quarterly progress reports for Regional Board review.	Regional Board	Periodically by the RP Review of sampling reports by Regional Board; sampling events will occur annually for the first five years and less frequently after that according to the schedule in the approved RAP			4.3; 11.1

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
<p>PDF AQ-6 The project will comply with applicable SCAQMD rules that govern the control of air pollutant emissions from the site, including: SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil.</p> <p>Submit a Mitigation Plan in accordance with Attachment A of SCAQMD Rule 1166, and obtain approval from the SCAQMD. VOC suppression measures shall include water mist as a first level of vapor and odor control. Care will be taken to ensure that the soil is not over-saturated, which could generate runoff that would need to be managed and increase the weight of soil to be disposed. Based on monitoring data or odor perception, vapor and odor control will be implemented on an as needed basis. Based on experience from the excavation pilot test, Rusmar AC-565 Long Duration Foam was found to be most effective at controlling vapors and odors. This type of foam, or equivalent, and necessary support equipment will be staged and ready for application at locations where remedial excavations are conducted and there is the potential for odor releases. A copy of the approved plan will be on-site during the entire excavation</p>	<p>Issuance of 1166 Permit Mitigation Plan in accordance with Attachment A of SCAQMD Rule 1166 submitted to the SCAQMD</p> <p>Use of a real-time monitor that is calibrated on a daily basis</p> <p>Monitoring consistent with Rule 1166</p> <p>Maintenance of monitoring logs</p>	<p>SCAQMD and Regional Board</p>	<p>Before and during all construction and remediation phases</p> <p>Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted</p>			<p>7.9; 9.10.3; 9.13</p>

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
<p>period.</p> <p>Monitor for the presence of VOC and implement the approved mitigation plan when VOC-contaminated soil, as defined in Rule 1166, is detected.</p> <p>If required, obtain a SCAQMD Permit for project activities, and provide a copy of said Permit to the Regional Board.</p>						7.9; 9.10.3; 9.13
<p>PDF AQ-7 The project will implement fugitive dust control measures consistent with SCAQMD rules and regulations. The dust control measures will consist of various elements including: proper maintenance and watering of internal haul roads; water spraying of soil excavated and placed for cover or soil reconsolidation; and applying water on intermediate soil cover areas. This project design feature is consistent with SCAQMD Rule 403 requirements.</p>	<p>The applicant will comply with SCAQMD Rule 403 which requires fugitive dust control measures including track-out prevention, street sweeping and watering of exposed surfaces.</p>	Regional Board	<p>Continuously by Responsible Party during all construction and remediation phases</p> <p>Visual inspections will be conducted frequently when Regional Board staff are on-site, and written inspection records will be made periodically by the Regional Board</p>			9.10.5; 9.13
<p>PDF AQ-8 Exposed surfaces and active excavation sites will be controlled with water and/or suppressants certified by CARB, the SCAQMD, or other air pollution control agency, to control fugitive dust, vapors, and odors. Such suppressants include foams (e.g., Rusmar AC-565 Long Duration Foam), nontoxic binders, or other suppressants to reduce fugitive</p>	<p>Maintenance of logs indicating frequency of watering, use of dust suppressant, and foam application</p>	Regional Board	<p>Continuously by Responsible Party during all construction and remediation phases</p> <p>Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted</p>			9.13

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
dust emissions and to control vapors and odors. Logs of water purchase or usage and suppressant application (including brand/manufacturer, date of application, area treated and amount applied) will be maintained by the RP and made available to the Regional Board and SCAQMD for inspection upon request.						9.13
PDF AQ-9 Prior to leaving the site, each haul truck, and other delivery trucks that come in contact with site waste, will be inspected and put through procedures, such as brushing, to remove loose debris from tire wells and on the truck exterior. Haul truck operators (drivers) will be required to have the proper training and registration by the State and as applicable to the material they will be hauling. Trucks transporting hazardous waste are required to maintain a hazardous waste manifest that describes the content of the materials. These manifests will be supplied by the waste receiver facility and prepared by the contractor or trucking company and the Kast Property RP representative(s) prior to export off-site. The contracted trucking company will be a certified hazardous waste transportation contractor, if the material is	<p>Installation of at least one track out prevention device</p> <p>Implement additional track out prevention devices if needed.</p> <p>Inspect track out device at end of each workday and clean as needed.</p> <p>Maintenance of log of manifest data for export trucks, including vehicle license plates and time of departure. Copies of the manifests with the information specified will be acceptable in place of the log.</p> <p>Verification that haul truck operators (drivers) are licensed to transport hazardous waste if load transported is characterized as hazardous waste.</p>	Regional Board	<p>Continuously by Responsible Party during all construction and remediation phases and upon completion of the remediated Site</p> <p>Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted</p>			9.15

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
profiled as hazardous. A log of manifest data will be maintained by the RP and made available to the Regional Board for inspection upon request.						9.15
PDF AQ-10 Waste haul trucks and soil delivery trucks entering and exiting the site will be required to follow the approved traffic plan that establishes the trucking route, days and hours of truck operation, and various requirements to provide traffic, pedestrian and bicycle safety. Truck operators will be provided with a trucking route map and hours of operation allowed.	Approved truck haul route map	City of Carson and Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			9.15
PDF AQ-11 In order to minimize traffic congestion at or near the site, construction worker parking will be provided at a nearby off-site location. Shuttles and/or vans will be provided to transport construction workers from the off-site parking location to the site.	Instrument, such as lease agreement, verifying approval for off-site parking	Regional Board	Prior to commencement of remedial activities Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			7.1.1; 9.15
PDF AQ-12 To the maximum practical extent, recyclable materials, including non-hazardous construction and demolition debris, will be reused or recycled.	Maintenance of log indicating number of trucks hauling recyclable materials	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			9.14
5.2 Geology and Soils						
PDF GEO-1 Prior to issuance of a grading permit, a final geotechnical investigation and remedial	Issuance of grading permit	Los Angeles County Department	Prior to issuance of grading permit			4.1; 7.1; 9.1

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
excavation grading plan with final design recommendations applicable to every excavated area will be prepared by a California-registered geotechnical or civil engineer and submitted to the LACDPW and City of Carson for review. The geotechnical report will describe the characteristics of underlying natural or fill soils, including expansive soils, potential differential settlement and varying soils strength and the placement of backfill. The geotechnical report will contain recommendations for any needed cut slopes or compaction of fill materials. The remedial excavation grading plan will detail the excavation and backfill design details based on the findings and recommendations of the geotechnical report.		of Public Works and City of Carson				4.1; 7.1; 9.1
PDF GEO-2 The geotechnical report and remedial excavation grading plans will include site-specific design criteria related to the excavation activities in proximity to foundations and footings.	Issuance of grading permit	Los Angeles County Department of Public Works and City of Carson	Prior to issuance of grading permit			7.1; 9.1
PDF GEO-3 Pre-excavation and post-excavation surveys of the existing structures and improvements at the site and at adjacent properties that have granted access will be conducted to document pre-excavation	Submittal of documentation (i.e., written notes, digital photographs and videos) after completion of excavation	Los Angeles County Department of Public Works and City of Carson	Pre- and post-excavation			9.6

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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conditions and any changes in those conditions following excavation. Documentation will consist of written notes, digital photographs, and videos. Existing cracks or other distress present in structures or concrete will be documented and measured. Cracks will be monitored by direct measurement using a dial caliper capable of measuring distances to approximately ±0.001 inch, or using commercially available crack monitoring devices installed on the existing cracks, such that any potential change of crack size during implementation of the RAP can be monitored and documented.						9.6
PDF GEO-4 Full time observation should be provided by qualified technical staff working under the responsible charge of a licensed engineer. Any conditions encountered within the field that are different than those anticipated (i.e. irrigation water seepage, localized loose soils, clean sand, etc.) will be brought to the immediate attention of the geotechnical engineer for corrective measures.	Any such occurrences shall be documented in a daily field report and included in the quarterly Remediation Progress Report	Los Angeles County Department of Public Works, City of Carson, and Regional Board	Ongoing during excavation Daily report reviewed by Regional Board			9.10.1
PDF GEO-5 Clean soil will be imported for backfill of excavations from an offsite source. Before importing the backfill soil to the site, samples of the proposed	Approval of laboratory analyses by geotechnical engineer	Los Angeles County Department of Public Works and	Ongoing during excavation			9.9.1

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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import soil will be submitted for laboratory geotechnical and chemical characterization analysis. Geotechnical tests include gradation, plasticity index (PI), maximum density and optimum moisture, and corrosivity tests. The geotechnical engineer will approve the backfill soil prior to its import, placement, and compaction at the site.		City of Carson				9.9.1
PDF GEO-6 Upon completion of excavation, concrete removal and environmental sampling (as appropriate), excavated areas will be backfilled as soon as possible. Backfill soils would be moisture conditioned to near optimal moisture content and compacted to at least 90 percent relative compaction, or as determined by the Geotechnical Engineer and approved by Los Angeles County Department of Public Works (LACDPW) and the City of Carson. Borings from auger excavation would be backfilled with controlled low strength material (CLSM, also referred to as flowable fill or sand/cement slurry) the same day they are excavated. Where slot trenching is used for 5-foot excavations or for targeted deeper excavations to 10 feet, the lower part of the slot trenches would also be backfilled with CLSM. The upper 3 feet of excavations would	Final Grading Compaction Report for each property	Los Angeles County Department of Public Works and the City of Carson	Upon completion of excavation, concrete removal and environmental sampling (as appropriate)			7.0; 9.1.4; 9.9

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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be backfilled with certified clean imported soil. Backfill soil would be free of deleterious organic matter (i.e., vegetation) and cobbles larger than four inches in diameter, and would be approved by the Geotechnical Engineer. The upper foot of soil backfill within landscaped areas would be topsoil suitable for vegetation growth and would be compacted to not more than 85 percent relative compaction.						7.0; 9.1.4; 9.9
PDF GEO-7 Landscaping of backfilled properties would be restored to “like conditions” or as agreed to with the homeowners, as allowable under current state and local regulations.	Property Specific Remediation Plan	Regional Board	Ongoing during restoration			12.0
5.3 Greenhouse Gas Emissions						
PDF GHG-1 The project will comply with the use of low carbon vehicle fuels as required under State law.	If fuel for the project is purchased outside of California, the contractor shall provide documentation that this out-of-state fuel complies with the California Low Carbon Fuel Standard.	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			9.15
5.5 Hydrology and Water Quality						
PDF H/WQ-1 The Responsible Party will provide a Surface Containment and Soil Management Plan to permitting agencies prior to the start of RAP implementation. This document will provide	Surface Containment and Soil Management Plan, and SWPPP Responsible Party submit Notice of Intent to enroll with General Construction	Los Angeles County Department of Building and Safety City of	Prior to issuance of a grading permit Ongoing during implementation of the RAP			6.7; Appx A; Appx C

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
measures for surface containment and management of residual soils containing COCs above SSCGs and will serve as part of the grading permit process. In addition, in compliance with the General Construction NPDES Permit, the Responsible Party will provide specific stormwater BMPs as part of proposed grading plans to reduce the potential for sediments within discharge of runoff into the storm drain system during grading. In accordance with the Los Angeles County Building Code, BMPs must demonstrate that eroded sediments and other pollutants will be retained on site and not transported from the site via sheetflow, swales, area drains, natural drainage courses, or wind; stockpiles of earth and other construction-related materials will be protected from being transported from the site by the forces of wind or water; fuels, oils, solvents, and other toxic materials will be stored in accordance with their listing and will not contaminate the soil and surface waters; spills will be cleaned up immediately and disposed of in a proper manner and not washed into the drainage system; non-stormwater runoff from equipment. Vehicles will be dry decontaminated before leaving the site to avoid water runoff. Excess	NPDES permit (State Water Board Order No. 2010-0014-DWQ)	Carson, and Regional Board				6.7; Appx A; Appx C

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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<p>or waste concrete will not be washed into the public way or any other drainage system and provisions will be made to retain concrete wastes on site until they can be disposed of as solid waste; sediments and other materials will not be tracked from the site by vehicle traffic, construction entrance roadways will be stabilized so as to inhibit sediments from being deposited into the public way, and accidental depositions will be swept up immediately and will not be washed down by rain or other means. Site-specific BMPs will be submitted to the Los Angeles County Department of Building and Safety (reviewing agency for the City of Carson) for review and approval. For areas of one-acre or greater, the RP shall prepare a SWPPP that describes all structural and non-structural BMPs. BMPs must be reviewed and approved by the Los Angeles County Department of Building and Safety prior to issuance of a grading permit. In accordance with Los Angeles Building Code, Appendix J, Section J111.3 a Wet Weather Erosion Control Plans (WWECP) for each storm season will be submitted for all active grading projects.</p>						6.7 Appx A; Appx C

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
PDF H/WQ-2 Dust monitoring will be conducted for all excavations. If visible dust is encountered, periodic watering of the active excavation areas will be recommended throughout the excavation and backfill activities. Watering will be monitored to prevent off-site runoff.	Observation; presence of water mists, water truck, and/or water buffalo on-site during excavation	Regional Board and City of Carson	Ongoing during implementation of the RAP			9.10.5
PDF-H/WQ-3 Impacted soil will be directly loaded into approved waste containers (such as drums, bins, or directly into trucks) for off-site transport. The RP will provide suitable containers based on the nature of the excavation work being conducted. In the event that it is necessary to temporarily stockpile soil onsite before loading, soils will be placed upon plastic sheeting and covered with plastic until they can be loaded into approved waste containers to be provided by the RP.	Visual inspection by Regional Board	Regional Board and City of Carson	Ongoing during implementation of the RAP			9.7.4
PDF H/WQ-4 LNAPL will be recovered where it has accumulated in monitoring wells to the extent technologically and economically feasible, and where a reduction in current and future risk to groundwater will result.	Review of records of interface probes	Regional Board	Throughout implementation of the RAP			13.0
PDF H/WQ-5 A stable or decreasing plume of site-related COCs will be maintained beneath the site. This will be achieved through reduction of COCs in soils	Groundwater monitoring reports	Regional Board	Throughout implementation of the RAP			14.0

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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through soil vapor extraction (SVE) and bio-venting, which would reduce COCs entering groundwater via on-site soils, removal of wastes in soil, and monitored natural attenuation (MNA) of groundwater.						14.0
PDF H/WQ-6 Periodic groundwater monitoring will continue as part of the remedial action. If, based on a five-year review following soil excavation and initiation of the SVE/bioventing system operation, the groundwater plume is not stable or declining, an evaluation of additional groundwater treatment technologies will be conducted and implemented as needed.	Groundwater monitoring reports	Regional Board	Semi-annual groundwater monitoring Ongoing during implementation of the components of the RAP; every 5 years following soil excavation and initiation of the SVE/bioventing system			14.0
PDF H/WQ-7 The Shallow Zone and Gage aquifer will be returned to background levels for site-related benzene and naphthalene through natural biodegradation.	Groundwater monitoring reports	Regional Board	Semi-annual groundwater monitoring			14.0
5.6 Noise and Vibration						
PDF NOISE-1 The project contractor(s) will equip all construction machinery and equipment, fixed or mobile, with properly operating and maintained noise mufflers, consistent with manufacturers' standards.	Quarterly compliance reports prepared by the Project Contractor(s)	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			9.11

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
PDF NOISE-2 Engine idling from construction equipment such as excavators and haul trucks will be limited, to the extent feasible.	See PDF AQ-3	See PDF AQ-3	See PDF AQ-3			9.11
PDF NOISE-3 Expected hours for construction equipment use on-site will be 7:30 A.M. to 4:30 P.M. Monday through Friday, with hauling activities from 8:00 A.M. to 4:00 P.M.	Daily log of start and stop times maintained by construction supervisor	Regional Board	Continuously by Responsible Party during all construction and remediation phases			9.11
PDF NOISE-4 Project-related heavy truck traffic will be limited to specific routes.	Approved truck haul route map	City of Carson and Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			6.4; 9.11; 9.15
PDF NOISE-5 During excavation, acoustical attenuation blankets approximately 12 feet in height will be installed between the excavation site and adjacent occupied houses provided that this can be done without creating a safety hazard, to reduce community noise exposure from stationary sources of substantial noise, such as generators and water buffalos (trailer).	Property Specific Plans Acoustical Report prepared by Responsible Party	Regional Board	Continuously by Responsible Party during all construction and remediation phases Review of Acoustical Record by Regional Board; Inspections will be conducted periodically by the Regional Board			7.3; 8.2; 9.11
MM NOISE-1 Residents of properties shall be offered noise mitigation measures (e.g., hearing protection, sound proofing, white noise machines, etc.) acceptable to the residents or relocation for the duration of nearby active	Property Specific Plans	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			7.3; 8.2; 9.10.7; 9.11

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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remediation activities which may create ambient noise levels at their property in excess of 75 dBA, L_{eq} , for 20 days or less or in excess of 65 dBA, L_{eq} , for 21 days or longer. Based on the analyses presented in this EIR, this shall apply to residences located within approximately 90 feet of street trenching or 130 feet from an edge of residential remediation (i.e. a cluster of 4 to 8 homes); these distances may be revised by the Regional Board upon completion of additional monitoring and analysis which could be performed under the direction of an independent acoustician during the implementation of the RAP, or if the City of Carson agrees that the 75 dBA threshold is acceptable for the construction activities. Appendix F-8 includes 75 dBA and 65 dBA contours showing the impacted properties surrounding a hypothetical 8-property cluster.						7.3; 8.2; 9.10.7; 9.11
MM NOISE-2 To the maximum extent feasible, the project shall provide noise blanket/temporary noise barriers between the active areas and occupied residential units during street trenching.	Visual inspection by Regional Board	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			8.2; 8.10.7; 9.11
MM NOISE-3 The RP shall either retain the services of a qualified acoustical engineer with expertise in design of sound isolations to	Issuance of permit	Regional Board and City of Carson	Prior to issuance of a building permit for the SVE/bioventing system enclosure Inspections will be conducted no less than quarterly by the Regional Board; frequency			10.4; 10.4.6

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
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ensure the noise from the SVE/bioventing system (i.e., installation of building enclosure) complies with the City's exterior noise limits (55 dBA) or provide documentation (e.g. manufacturer's specification sheet for an off-the-shelf product) to the satisfaction of the City, as applicable, that the design will achieve the standard.			may be modified as warranted			10.4; 10.4.6
MM VIB-1 Residents of properties located within 60 feet of the use of jack hammers on private property shall be offered relocation for the duration of jack hammer use.	Property Specific Plans	Regional Board	Ongoing by Responsible Party during all construction and remediation phases			9.7.3; 9.12
5.7 Traffic and Circulation						
PDF TRAF-1 Prior to implementation of the RAP, the project contractor will submit a Haul Route Plan to the City of Carson for review and approval. The proposed haul route will be restricted to the City's designated truck route roadways and will be as shown in Figure 5.7-2 of this EIR.	Approved truck haul route map	City of Carson	Prior to issuance of any City permits			9.11; 9.15
PDF TRAF-2 Prior to implementation of construction activities specified in the RAP, the project contractor will prepare a Construction Traffic Management Plan that will be submitted to the City of Carson for review and approval prior to the start of any	Construction Traffic Management Plan, including a site-specific construction work site traffic control plan	City of Carson	Prior to construction			9.15; Appx E

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
<p>work. This plan will comprise site traffic control plans, including but not limited to such elements as the designation of haul routes for construction-related trucks, the sequencing of construction activities, any driveway turning movement restrictions, temporary traffic control devices, travel time restrictions for construction-related traffic, consolidation of construction truck deliveries, flag control, and designated staging and parking areas for workers and equipment.</p> <p>Because the construction activities occur within a public street right-of-way, the following design features would also apply:</p> <p>A site-specific construction work site traffic control plan will be prepared and submitted to the City of Carson for review and approval prior to the start of any construction work. This plan will include such elements as the location and hours of any necessary lane closures, local traffic detours (if any), protective devices and traffic controls (such as barricades, cones, flag persons, lights, warning beacons, temporary traffic signals, warning signs), the location and hours of any necessary access limitations for abutting properties, and provisions</p>						9.15 Appx E

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
<p>to maintain emergency access through construction work areas.</p> <p>Generally accepted construction safety standards will be followed to separate pedestrians from construction activity through such measures as protection barriers and signage indicating alternative pedestrian access routes where existing facilities would be affected. This would include the sidewalks around the perimeter of an active excavation site.</p> <p>Advance notice of planned construction activities will be provided to any affected residents and property owners in the vicinity of the construction site.</p> <p>The project contractor will coordinate with emergency service providers (police/sheriffs, fire, ambulance and paramedic services) to provide advance notice of ongoing construction activity and construction hours.</p>						9.15 Appx E
<p>PDF TRAF-3 One travel lane will be kept open at all times or detours will be provided during residential property remediation, well installation and street trenching phases.</p>	Construction Traffic Management Plan	City of Carson	During construction			9.15
<p>PDF TRAF-4 The project contractor will arrange for off-site parking within 5 miles of the site and will provide shuttle services to</p>	Instrument, such as lease agreement, verifying approval for off-site parking	Regional Board	Prior to construction			7.11; 9.15

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
				Initial	Date	
the site for approximately 50 percent of on-site workers.						7.11; 9.15

In addition to the above PDFs and MMs, the Expedited Implementation Option requires the following additional PDF relative to Air Quality in order to reduce impacts to a less-than-significant level:

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party	Cross-referenced in RDIP
5.1 Air Quality					
PDF AQ-13 Under the Expedited Implementation Option, the contractors shall require that two clusters under active remediation and restoration are separated by a minimum distance of 64 meters (210 feet) as measured from the closest site boundary of each cluster.	Property Specific Plans	Regional Board	Continuously by Responsible Party during all construction and remediation phases if/when the Expedited Implementation Option is implemented. Inspections will be conducted periodically by the Regional Board		Not planned at this time.

In addition to the above PDFs and MMs, Alternative 2 requires the following two additional MMs relative to Hazardous Materials in order to reduce impacts to a less-than-significant level:

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party	Cross-referenced in RDIP
5.4 Hazardous Materials					
MM HAZ-1 CARB certified Level 3 diesel particulate filter (DPF) shall be installed on construction equipment used during excavation activities. DPFs shall be required	The contractor(s) will install CARB Level 3 certified DPF on all on-site off-road equipment rated at 20 horsepower (hp) or higher	Regional Board	Continuously by Responsible Party during all construction and remediation phases Logs will be reviewed periodically by the Regional Board		Alternative 2 not the subject of the RDIP

Project Design Feature (PDF)/ Mitigation Measure (MM)	Method of Verification	Monitoring Agency	Timing of Verification	Verification/ Approval Party		Cross-referenced in RDIP
for construction equipment rated at 20 horsepower (hp) or higher and used on-site for 21-days or longer. Diesel particulate filters (DPFs) shall reduce off-road diesel particulate matter (DPM) emissions from each piece of off-road equipment by at least 85 percent. Equipment which needs servicing (breaks down) may be replaced with Tier 3 on a temporary basis if equipment with a DPF is not commercially available. If replacement equipment is not equipped with a DPF, documentation must be provided to demonstrate that no commercially available equipment with a DPF is available.	and anticipated to be used on-site for 21-days or longer Equipment which breaks down or malfunctions may be immediately replaced with non-DPF equipped Tier 3 equipment. Documentation that no commercially available DPF equipped replacement equipment is available. Documentation with estimated repair time of equipment and search for feasible replacement.		Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			Alternative 2 not the subject of the RDIP
MM HAZ-2 The applicant shall investigate the feasibility of requiring haul trucks to be model year 2010 and newer engines or trucks which have been retrofitted to meet model year 2010 emissions standards. Results of this feasibility investigation shall be documented and provided to the Regional Water Quality Control Board for approval prior to start of hauling activities.	Hauling contractor(s) will provide written record demonstrating availability or absence of 2010 or newer model year trucks in its fleet; Bid documents giving preference to year 2010 and newer haul trucks	Regional Board	Continuously by Responsible Party during all construction and remediation phases Inspections will be conducted no less than quarterly by the Regional Board; frequency may be modified as warranted			Alternative 2 not the subject of the RDIP

APPENDIX P
PROCEDURES FOR PAINT FILTER TEST

APPENDIX P
EPA METHOD 9095B

PAINT FILTER LIQUIDS TEST

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the presence of free liquids in a representative sample of waste.

1.2 The method is used to determine compliance with 40 CFR 264.314 and 265.314.

2.0 SUMMARY OF METHOD

2.1 A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-min test period, the material is deemed to contain free liquids.

3.0 INTERFERENCES

3.1 Filter media were observed to separate from the filter cone on exposure to alkaline materials. This development causes no problem if the sample is not disturbed.

3.2 Temperature can affect the test results if the test is performed below the freezing point of any liquid in the sample. Tests must be performed above the freezing point and can, but are not required to, exceed room temperature of 25 °C.

4.0 APPARATUS AND MATERIALS

4.1 Conical paint filter -- Mesh number 60 +/- 5% (fine meshed size). Available at local paint stores such as Sherwin-Williams and Glidden.

4.2 Glass funnel -- If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 in. of the filter mesh to protrude should be used to support the filter. The funnel should be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

4.3 Ring stand and ring, or tripod.

4.4 Graduated cylinder or beaker -- 100-mL.

5.0 REAGENTS

5.1 None.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

A 100-mL or 100-g representative sample is required for the test. If it is not possible to obtain a sample of 100 mL or 100 g that is sufficiently representative of the waste, the analyst may use larger size samples in multiples of 100 mL or 100 g, i.e., 200, 300, 400 mL or g. However, when larger samples are used, analysts shall divide the sample into 100-mL or 100-g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquids. If the sample is measured volumetrically, then it should lack major air spaces or voids.

7.0 PROCEDURE

7.1 Assemble test apparatus as shown in Figure 1.

7.2 Place sample in the filter. A funnel may be used to provide support for the paint filter. If the sample is of such light bulk density that it overflows the filter, then the sides of the filter can be extended upward by taping filter paper to the inside of the filter and above the mesh. Settling the sample into the paint filter may be facilitated by lightly tapping the side of the filter as it is being filled.

7.3 In order to assure uniformity and standardization of the test, material such as sorbent pads or pillows which do not conform to the shape of the paint filter should be cut into small pieces and poured into the filter. Sample size reduction may be accomplished by cutting the sorbent material with scissors, shears, a knife, or other such device so as to preserve as much of the original integrity of the sorbent fabric as possible. Sorbents enclosed in a fabric should be mixed with the resultant fabric pieces. The particles to be tested should be reduced smaller than 1 cm (i.e., should be capable of passing through a 9.5 mm (0.375 inch) standard sieve). Grinding sorbent materials should be avoided as this may destroy the integrity of the sorbent and produce many "fine particles" which would normally not be present.

7.4 For brittle materials larger than 1 cm that do not conform to the filter, light crushing to reduce oversize particles is acceptable if it is not practical to cut the material. Materials such as clay, silica gel, and some polymers may fall into this category.

7.5 Allow sample to drain for 5 min into the graduated cylinder.

7.6 If any portion of the test material collects in the graduated cylinder in the 5-min period, then the material is deemed to contain free liquids for purposes of 40 CFR 264.314 and 265.314.

8.0 QUALITY CONTROL

8.1 Duplicate samples should be analyzed on a routine basis.

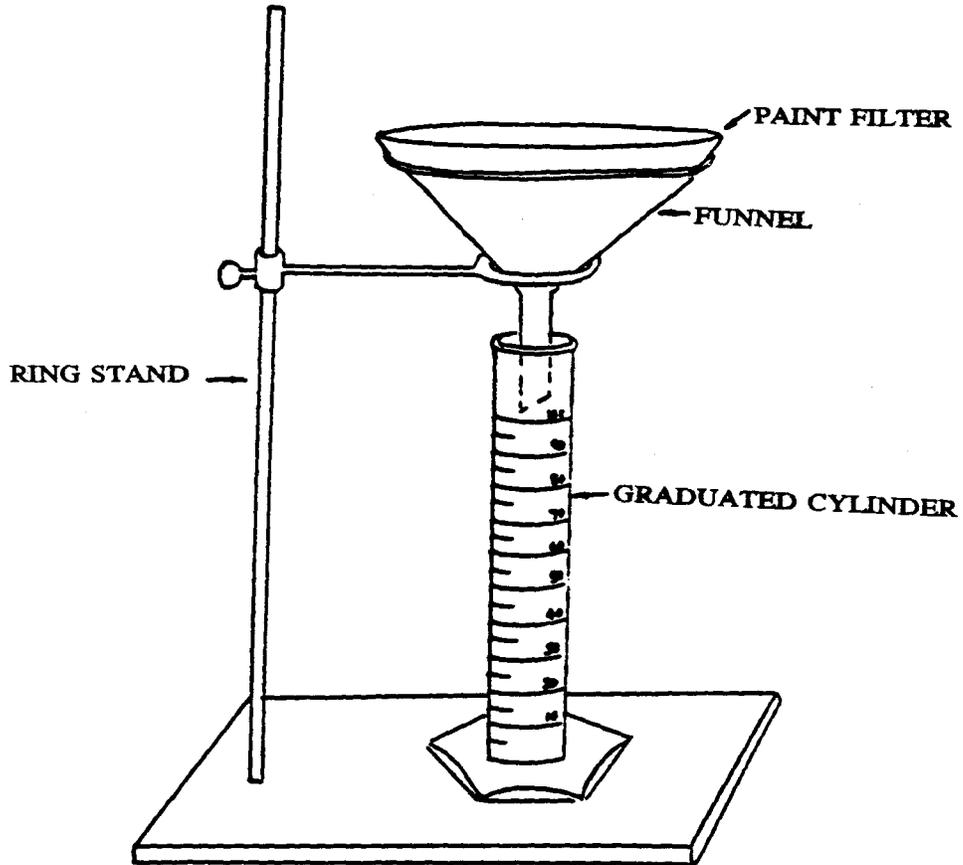
9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

10.1 None provided.

FIGURE 1
PAINT FILTER TEST APPARATUS



METHOD 9095B
PAINT FILTER LIQUIDS TEST

