Remedial Action Work Plan
Former Progress Dry Cleaners
8602 SW Hall Boulevard
Beaverton, Oregon

Prepared for
Oregon Department of
Environmental Quality

December 19, 2013
15656-01/Task 3

DRAFT

HARTCROWSER

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Prepared by
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DRAFT

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REMEDIAL ACTION WORK PLAN
FORMER PROGRESS DRY CLEANERS
8602 SW HALL BOULEVARD
BEAVERTON, OREGON

1.0 INTRODUCTION

This Remedial Action (RA) Work Plan (Work Plan) presents the scope of work for completing remedial action activities at the former Progress Dry Cleaners site at 8602 SW Hall Boulevard in Beaverton, Oregon (Figure 1). This Work Plan was prepared for the Oregon Department of Environmental Quality (DEQ) under Task 3 of Task Order 22-13-16.

1.1 Purpose

Previous environmental activities have detected chlorinated volatile organic compounds (VOCs) in soil and groundwater beneath and downgradient of the building formerly occupied by Progress Dry Cleaners. VOC contamination consists of tetrachloroethene (PCE) and its degradation products, trichloroethene (TCE), *cis*-1,2-dichloroethene (c-DCE), and vinyl chloride (VC). Data indicate that historical releases from dry cleaning equipment resulted in soil contamination beneath the building slab, which then acted as a source of shallow groundwater contamination. In addition, VOC intrusion into indoor air is a potential concern.

In 2007, Hart Crowser completed Intermediate Removal Measures (IRM) to address contamination and vapor intrusion concerns. A portion of the existing concrete slab was removed with the soil underneath excavated and disposed of. The excavation was backfilled and an active, sub-slab venting system was installed prior to the re-pouring of the concrete floor slab. A fan installed on the vent system draws VOCs to the outside atmosphere; this system, when on, is successful in mitigating vapor intrusion to DEQ acceptable risk levels.

The purpose of the RA activities presented in this Work Plan will be to address concerns that cracks present within the existing slab are creating a pathway for vapors to travel into the building creating a potential risks to human health from vapor intrusion. The RA will address this concern by installing a vapor barrier to mitigate this risk while at the same time being able to shut off the fan associated with the current vapor barrier, turning an active venting system into a passive venting system.

1.2 Scope of Work

The scope of work for the RA activities will consist of the following tasks:

- Cleaning and sealing cracks in the existing concrete slab;
- Installing a High Density Polyethylene (HDPE), or similar, vapor barrier fabric over most of the existing floor space;
- Pouring a two inch thick continuous concrete slab over the vapor barrier;
- Providing ramp access to the front and back doors from the existing grade to above the two inch lift; and
- Completing two rounds of air sampling to measure the effectiveness of the new vapor barrier.

These activities are discussed in further detail within this Work Plan. The history of the site and previous environmental activities are discussed in greater detail in our January 31, 2008, *IRM Completion Report* (Hart Crowser, 2008). This Work Plan will be implemented under Task 4 of Task Order 22-13-16.

1.3 Limitations

Work for this project will be performed in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities. A qualified construction contractor will be solicited and selected by Hart Crowser to complete the work. Pending approval by DEQ, the contractor will be responsible for the means and methods of the construction implementation. This Work Plan is intended for the exclusive use of the DEQ for specific application to the site. No other warranty, express or implied, is made.

2.0 REMEDIAL ACTION ACTIVITIES

This section describes field implementation of the planned RA. Activities will consist of preparation tasks, vapor barrier installation, concrete slab pouring, and access ramp construction. The proposed vapor barrier area is shown on Figure 2. Details of the vapor barrier construction are shown in Figure 3. Following these activities, two rounds of confirmation sampling will be conducted as discussed in Section 3.

2.1 Preparatory Activities

Several activities will be performed in preparation for RA activities. These are discussed below.

Health and Safety. Hart Crowser has prepared a site-specific Health and Safety Plan (HSP) in accordance with OSHA and Oregon Administrative Rules. This HSP is included in Appendix A, and will cover Hart Crowser employees for the remedial activities. All parties will be responsible for compliance with their health and safety plan, including use of appropriate personal protection equipment.

Subcontractor Solicitation. A construction services contractor will be required to complete the RA activities. We will prepare a bid solicitation document detailing the proposed RA activities. We will also conduct a site visit with potential bidders. At least three qualified firms will be solicited. Selection will likely be based on total cost, qualifications and experience, licensing, and/or schedule (as appropriate). The construction contractor will be under subcontract to Hart Crowser. Laboratory analyses will be performed by ESC Laboratory Sciences of Mt. Juliet, Tennessee, under their Price Agreement with the State of Oregon.

Site Access and Permits/Notifications. The property owner has agreed to provide site access for this work. The construction contractor will be responsible for obtaining any necessary permits associated with their performance of the RA activities.

Equipment Access. The site is a former retail dry cleaner. The back door is the largest on site at 3 feet 11 inches wide and 7 feet tall. If the construction contractor's equipment will not fit through that doorway then it will be necessary to disassemble the front door. The site has two front doors that are hinged on a common post in the center. If the center post were removed, the resulting opening would be 6 feet wide and 7 feet tall. Glass above the door could potentially also be removed, to create an opening 6 feet wide and 8 feet 10 inches tall. To the extent the front door is removed, it will require restoration to its previous condition at the end of the project.

Site Security and Temporary Facilities. During RA activities, access to the site should be limited to authorized personnel (i.e., subcontractors, Hart Crowser, DEQ, and the property owner's employees and subcontractors). The construction contractor will provide and place barricades, temporary fencing, caution tape, and/or warning signs appropriately to limit access to the building and adjacent walkways during RA implementation. A bathroom is available on site, so temporary sanitary facilities need not be provided.

Erosion and Dust Control. The RA activities will be completed indoors on a flat and paved surface, erosion is not anticipated. The construction contractor will be required, however, to meet all provisions of any permits. The concrete surface will require cleaning; it will be the responsibility of the contractor to operate in a manner that will minimize dust generation.

Ventilation. Because excavation work is occurring indoors, the construction contractor will need to provide ventilation to prevent the accumulation of equipment exhaust. The sub-slab fan shall be running during construction to prevent sub-surface VOCs from creating an unsafe work environment.

2.2 Vapor Barrier Installation

The planned vapor barrier coverage area consists of approximately 1,250 square feet as shown in Figure 2. The vapor barrier will cover most of the retail floor space with exception of the entrances at the front and back of the building. These areas were marked out in paint on the slab floor during a site visit and can be viewed in the Photograph Log in Appendix B. This section describes actions necessary to install the vapor barrier.

The surface of the existing concrete slab shall be thoroughly cleaned prior to vapor barrier installation. Various cracks are present in the slab, mostly along the edges of the retail space and around the concrete patch completed during IRM activities. Prior to installation of the vapor barrier fabric, all cracks identified will need to be filled using concrete sealing epoxy (or equivalent as approved by Hart Crowser).

Once the cracks have been sealed and epoxy cured, a 30 mil HDPE liner will be installed directly over the concrete. The liner will be installed, overlapped, and sealed according to manufacturer specifications. The liner will extend up the walls approximately 1.5 inches and be sealed to the walls where appropriate and as shown on Figure 2. The liner will be sealed to the floor along the eastern boundary and where the concrete slab does not rest against a wall (Figure 2). Details showing the location of each type of required seal are shown on Figure 3.

2.3 Concrete Slab

A 2-inch thick concrete slab will be poured over the HDPE vapor barrier liner in areas shown on Figure 2. The appropriate mix of concrete to minimize cracking will be determined by the construction contractor and approved by Hart Crowser. The concrete will be reinforced using welded wire sheets (estimated 10-gauge wire with 4-inch square spacing). Wire will be laid one inch above the

vapor barrier, in the center of the 2-inch slab, held in place using chairing or bar support methods to ensure proper placement. The slab will be smooth finished with reflective safety tape placed along open faced slab edges (edges not against a wall).

2.4 Access Ramps

Access ramps will be required at the front and rear entrances to the retail space. The ramps will comply with regulations set forth by the Americans with Disabilities Act (ADA). For the 2-inch lift, ramps will require a 24-inch run. The ramp placements are shown on Figure 2 and dimensions are shown on Figure 3. The ramps will begin and end flush with the adjacent grade and will be finished using antiskid material.

3.0 SAMPLING AND ANALYSIS PLAN

This section presents the field and sampling procedures and the analytical testing program Hart Crowser will use to assess the effectiveness of the vapor barrier.

Hart Crowser will collect two rounds of ambient air samples to determine if the vapor barrier is effective at mitigating exposure by vapor intrusion while the fan for the active sub-slab venting system is not operational. Confirmation sampling will consist of sampling for VOCs. Contaminants of concern (COCs) for this site are PCE, TCE, c-DCE, trans-DCE, and VC. Table 1 lists the estimated number of samples of each type.

The first round of air sampling will occur one month after completion of the RA activities (and subsequently one month after the fan has been shut off). Samples will be collected from the following locations:

- Two indoor air samples collected within the former Progress Cleaners building;
- One indoor air sample collected from the neighboring retail space; and
- One background air sample collected from outside the building (nearby and upwind).

Samples will be collected in laboratory-supplied Summa canisters and submitted for VOC analysis by EPA TO-15 on a standard turnaround time (10 days). Sample reporting limit goals and applicable RBCs for this project are listed in Table 1.

The first round of sampling will determine if the vapor barrier is effective at mitigating exposure to contaminants via vapor intrusion while the sub-slab vent fan is off. If the results from this sampling event are below the applicable risk-based concentrations (RBCs), then the fan will remain off. If concentrations are above the applicable RBCs, then the fan will be turned back on. A second round of air sampling will be completed one month after the first event. The sample number and location will be the same as the first sampling event.

4.0 REPORTING

After completion of RA activities, Hart Crowser will prepare a letter report to document the remedial activities. The RA Completion Report will be up to 6 pages of text (double-sided, single-spaced, and on recycled paper), excluding figures, graphics, tables, and supporting documentation. The letter report will be initially prepared as a draft and will be submitted to the DEQ via email. Upon receipt of DEQ's comments, we will issue the letter report in its final form.

The report will also include summary tables of the chemical results and figures showing the extent of the excavation and confirmation of soil sample locations. Photographs and copies of supporting documentation will be provided in the appendices.

5.0 REFERENCES

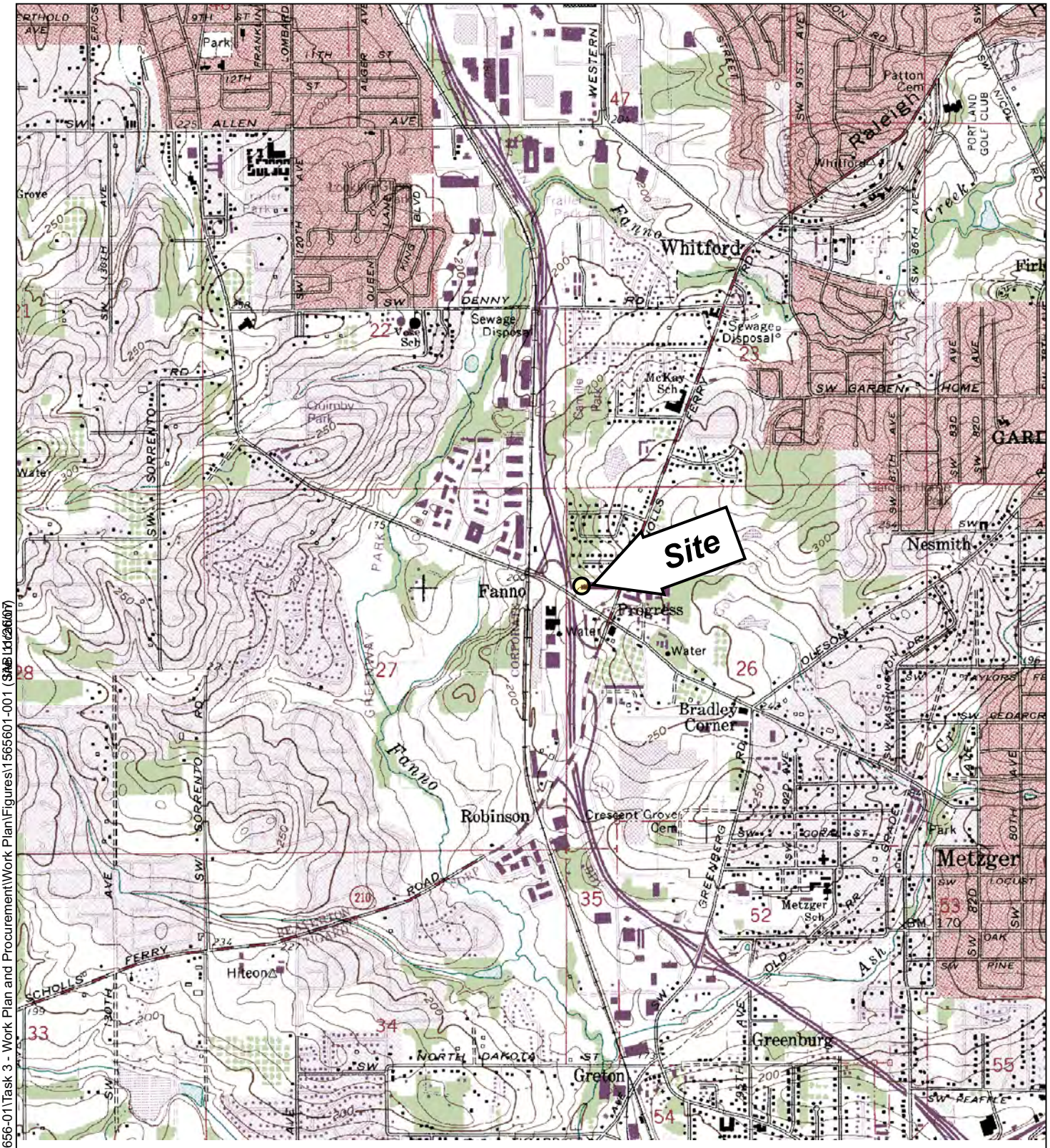
Hart Crowser, 2008. *Progress Cleaners IRM Completion Report.* January 31, 2008.

DEQ, 2012. *Risk-Based Concentrations for Individual Chemicals.* June 7, 2012.

Table 1 - Analytical Reporting Limit Goals and RBCs
Former Progress Dry Cleaners
Beaverton, Oregon

Method	Analyte	Reporting Limit Goal TO-15 [µg/m^3]	DEQ Risk Based Concentration Air Inhalation by Occupational Workers [µg/m^3]
VOCs (EPA TO-15)	PCE	1.4	47
	TCE	1.1	3.0
	c-DCE	0.79	--
	t-DCE	0.79	260
	VC	0.51	2.8

Notes:
DEQ Risk Based Concentration Revision June 2012
Only contaminants of concern at this project site are listed.
µg/m3 = micrograms per cubic meter
VOCs = Volatile Organic Compounds
PCE = tetrachloroethene
TCE = trichloroethene
DCE = dichloroethene
VC = vinyl chloride
-- = No risk based concentration available



0 2,000 4,000

Scale in Feet

N

Source: Base map prepared from the USGS 7.5-minute quadrangle of Beaverton, Oregon, photorevised 1984.

Former Progress Dry Cleaners
8602 SW Hall Boulevard, Beaverton, Oregon

Site Location Map

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Figure
1

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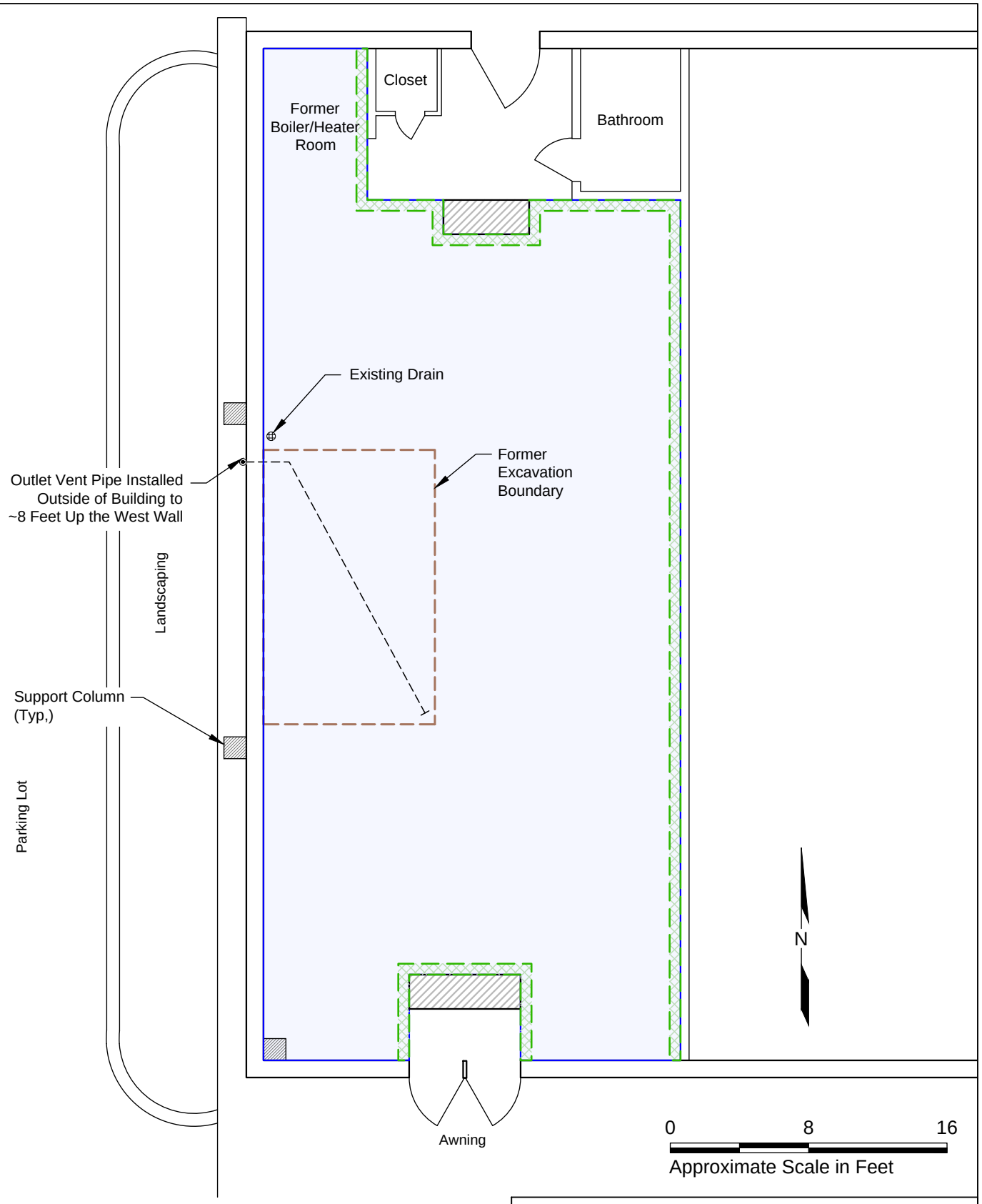

Concrete Slab Boundary which will be Sealed at the Ground Surface Along the Wall

Ramp (Gradient of 1"/12"), Width Varies, See Detail

Vapor Barrier Boundary

Source: On site reconnaissance by Hart Crowser personnel.

Former Progress Dry Cleaners
8602 SW Hall Boulevard, Beaverton, Oregon

Site Plan

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Figure
2

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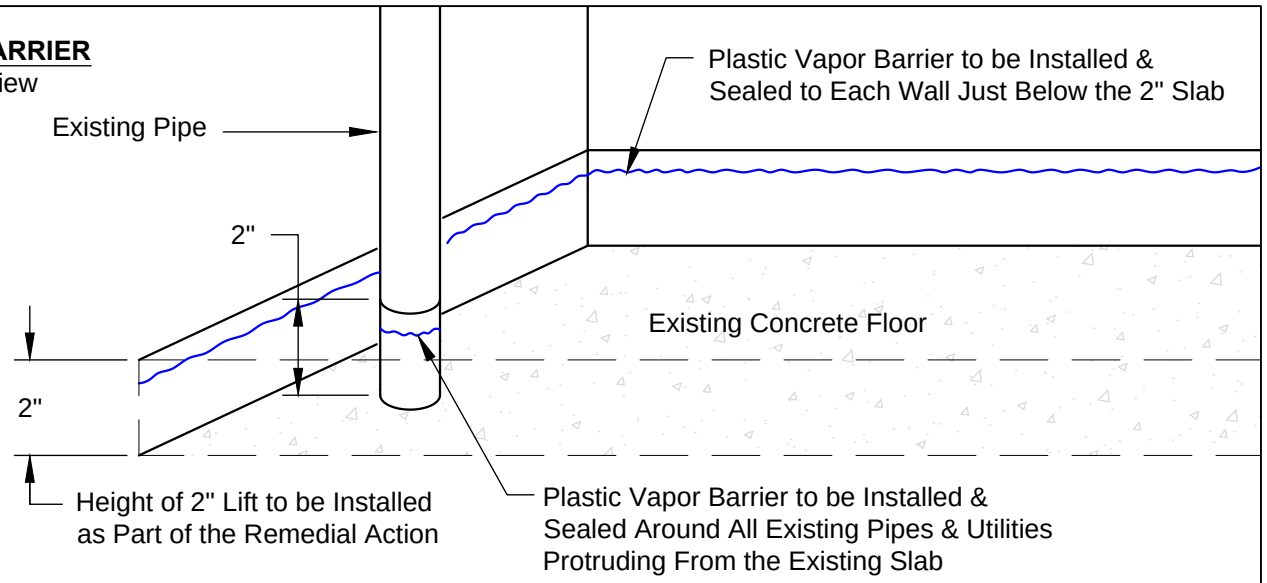
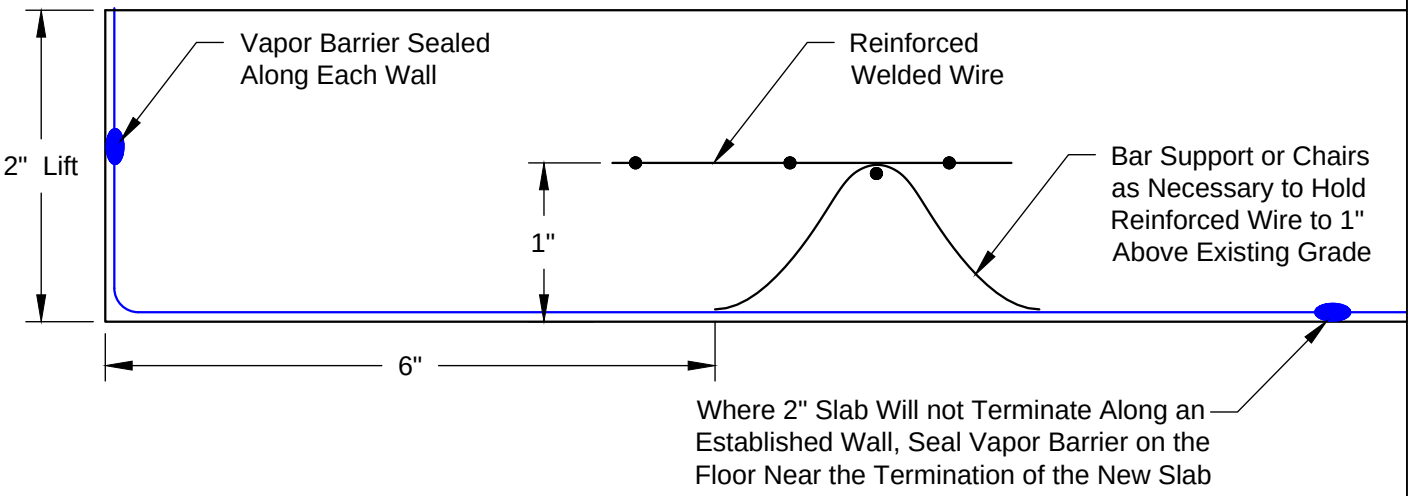
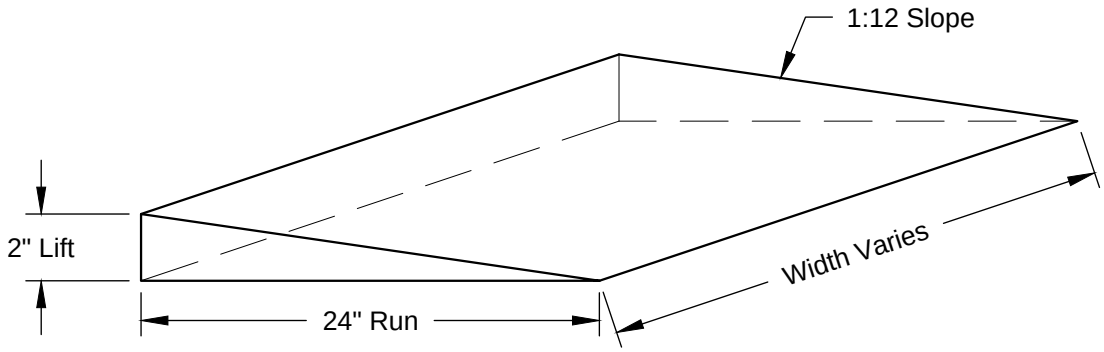
VAPOR BARRIER
Isometric View



VAPOR BARRIER
Elevation View



RAMP DEATIL
Isometric View



Former Progress Dry Cleaners
8602 SW Hall Boulevard, Beaverton, Oregon

Vapor Barrier Installation Details

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HARTCROWSER

Figure
3

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APPENDIX A
HEALTH AND SAFETY PLAN

APPENDIX A - HEALTH AND SAFETY PLAN
FORMER PROGRESS DRY CLEANERS
BEAVERTON, OREGON

EMERGENCY CONTINGENCY INFORMATION

SITE LOCATION	Former Progress Dry Cleaners 8602 SW Hall Boulevard Beaverton, Oregon
NEAREST HOSPITALS	Providence St. Vincent Medical Center 9205 SW Barnes Road Portland, Oregon 97225 (503) 216-1234 The route to the hospital is depicted on Figure HSP-1.
EMERGENCY RESPONDERS	Police Department.....911 Fire Department.....911 Ambulance.....911
EMERGENCY CONTACTS	Hart Crowser, Portland Office.....(503) 620-7284 National Response Center.....(800) 424-8802 Oregon Accident Response System.....(800) 452-0311 Environmental Response Team.....(503) 283-1150 Poison Control Center.....(503) 494-8968 Chemtrec.....(800) 424-9300 Joe Westersund (Office).....(503) 229-6240
	Give the following information: **Where You Are.** Address, cross streets, or landmarks. **Phone Number** you are calling from. **What Happened.** Type of injury, accident. **How many persons** need help. **What is being done** for the victim(s). **You hang up last.** Let whomever you called hang up first.

CORPORATE HEALTH AND SAFETY PLAN

The attached General Health and Safety Plan (HSP), including Attachments A and B of the General HSP, covers each of the 11 required plan elements as specified in OSHA 1910.120. The reader is advised to thoroughly review the entire plan. When used together with the Hart Crowser Corporate HSP, this site-specific plan meets all applicable regulatory requirements.

SITE HEALTH AND SAFETY PLAN SUMMARY

SITE NAME: Former Progress Dry Cleaners.

LOCATION: See Figure HSP-1.

PROPOSED DATES OF ACTIVITIES: January or February 2014.

TYPE OF FACILITY: Former dry cleaner.

LAND USE OF AREA SURROUNDING FACILITY: Retail and residential.

SITE ACTIVITIES: Vapor barrier installation, concrete pouring.

POTENTIAL SITE CONTAMINANTS: Chlorinated solvents, including tetrachloroethene (PCE) as well as trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE), and vinyl chloride.

ROUTES OF ENTRY: Inhalation of dust and volatile organic compounds (VOCs).

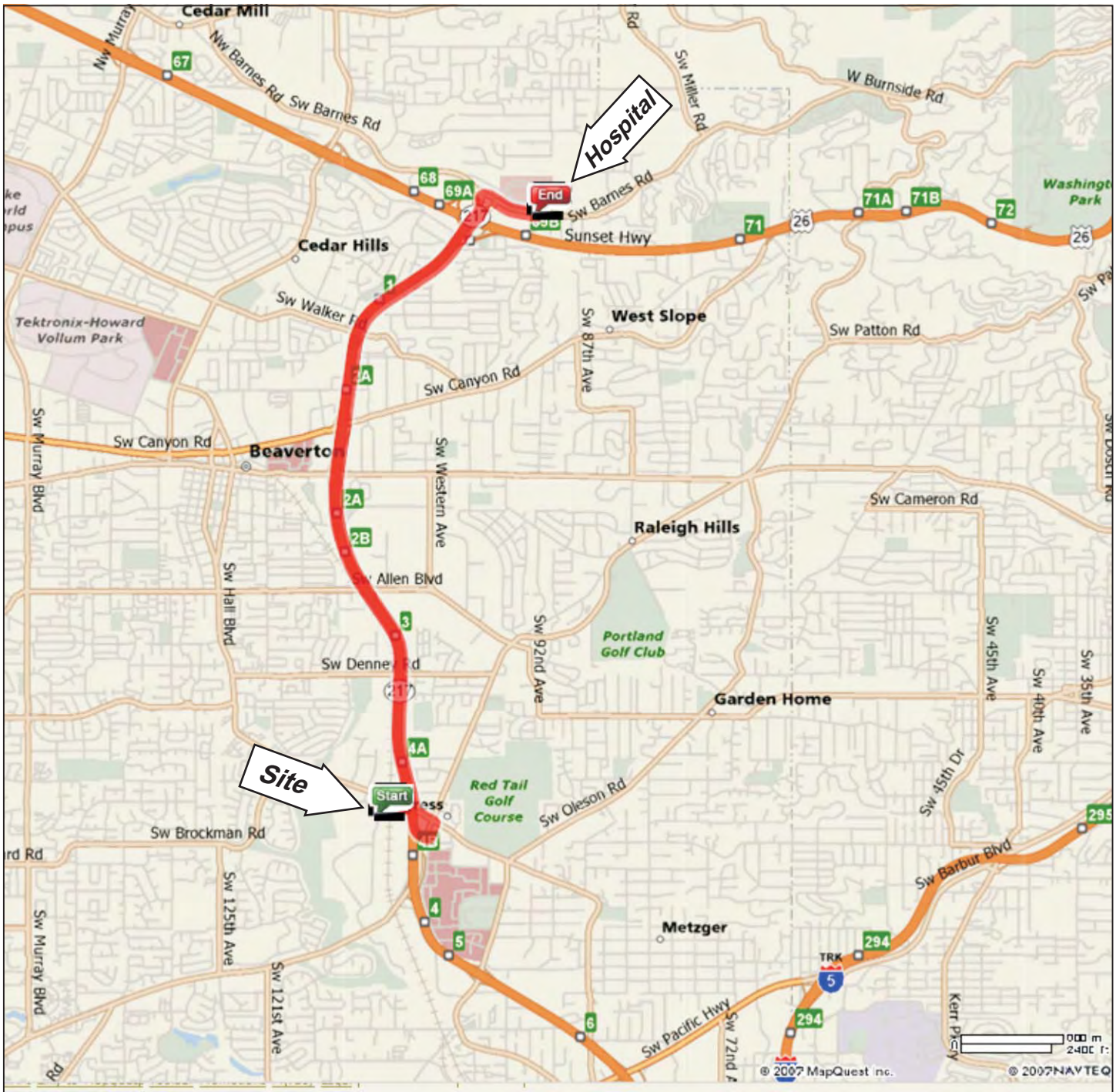
POTENTIAL PROTECTIVE MEASURES: Engineering controls, safety glasses, safety boots, hardhat, gloves, protective clothing, and respirators.

MONITORING EQUIPMENT: Photoionization detector (PID) with 10.2 eV lamp.

Chain of Command

The chain of command for Health and Safety (HS) in this project involves the following individuals:

CORPORATE HS MANAGER: Mike Ehlebracht
PROJECT MANAGER: Rick Ernst, RG
HS OFFICER: Chris Martin, PE
FIELD HS MANAGER: Jason Miles



Providence St. Vincent Medical Center

9205 SW Barnes Road
Portland, Oregon
(503) 216-1234

1: Start out going EAST on SW FARMINGTON RD / OR-10 / FARMINGTON HWY toward SW BETTS AVE. Continue to follow OR-10. 0.5 miles

2: Merge onto OR-217 N via the ramp on the LEFT toward SUNSET HWY. 1.8 miles

3: Take the BARNES RD. exit. 0.1 miles

4: Go STRAIGHT toward BARNES RD. EAST. <0.1 miles

5: Turn SLIGHT RIGHT onto SW BARNES RD. 0.2 miles

6: End at 9205 Sw Barnes Rd
Portland, OR 97225-6603, US

N

Source: Mapquest.

Former Progress Dry Cleaners
8602 SW Hall Boulevard, Beaverton, Oregon

Route to Hospital Map

15656-01/Task 3 12/13

HARTCROWSER

Figure
HSP-1

JAB 8/8/07

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Record of Health and Safety Communication

PROJECT NAME: Former Progress Dry Cleaners	PROJECT NUMBER: 15656-01/Task 3
SITE CONTAMINANTS (see Attachment B):	

PPE REQUIREMENTS (check all that apply):

__Safety glasses
__Safety boots
__Hard hat
__Gloves (specify)
__Clothing (specify)
__Respirator (specify)
__Other (specify)

The following personnel have reviewed a copy of the Summary Information regarding the site, the General Health and Safety Plan, and Attachments A and B. By signing below, these personnel indicate that they have read the plan, including all referenced information, and that they understand the requirements which are detailed for this project.

PRINTED NAME	SIGNATURE	PROJECT DUTIES	DATE

General Health and Safety Plan
Hart Crowser, Inc.
Portland, Oregon

December 2013

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ATTACHMENTS

ATTACHMENT A TABLES

GENERAL HEALTH AND SAFETY PLAN

1.0 INTRODUCTION

1.1 Purpose and Regulatory Compliance

This site-specific Health and Safety Plan (H&S Plan) addresses procedures to minimize the risk of chemical exposures, physical accidents to on-site workers, and environmental contamination. The H&S Plan covers each of the 11 required plan elements as specified in OSHA 1910.120. To help the reader find this required information, Table 1 shows the major sections where each of these elements is discussed. Additional supporting information is presented throughout this plan and the attachments. The reader is advised to thoroughly review the entire plan. When used together with the Hart Crowser Corporate H&S Plan, this site-specific plan meets all applicable regulatory requirements.

1.2 Distribution and Approval

This H&S Plan will be made available to all Hart Crowser personnel involved in fieldwork on this project. It will also be made available to subcontractors and other non-employees who may need to work on the site. For non-employees, it must be made clear that the plan represents minimum safety procedures and that they are responsible for their own safety while present on the site. The plan has been approved by the Hart Crowser Health and Safety (H&S) Manager. By signing the documentation form provided with this plan, project workers also certify their approval and agreement to comply with the plan.

1.3 Chain of Command

The chain of command for Health and Safety in Hart Crowser projects involves the following individuals: the Corporate H&S Manager, the Project Manager, the Project H&S Officer, and the Field H&S Manager. In some cases, based on the complexity of the project and level of staffing, the project and field related H&S positions may be combined. If the specified Field H&S Manager is unable to be present on the site during work activities, the Project H&S Officer will serve as the on-site safety officer or, alternatively, another Field H&S Manager will be designated.

Corporate H&S Manager: The Hart Crowser Corporate H&S Manager has overall responsibility for preparation and modification of this H&S Plan. In the event that health and safety issues arise during site operations, he will attempt to resolve them in discussion with the appropriate members of the project team.

Project Manager: The Project Manager is charged with overall responsibility for the successful outcome of the project. The Project Manager, in consultation with the Corporate H&S Manager, makes final decisions regarding questions concerning the implementation of the Site H&S Plan. The Project Manager may delegate this authority and responsibility to the Project and/or Field H&S Managers.

Project H&S Officer: The Project H&S Officer has overall responsibility for health and safety on this project. This individual ensures that everyone working on this project understands this H&S Plan. The project manager will maintain liaison with the Hart Crowser Project Manager so that all relevant safety and health issues are communicated effectively to project workers.

Field H&S Manager: The Field H&S Manager is responsible for implementing this H&S Plan in the field. This individual also observes subcontractors to verify that they are following these procedures, at a minimum. The Field H&S Manager will also assure that proper protective equipment is available and used in the correct manner, decontamination activities are carried out properly, and that employees have knowledge of the local emergency medical system should it be necessary.

1.4 Site Activities

A summary of site activities is attached to the front of this H&S Plan. A more detailed discussion of site activities is presented in Attachment A.

2.0 HAZARD EVALUATION AND CONTROL MEASURES

2.1 Toxicity of Chemicals of Concern

The chemicals of concern which may be present at this site are presented in Attachment B. Pertinent toxicological properties of these chemicals are discussed in this attachment.

2.2 Potential Exposure Routes

Inhalation. Exposure could occur via this route if: (1) volatile chemicals become airborne during site activities, especially upon exposure to open air, warm temperatures, and sunlight; or (2) dust is generated during the construction activities. Air monitoring and control measures specified in Attachment A will minimize the possibility for inhalation of site contaminants.

2.3 Air Monitoring and Action Levels

Air monitoring will be conducted to determine possible hazardous conditions and to confirm the adequacy of personal protection equipment. The results of the air monitoring will be used as the basis for specifying personal protective equipment and determining the need to upgrade protective measures. Please see Attachment A for site-specific air monitoring procedures and Table A-2 for air monitoring action levels.

2.4 Fire and Explosion Hazard

Potentially flammable or explosive conditions are not expected to be encountered in this project. To address emergency situations, however, an ABC dry chemical fire extinguisher will be available at the site.

2.5 Cold Stress

The field activities will take place indoors and are anticipated to be completed in January 2014. Heat and cold stress should not occur, although since activities will take place during winter weather condition, cold stress is discussed below.

Hypothermia. Hypothermia results from abnormal cooling of the core body temperature. It is caused by exposure to a cold environment, and wind-chill as well as wetness or water immersion can play a significant role. The following section discusses signs and symptoms as well as treatment for hypothermia.

Signs of Hypothermia. Typical warning signs of hypothermia include fatigue, weakness, incoordination, apathy, and drowsiness. A confused state is a key symptom of hypothermia. Shivering and pallor are usually absent, and the face may appear puffy and pink. Body temperatures below 90°F require immediate treatment to restore temperature to normal.

Treatment of Hypothermia. Current medical practice recommends slow rewarming as treatment for hypothermia, followed by professional medical care. This can be accomplished by moving the person into a sheltered area and wrapping with blankets in a warm room. In emergency situations where body temperature falls below 90°F and heated shelter is not available, use a sleeping bag, blankets and/or body heat from another individual to help restore normal body temperature.

2.6 Other Physical Hazards

Trips/Falls. As with all fieldwork sites, caution will be exercised to prevent slips on rain slick surfaces, stepping on sharp objects, etc. Work will not be performed on elevated platforms. The work zone will be kept clear of unnecessary equipment and obstacles to minimize the chance of a trip or fall.

Pinch Points. Heavy equipment with moving parts and joints will be required to complete the field activities at the site. Care will be taken by the field staff and equipment operators to remain in constant contact to avoid accidents.

Confined Spaces. Confined space entry is not anticipated for this project and will not be performed without specific approval of the Project Manager and H&S Manager.

Noise. Appropriate hearing protection (ear muffs or ear plugs) will be used if high noise levels are generated. When employees work around construction equipment, hearing protection should be worn.

2.7 Hazard Analysis and Applicable Safety Procedures by Task

The work tasks and associated hazards which may be anticipated during this project are described in Attachment A and presented in Table A-1.

3.0 PROTECTIVE EQUIPMENT

Table 2 presents a summary of minimum personnel protection requirements based on the potential route of contact and the potential contaminants. These requirements are classified in the designated Level D and C categories as discussed below. In this plan, Level C is presented as a modified protection level, incorporating respiratory protection only where required by site conditions and air monitoring. Situations requiring Level A or B protection are not presently anticipated for this project. Should they occur, work will stop and the H&S Plan will be amended as required prior to resuming work.

3.1 Level D Activities

Workers performing general site activities where skin contact with free product or contaminated materials is not likely and inhalation risks are not expected will wear regular work clothes, or regular or polyethylene coated Tyvek® coveralls, eye protection, hard hat (as required), nitrile or neoprene coated work gloves (as required), and safety boots.

3.2 Level C Activities

Workers performing site activities where skin contact with free product or contaminated materials is possible will wear chemically-resistant gloves (nitrile, neoprene, or other appropriate outer gloves, and surgical inner gloves). Workers will use face shields or goggles as necessary to avoid splashes in the eyes or face. When performing activities where skin exposure is possible, workers will use polyethylene-coated Tyvek® or other chemically-resistant suits or rain gear. Workers will make sure the protective clothing and gloves are suitable for the types of chemicals which may be encountered on the site.

When performing activities in which inhalation of chemical vapors or contaminated dusts is a concern, workers will wear full-face air-purifying respirators (APR) as specified in Table 2. If respirators are used, workers will change cartridges on a daily basis, at minimum. Cartridges should be changed more frequently if vapors are detected inside the respirator or other symptoms of breakthrough are noted (irritation, dizziness, breathing difficulty, etc.).

4.0 SAFETY EQUIPMENT LIST

The following Safety Equipment must be available on the site:

- Fire Extinguisher - 10 lb ABC CO_2
- First Aid Kit
- Eye Wash Kit
- Half-face APR - Organic Vapor/Particulate Filter Cartridge (MSA GMD or GMD-H or equivalent)
- Hard Hat
- Tyvek Coveralls/Polycoated Tyvek® Coveralls
- Steel-Toed Boots
- Nitrile Gloves

Additional equipment may also be present depending on-site activities may include:

- Photoionization Detector (PID)
- MSA 361 or equivalent

- Cell phone
- Latex Boot Covers

5.0 EXCLUSION AREAS

Wherever migration of chemicals from the work area is a possibility, or as otherwise required by regulations or client specifications, site control will be maintained by establishing clearly identified work zones. These will include the exclusion zone, contaminant reduction zone, and support zone, as discussed below. Figure 1 presents a layout of these zones.

5.1 Exclusion Zone

Exclusion zones will be established around each hazardous waste activity location. Only persons with appropriate training and authorization from the Field H&S Manager will enter this perimeter while work is being conducted there. Traffic cones, barrier tapes, and warning signs (or equivalent measures) will be used as necessary to establish the zone boundary. Caution tape or signs will be posted in plain view of approach from either direction.

5.2 Contamination Reduction Zone

A contamination reduction zone will be established just outside each temporary exclusion zone to decontaminate equipment and personnel as discussed below. This zone will be clearly delineated from the exclusion zone and support zone using the means noted above. Care will be taken to prevent the spread of contamination from this area. Spent decontamination fluids and used protective clothing will be disposed in a manner consistent with the toxicity of the chemicals of concern. The drums, after labeling, will be moved to central storage location(s) on the site pending disposal.

5.3 Support Zone

A support zone will be established outside the contamination reduction area to stage clean equipment, don protective clothing, take rest breaks, etc. This zone will be clearly delineated from the contaminant reduction zone using the means noted above.

6.0 MINIMIZATION OF CONTAMINATION

In order to make the work zone procedure function effectively, the amount of equipment and number of personnel allowed in contaminated areas must be

minimized. Workers will not perform any practice that increases the probability of hand-to-mouth transfer of contaminated materials. Workers will use plastic drop cloths and equipment covers where appropriate. Eating, drinking, chewing gum, smoking, or using smokeless tobacco are forbidden in the exclusion zone.

7.0 DECONTAMINATION

Decontamination is necessary to limit the migration of contaminants from the work zone(s) onto the site or from the site into the surrounding environment. Equipment and personnel decontamination are discussed in the following sections, and the following types of equipment will be available to perform these activities:

- Scrub Brushes - Long Handled
- Spray Rinse Applicator
- Plastic Garbage Bags
- 5-Gallon Container Alkaline Decon Solution

7.1 Equipment Decontamination

Proper decontamination (decon) procedures will be employed to ensure that contaminated materials do not contact individuals and are not spread from the site. These procedures will also ensure that contaminated materials generated during site operations and during decontamination are managed appropriately.

All non-disposable equipment will be decontaminated in the contamination reduction zone. Prior to demobilization, all contaminated portions of heavy equipment should be thoroughly cleaned. Since site activities do not require workers to excavate or have equipment come into direct contact with contaminated media, this may not be necessary.

7.2 Personnel Decontamination

Personnel working in exclusion zones will perform a mini-decontamination in the contamination reduction zone prior to changing respirator cartridges (if worn), taking rest breaks, drinking liquids, etc. They will decontaminate fully before eating lunch or leaving the site. The following describes the procedures for mini-decon and full decon activities.

Mini-decon procedure:

1. In the contamination reduction zone, wash and rinse outer gloves and boots in portable buckets.
2. Inspect protective outer suit, if worn, for severe contamination, rips or tears.
3. If suit is highly contaminated or damaged, full decontamination as outlined below will be performed.
4. Remove outer gloves. Inspect and discard if ripped or damaged.
5. Remove respirator (if worn) and clean off sweat and dirt using premoistened towelettes. Deposit used cartridges in plastic bag.
6. Replace cartridges and outer gloves, and return to work.

Full decontamination procedure:

1. In the contamination reduction zone, wash and rinse outer gloves and boots in portable buckets.
2. Remove outer gloves and protective suit and deposit in labeled container for disposable clothing.
3. Remove respirator, and place used respirator cartridges (if end of day) in container for disposable clothing.
4. If end of day, thoroughly clean respirator and store properly.
5. Remove inner gloves and discard into labeled container for disposable clothing.
6. Remove work boots without touching exposed surfaces, and put on street shoes. Put boots in individual plastic bag for later reuse.
7. Immediately wash hands and face using clean water and soap.
8. Shower as soon after work shift as possible.

8.0 DISPOSAL OF CONTAMINATED MATERIALS

All disposable sampling equipment and materials will be placed inside of two 10 mil polyurethane bags or other appropriate containers and placed in storage as directed by the client. If storage is unavailable on the site, or if other hazardous wastes will not be gathered and collected as part of this effort, then disposable supplies will be removed from the site with the personnel.

9.0 SITE SECURITY AND CONTROL

Site security and control will be the responsibility of the Project Manager. Any security or control problems will be reported to appropriate authorities.

10.0 SPILL CONTAINMENT

Sources of bulk chemicals subject to spillage are not expected to be encountered in this project. Accordingly, a spill containment plan is not required for this project.

11.0 EMERGENCY RESPONSE PLAN

The Hart Crowser Emergency Response Plan outlines the steps necessary for appropriate response to emergency situations. The following paragraphs summarize the key Emergency Response Plan procedures for Hart Crowser projects.

11.1 Plan Content and Review

The principal hazards addressed by the Emergency Response Plan include the following: fire or explosion, medical emergencies, uncontrolled contaminant release, and situations such as the presence of chemicals above exposure guidelines or inadequate protective equipment for the hazards present. However, in order to help anticipate potential emergency situations, field personnel shall always exercise caution and look for signs of potentially hazardous situations, including the following as examples:

- Visible or odorous chemical contaminants;
- Drums or other containers;
- General physical hazards (traffic, moving equipment, sharp or hot surfaces, slippery or uneven surfaces, etc.);
- Possible sources of radiation;
- Live electrical wires or equipment;
- Underground pipelines or cables; and
- Poisonous plants or dangerous animals.

These and other potential problems should be anticipated and steps taken to avert problems before they occur.

The Emergency Response Plan shall be reviewed and rehearsed, as necessary, during the on-site health and safety briefing. This ensures that all personnel will know what their duties shall be if an actual emergency occurs.

11.2 Plan Implementation

The Field H&S Manager shall act as the lead individual in the event of an emergency situation and evaluate the situation. He/she will determine the need to implement the emergency procedures, in concert with other resource personnel including client representatives, the Project Manager, and the Corporate H&S Manager. Other on-site field personnel will assist the Manager as required during the emergency.

In the event that the Emergency Response Plan is implemented, the Field H&S Manager or designee is responsible for alerting all personnel at the affected area by use of a signal device (such as a hand-held air horn) or visual or shouted instructions, as appropriate.

Emergency evacuation routes and safe assembly areas shall be identified and discussed in the on-site health and safety briefing, as appropriate.

11.3 Emergency Response Contacts

Site personnel must know whom to notify in the event of Emergency Response Plan implementation. The following information will be readily available at the site in a location known to all workers:

- Emergency Telephone Numbers -- see list at the beginning of this plan;
- Route to Nearest Hospital -- see list and route map at the beginning of this plan;
- Site Descriptions -- see the description at the beginning of this plan; and
- If a significant environmental release of contaminants occurs, the federal, state, and local agencies noted in this plan must be immediately notified. If the release to the environment includes navigable waters also notify:

  National Response Center at (800) 424-8802
  Oregon Accident Response System at (800) 452-0311

In the event of an emergency situation requiring implementation of the Emergency Response Plan (fire or explosion, serious injury, tank leak or other material spill, presence of chemicals above exposure guidelines, inadequate

personnel protection equipment for the hazards present, etc.), cease all work immediately. Offer whatever assistance is required, but do not enter work areas without proper protective equipment. Workers not needed for immediate assistance will decontaminate per normal procedures (if possible) and leave the work area, pending approval by the Field Safety Manager for re-start of work. The following general emergency response safety procedures should be followed.

11.4 Fires

Hart Crowser, Inc., personnel will attempt to control only very small fires. If an explosion appears likely, evacuate the area immediately. If a fire occurs which cannot be controlled with the 10-pound ABC fire extinguisher located in the field equipment, then immediate intervention by the local fire department or other appropriate agency is imperative. Use these steps:

- Evacuate the area to a previously agreed upon, upwind location;
- Contact fire agency identified in the site specific plan; and
- Inform Project Manager or Field H&S Manager of the situation.

11.5 Medical Emergencies

Contact the agency listed in the site-specific plan if a medical emergency occurs. If a worker leaves the site to seek medical attention, another worker should accompany the patient. When in doubt about the severity of an accident or exposure, always seek medical attention as a conservative approach. Notify the Project Manager of the outcome of the medical evaluation as soon as possible. For minor cuts and bruises, an on-site first aid kit will be available.

- If a worker is seriously injured or becomes ill or unconscious, immediately request assistance from the emergency contact sources noted in the site-specific plan. Do not attempt to assist an unconscious worker in an untested or known dangerous confined space without applying confined space entry procedures or without using proper respiratory protection, such as a self contained breathing apparatus (SCBA).
- In the event that a seriously injured person is also heavily contaminated, use clean plastic sheeting to prevent contamination of the inside of the emergency vehicle. Less severely injured individuals may also have their protective clothing carefully removed or cut off before transport to the hospital.

11.6 Uncontrolled Contaminant Release

In the event of a tank rupture or other material spill, attempt to stop and contain the flow of material using absorbents, booms, dirt, or other appropriate material. Prevent migration of liquids into streams or other bodies of water by building trenches, dikes, etc. Drum the material for proper disposal or contact a spill removal firm for material cleanup and disposal, as required. Observe all fire and explosion precautions while dealing with spills.

11.7 Potentially High Chemical Exposure Situations/Inadequate Protective Equipment

In some emergency situations, workers may encounter localized work area where exposure to previously unidentified chemicals could occur. A similar hazard includes the situation where chemicals are present above permissible exposure levels and/or above the levels suitable for the personnel protective equipment at hand on-site. If these situations occur, immediately stop work and evacuate the work area. Do not reenter the area until appropriate help is available and/or appropriate personnel protective equipment is obtained. Do not attempt to rescue a downed worker from such areas without employing confined space entry procedures. Professional emergency response assistance (fire department, HAZMAT team, etc.) may be necessary to deal with this type of situation.

11.8 Other Emergencies

Depending on the type of project, other emergency scenarios may be important at a specific work site. These scenarios will be considered as part of the site-specific plan and will be discussed during the on-site safety briefing, as required.

11.9 Plan Documentation and Review

The Field H&S Manager will notify the Project H&S Manager as soon as possible after the emergency situation has been stabilized. The Project Manager or H&S Manager will notify the appropriate client contacts, and regulatory agencies, if applicable. If an individual is injured, the Field H&S Manager or designate will file a detailed Accident Report with the Corporate H&S Manager within 24 hours.

The Project Manager and the Field, Project, and Corporate H&S Managers will critique the emergency response action following the event. The results of the critique will be used in follow-up training exercises to improve the Emergency Response Plan.

12.0 MEDICAL SURVEILLANCE

A medical surveillance program has been instituted for Hart Crowser employees having exposure to hazardous substances. Exams are given before assignment, annually thereafter, and upon termination. Content of exams is determined by the Occupational Medicine physician in compliance with applicable regulations and is detailed in the Corporate H&S Plan.

Each team member will have undergone a physical examination as noted above in order to verify that he/she is physically able to use protective equipment, work in hot environments, and not be predisposed to occupationally-induced disease. Additional exams may be needed to evaluate specific exposures or unexplainable illness.

13.0 TRAINING REQUIREMENTS

Hart Crowser employees who perform site work must understand potential health and safety hazards. All employees potentially exposed to hazardous substances, health hazards, or safety hazards will have completed 40 hours of off-site initial hazardous materials health and safety training or will possess equivalent training by past experience. They will also have a minimum of three days of actual field experience under the direct supervision of a trained supervisor. All employees will have in their possession evidence of completing this training. Employees will also complete annual refresher, supervisor, and other training as required by applicable regulations.

Prior to the start of each workday, the Field H&S Manager will review applicable health and safety issues with all employees and subcontractors working on the site, as appropriate. These briefings will also review the work to be accomplished, with an opportunity for questions to be asked.

14.0 REPORTING, REPORTS, AND DOCUMENTATION

Hart Crowser staff and subcontractors on this site will sign the Record of H&S Communication document, which will be kept on the site during work activities and recorded in the project files. The Field Health and Safety Report will also be completed daily by the Hart Crowser Field Representative. In the event that accidents or injuries occur during site work, the Health and Safety Manager and the client shall be immediately notified.

Table 1 - Location of Required Health and Safety Plan Elements
General Health and Safety Plan

Required Health and Safety Plan Elements*	Location in this Health and Safety Plan (Section number shown)
(A) Safety and hazard analysis	2.0 Hazard Evaluation and Control Measures (see Attachments A and B)
(B) Training	13.0 Training Requirements
(C) Personal protective equipment	3.0 Protective Equipment, 4.0 Safety Equipment List
(D) Medical surveillance	12.0 Medical Surveillance
(E) Monitoring program	2.3 Air Monitoring and Action Levels
(F) Site control	Attached Health and Safety Plan Summary, 5.0 Exclusion Areas, 9.0 Site Security and Control
(G) Decontamination	7.0 Decontamination
(H) Emergency response plan	11.0 Emergency Response Plan
(I) Confined space entry	2.6 Confined Spaces
(J) Spill containment	10.0 Spill Containment

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Note:

*Required H&S Plan elements are numbered according to their listing in OSHA 1910.120.

Table 2 - Minimum Personnel Protection Level Requirements
General Health and Safety Plan

Potential Route of Contact	Required Protection Level	Safety Glasses	Hard Hat	Safety Boots	Tyvek	Poly Tyvek	Nitrile Gloves	Neoprene Gloves	Half Face Respirator	Full Face Respirator
None Anticipated	Level D (a)	X	b	X						
Minor Skin Contact Possible	Level D (a)	X	b	X	X		X	X		
Skin Contamination Possible	Level C (c)	d	b	e		f	g	g		
Inhalation Possible	Level C (c)	d	b	e					h,i	h,j

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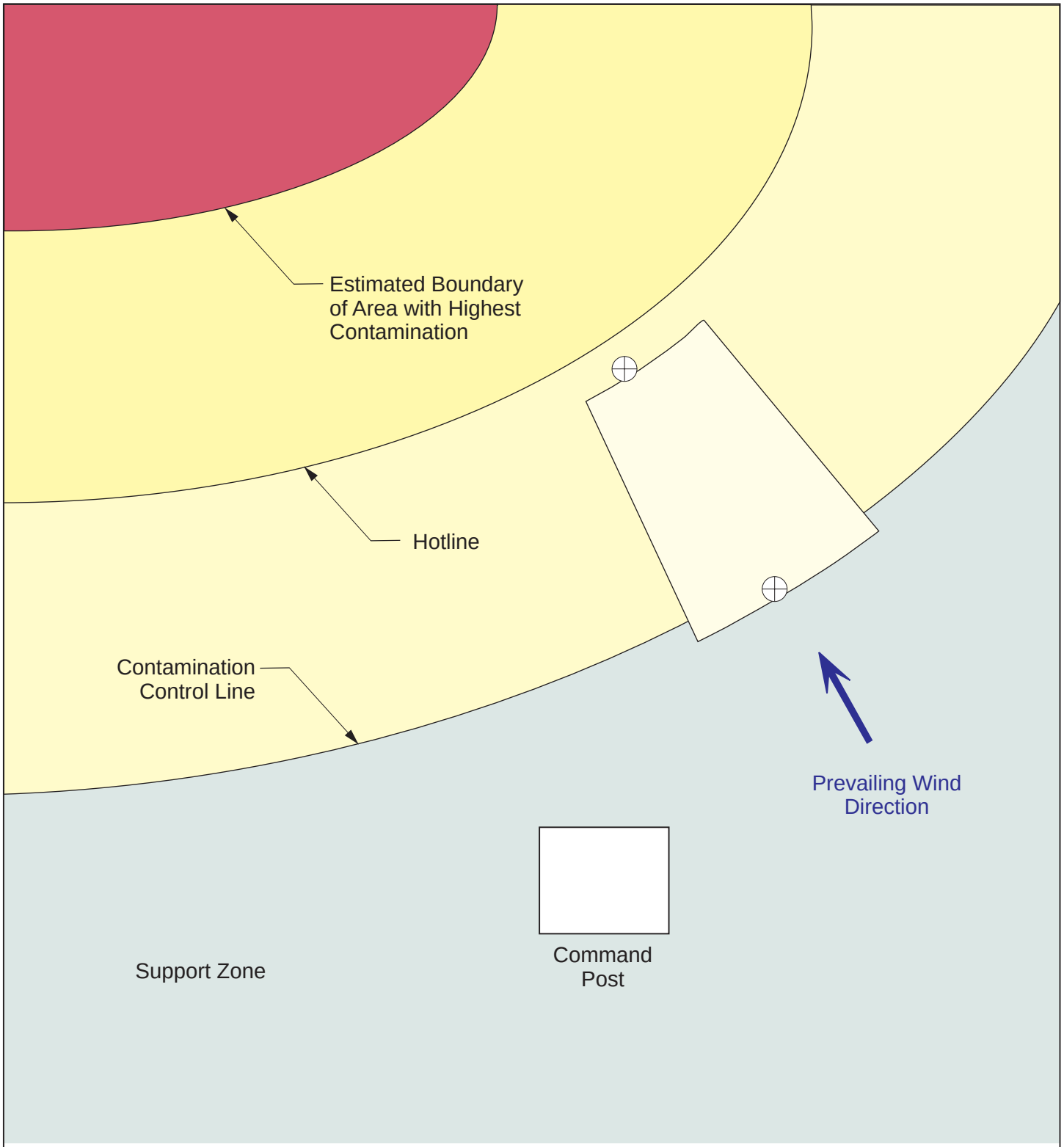
Notes:

a. Level D protection required when the atmsophere contains no known hazards and work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.
b. Hard hat is required where risk of striking overhead objects exists.
c. Level C protection required when the atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect any exposed skin; the types of air contaminants have been identified, concentrations measured, and appropriate respirator cartridges are available; and all air-purifying respirator criteria are met.
d. Goggles, face-shield, or full-face respirator required.
e. Chemical-resistant synthetic boots required.
f. Use polyethylene-coated Tyvek or equivalent as required by site chemicals. Some chemicals may require Saranex-coated Tyvek or similar materials; consult appropriate references as required.
g. Use nitrile or neoprene as required by the chemicals. Some chemicals may require Viton or other types of materials; consult appropriate references as required.
h. Appropriate respirator cartridges include: organic vapor (MSA GMA or equivalent), combination (MSA GMA-H or equivalent), and others as required by the contaminants.
i. Half-face organic cartridge respirator required when PID readings range from 5-10 units above background, or as indicated by other site data or information.
j. Full-face organic cartridge respirator required when PID readings range from 10 to 100 units above background, whenever respirators and safety glasses are necessary, and/or eye irritation occurs.



Notes: 1.) Area dimensions are not to scale. 2.) Distances between points may vary.
3.) Decontamination facilities are located in the contamination reduction zone.

- Access Control Points
- Contamination Reduction Corridor
- Contamination Reduction Zone
- Exclusion Zone

Former Progress Dry Cleaners
8602 SW Hall Boulevard, Beaverton, Oregon

Site Work Zones

15656-01/Task 3 12/13

HARTCROWSER

Figure
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Table A-1 - Hazard Analysis by Task
General Health and Safety Plan: Attachment A

Work Task	Hazards	Protective Measures
Vapor Barrier Installation and Concrete Slab Pouring Activities	Skin contact; noise; vapor, dust, and exhaust inhalation, trips/falls, and ceiling clearances.	Level C PPE (as necessary), hearing protection, visual and air monitoring, and caution around moving equipment.

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Notes:

a. Protection levels are defined in Table 2.
b. Protection levels may require upgrade based on site monitoring or other information.

Table A-2 - Air Monitoring Action Levels
General Health and Safety Plan: Attachment A

Monitoring Device	Result	Action Required	Notes
PID	0-5 units above background 5-100 units above background >100 units above background	Use half-face respirator Use full-face respirator Stop work; contact supervisor	a,b a,b a,b
Visual (e)	Slight dust	Use half-face respirator; begin instituting dust suppression measures.	b,c
	Moderate dust	Use full-face respirator; institute dust suppression measures.	b,c
	Very dusty conditions	Stop work; contact supervisor.	d

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Notes:

a. Use appropriate lamp and calibrate unit.
b. Air-purifying respirators must be used only when use criteria are met and when appropriate cartridges are available.
c. Dust suppression, i.e. watering, should be started from upwind direction.
d. Proper instigation of dust suppression earlier should avoid the possibility of this action.
e. Based on previous use of dust monitoring equipment, visual monitoring for dust generation would be conservative and adequate for this project.

ATTACHMENT B
HEALTH AND SAFETY PLAN

1.0 TOXICITY OF CHEMICALS OF CONCERN

This attachment presents the information regarding chemical constituents, hereafter referred to as "chemicals of concern," that may be encountered at the site.

1.1 Chemicals of Concern

Based on site information gathered to date, the primary chemicals present at the site are chlorinated (halogenated) hydrocarbons including tetrachloroethene (PCE) and its degradation products.

1.2 Toxicity Information

Pertinent toxicological properties of these chemicals are discussed below. This information generally covers potential toxic effects, which may occur from relatively significant acute and/or chronic exposures, and is not meant to indicate such effects will occur from the planned site activities. In general, the chemicals, which may be encountered at this site, are not expected to be present at concentrations that could produce significant exposures. The types of planned work activities should also limit potential exposures at this site. Furthermore, appropriate protective and monitoring equipment will be used as discussed below to further minimize any exposures that might occur.

Standards for occupational exposures to these chemicals are included where available. Site exposures are generally expected to be of short duration and well below the level of any of these exposure limits. These standards are presented below:

PEL Permissible exposure limit.

TWA Time-weighted average exposure limit for any 8-hour work shift of a 40-hour work week.

STEL Short term exposure limit expressed as a 15-minute time-weighted average and not to be exceeded at any time during a workday.

C Ceiling exposure limit not to be exceeded at any time during a workday.

Chlorinated (Halogenated) Hydrocarbons

Chlorinated hydrocarbons are members of a generic class of solvent materials typically composed of halogenated aliphatic hydrocarbons. Most often these are chlorine-, bromine-, or iodine-substituted methanes, ethanes, or ethylenes. Common chlorinated solvents include carbon tetrachloride, chloroform, methylene chloride, trichloroethene (TCE), and PCE. As a group, chlorinated solvents cause skin irritation, dermatitis, and defatting. They are irritating to the eyes and respiratory tract, and some may cause skin burns on prolonged contact. They are often narcotic and can cause confusion and irritability. Acute and chronic exposure can result in cardiac, central nervous system, and liver damage. Production of fatty liver and necrosis is characteristic of many chlorinated hydrocarbons, and some are also reported to be carcinogens. A PEL-TWA has not been established for this group of compounds. Individual compounds have assigned PEL-TWAs, including vinyl chloride (1 ppm), carbon tetrachloride (10 ppm), methylene chloride (25 ppm), TCE (100 ppm), and PCE (100 ppm).

APPENDIX B
PHOTOGRAPHS

Photograph 1 - Storefront of former dry cleaner (with Cricket Wireless sign).

Photograph 2 – Interior of the former dry cleaners looking towards the back of the building. Note the concrete patch on the left side of the building (lighter concrete).

Photograph 3 – Additional photograph of the interior space to receive a vapor barrier.

Photograph 4 – Close up image of typical gap between the current floor slab and the wall to be sealed prior to vapor barrier installation. Photograph shows a utility pipe that will require to be sealed during vapor barrier installation. Towards the center of the photograph (next to small red paint) is an existing power conduit which is currently capped. This will need to be extended two inches and capped flush with the new concrete slab.

Photograph 5 – Photograph of the front doorway. The white line delineates the boundary of the vapor barrier. The vapor barrier will not go up to the doorway. The hatch marked region shows where a small ramp will be installed.

Photograph 6 - Photograph of the back doorway. The white line delineates the boundary of the vapor barrier. The vapor barrier will not go up to the doorway. The hatch marked region shows where a small ramp will be installed.