



# INVENTORY METHODOLOGY

## Inventory Area

The 15,500-acre industrial land inventory area is the portion of the city committed to future industrial and industrially related uses. It consists of all taxlots that intersect (entirely or in part) with General Industrial (IG), Heavy Industrial (IH), or General Employment (EG) zoning in the *Portland Zoning Code* and any additional taxlots that intersect corresponding Industrial Sanctuary or Mixed Employment designations in Portland's *Comprehensive Plan*. The latter are expected to convert to industrial or employment zones over the long term. Industrial zones encompass 90 percent of the inventory area, and employment zones 8 percent. General Employment zones are included because they emphasize industrial and industrially related uses, while allowing a somewhat broader mix of land uses. An exception was made to the inventory area methodology concerning about 600 acres of publicly owned open space (the former St. Johns landfill and nearby wetlands) in the Smith and Bybee Lakes area of the Rivergate District. These taxlots each have a combination of open space and industrial zoning, but they are not included in the inventory area, since they are not expected to become available for industrial development in the foreseeable future.

## Sites

The basic geographical units used to analyze industrial land in the atlas are sites, which are linked to descriptive data about the underlying land, such as the businesses located there or the portion that is either vacant or in the 100-year floodplain. The term "site" here refers to contiguous taxlots that function and are controlled as a single development property and are generally held in single ownership. The following steps were used to define sites.

### 1. Combine contiguous taxlots under single ownership.

Taxlots were used as a starting point to identify properties, drawing from the City of Portland's Corporate Geographical Information System database of county assessment and taxation (A&T) records from February 2003. However, many properties include multiple taxlots that have no relation to the development pattern or to how the owner might reconfigure the property in the future. To more accurately describe the characteristics and developability of functioning properties, contiguous property ownership is used instead of taxlots to represent sites. A modified owner field was created, which was a simplified version of the A&T owner field, to standardize owner names. Adjustments were made for small inconsistencies in the data entry of these names, such as abbreviations and joint names in reverse order. The taxlots were dissolved on this modified owner name to create sites defined by adjacency and common ownership. Rights-of-way (either street or railroad) were also used as site boundaries, such that common ownership on both sides of a street were separated into two sites.

### 2. Combine sites that function as a single development property.

Aerial photos were examined to identify draft site boundaries that bisect structures or other features that appear to be part of the development pattern of single sites. Then the following steps were taken that resulted in combining nearly all of these sites. Adjacent sites were combined if one is owned by a company and the other is held by an owner of that company, based on Oregon Secretary of State records. Generally, privately owned sites less than 1,000 square feet were merged with the adjacent larger site if it appeared to function as part of the larger site. Sites with different owner names but clearly used as a single development property were combined, removing site boundaries that bisect structures or parking lots or other exterior uses that function as part of the property, based on aerial photos and field investigation. Parts of single taxlots that are split by waterways primarily along the Columbia Slough are considered single sites. Sites that are under the same ownership and separated by street rights-of-way were identified for possible future reference but were not combined. The site boundaries of Port of Portland properties, including public terminals, right-of-way, leases, and open spaces, were adjusted based on consultation with Port planning staff. Adjacent Port-owned taxlots were generally combined into single sites (e.g., portions of Terminal 6), except that the different large functional areas of the 2,700-acre airport complex described in the Airport Master Plan were separated into distinct sites, as were taxlots used primarily or entirely as open space.

### 3. Remove right-of-way and undevelopable fragment sites from the inventory area.

In most cases, but not all, A&T data excludes street and rail rights-of-way from taxlots. To be more consistent in excluding right-of-way, aerial photos were examined to identify taxlots that function as rail or street right-of-way. Waterfront edge sites that are under separate ownership but appear too narrow to develop were also identified. Then various steps were taken that resulted in removing most of these fragment sites from the inventory area. Publicly owned sites less than 1,000 square feet, which typically function as parts of right-of-way, were removed. Oblong taxlots were removed if the area divided by perimeter was less than eight, identifying sites that are too narrow to be developable and typically function as right-of-way or waterfront edge parcels. Taxlots were removed if occupied by rail lines and owned by railroads or the Port of Portland, except that rail yards and taxlots that widen out into developable property were retained. Railroad-owned properties not occupied by rail lines were also retained. Submerged portions of sites were excluded, based on aerial photos taken in July when the river and stream level was approximate to the average low water line.

## Facility Types

Facility types are the basic site attribute used in the atlas to map the land use patterns of industrial districts and to analyze industrial sectors by their use of land and their site characteristics. A facility type is identified for each site, classifying it by the industry of its occupant or by its primary use. In most cases, facility type is determined by the business

establishment(s) on the site. The methodology for identifying facility types is described below.

### 1. Develop a framework for classifying facility types in industrial districts

The North American Industrial Classification System (NAICS) groups establishments into industries according to similarity in the processes they use to produce goods or services. The framework used in the atlas to classify sites by facility type (shown in the matrix below) is equivalent to the NAICS classification of employment by industry sector. For example, general industrial facilities in the atlas correspond to the production and raw materials sectors in NAICS (manufacturing, construction, and utilities); distribution facilities correspond to distribution sectors (wholesale and transportation); and service facilities to service sectors. However, the Standard Industrial Classification (SIC) equivalent of NAICS sectors were used in identifying facility types, because the primary data source available classified establishments by SIC rather than NAICS codes. Service facilities are separated into industrial and non-industrial categories, to identify types of services that are more widely present in Portland's industrial districts. Multi-tenant facilities, which often have an interchangeable mix of uses, are distinguished as a separate facility type. Multi-tenant facilities are identified by the presence of two or more employers on a site. The real estate industry's "flex space" category of industrial construction is generally a subset of the "four or more tenants" facility type that is typically further distinguished by particular tenant-mix patterns (e.g., tech-flex, warehouse showrooms) and attractive physical design. No facility type is identified for unoccupied sites, those that may be developed but have no current tenant using the site. A "heavy industrial" designation is applied across a range of facility types to sites with large-scale industrial operations or rail, runway, or harbor use. These heavy industrial facilities may also have objectionable impacts and specific site needs that limit their location options.

### 2. Assign a facility type to each occupied site.

Steps were taken generally in the following order. First, freight terminal sites were assigned, regardless of the employers located there, since terminal operations are typically the primary function of these large sites. Second, facility types were assigned to sites based on the employers located there, drawing from Inside Prospects data. Third, residential facilities were identified, based on residential zoning or residential structures identified by assessment and taxation data. Fourth, sites in public and utility ownership not addressed in the previous steps were assigned to the corresponding public and utility facility types. Employment data did not fully report the extent of these facilities across the city. Fifth, upon field inspection, the previous steps did not provide a complete account of occupied sites, particularly of employers with multiple sites, so InfoUSA employment data (2003) and field inspection (2004) were used as supplemental data sources, focusing on sites not previously assigned to facility types. The covered employment data (ES202) from the Oregon Employment Department used for employment analysis could not be used for mapping, due to employer confidentiality requirements. Sixth, multiple-employer sites with a primary occupant were reclassified to the facility type of that occupant. Primary occupants were identified by owner occupancy or having

visibly primary land occupants determined by field inspection, which focused on multiple-employer sites larger than 10 acres.

FACILITY TYPE	CRITERIA TO DETERMINE FACILITY TYPE (SIC CODES IN PARENTHESES) OR ATTRIBUTE
<b>General Industrial</b>	
Manufacturing	Manufacturing (20-39) employer.
Utilities	Utility (48-49) employer or unoccupied site in utility ownership.
Construction	Construction (15-17) employer.
<b>Warehouse and Distribution</b>	
Freight Terminal	Rail yard; airport runway and terminal sites; marine terminal sites (distribution facilities for handling, or truck terminal (42) on sites with 50,000 or more square feet of structure area.
Other Transportation	Transportation (40-47) employer.
Wholesale trade	Wholesale (50-51) employer.
<b>Multi-Tenant</b>	
[primary occupant]	Multiple-employer sites with a primary occupant were identified and classified by the facility type of that occupant. Primary occupants include owner occupants and visibly primary land occupants determined by field inspection of sites generally larger than 10 acres.
2-3 tenants	2-3 employers on site, except primary occupant sites.
4 or more tenants	4 or more employers on site, except primary occupant sites.
<b>Industrial Services</b>	
Public	Government (90s) employer or unoccupied site in public ownership.
Rental & Maintenance	Repair (753, 76), equipment rental (735), laundry and garment services (721) or building maintenance (734) employer.
<b>Non-Industrial</b>	
Retail	Retail (52-59) employer
Other services	Services (60-89) employer, except for industrial services.
Residential	Residential use in A&T data or residential zone.
<b>Unoccupied</b>	
Unoccupied sites	No identified employers, except for public or utility ownership or residential site.
<b>Selected Facility Attributes</b>	
Heavy Industrial	Sites (except multi-tenant sites) that meet any of the following criteria: freight terminal facility; 100,000 or more square feet in structure footprint area; ten or more acres in outdoor impervious area; marine loading or moorage structure; active rail spur visible in 2003 aerial photography; or airport runway or terminal.
Open Space	Part or all of site not expected to be available for development, including the following: open space, environmental protection, or river natural zones; mitigation sites resulting from wetland fill or habitat development; public drainage facilities; or 10-year floodplain.

## Vacant Land Classification

Metro recently quantified the vacant industrial land supply regionwide, to inform policy decisions in 2002 and 2004 that substantially expanded the “urban growth boundary,” a regionally set limit on sprawl containing a 20-year land supply for urban growth. In the atlas, refinements were applied to Metro’s vacant industrial land analysis focusing on development constraints that are more prevalent in Portland’s older, riverfront industrial areas—floodplain, wildlife habitat, and environmental cleanup sites. These refinements are intended to better understand development constraints at the site and district level and facilitate responsive planning and economic development efforts. “Vacant land” here refers to unimproved land as a measure of growth potential, rather than land for sale or lease which varies daily with changes in market conditions. In some cases, vacant land is in active industrial use, such as an unimproved outdoor storage area, but is assumed to be available in the long term for more intensive use. The following steps were used to classify vacant land by development constraints.

### 1. Identify vacant land potentially available for private development.

Metro’s 2002 inventory of vacant (unimproved) land identified by aerial photography was used as a starting point, identifying 3,880 acres in Portland’s industrial districts. Vacant “open space” totaling 553 acres was deducted, consisting of land in open space (OS), environmental protection (p), and river natural (n) zones; mitigation sites established through wetland fill or environmental zone permitting; Johnson Creek 10-year floodplain; and public drainage facilities. Public drainage easements of the Multnomah County Drainage District were not included, only because GIS mapping of those easements is not currently available. Vacant land in public or utility company ownership was also deducted (413 acres), except for land owned by the Port of Portland, Portland Development Commission, or Bureau of Environmental Services that is expected to be available for private development. The resulting vacant land supply that is potentially available for private development is 2,914 acres.

### 2. Identify land constrained by floodplain, wetlands, steep slopes, or significant habitat (except open space) as partly buildable (Tier F).

Bureau of Planning staff consulted representatives of various organizations to seek advice on how to estimate the developable portion of vacant industrial land in Portland affected by floodplain and significant fish and wildlife habitat, where current regulations generally allow, but limit, development. The organizations included Portland Bureau of Environmental Services, Portland Endangered Species Act Program, Bureau of Development Services, Portland Development Commission, Port of Portland, Metro, Columbia Corridor Association, and Group MacKenzie. Maps were distributed of 61 sites with potentially developable floodplain areas larger than five acres, and a meeting was held in May 2004 focused on discussion of seven of those sites. Drawing from the ideas raised at that meeting, the atlas project staff used the following methods of classifying buildability of vacant floodplain and habitat. First, the open space areas identified in the preceding step identify land not expected to be available for development. Second, updated information on floodplain and vested development

projects that have already been permitted, filled, and partially developed are estimated to be buildable. Mapped 100-year floodplain that is impervious (already developed) and shown by City of Portland elevation data to be two feet or more above the base flood elevation is classified as buildable (part of Tier E). The Cascade Station Plan District area (except environmental conservation zones and open spaces) and the permitted and filled floodplain area developed by the Port of Portland in Rivergate (sites northeast of Lombard Street and sites along Leadbetter Road) are classified as buildable (part of Tier E). Third, other land affected by 100-year floodplain, 1996 flood inundation area (Title 3 delineation), wetland (Title 3 delineation), slope exceeding 10 percent, and Metro Goal 5 significant habitat inventory (excluding impact areas) are identified as “partly buildable” (Tier F, 1,102 acres). The portion of Tier F that is buildable is not estimated in the atlas and will depend on evolving regulatory limitations (e.g., development and local implementation of regional Goal 5 habitat protection rules) and how individual development proposals respond to the conditions of particular sites. The “buildable” vacant land supply identified in the atlas is quantified by deducting partly buildable land (Tier F) from the land potentially available for private development calculated in step 1 (i.e., 2,914 acres – 1,102 acres = 1,811 acres rounded off).

### 3. Identify the availability and use constraints (Tier A-D) of buildable vacant land.

The *Regional Industrial Lands Study* (1999) classified vacant, buildable industrial land by tiers of availability and use constraints (Tiers A-D), which Metro later updated. Generally, Tier D is redevelopable land with 10 percent or less site coverage by structures (e.g., farms); Tier C consists of taxlots less than an acre in size or valued above market rate for industrial land; Tier B consists of taxlots larger than two acres that are partially developed, available for lease only, or have access or unstable soil constraints; and Tier A has none of these identified constraints. Metro’s identification of Tier A-D land was applied to the universe of “buildable” vacant land identified in the atlas (1,811 acres). Other buildable areas that Metro did not classify in Tiers A-D were added to Tier E, which also includes the vested sites and updated floodplain area described in step 2. Tier E this consists of “other buildable” vacant land identified by the Bureau of Planning, most of which is equivalent to Tier B. The Port of Portland owns 62 percent of Tier E land and manages these sites as a lease-only land bank.

### 4. Identify vacant land on sites with environmental cleanup or investigation projects.

The Oregon Department of Environmental Quality (DEQ) maintains a database of environmental cleanup sites statewide, described as “working information” that may be unconfirmed, outdated, or incomplete. The Bureau of Environmental Services mapped these sites in Portland in collaboration with Bureau of Planning and Portland Development Commission staff, although the contaminated portions of the sites are not mapped. These sites are a starting point for identifying “brownfields,” which the U.S. Environmental Protection Agency characterizes as abandoned or underutilized sites where redevelopment is complicated by real or perceived contamination. Potentially, brownfields are vacant or underutilized because of cleanup liability. In most cases, the cleanup and investigation sites identified by DEQ are occupied

and being investigated and cleaned by the owner or another responsible party. In the atlas, vacant land (cleared and unimproved) and lack of occupancy (no current tenant) are identified among cleanup and investigation sites as indicators of potential brownfields. Sites with active cleanup or investigation projects have been identified within each tier of vacant

land described above, totaling 1,095 acres of vacant industrial land. However, the vacant portion of those sites may not actually be contaminated or affected by the investigation or cleanup process. Unoccupied, developed land on cleanup and investigation sites is also mapped as an indicator of brownfields.

## DATA SOURCES

Data Layer	Source	Date
<b>Sites and Structures</b>		
Impervious Surface	Developed as 10'x10' pixel grid data by Bureau of Planning from June 2002 multi-spectral imaging data.	March 2004
Industrial Districts	District boundaries developed by Bureau of Planning and Portland Development Commission for atlas.	March 2004
Property Values	Developed by Bureau of Planning by aggregating all real property value accounts from Multnomah County Assessment & Taxation data.	March – July 2004
Property for Sale or Lease	CoStar	April 2004
Sites	Developed by Bureau of Planning and Portland Development Commission by aggregating adjacent taxlots with common ownership.	March 2004
Structures	Original building footprints from 1994 photogrammetrics. Updated by Bureau of Planning using 2003 aerial photography.	2004
Structures, 3+ Stories	Fire Bureau data mapped by Portland Development Commission.	2004
Taxlots	Original geography and property data maintained by Multnomah County Assessment & Taxation.	February 2003
Vacant Land	Geographic information system (GIS) layer maintained by City of Portland Corporate GIS. Developed by Metro from 2002 photogrammetrics. Classification into tiers A-F, public and utility sites, and open space by Bureau of Planning.	2002
<b>Land Use and Employment</b>		
Facility types	Inside Prospects (2002), supplemented by InfoUSA (ESRI Biz Data – 2003) and Bureau of Planning field inspection (2004).	2002 - 2004
Industry Mix by Employment	Oregon Employment Department ES 202 compensated employee data on Covered Employment. Monthly estimates are averaged for year. Confidentiality requirements limit use of data that may identify specific employers.	2002
Largest Employers	Inside Prospects	2002
Zoning including Overlays	Developed and maintained by Bureau of Planning.	March 2004
<b>Infrastructure</b>		
Airport Runways	Developed by Bureau of Planning from 2003 aerial photography.	2004
Bus Routes and Frequencies	Developed and maintained by TriMet.	March 2004
Capital Improvement Program (CIP)	Developed by individual bureaus for citywide Capital Improvement Program.	2003-2004
Freeway Ramps	From regional street centerline maintained by Portland Office of Transportation and Metro.	March 2004
Freight Projects	Developed by Portland Office of Transportation for the Transportation System Plan.	December 2002
Proximity to transportation infrastructure	Developed by Bureau of Planning from the straight-line distance from the GIS-determined centroid of each site to the nearest infrastructure by 50-foot increments.	March 2004
Railroads	Developed by Metro, registered to taxlots.	1995
Sewer Collectors	Developed and maintained by Portland Bureau of Environmental Services.	2003
Truck Routes	Developed by Portland Office of Transportation for the Transportation System Plan.	December 2002
<b>Environmental Constraints</b>		
10 Percent Slope	Developed as 10'x10' pixel grid data by Bureau of Planning from 1994 photogrammetric topographic data.	2004
100 Year Floodplain	Developed by Bureau of Environmental Services for modeling purposes.	2003
Goal 5 Significant Habitat	Inventory by Metro of significant fish and wildlife habitat resources for Goal 5 program. Impact areas are not included.	May 2004
Potential Cleanup Sites	Environmental Cleanup Site Information (ECSI) data developed by Oregon Department of Environmental Quality. Modified for mapping by Bureau of Environmental Services and Bureau of Planning.	2004
Title 3 Flood Inundation	Originally developed by the U.S. Army Corps of Engineers from 1996 aerial photography. Modified by Metro for Title 3.	
Wetlands	Metro Title 3 Wetlands Inventory	

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# GLOSSARY

## Capital Improvements Plan, City of Portland

A 10-year list of prioritized capital improvements adopted by City Council for planning and budgeting purposes. Also called Capital Improvements Program.

## Cleanup and Investigation Sites

Sites (as defined in the atlas) where the Oregon Department of Environmental Quality (DEQ) identifies one or more cleanup or investigation projects in its published Environmental Cleanup Site Information database. Cleanup and investigation sites identified as unoccupied or vacant land in the atlas do not include sites where DEQ has issued a "No Further Action" required letter.

## Developed Area

All site area except identified vacant (unimproved) land and open space (land not generally available for development).

## District Specialty Industries

Specialty industries (3-digit NAICS level) concentrated in the district are identified as those having the highest percentage share of their citywide employment located within the district.

## Facility Types

A framework for classifying (see page 16) and mapping (see page 32) each site by the industry of its current occupant or by its primary use. Steps taken to identify facility types are summarized above in this chapter.

## Multimodal Freight Access

Sites with access to the airport runway system, a railroad (main line or spur), or the Portland Harbor deepwater channel are identified by adjacency, although the facilities on site might not use these freight transportation modes.

## Heavy Industrial Facilities

A freight terminal or other large-scale industrial facility identified by either 100,000 or more square feet in structure footprint area, ten or more acres in outdoor impervious area, marine loading or moorage structures, or an active rail spur on site.

## High Land Value Sites

Sites with land value exceeding typical industrial land market prices in the metro area, identified as \$6 or more per square foot of developed area based on taxlot market value estimates of Multnomah County Assessment and Taxation.

## Industrial Districts

Geographically proximate areas of land committed to future industrial or general employment use in the *Portland Zoning Code* or *Comprehensive Plan*.

## NAICS

The North American Industrial Classification System is the current standard system used to identify groups of industries.

## Occupied Site

A site currently occupied by a tenant, identified by employment data and supplemented by limited field investigation.

## Open Space

Land that is generally not available for development, identified by certain zones (open space, environmental protection, and river natural zones), mitigation sites established through development projects on regulated wetlands or habitat area, public drainage facilities, and the 10-year Johnson Creek floodplain.

## Outdoor Impervious Area

Outdoor areas are typically paved or graveled and used for storage, vehicle maneuvering area, or parking. They are identified as all impervious area minus structure footprints. Impervious area is identified from 2002 multispectral imaging data.

## Property Value

Market value of land and all real improvements are identified from Multnomah County Assessment and Taxation estimates in 2004. All real value accounts are included for each taxlot.

## Site

Contiguous taxlots that function and are controlled as a single development property and are generally held in single ownership. Steps taken to identify sites are summarized above in this chapter.

## Structure Area

Footprint of buildings and other structures (e.g., tanks, silos) were identified from 1994 photogrametrics updated by 2003 aerial photography.

## Vacant Land

Vacant land refers to unimproved land as a measure of growth potential, rather than land for sale or lease which varies daily with changes in market conditions. Vacant land was identified by Metro in 2002 from aerial photography. In some cases, vacant land is in active industrial use, such as an unimproved outdoor storage area, which is assumed to be available in the long term for more intensive use.

**Vacant Land, Buildable Private**

Buildable vacant land that is potentially available for private development, identified as all vacant land minus the following: open space (land that is generally not available for development); public and utility ownership with some exceptions; and partly buildable (Tier F) vacant land affected by specific environmental constraints. Steps taken to classify vacant land are described in more detail earlier in this chapter.

**Vacant Land, Partly Buildable (Tier F)**

Vacant land potentially available for private development (all vacant land minus open space and public and utility sites with exceptions) where development is generally allowed but limited by specific environmental constraints. Steps taken to classify vacant land are described in more detail earlier in this chapter.

**Zones**

The *Portland Zoning Code* regulates the types of new land uses allowed and some aspects of development, varying by zone across the city. The zoning code is among the tools used to implement the land use patterns recommended in the *Comprehensive Plan*.

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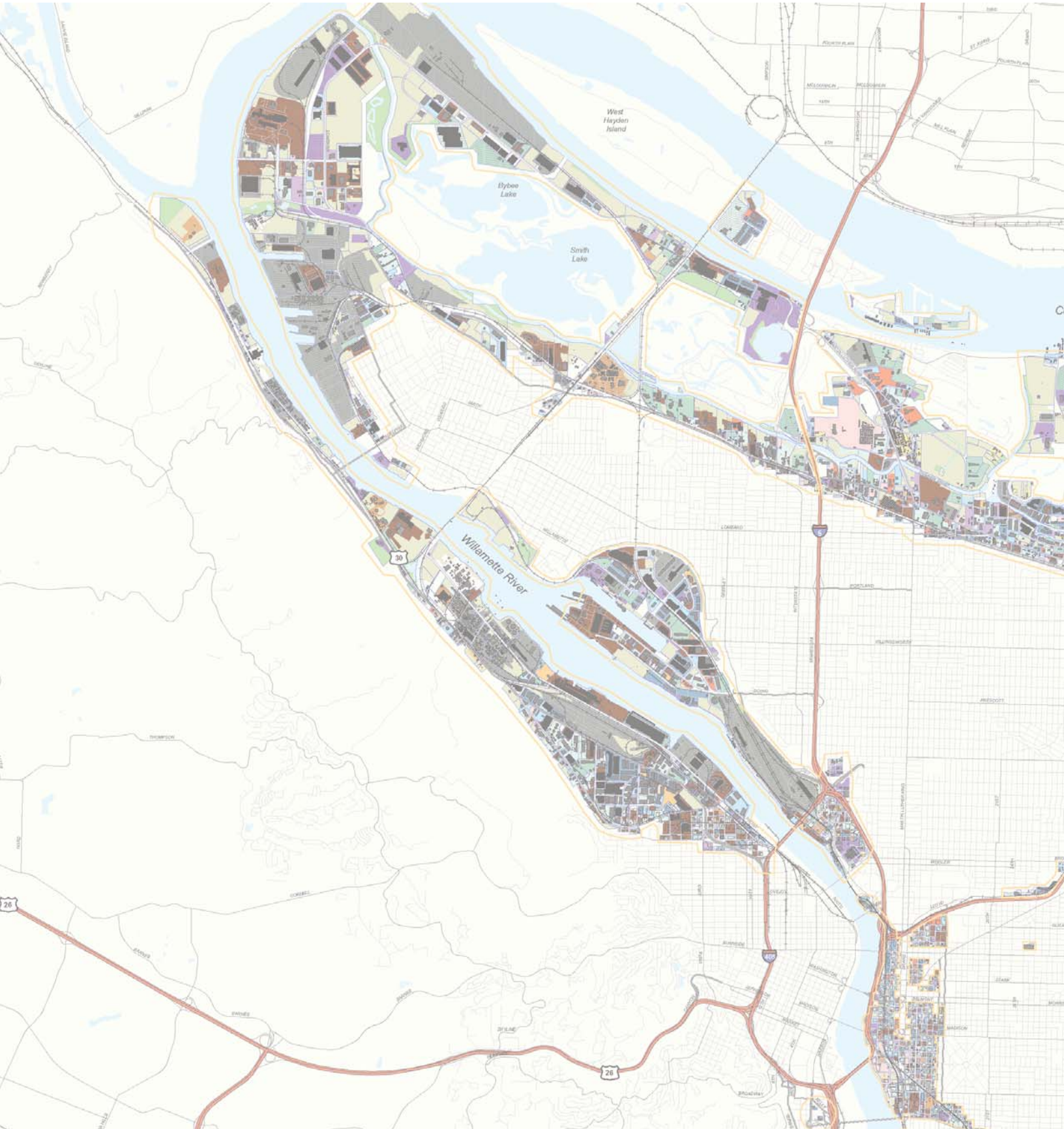
Portland Development Commission

Bureau of Planning

Naito Corporation



*Union Pacific's Albina Yard is the busiest rail yard in the metro area and one of the anchors of Portland's inner city industrial districts.*



**Citywide Industrial Land Facilities**

<b>Heavy Industrial</b>	<b>Distribution</b>	<b>Industrial Services</b>	<b>Open Space</b>	<b>Transportation Infrastructure</b>
Heavy Industrial (overlay)	Freight	Public	Vacant Land	Railroads
<b>General Industrial</b>	Transportation	Rental & Maintenance	3+ Story (overlay)	Freeways
Manufacturing	Wholesale	<b>Non-Industrial</b>	Structures > 100,000 Sq Ft	Major Truck Streets
Utilities	<b>Multi-Tenant</b>	Retail	Other Structures	Streets
Construction	4+ Employers	Services	Site Boundary	0 1,100 2,200 4,400 6,600 8,800 Feet
	2-3 Employers	Residential	Inventory Area Boundary	