Completion Summary for City of Portland Outfall Basin 22

1 Summary

The City of Portland (City) has been addressing source control concerns related to the City conveyance systems for more than four decades, and a number of City programs have evolved to meet changing regulatory requirements and watershed health objectives. Following the 2000 listing of Portland Harbor on the National Priorities List, the City initiated a new partnership with the Oregon Department of Environmental Quality (DEQ) Cleanup Program to identify specific sources of contaminants to City stormwater conveyance systems in the harbor that were not being adequately controlled. This report summarizes the results of this collaborative effort in Outfall Basin 22.

This Completion Summary includes a weight-of-evidence evaluation to demonstrate that source identification is complete and a summary of source controls (implemented or planned) that will control future contaminant discharges to the Willamette River.

Basin 22 is located on the west side of the Willamette River in the Willbridge area, which largely consists of bulk fuel terminals that have been in operation since the early 1900s. The basin includes drainage from Forest Park, a small residential and commercial area, Highway 30, and an industrialized area between Highway 30 and the river. The industrial portion of the basin is almost entirely comprised of DEQ Cleanup Program sites. These sites have completed or are conducting source control evaluations to investigate onsite contaminant sources, determine the significance of site stormwater and groundwater pathways, and implement source control measures (SCM) under DEQ oversight. Based on the historical presence of petroleum plumes in the vicinity of the City stormwater lines, the preferential groundwater pathway is a potentially significant pathway for upland site contaminants to enter the conveyance system. Sites in the basin have implemented numerous SCMs, including lining private and City storm lines to mitigate the infiltration of petroleum-impacted groundwater into the stormwater system. In addition, the Oregon Department of Transportation (ODOT) is conducting a source control evaluation of Highway 30, which runs through the basin.

Based on data collected by the City and other parties, no other major sources of contaminants to the City conveyance system were identified. Because necessary controls are being implemented under DEQ authority, future discharges from the basin are not likely to represent a significant source to the Willamette River and the City has met its remedial investigation (RI)/SCM objectives for Basin 22.

2 Introduction

This Completion Summary presents a weight-of-evidence evaluation of whether further source investigation is needed in Basin 22, and the rationale for concluding that future discharges from the basin are not likely to be significant sources of contaminants to river sediment. The purpose of this report is to demonstrate that, for Basin 22, the City has met the joint RI/SCM objectives of the August 13, 2003, intergovernmental agreement (IGA) between the City and DEQ.

Together, the City and DEQ identified all major sources of contaminants to the basin and are using their respective authorities to ensure that source controls are implemented where needed.

This report is included in Appendix A of the *Municipal Stormwater Source Control Report for Portland Harbor* (Municipal Report), which provides additional background and detail regarding the City's harborwide source control efforts, including regulatory and non-regulatory programs to address current and future sources and to minimize recontamination potential.

3 Outfall and Basin Setting

3.1 Basin Location and Configuration

Outfall 22 discharges to the west side of the Willamette River at approximately River Mile 7.8. The drainage area for this outfall is about 95 acres. Figure 1 shows the location of the outfall and drainage basin boundary and provides an overview of the associated stormwater conveyance system. The Basin 22 system mainly conveys stormwater flow from Forest Park and the Willbridge industrial area. Additional detail on the Outfall 22 stormwater conveyance system and associated drainage basin is included in the *Programmatic Source Control Remedial Investigation Work Plan for the City of Portland Outfalls Project* (CH2M HILL, 2004) and the *Outfall Basin 22 Inline Solids Sampling* Technical Memorandum No. OF22-1 (BES, 2008).

3.2 Land Use and Potential Upland Sources

Land use in the developed portion of the basin is predominantly heavy industrial. The industrial operations east of NW St. Helens Road (State Highway 30) are mainly bulk fuel terminals that have been in operation since the early 1900s and currently handle, store, and distribute a variety of petroleum and chemical products. The products are transferred to other locations via tank cars, trucks, marine vessels, and pipelines. On the west side of the highway, land use is primarily open space (Forest Park). Although the developed properties are zoned industrial west of the highway, actual land use includes a mix of residential, commercial and industrial properties (e.g., a roofing company, video store, a City storage warehouse, and several small commercial/industrial buildings with little to no outside activities). Land use also includes a short section of major transportation (ODOT Highway 30).

Sites that were identified as potential sources to the basin include the six DEQ Cleanup Program sites in Basin 22, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Four of these sites are bulk fuel and/or chemical storage facilities (Chevron-Willbridge Distribution Terminal, Chevron USA Asphalt, Unocal – Willbridge Terminal, and McCall Oil). Only small portions of the remaining two sites (ODOT and the Burlington Northern Santa Fe Willbridge Yard) are included in the basin. Table 1 lists these sites and indicates the associated contaminants of interest (COI) and the status of stormwater and preferential groundwater pathway evaluations. All six of the DEQ Cleanup Program sites in the basin have completed site investigation and remediation or currently are conducting source control evaluations under DEQ oversight.

Table 1. DEQ Cleanup Program Sites in Basin 22

DEQ Cleanup Site	Site COIs [1]	Site Pathway Evaluations	
		Stormwater Pathway[2]	Preferential Groundwater Pathway [3]
Chevron - Willbridge Distribution Terminal (ECSI #25/1549)[4]	*Stormwater:* VOCs, PAHs, TPH, metals *Groundwater:* VOCs, PAHs, TPH, metals [5]	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Chevron USA Asphalt Refinery (ECSI #1281)	*Stormwater:* VOCs, PAHs, TPH, metals *Groundwater:* VOCs, PAHs, TPH, metals	Source Control Decision /No Further Action Issued	Source Control Decision Completed
McCall Oil (ECSI # 134)	*Stormwater:* VOCs, SVOCs, PAHs, TPH, PCBs, metals, phthalates *Groundwater:* VOCs, SVOCs, PAHs, TPH, metals	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	Not listed [6]	Source Control Evaluation In Progress	Not Shown
Unocal – Willbridge Terminal (ECSI #177/1549)[4] (Phillips 66)	*Stormwater:* VOCs, PAHs, TPH, metals *Groundwater:* VOCs, PAHs, TPH, metals [5]	Source Control Evaluation In Progress	Source Control Evaluation Completed - Source Control Determination Pending
Willbridge Bulk Fuel Area (ECSI #1549) [7]	*Stormwater:* VOCs, PAHs, TPH, metals *Groundwater:* VOCs, PAHs, TPH, metals	Not Applicable[7]	Not Applicable[7]
Willbridge Yard (BNSF) (ECSI #3395)	Metals	Source Control Evaluation In Progress	Not shown

Notes:

PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; SVOCs = semivolatile organic compounds; TPH = total petroleum hydrocarbons; VOCs = volatile organic compounds; BNSP = Burlington Northern Santa Fe

(1) Unless otherwise noted, site contaminants of interest are those identified in Appendix Q (Source Control Inventory Tables) of the Portland Harbor RI/FS Draft Feasibility Study (FS) (Anchor et al., 2012).

(2) Source: DEQ Milestone Report, Figure 1b, "Status of Stormwater Source Control Evaluations, January 2013" (DEQ, 2013a).

(3) Source: DEQ Milestone Report, Figure 3, "Groundwater Source Control Evaluation Status, January 2013" (DEQ, 2013a).

(4) Site also is part of the larger Willbridge Bulk Fuel Area site (ECSI #1549).

(5) This site is not listed separately in Appendix Q of the FS (Anchor et al., 2012), but is included in information listed for the Willbridge Bulk Fuel Area (ECSI #1549). COIs for this site are from the listing for ECSI #1549.

(6) Site is not listed in Appendix Q of the draft FS or Table 4.2-2 of the Portland Harbor RI/FS Draft Final Remedial Investigation Report (Integral Consulting et al., 2011), and site COIs are not listed in ECSI database (DEQ, 2012).

(7) The Willbridge Bulk Fuel Area consists of three bulk petroleum facilities, including two within Basin 22 (Chevron - Willbridge Distribution Terminal and Unocal – Willbridge Terminal) and is not shown as a separate facility in Figures 1b and 3 of the DEQ Milestone Report (DEQ, 2013a).

Industrial sites covered or historically covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of pollutants to the City conveyance system. Sites within the basin that currently hold, or historically held, NPDES permits to discharge to the Basin 22 conveyance system are listed in Table 2. Sites with

current NPDES permits are shown in Figure 1. Note that the City and ODOT both have NPDES Municipal Separate Storm Sewer System (MS4) stormwater permits that also cover basin drainage areas.

Table 2. Current(1) and Historical NPDES Permit Coverage in Basin 22

Address	Company	Permit Type	Time Period
5501 NW Front	Chevron Willbridge Asphalt	Cooling Water (100J)	1985 – 1995
		Stormwater (1200-H)	1992 – 1996
	Chevron Willbridge Asphalt/ Paramount Petroleum Corporation/ **Paramount Petroleum Corporation**	Stormwater (1200-Z)	2002 – Present
5814 NW Doane	BNSF Willbridge Yard	Stormwater (1200-Z)	1999 – 2005
5528 NW Doane	Unocal Terminal	Stormwater (Individual)	1984 – 1997
		Stormwater (1200-T)	1992 – 1998
	Tosco Corporation/ConocoPhillips	Stormwater (1300-J)	1997 – 2004
	ConocoPhillips/**Phillips 66 Company**	Stormwater (1200-Z)	2007 – Present
5531 NW Doane	**Chevron USA Willbridge Distribution /Chevron Products Company**	Individual NPDES	1991 – 1998
		Oily Stormwater (1300-J)	2000 – 2007
		Stormwater (1200-Z)	2007 – Present
5700 NW Front	Great Western Chemical Co.	Stormwater (1200-H)	1992 – 1996
	Great Western Chemical Co./Quadra Chemical Co./**Brenntag Pacific, Inc.**	Stormwater (1200-Z)	1997 – Present

Notes:

BNSF = Burlington Northern Santa Fe; NPDES = National Pollutant Discharge Elimination System

(1) Current permits are indicated in bold.

3.3 Outfall Setting

Outfall 22 discharges to Willbridge Cove within a large area of potential concern (AOPC 16) identified by the U.S. Environmental Protection Agency (EPA) based on elevated concentrations of metals, polycyclic aromatic hydrocarbons (PAH), and other contaminants in river sediment (EPA, 2010). In addition to Outfall 22, 11 non-City outfalls discharge to AOPC 16 in the area of Willbridge Cove. There are also three docks in the cove.

4 Basin Screening and Source Investigations

The Willbridge Bulk Fuel Area study area (ECSI #1549), which Outfall 22 partially drains, has known petroleum-contaminated groundwater, including free product[1] floating on the groundwater surface. Individual companies within the study area have been working with

[1] Separate-phase hydrocarbons.

DEQ since the 1970s to address migration of contaminated groundwater. Contaminated groundwater can discharge directly to the river or via the City's conveyance system, through infiltration into storm lines or migration through the conveyance system bedding. All of the basin properties east of Highway 30 are in the DEQ Cleanup Program. Therefore, the City's approach to source investigation in this basin consisted of:

- Evaluating whether there are significant stormwater sources in the basin upgradient of the Willbridge bulk fuel terminals area that need to be controlled.
- Identifying any stormwater-specific issues for the Willbridge bulk fuel terminals area that need to be referred to DEQ.
- Continuing support of DEQ on investigation and control of groundwater impacts to the municipal storm system.

The City evaluated inriver sediment data in the vicinity of Outfall 22 in 2002 and subsequently conducted an inline solids source investigation for three metals (cadmium, copper, and zinc), polychlorinated biphenyls (PCB), PAHs, phthalates, and pesticides to determine if contaminated inline solids were present and whether major stormwater sources were likely in the basin. Although some contaminants exceeded screening levels, the exceedances were relatively small and did not warrant additional source tracing upgradient of the bulk fuel terminal area (BES, 2008). In 2007-2008, the Lower Willamette Group (LWG) collected stormwater and sediment trap data in Basin 22 at a point representing all piped discharges to the basin (Anchor and Integral, 2008), and the City evaluated these data to determine if the results changed the City's conclusions about the need for additional stormwater source tracing (BES, 2010). Based on the results of these data and site investigation results, the City concluded that further City source tracing in Basin 22 was not needed (BES, 2010).

In 2010-2011, the Chevron Willbridge and Unocal-Willbridge Terminal (now Phillips 66) sites jointly collected stormwater upgradient and downgradient of the Terminal to meet DEQ Cleanup Program requirements (ARCADIS, 2012). Results of these evaluations are currently under DEQ review. Based on the City's review of these data (BES, 2012), they do not indicate the presence of major sources upgradient of the Terminal.

The City has continued to coordinate with DEQ on groundwater issues related to the municipal system to ensure that site evaluations encompass all potentially significant pathways.

Investigations and evaluations completed by the City and others in the Basin 22 conveyance system are listed in Table 3.

Table 3. Investigations in the Basin 22 Stormwater Conveyance System

Data Collection Period	Party	Purpose	Documentation
2000	City	Compile basin background information to identify potential sources.	Preliminary Evaluation of City Outfalls (West Shore) (BES, 2000)
2002	City	Evaluate inriver sediment data near City outfalls to prioritize basins for source tracing.	Programmatic Source Control Remedial Investigation Work Plan (CH2M HILL, 2004)

Data Collection Period	Party	Purpose	Documentation
2005	City	Evaluate existing data on groundwater plumes and identify the potential for City conveyance systems (including Basin 22) to act as preferential pathways.	Relationships Between Upland Shallow Groundwater Plumes and the City Stormwater and Combined Conveyance System with the Portland Harbor (GSI, 2006)
2006	City	Collect inline solids samples to evaluate whether contaminated solids were present and indicative of sources within the basin.	Outfall Basin 22 Inline Solids Sampling Technical Memorandum No. OF 22-1 (BES, 2008)
2007-2008	LWG	Collect stormwater and sediment trap samples representative of discharges from the whole basin to evaluate stormwater discharges representative of industrial land use.	Portland Harbor RI/FS. Round 3A and 3B Stormwater Data Report (Anchor and Integral, 2008)
2007-2008	City	Evaluate stormwater data from City outfalls (including the LWG stormwater and sediment trap data from Basin 22) to identify additional source tracing needs.	Stormwater Evaluation Report. City of Portland, Bureau of Environmental Services (BES, 2010)
2007	Chevron Asphalt USA	Chevron Asphalt video surveyed a portion of the City storm line along NW Front Avenue to verify site connections to the conveyance system and observe potential groundwater infiltration.	Source Control Evaluation Report – Former Chevron Willbridge Asphalt Plant (ARCADIS, 2009)
(No basin data collection)	Chevron Willbridge and ConocoPhillips	Evaluate historical groundwater data to assess whether existing source control measures are controlling migration of groundwater contaminants and free product from the Chevron and ConocoPhillips terminals to the river. Evaluation included an assessment of potential groundwater discharges to the City's NW Doane Avenue storm line.	Groundwater Source Control Evaluation Report (ARCADIS, 2011)
2010 – 2011	Chevron Willbridge and ConocoPhillips	Conduct video observations and collect stormwater samples from the City's Basin 22 conveyance system, upgradient and downgradient of the Terminal, to evaluate the stormwater discharge pathway and the potential preferential groundwater pathway from the Chevron and Unocal (ConocoPhillips) sites to the river through the NW Doane Avenue storm line.	NW Doane Avenue Stormwater Evaluation Report (ARCADIS, 2012)

The City's investigation and data evaluation did not identify any current major sources of contaminants in Basin 22 upgradient of the Willbridge terminal sites.

5 Completion of Source Identification

The lines of evidence evaluated to verify that source tracing is complete and all major sources have been identified include (1) results of source tracing activities conducted in the basin (including review of upland site information), (2) the extent of upland investigation coverage, and (3) land use in remaining portions of the basin that are not subject to active investigation. Findings from this evaluation are summarized below.

- *Source Tracing Results (and Upland Site Information)*: Evaluation of storm solids and water collected from the system indicates that concentrations are generally below screening levels. The few exceedances are relatively low, indicating no major stormwater sources to the basin. Upland site source control evaluations conducted in the basin have extensively documented the presence of petroleum-contaminated groundwater and free product infiltrating the City conveyance system; sources of elevated contaminant concentrations in basin dry-weather flow have been identified.
- *Upland Investigation Coverage*: Figure 2 displays the spatial extent of DEQ Cleanup Program site investigations and other programmatic controls (see key to figures provided at beginning of this Appendix). As shown in Figure 2, almost all sites within the industrialized portion of Basin 22 are in the DEQ Cleanup Program and:
    - Are investigating the stormwater and preferential groundwater pathways and implementing SCMs under DEQ Cleanup Program authority;
    - Have completed investigation and remediation activities under DEQ oversight; and/or
    - Are covered under NPDES stormwater regulations.
- *Land Use:* Land use at sites not covered by DEQ Cleanup or Water Quality Programs consists primarily of open space (Forest Park), and a mix of residential, commercial, and industrial uses. Most of these properties have little to no outdoor exposure except for the roofing company, which has implemented stormwater controls under City Code. Any current and future industrial activities exposed to stormwater at these sites will be addressed by the DEQ NPDES Program, and non-industrial activities are not a known or suspected major source of contaminants to the City stormwater conveyance system.

Based on these lines of evidence, the City concludes that Basin 22 source tracing is complete and all major sources have been identified.

6 Basin Source Controls

The City and DEQ collaborated under their respective authorities to identify control mechanisms for major sources identified in the basin. Source control for major and minor sources in Basin 22 includes SCMs completed (or planned) at contaminated sites under DEQ Cleanup Program agreements, specific controls implemented within the City's shared stormwater conveyance system (e.g., pipe lining to address contaminated groundwater infiltration and targeted line cleaning), and ongoing City and DEQ programs that are described in the Municipal Report. Source controls implemented in Basin 22 are displayed in Figures 1

and 2. Additional site-specific, programmatic, and conveyance system source controls completed to date for discharges into the municipal storm system are summarized in Table 4.

Table 4. Basin 22 Source Controls

Site / Area	Source Controls	Implementation Timeframe
Source Control Measures (SCM) at DEQ Cleanup Sites [(1)]		
Chevron USA Asphalt Refinery (ECSI #1281)	Completed targeted catch basin and storm line cleaning.	2007; 2009
	Conducted video surveys to verify that former connections to Basin 22 had been abandoned.	2007
Chevron - Willbridge Distribution Terminal (ECSI #25)	Replaced portions of the site storm system to prevent the infiltration of petroleum-contaminated groundwater.	2003; 2007-2009
	Installed emergency shut-off/control valves to prevent product releases to the basin.	2003; 2008
	Installed storm filters in the new manholes to reduce total suspended solids (TSS) loading.	2007 – 2009
	Chevron Environmental Management Company prepared and is implementing an "Outfall Inspection and Sheen Response Plan" to monitor and respond to oily sheen discharges from the outfall.	2009 -- Present
	Additional SCMs to be determined for stormwater and preferential groundwater pathways.	To be determined
McCall Oil (ECSI # 134)	No SCMs identified for the site area draining to Basin 22.	Not applicable
ODOT – Portland Harbor Source Control Evaluation (ECSI #5437)	To be determined.	To be determined
Unocal – Willbridge Terminal (ECSI #177) (Phillips 66)	Targeted removal of legacy materials in site storm system (catch basin, oil/water separator, and storm line cleanouts).	2008 – 2010
	Repair and lining of onsite manhole connecting storm line to prevent groundwater infiltration.	2010
	Additional SCMs to be determined for stormwater and preferential groundwater pathways.	To be determined
Willbridge Yard (BNSF) (ECSI #3395)	No SCMs identified for the site area draining to Basin 22.	Not applicable
City Conveyance System		
NW Doane Avenue	ConocoPhillips constructed Cure-in-Place Pipe (CIPP) liners in portions of the City system between NW Doane Avenue and the site system to prevent petroleum or hydrocarbon-impacted groundwater infiltration.	2008

Site / Area	Source Controls	Implementation Timeframe
NW Front Avenue	Chevron USA Asphalt cleaned an 8" storm line on NW Front Avenue that historically conveyed only discharges from the site, to remove legacy inline solids.	2009
Outfall pipe	A CIPP liner was installed in the main line between NW Front Avenue and the outfall pipe. The CIPP lining is intended to mitigate petroleum or hydrocarbon-impacted groundwater infiltration.	2010
Other (Programmatic SCM)		
Anderson Roofing, Chevron Willbridge Distribution Terminal	**Stormwater Management Manual Requirements**	Ongoing
See listing in Table 2	**NPDES 1200-Z Stormwater Permit Requirements**	Ongoing

Notes:

BNSF = Burlington Northern Santa Fe; ODOT = Oregon Department of Transportation; ECSI = Environmental Cleanup Site Information

(1) For upland sites, descriptions of SCMs are based on information in DEQ Milestone Report (DEQ, 2013a), DEQ source control decisions (DEQ, 2010, 2013b), and/or reports on file with DEQ (Anchor QEA, 2011; ARCADIS, 2009, 2010, 2011; Santec, 2011).

Additionally, several SCMs have been implemented by Willbridge Terminal facilities to minimize groundwater migration via the bedding of private and municipal storm lines, including installation of recovery wells and cutoff collars. DEQ will determine if additional SCMs are needed to address this pathway.

All major contaminant sources have been controlled or will be controlled after implementation of SCMs has been completed under the programs identified above.

The City and ODOT both have NPDES MS4 stormwater permits that cover basin drainage areas. Other municipal programs (e.g., periodic inspection of and technical assistance to non-NPDES sites, illicit discharge monitoring, street sweeping, etc.) likely provide additional source control benefits in the basin and will help to address minor sources for which specific control measures have not been required. City programs that control current and future contaminant discharges to the conveyance system are described in the Municipal Report.

7 Conclusion

At the time the City initiated the Basin 22 evaluation, most of the developed portion of the basin already had been identified as potential sources by DEQ. Based on subsequent data collected by the City and other parties, no other major sources of contaminants to the City conveyance system were identified. Because necessary SCMs at identified sources have been implemented or are being determined under appropriate DEQ and City regulatory authorities, future discharges from Outfall 22 are unlikely to represent a significant source of contaminants to the river. The City concludes that it has met the RI/SCM objectives of the IGA and requests a source control decision from DEQ for Basin 22.

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List of Figures

FIGURE 1

Basin 22
Overview and Conveyance System Source Controls

- Basin 22
- DEQ ECSI Site
- NPDES Stormwater Permit
- NPDES No Exposure Certification

Conveyance System

- Storm Line
- Culvert
- Ditch
- Channel
- Water Quality Swale
- Lined Pipe
- City Outfall
- Non-City Outfall

Land Use/Zoning

- Heavy Industrial
- Residential
- Parks and Open Space
- Major Transportation

All Other Data

- River Mile (RM)
- Tax Lot
- Discharges to City Outfall
- Portland Harbor Hydroboundary

N

0 170 340 510
Feet

MAP NOTES:
Date: December 31, 2013
Data Sources: BES, METRO

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912

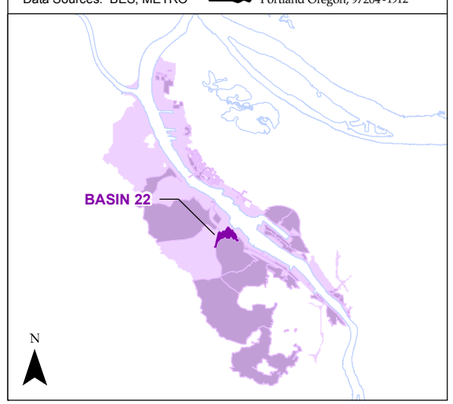

FIGURE 2

Basin 22
Upland Site Source Controls

- Basin 22
- Tax Lot

DEQ Stormwater SCE

- SCEs implemented or pending

All Other Features

- NPDES Stormwater Discharge Permit
- NPDES No Exposure Certification
- Stormwater Treatment Facility
- Ecoroof
- Site Inspection - BES Industrial Stormwater Program
- Discharges to City Outfall
- Portland Harbor Hydroboundary

N

0 140 280 420

Feet

MAP NOTES:
Date: January 9, 2014
Data Sources: BES, METRO, Aerial Photo Taken 2012

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CITY OF PORTLAND
1120 SW Fifth Avenue, Room 1000
Portland Oregon, 97204-1912