

**Contaminated Media  
Management Plan (CMMP)  
For the Balch Consolidation Conduit  
(BCC) Shafts and Pipelines Project  
BES Project No. E05510**

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Coordinated Site Analysis**

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# Acronyms and Abbreviations

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BCC	Balch Consolidation Conduit Shafts and Pipelines Project #E05510
BES	Bureau of Environmental Services
bgs	below the ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulation</i>
City	City of Portland
CMMP	Contaminated Media Management Plan
CSO	combined sewer overflow
DEQ	Oregon Department of Environmental Quality
EOC	environmental oversight consultant
EPA	U.S. Environmental Protection Agency
FOC	feature of concern
HHMSL	Human Health Medium Specific Screening Levels
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mg/L	milligram per liter
NPDES	National Pollutant Discharge Elimination System
OAR	<i>Oregon Administrative Rule</i>
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
ppm	parts per million
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
SCL	significant contribution level
TCLP	toxicity characteristic leaching procedure
UST	underground storage tank
VOC	volatile organic compound

# 1.0 Introduction

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## SECTION 1

This section provides an introduction to the Contaminated Media Management Program for the City of Portland (City) Balch Consolidation Conduit (BCC), Shafts and Pipelines Project.

### 1.1 Purpose

The Contaminated Media Management Program has been designed to facilitate the efficient construction of the BCC Project and to properly manage contaminated media encountered during construction.

This Contaminated Media Management Plan (CMMP) presents the processes and procedures that will be used to handle contaminated media (soil and groundwater) encountered during construction. The CMMP will be submitted to the Oregon Department of Environmental Quality (DEQ) to obtain agency concurrence that contaminated media will be handled in a manner that is protective of human health and the environment and does not exacerbate existing environmental conditions.

### 1.2 Objectives

The City of Portland Bureau of Environmental Services (BES) has established the following objectives for the BCC Contaminated Media Management Program:

- Minimize the cost to the BCC Project in addressing contaminated media issues during the design and construction;
- Minimize decisions related to contaminated media management required during construction;
- Address long-term environmental risk to the City in a manner consistent with City policies and philosophies;
- Manage contaminated media in a manner that is protective of human health and the environment;
- Protect the BCC Project construction workers from adverse exposure to hazardous substances during construction by identifying, to the extent feasible, location, concentrations, and quantities of contaminated media likely to be encountered during construction activities;
- Prevent exacerbation of existing environmental conditions and hindrance of potential future remediation activities.

At the conclusion of BCC Project construction, BES will seek DEQ concurrence that the BCC Project has been designed and constructed in a manner that has:

- Prevented exacerbation of existing environmental conditions;

- Not hindered potential future remediation activities by other parties;
- Properly managed contaminated media encountered during design and construction.

This CMMP defines the processes, criteria, and methodologies that will be used to manage contaminated media encountered during construction in order to achieve the above objectives and obtain the desired concurrence from DEQ.

### 1.3 Organization

Subsequent sections of this CMMP are organized as follows:

- **Section 2** provides background information on the BCC Project and identifies soil and groundwater conditions in the project area.
- **Section 3** describes the proposed approach to designating and managing contaminated soil encountered during construction.
- **Section 4** describes the proposed approach to designating and managing contaminated groundwater encountered during construction.
- **Section 5** describes contaminated media handling, monitoring, and documentation practices to be performed during construction.
- **Section 6** describes contingency plans for unanticipated conditions encountered during construction.
- **Section 7** addresses project reporting procedures.

Tables and figures show the locations and depths of anticipated contaminated soil and groundwater in the project area.

Appendix A defines contaminated media and presents general contaminated media management practices that will be implemented during construction of the BCC Project.

Appendix B presents the sampling and analysis plan for documentation sample collection to be performed during construction.

See *Geotechnical Baseline Report* (under separate cover) for geologic profile (interpretive cross-section) for BCC Project.

## 2.0 Project Description

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### SECTION 2

This section provides background information on the BCC Project and identifies soil and groundwater conditions in the project area.

#### 2.1 Background

The Project is needed to comply with the mandated Amended Stipulated and Final Order (ASFO) administered by the Oregon Department of Environmental Quality. The ASFO requires that the City construct facilities to control Combined Sewer Overflows (CSO) to the Willamette River to a level commensurate with 4 winter overflows annually and one summer overflow every three years. Control of 16 outfalls along the west side of the Willamette River must be completed by December 2006, and full control to the stipulated level by December 2011.

The BCC Project will convey combined sewer overflows from the Balch drainage basin in Northwest Portland. The area is bounded by the Willamette River to the north and the Tualatin Mountains to the south.

##### 2.1.1 Project Overview

The BCC Project is located in the NW industrial neighborhood (Guilds Lake area) of the City of Portland, Multnomah County, Oregon (see Figure 1). The Project area is bounded by the Willamette River to the north and the Tualatin Mountains to the south. The BCC Project is part of the overall Willamette Combined Sewer Overflow (Willamette CSO) Project. The Willamette CSO project is intended to reduce the frequency and volume of combined sewage overflows to the Willamette River from drainage areas in Portland, Oregon. The BCC Project will convey combined sanitary and storm water from the Balch Drainage Basin in northwest Portland to the recently completed Nicolai drop shaft on the West Side CSO tunnel. The Project will include over 6,900 feet of 84-inch sewer main. New pipelines connecting to the BCC Project (Industrial 29 line) are 36 and 54 inches in diameter and total approximately 1,440 feet.

##### Microtunnels and Shafts

The major elements of the project are approximately 6,900 feet of 84-inch microtunneled pipeline and six associated shafts. The pipeline will collect and intercept flows mid-basin, and convey the flows to the Nicolai drop shaft. The microtunneling will be completed in five segments between the six shafts. The segments will range in length from 1,135 feet to 1,685 feet. The microtunnels will range from 24 to 74 feet beneath the ground surface, crossing beneath NW Yeon Avenue (U.S. Highway 30), NW Nicolai Street, and active railroad tracks operated by Burlington Northern & Santa Fe Railroad.

The shafts will be constructed to launch and receive the microtunneling machine. The inside diameter of the launching or “jacking” shafts will be approximately 36 feet and receiving shafts will have an inside diameter of approximately 18 feet.

The Industrial 29 line will include approximately 1,110 feet of 54-inch microtunneled pipeline, extending along NW 29<sup>th</sup> Avenue from NW Industrial Street to NW Roosevelt Street. This microtunnel will range from 16 to 20 feet beneath the ground surface.

### **Pipelines and Diversion Structures**

The project also includes the construction of new pipelines and the modification of existing facilities to convey sanitary and storm flows to the BCC Project 84-inch pipeline. These facilities include modification to the existing Yeon Pump Station, construction and modification of three consolidation/diversion structures and new installation of 36-inch diameter pipelines by open-cut excavation methods along NW Roosevelt Street that will tie into the 54-inch microtunneled pipeline as part of the Industrial 29 line.

The project includes the construction of three consolidation/diversion (CD) structures. These structures will consolidate the flows from a number of pipelines and divert these flows into the BCC Project pipeline. The CD structures are located near the intersections of NW 29<sup>th</sup> Avenue and 31<sup>st</sup> Avenue, NW 29<sup>th</sup> Avenue and Industrial Street, and NW 29<sup>th</sup> Avenue and Nicolai Street.

## **2.1.2 Project Area Current and Historical Landuse**

There are two dominant types of land use in the Balch basin. Industrial properties are common in the lower “Guilds Lake” region and single family residential homes are common on the hillside in the south of the basin. A number of properties within the industrial area are known to contain or are suspected to contain hazardous wastes or substances. Several of these sites are listed with the Oregon DEQ as either suspected or confirmed releases to the environment.

## **2.2 Soil and Groundwater Conditions**

### **2.2.1 Geologic Setting**

The greater Portland-Vancouver metropolitan area lies within a structural depression called the Portland Basin, formed by folding and faulting of a sequence of lava flows of the Columbia River Basalt Group (CRBG). The CRBG flowed into the area between 17 and 6 million years ago, during the middle Miocene Epoch of geologic time. The Tualatin Mountains (also known as the Portland Hills or the “West Hills”) form the uplifted southwest margin of the Portland basin.

The Willamette River joins the Columbia River within the basin, and with their tributaries, they have contributed an extensive sedimentary fill which overlies the CRBG.

The Sandy River mudstone (SRM) overlies the CRBG throughout much of the basin, and typically consists of 200 to 400 feet of mudstone, siltstone, claystone, and sandstone beds with minor gravel deposits within ancient stream channels. The SRM is overlain by 100 to 350 feet of well consolidated and locally cemented sandstone and conglomerate with minor fine-grained sediments of the Troutdale Formation.

Near the end of the last great ice age, between 15,500 and 13,000 years ago, a lobe of the continental ice sheet blocked the mouth of the Clark Fork River in western Montana, which then formed an immense glacial lake called Lake Missoula. The lake grew until its depth was sufficient to breach the ice dam, allowing the entire massive lake to empty catastrophically. Once the lake had emptied, the ice sheet again dammed the Clark Fork Valley and the lake began to refill. This process was repeated 40 or more times, probably at intervals of several decades.

During each short lived episode, Lake Missoula floodwaters washed across the Idaho panhandle and southeastern Washington before entering the Columbia River channel. The flooding then continued down the Columbia River and through the Columbia River Gorge. When the floodwater emerged from the gorge, it spread out over the Portland basin and deposited a tremendous load of sediment. Boulders, cobbles, and gravel were deposited nearest the mouth of the gorge and along the main channel of the Columbia. Great cobble-gravel bars reached westward across the basin, grading to thick blankets of micaceous sand. Unconsolidated gravel deposits from the flood deposits range from as little as 30 to more than 200 feet thick. The last flood episode mantled underlying deposits with micaceous sand in the Portland area.

Following the last of the catastrophic floods, sea level rose hundreds of feet and the deep Pleistocene channels of the lower Columbia and Willamette Rivers were filled with silt and sand alluvium. Much of the channel-fill sediment is reworked and re-deposited catastrophic flood sediment. As the old eroded channel filled and river levels rose, broad floodplains developed along the lower Willamette River underlain by poorly consolidated silt and fine sand, often rich with organic material.

Not long after the first Oregon pioneers settled in the Guilds Lake area, artificial fill began to become an important geologic unit in the area. The fills are composed of various materials compacted to varying degrees of density. Beginning in 1905 the southern portions of Guilds Lake were filled with soil (Portland Hills Silt and Troutdale Formation) sluiced from the West Hills. In the 1920s the remainder of the lake was hydraulically filled to elevations above river level with sand and silt dredged from the Willamette River. Dredged sand was also used extensively along the Willamette shoreline to raise and level the ground for the development of port facilities. Pockets of wood waste have been discovered locally (mostly between the river and NW Front Avenue) on former lumber mill sites. Incinerated municipal garbage was land filled in the southeastern portion of the former lake from before 1909 until the late 1940s.

## Ground Characterization

The BCC exploration program encountered variable subsurface conditions in the project area. Both natural soil and manmade fill deposits are present. Based on the materials encountered, their depositional origin and engineering characteristics, the materials have been grouped into the following nine units:

- Landfill Debris,
- Dredged Sand Fill,
- Sluiced Fill,
- Other Fill,
- Guilds Lake Alluvium,
- Stratified Sand/Silt Alluvium,
- Gravel Alluvium,
- Troutdale Formation, and
- Sandy River Mudstone.

A detailed description of the materials encountered in each of the above soil units is presented in the BCC Project *Geotechnical and Environmental Data Report*.

### 2.2.2 Groundwater Conditions

Groundwater was encountered at varying depths along the BCC Project alignment. Table 1 presents the groundwater elevations as they were recorded in January and August-September of 2008. Groundwater levels should be expected to fluctuate seasonally.

**Table 1. Groundwater Elevations at Shaft Locations**

Shaft Designation	Ground Surface Elevation in feet	Groundwater Surface Elevation in feet	
		January 2008	Aug-Sep 2008
Former A – 29 <sup>th</sup> /31st	32	17.3	17.1
B	32	18.8	18.9
C	35	13.6	15.4
D	42	ND	18.3
L	48	ND	11.3
M	30	ND	ND

Note: “ND”= No Data.

In general, groundwater occurs unconfined within the BCC Project area, and the Gravel Alluvium aquifer is believed to be regional in extent. However, a previous investigation (Northwest Geological Services, Inc., 1989, Marathon U.S. Realties, Inc. Guilds Lake Phase 2 Remedial Investigation) identified two aquifers beneath the former landfill site. The former landfill lies beneath the BCC Project alignment between Shafts C and D. Here, the landfill mass overlies fine-grained soils of the Guilds Lake Alluvium unit which acts as an aquitard. The two identified aquifers are a perched aquifer in the fill and a confined aquifer in the underlying gravel alluvium unit that lies below the Guilds Lake alluvium.

## 3.0 Contaminated Soil Designation and Management

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### SECTION 3

This section describes the proposed approach to designating and managing contaminated soil encountered during construction.

Reviews of environmental sampling data performed by Shannon and Wilson indicate that contaminated soil and groundwater are present at areas within the alignment corridor.

### 3.1 Definition of Contaminated Soil

For the purposes of the BCC Project Contaminated Media Management Program, contaminated soil is defined as soil with concentrations of hazardous substances greater than background conditions. Hazardous substances are defined by DEQ rules (OAR Chapter 340, Division 122) as:

- Substances defined as hazardous substances in Section 101 (14) of the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- Oil, including gasoline, fuel oil, diesel, lubricating oil, or other petroleum products

Common hazardous substances include petroleum hydrocarbons and substances presented in the United States Environmental Protection Agency (EPA) Region 6 HHMSLs and Oregon Department of Environmental Quality (DEQ) RBCs Table (i.e., volatile organic compounds [VOCs], metals, pesticides, and polycyclic aromatic hydrocarbons [PAHs]).

The background concentration of organic hazardous substances is assumed to be zero. Thus, any excavation spoils generated as a result of the BCC Project work that have detectable concentrations of organic hazardous substances (for example, petroleum hydrocarbons, VOCs, chlorinated solvents, pesticides, polychlorinated biphenyls [PCBs], and PAHs) are considered contaminated media.

The background concentrations of inorganic hazardous substances (for example, metals) are site-specific and are established for each site through the use of DEQ-approved procedures. The background concentration for arsenic is of particular interest because background arsenic concentrations in the Willamette Valley typically are greater than those associated with acceptable risk in generic exposure scenarios. The range of arsenic background concentrations found in the Portland area is 5 to 15 parts per million (mg/kg), as compared to the EPA compilation Screening Level value of 1.6 mg/kg for arsenic in industrial soil. As a result, using an arsenic background concentration of 7

mg/kg is effective for differentiating between levels of arsenic likely to be naturally occurring and those associated with anthropogenic sources (which might require soil management consistent with contaminated media). A summary of the screening levels used for identifying soil contaminated by metals is provided in Table 1B.

In summary, the determination of contaminated soil is not based on regulatory cleanup criteria, but rather the presence of hazardous substances. If hazardous substances, particularly metals, are present at concentrations greater than background concentrations in the soil or if organic hazardous substances are detected at any concentration, the soil is considered contaminated.

## **3.2 Identification and Assessment of Contaminated Soil in Project Area**

A major goal of this Contaminated Media Management Plan is to minimize decisions required during construction. Contaminated soil was identified and assessed in each area along the project alignment during the design phase of this Project. Soil sampling was performed by Shannon and Wilson. The investigation occurred in phases from April 2007 through August 2008. Results of this sampling effort are found in the *Geotechnical and Environmental Data Report* (Shannon and Wilson). All sampling was conducted in general accordance with the Project *Sampling and Analysis Plan* (Shannon and Wilson 2007).

### **3.2.1 Environmental Data Report**

The initial task of identifying and assessing contaminated soil in the project area consisted of a review of existing environmental information. The purpose of this review was to identify features of concern (FOCs). FOCs are current or historical features associated with known or suspected releases of hazardous substances to the environment, such as gas stations, leaking underground storage tanks, dry cleaners, machine shops, wood-treating facilities, substations, chemical manufacturers, petroleum bulk storage facilities, heavy industrial facilities, fill material, and areas of significant (more than 30 feet) thickness of fill of unknown origin. The specific subtasks performed for the environmental data review included:

- Review Sanborn Fire Insurance maps
- Review historical photographs
- Conduct site reconnaissance
- Review selected DEQ files
- Review reports from previous investigations in the vicinity of the subject site

The report for the environmental data review typically identifies the FOCs and the hazardous substances commonly associated with them.

Historically, the BCC Project alignment area has been an active industrial area. Past industrial facilities included municipal incinerators, warehouses, storage lots, retail

structures, and metal plating shops. Many of these facilities might have caused releases of hazardous substances and thus are considered FOCs. The approximate locations of these FOCs are shown in the *Environmental Alternative Analysis Technical Memorandum* (found under separate cover).

### **3.2.2 Soil Sampling and Analysis**

Soil sampling was performed by Shannon and Wilson to directly assess whether soil contamination is present in the areas along the alignment corridor. The specific soil sampling program performed along the project alignment was determined based on the results of the environmental data review. In general, exploratory boring locations were placed approximately from 100 to 200 feet apart along the length of the project alignment.

In accordance with the intergovernmental agreement between BES and DEQ, soil samples were not collected in areas of the deep tunneling or micro tunneling (>30 feet) unless a FOC suggested the potential for contamination at those depths. Unless poor recovery or field conditions prohibited, soil samples were collected vertically at five foot intervals and submitted for analytical testing.

The soil cores were observed in the field for evidence of contamination (headspace measurements, stains, sheen, and odor). If field screening indicated the potential for contamination between the set sampling intervals, an additional sample was collected in the area of question.

Select soil samples collected for chemical analysis were analyzed for the following contaminants of concern (COCs) related to the FOCs identified during the design and pre-design phases of the project:

- Petroleum hydrocarbons by NWTPH-HCID Method and all appropriate quantification analyses via methods NWTPH-Dx and NWTPH-Gx
- PCBs by EPA Method 8082
- RCRA 8 metals (silver, arsenic, barium, cadmium, chromium, mercury, lead, and selenium), copper, and zinc by total metals analysis EPA 6020 as well as iron and manganese by total metals analysis EPA 6010 and, if total metal concentrations suggest possible exceedences of characteristic hazardous waste criteria, toxicity characteristic leaching procedure (TCLP) methods EPA 1311/6010
- VOCs by EPA Method 8260B
- PAHs by EPA Method 8270-SIM

If groundwater was encountered in any of the explorations, a grab groundwater sample was collected from near the groundwater table interface (see Section 4) and analyzed.

### 3.3 Designation of Contaminated Soil

Areas and depth of contaminated soil were identified based on the results of the environmental data review and the soil sampling program using the following guidelines:

- The horizontal extent of contaminated soil was designated with the midpoint between contaminated and uncontaminated soil samples.
- Contaminated soil, as indicated by one or more contaminated soil samples, was designated vertically at a point immediately above the shallowest contaminated sample where a clean sample was collected and extending to the depth of the clean sample immediately below the deepest contaminated sample.
- In commercial and industrial areas, and in the absence of the necessary frequency of soil sample results (that is, the scope of minimum sampling described in Section 3.2.2), soil in the upper 30 feet or the depth of fill, whichever is deeper, is considered contaminated.
- Soil deeper than 30 feet or deeper than the depth of fill, whichever is deeper, was considered uncontaminated unless there is an FOC that would indicate the presence of contaminated soil at greater depths.
- For nonlinear projects or structures (for example, shafts), soil samples were collected from within the footprint of the proposed structure.

The locations, depths, and concentrations of anticipated contaminated media along the Project alignment are presented in the Contaminated Media Delineation Profile Figures (Figure 2), the Environmental Data Summary, Soil table and the Location, Depth, and Quantity of Anticipated Contaminated Media table (Tables 1B and 3, respectively). The figures illustrate the planned excavation depths along the centerline of the alignment, environmental sampling locations in the vicinity, and soils anticipated to be contaminated that will require special management in accordance with the criteria described in this CMMP.

### 3.4 Management of Contaminated Soil

Soil was classified as “clean” or contaminated based upon the following:

1. Except for arsenic, were metals detected above the analytical method reporting limit but below the most stringent applicable screening value (EPA Region 6 HHMSL or DEQ RBC)? Was arsenic detected at a concentration below 7mg/Kg? Were no organic compounds detected above the method reporting limit? If **all three** conditions are met, then the material may be managed at a **clean-fill** location with the approval of the City and the owner of the clean fill facility.
2. Were metals detected above the most stringent applicable screening value (EPA Region 6 HHMSL or DEQ RBC)? Was arsenic detected above 7 mg/Kg? Were organic compounds detected above the analytical method reporting limits? If **any** of these conditions are present, then the material (unless suitable and required for backfill and it meets the criteria listed in section 3.4.1 for onsite management of contaminated

soil) must be hauled offsite for disposal at a facility permitted to accept the material such as a Subtitle D landfill or approved equal.

When soil is found to be, or is classified as, contaminated (contamination concentrations above screening levels), the soil will be disposed of at an offsite facility permitted to accept the waste (for example, a solid waste landfill). Offsite disposal shipments will be tracked by the contractor and the City. The contractor will be required to show that a proper bill of lading, documenting the area from which the contaminated soil was excavated, has been prepared before removing soil for offsite disposal.

All of the contaminated media identified on the BCC Project site appear to be eligible for disposal at a Subtitle D solid waste landfill. No contaminated media has been identified that would be designated as a Resource Conservation and Recovery Act (RCRA) hazardous waste requiring disposal in a RCRA facility (for example, Subtitle C landfill). However, such material could be encountered during construction and would need to be properly handled in accordance with the unknown or unanticipated contaminated media guidelines.

For disposal purposes, the City of Portland will be identified as the “Generator” of any contaminated media excavated during construction of the BCC Project and identified in this CMMP, as well as any unanticipated contaminated media encountered. For the disposal of any additional media that are contaminated as a result of the contractor’s activities (for example, spills, sloppy practices), the contractor will be identified as the Generator.

No onsite reuse of contaminated soil is anticipated. However, if the City decides that onsite use of contaminated soil is desired, the criteria specified in Section 3.4.2 will be applied.

### **3.4.1 Criteria Onsite Management of Contaminated Soil**

It is not anticipated that soil will be reused as backfill on site. However, if excavation spoils are to be reused on site, the specific environmental criteria used to manage contaminated soil for onsite purposes during the construction of the BCC Project are determined according to the types and variability of land use in the project area and the nature of property ownership along the BCC Project alignment.

If contaminated soil is considered for reuse as backfill it must first be determined if the soil must be removed from the project site and managed in an offsite solid waste treatment or disposal facility. This is based on the contaminant concentration and the land use in the project area. Land use in the BCC Project area is divided into two general categories: industrial / commercial being the predominant land use and residential being a minor component. Criteria are established for each contaminant and land use through the use of published regulatory values. The following regulatory criteria are used to determine whether contaminated soil must be managed offsite of the BCC Project:

- DEQ RBCs for petroleum hydrocarbons
- EPA Region 6 HHMSL or DEQ RBCs (whichever is lower) for hazardous substances such as metals, VOCs, PAHs, pesticides, and PCBs

EPA Screening Levels and DEQ RBCs are established for various land use categories. If onsite management of contaminated soil becomes an option, Screening Levels or RBCs (whichever is lowest) would be established for a specific location based on land use and the contaminant of concern.

If the soil concentration of any hazardous substance in a specific project area exceeds the Screening Levels or RBC (whichever is lowest) based on the land use present in the project-specific area, the soil must be managed offsite in a solid waste disposal or treatment facility. For petroleum hydrocarbons, if the measured petroleum hydrocarbon concentration at a specific project location exceeds the relevant DEQ RBCs associated with that project area, the soil must be managed offsite in a solid waste disposal/treatment facility or approved equal.

Most commonly, the solid waste disposal facility will consist of a Subtitle D landfill. There may be some instances where excavated soil is designated a RCRA hazardous waste and will require management at a hazardous waste facility.

### **3.4.2 Onsite Reuse of Contaminated Soil**

If the soil concentration of any hazardous substance / contaminants of concern (COC) in a specific project area does not exceed the EPA Region 6 HHMSL or DEQ RBC established for that particular landuse / exposure scenario (i.e. industrial, residential, construction worker, etc.) the soil can be reused onsite with permission from the Owner and in accordance with specific conditions. The conditions are listed below:

- Contaminated soil is not to be placed within 3 feet of any final structure.
- The concentrations of the COCs in the proposed backfill should be below the concentrations listed in the EPA Region 6 HHMSL or DEQ RBC for the applicable landuse / exposure scenario.
- It must be placed back in the same location from which it was excavated.
- It must be placed deeper than 5 feet from the ground surface (i.e. clean fill from 0-5 feet below ground surface).
- It must be placed in a manner that results in no co-mingling of contaminated and uncontaminated soil.
- A demarcation layer (plastic sheeting, geotextile membrane or other approved material) must be placed between contaminated soil and clean (preferably imported) soil.

## 4.0 Contaminated Groundwater Designation and Management

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### SECTION 4

This section describes the proposed approach to designating and managing contaminated groundwater encountered during construction.

Environmental reviews and groundwater sampling conducted by Shannon and Wilson showed that contaminated groundwater is present within the proposed construction area. Areas considered contaminated will be managed as contaminated media in accordance with the approaches presented in this CMMP. Should construction dewatering of contaminated groundwater become necessary in some portions of the BCC project, *BES will contact DEQ prior to any dewatering activities.*

The following contaminated groundwater management issues must be addressed to ensure that the contaminated media management goals are achieved:

- Properly disposing of contaminated groundwater generated during construction dewatering. It is the responsibility of the contractor to obtain and comply with appropriate discharge permits.
- Groundwater for which there was no evidence of contamination, or groundwater where environmental sampling indicated that contaminants were not present (for example, organic chemicals were not detected or the detected concentrations of metals were below background levels), will be considered clean.

### 4.1 Definition of Contaminated Groundwater

If dewatering is needed and it is anticipated that it may impact contaminated groundwater, contaminated groundwater must be defined. For the purposes of the BCC Project Contaminated Media Management Program, contaminated groundwater is defined as groundwater with concentrations of hazardous substances greater than background conditions. Hazardous substances include:

- Substances defined as hazardous substances in the DEQ RBCs or EPA Region 6 HHMSL.
- Oil, including gasoline, fuel oil, diesel, lubricating oil, or other petroleum products.

The background concentration of organic hazardous substances is assumed to be zero. Thus, any groundwater that has detectable concentrations of organic hazardous substances (for example, petroleum hydrocarbons, VOCs, chlorinated solvents, pesticides, PCBs, and PAHs) is considered contaminated media.

- Even though hazardous substances may be present, it does not mean that the water is not acceptable for discharge to the City of Portland sanitary sewer. A batch discharge permit or other permit for disposal of any contaminated groundwater encountered is the responsibility of James W. Fowler Co. (Contractor) to obtain and comply with its requirements.

If hazardous substances are present at concentrations greater than background concentrations in the groundwater (that is, if organic hazardous substances are detected at any concentration), the groundwater is considered contaminated and will require management during construction.

## **4.2 Identification and Assessment of Contaminated Groundwater in Project Area**

One goal of BCC Project Contaminated Media Management Program is to minimize decisions required during construction. Consistent with this goal, contaminated groundwater was identified within the project alignment. The identification was accomplished during the following tasks:

- Environmental data review
- Groundwater sampling and analysis

(Contaminated groundwater may also be indicative of contaminated soil)

### **4.2.1 Environmental Data Review**

The environmental data review identified sites where contaminated groundwater is present.

### **4.2.2 Groundwater Sampling and Analysis**

Groundwater sampling was performed by Shannon and Wilson to assess whether groundwater contamination is present within the Project alignment. The specific groundwater sampling program performed at each Project area was determined based on the results of the environmental data review and at locations where groundwater may be encountered during construction activities along the Project alignment as described below.

Groundwater samples were collected for analytical testing from borings at the major shaft locations or areas where dewatering may occur for construction. In several locations, exploratory borings were installed for geotechnical purposes and when possible, groundwater samples were collected from the borings. Groundwater samples typically were collected at the first interface of the groundwater aquifer. Groundwater sampling locations are shown on Figures 2A through 2P and detected contaminants are listed in Table 2A, with a data summary in Tables 2B and 2C.

Groundwater samples collected for chemical analysis were analyzed for the following:

- Petroleum hydrocarbons by NWTPH-HCID Method and all appropriate quantification analyses NWTPH-Dx and NWTPH-Gx
- VOCs by EPA Method 8260B

- Mercury, iron, and manganese by EPA Method 200
- Other selected metals by EPA Method 6020
- PAHs by EPA Method 8270 SIM

### **4.3 Management of Contaminated Groundwater**

Two management considerations for contaminated groundwater within the BCC construction area are as follows:

- Management and discharge of dewatering water.
- Potential movement of contaminated groundwater plumes in the vicinity of dewatering areas.

#### **4.3.1 Management and Discharge of Dewatering Groundwater**

If contaminated groundwater is generated as a result of construction dewatering it will be disposed at a permitted offsite facility (for example, a sanitary sewer) or in a permitted manner (for example, the City's NPDES permitted stormwater system).

James W. Fowler Co. (contractor) will be required to obtain a permit approving water discharge or disposal. The approved discharge will be consistent with the applicable permit and associated surface water or groundwater quality standards that drive the permitting process. The permitting process will also dictate the sampling requirements. The requirements may include specifications of where and when samples are collected as well as specific laboratory method reporting limits that will need to be established.

- No contaminated groundwater has been identified that would be designated as a RCRA hazardous waste requiring disposal in a RCRA facility (for example, Subtitle C facility). However, such material could be encountered (sheen, odors, free product floating on surface etc.) during construction and would need to be properly handled in accordance with the unknown or unanticipated contaminated media guidelines. Water from each dewatering location will be evaluated through sampling and analyzing a representative number of samples (for permit and DEQ requirements). Potential discharge options will need to be determined by the contractor, approved by the owner and meet all discharge requirements.

Samples were collected from the groundwater sampling points identified in the *Geotechnical and Environmental Data Report* and do not represent the actual discharge water that may be generated during dewatering activities. Therefore, the current analysis is a simple picture of the potential constituents of concern from groundwater at those individual sampling locations, and further sampling and assessment will be required.

When dewatering occurs, the contractor will perform all monitoring required by the discharge permit(s) and submit that data to the City under the terms of the contract. The contractor will also determine and document locations of dewatering, dewatering pump

rates, and estimated flows and volumes of discharge water.

#### **4.3.2 Preventing Exacerbation of Existing Groundwater Contamination**

If construction dewatering occurs it may affect groundwater flow in the vicinity of the dewatering locations and could potentially affect areas with groundwater contamination. This potentiality will be evaluated separately and be presented to DEQ for its approval.

## **5.0 Contaminated Media Management Practices During Construction**

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### **SECTION 5**

Contaminated media will be managed during the BCC Project construction to ensure that program goals are achieved. This section describes media handling, monitoring, and documentation practices that will be performed during the construction phase of the BCC Project.

#### **5.1 Contaminated Media Handling**

Specific practices will be implemented to ensure that contaminated media are properly handled during construction. These practices address soil handling, stockpiling, loading, hauling, and groundwater pumping, handling, and discharge. Section 3 specifies requirements for contaminated soil designation and management. Appendix A explains unknown or unanticipated contaminated media management requirements and Appendix B documents the requirement for sampling and analysis activities.

#### **5.2 Monitoring During Construction**

##### **5.2.1 Soil Monitoring**

All excavations (clean or contaminated areas) performed for the BCC Project will be monitored for the possible presence of contamination. The contractor and City construction inspectors will observe for visual, olfactory, or textural indications of contamination. These indications may include, but are not limited to: petroleum, oil, fuel, or gasoline odor; other unusual odors; mottled or gray appearance; and unusual color, sheen, staining, debris, or other non-native material. Observations will be recorded in daily reports and presented to the owner's representative. Soil observations will be documented in the contractor's daily reports. If suspected contaminated media are observed in an area designated as uncontaminated, the owner's representative will be notified immediately. Suspect material will be placed in drop boxes for further evaluation.

##### **5.2.2 Groundwater Monitoring**

Dewatering of groundwater will be monitored in accordance with applicable discharge permits. Monitoring could range from visual to periodic or regular sampling and analysis. Dewatering pumping rates will be monitored and documented by the contractor during construction.

Groundwater monitoring reports will be documented in daily, weekly, or monthly reports depending on the monitoring requirements of the permit issued for the

discharges. Dewatering pumping rates will be documented in the daily reports.

## **5.3 Documentation of Remaining Contaminated Media**

### **5.3.1 Soil**

It is not the intent of the program to remove all soil that exceeds cleanup levels from the area surrounding the BCC Project. Rather, only contaminated soil encountered during construction activities will be removed to allow construction of the BCC Project and prevent exacerbation of existing conditions. However, environmental monitoring activities will be performed during construction to document the presence of contaminated media remaining along the BCC Project alignment after completion of the construction activities. No sampling and analysis will be performed to document remaining soil conditions after a soil has been designated "clean", based on the criteria presented in this document. However, "clean" soils excavated will be monitored in the field in conformance with the approach detailed in section 5.2.1.

#### **Nature and Extent of Contaminated Soil**

The nature and extent of contaminated soil remaining along the BCC Project will be documented primarily through sampling and analysis of the excavation sidewalls and or floors. Soil samples will be collected in areas designated as "contaminated" to document the nature of the contaminated soil remaining in the project areas at the conclusion of BCC Project construction.

#### **Documentation of Contaminated Soil Remaining After Construction**

The owner's representative will be responsible for documentation of the soil conditions remaining at the BCC Project site. This will require sampling and analysis. Samples collected for this purpose are referred to as "documentation samples." The documentation soil samples will provide information on the contamination remaining in place after construction, rather than determining management of the excavated soil or verifying that all contaminated soil was removed. The management of the soil sampled will not be contingent on the results of the documentation sampling and analysis.

The owner's representative will collect one representative soil sample from the excavation sidewall or bottom for each 400-cubic-yard volume of excavated contaminated soil. The soil samples will be analyzed for the contaminants listed in Table-1B to quantify the concentration of contamination left in place after construction.

Sections that are considered clean or do not contain contaminants (see Section 3, first paragraph) can be used as clean fill subject to the regulatory definition at OAR 340-93-030(13).

Soil designated as contaminated consistent with this CMMP must be disposed offsite at an approved solid waste management facility such as a Subtitle D landfill or approved equal.

### **5.3.2 Groundwater**

It is not the intent of the program to remove all groundwater that exceeds cleanup levels from the area surrounding the BCC Project. The intent is only to remove groundwater (contaminated or clean) that must be removed to allow construction of the BCC Project.

### **5.3.3 Nature and Extent of Contaminated Groundwater**

Groundwater dewatering discharges will be monitored in accordance with the permit issued for that activity.

### **5.3.4 Documentation of Contaminated Groundwater Remaining After Construction**

There will be no additional groundwater sampling or monitoring as part of this Project after BCC Project construction is complete.

## 6.0 Contingency Plans for Unanticipated Conditions

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### SECTION 6

Section 6 describes contingency plans for unanticipated conditions encountered during construction.

Sampling and analysis performed during the BCC Project design indicate that contaminated media are likely to be encountered during project construction. Areas of known contamination will be managed as specified in Sections 3 through 5 of this CMMP. Because the BCC Project is in an industrialized area of the City, the potential also exists for encountering unanticipated contaminated media. Field observations, field testing, and laboratory analysis may reveal different locations or concentration of contaminated soil or groundwater than anticipated. This soil or groundwater will be treated as unanticipated contaminated media and managed in a manner consistent with program goals.

The potential exists for unanticipated contaminated soil to be designated as hazardous waste. Therefore, unanticipated soil will be managed onsite according to contingent soil management requirements. Isolation, sampling, and analysis of unanticipated contaminated soil are likely to be necessary for waste disposal characterization, worker health and safety, and assessment. Soil with unanticipated contamination will have to be stored onsite in drop boxes for at least 3 days (and as many as 7 days) to enable sampling, analysis, and decision making.

To reduce the potential for construction delays, soil storage areas will be identified before construction begins. Soil storage areas will be located within the boundaries of the site.

If the owner's representative determines that space for soil storage is not available, excavated unanticipated and unknown contaminated soil may be placed directly into drop boxes and hauled offsite by a licensed hazardous waste hauler. The soil will be hauled to an offsite facility permitted to temporarily store hazardous waste. The unanticipated contaminated soil will be stored temporarily, pending results of sampling and analysis and final determination of the waste classification. Once the final disposition of the soil has been determined, the soil will be hauled from the temporary storage facility to the appropriate disposal facility. Such removal will be performed only after receiving owner's representative approval for offsite disposal as a result of insufficient soil storage space.

Unanticipated groundwater that is suspected of being contaminated will be held from discharge until further assessment can be performed to evaluate the nature of the issue. The permit issued for the discharge will likely have restrictions for handling unanticipated

conditions that will be followed. If practicable, the groundwater could be pumped into holding tanks for further assessment prior to discharge.

## 7.0 Project Reporting

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### SECTION 7

Section 7 addresses project reporting procedures.

When the construction phase of the BCC Project is complete, a closeout report summarizing the environmental activities of the project will be prepared by the owner or owner's representative. The City will submit the report to DEQ. This report will present the actual total volume of contaminated material removed from the site, as compared to the volume presented in Table-3 in this CMMP.