

State of Oregon
Department of Environmental Quality

Memorandum

Date: November 22, 2023

To: FILE

Through: Kevin Parrett, Katie Daugherty, and Erin McDonnell

From: Kevin Dana
Northwest Region

Subject: Holden of Pearl, ECSI #6352; Staff Memorandum in support of a Conditional No Further Action determination

This document presents the basis for the Oregon Department of Environmental Quality's (DEQ's) recommended Conditional No Further Action (CNFA) determination for the Holden of Pearl site in Portland. As discussed in this report, contaminant concentrations in soil and soil gas exceed acceptable risk levels for applicable exposure pathways. Consequently, the No Further Action determination will be conditioned upon adherence to restrictions recorded in an Easement & Equitable Servitudes and a License & Declaration of Restrictions attached to the property deed.

The proposed CNFA determination meets the requirements of Oregon Administrative Rules (OAR) Chapter 340, Division 122, Sections 010 to 0140; and Oregon Revised Statutes (ORS) 465.200 through 465.455.

The proposal is based on information documented in the administrative record for this site. A copy of the administrative record index is presented at the end of this report.

1. BACKGROUND

Site location.

The site's location can be described as follows:

- Address: 1540 NW 13th Ave., Portland, Multnomah County, Oregon.
- Latitude 45.5337° North; Longitude 122.6845° West
- Tax Lot 712, Township 1 North, Range 1 East, Section 28 DD, Willamette Baseline and Meridian.

Site setting.

The 1.32-acre Holden of Pearl site covers the city block northeast of the intersection of NW 13th Avenue and NW Quimby Street in Portland's Pearl District. The site incorporates the NW Raleigh Street right-of-way to the north, which has been redeveloped as a pedestrian-only corridor between Holden of Pearl and The Abigail Apartments. The Holden of Pearl building is

a 16-story senior living center with 237 apartments. See Attachment 1 for a topographic map of the area, and Attachment 2 for an aerial photo of the (then under construction) site.

Hydrogeologic setting.

Soils at the site consisted of imported fill material (silts, sands and gravels) to a depth of about 12 feet below ground surface (bgs), underlain by sawdust and other woody debris to depths up to 20 feet bgs. Native clayey silt soils underlie the sawdust. See Attachment 3 for representative cross-sections of the area. Groundwater levels are variable. In November 2010, groundwater was encountered at depths ranging from 4-11 feet bgs. In September 2018, the depth to groundwater ranged from 11-12 feet bgs. Groundwater likely historically flowed northeast towards the Willamette River, but due to development in the area now flows southeast towards the Tanner Creek Sewer, which discharges to the Willamette.

Site history.

The area was originally a marshy floodplain on the north end of downtown Portland. The area was filled in with soil and industrial debris beginning in the 1880s, and by 1889 the site had been developed as a storage area and horse stable for the Willamette Steam Mills Lumbering and Manufacturing Company. (See Attachment 4 for an 1889 Sanborn map of the area). The mill was gone by 1897, and in the first decade of the 1900s Portland & Seattle Railway constructed the Hoyt Street Railyard in the area. Aerial photos show the current site to have been an undeveloped storage and staging area in the northwest corner of the railyard.

The renamed Spokane, Portland & Seattle Railway Company was acquired by Burlington Northern Railroad in 1970. In 1994, Burlington Northern sold the Hoyt Street Railyard to Hoyt Street Properties for redevelopment as a high-density mixed-use neighborhood. In August 1995, Burlington Northern signed an Order on Consent with DEQ to investigate and clean up environmental contamination at the railyard. Burlington Northern completed a Remedial Investigation in October 1996, a Risk Assessment in February 1998, and a Feasibility Study in July 1999. DEQ issued a Record of Decision (ROD) for the railyard in December 2000.

In January 2002, DEQ signed a Stipulation and Consent Decree with the renamed Burlington Northern Santa Fe (BNSF) Railway Company and Hoyt Street Properties (HSP). HSP agreed to address contaminated soils at the railyard while BNSF agreed to address the groundwater.

Under the ROD and Consent Decree, each new city block in the railyard was to be capped with buildings, pavement, and/or 2-3 feet of clean soil upon redevelopment. Utility corridors were to be excavated to five feet bgs and backfilled with clean soil. Deed restrictions (referred to as a "License and Declaration of Restrictions") were to be recorded on each block prohibiting beneficial use of groundwater and "detached single-family residential development" and requiring maintenance of the building/pavement/clean soil cap.

HSP numbered most of the new city blocks that would be established in the former railyard. Holden of Pearl is on Block 23. US Alliance Holden of Pearl District LLC entered the site into DEQ's Voluntary Cleanup Program in July 2019. A License and Declaration of Restrictions was recorded with the property deed for Block 23 in February 2020.

2. BENEFICIAL LAND AND WATER USE DETERMINATIONS

Land use.

The site and the surrounding area is zoned Central Employment with a design overlay (EXd) by the City of Portland. See Attachment 5 for a zoning map of the area. The Central Employment zoning allows for a full range of high density commercial, light industrial, and residential uses in and near the Central City. The design overlay “promotes design excellence in the built environment through the application of additional design standards and design guidelines”.

Groundwater use.

A search of well logs on file with the Oregon Water Resources Department identified no domestic, irrigation, or community wells in the former Hoyt Street Railyard.

The City of Portland is served by a municipal water supply system. The water is primarily obtained from surface water reservoirs in the Bull Run watershed on the western slopes of Mount Hood, supplemented as needed with groundwater from the Columbia South Shore Wellfield.

Surface water use.

The nearest surface water body is the Willamette River, approximately 540 feet northeast of the site, as shown on Attachment 6. The Willamette is used for navigation, fishing and recreation, and provides habitat for wildlife including steelhead and Chinook and Coho salmon. Stormwater at the site is directed to the City of Portland’s municipal stormwater system.

3. INVESTIGATION AND CLEANUP WORK

Soil samples were collected from six test pits on and adjacent to Block 23 in October 1998 as part of an investigation of the Hoyt Street Railyard. The test pits (“23A” through “23F”) are shown on both Attachment 3 and Attachment 7. Three soil samples were collected from each test pit (from 0-5 feet, 5-10 feet, and 10-15 feet bgs) and analyzed for petroleum products and lead. Petroleum was encountered in eight of the 18 soil samples, including diesel at concentrations up to 3,500 parts per million (ppm) and “lube oil/Bunker C” at concentrations up to 4,200 ppm. Lead was detected in 16 of the 18 soil samples, at concentrations ranging from 18 ppm to 150 ppm.

The soil samples with detectable petroleum concentrations were further analyzed for polycyclic aromatic hydrocarbons (PAHs), finding up to 2.5 ppm anthracene, 3.5 ppm benzo[a]anthracene, 6.3 ppm benzo[a]pyrene, 3.5 ppm chrysene, 3.7 ppm dibenz[a,h]anthracene, 11 ppm fluoranthene, 6.0 ppm naphthalene, and 15 ppm pyrene.

In November 2010, soil samples were collected from seven direct-push borings on Block 23 as part of a “due diligence” investigation of both Block 23 and the adjacent Block 24 to the east, as shown on Attachment 8. The borings (DP-7 through DP-13) extended 15-20 feet bgs. A single composite soil sample was collected from the length of each boring and analyzed for diesel, heavy oils, and lead. Diesel (up to 2,260 ppm), heavy oils (up to 1,830 ppm), and lead (up to 246 ppm) were detected in all seven samples.

Two soil samples with high concentrations of diesel and oils were further analyzed for PAHs and polychlorinated biphenyls (PCBs). Detected PAHs included anthracene (3.6 ppm), benz[a]anthracene (9.01 ppm), benzo[a]pyrene (13.9 ppm), benzo[b]fluoranthene (12.6 ppm), benzo[k]fluoranthene (3.88 ppm), chrysene (10.6 ppm), dibenz[a,h]anthracene (1.38 ppm), fluoranthene (22.4 ppm), indeno[1,2,3-cd]pyrene (9.77 ppm), naphthalene (8.49 ppm), and pyrene (30.4 ppm). No PCB Aroclors were detected. The soil samples with the two highest concentrations of lead were analyzed for leachable lead by the Toxicity Characteristic Leaching Procedure (TCLP). No leachable lead was detected. Groundwater samples from two of the borings were analyzed for volatile organic compounds (VOCs). No VOCs were detected. Finally, methane gas samples were collected from five of the borings. Methane concentrations ranged from 6.2 percent by volume (pbv) to 49.5 pbv.

Phase II ESA (2018)

A third investigation was conducted in September 2018, as part of an environmental site assessment for the Holden of Pearl development. Four direct-push borings were advanced at the site, as shown on Attachment 9. The borings extended 15-20 feet bgs. Three soil samples were collected from each boring at various intervals, and the 12 soil samples were analyzed for diesel, heavy oils, metals, PAHs, and VOCs. Diesel was encountered in four of the samples, at concentrations up to 3,670 ppm. Heavy oils were detected in eight of the samples, at concentrations up to 6,410 ppm. Metals included arsenic (12.7 ppm), cadmium (1.60 ppm), and lead (416 ppm). No leachable lead was detected. PAHs included anthracene (0.982 ppm), benz[a]anthracene (1.69 ppm), benzo[a]pyrene (1.70 ppm), benzo[b]fluoranthene (2.58 ppm), benzo[k]fluoranthene (0.684 ppm), chrysene (2.43 ppm), dibenz[a,h]anthracene (0.291 ppm), fluoranthene (5.26 ppm), indeno[1,2,3-cd]pyrene (1.41 ppm), naphthalene (1.01 ppm), and pyrene (5.64 ppm). VOCs were only detected in one soil sample and included naphthalene (0.103 ppm), toluene (0.0676 ppm), 1,2,4-trimethylbenzene (0.0507 ppm), and xylenes (0.1165 ppm).

Groundwater samples were collected from two of the borings and analyzed for PAHs, VOCs, and total and dissolved metals. Total metals included arsenic at concentrations up to 81.4 parts per billion (ppb), along with barium (1,610 ppb), cadmium (6.04 ppb), chromium (201 ppb), lead (477 ppb), and mercury (0.43 ppb). Dissolved metals included arsenic (43.3 ppb), barium (218 ppb), and chromium (2.26 ppb). PAHs included acenaphthene (0.101 ppb), anthracene (0.119 ppb), benz[a]anthracene (0.579 ppb), benzo[a]pyrene (0.630 ppb), benzo[b]fluoranthene (0.566 ppb), benzo[k]fluoranthene (0.193 ppb), chrysene (0.694 ppb), dibenz[a,h]anthracene (0.0827 ppb), fluoranthene (1.95 ppb), fluorene (0.0538 ppb), indeno[1,2,3-cd]pyrene (0.319 ppb), and pyrene (1.65 ppb). No VOCs were detected.

Temporary methane probes (MP-1 through MP-4) were installed adjacent to the four direct-push borings, as shown on Attachment 9. Two methane samples, 72 hours apart, were collected from each probe. No methane was detected in MP-1. Methane concentrations in the other probes initially ranged from 18.0 pbv to 44.9 pbv. Three days later methane concentrations ranged from 18.5 pbv to 63.4 pbv.

Construction of the Holden of Pearl building began in 2021. All of Block 23 was excavated to a depth of 13 feet bgs for a one-level underground parking garage. A series of groundwater samples were collected during dewatering of the excavation pit. The groundwater samples were analyzed for petroleum hydrocarbons, total metals, dissolved metals, and PAHs. Petroleum hydrocarbons were detected in an initial groundwater sample in April 2021, but subsequent samples only detected total barium, at concentrations averaging around 30 ppb.

A total of 46,037 tons of soil and debris were excavated from the site, mostly from March 26 to April 30, 2021, and shipped to the Hillsboro Landfill in Hillsboro and the Wasco County Landfill in The Dalles for disposal. A total of 1,135,801 gallons of groundwater were discharged to the City of Portland's storm sewer system from May 7 to November 3, 2021. A methane mitigation system was incorporated into the building design. The system consists of sub-slab ventilation pipes connected to five vent risers equipped with wind-activated turbine ventilators to passively extract sub-slab vapors. Three permanent methane monitoring probes were installed in the basement. The vapor barrier was MiraPLY-H, a 70-mil waterproofing membrane.

Nature and extent of contamination.

Diesel and heavy oils were present in soils and groundwater at the site, along with PAHs and metals. Methane was present in soil gas.

4. RISK EVALUATION

Conceptual site model.

A conceptual site model identifies the sources of contamination at a site, the human or ecological receptors that could be exposed to the contamination, and the pathways by which the exposures could occur.

To evaluate human exposure to residual chemical contamination requires an assessment of the type and extent of that exposure. This is based on current and reasonably likely future site use. DEQ publishes risk-based concentrations (RBCs) for contaminants commonly encountered, for different types of exposure scenarios. These RBCs are conservative estimates of protective levels of contaminants in soil, groundwater and air. Table 1 shows potential exposure pathways and receptors for this site. Based on this, applicable RBCs are identified and used for risk screening.

Table 1. Identification of applicable RBCs, based on pertinent pathways and receptors

Pathway	Receptor	Applicable RBC?	Basis for exclusion
SOIL			
Ingestion, dermal contact, and inhalation	Residential	No	See Note 1 & Note 2.
	Urban residential	No	See Note 2.
	Occupational	No	See Note 2.
	Construction worker	Yes	
	Excavation worker	Yes	

Pathway	Receptor	Applicable RBC?	Basis for exclusion
Volatilization to outdoor air	Residential	No	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Leaching to groundwater	Residential	No	See Note 1 & Note 3.
	Urban residential	No	See Note 3.
	Occupational	No	See Note 3.
GROUNDWATER			
Ingestion and inhalation from tap water	Residential	No	See Note 1 & Note 3.
	Urban residential	No	See Note 3.
	Occupational	No	See Note 3.
Volatilization to outdoor air	Residential	No	See Note 1.
	Urban residential	Yes	
	Occupational	Yes	
Vapor intrusion into buildings	Residential	No	See Note 1 & Note 4.
	Urban residential	No	See Note 4.
	Occupational	No	See Note 4.
Groundwater in excavation	Construction and excavation worker	Yes	
SOIL VAPOR			
Vapor intrusion into buildings	Residential	No	See Note 1 & Note 4.
	Urban residential	No	See Note 4.
	Occupational	No	See Note 4.

Notes:

1. A senior living tower has been constructed at the site, and zoning in the area does not allow for single-family residential use.
2. The entire site has been capped with buildings and pavement. Residents and occupants are not expected to come into direct contact with contaminated soils at the site.
3. A municipal water supply is available to the area, and no domestic wells have been identified in the vicinity of the site. This exposure pathway is not likely to be complete.
4. A sub-slab methane mitigation system was incorporated into the building design. This exposure pathway is not likely to be complete.

Contaminant concentrations.

Contaminants of Potential Concern (COPCs) are contaminants that are present at a site at concentrations exceeding an RBC for a complete exposure pathway. Over 46,000 tons of soil were removed from the site to a depth of 13 feet bgs during construction of the Holden of Pearl building. However, contamination at the site may have extended up to 20 feet bgs, and no post-removal samples were collected to confirm that all of the contaminated soils and/or woody debris were removed. Therefore, in screening the risks for potentially-complete exposure pathways at the site, the maximum original concentrations of soil contaminants will be used to determine if any COPCs were present.

Carcinogenic PAHs (cPAHs) are evaluated individually and in the aggregate to determine their risks to human health. At the Holden of Pearl site, the highest concentrations of individual

cPAHs in soils (except dibenz[a,h]anthracene) were detected in boring DP-10 in November 2010 near the southwest corner of the block. As shown on Attachment 10, the sample results for each cPAH in boring DP-10 were multiplied by a toxic equivalency factor (TEF) and summed to derive a toxic equivalency (TEQ) relative to benzo[a]pyrene.

Construction and excavation workers may come into direct contact with contaminated soils while working at the site. Table 2 shows the maximum concentrations of contaminants detected in soils at the Holden of Pearl site, and compares those concentrations with DEQ's direct contact RBCs to determine if there are any COPCs.

Table 2. Screening for Construction and Excavation Worker COPCs for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway.

Contaminant of Interest	Maximum Soil Contamination	Construction Worker RBC	Excavation Worker RBC	COPC (Y/N)
Diesel	3,670 ppm	4,600 ppm	>MAX	N
Heavy Oils	6,410 ppm	NE	NE	Y
Arsenic	12.7 ppm	15 ppm	420 ppm	N
Cadmium	1.60 ppm	350 ppm	9,700 ppm	N
Lead	416 ppm	800 ppm	800 ppm	N
Anthracene	3.6 ppm	110,000 ppm	>MAX	N
Benz[a]anthracene	9.01 ppm	170 ppm	4,800 ppm	N
Benzo[a]pyrene	13.9 ppm	17 ppm	490 ppm	N
Benzo[b]fluoranthene	12.6 ppm	170 ppm	4,900 ppm	N
Benzo[k]fluoranthene	3.88 ppm	1,700 ppm	49,000 ppm	N
Chrysene	10.6 ppm	17,000 ppm	490,000 ppm	N
Dibenz[a,h]anthracene	3.7 ppm	17 ppm	490 ppm	N
Fluoranthene	22.4 ppm	10,000 ppm	280,000 ppm	N
Indeno[1,2,3-cd]pyrene	9.77 ppm	170 ppm	4,900 ppm	N
Naphthalene	8.49 ppm	580 ppm	16,000 ppm	N
Pyrene	30.4 ppm	7,500 ppm	210,000 ppm	N
Total cPAH TEQ	18.47 ppm	17 ppm	490 ppm	Y

Notes:

1. The symbol ">MAX" signifies that the RBC for this pathway is greater than 1,000,000 ppm.
2. NE = Not Established. DEQ has not established RBCs for heavy oils. To be conservative, heavy oils will be considered a COPC.

Construction and excavation workers may also come into direct contact with contaminated groundwater while working at the site. Table 3 shows the maximum concentrations of contaminants detected in groundwater at the Holden of Pearl site, and compares those

concentrations with DEQ's groundwater in excavation RBCs to determine if there are any COPCs.

Table 3. Screening for Construction & Excavation Worker COPCs for the Groundwater in Excavation exposure pathway.

Contaminant of Interest	Maximum GW Concentration	Construct/Excavate Worker RBC	COPC (Y/N)
Arsenic	81.4 ppb	6,300 ppb	N
Barium	1,610 ppb	>S	N
Cadmium	6.04 ppb	130,000 ppb	N
Chromium	201 ppb	>S	N
Lead	477 ppb	>S	N
Mercury	0.43 ppb	>S	N
Acenaphthene	0.101 ppb	>S	N
Anthracene	0.119 ppb	>S	N
Benz[a]anthracene	0.579 ppb	>S	N
Benzo[a]pyrene	0.630 ppb	>S	N
Benzo[b]fluoranthene	0.566 ppb	>S	N
Benzo[k]fluoranthene	0.193 ppb	>S	N
Chrysene	0.694 ppb	>S	N
Dibenz[a,h]anthracene	0.0827 ppb	>S	N
Fluoranthene	1.95 ppb	>S	N
Fluorene	0.0538 ppb	>S	N
Indeno[1,2,3-cd]pyrene	0.319 ppb	>S	N
Pyrene	1.65 ppb	>S	N

Notes:

1. The symbol ">S" signifies that the RBC for this pathway is greater than the solubility limit of the contaminant.

Soil and groundwater contaminants may volatilize to outdoor air and be inhaled by residents and occupants of a site. However, no VOCs were detected in groundwater, and virtually no VOCs were detected in soils, at the Holden of Pearl site. Only naphthalene was detected at significant concentrations (up to 8.49 ppm in soils). The urban residential volatilization to outdoor air RBC for naphthalene is 15 ppm, and the occupational outdoor air RBC is 83 ppm. As the maximum concentration of naphthalene in soils at the site was below 15 ppm, naphthalene is not a COPC for the volatilization to outdoor air exposure pathway.

Finally, methane gas samples were collected based on the presence of subsurface wood wastes. Methane was detected in soil borings at the site at concentrations up to 63.4 pbv. The lower explosive limit for methane is 5.0 pbv, and the upper explosive limit is 15.0 pbv. Methane gas is regulated as a hazardous substance in Oregon, with an action level of 1.25 pbv.

In summary, Contaminants of Potential Concern at the Holden of Pearl site are heavy oils and total cPAHs in the soils and methane in the soil gas.

Human health risk.

Contaminants of Concern (COCs) are those chemicals at a site that present an unacceptable risk to human health or the environment.

A License & Declaration of Restrictions (LDR), recorded with the property deed in February 2020, requires maintenance of the building and pavement cap at the site and prohibits beneficial use of groundwater at the site. The restrictions are intended to ensure that residents and occupants do not come into contact with contaminated soil or groundwater at the site. A methane mitigation system was subsequently constructed at the site, to protect residents and occupants from the accumulation of methane gas beneath the building.

Construction and excavation workers may come into direct contact with heavy oils and cPAHs in residual contaminated soils beneath the building and pavement cap. The workers can take precautions if they are notified of the potential presence of soil contamination prior to conducting subsurface work at the site, and follow the procedures in a DEQ-approved Soil Management Plan while conducting the work.

Ecological risk.

A site-specific ecological risk assessment was not conducted for the Holden of Pearl site. The risk assessment for the Hoyt Street Railyard, completed in February 1998, found no unacceptable risks to the environment from groundwater discharging to the Willamette River. The site has been completely capped by the Holden of Pearl building and sidewalks, and only ornamental vegetation is present. No adverse impacts to ecological receptors are anticipated.

5. RECOMMENDATION

Methane gas is a Contaminant of Concern at the Holden of Pearl site, and residual concentrations of heavy oils and cPAHs are contaminants of potential concern. The vapor intrusion and explosion risks posed by methane gas are being managed by a methane mitigation system incorporated into the building design. A requirement to operate and maintain the system, and provide annual methane monitoring reports to DEQ, will be incorporated into an Easement and Equitable Servitudes (EES) and recorded on the property deed. A separate requirement to prepare a DEQ-approved Soil Management Plan for construction and excavation workers prior to conducting subsurface work at the site will also be incorporated into the EES.

With the installation of both a soil cap and a methane mitigation system at the site, a No Further Action determination is recommended, conditioned upon adherence to the restrictions in the License and Declaration of Restrictions and the Easement and Equitable Servitudes recorded with the property deed. The Conditional No Further Action determination will be recorded in Your DEQ Online (YDO) in Environmental Cleanup Site Information (ECSI) file 6352.

6. ADMINISTRATIVE RECORD

1. EMCON “Results of Phase 2 Supplemental Soil Investigation” (December 18, 1998).
2. GeoDesign “Due Diligence Environmental Services” (December 21, 2010).
3. GeoDesign “Limited Phase II Environmental Site Assessment” (October 30, 2018).
4. GeoDesign “Contaminated Media Management Plan” (September 23, 2019).
5. NV5 “Construction Completion Report” (May 23, 2023).

7. ATTACHMENTS

1. Topographic Map
2. Aerial Photo
3. Soil Cross-Sections
4. 1889 Sanborn Map
5. Zoning Map
6. Oregon Explorer Map
7. Sample Location Map (1998)
8. Sample Location Map (2010)
9. Sample Location Map (2018)
10. Total cPAHs Spreadsheet