PORTLAND HARBOR



INDUSTRIAL LANDS STUDY


Part One: Inventories, Trends and Geographic Context

February 2003

Prepared by:

Portland Bureau of Planning

RIVER RENAISSANCE

City of Portland
Bureau of Planning

Portland Development Commission

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EXECUTIVE SUMMARY

The Portland Harbor Industrial Lands Study assesses the future land needs of industries in the harbor area, focusing on river-dependent, freight-related, and other concentrated industries there. A secondary purpose is to generally describe the structure, dynamics, and outlook of the urban industrial districts along the harbor. The study will be used as background research for area planning efforts related to land use, economic development, infrastructure, and the natural environment. The City of Portland Bureau of Planning partnered with the Port of Portland and Portland Development Commission in drafting, funding, and overseeing the study.

The study was done in two parts. The Bureau of Planning prepared Part One, which is an inventory of harbor area industries, a review of industrial trends, and analysis of the harbor area's economic role in the region. E.D. Hovee & Company prepared Part Two in association with Parsons Brinkerhoff and The JD White Company. Their work draws from 80 interviews with industry leaders to understand the decisions being made in firms that drive industrial development. Part Two analyzes how harbor area industries are changing, their future land and location needs, and the industrial development constraints of harbor area sites, concluding with follow-up policy questions.

A. INVENTORY OF HARBOR AREA INDUSTRIES

The harbor study area consists of the industrial districts downstream of the Steel Bridge—Guild's Lake, Linnton, Lower Albina, Swan Island, St. Johns, and most of Rivergate. This study area covers 5,532 acres of land in taxlots, about one third of the city's industrial land supply.

Employment

Approximately 940 private businesses employed 39,200 workers in the area in 2000. Approximately half of that employment was in the manufacturing sector and one-third in distribution (transportation and wholesale trade). A diverse mix of industrial businesses occupies the harbor area, reflecting its age and competitive advantages as an industrial area. Much of the area has been in industrial use for nearly a century.

Clusters of particular industries in a district are an indication of its competitive advantage for those industries. Metals and equipment manufacturing is the harbor area's largest industry cluster, accounting for 104 businesses and 14,700 jobs in 2000. These industries have become highly interdependent, forming a large portion of each other's suppliers, subcontractors, and customers. Larger harbor area firms in these industries include Freightliner, Gunderson, Cascade General, ESCO, and Oregon Steel.

Distribution (transportation and wholesale trade) is the second largest industry cluster in the harbor area, consisting of 375 businesses and 12,700 jobs. The distribution industries that have high concentrations of employment in the harbor area are water, air, and truck transportation and wholesale trade of alcoholic beverages, metals, furniture, chemicals, and petroleum products.

Land use

The primary development feature of the harbor area is that it is Oregon's freight transportation hub, connecting the seaport with the Columbia and Snake Rivers barge routes, two interstate highways, and two transcontinental railroads. Freight-related (transportation and wholesale) firms and infrastructure span the entire length of the harbor and the width of the adjacent industrial districts. Rail lines run the length of the harbor on both sides, and the Albina and Lake rail yards are situated within a few hundred feet of the river. There is no similar place in Oregon with this confluence of significant intermodal transportation facilities—nor is there expectation of a similar hub developing elsewhere in the state in the foreseeable future.

Much of the harbor riverfront is lined with river-dependent industrial uses, which is partly the result of zoning regulations that reserve those properties for such use. River-dependent uses include marine terminals, vessel-related industries, and manufacturers that need to locate adjacent to the river for transportation access. River-dependent uses cover an estimated 72 percent (1,704 acres) of the occupied riverfront (between the river and nearest street or railroad right-of-way) in the study area.

Maps 2 through 5 depict the development pattern of area industries. Most industries are dispersed throughout the harbor area, but some are concentrated in particular locations. The petroleum terminals are grouped on the west side of the river in the Linnton and Guild's Lake areas, where most of the gasoline and diesel used in Oregon is received via tankers and the Olympic pipeline. Automobile import terminals (i.e. Honda, Hyundai, and Toyota) are situated in Rivergate and St. Johns, near Ford and GM's upland distribution facilities. Most of the harbor area's industrial machinery firms, metal fabricators, and printing and publishing firms are tightly clustered in the southern Guild's Lake and Lower Albina areas.

Industrial sites in the harbor area vary widely in size. The median size of industrial sites is 2.2 acres, although the larger industrial sites bring the average size up to 8.0 acres. Utilities, primary metals, manufacturing, and water transportation uses occupy sites that average 20 acres or larger. Average employment density is 8.1 jobs per acre. Manufacturing has the highest employment density at 12.4 jobs per acre; and utilities have the lowest at 0.5 per acre.

Based on Metro's regional inventory of vacant industrial land dated July 2000, 735 acres were vacant (undeveloped) in the study area, which is 13 percent of the total 5,532 acres of land in taxlots. Metro classified 543 acres (10 percent of the total land in taxlots) in Tiers A and B, indicating unconstrained and less constrained sites. Over half of the vacant land in the harbor area is located in Rivergate, and the Port of Portland is the largest owner of those sites.

B. INDUSTRY TRENDS

Regional Employment Trends

Industrial employment in the metro area (Multnomah, Washington, Clackamas, Columbia, and Yamhill Counties) grew by 37 percent between 1980 and 2000, compared to 12 percent growth nationwide. Metro area industries added 77,200 net new jobs during that period. Of those new jobs, 46 percent were in transportation and wholesale trade, 26 percent in electronics manufacturing, and 28 percent in construction.

While manufacturing employment in the U.S. declined by 9 percent between 1980 and 2000, it increased by 18 percent in the Portland metro area. The metro area share of national manufacturing employment grew by 31 percent during those decades. Electronics was the metro area's driving growth industry in the manufacturing sector, adding 20,100 net new jobs between 1980 and 2000. Combined employment in the other manufacturing industries declined slightly, less than 1 percent, compared to a 10 percent decline nationally. The printing and publishing, rubber and plastics, and transportation equipment manufacturing industries each added more than 2,000 jobs in the metro area, while substantial employment reductions occurred in lumber, paper, apparel, textiles, and instruments manufacturing.

Multnomah County is the metro area's primary location of industrial jobs, but its share of the metro area's industrial employment reduced from 59 percent in 1980 to 48 percent in 2000. At least three reasons for the county's declining share are apparent: being more built out than its suburban neighbors; having a different mix of expanding and contracting industries (e.g., electronics employment is concentrated in Washington County); and substantial relocation in some industries (e.g., wholesale of durable goods) to other counties.

U.S. maritime employment has declined over the last two decades, as U.S. maritime operations have become less labor intensive and offshore competition has grown. Between 1980 and 1999, U.S. waterborne cargo tonnage increased by 0.9 percent per year, but national employment in marine cargo handling declined by 1.8 percent per year. Between 1980 and 1999, the U.S. lost half of its shipbuilding and repair jobs.

Employment forecasts by Metro and the Oregon Office of Economic Analysis predict continuing industrial job growth following the current recession. Metro's 2030 regional forecast completed last March predicts 0.8 percent average annual growth in manufacturing jobs, 1.5 percent in transportation and utilities, and 1.6 percent in wholesale trade—each far outpacing national forecasts. The regional forecast for the metals and equipment industries is mixed, with anticipated employment gains in industrial machinery exceeding modest reductions in transportation equipment and metals.

Land Use Trends

Many U.S. cities have lost much of their central city industrial land to other uses, as development pressure has led to conversion of industrial land to residential and commercial uses that command higher market land values. To date, this has not occurred extensively within the City of Portland. Most of Portland's industrial land is protected by industrial sanctuary zoning, limiting the encroachment of non-industrial uses. Portland has approximately 18,800 acres of industrially zoned land. Since 1991, the City has converted approximately 2.5 percent (474 acres) of its industrial land to other zones and has established environmental protection zoning on another 3 percent (570 acres).

The proportion of land in industrial and river-dependent uses has been relatively stable or growing along most of the harbor between 1960 and 1997, as revealed by periodic land use inventories conducted by the Port of Portland. There are two exceptions, where land has converted from industrial to other uses: the River District (west side of the river between the Broadway and Fremont Bridges) and North Beach (east side between St. John's Bridge and

University of Portland. Both areas were primarily in marine industrial use in 1960, and both are transitioning into parts of the expanding urban mixed-use centers nearby (Central City and St. Johns town center).

On average, 21 acres per year of new marine cargo and marine industrial development occurred along the harbor between 1960 and 1997. Much of that development occurred on about 2,700 acres of land acquired around 1960 by the Port of Portland in Rivergate and on vacant land in the Swan Island area. Of the 232 acres that were vacant in 1990 and occupied by 1997, 105 acres were developed as marine cargo uses, 43 acres as marine industrial, and 20 acres as marine infrastructure. Marine cargo developments since 1990 have included the Portland Bulk Terminal at Terminal 5 (T-5), the chassis yard and intermodal yard expansion at T-6, and the Ash Grove plant near the Albina rail yard.

The *Regional Industrial Lands Study* forecasts 6,310 acres of net industrial land absorption (demand) in the Portland-Vancouver area from 2000 to 2020. In Multnomah County, the study forecasts 813 acres of industrial land absorption over the 20-year period and found a vacant land supply of 2,572 acres, including 442 acres in Tier A and 1,960 acres in Tier B (less constrained sites for new development).

The Rivergate area is well situated to receive a significant portion of Portland's maritime industrial growth, having the advantages of large sites, vacant land, convenient rail access, and few Superfund sites. However, the freight distribution complex is not necessarily moving northward. Transportation and wholesale firms remain more densely concentrated in the upper harbor area (Guild's Lake, Swan Island, and Lower Albina).

Cargo and Freight Trends

Between 1960 and 2000, marine cargo tonnage handled at Portland Harbor increased by 253 percent, primarily driven by growth in exports. The average annual growth rate over the 40-year period and in the 1990s was 2.3 percent. Among West Coast ports, Portland has multiple cargo niches in dry bulk exports (primarily wheat), auto imports, regional container service, and petroleum from the Puget Sound. Between 1985 and 2000, Portland captured an increased share of West Coast marine cargo in dry bulks, autos, and breakbulks. Portland, Seattle, and Tacoma had declining shares of West Coast container cargo between 1985 and 2000, as an increasing share has concentrated at the Los Angeles and Long Beach harbors.

DRI-WEFA predicts average annual growth of total marine cargo to be handled at the Lower Columbia River ports between 2000 and 2030 at –0.4 to +0.8 percent (0.2 percent midpoint) without channel deepening. With the proposed Columbia River channel deepening to 43 feet, the forecast range is 0.0 to 1.3 percent (0.7 percent midpoint). DRI-WEFA is projecting an increase across all cargo types, except liquid bulk, which declined after 2000 as the Olympic pipeline has come back into full use following repairs.

Rail is the primary mode of transportation for ocean bound cargo, handling 51 percent of all tonnage in the metro area. Another 26 percent is hauled by barge and 22 percent by truck. Rail tonnage has increased by 1.8 percent per year over the last ten years. Preliminary forecasts being prepared as part of the I-5 Trade Corridor study anticipate rail tonnage to increase at an even

greater 3.0 to 3.5 percent annualized rate over the next ten years. Significant increases are expected for auto, grain, and bulk unit trains.

C. Regional Role of Harbor Area

Industrial Location Factors

Four primary functions of the harbor area are identified as factors that influence which industries locate there: multi-modal distribution infrastructure, industry clusters, heavy industrial character, and central urban location.

Freight transportation investment is a significant industrial location advantage for the harbor area in at least two respects: as a freight hub location for distribution industries and as a marine and rail access location for manufacturers that require those facilities. As shown in Map 8, the harbor area and Columbia Corridor are the center of the region's freight distribution facilities and industrial activity that requires rail or maritime access. Portland is well positioned by its location and intermodal infrastructure for continued growth as a West Coast distribution hub.

Among the mix of industries in the harbor area, the metals and equipment industries (primary metals, fabricated metal products, industrial machinery, electronics equipment, and transportation equipment) appear to be the most affected by inter-firm linkages as a location factor. In 1998, 57 percent of the production inputs of the metals and equipment industries nationally were provided by other firms within that industry group. The significant trade volume between these industries is consistent with their geographic concentration in the harbor area. The presence of more than 200 metals and equipment firms (manufacturing and wholesale) there, their skilled labor pool, established networks of suppliers and customers, specialized infrastructure, and other inter-firm relationships are potentially significant location factors for the cluster's continued growth.

Another apparent location factor is that the harbor area is the region's largest heavy industrial district. Conceptually, heavy industrial areas provide locations for industries with objectionable impacts and appearance, separated from other urban areas. Examples in the harbor area of what are traditionally perceived as heavy industries include steel mills, heavy equipment manufacturing, petroleum bulk storage, chemicals manufacturing and distribution, utility yards, rail yards, and marine terminals. Most of the land in Portland with heavy industrial zoning is in the harbor area, and nearly all of the rest is adjacent in the Columbia Corridor west of I-5.
A fourth factor that influences the mix of industries in the harbor area is its central urban location. The harbor area offers large employers central access to the metro area's skilled labor markets and is an advantage for distributors with nearby or regional delivery locations.

Relation to Other Regional Seaports

Portland is a major West Coast seaport, the fourth largest in total marine cargo tonnage in 2000 with 34.3 million short tons, as reported by the U.S. Army Corps of Engineers. In comparison, total marine cargo tonnage was 24.1 million in Seattle, 22.3 million in Tacoma, and 12.2 million in Oakland. Of the 34.3 million tons of waterborne cargo handled at Portland Harbor in 2000, 18 million tons (52 percent) was international cargo, 7.1 million tons (21 percent) was coastwise

cargo (primarily petroleum from Puget Sound refineries), and 9.3 million tons (27 percent) was internal cargo carried by barge.

Portland terminals handled 66 percent of the total marine cargo tonnage of the Columbia River deepwater seaports in 2000. By comparison, Vancouver (Washington) handled 15 percent; Kalama, 11 percent; Longview, 8 percent; and Astoria, less than 1 percent. Portland Harbor currently competes with the other Columbia River seaports primarily for dry bulk and breakbulk cargo. Virtually all of the Columbia River container and petroleum cargo and 86 percent of the automobile cargo were handled in Portland in 2000.

Among the vacant industrial sites currently marketed by the port authorities at the Lower Columbia River seaports, the only 100 acre and larger sites currently available are one in Kalama and two in Longview. Based on research conducted for the Port of Portland, the land area needs for new marine terminals reflecting current and projected technology are 115-125 acre sites for grain and dry bulk terminals, to accommodate a rail loop, and 50-100 acre sites for auto and container terminals, to provide adequate yard storage area. Land requirements for river-dependent manufacturing, warehouse, and industrial service facilities are more varied. There are also many existing river-dependent industrial sites on Portland Harbor in the 5-50 acre range.

The Port of Portland's *Marine Terminals Master Plan* process underway has proposed alternatives to accommodate new grain, dry bulk, auto, and container facilities through redevelopment, consolidation, or relocation of facilities within the existing terminal sites. The Port of Portland also owns and is reserving West Hayden Island for future marine terminal development, which includes about 550 acres of potential development area. In addition, the Port of Vancouver has recently prepared an environmental impact statement for a subarea plan to develop Columbia Gateway, which is proposed to include 152-504 acres for water-dependent industry in addition to other proposed industrial land.

Regional Economic Role of Harbor Area

The harbor area is a regional job engine. For each of the 34,300 industrial jobs there in 2000, an average 1.9 additional jobs was supported in the six-county metro area by the purchases of harbor area firms and employees. Accounting for these multiplier effects, the total employment in the metro area supported by harbor area industries is an estimated 99,800 jobs. That is approximately one in eight regional jobs. The total annual payroll of those metro area jobs is $3.5 billion. These estimates are based on regional multipliers calculated by the U.S. Bureau of Economic Analysis in the Regional Input-Output Modeling System (RIMSII). The multiplier effects of industrial sectors are generally higher than other sectors because of above-average industrial wages and levels of trade with other regional firms.

Among the multiplier effects of harbor area industries, Portland's maritime activity by itself generated 21,000 jobs and $970 million of resultant employee earnings in 2000, as calculated by Martin Associates in 2001. The multiplier effects of Portland's maritime activity span the Pacific Northwest states.

In addition to job and income creation, the study area also has the specialized function of being Oregon's primary port and distribution hub. The presence of this hub within the region provides

more convenient transportation access to the region's producers and consumers and saves on transportation costs. For example, HDR Engineering in 2000 calculated that shippers in the Pacific Northwest saved $67.9 million per year in transportation costs as a result of Portland's container terminal at T-6.

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INTRODUCTION

Portland Harbor is a major West Coast port, the fourth largest in overall tonnage in 2000. Along with the adjacent Columbia Corridor, the harbor area is Oregon's distribution hub for marine, rail, truck, and air cargo. A diverse mix of manufacturing industries along the harbor also anchors a hefty segment of the regional economy. Overall, harbor area firms generated one out of eight jobs in the Portland-Vancouver region in 2000, taking into account the multiplier effects of purchases by harbor area firms and employees.

Many existing studies and data sources, to which this report is indebted, provide a substantial base of information and insight on particular aspects of the working harbor. This study builds on that work as a focused industrial analysis of the harbor area. The primary purpose of the study is to assess the future demand and supply of industrial land in the harbor area, focusing on river-dependent, freight-related, and other concentrated industries in the area. In doing so, a secondary purpose is to describe the structure, dynamics, and outlook of these urban industrial districts.

The City of Portland Bureau of Planning partnered with the Port of Portland and Portland Development Commission in drafting, funding, and overseeing the study. The River Economic Advisory Group, a business and industry stakeholder group, was also instrumental in identifying the need for such research and reviewing the project work plan and draft products.

The study is intended to provide background research for various planning efforts in the harbor area. It will help the City formulate policy revisions and action strategies in current and future river planning efforts related to land use, watershed health, industrial development, recreation, and the Portland Harbor Superfund project. The study will inform the Portland Development Commission's industrial development efforts in the area. And the Port of Portland will use study results in considering strategic decisions on land use, development, and marine facilities planning.

Study Approach

The study consists of two parts that differ by method and tasks. Part One, of which this report is the product, is primarily a statistical analysis of available data and a synthesis of relevant secondary sources. The first chapter is an inventory of harbor area industries in terms of employment and land use. Chapter 2 reviews local and regional trends and forecasts on employment, freight volume, and industrial land uses pertinent to the harbor area. And Chapter 3 provides a contextual description of the factors that attract industry to the harbor area, its relation to other regional seaports, and its economic contribution to the regional economy.

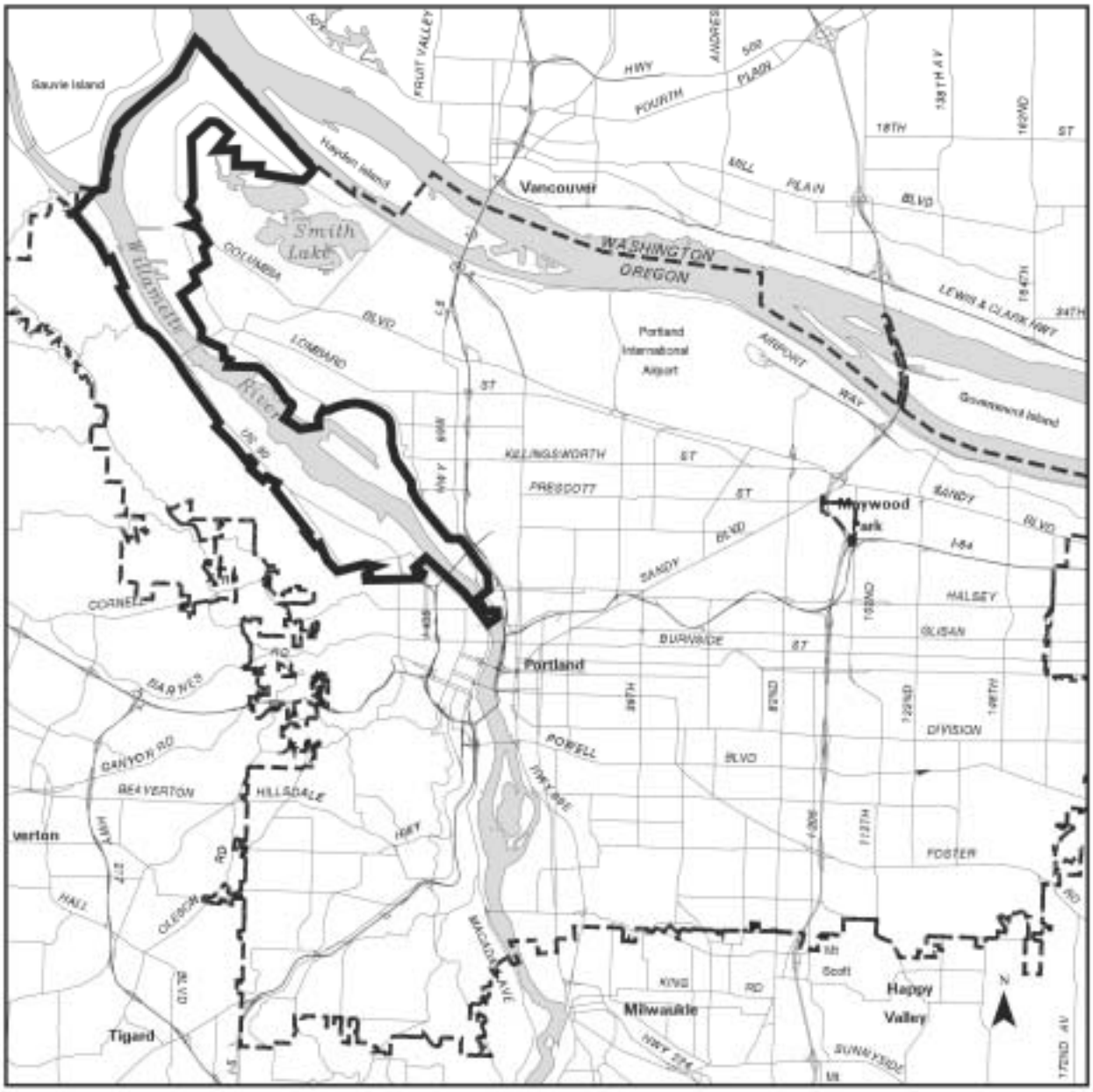
E.D. Hovee & Company prepared Part Two of the study in association with Parsons Brinkerhoff and the JD White Company. Their analysis is based on 80 interviews with industry leaders and experts and other supportive research. That analysis includes a more in-depth description of industry dynamics and location factors, an assessment of future demand for industrial land in the area, a sensitivity analysis of issues that could affect that demand, a rating of industrial site quality in the area, and a framework of resulting policy questions.

Study Area
The study area consists of the industrial districts along Portland Harbor, including Guilds Lake, Linnton, Lower Albina, Swan Island, St. Johns, and Rivergate. This area is depicted in Map 1. The terms harbor area and study area are used interchangeably throughout this report.

The study area boundary is based primarily on two geographic features: the harbor shipping channel and the entire existing industrial districts adjacent to the channel. The main reason for focus on the harbor area is to assess the land needs of river-dependent industries—that is, the marine terminals, vessel-related industries, and manufacturers that need to locate adjacent to the river for transportation access. The deep draft channel spans most of the Willamette River in Portland, generally downstream from the Broadway Bridge, and along the Columbia River adjacent to Port of Portland Terminal 6. The reasons for including the entire adjacent industrial districts are to examine the inter dynamics and competing land needs of other industries in these larger districts.

The study area consists more specifically of the industrial and employment zones mapped in the *Portland Zoning Code* along the harbor, with some exceptions to better reflect actual conditions at specific sites. The southern portion of the study area is extended beyond the Broadway Bridge to the Steel Bridge on the eastside, to include the Louis Dreyfus grain terminal, a major river-dependent use. Some large institutional uses are excluded from the study area: the University of Portland and the Multnomah County Detention Facility sites. Additionally, some Metro Title 3 designated wetland areas owned by the Port of Portland, along the Columbia Slough, are excluded. The study area includes all parcels within the *Portland Zoning Code*'s "River Industrial" (i overlay) zone, which is intended to encourage and promote the development of river-dependent and river-related industries.

On Format
Much of the information in this report is presented in detailed tables, to give readers the option to concentrate on information of individual interest. The typical format consists of tables, notes on methodology, and a series of observations drawn from the data. Summary observations are highlighted in text boxes, followed by related information and discussion.



Map 1: Portland Harbor Study Area

Study Area Boundary

Scale: 1" = 2.5 Miles

City of Portland Bureau of Planning
Geographic Information System
2002

1. INVENTORIES

A. INDUSTRIES BY EMPLOYMENT

Sectoral Mix

Table 1 presents estimates of the number of private business establishments and their employment by economic sector in the study area, followed by comparison figures for Multnomah County and the metropolitan area. The employment data cited in this report refers to average annual "covered employment," estimated by the Oregon Employment Department or U.S. Bureau of Labor Statistics. Compared to other employment data, its advantage for this study is that it is available annually for small geographic areas such as the harbor area. Covered employment data is based on Unemployment Insurance tax reports submitted quarterly by employers. Information for some industries is suppressed for confidentiality purposes.1 Unless noted otherwise, the employment data cited for the Portland Metropolitan Statistical Area (PMSA) is from the Oregon Employment Department, and it applies to the Oregon portion of the PMSA only (Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties), excluding Clark County, Washington.

Table 1. Employment and Establishments by Sector in Study Area, 2000

Industry	Establish-ments in Study Area	Average Annual Covered Employment in Study Area	Study Area Share of County Employment	Study Area Share of PMSA* Employment	Sectoral Share of Total Employment in Study Area	Sectoral Share of Total Employment in County	Sectoral Share of Total Employment in PMSA*
Agriculture	**	**				1%	2%
Mining	**	**				0%	0%
Construction	63	2,081	10%	5%	5%	5%	5%
Manufacturing	222	19,391	37%	15%	49%	11%	15%
Transportation	123	6,460	27%	19%	16%	5%	4%
Communications & Utilities	5	71	1%	1%	0%	2%	2%
Wholesale Trade	252	6,269	19%	10%	16%	7%	7%
Retail Trade	69	1,481	2%	1%	4%	16%	17%
Finance, Insur. & Real Estate	42	865	3%	2%	2%	7%	6%
Services	155	2,559	2%	1%	7%	31%	28%
Government	**	**				14%	12%
Nonclassified, Other	5	15	7%	3%	0%	0%	0%
Total***	936	39,192	9%	5%	100%	100%	100%

* Portland Metropolitan Statistical Area (PMSA) data includes Oregon share only.

** Data suppressed.

*** Study area total does not include agriculture, mining, and government.

Sources: Bureau of Planning calculations from Oregon Employment Department data.

[1] Information is suppressed in cases where the information represents less than three establishments or one establishment accounts for 80% or more of the summary level employment in that segment.

⇨ An estimated 936 private business establishments in the harbor area employed 39,192 workers in 2000.

Approximately one in eleven jobs in Multnomah County were located in the study area in 2000. Nearly half of the study area employment was in the manufacturing sector, and approximately one third in the distribution sectors of transportation and wholesale trade. Since industrial and employment zoning in the area limit commercial development, retail and services represent a relatively minor portion (12 percent) of study area employment.

A significant cluster of public sector facilities also exists in the harbor area, on which data is suppressed in Tables 1 and 2 because one organization accounts for more than 80 percent of the area's government employment. Among the public employers with harbor facilities that require river access for transportation are the Port of Portland, U.S. Naval Reserve, U.S. Coast Guard, U.S. Army Corps of Engineers, Multnomah County Sheriff, and Portland Fire Bureau.

Concentrated Industries

Industrial geographers have found that industries do not emerge and grow ubiquitously. Particular industries tend to be concentrated in particular regions and districts, where they benefit from proximity to markets, access to increasingly productive inputs, networks of subcontractors and suppliers, and other location advantages. As a result, regions and districts have varying mixes of industries and specializations. At the same time, industries are not fixed in place. They move in response to competition, business cycles, and product and process innovation. This chapter and the next provide a recent snapshot of the concentrated industries in the Portland Harbor area and a summary of trends that describe how and to what extent they are changing.

Industry concentration is explored in this report through employment location quotients, a statistical tool commonly used for such analysis. A location quotient measures an industry's concentration in a particular location relative to its larger context, typically a district to a region or a region to a nation. High or low location quotients reflect significant geographic specialization or underrepresentation. Employment location quotients are calculated as the industry's share of the total employment in the subset area divided by its share of total employment in the larger area. If the industry's employment share in the two geographic areas is equal, the location quotient is 1; if more concentrated in the subset area, it is more than 1; if less concentrated, less than 1.

Table 2 presents information on the employment, number of business establishments, and location quotients of industries in the harbor area at the two-digit SIC level and wholesale trade segments at the three-digit level. [2] The table focuses on the industrial sectors of construction, manufacturing, transportation, communication and utilities, and wholesale trade. No service sector industries (retail, finance, insurance, real estate, services, and government) at the two-digit

[2] The Standard Industrial Classification (SIC) Manual of the U.S. Office of Management and Budget classifies industries by a 4-digit numerical system. Each digit relates to a level of detail. For example, SIC 3731 applies to Shipbuilding and Repair, SIC 373 to Ship and Boat Building and Repair, and SIC 37 to Transportation Equipment Manufacturing. SIC 2 and 3 include all manufacturing industries.

Table 2. Business Establishments, Employment, and Location Quotients in the Study Area, 2000

SIC	Industry (concentrated industries in **bold** text)	Establish-ments	Average Annual Covered Employment	Study Area Share of PMSA* Employment	Location Quotient: Study Area to PMSA*	Location Quotient: PMSA* to Nation
Construction		63	2,081	5%	0.99	1.02
15	General building contractors	15	430	4%	0.86	1.10
16	Heavy construction	3	231	6%	1.31	0.54
17	Special trades	45	1,420	5%	1.00	1.11
Manufacturing		222	19,391	15%	3.27	1.06
20	Food & kindred products	17	1,241	16%	3.40	0.72
22-3	Apparel & textile products	5	68	3%	0.62	0.31
24	Lumber & wood products	6	208	3%	0.61	1.38
25	Furniture & fixtures	7	221	9%	1.94	0.68
26	Paper & allied products	9	318	11%	2.28	0.70
27	Printing & publishing	26	1,111	11%	2.32	1.03
28	Chemicals & allied products	18	511	31%	6.63	0.25
29	Petroleum & related products	3	188	63%	13.58	0.36
30	Rubber & plastic products	5	103	2%	0.46	0.74
31	Leather & leather products	0	0	0%	0.00	0.59
32	Stone, clay, glass, & concrete	12	309	10%	2.07	0.86
33	Primary metal industries	12	3,016	40%	8.77	1.63
34	Fabricated metal products	31	930	9%	1.92	1.03
35	Industrial machinery & equipment	32	829	6%	1.30	1.00
36	Electronic & other electric equipment	11	2,094	8%	1.63	2.49
37	Transportation equipment	18	7,811	64%	13.96	0.99
38	Instruments & related products	0	0	0%	0.00	1.53
39	Misc. manufacturing industries	10	433	18%	3.87	0.95
Transportation		123	6,460	19%	4.04	1.17
41	Local & interurban transit	***	***			0.67
42	Trucking & warehousing	77	2,672	17%	3.76	1.28
44	Water transportation	18	1,209	54%	11.78	1.69
45	Transportation by air	***	***			1.20
47	Transportation services	16	156	4%	0.90	1.18
48-9	Communication & utilities	5	71	1%	0.11	0.77
Wholesale		252	6,269	10%	2.15	1.38
50	Wholesale durable goods	175	3,310	9%	1.98	1.32
501	Motor vehicles, parts & supplies	19	607	12%	2.88	1.33
502	Furniture & home furnishings	13	270	21%	5.20	0.98
503	Lumber & construction materials	14	274	7%	1.67	1.87
504	Professional & commercial equipment	5	17	0%	0.05	1.18
505	Metals & minerals, exc. petroleum**	18	589	30%	12.20	0.99
506	Electrical goods**	11	210	3%	1.28	0.92
507	Hardware, plumbing & heating equip.	16	290	10%	2.39	1.25
508	Machinery, equipment & supplies	61	774	9%	2.21	1.37
509	Misc. durable goods	18	279	12%	2.86	0.95

Table 2. continued

SIC	Industry (concentrated industries in bold text)	Establish-ments	Average Annual Covered Employment	Study Area Share of PMSA* Employment	Location Quotient: Study Area to PMSA*	Location Quotient: PMSA* to Nation
51	Wholesale nondurable goods	77	2,959	11%	2.58	1.46
511	Paper & paper products	9	319	12%	2.96	1.31
512	Drugs, proprietaries & sundries**	***	***			0.67
513	Apparel, piece goods & notions**	***	***			2.52
514	Groceries & related products**	11	298	2%	0.88	1.20
516	Chemicals & allied products	16	252	23%	5.53	0.93
517	Petroleum & petroleum products**	8	375	16%	6.73	1.22
518	Beer, wine, distilled alcoholic bvgs.**	10	784	32%	12.96	1.22
519	Misc. nondurable goods	19	211	5%	1.29	0.99
Combined Industrial Sectors		665	34,272	12%	2.60	1.10
Total of all industries		936	39,192	5%		

* Portland Metropolitan Statistical Area (PMSA) data includes Oregon share only for industries at the 2-digit SIC level and the entire PMSA (including Clark County, Washington) for industries at the 3-digit level.

** Employment share and location quotient calculations use statewide data for this industry, because PMSA data is suppressed.

*** Data suppressed.

Sources: Bureau of Planning calculations from Oregon Employment Department and U.S. Bureau of Labor Statistics data.

SIC level had a location quotient above 1.0 in the study area relative to the metropolitan area, and most were less than 0.5.

Selecting a location quotient threshold to identify concentrated industries in a district is a matter of assumption. Since the study area was selected specifically as an industrial area, its location quotients for the industrial sectors in general are skewed upward. Since the study area location quotient for the combined industrial sectors was 2.56 in 2000, we use a location quotient of 3.0 or higher to indicate concentration in the harbor area, and those industries are identified by bold lettering in Table 2.

Table 3 lists the largest employers and their approximate employment (e.g., 100-249 or 250-499 employees) within the industrial sectors in the study area. InfoUSA, a data compilation firm, developed the information on firms and employment used in Table 3, drawing from business telephone directories and periodic surveys. The published date of the information is second quarter 2002. Classification of industries by SIC code is imprecise, and the InfoUSA and Oregon Employment Department data sources conflict in how they classify some harbor area firms.

Table 3. Largest Employers in Industrial Sectors in Study Area, 2002

SIC	Industry	Largest Employers (no. employees)
Construction		
17	Special Trades	Streimer Sheet Metal (100-249), McDowell Welding & Pipefit (100-249)
Manufacturing		
20	Food & kindred products	Steinfelds (100-249), Gran Pac Foods (100-249), Widmer Brothers Brewing (100-249)
24	Lumber & wood products	Weyerhaeuser Co. (50-99), Medallion Industries (50-99)
25	Furniture & fixtures	Sealy Mattress (100-249)
26	Paper & allied products	Boise Cascade Trucking (100-249), Smurfit-Stone Container (100-249), Rose City Printing & Packaging (50-99)
27	Printing & publishing	Graphic Arts Center (250-499), Journal Graphics Inc. (100-249), Color Technology (100-249)
28	Chemicals & allied products	Mt. Hood Chemical Co. (50-99), Rodda Paint (50-99)
29	Petroleum & related products	Owens Corning (50-99), GS Roofing (50-99), Lakeside Industries (50-99)
30	Rubber & plastics	Griffith Rubber Mills (100-249)
32	Stone, clay, glass, & concrete products	Glacier NW Inc. (50-99), C H Murphy/Clark-Ullman (50-99), Ash Grove Cement (20-49)
33	Primary metal industries	Esco Corp. (500-999), Oregon Steel Mills Inc. (500-999), Consolidated Metco (250-499)
34	Fabricated metal products	Crown Cork & Seal (100-249), Tube Forgings of America (100-249), Western Wire Works (100-249)
35	Industrial machinery	Sulzer (250-499), Western Group (100-250), Armstrong Mfg. Co. (50-99)
36	Electronic equipment	Wacker Siltronic (>1000), Phoenix Gold International (100-249)
37	Transportation equipment	Freightliner (>1000), Gunderson (>1000), Cascade General (500-999)
39	Misc. manufacturing	Columbia Manufacturing (>1,000), Purdy Corp. (250-499)
Transportation		
42	Trucking & warehousing	Roadway Express (250-499), Active USA (100-249), FTL Trucking (100-249)
44	Water transportation	Pacific Maritime Association (500-999), Brix Maritime (100-249), Shaver Transportation (50-99)
45	Transportation by air	(cannot verify largest employers)
47	Transportation Services	Menlo Logistics (100-249), Northwest Container Services (50-99), Oregon Transfer Co. (50-99)
Wholesale		
501	Motor vehicles & parts	Toyota Vehicle Processors (100-249), DSU-Peterbilt & GMC (100-249)
502	Furniture & home furnishings	Boise Cascade Office Products (100-249), First Inc. (50-99)
503	Lumber & construction materials	Western Pacific Bldg Materials (100-249), Medallion Industries Inc. (50-99), Jasco Supply (50-99)
504	Professional equipment	Christenson Electric (100-249), BSB Inc. (100-249)
505	Metals & minerals	American Steel (100-249), Reyerson Tull (50-99)
506	Electrical goods	Pacific Detroit Diesel Allison Co. (100-249), Rejuvenation Inc. (100-249)
507	Hardware & plumbing	General Tool & Supply Co. (50-99)
508	Machinery, equipment & supplies	Cummins Northwest (50-99), Helser Services (50-99), West Coast Wire Rope (50-99)
509	Misc. durable goods	Schnitzer Steel (250-499), Container Recovery Inc (100-249), Emerson Hardwood Co. (50-99)

Table 3. continued

SIC	Industry	Largest Employers (no. employees)
511	Paper & paper products	Boise Cascade Office Products (100-249), West Coast Paper Co. (50-99), Office Depot Business Svcs. Div. (50-99)
513	Apparel, piece goods & notions	Columbia Sportswear Co. (250-499), Layton Home Fashions (250-499), E E Schenck Co. (50-99)
514	Groceries & related products	Graziano Fresh Cut Produce (250-499), Golden State Foods (50-99), Delphina's Bakery (50-99)
515	Farm product materials	Cargill Inc. (10-19), Columbia Grain Inc. (10-19)
516	Chemical products	VanWaters & Rogers (50-99), Tarr Inc. (50-99)
517	Petroleum & petroleum products	Northwest Pump & Equipment Co. (100-249), Carson Oil (100-249), Fuelman (50-99)
518	Beer, wine & distilled alcoholic beverages	Mt. Hood Beverage Co. (250-499), Columbia Distributing (250-499), Henny-Hinsdale Inc. (250-499)

Sources: InfoUSA and OLMIS Employer Database (Second Quarter 2002), modified by Bureau of Planning from phone contacts.

⇨ The harbor is a diverse industrial location. Nearly all of the manufacturing, transportation and wholesale industries at the two-digit SIC level have a substantial presence in the study area.

Much of the area has been in industrial use for nearly a century, and its diversity reflects both its age and viability as an industrial area.

⇨ The harbor area is a regional center of the transportation equipment, primary metals, petroleum products, and water transportation industries.

Measurements of concentration in the harbor area are high in these industries:

- transportation equipment manufacturing – the study area contains 64 percent of the PMSA employment in this industry and has a location quotient of 13.96;
- petroleum products manufacturing – 63 percent of PMSA employment, 13.58 location quotient;
- water transportation – 54 percent of PMSA employment, 11.78 location quotient; and
- primary metals manufacturing – 40 percent of PMSA employment, 8.77 location quotient.

Water transportation and primary metals manufacturing are also regional economic specializations, having high location quotients for the PMSA in relation to the nation. Conditions in the study area are thus important to the regional performance of those industries. In contrast, regional industrial specializations that are underrepresented in the study area include wood products manufacturing and instruments manufacturing.

⇨ The cluster of metals and equipment industries in the harbor area encompassed 213 business establishments and 16,860 jobs in 2000, which is 43 percent of total private employment in the area.

Metals and equipment manufacturers (primary metals, fabricated metal products, industrial machinery, transportation equipment, and electronics equipment) employed 14,680 manufacturing workers in 2000, representing 76.5 percent of the manufacturing employment in the study area. The related firms in the motor vehicles, metals, electrical goods, and machinery segments of wholesale trade employ another 2,180 workers. The focal industries of this cluster are transportation equipment and primary metals manufacturing, which are the most highly concentrated in the harbor area and together provide over 10,000 harbor area jobs.

We refer to the metals and equipment industries together, as a cluster, because of the significant potential for supplier, subcontractor, and custumer relationships among them, commonly called "linkages." As discussed further in Chapter 3, much or most of the intermediate inputs of this group of industries comes from within the group, which has the effect of creating interdependencies and blurring the boundaries between these industries.

⇨ The distribution industries (transportation and wholesale) form another significant industry cluster in the harbor area, accounting for 375 business establishments and 12,729 jobs in 2000.

The study area contains 19 percent of the PMSA's transportation employment and 10 percent of its wholesale employment. Water transportation is the most concentrated (location quotient of 11.78) of the distribution industries in the harbor area. Most of this industry's employment consists of Local 8 members in the International Longshoreman's and Warehouseman's Union under contract with the Pacific Maritime Association, and their workplaces span various marine terminals in the harbor area. Trucking and air transportation (courier services) are also concentrated industries in the study area and provide most of the study area employment in the transportation sector. The Union Pacific and Burlington Northern Santa Fe Railroads have rail yards in the study area, but railroad employment is not included in 'covered employment' data. Wholesale industry segments in commodities that are manufactured in the study area tend to be more concentrated there, including alcoholic beverages (12.74 location quotient), metals (11.99), petroleum products (6.62), chemicals (5.44), and furniture (5.12).

River-Dependent Industries

Table 4 addresses land uses in the riverfront portion of the study area, which is defined in this table as the area between the river and the nearest parallel street or railroad right-of-way. The table shows, by district, the acreage of land that is in river-dependent use, in other uses, and vacant in 2000. Bureau of Planning staff interpreted which sites are in river-dependent use, based on the zoning definition discussed below. The source of the vacancy information is Metro, the methodology of which is described at the end of this chapter. The river-dependent and vacant sites are depicted in Maps 3 and 6 below.

Table 4. Harbor Riverfront in River-Dependent Use, Other Uses, and Vacant, 2000

			Uses of Riverfront Area*						
			River-Dependent Uses**			Other Uses		Vacant Land**	
District	Total Study Area Acreage	Riverfront Acreage*	Occupied Acreage	Percent of Total Occupied Acreage	Percent of Lineal River Frontage	Occupied Acreage	Percent of Total Occupied Acreage	Acreage	Vacancy Rate
Linnton	279	193	107	65%	59%	58	35%	28	14%
Guild's Lake	1,686	464	259	64%	65%	146	36%	59	13%
Rivergate	1,988	1,059	759	83%	64%	159	17%	141	13%
St. Johns	1,043	684	436	70%	54%	186	30%	62	9%
Swan Island	744	243	117	52%	61%	106	48%	20	8%
Lower Albina	383	34	26	77%	70%	8	23%	0	0%
Study Area	6,123	2,677	1,704	72%	62%	662	28%	310	12%

* Riverfront portion of study area from the river to the nearest parallel street or railroad right-of-way.
** Percent of riverfront land shown on Map 6 Vacant Land Supply in all tiers.
*** Marine terminals and other primary uses that require river access for waterborne transportation, as shown on Map 3 Freight-Related Industries.
Source: Bureau of Planning calculations from Maps 3 and 6. Vacant lands information from Metro.

⇨ The "River Industrial" (i overlay) zone in the *Portland Zoning Code* reinforces Portland's maritime functions by essentially reserving nearly all of the harbor riverfront land for new and expanding river-dependent or river-related uses.

This zone specifically implements Objective 5 in Portland's *Willamette Greenway Plan*, which is, "To maintain the economic viability of Portland's maritime shipping facilities, based on the overall economic importance of deep-channel shipping to Portland's and Oregon's economy." The River Industrial overlay requires that new land uses be river-dependent or river-related, unless it is found through a land use review process that the site is unsuitable for such uses.

The zone is also premised on the limited supply of land suitable for maritime functions. The working harbor is a unique part of Portland's industrial landscape. It has developed (along with the Columbia Corridor) as Oregon's freight transportation hub, connecting the seaport with regional rail, barge, and highway networks. Chapter 3 includes maps of regional freight transportation infrastructure and discussion of their importance as an industrial location factor.

The terms "river-dependent" and "river-related" have specific meanings in the *Portland Zoning Code*, where they are defined as follows.[3] These definitions are based on those of water-dependent and water-related in Oregon's Statewide Planning Goals.

[3] When the terms river-dependent and river-related apply to land use requirements, as included in the River Industrial overlay zone (Section 33.440.100.B.2, *Portland Zoning Code*), they focus on "primary" uses, in contrast to greenway setback requirements (Section 33.440.210) that are concerned with development (e.g., buildings) and accessory uses. A primary use is the activity or combination of activities of chief importance on the site, while an accessory use is a subordinate part of a primary

River-Dependent. A use which can be carried out only on, in, or adjacent to a river because it requires access to the river for waterborne transportation or recreation. River-dependent also includes development, which by its nature, can be built only on, in, or over a river. Bridges supported by piers or pillars, as opposed to fill, are river-dependent development.

River-Related. A use or development which is not directly dependent upon access to a water body but which provides goods or services that are directly associated with river-dependent land or waterway use or development, and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered. Residences (including houseboats), parking areas, spoil and dump sites, roads and highways, restaurants, businesses, factories, and recreational vehicle parks are not generally considered dependent or related to water. Recreational trails and viewpoints adjacent to the river are river-related development. Bridge exit and entrance ramps supported by piers or pillars, as opposed to fill, are river-related development.

To characterize which of the existing uses in the study area are river-dependent, we propose the following categories and corresponding examples of uses that require river access for waterborne transportation.[4]

- *Marine cargo terminals*, in which commodities are loaded to or unloaded from ships and stored on land for eventual distribution in a relatively unaltered state. Examples in the study area include the Port of Portland marine terminals (among SIC code 9621), various petroleum bulk terminals and associated tank farms (among SIC 5171), and private grain terminals (among SIC 5149 and 5153).

- *Marine- or vessel-related services.* Among the variety of examples in the study area are marine cargo handling and services (among SIC 4491 and 4499), towing and barge services (among SIC 4424, 4449, and 4492), dredging related services (among SIC 9512 and 9621), and naval and coast guard services (among SIC 9621).

- *Marine-dependent manufacturers*, which depend on marine loading facilities for transport of raw materials or finished products. Examples in the study area include firms that manufacture ships or barges (SIC 3731), steel (among SIC 33), chemicals (among SIC 28), asphalt products (among SIC 295), and concrete (among SIC 32).

The term river-related is more narrowly defined for primary uses than river-dependent, and, upon preliminary review, none of the industrial uses in the study area appears to meet it. As an alternative, the term freight-related is explored in this report to acknowledge and investigate the location advantages of the harbor area (not necessarily the riverfront) for transportation and wholesale industries. Harbor functions require a network of waterborne, rail and truck transportation systems. Firms involved with freight distribution have varying needs to locate adjacent to or near that infrastructure. For example, the Albina and Lake rail yards provide

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use and clearly incidental to a primary use. For example, a marine terminal is a river-dependent primary use. On that marine terminal site, a dock and loading crane are river-dependent accessory uses, but an office and employee parking lot are not.

[4] These categories closely mirror those used by the Port of Portland in the *1997 Portland Harbor Land Use Inventory* to identify "marine-related uses," which, as defined in that inventory, also depend upon access to the river.

important rail capacity in the study area, not adjacent to the river but within a few hundred feet. We loosely characterize freight-related industries as the entire transportation and wholesale sectors, which generally require convenient access to the freight transportation system. A survey of these firms could also be used to define a narrower group of freight-system dependent industries that would be likely to close down without adjacent or nearby access to the transportation infrastructure network along the harbor.

⇒ Currently, 1,704 acres of riverfront land (72 percent of the occupied riverfront land area) are in river-dependent use.

The parcels in river-dependent use are depicted on Map 3. Again, the riverfront area is defined here as the properties between the river and the nearest street or railroad right-of-way, which covers 2,677 acres in the study area. Property acreage is measured to a waterline location, so the submerged portions of some riverfront parcels are excluded from this acreage calculation. The waterline location is near the ordinary low water level, although the specific elevation is not confirmed. In Part 2 of the study, E.D. Hovee and Co. analyzes a larger riverfront area of 3,133 acres, which includes some vacant and marine cargo facilities on the landward side of the nearest street or railroad right-of-way, such as the GATX, Chevron, and Tosco facilities on Front Ave.

⇒ The riverbank in the harbor area covers roughly 200 acres of land, which is 7 percent of the riverfront land area. The 25-foot greenway setback area applies to another 81 acres (3 percent of the riverfront land area).

An accurate calculation of the riverbank area would require surveying the top of bank and ordinary low water level for the study area, which has not been done. As an alternative, the bank area is estimated using the following assumptions. The length of the riverfront in the study area is measured at 26.73 miles, using GIS mapping tools. The average bank height is approximated as 24 feet, which is the difference between the 100-year flood elevation (28 feet) and ordinary low water (4 feet) for most of the harbor area. Average bank slope is estimated to be 2.5H:1V, which is depicted in the *Willamette Riverbank Design Notebook* as typical of a traditional riprap bank. The harbor riverbanks also include a combination of river beach, natural bank, bioengineered bank, seawall, structures, and unclassified fill, some of which are more steep, and others less steep, than riprap. Using these assumptions, average bank width is estimated at 60 feet. The *Portland Zoning Code* allows river-dependent and river-related development within the bank and setback areas, as determined through a land use review process.

⇒ Martin Associates (2001) estimated that 7,189 jobs are directly dependent on cargo moving over the private and public port facilities at Portland Harbor, although many of the employers are not actually located along the harbor.

That employment estimate is distributed among industries as follows:

- Maritime services (e.g., terminal employees, ILWU, towing, pilots, agents, surveyors/chandlers, forwarders, warehouse, container repair, government, marine construction, barge environmental services)—2,870 jobs
- Port of Portland (maritime and dredging operations)—166 jobs
- Associated rail and truck transportation—1,763 jobs
- Banking, insurance, law—50 jobs
- Shippers/consignees (i.e., manufacturer who would likely shut down operations if marine terminals were not available)—2,340 jobs.

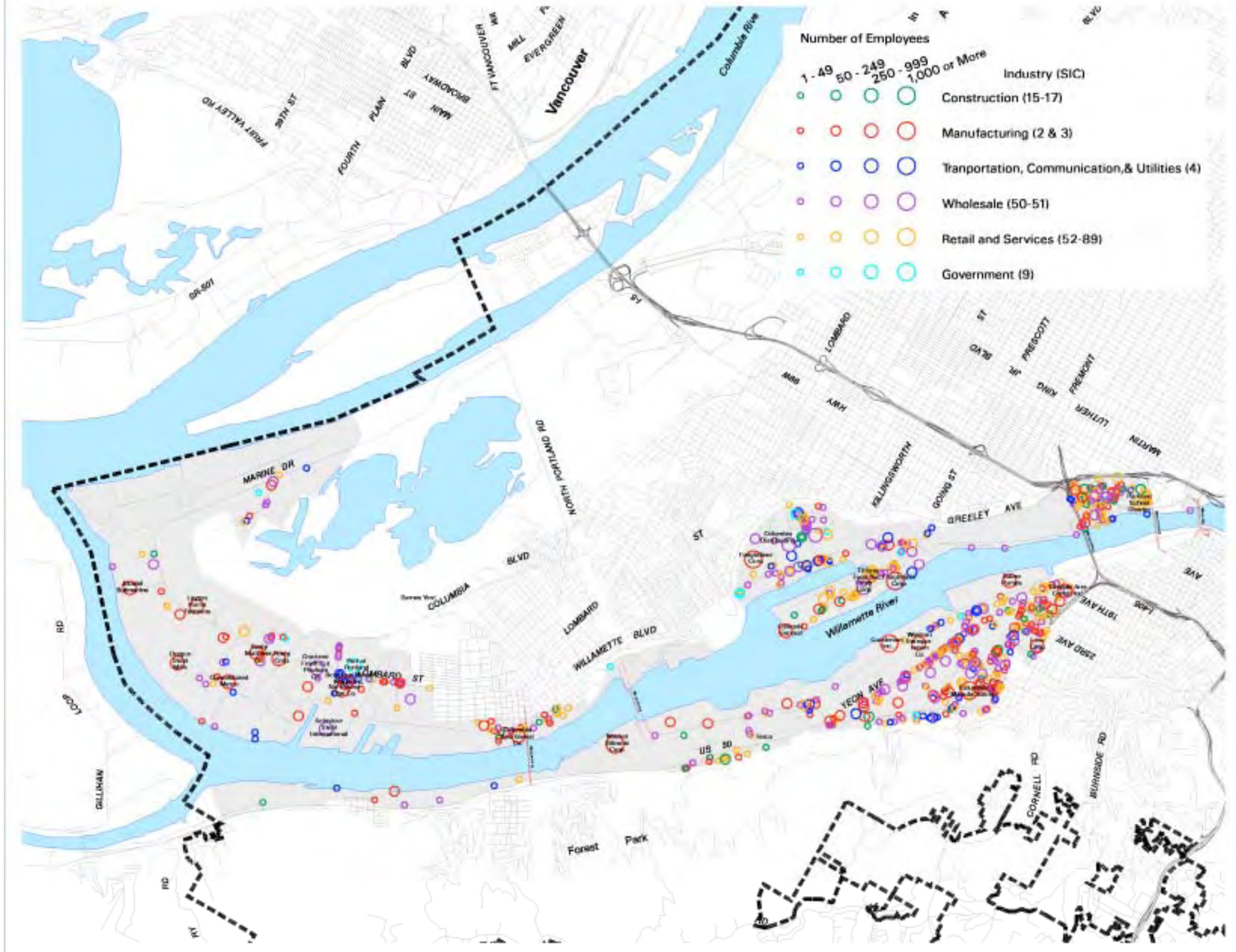
B. LAND USES

Firm Locations and Industry Clusters

Maps 2 through 5 depict the current distribution of firms in the study area by location, industry, and size. Firm size is shown as employment ranges at the site, such as 1-49 or 50-249 employees. InfoUSA developed the information in these maps on firms and employment from business telephone directories and periodic surveys.[5]

- Map 2 presents the overall land use pattern of the area, showing all firms in the study area by sector—construction, manufacturing, transportation, communication and utilities, wholesale, retail and services, and government.
- Map 3 combines many aspects of the freight distribution complex along the harbor: the firms in the transportation and wholesale sectors; the properties used as marine cargo terminals; the portion of the riverfront in river-dependent industrial use; the railroads and rail yards; and the major and minor truck routes.
- Map 4 depicts the firms in the metals and equipment industries cluster in the harbor area, including both manufacturing and wholesale firms.
- Map 5 shows the firms in various other, more concentrated industries (location quotients above 1.5) in the study area, primarily in the nondurable goods sector. These include food products, furniture, paper, printing and publishing, chemicals, petroleum products, glass and concrete products, and miscellaneous manufactured goods.

[5] Map 3 also includes freight system information from other sources. The Bureau of Planning mapped the river-dependent uses and marine cargo terminals, originally published in *Portland's Willamette River Atlas* (August 2001). Truck route information is from the Transportation Element of Portland's *Comprehensive Plan*, and railroad information is from the *Regional Transportation Plan* (Metro, 2000).



City of Portland
Bureau of Planning

October 10, 2002

Map 2: All Industries

INFORMATION SOURCES:

Employment Data:
Developed by InfoUSA, a data compilation firm, as provided in the ESRI Business Analyst Extension. Data from second quarter 2002. Positional accuracy not verified.

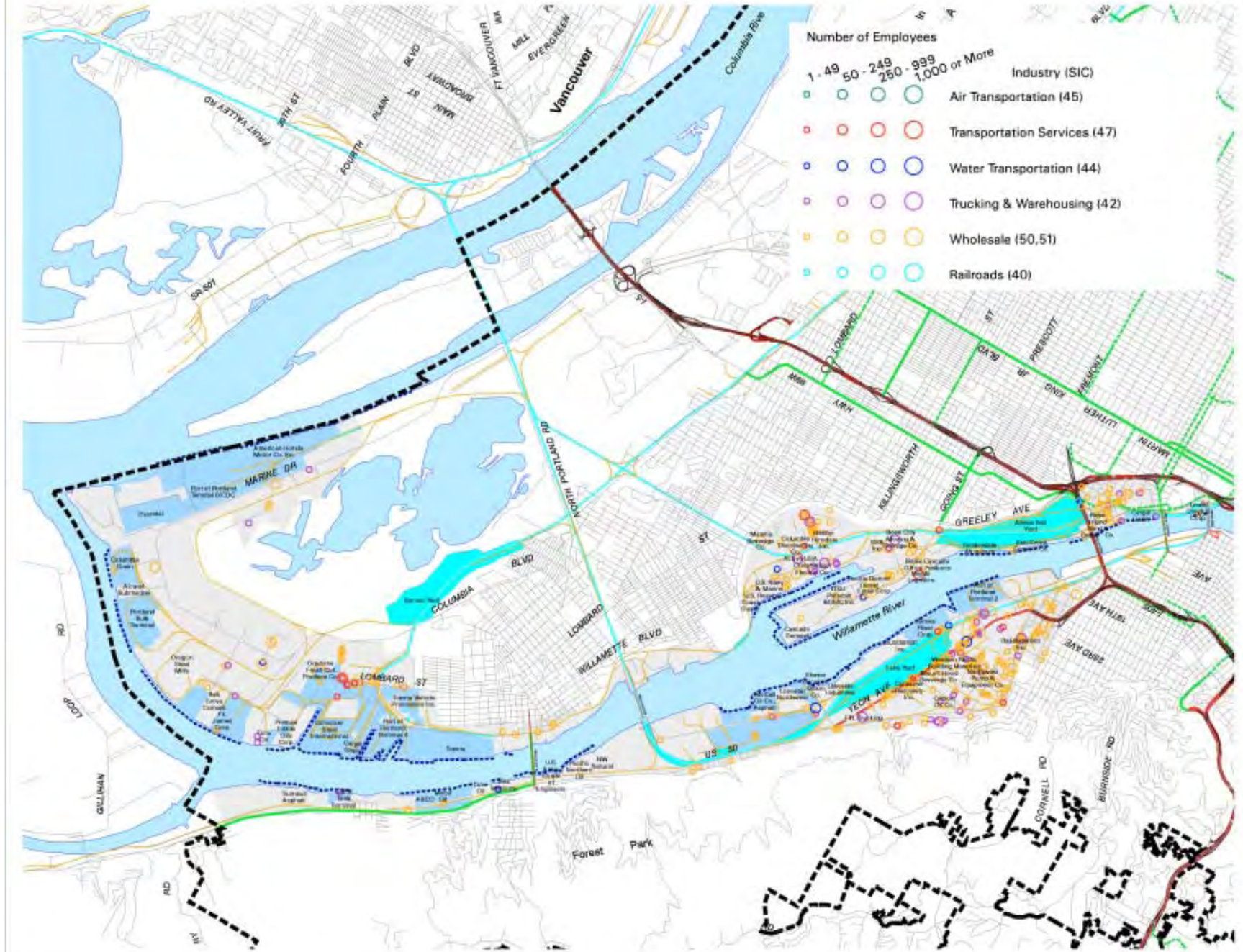
Street Centerlines:
U.S. Census Bureau TIGER data, registered to taxlots under contract to Metro. Updated by Metro through Jan., 1999.

Business names are shown for establishments with 250 or more employees.

All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.

N

Scale
0' 2000' 4000' 8000'



City of Portland
Bureau of Planning

January 02, 2003

Map 3: Distribution Industries

- River-Dependent Use
- Regional Truck Route
- Major Truck Street
- Minor Truck Street
- Major Rail System
- Branch Rail Line
- Study Area
- Marine Cargo

INFORMATION SOURCES:

Employment Data:
Developed by InfoUSA, a data compilation firm, as provided in the ESRI Business Analyst Extension. Data from second quarter 2002. Positional accuracy not verified.

Street Centerlines:
U.S. Census Bureau TIGER data, registered to taxlots under contract to Metro. Updated by Metro through Jan., 1999.

Freight Network:
Truck Routes:
Developed by Portland Department of Transportation for Transportation Element of the City's Comprehensive Plan. Updated Dec. 2000.
Railroads:
Developed by Metro for the Regional Transportation Plan (Dec. 1999).

Business names are shown for transportation and wholesale establishments with 100 or more employees and selected river-dependent uses.

All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.

N

Scale
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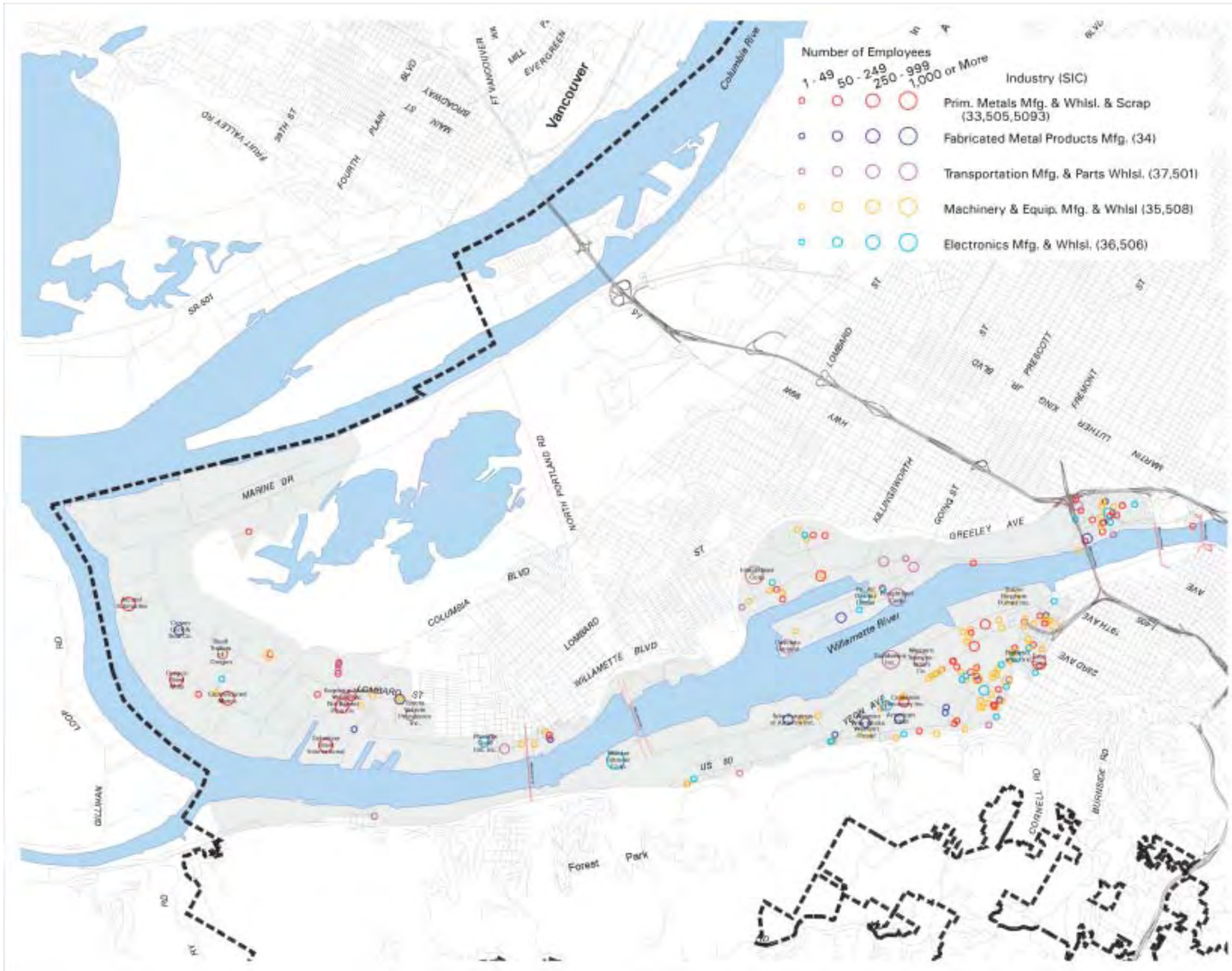


City of Portland
Bureau of Planning

October 10, 2002

Map 4: Metals and Equipment Industries

INFORMATION SOURCES:

Employment Data:
Developed by InfoUSA, a data compilation firm, as provided in the ESRI Business Analyst Extension. Data from second quarter 2002. Positional accuracy not verified.

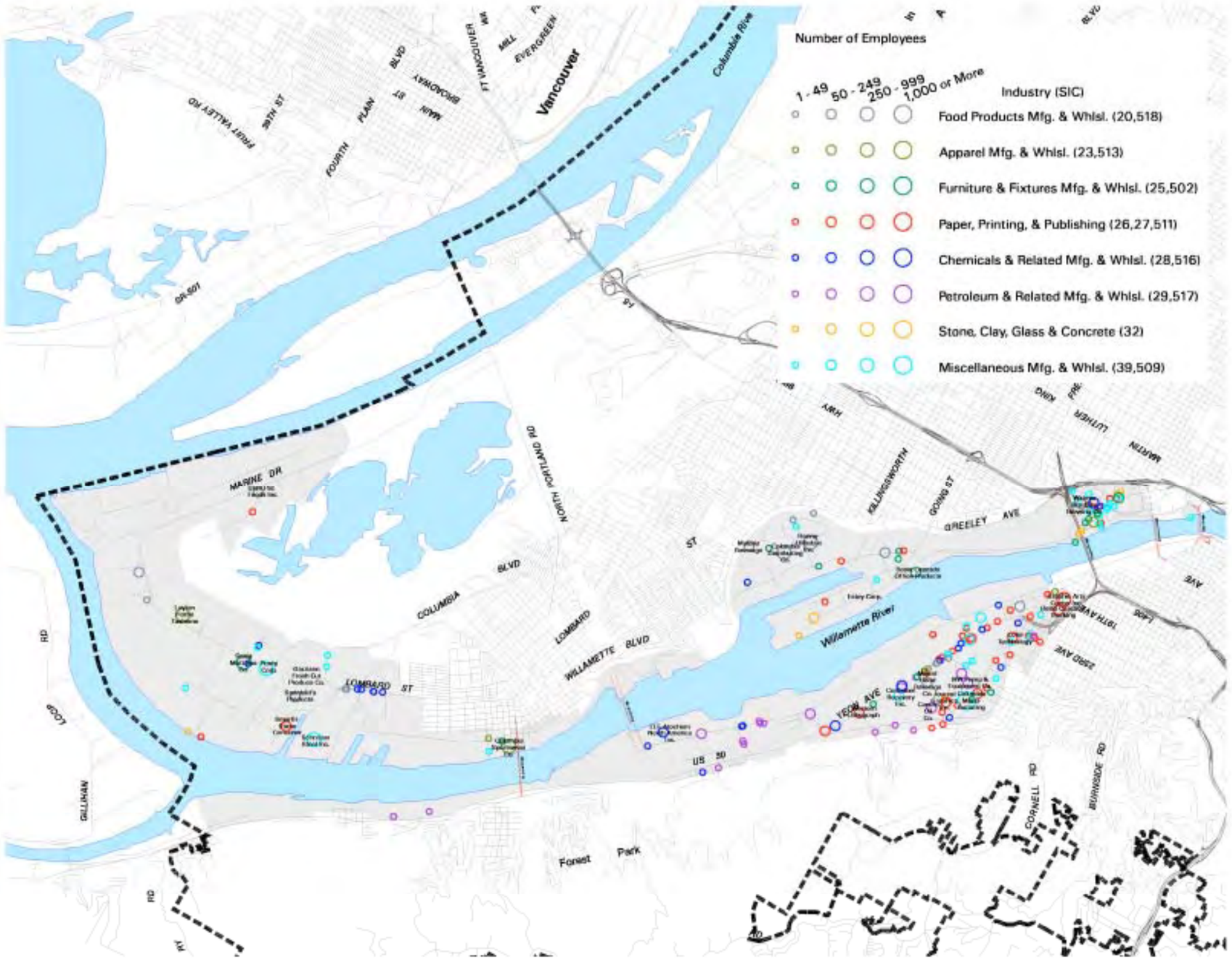
Street Centerlines:
U.S. Census Bureau TIGER data, registered to taxlots under contract to Metro. Updated by Metro through Jan., 1999.

Business names are shown for establishments with 100 or more employees in these industries.

All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.

N

Scale
0' 2000' 4000' 6000'



City of Portland
Bureau of Planning

October 10, 2002

Map 5: Other Concentrated Industries

INFORMATION SOURCES:

Employment Data:
Developed by InfoUSA, a data compilation firm, as provided in the ESRI Business Analyst Extension. Data from second quarter 2002. Positional accuracy not verified.

Street Centerlines:
U.S. Census Bureau TIGER data, registered to taxlots under contract to Metro. Updated by Metro through Jan., 1999.

Business names are shown for establishments with 100 or more employees in these industries.

All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.

⇨ Freight-related firms and infrastructure span the entire length of the harbor and the width of the adjacent industrial districts.

The harbor appears not so much to be a linear feature along the riverfront as a freight distribution complex that spans the wider industrial districts adjacent to the harbor. Marine cargo terminals and other river-dependent industries extend the river's length from the grain terminals and concrete industries in Lower Albina to the container and auto facilities at Port of Portland Terminal 6. Railroads also run the length of the harbor on both sides. Union Pacific and Burlington Northern Santa Fe each have rail yards within a few hundred feet of the harbor. Wholesale and transportation firms are much more densely concentrated in the Guild's Lake, Swan Island, and Lower Albina areas than in the northerly Rivergate, St. Johns, and Linnton areas.

⇨ Among the distribution industries, the petroleum and automobile terminals are the most tightly clustered geographically.

Several petroleum bulk terminals—GATX (Shell), ARCO, Mobile, Tosco, Pacific Northern, Unocal, Chevron, and McCall Oil— are concentrated on the west side of the river in the Linnton and Guild's Lake areas. This area serves as Oregon's petroleum distribution hub, receiving gasoline, diesel, fuel oil, and other petroleum products via tanker vessels and the Olympic pipeline, which extends through Linnton from the Puget Sound.

The Honda, Hyundai, and Toyota marine terminals in the Rivergate and St. Johns areas are situated nearly adjacent to the Ford and General Motors land-side distribution facilities. Trains that bring Ford, GM, and Honda automobiles from the Midwest to North Portland for regional distribution by truck make return trips to the inland U.S. loaded with Honda, Hyundai, Subaru (Vancouver marine terminal), and Toyota automobiles.

⇨ Much of the employment in the harbor area's transportation equipment and primary metals industries is within large employers located on large sites, many along the riverfront.

Examples of large, transportation equipment firms:
- Freightliner, truck manufacturing, more than 1,000 employees
- Cascade General, ship repair, more than 1,000 employees
- Gunderson, rail car and barge manufacturing, more than 1,000 employees
- Western Transportation, ship repair, 250-499 employees
- Boydstun Metal Works, 250-499 employees
- Toyota Vehicle Processors, automobile detailing, 100-249 employees

Examples of large, primary metals firms:
- Esco, steel mill, 500-999 employees
- Oregon Steel Mills, 500-999 employees

- Consolidated Metco, aluminum foundry, 250-499 employees
- Northwest Pipe, pipe manufacturer, 250-499 employees
- Schnitzer Steel, steel recycling and distribution, 250-499 employees
- Alcatel Submarine, cable manufacturing, 250-499 employees (closed in 2001)

The riverfront facilities cited above (Cascade General, Gunderson, Toyota, Oregon Steel, Schnitzer, and Alcatel) are all river-dependent uses.

⇨ Among the metals and equipment industries, the most tightly clustered are the 56 industrial machinery (manufacturing and wholesale) establishments and 17 fabricated metal products establishments in the southern Guild's Lake and Lower Albina areas.

Potentially related to their geographic concentration, these two industries have much smaller average firm size than the other metals and equipment industries. The printing, publishing, and paper industries (manufacturing and wholesale) are also clustered in the southern Guild's Lake and Lower Albina areas (35 establishments), close to the Central City.

Land Area

Table 5 shows the size (average and median) of properties and employees per acre of industries in the harbor area. The Bureau of Planning calculated this information from Metro's RLISLite taxlot data and Oregon Employment Department data on firm addresses and employment. The adjacent parcels under single ownership were grouped together as single sites. The land area of some sites is double counted—if the site was occupied by more than one firm in more than one industry, the acreage of the entire site was applied to each industry. A rough indication of the extent of double-counting can be gleaned from the difference in the number of sites and establishments within each industry shown in Table 5—that difference approximates the number of businesses on multiple-business sites. Additionally, the Oregon Employment Department data does not include site and employment information for the following very large sites: the Port of Portland's public terminal facilities (approximately 125 acres at the Terminal 6 container facility and 49 acres at Terminal 2); Union Pacific Railroad's Albina Yard (approximately 185 acres), or Burlington Northern Santa Fe Railroad's Lake Yard (approximately 150 acres).

⇨ The median size of sites occupied by firms in the industrial sectors is 2.2 acres, and the average size is 8.0 acres.

The size of properties in the harbor area varies widely. Industries with average site size larger than twenty acres include utilities, primary metals manufacturing, and water transportation. Among the industrial sectors, manufacturing has the highest employment density with 12.4 employees per acre, and utilities the least with 0.5 employees per acre.

Table 5. Land Area of Industries in Study Area, 2000

SIC	Industry	Total Acreage*	Sites	Establish-ments	Average Site Size	Median Site Size	Employees per Acre
Construction		451	43	63	10.5	1.9	4.6
15	General building contractors	19	11	15	1.8	1.2	22.3
16	Heavy construction	54	3	3	18.0	9.4	4.3
17	Special trades	378	29	45	13.0	2.1	3.8
Manufacturing		1,562	194	222	8.1	1.9	12.4
20	Food & kindred products	185	11	17	16.8	7.4	6.7
22-23	Apparel & textile products	13	5	5	3.3	0.2	5.2
24	Lumber & wood products	40	6	6	6.7	1.3	5.2
25	Furniture & fixtures	8	6	7	1.4	0.6	26.7
26	Paper & allied products	56	7	9	8.0	6.5	5.7
27	Printing & publishing	60	18	26	3.3	2.3	18.5
28	Chemicals & allied products	128	17	18	7.5	2.3	4.0
29	Petroleum & related products	13	3	3	4.3	3.5	14.7
30	Rubber & plastic products	8	5	5	1.7	1.7	12.4
32	Stone, clay, glass & concrete	48	10	12	4.8	2.0	6.4
33	Primary metals industries	307	12	12	25.6	9.8	9.8
34	Fabricated metal products	102	28	31	3.6	0.9	9.1
35	Industrial machinery & equipment	244	32	32	7.6	0.9	3.4
36	Electronic & electric equipment	115	10	11	11.5	1.3	18.3
37	Transportation equipment	214	14	18	15.3	6.6	36.5
39	Misc. manufacturing industries	21	10	10	2.1	0.7	20.5
Transportation		895	92	123	9.7	4.4	7.2
41	Local & interurban transit	**	**	**	**	**	**
42	Trucking & warehousing	486	59	77	8.2	4.7	5.5
44	Water transportation	280	14	18	20.0	5.4	4.3
45	Transportation by air	**	**	**	**	**	**
47	Transportation services	106	14	16	7.6	5.4	1.5
Communication and Utilities		137	4	5	34.2	16.1	0.5
Wholesale		1,163	194	252	6.0	2.2	5.4
50	Wholesale durable goods	750	136	175	5.5	2.2	4.4
501	Motor vehicles, parts & supplies	127	15	19	8.5	3.5	4.8
502	Furniture & home furnishings	65	13	13	5.0	3.5	4.2
503	Lumber & construction materials	18	7	14	2.6	1.8	15.3
505	Metals & minerals, except petroleum	226	15	18	15.1	4.2	2.6
506	Electrical goods	41	11	11	3.8	2.1	5.1
507	Hardware, plumbing & heating equipment	47	14	16	3.4	1.8	6.1
508	Machinery, equipment, & supplies	146	46	61	3.2	1.6	5.3
509	Misc. durable goods	79	15	18	9.9	3.5	3.5
51	Wholesale nondurable goods	413	58	77	7.1	2.5	7.2
511	Paper & paper products	141	9	9	15.7	2.1	2.3
514	Groceries & related products	41	10	11	4.1	3.4	7.3
516	Chemicals & allied products	40	13	16	3.1	2.2	6.3
517	Petroleum & petroleum products	39	7	8	5.6	2.3	9.6
518	Beer, wine, & distilled alcoholic beverages	58	6	10	9.7	7.2	13.4
519	Misc. nondurable goods	77	8	19	9.6	4.8	2.7
Combined Industrial Sectors		4,208	527	665	8.0	2.2	8.1

* At sites occupied by firms in more than one industry, the site's acreage was applied to each industry.

Sources: Bureau of Planning calculations from Oregon Employment Department and RLISLite taxlot data.

Vacant Lands

Table 6 describes, and Map 6 depicts, the study area's portion of Metro's inventory of the vacant land supply in July 2000. Otak developed this information for Metro, as an update of the inventory presented in the *Regional Industrial Lands Study* (Otak, et al., 1999). The vacant land identified is defined by particular study assumptions. Vacancy is determined by the lack of site improvements valued at more than $1,000 on county assessor tax records. Industrial land is determined by an industrial designation in the local comprehensive plan. Entire parcels, as well as vacant portions of occupied parcels, are included. Lands with slopes exceeding 10 percent, Title 3 wetlands, and 100-year floodplains are excluded. Vacant lands are sorted into four tiers that correspond to different types of development constraints for reuse, as explained below.

Table 6. Vacant Industrial Lands in the Study Area, 2000

		Vacant Industrial Acreage						
District	Total Acreage	Tier A	Tier B	Tier C, Infill	Tier C, Overvalued	Tier D	Total	Vacancy Rate
Linnton	279	2.1	19.6	3.1	11.0	2.7	39	13.8%
Guild's Lake	1,686	1.2	97.7	23.2	14.5	13.4	150	8.9%
Rivergate	1,988	26.2	323.5	2.0	17.3	12.1	381	19.2%
St. Johns	1,043	3.7	66.3	11.8	24.8	7.2	114	10.9%
Swan Island	744	0.0	26.1	3.0	18.2	0.1	47	6.4%
Lower Albina	383	0.0	0.0	1.7	0.0	2.6	4	1.1%
Study Area	6,123	33	533	45	86	38	735	12.0%
City of Portland	18,809	229	1,338	177	162	158	2,063	11.0%

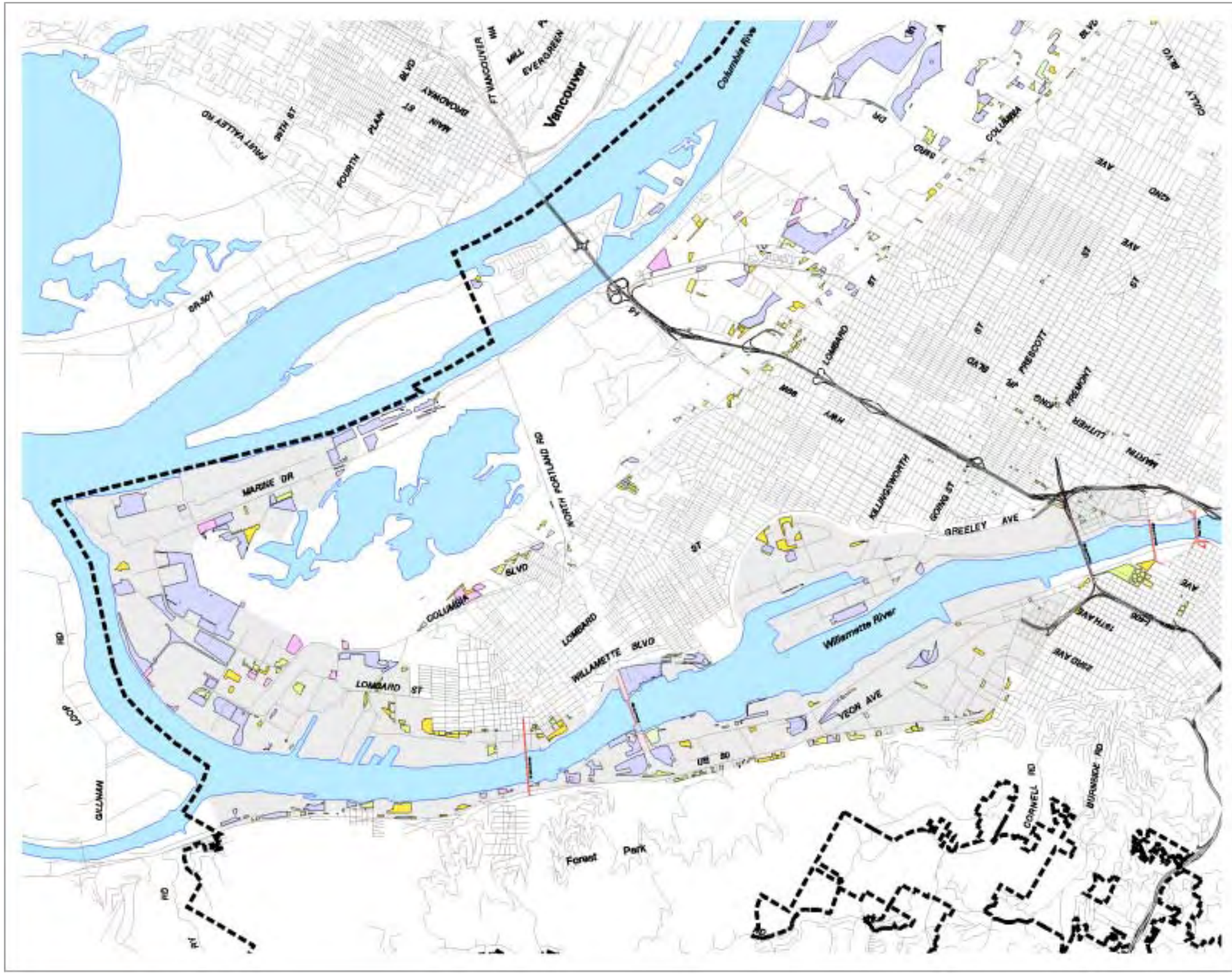
Tier A – no identified constraints; taxlots > 1 acre.
Tier B – constrained by "landbanked" corporate ownership, access, unstable soils; taxlots > 2 acres.
Tier C, infill - taxlots < 1 acre.
Tier C, overvalued - value > $5.50 / sq. ft.; taxlots < 1 acre.
Tier D – redevelopable, but constrained by buildings, brownfields, existing uses; floor area ratio < 10%.
Sources: 2000 vacant land inventory developed by Metro using July 2000 aerial photography.

⇨ Metro found that 735 acres of land within the study area were vacant (unimproved) in July 2000, which is 13.3 percent of the total land in taxlots (5,532 acres). The less constrained vacant sites (Tiers A& B in the Metro inventory) totaled 566 acres, 10.2 percent of the land in taxlots.

Over half of the vacant land identified in the study area was in the Rivergate district. In addition, the Port of Portland owns approximately 750 acres of undeveloped land on West Hayden Island across from Terminal 6. That property is being held in reserve for potential future marine terminal development, although it has not been annexed or zoned for industrial use.

Nearly three fourths of the vacant land identified in the study area was classified as Tier B, which is constrained by ownership (e.g., "landbanked" for future expansion), access limitations, or unstable soils. Much of that land is in Tier B because it is owned by the Port of Portland (the largest landowner in the study area) and is available for lease only or for marine-related use only. Those parcels are not necessarily less ready for immediate development than Tier A. Vacant portions of sites that could be used for future expansion are also included in this tier, such as on the Wacker Siltronic and NW Natural properties.

Some notable changes have occurred in the vacant land supply since 2000. The Atofina (59 acres), Time Oil (approximately 20 occupied acres), and Alcatel (15 acres) sites, each located adjacent to the river, have been vacated.



City of Portland
Bureau of Planning

July 25, 2002

Vacant Land Supply, 2000

Tiers

- A - Unconstrained
  Taxlot > 1 acre
- B - Constrained by "landbanked" corporate ownership access or unstable soils
  Taxlot > 2 acres
- C - Infill
  Taxlot < 1 acre
- C - Over Valued
  Taxlot < 1 acre and value > $5.50/sq.ft.
- D - Redevelopable but constrained by buildings, brownfields, or existing uses.
  Taxlot < $3.00/sq.ft. and FAR < 10%
- DS+ - Taxlot Value > $3.00/sq.ft. and < $5.50/sq.ft.

INFORMATION SOURCES:

Street Centerlines:
U.S. Census Bureau TIGER data, registered to taxlots under contract to Metro. Updated by Metro through Jan., 1999.

Industrial Vacant Lands:
2000 Vacant Land Inventory developed by Metro using July 2000 aerial photography. Title 3 protected land, publicly owned land, platted lots smaller than 3/8 acre, church and fraternal organization owned land, land with major utility easements, and parks and open space removed.

All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.

N

Scale
0' 2000' 4000' 8000'

2. TRENDS

A. EMPLOYMENT TRENDS

Industrial Sectors

The mix of industries and their location in the Portland metropolitan area changed markedly in the 1980s and 1990s. These decades were also a business-cycle period, as the recession of the early 1980s led to substantial growth through the 1990s and back into recession in 2001. Tables 7 and 8 provide an overview of these changes, using employment as an indicator.

Table 7 presents employment trends in the industrial sectors (construction, manufacturing, transportation, communication and utilities, and wholesale trade) during the 1980-2000 period in Multnomah County and the PMSA (Oregon portion).[6] Trend data is not shown for the study area specifically, because covered employment data in smaller geographic areas was less accurate before the early 1990s.[7]

Table 8 is an accompanying "shift-share" analysis, showing how the PMSA share of national employment in the industrial sectors has shifted over the 1980-2000 period. Shift-share analysis is a tool used to compare the performance of an industry in one geographic area relative to another over time. Comparing Tables 7 and 8 also shows whether each industry's regional growth or decline is part of a national trend.

⇨ During the 1980s and 1990s, the metropolitan area's top job-growth industries in the industrial sectors were electronics manufacturing, the construction trades, air transportation, and wholesale trade.

Net new industrial employment of the top job-growth industries in the PMSA during the 1980-2000 period was as follows:

- electronic equipment manufacturing—20,137 new jobs in PMSA, 14 percent of those jobs in Multnomah County;
- special trades construction—16,610 new PMSA jobs, 46 percent in Multnomah County;
- nondurable wholesale trade—12,667 new PMSA jobs, 24 percent in Multnomah County;
- air transportation—9,036 new PMSA jobs, 86 percent in Multnomah County; and
- durable wholesale trade—5,846 new PMSA jobs, including an employment loss in Multnomah County.

[6] The average annual growth rate of each industry over the 20-year period is calculated as the slope of an exponential regression curve plotted with 1980, 1985, 1990, 1995, and 2000 data. This statistical tool considers incremental changes over the 20-year period to estimate the rate of growth, instead of just using the starting and ending data.

[7] Reporting changes were made in the 1980s and 1990s to more accurately link employment to actual workplace addresses in firms with more than one location, making 10-20 year trend analysis less reliable in smaller geographic areas within the county.

Table 7. Employment Trends of Industrial Sectors in Multnomah County and PMSA, 1980-2000

SIC	Industry	Area*	Covered Employment 1980	1985	1990	1995	2000	1980-00 change	Annual Growth Trend**
Construction		County	13,203	9,612	15,527	17,621	21,855	8,652	3.3%
		PMSA	23,420	17,500	29,614	36,821	45,338	21,918	4.2%
15	General contractors	County	3,499	2,171	3,554	3,443	4,911	1,412	2.3%
		PMSA	6,264	4,152	7,199	8,203	10,820	4,556	3.6%
16	Heavy construction	County	1,708	1,637	1,809	1,533	1,370	-338	-1.0%
		PMSA	3,076	2,840	3,238	3,843	3,827	751	1.5%
17	Special trades	County	7,996	5,804	10,164	12,645	15,574	7,578	4.3%
		PMSA	14,080	10,508	19,176	24,775	30,690	16,610	5.0%
Manufacturing		County	52,804	43,424	50,176	50,334	51,732	-1,072	0.2%
		PMSA	108,320	95,584	107,006	115,870	128,275	19,955	1.1%
20	Food products	County	5,033	4,856	5,159	5,289	4,518	-515	-0.3%
		PMSA	7,817	7,730	8,445	8,681	7,909	92	0.3%
22	Textile mill products	County	1,460	1,349	1,380	1,332	746	-714	-2.7%
		PMSA	1,460	1,349	1,380	1,361	746	-714	-2.6%
23	Apparel & textiles	County	1,946	1,568	1,458	1,292	961	-985	-3.2%
		PMSA	2,544	1,933	1,994	1,904	1,623	-921	-1.8%
24	Lumber & wood	County	3,324	2,514	2,248	1,760	1,818	-1,506	-3.1%
		PMSA	10,338	8,990	8,658	7,294	7,435	-2,903	-1.7%
25	Furniture & fixtures	County	779	740	1,136	1,311	1,376	597	3.5%
		PMSA	1,662	1,721	1,985	2,327	2,467	805	2.2%
26	Paper products	County	2,162	1,828	1,768	1,611	1,211	-951	-2.5%
		PMSA	4,974	4,078	4,150	4,158	3,017	-1,957	-1.9%
27	Printing & publishing	County	4,034	4,582	5,503	6,603	6,798	2,764	2.9%
		PMSA	5,572	6,550	8,084	9,562	10,390	4,818	3.3%
28	Chemical products	County	1,550	1,178	944	1,119	971	-579	-2.0%
		PMSA	1,683	1,454	1,204	1,722	1,671	-12	0.3%
29	Petroleum products	County	418	231	496	331	300	-118	-0.6%
		PMSA	418	231	496	331	300	-118	-0.6%
30	Rubber & plastics	County	1,098	899	1,266	1,230	982	-116	0.2%
		PMSA	1,778	2,144	3,273	4,769	4,879	3,101	5.8%
31	Leather products	County	72	130	157	108	248	176	4.7%
		PMSA	72	184	198	314	271	199	6.6%
32	Stone, glass & concrete	County	1,672	1,026	1,430	1,275	1,398	-274	-0.3%
		PMSA	2,501	1,655	2,418	2,573	3,238	737	1.9%
33	Primary metals	County	6,124	5,343	7,181	5,756	5,683	-441	-0.1%
		PMSA	6,908	6,057	7,776	6,466	7,453	545	0.4%
34	Fabricated metal prod.	County	5,180	4,079	3,117	3,939	4,300	-880	-0.8%
		PMSA	9,886	7,920	8,279	9,395	10,480	594	0.6%
35	Industrial machinery	County	6,760	3,607	4,610	4,629	3,696	-3,064	-1.9%
		PMSA	12,051	10,223	12,143	14,643	13,784	1,733	1.3%
36	Electronic equipment	County	1,938	2,185	2,141	2,294	4,784	2,846	3.8%
		PMSA	7,779	9,313	12,089	18,613	27,916	20,137	6.7%
37	Transport. equipment	County	8,029	6,143	8,455	8,709	10,213	2,184	1.7%
		PMSA	9,209	6,974	9,980	10,260	12,126	2,917	1.9%

Table 7. continued

SIC	Industry	Area*	Covered Employment 1980	1985	1990	1995	2000	1980-00 change	Annual Growth Trend**
38	Instruments	County	345	316	632	424	613	268	2.9%
		PMSA	19,049	14,066	10,433	7,762	8,419	-10,630	-4.4%
39	Misc. manufacturing	County	881	848	1,097	1,321	1,115	234	1.8%
		PMSA	1,292	1,650	2,662	2,544	2,423	1,131	3.4%
Transportation		County	14,724	15,324	18,897	22,473	23,787	9,063	2.7%
		PMSA	17,382	19,094	25,028	30,256	34,639	17,257	3.7%
41	Transit	County	1,535	1,524	1,556	1,713	1,451	-84	0.0%
		PMSA	1,835	1,889	2,254	2,518	2,912	1,077	2.5%
42	Trucking & warehousing	County	8,493	8,952	10,411	12,209	9,253	760	1.0%
		PMSA	10,560	11,529	14,463	17,242	15,389	4,829	2.3%
44	Water transportation	County	1,619	1,110	1,121	1,413	1,462	-157	0.1%
		PMSA	1,696	1,194	1,224	1,513	2,223	527	1.6%
45	Air transportation	County	1,300	1,753	3,727	4,842	9,040	7,740	10.3%
		PMSA	1,311	1,969	4,095	5,379	10,347	9,036	10.8%
47	Transportation services	County	1,777	1,985	2,082	2,296	2,581	804	1.8%
		PMSA	1,980	2,513	2,992	3,604	3,768	1,788	3.3%
Communication & Utilities		County	11,954	10,525	9,086	9,576	9,881	-2,073	-0.9%
		PMSA	14,492	13,029	12,817	12,544	14,014	-478	-0.2%
48	Communication	County	7,645	6,040	5,353	5,592	5,343	-2,302	-1.6%
		PMSA	9,298	7,572	6,915	7,203	7,932	-1,366	-0.7%
49	Electric, gas & sanitation	County	4,309	4,485	3,733	3,984	4,538	229	0.0%
		PMSA	5,194	5,457	5,902	5,341	6,082	888	0.6%
Wholesale		County	33,595	29,405	30,252	32,348	32,192	-1,403	0.0%
		PMSA	44,580	44,363	52,567	59,498	63,101	18,521	2.0%
50	Durable	County	24,325	19,987	20,632	20,546	19,904	-4,421	-0.7%
		PMSA	30,339	28,271	32,517	34,603	36,185	5,846	1.1%
51	Nondurable	County	9,270	9,418	9,620	11,802	12,288	3,018	1.6%
		PMSA	14,240	16,092	20,050	24,895	26,917	12,677	3.5%
Combined industrial sectors		County	126,280	108,290	123,938	132,352	139,447	13,167	0.8%
		PMSA	208,194	189,570	227,032	254,989	285,367	77,173	1.9%
All Industries		County	334,766	319,583	375,768	415,113	453,254	118,488	1.8%
		PMSA	515,277	512,812	637,618	733,896	849,075	333,798	2.8%

* Multnomah County or the Oregon portion of the Portland Metropolitan Statistical Area.

** Annual growth trend is an estimate of the average annual rate of growth, calculated as the slope of an exponential regression line using 1980, 1985, 1990, 1995, and 2000 data.

Sources: Bureau of Planning calculations from Oregon Employment Department data.

Table 8. Employment Shift-Share Analysis of Industrial Sectors, PMSA to Nation, 1980-2000

SIC	Industry	PMSA* Share of U.S. Covered Employment by Industry					Percent shift** 1980-00	1980-2000 growth	
		1980	1985	1990	1995	2000		PMSA	U.S.
Construction		0.52%	0.37%	0.57%	0.70%	0.66%	29%	94%	51%
15	General contractors	0.53%	0.33%	0.56%	0.68%	0.72%	36%	73%	27%
16	Heavy construction	0.28%	0.32%	0.37%	0.41%	0.35%	26%	24%	-2%
17	Special trades	0.63%	0.40%	0.64%	0.79%	0.73%	16%	118%	89%
Manufacturing		0.53%	0.49%	0.56%	0.63%	0.70%	31%	18%	-9%
Manufacturing, except electronics		0.54%	0.49%	0.54%	0.58%	0.60%	11%	0%	-10%
20	Food & kindred products	0.46%	0.48%	0.51%	0.52%	0.47%	2%	1%	-1%
22	Textile mill products	0.17%	0.19%	0.20%	0.20%	0.14%	-18%	-49%	-38%
23	Apparel & textile products	0.20%	0.17%	0.19%	0.20%	0.26%	28%	-36%	-50%
24	Lumber & wood products	1.49%	1.29%	1.17%	0.95%	0.90%	-39%	-28%	19%
25	Furniture & fixtures	0.36%	0.35%	0.39%	0.46%	0.44%	24%	48%	19%
26	Paper & allied products	0.72%	0.60%	0.59%	0.60%	0.46%	-36%	-39%	-5%
27	Printing & publishing	0.44%	0.46%	0.51%	0.62%	0.67%	53%	86%	22%
28	Chemicals & allied products	0.15%	0.14%	0.11%	0.17%	0.16%	7%	-1%	-7%
29	Petroleum & coal products	0.20%	0.13%	0.31%	0.23%	0.24%	16%	-28%	-38%
30	Rubber & plastic products	0.24%	0.27%	0.37%	0.49%	0.48%	97%	174%	39%
32	Stone, clay, glass & concrete	0.38%	0.28%	0.43%	0.48%	0.56%	49%	29%	-13%
33	Primary metals	0.60%	0.75%	1.03%	0.91%	1.07%	77%	8%	-39%
34	Fabricated metal products	0.60%	0.53%	0.57%	0.65%	0.68%	12%	6%	-5%
35	Industrial machinery	0.48%	0.47%	0.58%	0.71%	0.65%	35%	14%	-15%
36	Electronic equipment****	0.44%	0.50%	0.72%	1.15%	1.62%	268%	259%	-3%
37	Transportation equipment	0.46%	0.34%	0.48%	0.56%	0.65%	39%	32%	-5%
38	Instruments****	1.86%	1.35%	1.04%	0.92%	1.00%	-47%	-56%	-17%
39	Misc. manufacturing	0.30%	0.45%	0.70%	0.65%	0.62%	103%	88%	-8%
Transportation		0.67%	0.67%	0.77%	0.78%	0.77%	14%	99%	75%
41	Local & interurban transit	0.47%	0.43%	0.67%	0.44%	0.44%	-7%	59%	71%
42	Trucking & warehousing	0.82%	0.84%	0.89%	0.92%	0.83%	2%	46%	43%
44	Water transportation	0.76%	0.61%	0.65%	0.81%	1.11%	46%	31%	-10%
45	Transportation by air	0.28%	0.37%	0.54%	0.67%	0.79%	184%	689%	178%
47	Transportation services	0.94%	0.87%	0.87%	0.84%	0.77%	-18%	90%	132%
Communication & Utilities		0.60%	0.52%	0.50%	0.50%	0.50%	-16%	-3%	15%
48	Communication	0.69%	0.57%	0.52%	0.55%	0.48%	-30%	-15%	22%
49	Electric, gas & sanitary svcs.	0.48%	0.46%	0.48%	0.45%	0.54%	11%	17%	5%
Wholesale		0.84%	0.78%	0.85%	0.93%	0.90%	7%	42%	33%
50	Durable	0.97%	0.84%	0.89%	0.93%	0.86%	-11%	19%	34%
51	Non durable	0.66%	0.69%	0.78%	0.93%	0.96%	45%	89%	31%
Combined Industrial Sectors		0.59%	0.54%	0.62%	0.70%	0.72%	22%	37%	12%

* Oregon portion of Portland Metropolitan Statistical Area.

** Percent shift is the percentage change in PMSA share from 1980 to 2000.

*** This category includes all manufacturing industries except electronics.

**** National data used for the electronics and instruments industries are from the Current Employment Statistics survey, instead of Covered Employment, since the latter source changed how firms were classified among these industries between 1985 and 1990.

Sources: Portland Bureau of Planning calculations from Oregon Employment Department and U.S. Bureau of Labor Statistics data.

Growth in the electronics manufacturing industry reflects an expanding Portland metropolitan area share of national employment from 0.37 percent in 1980 to 1.46 percent in 2000, as shown in Table 8. Thus, the Portland area is one of the focal points of national growth in this industry. Similarly, the PMSA share of air transportation employment increased from 0.28 to 0.79 percent; nondurable goods wholesale trade from 0.66 to 0.96 percent; and special trades construction from 0.63 to 0.73 percent. In contrast, the PMSA's 7,210 new jobs in wholesale trade of durable goods did not keep up with the industry's national growth, and the PMSA employment share fell from 0.97 to 0.86 percent.

⇨ Industrial employment in the Portland metropolitan area grew by 37 percent between 1980 and 2000, compared to 12 percent growth nationwide.

The metropolitan area added 77,200 net new industrial jobs between 1980 and 2000. Of those new jobs, 46 percent were in the distribution sectors of transportation and wholesale trade, 26 percent in manufacturing, and 28 percent in construction. During that 20-year period, the Portland metropolitan area share of national employment grew by 22 percent.

⇨ Multnomah County is the metropolitan area's primary industrial location, but its share of the PMSA's employment in the industrial sectors reduced from 59 percent in 1980 to 48 percent in 2000.

Only 17 percent of the industrial employment added in the region between 1980 and 2000 occurred in Multnomah County. One likely reason for Multnomah County's loss of employment share is its relative availability of vacant industrial land, since Multnomah County is generally more built out than its suburban neighbors. A second reason is Multnomah County's particular mix of expanding and contracting industries relative to the region, as shown in Table 7. For example, the fast growing electronics manufacturing industry is concentrated in Washington County, while most of the slower growing and declining industries in the industrial sectors are concentrated in Multnomah County. A third reason is that some industries experienced substantial employment cutbacks in Multnomah County and growth elsewhere in the region, including durable goods wholesale, communication, industrial machinery, and fabricated metal products.

⇨ While manufacturing employment in the U.S. declined by 9 percent between 1980 and 2000, it increased by 18 percent in the Portland metropolitan area. The metro area share of national manufacturing employment grew by 31 percent during those decades.

Electronics has been the metropolitan area's driving growth industry in the manufacturing sector, adding 20,137 net new jobs between 1980 and 2000, compared with 19,955 net new jobs for the entire manufacturing sector. Combined employment in the region's other manufacturing industries declined slightly, less than 1 percent, but it declined 10 percent nationally. Excluding electronics, the PMSA's share of the national manufacturing employment increased by 11 percent during these decades. Thus, regional manufacturers were significantly outperforming their national counterparts in job creation. The printing and publishing, rubber and plastics, and

transportation equipment industries each added more than 2,000 jobs in the PMSA over the 1980-2000 period, while substantial employment reductions occurred in lumber, paper, apparel, textiles, and instruments manufacturing. The decline in the apparel and textiles manufacturing reflects a national trend, while that in the lumber, paper, and instruments industries reflects a declining PMSA share of national employment.

⇨ In the transportation sector, the leading employment generator has been the air transportation industry, growing in Multnomah County from 1,300 jobs in 1980 to 9,040 in 2000.

Air transportation was by far the largest source of industrial job growth in Multnomah County. The air transportation industry is concentrated near the Portland International Airport, although air courier employment also substantially expanded in the harbor area. Water transportation employment experienced modest growth in the PMSA but essentially none in Multnomah County. This industry's employment nationally was declining, so local water transportation firms were outperforming their national counterparts. Multnomah County is clearly the center of the PMSA's transportation employment, although its share reduced from 85 percent in 1980 to 69 percent in 2000, due primarily to suburban growth in trucking and warehousing employment.

⇨ The wholesale of durable goods industry in Multnomah County had a downsizing period in the early 1980s, losing over 4,000 jobs, and then stabilized but did not substantially rebound afterward.

In contrast, over 20,000 new wholesale jobs were added in the PMSA with substantial growth in both durable and nondurable goods. Multnomah County's share of PMSA employment in durable goods wholesale dropped from 80 percent in 1980 to 55 percent in 2000; nondurable goods wholesale, from 65 to 46 percent.

⇨ The construction sector added 21,918 jobs in the PMSA between 1980 and 2000, including 8,652 jobs in Multnomah County.

Population in the Portland area is growing faster than nationally, and the PMSA share of national construction employment increased from 0.52 to 0.66 percent over the 1980-2000 period. Three out of four new construction jobs in the PMSA were in special trades construction, which expanded at a rapid average annual rate of 5.0 percent. In contrast, heavy construction employment expanded at an average annual rate of 1.5 percent in the PMSA and declined in Multnomah County.

Maritime Employment

To provide a more detailed look at maritime-related employment, Table 9 shows national employment trends since 1980 in selected industry segments at the 4-digit SIC level that include maritime-related uses. These industry segments were chosen to include most of the river-dependent uses on Portland Harbor. Historical trend data is not published for the PMSA at the 4-digit SIC level, but national data is useful for trend analysis at this level of detail.

Table 9 supplements the local trend data shown at the less detailed, 2-digit level in Tables 7 and 8. Table 7 shows that "water transportation" (SIC 44) employment in the PMSA expanded at a 1.6 percent average annual rate between 1980 and 2000, and Table 8 shows that the PMSA share of national water transportation employment expanded substantially from 0.76 to 1.11 percent during that period. In addition to maritime commerce, water transportation also includes excursion boat businesses and marinas.

Table 9. Maritime Employment Trends in U.S., 1980-1999

		Covered Employment in U.S.					1980-99	Annual Growth
SIC	Industry	1980	1985	1990	1995	1999	Change	Trend**
Commodity distribution, including marine terminals								
5153	Grain buying & wholesale	81,615	71,814	67,544	62,157	59,336	-22,279	-1.6%
5171	Petroleum bulk terminals	95,605	84,275	82,289	65,405	60,016	-35,589	-2.4%
5012	Motor vehicle wholesale distrib.	105,839	109,659	119,394	129,173	158,160	52,321	2.0%
9621	Public transportation, incl. Ports	322,806	306,761	323,515	323,515	289,418	-33,388	-0.3%
Water transportation & vessel services								
441	Deep sea foreign transportation	34,827	29,368	22,687	18,303	14,895	-19,932	-4.4%
442	Deep sea domestic transport.	12,142	12,458	11,278	10,144	9,693	-2,449	-1.4%
444	River & canal transportation	16,940	14,768	15,695	12,941	14,296	-2,644	-1.0%
4492*	Towing & tugboat services	25,506	20,020	18,693	18,593	18,985	-6,521	-1.4%
4491*	Marine cargo handling	87,928	68,679	60,241	62,013	62,356	-25,572	-1.7%
Manufacturing, including river-dependent facilities								
3731	Shipbuilding & repair	252,041	220,682	201,251	136,681	126,629	-125,412	-3.8%
295	Asphalt, paving & roofing	31,269	26,101	27,202	26,724	29,856	-1,413	-0.2%
327	Concrete, gypsum & plaster	205,716	204,977	207,459	203,930	240,017	34,301	0.6%
3312	Steel mills & blast furnaces	431,187	238,359	208,908	171,184	153,549	-277,638	-4.9%

* Towing & towboat services data before 1990 was in SIC 4454; marine cargo handling, in SIC 4463.

** Annual growth trend is an estimate of the average annual rate of growth, calculated as the slope of an exponential regression line using 1980, 1985, 1990, 1995, and 1999 data.

Sources: Bureau of Planning calculations from U.S. Bureau of Labor Statistics data.

⇨ U.S. maritime employment has generally declined over the last two decades, as maritime operations have become more capital intensive.

As tonnage handled by the marine cargo industry nationally has increased in the 1980s and 1990s (U.S. waterborne cargo tonnage increased from 1.8 to 2.1 billion metric tons between 1980 and 1999, as estimated by the U.S. Maritime Administration), related maritime employment has declined. National employment in marine cargo handling (SIC 4491) declined at an average annual rate of 1.8 percent between 1980 and 1999. Marine cargo handling accounted for 80 percent of the water transportation (SIC 44) employment in the study area in

2000. The shipbuilding and repair industry (another large employer in the study area) eliminated approximately half of its U.S. employment between 1980 and 1999.

Employment Forecasts

In March 2002, Metro completed an employment forecast for the Portland-Vancouver Metropolitan Area by industry to the year 2030. The industrial employment projections of that forecast are shown in Table 10. Metro conducted the forecast to inform upcoming decisions on expansion of the urban growth boundary. The forecast is based on assumptions of national and global conditions prepared by DRI-WEFA, a national forecasting firm.

⇨ Metro (2001) predicts a 0.8 percent average annual growth in regional manufacturing employment from 2000 to 2030, 1.5 percent in transportation and utilities, and 1.6 percent in wholesale trade.

Both Metro and the Oregon Office of Economic Analysis[8] foresee employment growth over the next five years in most manufacturing and distribution industries. Industrial job growth in the Portland-Vancouver area is predicted to substantially outpace the national average. Wholesale trade, transportation, and electronics manufacturing are predicted to be the primary job-growth industries of the region's industrial sectors, in similar fashion to the trends of recent decades.

⇨ The region's shifting mix of manufacturing industries is projected to continue.

Three out of four new manufacturing jobs between 2000 and 2030 are expected to be created in the electronics and instruments industries (the forecast combines these two industries). Continued employment reductions are projected in the food products, textiles and apparel, lumber, and paper industries.

⇨ Extrapolating from the Metro forecast, overall industrial employment can be expected to increase moderately in the harbor area over the next 30 years.

Based on the Metro forecast and the current mix of harbor area industries, transportation and wholesale trade are likely to be the leading job-growth sectors in the harbor area. The long-term forecast for the metals and equipment industries is mixed but stable overall: anticipated employment gains in industrial machinery manufacturing exceed the modest reductions expected in transportation equipment and metals. The harbor area could also share in the projected regional growth of other manufacturing industries, including electronics, printing and publishing, and the grouped categories of "other durable goods" (e.g., furniture and fixtures, concrete products) and "other nondurable goods" (e.g., rubber and plastics, chemicals, and petroleum products).

[8] The Oregon Office of Economic Analysis (Department of Administrative Services) also prepares employment forecasts by industry. Their five-year statewide forecasts are used for state budget analysis. The projections of their March 2002 forecast are comparable to those of the Metro forecast in Table 9.

Table 10. Employment Projections to 2030, Portland-Vancouver Region and U.S.

Industry	Average Annual Growth Rate of Employment							Employment Change
Area*	2002	2003	2004	2005	1970-00	2000-05	2000-30	2000-30
Manufacturing								
Portland-Vancouver	-1.3%	2.8%	3.6%	3.5%	1.7%	1.2%	0.8%	37,400
U.S.	-4.8%	1.0%	1.5%	0.7%	-0.2%	-1.2%	-0.6%	
Food processing								
Portland-Vancouver	-1.7%	0.6%	1.3%	0.3%	-0.7%	-0.9%	-1.2%	-2,600
U.S.	0.4%	1.4%	1.9%	0.2%	-0.2%	0.8%	-0.3%	
Textiles & apparel								
Portland-Vancouver	-0.7%	6.2%	5.0%	1.4%	-1.8%	3.1%	-1.7%	-1,400
U.S.	-7.5%	-0.9%	-0.6%	-1.0%	-2.3%	-4.2%	-1.4%	
Lumber & wood products								
Portland-Vancouver	0.8%	-0.3%	-1.8%	0.4%	-0.7%	-0.6%	-2.5%	-4,000
U.S.	0.1%	4.3%	4.2%	1.4%	0.8%	1.1%	-0.4%	
Paper & allied products								
Portland-Vancouver	-0.6%	0.1%	1.4%	0.8%	-0.4%	0.1%	-0.9%	-1,500
U.S.	-1.6%	1.4%	2.7%	0.2%	-0.2%	-0.2%	-0.7%	
Printing & publishing								
Portland-Vancouver	3.4%	2.9%	2.3%	2.0%	3.4%	2.1%	0.7%	2,700
U.S.	-3.0%	4.2%	5.2%	2.8%	1.1%	1.1%	-0.1%	
Metals								
Portland-Vancouver	-2.7%	3.1%	2.8%	2.3%	1.3%	0.1%	-0.2%	-1,300
U.S.	-4.8%	3.1%	2.8%	0.9%	-0.8%	-0.6%	-1.4%	
Nonelectrical machinery								
Portland-Vancouver	0.0%	3.2%	3.1%	4.1%	2.6%	0.7%	1.2%	7,000
U.S.	-12.6%	-12.6%	-4.0%	-0.2%	0.2%	-7.0%	-0.4%	
Electronics & instruments								
Portland-Vancouver	-1.3%	3.5%	6.4%	5.9%	4.2%	3.8%	1.7%	28,200
U.S.	-5.7%	1.9%	-2.0%	1.0%	0.3%	-1.8%	0.2%	
Transportation equipment								
Portland-Vancouver	-5.4%	3.6%	3.0%	3.5%	2.1%	-3.7%	0.0%	-100
U.S.	-6.8%	1.5%	1.2%	-0.7%	0.0%	-2.1%	-0.8%	
Other durable goods (furniture & fixtures, stone, clay, glass & concrete)								
Portland-Vancouver	-1.7%	3.4%	2.7%	2.7%	0.8%	2.0%	1.6%	5,000
U.S.	-4.5%	1.5%	3.0%	1.2%	0.0%	-0.4%	-0.4%	
Other nondurable goods (chemicals, petroleum products, rubber & plastics, leather)								
Portland-Vancouver	-3.8%	1.2%	2.7%	4.1%	2.5%	-0.3%	1.8%	5,400
U.S.	-1.9%	3.6%	2.7%	0.3%	0.0%	0.3%	0.0%	
Transportation, communication & utilities								
Portland-Vancouver	-0.5%	1.2%	2.7%	2.9%	2.0%	1.0%	1.5%	31,100
U.S.	-0.5%	3.0%	3.9%	2.6%	1.5%	1.9%	0.7%	
Wholesale trade								
Portland-Vancouver	-0.9%	4.1%	4.3%	3.9%	2.5%	1.7%	1.6%	41,400
U.S.	-0.9%	1.3%	2.3%	1.3%	1.9%	0.8%	0.6%	
All industries								
Portland-Vancouver	-0.4%	2.7%	3.4%	3.4%	3.0%	1.7%	1.8%	683,400
U.S.	-0.4%	1.6%	2.1%	1.6%	2.1%	1.0%	1.0%	

* Portland Vancouver Region: Multnomah, Clackamas, Washington, Yamhill, and Clark Counties.
Source: Metro, *Draft Economic Report to the Metro Council (*March 2002) from DRI-WEFA U.S. forecast.

Transportation Analysis Zones Forecast

Metro prepared an employment forecast for subareas of the region called transportation analysis zones (TAZs), which are generally at a neighborhood or business district scale. Table 11 presents the 2020 forecast employment for TAZs that roughly approximate the harbor industrial districts. These forecasts were used for transportation modeling to prepare the *Regional Transportation Plan*. The forecasts were developed with information on and by roughly allocating regional industry forecasts to subareas within the region, giving consideration to the industry mix and the vacant and redevelopable land available in these subareas.

Table 11. Employment Forecast by Transportation Analysis Zones (TAZs) to 2020

Approximate Area*	TAZ	Employment 2000	Employment 2020	Change	Annual Growth**
Linnton	26	799	1,358	559	2.7%
Guild's Lake	19 & 25	12,155	13,039	884	0.4%
Rivergate	925 & 926	8,755	15,345	6,590	2.8%
St. Johns	920, 922 & 924	6,682	7,670	988	0.7%
Swan Island	852	10,491	11,158	667	0.3%
Lower Albina	928 & 950	2,335	3,109	774	1.4%
Harbor Area Total		41,218	51,680	10,462	1.1%

* TAZ boundaries roughly approximate these districts. The Rivergate TAZs extend east to North Portland Rd. The St. Johns TAZs include the town center.

** Average (compounded) annual rate of growth.

Source: Metro forecast used for Regional Transportation Plan modeling.

⇨ The TAZ forecast anticipates over 10,000 net new jobs in the harbor area—primarily in Rivergate, where the majority of the area's vacant land is located.

The Metro forecast anticipates employment growth in each of harbor area industrial districts. The districts having the most employment in 2000 were Guild's Lake with 12,155 jobs and Swan Island with 10,491 jobs. The harbor area district forecast to have the most employment in 2020 is Rivergate with a projected 15,345 jobs.

B. LAND USE TRENDS

Industrial Zoning Changes

Many U.S. cities have lost much of their central industrial areas to other land uses in recent decades. As cities grow, development pressure increases for conversion of industrial land to residential and commercial uses that bring higher market land values. In response, the "Industrial Sanctuary" Policy (2.14) in Portland's *Comprehensive Plan* is to, "Encourage the growth of industrial activities in the city by preserving industrial land primarily for manufacturing purposes." The Plan designates most of the city's industrial land, including nearly all of the study area, as Industrial Sanctuary, and the industrial zoning regulations that implement the Plan constrain the encroachment of residential and commercial uses in these areas.

Table 12 lists industrial zone changes adopted in Portland since 1991 and their general location. This list was generated from a review of zone change applications recorded in the City's computerized CaseInfo database and historical records of legislative projects, such as area plans. Due to the lack of a systematic accounting system for tracking the acreage of historical zone changes, this list is probably incomplete, but it provides an approximation of the acreage involved in industrial zone changes.

⇨ Approximately 474 acres of land have been converted out of the IH and IG industrial zones since 1991 in Portland, equivalent to 2.5 percent of the city's current industrial land supply.

By comparison, Portland had approximately 2,063 acres of vacant industrial land in 2000 (see Table 6). Most of the acreage converted from the IH and IG zones since 1991 were changed to EX or EG Employment zones, which have an industrial emphasis but also allow a wide range of commercial uses and interspersed residential uses. The largest industrial zone change was for 127 acres from IG2 to EG2 in the Airport Way area. The next largest change was 123 acres in Lents (much of that land in 100-year floodplain) implemented through the *Outer Southeast Community Plan*. The two zone changes that occurred in the study area (both at Guild's Lake) since 1991 resulted in a minor net addition of 0.04 acres of industrially zoned land.

⇨ Adoption of environmental protection (p overlay) zones since 1989 has also essentially removed development potential on approximately 570 acres in industrial zones.

The environmental protection and conservation (p and c overlay) zones in the *Portland Zoning Code* are intended to protect natural resources and functional values that provide public benefits, such as land next to streams and wetlands. The p overlay zone is applied to areas with the most significant resources and functions, and it only allows development in rare and unusual circumstances. The c overlay sets standards for environmentally sensitive development to conserve natural resources and functions.

⇨ Industrial land supply trends of recent decades in Portland include infill industrial development in the harbor area, expansion of industrial land in the Columbia Corridor, and conversion to non-industrial uses in the Central City.

Table 12. Industrial Zone Changes in Portland, 1991-2001

Date	LUR Case/ Legislative Project	Location	Change	IG or IH acreage affected	Notes
Land Use Review Cases					
5/91	91-00106	Guild's Lake	IH to IG1	0	
6/91	91-00334	Lower Albina	IG1 not changed	0	Mapping error correction
6/91	91-00335	Northwest	IG1 to CS	-0.25	Mapping error correction
9/91	91-00476	NE 181st/Airport Way	IG2 to EG2	-127.35	Change to Comprehensive Plan designation
3/92	92-00027	Central Eastside	IG1 to EX	-0.67	Change to Comprehensive Plan designation
6/92	92-00342	Hayden Island	RF to IG2	0.85	Mapping error correction
10/92	92-00603	Guild's Lake	OS to IH	1.5	
10/93	93-00547	Guild's Lake	OS to IH	1.46	Mapping error correction
12/93	93-00721	Northwest	IG1 not changed	0	
5/95	94-00896	Central Eastside	IG1 to EG2	-13.24	Change to Comprehensive Plan designation
5/95	95-00153	Central Eastside	IG1 to EX	-0.59	Change to Comprehensive Plan designation
8/96	96-00502	Central Eastside	EX to IG1	0.07	Mapping error correction
7/97	97-00131	Central Eastside	IG1 to EX	-0.36	Change to Comprehensive Plan designation
9/97	97-00158	Northwest	IG1 to EX	-7.02	
2/99	98-00903	Central Eastside	IG1 to EX	-0.83	Change to Comprehensive Plan designation
1/00	99-00486	Hayden Island	R2 to IG2	1.68	
Open	00-00672	Sullivans Gulch	IG1, IH, CG to EX		Approximately 5 acres may be affected.
1/02	01-00617	Central Eastside	IG1 to OS & EX	-43.93	I-5 and Eastbank Esplanade right-of-way
				-189	
Legislative Projects*					
8/93	*Albina Community Plan*			-45	
1/96	*Outer Southeast Community Plan*				123 ac. changed from IH and IG in Lents; 54 ac. from IG in Hazelwood
4/98	*Sellwood-Moreland Neighborhood Plan*			-15	14 ac. to EX or EG2
8/01	Northwest Transition Zoning Project			-42	Changes to support new streetcar line and limit telecommunication facilities
				-300	
Net acreage of industrial zone changes, 1991 to present:				-489	
Existing acreage in industrial zones (May 14, 2002)				18,809	
Percentage loss of industrial land, 1991-2001:				-2.5%	

* Acreage is approximate.

Source: Bureau of Planning from CaseInfo database and historical records.

Examples of development and rezoning actions in the harbor area prior to 1991:

- development of the Rivergate Industrial District and expansion of development in the Swan Island/Mocks Bottom area by the Port of Portland;
- annexation and IH Heavy Industrial zoning in various portions of Rivergate;
- EX Employment zoning along the west bank between the Broadway and Fremont Bridges;

- RX Residential zoning at Port of Portland Terminal 1 South (westbank, north of Fremont Bridge;
- EG-2 Employment zoning in the southern portion of Swan Island; and
- EG-2 Employment zoning along the east bank between the Railroad Bridge and Cathedral Park.

Nearly all of the Central City riverfront south of the Broadway Bridge (i.e., south of the harbor shipping channel) has gradually transformed from industrial to other uses with accompanying zoning actions in past decades. In contrast, Portland's industrial lands supply has substantially expanded in the Columbia Corridor area with the annexation and industrial zoning of former agricultural and industrial land.

Harbor Land Use Trends

The Port of Portland conducted land use inventories of the Portland Harbor riverfront between 1960 and 1997. Table 13 presents a summary of 1960-1997 growth trends (acres per year) by land use, as well as a more detailed account of 1990-1997 changes where vacant land was developed or occupied land was vacated. The inventoried area includes the Willamette riverfront properties from the Steel Bridge to the Willamette/Columbia confluence, the Columbia riverfront from the confluence to the Burlington Northern Railroad Bridge, and West Hayden Island (in the 1997 inventory). The area generally extends from the river to the nearest parallel street (and further to Lombard Street in Rivergate) or railroad right-of-way.

Table 13. Portland Harbor Land Use Absorption, 1960-1997

	Land use inventory changes on the Portland Harbor waterfront*					
			1960-1997 Change		1990-1997 Change	
	Occupied Acres		*Acres*	*Annual*	*1990 Vacant*	*1990 Use to*
Land use	*1960*	*1997*	*per Year*	*Growth***	*to 1997 Use*	*1997 Vacant*
Marine Cargo	494	1,075	15.7	2.1%	105	43
Marine Industrial	498	704	5.6	0.9%	43	36
Other Industrial & Infrastructure	309	1,189	23.8	3.7%	50	
Parks, Commercial, & Housing	7	221	5.8	9.8%	27	
Other Waterfront	23	114	2.5	4.4%	7	
All Uses	1,331	3,303	53.3	2.5%	232	79
Vacant Land***	2,399	1,164	-33.4	-1.9%		
Total Land***	3,730	4,467				

* The inventory area generally extends from the river to the nearest street or railroad right-of-way, and from the Willamette River's Steel Bridge to the Columbia River's Railroad Bridge.

** Annual growth is the average annual rate, based on 1960 and 1997 data.

*** In 1994, the Port purchased 734 acres of vacant land on West Hayden Island, which was added to the inventory.

Sources: Bureau of Planning calculations from Port of Portland data in *Marine Terminals Master* Plan (1991) and *1997 Portland Harbor Land Use Inventory*.

⇨ In 1997, 63 percent of the inventoried land along Portland Harbor was in industrial use, 26 percent vacant, 4 percent in utility corridors, 3 percent in parks and trails, 3 percent in schools and government facilities, and 1 percent in commercial use.

Of the 2,792 acres in industrial use in 1997, 39 percent were in marine cargo uses (ship loading and storage of marine cargo) and another 25 percent in marine industrial uses (other industrial activities dependent on access to the river and providing goods and services associated with river-dependent land or waterway use). The 26 percent vacancy figure includes 734 acres on West Hayden Island, which the Port of Portland purchased in 1994. West Hayden Island is not zoned for industrial development and has not been annexed by the City of Portland. However, it is included within the urban growth boundary, and most of it is designated for industrial use in Metro's *2040 Growth Concept*. If West Hayden Island were excluded, the 1997 vacancy rate would have been 7 percent, compared to 32 percent in 1990. Vacancy has increased since 1997 (see discussion on vacant lands in Chapter 1), partly reflecting the current recession and the listing of the Portland Harbor Superfund Project.

⇨ On average, 21 acres per year of new marine cargo and marine industrial development occurred in the harbor between 1960 and 1997.

Between 1960 and 1997, 787 acres of land were absorbed by marine cargo and marine industrial development and 880 acres in other industrial uses within the riverfront area inventoried by the Port of Portland. Much of that development occurred on the 2,700 acres of land acquired in 1960 by the Port of Portland in Rivergate and on vacant land in the Swan Island area. Of the 232 acres that were vacant in 1990 and occupied by 1997, 105 acres were developed as marine cargo uses, 43 acres as marine industrial, and 20 acres as marine infrastructure. The marine cargo development included the Portland Bulk Terminal facility at Port of Portland T-5 (85 acres) and a 20-acre expansion of the container terminal at T-6. The marine industrial development included 20 acres of the intermodal yard at T-6, the chassis yard at T-6 (13 acres), the five-acre aggregate rehandling area on the Linnton Plywood site, and the Ash Grove cement plant (five acres) near Albina Rail Yard.

⇨ The proportion of land in industrial and river-dependent uses has been relatively stable or growing in most of the harbor between 1960 and 1997.

While most new industrial development in the harbor area in the last 40 years has occurred on the extensive supply of vacant land in Rivergate, the marine-related riverfront in the older industrial districts has generally remained stable. In the older Guild's Lake and Lower Albina areas, for example, 65 and 70 percent respectively of the lineal riverfront (see Table 4) was in river-dependent industrial use in 2000, and the upland areas include two of Portland's four rail yards and dense concentrations of industrial firms.

Two areas of the harbor are exceptions and have largely converted to non-industrial uses: the River District and North Beach. The west-bank area between the Fremont and Steel Bridges is in the River District urban renewal area, a central city district that has transitioned from largely

industrial to residential and commercial development. The proportion of this riverfront area in marine-related industrial use has dropped from 65 percent in 1960 to none in 1997. The adjacent Terminal 1 South site (directly north of the Fremont Bridge) is also no longer in marine-related use and was rezoned for residential use.

The other area of the harbor that has transitioned away from marine-related industrial use is North Beach, along the east bank between the University of Portland and St. Johns Bridge. This area was primarily in marine-related industrial use in 1960. Today, none are left. The portion of North Beach south of the Railroad Bridge has been vacant since about 1990. Industrial reuse of this area is constrained by marginal truck access and Superfund cleanup liability on the McCormick & Baxter site. The portion north of the Railroad Bridge, adjacent to St. Johns town center, has Employment zoning, and most of it has been converted to public use, including Metro's Willamette Cove greenspace and the City of Portland Water Pollution Control Laboratory.

Regional Industrial Land Forecast

⇨ The *Regional Industrial Lands Study* (Otak, et al.; 1999) forecasts 6,310 acres of net industrial land absorption (demand) in the Portland-Vancouver PMSA from 2000 to 2020.

That study (second phase) converts employment growth projections in industrial sectors to estimates of future land absorption. The study forecasts regional demand for 2,030 acres of warehouse and distribution space, 1,850 acres of general industrial space, 1,168 acres of tech/flex space, and 1,262 acres of non-industrial uses on industrial land. To meet this demand, the study found a total supply of 9,198 acres of vacant industrial land, of which 2,387 acres was classified as Tier A—considered "ready to develop." In Multnomah County, the study forecasts 813 acres of industrial land absorption over the 20-year period and found a vacant land supply of 2,572 acres, including 442 acres in Tier A and 1,960 acres in Tier B.

In the third phase of the study (Otak, et al., 2001), the authors found that there is currently an adequate supply of unconstrained vacant sites in the 3-50 acres size range to meet nearly all of the projected demand for the next 25 years. However, they found a significant shortfall in unconstrained land to meet projected demand for 50-acre and larger parcels. Transportation consistently emerged as the leading cost factor for removing development constraints, both in and outside of the urban growth boundary. The study will inform upcoming decisions on expansion of the urban growth boundary.

C. Freight Distribution Trends

Marine Cargo

Tables 14 and 15 show historical data on marine cargo tonnage and vessel trips at Portland Harbor between 1960 and 2000. Table 16 compares the performance of Portland Harbor among other West Coast ports by cargo type, showing how the Portland and Columbia River shares of West Coast marine cargo has shifted between 1985 and 2000. The data sources of these tables

Table 14. Portland Harbor Cargo Trends, 1960-2000

Cargo in Short Tons (000s)

		Foreign		*Coastwise*		*Internal (barges)*		
Year	*Total*	*Imports*	*Exports*	*Receipts*	*Shipments*	*Receipts*	*Shipments*	*Local*
1960	13,549	569	2,790	5,227	290	2,606	1,354	713
1965	16,726	977	3,617	5,594	303	3,457	1,628	1,151
1970	15,490	1,322	3,886	4,421	309	2,864	1,118	1,570
1975	19,600	2,030	6,560	3,226	340	3,304	2,203	1,896
1980	29,314	2,087	11,674	4,805	336	5,315	2,996	2,100
1985	21,845	2,319	8,567	2,506	286	5,313	1,866	986
1990	27,475	2,930	13,304	2,581	553	4,974	2,038	1,097
1995	31,256	2,715	14,924	3,230	256	6,005	3,023	1,103
2000	34,334	4,861	13,115	6,778	302	5,648	2,761	869
*Average Annual Growth Trend**								
1960s	1.3%	8.8%	3.4%	-1.7%	0.6%	0.9%	-1.9%	8.2%
1970s	6.6%	4.7%	11.6%	0.8%	0.8%	6.4%	10.4%	3.0%
1980s	-0.6%	3.5%	1.3%	-6.0%	5.1%	-0.7%	-3.8%	-6.3%
1990s	2.3%	5.2%	-0.1%	10.1%	-5.9%	1.3%	3.1%	-2.3%
1960-00	2.3%	4.6%	4.5%	-0.6%	0.2%	2.1%	1.9%	-0.2%

* Annual growth trend is an estimate of the average (compounded) annual rate of growth, calculated as the slope of an exponential regression line using the 1960-2000 data shown.

Sources: Port of Portland from U.S. Army Corps of Engineers data. Growth rates by Bureau of Planning.

Table 15. Portland Harbor Vessel Activity Trends, 1960-2000

Outbound Trips, All Vessels

		Self-Propelled Vessels			Other Vessels			
Year	Total	Pass & Dry Cargo	Tanker	Towboat or Tugboat	Dry Cargo	Tanker	Towboat or Tugboat	Other
1960	22,578	1,192	415	11,550	7,545	1,874	2	2
1965	23,394	1,103	411	11,690	8,960	1,225	-	5
1970	19,082	969	332	9,754	6,697	1,330	-	-
1975	16,019	868	302	8,439	4,978	1,432	-	-
1980	25,330	1,032	281	14,525	5,119	4,373	-	-
1985	22,198	1,444	149	14,372	4,907	1,326	-	-
1990	23,952	1,946	149	15,418	4,517	1,922	-	-
1995	20,256	2,816	151	8,563	6,280	2,446	-	-
2000	16,866	1,472	202	10,091	3,033	2,068		
		Average Annual Growth Trend*						
1960s	-1.7%	-2.0%	-2.2%	-1.7%	-1.2%	-3.4%	-	-
1970s	2.9%	0.6%	-1.7%	4.1%	-2.7%	12.6%	-	-
1980s	-0.6%	6.5%	-6.1%	0.6%	-1.2%	-7.9%	-	-
1990s	-3.4%	-2.8%	3.1%	-4.2%	-3.9%	0.7%	-	-
1960-00	-0.3%	1.9%	-2.7%	0.0%	-1.8%	1.0%	-	-
		Outbound Trips, Vessels with Drafts of 18 Feet or Less						
1960	21,305	316	27	11,550	7,543	1,867	2	2
2000	15,586	459	16	10,035	3,029	2,047	-	-
1960-00*	-0.8%	0.9%	-1.3%	-0.4%	-2.3%	0.2%		

* Annual growth trend is an estimate of the average (compounded) annual rate of growth, calculated as the slope of an exponential regression line using the 1960-1999 data shown.

Sources: Port of Portland from U.S. Army Corps of Engineers data. Growth rates by Bureau of Planning.

Table 16. Shift-Share Analysis of West Coast Marine Cargo, 1985-2000

Ports by Cargo Type	Share of West Coast Cargo Tonnage* 1985	1990	1995	2000	Percent Shift** 1885-00
Dry Bulks					
Portland	16.8%	18.1%	18.7%	20.9%	24%
Columbia River	40.6%	43.6%	46.3%	42.3%	4%
Containers*					
Portland	2.4%	2.2%	3.2%	1.9%	-21%
Columbia River	2.4%	2.2%	3.2%	1.9%	-21%
Vancouver BC	3.8%	4.4%	4.8%	7.4%	95%
Seattle	13.5%	16.0%	14.2%	9.5%	-30%
Tacoma	10.9%	12.8%	10.5%	8.8%	-19%
Southern California	48.5%	50.7%	51.9%	60.4%	25%
Autos					
Portland	17.1%	15.7%	17.5%	18.5%	8%
Columbia River	17.7%	16.0%	18.5%	21.5%	21%
Breakbulk					
Portland	5.2%	6.4%	3.6%	6.4%	23%
Columbia River	11.1%	11.9%	13.0%	19.2%	73%

* Revenue tonnage calculation for containers, autos, and some breakbulk is based on cubic measure rather than actual tonnage

** Percent shift is the percentage change in the share of West Coast cargo from 1985 to 2000.

Source: DRI-WEFA and BST Associates, Draft Lower Columbia River Cargo Forecast, March 15, 2002 from Pacific Maritime Association data.

differ. The U.S. Army Corps of Engineers data cited in Tables 14 and 15 is not categorized by commodity type but is more comprehensive than the data cited in Table 16. The latter is tracked by the Pacific Maritime Association and measures cargo handled by longshoreman and paid under terms of PMA-ILWU collective bargaining agreements. The PMA data includes most international and domestic dry cargo.

The recently completed *Lower Columbia River Cargo Forecast* (DRI-WEFA, et al, 2002) provides a detailed analysis of cargo tonnage trends by commodity type among the Lower Columbia River ports (Portland, Vancouver, Kalama, Longview, and Astoria). Table 16 and the following discussion provides a brief overview of those trends, drawing from the Forecast as the primary source of marine cargo information.

⇨ Cargo moving through Portland Harbor increased at an average annual rate of 2.3 percent between 1960 and 2000. Export cargo was the primary source of this growth.

The export share of total marine cargo increased from 21 percent in 1960 to 38 percent in 2000. The 1970s were the peak period of export cargo growth. Coastwise cargo was cyclical over these four decades and declined slightly overall. Columbia River barge cargo moving through Portland Harbor increased at an average annual rate of 2.1 percent with peak growth in the 1970s as well. As cargo tonnage increased between 1960 and 2000, the number of vessel trips declined substantially, reflecting larger vessel size. Assuming that the vessels with drafts exceeding 18

feet generally reflect oceangoing cargo (foreign and coastwise cargo in Table 14), the average tonnage of oceangoing ships more than doubled between 1960 and 1999 from approximately 7,000 to 17,000 short tons.

⇨ DRI-WEFA predicts –0.4 to +0.8 percent average annual growth of total marine cargo handled at the Lower Columbia River ports between 2000 and 2030 without channel deepening. With the proposed Columbia River channel deepening to 43 feet, the forecast range is 0.0 to 1.3 percent.

The forecast is conservative, given the 2.3 percent average rate of marine cargo growth during the 1960-2000 period. These high and low scenarios reflect a range of 34 to 55 million tons of Lower Columbia River marine cargo in 2030.

⇨ Dry bulk exports are the Columbia River ports' primary competitive niche among West Coast ports. Modest long-term growth is expected in dry bulk cargo.

Dry bulks made up nearly two thirds of Lower Columbia River marine cargo tonnage in 2000. Lower Columbia dry bulk cargo increased from 14.7 million revenue tons in 1982 to 22.8 million in 2000, with a brief peak of 31.2 million in 1995. Most of that cargo is wheat brought by barge or rail from eastern Oregon, Washington, and inland states for export to Asia. Other dry bulk exports include barley, corn, soybeans, soda ash, potash, and bentonite. Dry bulk imports include limestone, cement, salt, and alumina.

The combined Lower Columbia River ports accounted for 42.3 percent of the dry bulk marine cargo handled at West Coast ports in 2000, up from 40.6 percent in 1985. That percentage is roughly equivalent to market share. Half of the Lower Columbia dry bulk cargo in 2000 was handled at Portland Harbor, also up slightly from 1985. Of the six grain terminals operating on the Lower Columbia, one is in Vancouver, two in Kalama, and three in Portland.

The DRI-WEFA cargo forecast for the Lower Columbia River ports considers the proposed channel-deepening project from 40 to 43 feet as a variable, providing cargo projections with and without deepening. The channel-deepening project would accommodate the expanding fleet of larger grain and container ships that are constrained by the existing channel depth. The forecast predicts a range of 0.5 to 1.5 percent average annual growth of grain tonnage through Lower Columbia River ports from 2000 to 2030 without channel deepening and 1.0 to 2.0 percent with deepening. The 2000-2030 forecast for non-grain dry bulks is –0.3 to 1.7 percent average annual growth for exports and –1.2 to 1.0 percent for imports (not affected by channel deepening).

⇨ Automobile imports are another of Portland Harbor's competitive niches. Modest long-term growth is expected in automobile cargo.

The volume of assembled automobiles moving through Portland Harbor has fluctuated from 2.3 million revenue tons in 1982 to 3.6 million in 1988, 2.2 million in 1996, and 3.7 million in 2000. Portland's three auto terminals (Toyota, Honda, and Hyundai) accounted for 17.1 percent of the automobiles handled at West Coast ports in 1985 and 18.5 percent in 2000. The Subaru terminal in Vancouver handled another 3.0 percent of West Coast auto cargo in 2000. The DRI-WEFA forecast for Lower Columbia River automobile cargo predicts -0.1 to 1.3 percent average annual growth from 2000 to 2030.

⇨ Containerized cargo at Portland Harbor increased rapidly from 0.7 million revenue tons in 1982 to 4.2 million in 1995 and leveled off after 1995. Moderate growth of container cargo is forecast.

Between 1990 and 2000, the Pacific Northwest share (including Vancouver BC) of West Coast container traffic (full TEUs) decreased from 36.2 percent in 1990 to 27.9 percent in 2000, while the Southern California share increased from 50.7 to 60.4 percent. Portland had a relatively small, 1.9-percent share of West Coast container traffic in 2000.

While the range of commodities shipped by containers is diverse, Portland's container facilities primarily serve a niche market for export of agricultural and forest products. The highest volume commodities in 2000 were hay and animal feed, paper, and lumber. Port of Portland Terminal 6 handled 99.7 percent of the Lower Columbia River container tonnage in 2000. The DRI-WEFA forecast for Lower Columbia River container cargo predicts 0 to 1.5 percent average annual growth from 2000 to 2030 without channel deepening and 2.0 to 3.6 percent with deepening.

⇨ Columbia River breakbulk cargo increased slightly from 0.9 to 1.0 million revenue tons between 1982 and 1997, and then grew rapidly to 1.9 million tons in 2000.

Most general cargo that can be shipped in containers is now done so. Breakbulk cargo consists of general goods not shipped in containers, typically steel, paper, and wood products. Breakbulk growth since 1997 has been primarily in steel imports. Steel imports accounted for 55 percent of the Lower Columbia River breakbulk tonnage in 2000, and wood and paper product exports made up another 25 percent. Portland's share of Columbia River breakbulk cargo increased from 43.1 percent in 1982 to 55.9 percent in 1989, and then dropped to 33.2 percent in 2000. The DRI-WEFA forecast for Lower Columbia River breakbulk cargo predicts 0.5 to 0.8 percent average annual growth of breakbulk exports from 2000 to 2030; 0.2 to 1.8 percent average annual growth of breakbulk imports.

⇨ Lower Columbia River receipts of refined petroleum products increased moderately from 2.2 million tons in 1990 to 2.6 million tons in 1998 and then rapidly to 5.3 million tons in 2000.

Refined petroleum products, primarily gasoline and diesel, are the primary liquid bulk commodity shipped on the Lower Columbia River. The rapid growth of refined petroleum cargo after 1998 reflected the explosion of the Olympic pipeline, as tanker shipments provided an immediate alternative to pipeline transportation. The pipeline has since been repaired. Portland is the primary Lower Columbia River port for handling liquid bulks. All of the refined petroleum cargo on the Lower Columbia in 2000 arrived in Portland Harbor terminals.

The DRI-WEFA forecast for the Lower Columbia River ports predicts a –1.3 to –0.6 percent average annual decline in refined petroleum cargo from 2000 to 2030. The 2030 forecast 0.6 to 1.6 percent average annual growth for crude oil and –0.6 to 0.6 percent for liquid chemicals and fertilizers.

Mode Split of Marine Cargo

Ocean cargo is transported to or from the marine terminals by rail, truck, barge, or intermodal facilities. Table 17 shows the distribution of ocean cargo among these connecting transport modes at Portland and Vancouver Harbors in 1996 and projections for 2030, along with comparison mode shares of all freight flows in the Portland Metropolitan Area. This information was drawn from the *Commodity Flow Analysis for the Portland Metropolitan Area*, prepared by ICF Kaiser, et al., in 1999. A primary data source for this forecast was the 1993 Commodity Flow Survey conducted by the U.S. Bureau of Census. DRI-WEFA is currently updating the 1999 commodity flow forecast, using data from the 1997 Commodity Flow Survey. Completion of the DRI-WEFA forecast is expected later this year.

⇨ The majority of ocean cargo is carried to or from Portland and Vancouver Harbors by rail, and that share is projected to increase in coming decades.

The ICF Kaiser *Commodity Flow Forecast* predicted that the share of ocean cargo transported to or from Portland and Vancouver marine terminals by rail will increase from 51 percent in 1996 to 56 percent in 2030. Marine and rail distribution provide similar functions, emphasizing economical transport of heavy commodities over long distances, and Portland is a regional connecting point for these transport modes. Columbia River barge transportation is a low-cost alternative to rail for grain and other bulk commodities.

Table 17. Transport Mode Summary of Freight Flows In Portland-Vancouver Metropolitan Area, 1996 and Forecast 2030

	Freight Flows in Short Tons Beginning and/or Ending in the Metropolitan Area*							
	Ocean Cargo				All Freight			
	1996		2030		1996		2030	
Mode	Tons (000)	Share	Tons (000)	Share	Tons (000)	Share	Tons (000)	Share
Rail	10,365	50.9%	40,282	55.8%	42,989	22.9%	95,170	23.6%
Truck	4,510	22.2%	19,096	26.5%	103,445	55.0%	195,428	48.5%
Intermodal	269	1.3%	986	1.4%	3,025	1.6%	7,189	1.8%
Barge	5,203	25.6%	11,771	16.3%	18,160	9.7%	32,596	8.1%
Ship					20,353	10.8%	72,157	17.9%
All modes	20,353	100.0%	72,157	100.0%	187,971	100.0%	402,539	100.0%

* Double counting occurs when commodities use more than one mode over the course of their trip in the Metropolitan Area.

Source: ICF Kaiser, et al., *Commodity Flow Analysis for the Portland Metropolitan Area, April 1999*

⇨ Truck transportation is the dominant mode for domestic and overall freight distribution in the Portland metropolitan area.

Truck transportation is also a supplemental mode for ocean cargo, providing for decentralized regional distribution and collection of ocean cargo and more rapid delivery as needed.

Rail Freight

Table 18 shows the growth of rail tonnage carried over specific Portland area rail lines between 1989 and 1999, based on Burlington Northern Santa Fe and Union Pacific data.

Table 18. Rail freight trends on Portland area lines, 1989-1999

	Freight (million tons)		Average annual
Rail lines	1989	1999	growth, 1989-99
Burlington Northern Santa Fe			
Vancouver east (North Bank Columbia)	55.54	61.9	1.1%
Vancouver to NW Portland	50.31	51.9	0.3%
Union Pacific			
Kenton Line (T-4 to Troutdale)	15.98	21.7	3.1%
Graham Line (Rose Qtr. to Troutdale)	20.25	34.63	5.5%
Portland south (Rose Qtr. To Milwaukie)	27.8	29.1	0.5%
Combined Portland lines shown	114.34	137.33	1.8%

Source: BNSF and UP line density maps. Growth calculations by Bureau of Planning

⇨ Rail freight on the primary Burlington Northern Santa Fe and Union Pacific lines in Portland increased at a 1.8 percent average annual rate from 1989 to 1999.

Both Burlington Northern Santa Fe (BNSF) and Union Pacific (UP) have Portland area rail lines that extend north to Washington, south to California, and east through the Columbia River Gorge to inland states. The rail lines in the harbor area are shown in Map 2 above. The BNSF line enters Portland from Vancouver and has branch lines that extend into Rivergate and along the west side of the harbor between the Steel and Railroad Bridges. Average annual growth of rail freight on BNSF's Vancouver-Portland route was a slight 0.3 percent between 1989 and 1999. The UP lines enter Portland from the south and east. A looped UP line runs along the east side of the harbor between Port of Portland Terminal 4 and the Rose Quarter, connecting to its Kenton, Graham, and Portland south (former Southern Pacific) lines shown in Table 18. Tonnage on UP's Graham and Kenton lines increased at 5.5 and 3.1 average annual rates (respectively) between 1989 and 1999.

⇨ The draft rail forecast being prepared to support I-5 Trade Corridor planning anticipates a 3.0 to 3.5 percent average annual increase in Portland-Vancouver area freight trains between 2001 and 2011.

The 10-year rail forecasts will be finalized later in 2002. A draft 10-year "3.25 percent hybrid" forecast (June 2002) projects a 3.9 percent average annual increase in intermodal trains, 3.9 percent increase in auto trains, 2.2 percent increase in merchandise trains, 3.4 percent increase in grain trains, and 5.2 percent increase in other bulk unit trains. The rail capacity analysis will inform the *I-5 Partnership Strategic Plan*, which includes recommendations for rail system improvements to accommodate projected growth.

Truck Traffic

Table 19 shows traffic count trends of selected higher-volume streets in the harbor area between 1990 and 2001. No systematic, periodic traffic counts were taken that span the entire harbor area during the 1990s, so Table 19 draws from available counts by the Port of Portland and City of Portland, which cover a cross-section of streets over a mix of years since 1990. Each of these traffic count locations are in designated "truck districts" in Portland's *Comprehensive Plan*, except for Interstate Avenue which is adjacent to, and provides access to, the Lower Albina area truck district. The Transportation Element in the *Comprehensive Plan* notes that truck districts are intended to provide for convenient truck movement in areas serving large numbers of truck ends.

⇨ Traffic volumes on the busier truck streets in the harbor area generally increased during the 1990s. The fastest growth was in the Rivergate area, reflecting the development of vacant land there.

The two highest volume streets in the study area are Swan Island's Going Street, carrying 38,616 daily trips in October 2000 at the railroad crossing (the entrance to the Swan Island area), and the Guild's Lake area's Yeon Avenue with 35,686 daily trips in January 2001 at 35th Avenue. Going Street (between I-5 and Greeley Avenue) is designed a "major truck street" and Yeon Avenue (between I-405 and Highway 30) a "regional truck route" in Metro's *Regional Transportation Plan*. As shown in Table 19, Going Street had a modest increase in traffic volume between 1994 and 2000, and Yeon Avenue had a modest reduction between 1995 and 2001. The traffic volume of the other streets shown in Table 19 ranged from 7,936 to 13,358 daily trips.

⇨ Lumber, wood products, and furniture were the dominant commodity group carried by truck in the region in 1996.

The ICF Kaiser *Commodity Flow Analysis* (1999) found that lumber, wood products and furniture accounted for 56 percent of truck freight in the Portland-Vancouver metropolitan area in 1996, followed by processed food products with 18 percent and stone, clay, concrete, and similar products with 9 percent.

Table 19. Traffic Counts on Selected Truck Streets in Study Area, 1990-2001

Location	Daily Traffic Volume 1990	1994	1995	1996	1997	1998	1999	2000	2001	Average Annual Growth*
Rivergate										
Lombard Street, 50 Feet East of Rivergate Boulevard (September counts)										
Westbound		4,070	4,182	3,818	5,497	4,050	4,188	4,553		1.4%
Eastbound		3,689	4,487	3,858	5,423	3,776	4,296	4,615		2.0%
Lombard Street North of Columbia Slough (September counts)										
Northbound		2,349	3,880	3,676	6,866	4,080	4,895	5,346		11.5%
Southbound		2,428	4,120	3,664	5,509	3,944	4,678	5,354		10.1%
Marine Drive West of Portland Avenue (September counts)										
Westbound		4,131	4,272	4,825	6,347	5,572	5,782	6,149		7.2%
Eastbound		4,055	4,724	4,862	6,210	5,703	6,335	6,045		7.2%
Swan Island Area										
Going Street at Railroad Crossing (October counts)										
Westbound		18,914	19,501	21,027	19,441	20,319	21,121	18,935		0.5%
Eastbound		18,975	19,650	20,911	12,739	20,241	23,952	19,681		1.7%
Lower Albina Area										
North Interstate Avenue at Larrabee Avenue										
					Oct. 6	Aug. 24	Oct. 4			
Total (N & S)					11,948	13,387	13,358			5.7%
Guilds Lake Area										
NW Yeon Avenue at 35th Avenue**										
			Sep. 13,19						Jan. 30	
Westbound			19,674						18,231	-1.3%
Eastbound			18,229						17,455	-0.7%
NW Front Avenue at Kittridge Avenue										
	Mar. 27						Nov. 2		Feb. 5	
Northbound	2,915						3,408		3,408	1.5%
Southbound	3,295						4,528		4,528	3.1%

* Average annual growth rates were calculated using an exponential regression line of the data shown.

** The Sep. 19, 1995, eastbound count was taken on NW Yeon Avenue at 29th Avenue.

Sources: Port of Portland, *2000 Traffic Monitoring Program*, for Rivergate and Swan Island areas. Portland Office of Transportation for Guild's Lake and Lower Albina areas. Growth rates by Bureau of Planning.

3. LOCATION FACTORS AND CONTEXT

A. INDUSTRIAL LOCATION FACTORS

Distribution Infrastructure and Facilities

Maps 7 and 8 depict the freight infrastructure network of the Northwest states and the Portland metropolitan area. Map 7 shows the Pacific Northwest seaports; the Columbia/Snake Rivers barge routes; the Union Pacific, Burlington Northern Santa Fe, and Canadian Pacific rail lines; and interstate highways. Size of seaports is shown by total marine cargo volume in short tons in 2000, based on U.S. Army Corps of Engineers data in *Waterborne Commerce of the U.S.* Vancouver B.C. tonnage data is from the Port of Vancouver website.

Map 8 displays the industrial lands, freight infrastructure, and major freight facilities in the Portland metropolitan area. Industrial and employment zoning depict the region's industrial land use pattern. The railroads, truck routes, and freight transportation facilities on Map 8 are from Metro's 2000 *Regional Transportation Plan*. Marine facilities are where freight is transferred from water- to land-based modes; rail facilities, from rail spurs to other modes; and air facilities, from airport runways to land-based modes. Rail yards, which are shown separately from other rail facilities, are those operated by Union Pacific and Burlington Northern Santa Fe. Truck terminals are truck-to-truck transfer facilities that are primary gateways for freight entering or leaving the region.

⇨ Portland is well positioned by its location and intermodal infrastructure for growth as a West Coast distribution hub.

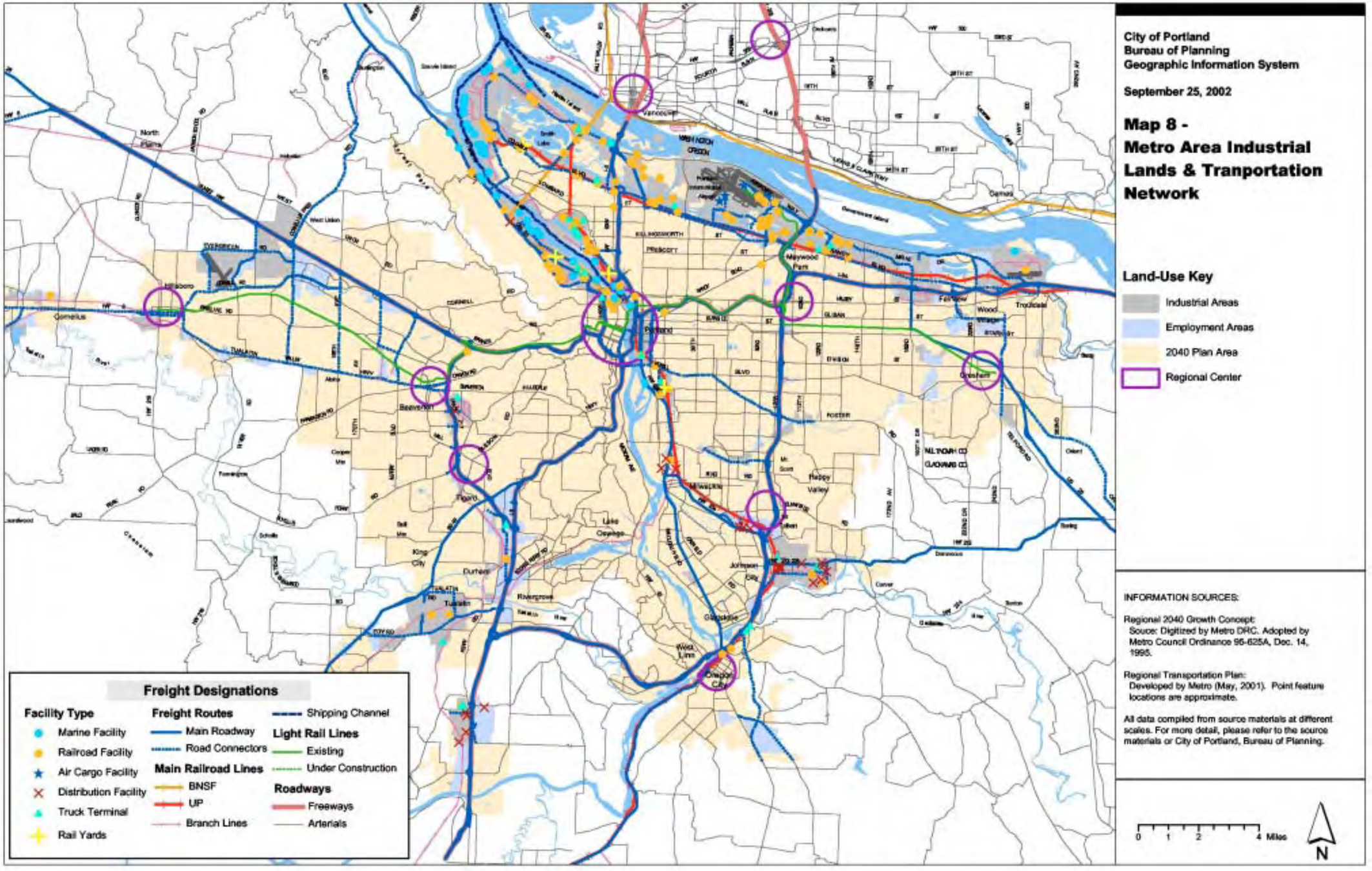
As shown in Map 7, Portland is located at the intersection of the Lower Columbia River deepwater shipping channel, the Upper Columbia/Snake Rivers barge routes, two major national railroads, and two interstate highways. The U.S. Army Corps of Engineers maintains the deepwater channel at 40-foot depth and 600-foot width from the Pacific Ocean to Portland and Vancouver Harbors. The Upper Columbia and Snake River barge network includes 26 ports upriver from Portland that extend north into Eastern Washington and east to Lewiston, Idaho. Portland's rail access is a unique advantage to marine trade. Union Pacific (UP) and Burlington Northern Santa Fe (BNSF) each have West Coast and east-west transcontinental rail lines that run through Portland. The east-west lines leading to Portland cross the Cascade Range along the Columbia River at river grade. The two alternative BNSF lines that cross the Cascade Range to the Puget Sound over Stevens Pass and Stampede Pass require helper locomotives, a cost disadvantage for heavy-haul bulk trains. And the I-5 and I-84 highways intersect in Portland, providing truck access along the West Coast and across the country.

Map 8. Northwest States Freight Distribution Network , 2002

Transcontinental Railroads

- Burlington Northern Santa Fe
- Union Pacific
- Canadian Pacific
- Columbia/Snake River Shipping Channel
- 84 Interstate Highway
- Seaports and waterborne tons* shipped in 2000
- Other ports and rail connections

* Source: U.S. Army Corps of Engineers, *Waterborne Commerce of the U.S.*


City of Portland
Bureau of Planning
Geographic Information System
September 25, 2002
Map 8 -
Metro Area Industrial Lands & Tranportation Network
Land-Use Key
Industrial Areas
Employment Areas
2040 Plan Area
Regional Center
Freight Designations
Facility Type
Marine Facility
Railroad Facility
Air Cargo Facility
Distribution Facility
Truck Terminal
Rail Yards
Freight Routes
Main Roadway
Road Connectors
Main Railroad Lines
BNSF
UP
Branch Lines
Shipping Channel
Light Rail Lines
Existing
Under Construction
Roadways
Freeways
Arterials
INFORMATION SOURCES:
Regional 2040 Growth Concept:
Souce: Digitized by Metro DRC. Adopted by Metro Council Ordinance 95-625A, Dec. 14, 1995.
Regional Transportation Plan:
Developed by Metro (May, 2001). Point feature locations are approximate.
All data compiled from source materials at different scales. For more detail, please refer to the source materials or City of Portland, Bureau of Planning.
0 1 2 4 Miles
N

⇨ Portland's freight network supports a variety of international, domestic, and regional distribution functions.

The majority of marine cargo tonnage consists of grain and other export dry bulks, en route primarily to Asia, that arrive at terminals by rail or barge. Several firms also use Portland as an import center for domestic rail and truck distribution, such as Toyota, Hyundai, Honda, Nike, and Columbia Sportswear. Regional distribution (i.e., of freight with an origin or destination in the region) is more diverse and dispersed. Trucking is the primary transport mode for regional distribution, although regional producers and wholesalers to regional markets also rely on rail, ship, barge, pipeline, and air transportation. Air cargo shipping through PDX is primarily of domestic cargo on all-cargo carriers. Portland's air freight activity includes regional hubs for UPS and FedEx and shipping for much of the region's high tech sector. Through-traffic of freight that does not stop in the region is another major use of distribution infrastructure. This combination of regional functions provides a critical mass of facilities that use and support a multimodal distribution network, and these functions also compete for network capacity at congested locations during peak periods.

⇨ The harbor area and Columbia Corridor are the center of the region's freight distribution facilities and industrial activity that requires rail or maritime access.

As shown in Map 8, the industrial districts throughout the region are generally well served by truck routes with close access to the freeway system. Rail access is more concentrated along the main rail lines—BNSF lines on the west side of Portland Harbor, Rivergate, and Vancouver and UP lines on the harbor's east side, southward into Clackamas County, and the Columbia Corridor. Marine facilities, railroad facilities, air cargo facilities, and truck terminals (see Map 8) are even more tightly clustered in the harbor area and Columbia Corridor, showing the interconnection of these transportation modes.

⇨ Freight transportation investment is a significant industrial location advantage for the harbor area in at least two respects: as a freight hub location for distribution industries growth and as a marine and rail access location for manufacturers that require those facilities.

Map 8 shows the network of intermodal freight infrastructure and the cluster of related transportation facilities in the harbor area. Map 3 in Chapter 1 shows the cluster of 252 wholesale firms in the harbor area and a variety of concrete, metals, and transportation equipment manufacturers that require river access for water transportation. A striking convergence of freight transportation investment and related industrial land uses is evident in these maps. Additionally, Table 10 in Chapter 2, which reviews Metro's 2030 employment forecast, shows that the transportation and wholesale industries are projected to be primary sources of the region's industrial job growth. Thus, the importance of freight infrastructure and facilities as an industrial location factor in the region appears likely to increase in the coming decades.

⇨ Long-term industrial strategies that have dramatically expanded global trade in recent decades indicate continuing growth potential of multimodal distribution hubs.

Industrial "globalization" trends that have been widely recognized since the 1970s include international movements of many segments of production processes to lower-cost locations, increasing competition by product diversification into domestic and export niche markets, and "just in time" production and delivery to reduce product and raw material inventories (Storper, 1997). These shifts in how goods are produced and transported have contributed to a substantial increase in global trade and have generated major technological and process changes in the distribution industries. For example, containers, which can be efficiently transloaded between trucks, railcars, ships, and barges, reducing the need for piecemeal reloading at ports, have become a predominant technological feature of global trade. Also, as the timing, transport modes, quantities, and geography of shipping has become more complex, managing the "logistics" of the supply chain to increase productivity has become an expanding function of the distribution industries. These structural shifts indicate an increasing role for the wholesale and transportation industries in multimodal distribution hubs.

⇨ Major investments to maintain and expand the capacity of regional freight infrastructure are currently being considered.

The U.S. Army Corps of Engineers and sponsoring ports have proposed the Columbia River Channel Improvements Project to deepen the shipping channel from 40 to 43 foot depth, which is intended to increase access to the expanding international fleet of deeper draft grain and container ships. The feasibility report and environmental impact statement for this project are currently under consideration. The Corps has also begun work on a *Dredge Materials Management Plan* for the Lower Willamette River, to provide for continued maintenance dredging and dredge materials management, including the contaminated portions of the harbor. The I-5 Corridor Partnership, including Oregon and Washington Departments of Transportation and others, has studied and proposed a series of infrastructure and management recommendations to maintain truck and rail capacity along the I-5 corridor between I-84 and I-205 in Vancouver. The multifaceted recommendations include I-5 widening to six lanes (three per direction) from the Fremont Bridge to I-205, further study of 10-lane bridge capacity, further study of rail capacity improvements, and land use management to protect industrial land along I-5 and interchange capacity. These major infrastructure projects will expand the region's competitive capacity as an intermodal distribution hub.

Industry Clustering

Table 20 is an input-output table, which quantifies the flow of commodities as intermediate inputs between industries. Specifically, the table shows the use of commodities in the U.S. by selected industries that are substantially represented in the study area (generally having location quotients above 1.5 in the study area relative to the PMSA). The table can be read in two ways: each column shows an industry's composition of intermediate inputs from other industries;

Table 20. Commodity Inputs and Outputs of Selected Industries in the U.S., 1998

For the composition of inputs to an industry, read the column for that industry. For the distribution of output of a commodity, read the row for that commodity.

Percent of total intermediate-input purchases at producers' prices.

	Food & kindred products	Furniture & fixtures	Paper & allied products	Printing & publishing	Chemicals & allied products	Petroleum products	Stone, clay, glass, & concrete	Primary metals	Fabricated metal products	Industrial machinery	Electronics equipment	Transportation equipment	Miscellaneous manufacturing	Railroads & passenger transit	Trucking & warehousing	Water transportation	Air transportation	Wholesale trade	Combined metals & equipment	Combined mfg. industries shown	All industries shown
SIC	20	25	26	27	28	29	32	33	34	35	36	37	39	40	42	44	45	50, 51	33-37		
Intermediate Inputs																					
Food & kindred products	23%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	3%
Furniture & fixtures	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Paper & allied products	5%	3%	37%	27%	2%	0%	4%	0%	1%	1%	1%	0%	4%	0%	0%	0%	0%	3%	1%	4%	4%
Printing & publishing	0%	0%	0%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	3%	0%	1%	1%
Chemicals & allied products	1%	2%	10%	4%	39%	3%	7%	3%	3%	1%	3%	1%	8%	1%	0%	0%	0%	1%	2%	6%	5%
Petroleum products	0%	1%	1%	0%	1%	14%	1%	3%	0%	0%	0%	0%	1%	8%	4%	1%	11%	1%	0%	1%	2%
Stone, clay, glass & concrete	1%	1%	0%	0%	0%	1%	24%	2%	1%	0%	1%	1%	1%	0%	0%	0%	0%	0%	1%	1%	1%
Primary metals	0%	9%	1%	0%	0%	0%	2%	37%	43%	14%	8%	8%	12%	2%	0%	0%	0%	0%	17%	9%	7%
Fabricated metal products	3%	12%	1%	0%	1%	0%	1%	3%	14%	8%	7%	10%	4%	2%	1%	1%	0%	1%	9%	6%	5%
Industrial machinery	0%	1%	1%	1%	1%	0%	1%	4%	4%	20%	3%	6%	2%	4%	0%	4%	0%	1%	8%	5%	4%
Electronics equipment	0%	0%	0%	0%	0%	0%	0%	1%	0%	18%	35%	6%	2%	2%	0%	0%	0%	3%	13%	7%	6%
Transportation equipment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	27%	0%	8%	1%	3%	14%	1%	10%	5%	5%
Misc. manufacturing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	0%	0%	0%	0%	0%	0%
Railroads & transit	1%	1%	2%	1%	1%	0%	2%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%
Trucking & warehousing	3%	3%	6%	3%	3%	1%	10%	5%	3%	1%	1%	2%	2%	2%	39%	0%	0%	1%	2%	3%	4%
Water transportation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	30%	0%	0%	0%	0%	0%
Air transportation	1%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	1%	2%	0%	12%	2%	1%	1%	1%
Wholesale trade	9%	13%	8%	7%	10%	5%	8%	12%	10%	13%	11%	8%	16%	5%	4%	2%	2%	9%	11%	10%	9%
All industries shown above	46%	45%	67%	63%	60%	25%	61%	68%	79%	78%	73%	74%	64%	36%	53%	44%	41%	25%	75%	64%	58%
Inputs by own industry	23%	1%	37%	19%	39%	14%	24%	37%	14%	20%	35%	27%	11%	11%	39%	30%	12%	9%	57%	26%	58%
Combined metals & equipment	4%	22%	3%	1%	2%	0%	5%	45%	61%	61%	53%	58%	20%	17%	2%	9%	15%	5%	57%	31%	27%
All transportation inputs	4%	4%	8%	5%	5%	6%	13%	7%	4%	2%	2%	3%	3%	3%	49%	39%	31%	3%	3%	4%	7%
Gas and electric utilities	1%	2%	4%	2%	4%	3%	7%	6%	2%	1%	2%	1%	1%	0%	1%	1%	0%	3%	2%	2%	2%
Business services	2%	5%	3%	9%	8%	3%	4%	3%	5%	4%	5%	3%	5%	9%	7%	19%	5%	23%	4%	4%	7%
Total intermediate inputs	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Portland Bureau of Planning from U.S. Bureau of Economic Analysis annual input-output accounts in 1998.

each row shows a commodity's distribution as output to other industries. The data source is the *Annual Input-Output Accounts of the U.S. Economy, 1998* (Planting and Kuhbach, 2001). Higher proportions in the table represent more significant trade linkages between firms and industries. The highest shares of trade tend to be among firms in the same industry, an indication of "vertical disintegration." Vertical disintegration is the dispersal of production to subcontractors, suppliers, and services instead of production internally within vertically integrated firms. Higher shares of trade between industries can also be seen as a blurring of industry boundaries, showing that linked industries have interdependent roles in a larger production process.

⇨ Agglomeration economies, evident in the geographic clustering of many industries in a small number of locations, have been recognized in industrial location literature as a significant location factor.

The inter-firm and inter-industry production complexes evident in Table 20 have geographic implications. As globalization of production has reduced the importance of proximity to markets as an industrial location factor, it has increased the importance of access to inter-firm production complexes and suitable labor markets. Industrial districts literature beginning in the 1980s recognized that localized clusters of firms in high tech, film, and other industries have emerged as a common competitive model of industrial organization, distinct from the "fordist" model of mass-production in vertically integrated firms (Piore and Sabel, 1984; Storper and Walker, 1989). Networks of firms with significant trade, competition, and cooperative relationships and a skilled labor pool combine to give firms in the cluster a competitive edge, or agglomeration economies. A key advantage results from an expansive industrialization process within the cluster, where competition drives innovation in new activities and technologies to continually develop new products and split off new firms.

Industrial districts focused on localized linkages are only one form of the specialized industrial complexes that have driven growth in many second-tier cities such as Portland and Seattle (distinct from the largest metropolitan areas) in the last two decades (Markusen, et al., 1999). These complexes also include "hub-and-spoke" districts dominated by one or a few large firms with significant inter-firm relationships in and outside the region (e.g., Boeing in Seattle); satellite industrial platforms made up primarily of branch plants with minimal intra-district trade; and state-anchored districts that develop around large universities, military bases, or similar institutions. The role of these clusters in regional economies is further discussed in last section of this chapter.

⇨ The Portland area's industry clusters in primary metals and transportation equipment manufacturing are part of a larger complex of metals and equipment industries with significant inter-industry linkages.

The existence of an integrated metals and equipment industries complex (primary metals, fabricated metal products, industrial machinery, electronics equipment, and transportation equipment) is suggested by their significant input-output relationships and their geographic clustering in the harbor area. In 1998, approximately 57 percent of the production inputs of the

metals and equipment industries nationally was provided by other firms within that industry group, as shown in Table 20. For instance, the primary metals industry is a major supplier to each of the others. In particular, 43 percent of the inputs to the fabricated metal products industry were from the primary metals industry. The transportation equipment industry is a major consumer of output from each of the others. The industrial machinery and electronics industry are also major consumers of each other's products and of fabricated metal products and primary metals. The significant trade volumes between these industries appear to be consistent with the substantial representation of each in the harbor area. As described in Chapter 1, the metals and equipment industries cluster in the harbor area in 2000 included 213 business establishments and 16,860 jobs. The presence of these firms, their skilled labor pool, established networks of suppliers and customers, specialized infrastructure, and other inter-firm relationships are potentially significant location factors for the cluster's continued growth.

⇨ The wholesale and manufacturing sectors have significant inter-industry trade linkages.

Wholesale trade made up 10 percent of intermediate inputs into the combined manufacturing industries shown in Table 20. Given the significance of these linkages, it is not surprising that the manufacturing industries that are highly concentrated in the harbor area tend also to have high concentrations of related wholesale trade (e.g., metals, transportation equipment, food products, chemicals, and petroleum industries).

Transportation costs accounted for an additional 4 percent of intermediate inputs into the combined manufacturing industries, the highest shares being 13 percent of inputs to the stone/clay/glass/concrete industries category, 8 percent to paper products, 7 percent to primary metals, and 6 percent to petroleum products. These manufacturing industries with the highest shares of transportation costs nationally also have substantial presence of firms and employment in the harbor area, benefiting from the area's network of transportation infrastructure and facilities.

⇨ Table 20 also shows the advantage of a diverse industrial district for inter-industry trade.

Combining all of the industries shown in Table 20 that have substantial representation in the harbor area, 58 percent of their inputs are provided by other firms among those industries. Some industries benefit more than others from location within diverse industrial districts. Transportation equipment, electronics equipment, fabricated metal products, and industrial machinery manufacturers, on average, depend on the other industries shown in the table for more than 70 percent of their inputs.

Central Urban Location

As shown in Map 8, the harbor area is centrally located in the region and directly north of downtown Portland. Its central location provides both advantages and disadvantages for industry.

⇨ Access to labor is a primary industrial location factor between regions. Within the region, the harbor area offers central access to the metropolitan area labor supply.

Recent studies have highlighted the importance of suitable labor markets as a primary inter-regional location factor for manufacturing firms in the U.S. (Dumais, et al., 1997; Portland Development Commission, 2002). As technology and knowledge have become increasing factors of industrial competitiveness, location of a firm in a place where skilled and professional labor want to live has in turn become more important (Atkinson and Gottlieb, 2001). For large manufacturing employers, labor access may also be an important intra-regional location advantage for the harbor area, drawing from its central access to the regional labor market, transit options, and the livability of Portland's close-in neighborhoods. As housing costs in Portland have increased closer to the Central City, other locations in the region likely become more attractive to large employers of lower paid workers. However, the average employee earnings in the local industrial sectors generally is much higher than the county average for all sectors, as shown in Table 23 below. The labor access advantage of a central location may be reduced over time by urban traffic congestion, although that reduction can potentially be mitigated by transit improvements in industrial areas.

⇨ For regional wholesaling and delivery facilities, the harbor area's central location is also a location advantage.

Harbor area wholesalers that serve regional markets benefit from relative proximity to delivery destinations across the region and central access to the region's truck network. These proximity-to-market advantages for wholesale facilities are in addition to the freight hub advantages discussed above, resulting from proximity to freight terminals (the primary freight entry points into the region) and to related manufacturers. As with labor access benefits, the advantage of a central regional location for wholesalers may be reduced over time by urban traffic congestion at particular locations and peak periods.

⇨ A central location can increase gentrification pressure to convert land to non-industrial uses that bring higher land values.

Historical industrial development has been displaced from parts of the Central City to accommodate highway construction (e.g., former Harbor Drive and I-5) and higher density mixed-use development (e.g., Pearl District and North Macadam). Industrial Sanctuary zoning (discussed in Chapter 2) has been applied as a tool to prevent conversion of important industrial land to other uses. The *Guild's Lake Industrial Sanctuary Plan*, adopted earlier this year, established the Vaughn Street corridor as an "iron curtain," the northern boundary of Central City mixed-use development on the west side of the river.

Regional Heavy Industrial Complex

⇨ "Heavy industrial" uses characterize the established land use pattern in most of the harbor area, and those lands are a substantial portion of the region's heavy industrial land supply.

Conceptually, heavy industrial areas provide locations for industries with objectionable impacts and appearance, separated from other urban areas. Thus, maintaining an adequate supply of heavy industrial land in suitable locations reduces their disturbance in the rest of the city. The harbor area is one of the primary locations in the region for many uses that are typically perceived as heavy industrial, such as steel mills, heavy equipment manufacturing, petroleum bulk storage, chemicals manufacturing and distribution, utility yards, rail yards, and marine terminals. Also, most of the land in Portland with heavy industrial zoning is in the harbor area, and nearly all of the rest is adjacent, i.e., in the Columbia Corridor west of I-5. Metro's *2040 Growth Concept* also designates other smaller heavy industrial areas in the region, including at Hillsboro, Tualatin, Gresham, and Vancouver.

⇨ What constitutes heavy industry and heavy industrial areas, however, is imprecise and evolving.

Examples of objectionable impacts include use of hazardous materials, air pollution, water pollution, scale of heavy equipment use, odors, noise, dust, and outdoor storage. An accounting of these impacts is not necessarily consistent with the types of industries and facilities that have historically been considered heavy industrial. The historical image of heavy industry as major polluters is less relevant today. Environmental regulations require control and filtering of industrial point sources of air and water pollution. For example, a large warehouse that would typically be considered light industrial may generate more air pollution from truck exhaust than a heavy equipment factory with a regulated smokestack. Also, indiscriminate dumping practices that were historically common and contributed to many of today's contaminated sites have been curbed. There remains, nevertheless, a perhaps growing difference between general industrial areas that include traditional heavy industries and contemporary light industrial parks characterized by more flex office and retail space, minimal rail access, and more aesthetic design control.

⇨ Portland's heavy industrial districts are more a result of practice than regulation.

The *Portland Zoning Code* does distinguish between IH Heavy Industrial and IG General Industrial zones, and these two zones implement Portland's Industrial Sanctuary policy. Most of the IH zoning is along the Willamette, and most of the Columbia Corridor and Central Eastside are in IG zones. Nevertheless, both zones allow nearly all industrial uses, including smokestack industries in IG zones. The essential use-related difference is that IH is more restrictive in the use of hazardous substances. Specifically, packaged explosives are allowed in IH zones with a hazardous substances review and not allowed in IG; and flammable solids, irritating gases, and

combustible liquids in bulk form require a hazardous substances review in IG and not in IH. There are also some design standard differences between IH and IG zones regarding building setbacks, lot coverage, and landscaping.

Emerging Environmental Challenges

⇨ Major environmental planning projects affecting the harbor area are underway that implement federal and state mandates.

- A six-mile segment of Portland Harbor was listed as a Superfund site in 2000. This project addresses contaminated in-water sediments and approximately 50 (as of 2002) upland site investigation and clean-up projects. The multi-year Superfund project entails investigation, contamination source control, remedies to remove or isolate contaminants, restoration of resulting natural resource damages, and assigning liability for project costs.
- Willamette River populations of Steelhead Trout and Chinook Salmon were listed (in 1998 and 1999, respectively) as threatened under the *Endangered Species Act* (ESA). The Act restricts, at both a programatic and case-by-case level, activities that have potential to harm the fish or its habitat. The City of Portland is developing a comprehensive program to respond to the listings and assist with species recovery. Federal permitting of in-water construction (e.g., harbor docks) and discharges also enforce ESA restrictions.
- Among its provisions, the *Clean Water Act* sets standards for point-source discharges into waterways and stormwater discharges by jurisdictions with more than 50,000 people, enforced through NPDES (National Pollution Discharge Elimination System) permits. Section 303(d) of the Act also requires states to develop plans to reduce pollution in water quality impaired streams, including the Lower Willamette River which is listed for mercury, bacteria, high temperature, and (near the McCormick & Baxter site in Portland Harbor) PCP and arsenic. The City of Portland is preparing watershed plans that will recommend ways to achieve compliance with both the *Clean Water Act* and *Endangered Species Act*.
- Oregon's Statewide Planning Goal 5 requires local jurisdictions to inventory natural resources, including riparian areas and wildlife habitat, and take steps to protect them. While most jurisdictions have complied with Goal 5, Metro is currently developing a regional interpretation of Goal 5 with the fish and wildlife conservation element of Title 3 in its *Functional Plan*. Title 3 will set regional Goal 5 standards for natural resource protections, such as riparian setbacks.

These environmental initiatives have a wide range of potential implications for industrial operations in the harbor area, including cost and allocation of liability for cleanup and restoration, effect on available land for industrial expansion, disruption to current and future industrial operations, and the initiatives' effects on timing of property investments.

The City of Portland is currently in the early stages of developing the *Riverside Plan*, an area plan for the river corridor. Its products will include technical studies (including this document) and area-specific policies and recommended actions on land use and built form, transportation, recreation, economic development, and natural resources. Among the tasks of this planning effort are to integrate ESA, Watershed Health, and Title 3 Goal 5 responses for the river corridor and develop a land-use framework for the Superfund project. Those tasks are part of a broader

charge of the *Riverside Plan* to integrate and advance each of the City's *River Renaissance Vision* themes in the river corridor, including those for a clean and healthy river and prosperous working harbor.

B. RELATION TO OTHER REGIONAL SEAPORTS

Cargo Distribution

Table 21 compares the performance of Portland Harbor among other Lower Columbia River ports by cargo type, showing how their shares of Lower Columbia marine cargo has shifted between 1985 and 2000. The data source is the Pacific Maritime Association and covers the cargo handled by longshoreman and paid under terms of PMA-ILWU collective bargaining agreements. As discussed in Chapter 2, the U.S. Army Corps of Engineers marine cargo data is more comprehensive than the PMA data, but it does not track cargo by type.

Table 21. Shift-Share Analysis of Columbia River Marine Cargo, 1985-2000

Ports by Cargo Type	Tonnage (000s) in 2000	Share of Columbia River Cargo Tonnage 1985	1990	1995	2000	Shift** 1885-00
Dry Bulks						
Portland	11,246	41.4%	41.6%	40.5%	49.4%	8.0%
Astoria	-	0.0%	0.0%	0.0%	0.0%	0.0%
Vancouver	3,561	19.4%	18.4%	15.4%	15.6%	-3.8%
Longview/Kalama	7,965	39.2%	40.0%	44.1%	35.0%	-4.2%
Containers						
Portland	3,675	98.8%	99.2%	99.7%	99.7%	0.9%
Astoria	-	0.1%	0.0%	0.0%	0.0%	-0.1%
Vancouver	11	0.8%	0.8%	0.2%	0.3%	-0.5%
Longview/Kalama	1	0.4%	0.0%	0.1%	0.0%	-0.4%
Autos						
Portland	3,659	96.5%	98.0%	94.6%	86.1%	-10.4%
Vancouver	591	3.5%	2.0%	5.4%	13.9%	10.4%
Breakbulk						
Portland	634	47.0%	53.8%	27.7%	33.2%	-13.8%
Astoria	-	1.5%	2.9%	0.0%	0.0%	-1.5%
Vancouver	384	15.7%	9.0%	32.4%	20.1%	4.4%
Longview/Kalama	890	35.8%	34.3%	39.9%	46.7%	10.9%

* Shift is calculated as the 2000 share minus the 1985 share.

Source: DRI-WEFA and BST Associates, *Draft Lower Columbia River Cargo Forecast*, March 15, 2002, from Pacific Maritime Association data.

⇨ Portland Harbor is a major West Coast seaport, the fourth largest in total marine cargo tonnage in 2000.

A comparison of total marine cargo tonnage (short tons) handled in 2000 among the largest West Coast seaports is as follows (U.S. Army Corps of Engineers, *Waterborne Commerce of the U.S.*; Vancouver B.C. data is from the Port of Vancouver website):

Vancouver, B.C.	84.4 million
Puget Sound, WA	
Seattle	24.1 million
Tacoma	22.3 million
Anacortes	18.0 million
Columbia River	
Portland, OR	34.3 million
Portland, excluding internal barge activity	25.1 million
Vancouver, WA	7.7 million
Kalama, WA	5.8 million
Longview, WA	4.1 million
Bay Area, CA	
Richmond	19.5 million
Oakland	12.2 million
San Francisco	3.6 million
Southern California	
Long Beach	70.2 million
Los Angeles	48.2 million
San Diego	3.7 million

The cargo and vessel mix of each of these ports varies widely. By tonnage, grain is the primary marine cargo line in Portland, containers in Seattle and Tacoma, petroleum at Anacortes, and coal in Vancouver BC. Of the 34.3 million tons of waterborne cargo handled at Portland Harbor in 2000, 18.0 million tons (52 percent) was international cargo, 7.1 million tons (21 percent) was coastwise cargo (primarily petroleum from Puget Sound refineries), and 9.3 million tons (27 percent) was internal cargo carried by barge (see Table 14).

⇨ Portland terminals handled about two thirds of the total marine cargo tonnage of the Columbia River seaports in 2000.

The primary deepwater ports on the Columbia River are Portland, Vancouver, Kalama, and Longview. Each abuts the deepwater (40 foot) channel, the Union Pacific and the Burlington Northern Santa Fe main lines, and I-5. Astoria is also a deepwater port, but handled less than one percent of the Columbia River marine cargo tonnage in 2000 (see Table 21) and does not abut I-5 or the UP or BNSF railroads. A comparison of total marine cargo tonnage (short tons) handled at the Columbia River deepwater ports in 2000 is as follows (U.S. Army Corps of Engineers, *Waterborne Commerce of the U.S.*):

Portland	34.3 million	66%
Vancouver, WA	7.7 million	15%
Longview, WA	4.1 million	8%
Kalama, WA	5.8 million	11%
Total	51.9 million	100%

⇨ Portland Harbor currently competes with the other Columbia River seaports primarily for dry bulk and breakbulk cargo. Virtually all of the Columbia River container and petroleum cargo and 86 percent of the automobile cargo were handled in Portland in 2000.

Most of the cargo handled at each of the Columbia River seaports is for export. The primary marine exports (by weight) are wheat, soda ash, and potash in Portland; wheat in Vancouver, wheat and corn in Kalama, and logs in Longview. As shown in Table 21, Portland handled about 49 percent of the Columbia River dry bulk tonnage in 2000, up from 41 percent in 1995 following construction of the Portland Bulk Terminal at T-5 (Port of Portland Terminal 5). Grain terminals operating include three in Portland (Columbia Grain at T-5 and Cargill and Louis Dreyfus in Lower Albina), two in Kalama (United Harvest and Kalama Export), and one in Vancouver (United Harvest).

Portland's share of Columbia River breakbulk cargo has fallen from 47 percent in 1985 to 33 percent in 2000, as the cargo mix and location have shifted (BST and DRI-WEFA, 2002). Columbia River imports of breakbulk steel have increased from 276,100 metric tons in 1990 to 1.2 million in 2000, at which time 52 percent was handled in Portland, 18 percent in Vancouver, 25 percent in Kalama, and 5 percent in Longview. Breakbulk lumber exports and coastwise shipments from the Columbia River plummeted from 350,500 metric tons in 1990 to 31,800 in 2000, and 74 percent of the 1980 tonnage was shipped from Portland. Reductions in breakbulk lumber exports are attributed to declines in regional production, shift to domestic markets, and conversion from breakbulk to container shipping. Columbia River exports of breakbulk newsprint, nearly all from the NORPAC mill in Longview, have grown from 247,200 metric tons in 1990 to 367,000 in 2000. As Columbia River log exports have dropped from 1.7 million tons in 1982 to 0.7 million in 2000, the share of log tonnage in Longview and Kalama has increased from 68 percent in 1982 to 92 percent in 2000.

Available Land for River-Dependent Industry

Table 22 presents a selective summary of available vacant and planned river industrial sites at Portland, Vancouver, Kalama, and Longview harbors. Specifically, the table includes sites that are at least ten acres in size, have deepwater shipping channel access, and are owned by the Ports of Portland, Vancouver, Kalama, or Longview. The 10-acre and port-ownership criteria are intended to be indicators of suitability for marine cargo and marine industrial use. These criteria result in an incomplete summary of vacant land. For example, the 146 acres of available sites in Portland shown in Table 22 is less than half of the 310 acres of vacant riverfront land in the study area shown in Table 5. Other sites shown in Table 4 generally have constraints to current availability, including vacant portions of private sites held for future expansion, Superfund project sites, and land with employment (not industrial) zoning. For reference, the 1,100-acre Columbia Gateway site planned by the Port of Vancouver and 750-acre West Hayden Island site

planned by the Port of Portland are also listed. The Vancouver, Kalama, and Longview information is from their perspective port's websites. The Bureau of Planning estimated the Portland information from ownership maps.

Table 22. Available and Planned Industrial Sites at Lower Columbia River Seaports, September 2002

A summary of available and planned industrial sites that are owned by the Ports of Portland, Vancouver, Kalama, or Longview; are ten acres or larger; and have deepwater channel access.

10+ Acre Industrial Sites with Deepwater Channel Access	*Acreage Total*	*Acreage 100+ acre sites*	*Heavy Industrial Zoning*	*BNSF or UP Rail Access*	*Current Availability for Sale or Lease*
Portland					
T-6 site abutting Hyundai	22	*0*	yes	yes	yes*
T-6 site abutting Honda	15	*0*	yes	yes	yes*
T-5 site abutting Portland Bulk Terminal	63	*0*	yes	yes	yes*
15540 Lombard at T-5, former Alcatel	16	*0*	yes	yes	yes
Channel Ave. site abutting shipyard	30	*0*	yes	yes	yes
West Hayden Island	<750	<750	no	planned	planned
Vancouver					
Parcel 1-A	55	*0*	yes	yes	yes
Parcel 1-C	<12	*0*	yes	yes	yes
Parcel 1-D	10	*0*	yes	yes	yes
Columbia Gateway	<1,100	<1,100	yes	planned	planned
Kalama					
North Port Marine Terminal	125	125		yes	yes
South Port Industrial Park	23	0		yes	yes
Kalama River Industrial Park, 9 lots	75	0		yes	yes
Longview					
Port of Longview East Park	120	120	yes	yes	yes
Port of Longview West Park	180	180	yes	yes	yes

* Sites are vacant portions of Port of Portland terminals and available only for marine cargo uses consistent with terminal configuration and objectives.

Source: Vancouver, Kalama, and Longview information from their respective port authority websites, September 2002. Portland info estimated by Bureau of Planning.

⇨ The Ports of Portland, Vancouver, Kalama, and Longview each have river-access industrial sites of ten acres or larger available. Of these, the only 100+ acre sites currently available are one in Kalama and two in Longview.

The Port of Portland's *West Hayden Island Development Program Final Report* (Century West Engineering, 1997) cites land area needs for new marine terminals to reflect current and projected technology. For example, the report recommends 115-125 acre sites for grain and dry

bulk terminals, to accommodate a rail loop, and 50-100 acre sites for auto and container terminals, to provide adequate yard storage area. Land requirements for river-dependent manufacturing, warehouse, and industrial service facilities are more varied. There are many existing river-dependent industrial sites on Portland Harbor in the 5-50 acre range. The only vacant site with more than 100 acres along Portland Harbor is West Hayden Island, and only three sites have more than 50 acres—at T-5 and the former McCormick & Baxter and Atofina sites. The 63-acre vacant portion of T-5 is primarily within the Portland Bulk Terminal rail loop and its use is probably limited to that facility's expansion or a compatible mineral bulk terminal. The approximately 50-acre McCormick & Baxter site and 60-acre Atofina site are part of the harbor Superfund project. As such, they are not currently available for reuse and have significant cleanup liability constraints. The McCormick & Baxter site also has marginal truck access over residential streets and requires major access improvements. The Port of Portland's *Marine Terminals Master Plan* process underway has also proposed alternatives for accommodation of new grain, dry bulk, auto, and container facilities through redevelopment, consolidation, or relocation of facilities within the existing terminal sites.

⇨ The Ports of Portland and Vancouver also own large undeveloped sites planned for future industrial use—West Hayden Island and Columbia Gateway.

In 1960, the Port of Portland purchased 2,700 acres in the Rivergate Industrial District for industrial development. Most of that land is now in industrial use. In 2000, only 381 acres of Rivergate land was still vacant in the study area, which includes most of Rivergate. In a comparable strategy, the Port of Portland purchased approximately 734 acres on West Hayden Island, which is being held in reserve for future marine terminal development when the market warrants. The *West Hayden Island Development Program Final Report* (Century West Engineering, 1997) proposes a flexible 556-acre development area for grain, mineral bulk, and container facilities and a 269-acre open space area for wetland and shallow water habitat.

The Port of Vancouver has recently prepared a draft environmental impact statement for a subarea plan to develop Columbia Gateway. The alternatives propose 504-720 acres of industrial development on the 1,094-acre site, including 152-504 acres of water-dependent industry and 242-326 acres of mitigation open space. Both the West Hayden Island and Columbia Gateway are in the 100-year floodplain and their development would require extensive fill to a suitable elevation on developed portions of the site.

C. Regional Economic Role of Harbor Area

Role of the Harbor Area's Traded Sectors

A region's economic growth or contraction in the long run tends to be tied to the performance of its "traded sectors." Traded sectors are those that compete across regions in national and international markets. Michael Porter (2000; 2002) has broadly applied the concept of clustering as an explanation of regional economic structure. He has found that traded sectors tend to concentrate in a small number of locations, where agglomeration economies provide a competitive advantage in national and international markets. These industries tend to be the engines of regional economic competitiveness and generate high wage jobs through productivity growth. In the *Regional Connections Project* (1999), the Institute of Portland Metropolitan

Studies similarly explains Portland's recent growth as largely the result of expansion in a few traded clusters (identified by higher location quotients, number of employees, and growth rates).

⇨ Most of the Portland area's traded clusters with the highest levels of employment are the types of land uses that locate in industrial districts. Some of these clusters are concentrated in the harbor area.

Traded clusters with the highest employment in the Portland-Vancouver PMSA in 1999 were as follows, in descending order (Porter, 2002). Those concentrated in the harbor area (having location quotients above 3 in the harbor area relative to the PMSA) are shown in bold text:

Business services
Information technology
Education and knowledge creation
Distribution services
Financial services
Transportation and logistics
Heavy construction services
Tourism and hospitality
Metal manufacturing
Analytical instruments
Processed food
Motor vehicles
Medical devices
Publishing and printing
Forest products

Regional Multiplier Effects of Harbor Area Jobs

Table 23 shows the multiplier effects of harbor area jobs in 2000 on employment and income in the Portland-Vancouver PMSA. The output associated with each job in the harbor area indirectly generates additional jobs and resulting earnings in the region, called multiplier effects. The employment multipliers used in the table account for the sum of (1) the "direct" employment at business establishments in the harbor area; (2) the "induced" employment resulting from purchases by harbor area employees of goods and services in the region; and (3) the "indirect" employment resulting from purchases of intermediate inputs by harbor area firms from other firms in the region. Industries that pay higher wages and salaries and that purchase more intermediate inputs in the region for a given level of output have higher multipliers. The U.S. Bureau of Economic Analysis calculated the multipliers used in the table through the Regional Input-Output Modeling System (RIMSII) applied to the Portland-Vancouver PMSA.

Table 23. Multiplier Effects of Employment and Earnings in Study Area, 2000

SIC	Industry	Covered Employment in Study Area (Column A)	PMSA Employment Multiplier* (B)	Total PMSA Employment Impact of Study Area Employment (A x B)	County Average Annual Pay per Worker (C)	PMSA Earnings Multiplier** (D)	Total PMSA Earnings Impact of Study Area Employment in $ millions (A x C x D)
15-17	***Construction***	2,081	2.4414	5,081	$46,355	2.1958	$211.8
20-39	***Manufacturing***	19,391		65,285	$43,745		$2,287.4
20	Food & kindred products	1,241	3.2133	3,988	$36,320	2.9999	$135.2
22-23	Apparel & textile products***	68	1.9860	135	$27,979	2.0971	$4.0
24-25	Wood products, furniture & fixtures	429	3.6948	1,585	$44,104	3.0511	$57.7
26	Paper & allied products	318	4.4759	1,423	$49,279	2.9804	$46.7
27	Printing & publishing	1,111	2.1568	2,396	$42,480	2.0809	$98.2
28-29	Chemicals & petroleum products	699	3.9370	2,752	$47,424	2.3255	$77.1
30-31	Rubber, plastic & leather products	103	2.2301	230	$31,699	2.1731	$7.1
32	Stone, clay, glass, & concrete	309	2.4360	753	$39,019	2.2616	$27.3
33	Primary metal industries	3,016	3.2387	9,768	$48,014	2.3334	$337.9
34	Fabricated metal products	930	2.4712	2,298	$35,503	2.2937	$75.7
35	Industrial machinery & equipment	829	3.0254	2,508	$47,163	2.4035	$94.0
36	Electronic & electric equipment	2,094	3.0432	6,372	$48,313	2.1528	$217.8
37	Transportation equipment***	7,811	3.8655	30,193	$51,232	2.6981	$1,079.7
39	Misc. manufacturing industries	433	2.0400	883	$28,355	2.3635	$29.0
41-47	***Transportation***	6,460	2.3748	15,341	$36,453	2.1025	$495.1
48-49	***Communication & utilities******	71	4.4967	319	$81,345	2.4480	$14.1
50-51	***Wholesale trade***	6,269	2.1945	13,757	$43,884	1.8232	$501.6
52-59	***Retail trade***	1,481	1.5391	2,279	$20,869	1.7649	$54.5
60-69	***Finance, insurance & real estate***	865		2,159	$47,093		$98.5
	Finance	420	2.2322	938	$56,660	2.0622	$49.1
63-64	Insurance	353	2.8445	1,004	$45,891	2.4168	$39.2
65	Real estate	92	2.3669	218	$31,128	3.5982	$10.3
70-89	***Services***	2,559		4,665	$33,500		$127.6
70, 72	Hotels & personal services***	247	1.5358	379	$19,593	1.8817	$9.1
73, 87	Business services	1,298	1.8768	2,436	$33,502	1.7325	$75.3
80	Health services	494	1.8966	937	$24,870	1.6625	$20.4
	Other services	520	1.7546	912	$21,422	2.0425	$22.8
99	Nonclassified employment	15			$38,615		
All industrial sectors in study area		34,272		99,783			$3,510
All private industries in study area		39,192		108,887			$3,791
All private industries in Multnomah County		389,826			$36,486		$14,223
All private industries in Ptd.-Vanc. PMSA		842,561					$31,279

* Total change in the number of jobs in the six-county PMSA in all private industries that results from a change of one job in the industry corresponding to the entry.

** Total change in the earnings of households in the six-county PMSA employed by all private industries that Results from a change of one job in the industry corresponding to the entry.

*** Industries or industry segments are aggregated to avoid the need to suppress employment data. The Corresponding employment and earnings multipliers are estimated as the average of the multipliers of each Aggregated industry or industry segment.

Sources: Bureau of Planning calculations from Oregon Employment Department data and U.S. Bureau of Labor Statistics RIMSII multipliers for the Portland-Vancouver PMSA.

The multipliers are based on the 1992 benchmark input-output accounts for the U.S. economy and 1997 regional location quotients.

⇨ Overall, the industrial firms operating in the harbor area generated approximately one out of eight jobs in the Portland-Vancouver region in 2000, taking into account the multiplier effects of regional purchases by harbor area firms and employees.

This regional employment impact accounts for direct, induced, and indirect employment effects. In 2000, the output of industrial firms that employed 34, 300 workers in the harbor area generated 99,800 jobs in the Portland-Vancouver PMSA. In comparison, Multnomah County had 390,000 private sector jobs in 2000, and the Portland-Vancouver PMSA had 843,000. The regional employment impact of the transportation equipment manufacturing firms in the harbor area was 30,200 jobs; the primary metals manufacturing firms, 9,800 jobs; the transportation and wholesale firms, 29,100 jobs.

⇨ The industrial firms in the harbor area generated $3.5 billion of employee earnings in the Portland Vancouver region in 2000, which is 11 percent of the total regional payroll of private firms.

Industrial sectors continue to pay employee earnings that are significantly above the average of all sectors in Multnomah County. In 2000, the ratio of average annual employee earnings in the industrial sectors to the county average of all sectors was as follows:

	Employee earnings ratio
Construction	127%
Manufacturing	120%
Transportation	100%
Communication & utilities	223%
Wholesale	120%

While the employee earnings ratio for the transportation sector is the same as the county average of all sectors, the ratio for the water transportation industry specifically is 143 percent.

Employment and Income Benefits of Maritime Activity

⇨ Maritime activity at Portland Harbor generated 21,364 jobs and $970 million of resulting employee earnings in 2000.

Martin Associates (2001) calculated these economic impacts. The estimated 21,364 jobs that depend on maritime activity include 7,189 direct jobs involved in the harbor's maritime operations, 4,222 induced jobs from local purchases made by those directly employed as a result of port activity, and 9,953 indirect jobs from local purchases by firms directly dependent on port

activity. In addition to these jobs that are dependent on maritime activity, there are another 52,233 "influenced" jobs with Oregon manufacturers and agricultural producers that export or import cargo through Portland Harbor, primarily through the container terminal at T-6. These impacts were estimated for the year 2000. Employment impacts have likely reduced since 2000 as cargo tonnage has declined (e.g., grain, containers, alumina, and salt).

The direct employment includes 2,870 jobs in the maritime services sector; 1,793 trucking and railroad jobs involved in moving cargo to and from port terminals; 2,340 jobs at port-dependent manufacturers (shippers) located on or near the harbor; 166 jobs in the Port of Portland marine and dredge operations; and 50 jobs in banking, insurance, and legal services related to port transactions. Of this direct employment, an estimated 1,234 jobs were attributable to container cargo, 759 jobs to petroleum cargo, 740 jobs to breakbulk, 700 jobs to alumina, 686 jobs to sand and gravel, 659 jobs to grain, 583 jobs to autos, and the rest to various other commodities in smaller amounts. Virtually all of the direct employment occurred in Oregon or Washington, and 81 percent in the Portland-Vancouver PMSA.

Regional Transportation Costs and Access

⇨ Shippers in the Pacific Northwest saved $67.9 million per year in transportation costs as a result of Portland's container terminal at T-6.

HDR Engineering (2000) calculated these transportation cost savings, representing the difference between existing transportation costs and hypothetical costs in the absence of Portland's container service. Approximately $17.9 million of the estimated savings accrued to shippers of grain, seed, fruit, and hay; $11.2 million to wood products shippers; $8.4 million to paper and paperboard shippers; $6.1 million to vegetables shippers; $5.0 million to wood pulp and waste paper shippers; and the rest to shippers of other commodities. An estimated 79 percent of the savings was for export cargo and 21 percent for imports. Portland's container market area, where exporters and importers benefit from these cost savings, includes Oregon and parts of Washington, Idaho, and Montana.

About two thirds of the savings resulted from cargo shipped through T-6, and one third resulted from competitively lowered rates by ocean carriers for regional commodities handled at other container ports. In other words, to compete for cargo originating in Portland's container market area, ocean carriers calling on Seattle, Tacoma, and Oakland container facilities essentially absorb the rail or truck drayage costs from Portland to these other ports.

Port of Portland staff have estimated that shipper savings has likely declined to between $54 million and $58 million since 2000, due to reduced inland transportation rates.

Regional exporters and consumers also accrue transportation cost savings from access to Portland's bulk, breakbulk and auto terminals, as well as its rail, barge, truck, and air freight facilities. Savings result from modal options within a distribution hub, which enable shippers to manage their supply chain transactions to increase productivity. Modal options also increase transportation system reliability, providing a relative cushion against shocks. For example, after

the explosion of the Olympic pipeline, which supplied most of Oregon's gasoline and diesel, Portland Harbor's petroleum tanker volume more than tripled between 1998 and 1999 to meet the demand. As the global marketplace continues to become more integrated, using the distribution sector as a tool to increase productivity, exporters and consumers will be primary beneficiaries of those changes.

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PORTLAND HARBOR



INDUSTRIAL LANDS STUDY


Part Two: Interviews and Analysis

February 2003

Prepared by:

E. D. Hovee & Company

Economic and Development Services

RIVER RENAISSANCE

City of Portland
Bureau of Planning

Portland Development Commission

Port of Portland

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Part Two: Interviews and Analysis

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EXECUTIVE SUMMARY

The Portland Harbor Industrial Lands Study (PHILS) assesses the future land needs of industries in the Portland Harbor area, focusing on river-dependent, freight-related, and other concentrated industries in this area. The study has been prepared for the City of Portland Bureau of Planning, Portland Development Commission, and Port of Portland.

This Part Two study draws from a series of 80 in-depth personal interviews conducted with harbor area industry leaders, two focus groups and additional input-output economic analysis. The results are intended to supplement Part One employment and land use analysis conducted by the Bureau of Planning.

What follows is a summary of major observations focused primarily on this Part Two PHILS assessment.

PART ONE PHILS SUMMARY

The Bureau of Planning's Part One report reviews employment and land use trends over the last 20 years from within the Portland metropolitan area. A summary of results and implications from the Part One study pertinent to the Part Two analysis follows:

- Approximately 940 private sector businesses are located within the Portland Harbor area, employing nearly 39,200 workers or one in eleven jobs in Multnomah County. Half of the study area's workers are employed by manufacturers, with another one-third in distribution (transportation and wholesale sectors).
- Portland's share of the nation's manufacturing base is increasing even as manufacturing represents a smaller component of the nation's total employment base. Much of the region's heavy manufacturing base and its core transportation infrastructure is centered on the harbor industrial area. Nearly 65% of the harbor study area's future employment growth has been forecast to occur within the Rivergate area.
- U.S. maritime employment is declining as marine terminal operations have become less labor intensive and offshore competition has grown. However, Portland's harbor area is the center of the region's and state's competitive maritime industry – with competitive niches as a major west coast center for auto imports, grain and dry bulk exports and specialty container activity.
- Industrial sites within the Portland Harbor area vary widely in size. The *median* property size is 2.2 acres. However, the large industrial sites within the study area bring *average* site size up to 8 acres. Average employment density is 8.1 jobs per acre with manufacturing having the highest employment density at 12.4 workers per acre.
- The Portland Harbor area comprises over 5,532 acres of industrial land (excluding rights-of-way) – or nearly one-third of the City's industrial land base. As of July 2000, 543 acres (or 10%) were vacant Tier A/B lands. (Metro classifies undeveloped, unconstrained land over 1 acre Tier A; Tier B is comprised of undeveloped land with some constraints – including land banked sites – over 2 acres). Only 33 acres are free of constraints (Tier A). Over one-half of the vacant land is located in Rivergate.

In short, Portland's harbor is Oregon's freight transportation hub, connecting the seaport with regional barge routes, interstate highways, and transcontinental railroads. It is also in close proximity to Portland International Airport. There is no similar place in Oregon with this confluence of significant intermodal transportation facilities – nor is there any expectation that a similar transportation hub will be developed elsewhere in the state for the foreseeable future.

The Part One Bureau of Planning research raised two central questions for Portland's harbor industrial area. Simply stated, those questions are: Will Portland's harbor area continue as the focus for the region's maritime and heavy manufacturing activities? Or, is the harbor area transitioning to a different and as yet undefined future? Part Two industry interviews are intended to provide an initial framework within which these questions can be addressed.

PART TWO INDUSTRY INTERVIEWS

The consultant team interviewed a selected target group of 80 business leaders within the Portland harbor industrial study area. Information obtained from the interviews provides both factual information and opinions into the public policy and economic issues affecting area industries:

- Industries in the Portland Harbor area can be divided into two distinct groups: a) *river-dependent* uses encompassing aggregate firms, marine terminals, and supporting marine services, and b) other non-marine or *non-river dependent* firms including manufacturing, wholesale/distribution and land-holding activities.

  The *manufacturing grouping* is represented by seven industry clusters that comprise chemicals, electronics, food-related, metals, printing/publishing, transportation manufacturing, and specialty manufacturing industries. *Wholesale/distribution* includes distribution centers, distribution service providers, recycling, and wholesalers.
- The firms interviewed employ almost 13,000 full and part-time workers. The manufacturing sector employs the largest number (70%) of workers. River-dependent employers provide another 16% of the jobs, followed by wholesale distribution at 14%. The more than 12,500 full-time employees for the firms interviewed represent 32% of the 39,200 jobs in Portland's harbor industrial area.

In addition to the firm interviews, two focus group discussions were conducted during September 2002. The groups were convened to: (a) present and discuss results of what was learned from the industry interviews and associated analysis; and (b) identify potential policy implications for Willamette River planning initiatives.

Results of both the interview and focus group research have been organized around four major questions – which also serve as a basis for discussion of potentially important policy questions and options. Responses to these questions – as stated by interview and focus group participants – are summarized as follows:

1. What are the Major Trends & Issues Affecting Prospects for Portland's Harbor Area Industries?

- Business activity is expected to be stable through the recession but limited job growth is anticipated with economic recovery.
- Even with expansion, existing medium-larger firms anticipate minimal need for added industrial land.
- Remaining cost competitive emerges as the #1 issue for harbor area firms – extending beyond the current economic downturn. This is in part due to the growing perception of Portland as a high cost place to do business.
- Many long time manufacturers will reinvent their business model and operations over the next 10-20 years – to remain competitive domestically and globally.
- Local issues affecting business investment are noted as including:
    - ✓ Superfund uncertainty & competitive multi-modal transport – for *riverfront* owners.
    - ✓ Regional congestion (freight/employee), non-industrial encroachment, permitting, public policy & community support – for *riverfront and upland* firms.

2. Will the Mix of Harbor Industries Change?

Both current conditions and the outlook vary depending on the industry grouping considered:

- *River-Dependent* – need multi modal access including 20+ foot depth for barges, 30-40+ foot for deep draft vessels. These firms serve as suppliers and transporters to the entire metro area and state. Little near-term expansion is anticipated except for auto imports.
- *Wholesale Distribution* – separated between (a) serving Central City and metro area from a central location and (b) markets beyond the metro area. Firms that serve the local market likely will continue to value a harbor area location; demand for firms serving a regional or national market is more uncertain depending on comparative costs of business and intermodal transport accessibility.
- *Manufacturing:*
    - ✓ Chemicals & electronics – tend to be suppliers to the region's industrial base; a central harbor-area location with in-place capital investment remains important.
    - ✓ Printing/publishing – have and will continue to value Central City proximity and interaction though the industry is rapidly becoming more global.
    - ✓ Metals & transportation – significant inter-industry linkages are led by Freightliner, Esco, Oregon Steel, and Gunderson, firms that are also associated with growth prospects for a wide array of additional support businesses.

  Mid/large manufacturer land needs are expected to be relatively modest; growth needs are linked to the desire or capacity to accommodate smaller firms. Growth will occur within existing operations before plant expansion is considered.

- *Other Sectors Potentially Suited to Harbor Area* – sectors with a potential (but not current) harbor presence include:
  - ✓ **High tech/bio tech**
  - ✓ **Creative services/information technology**
  - ✓ **Wood/plastics/fiber materials**
  - ✓ **Corporate headquarters & business parks**

3. What are the Needs & Issues Facing River-Dependent Industries & Sites?

- From existing operations, greatest demand (for 100+ acres) is indicated by marine terminals (notably auto importers).
- Approximately 9% of 3,130 acres of riverfront property is classified as vacant (and within the top two tiers of the 2000 Buildable Land Inventory) by Metro.
- Only 153 acres of Tier A/B vacant riverfront land are situated north of the St. Johns Bridge.
- A site constraints evaluation has focused on *threshold criteria* of appropriate zoning and minimum depth barge access. Other criteria considered include deep draft shipping, rail/street access, lot depth, environmental contamination, compatible neighbors, wetlands, trail easements, flood plain, and scenic overlay.
- Capital investment for riverfront and related sites may be deferred pending Superfund resolution.
- Harbor area firms express interest in reserving riverfront sites for industrial use – whether marine dependent or not.
- Reserving riverfront land for future generations' industrial use also is an expressed or implied interest for a number of firms – even if demand for added riverfront activity is not readily foreseeable today.

4. What are the Needs & Issues Facing Upland Industries & Sites?

- There appears to be a general consensus to continue exclusion of residential and large scale commercial from the industrial sanctuary.
- Less agreement is evident on how broadly "industrial" should be construed with potential flexibility for:
  - ✓ Corporate office
  - ✓ Support retail/service
  - ✓ Creative services/information technology
  - ✓ Business park/flex space
- Priority emphasis is desired by firms throughout the harbor area for roadway improvements for freight and employee commutes.
- Some shift from manufacturing to transportation dependent firms is expected, particularly if major manufacturing anchors downsize or terminate Portland operations.
- There is strong interest in improved transit – including service for shift workers.

- Firms desire greater evidence of public support for improved, faster, lower-cost permitting, and managing labor issues including rising workers compensation and health care costs. Public support is seen as the first step in taking action to address these issues.
- Pro-active public decision-maker support also is desired for (a) increased business/policy maker interaction, and (b) policy/investment decisions that make a difference.

HARBOR INDUSTRY ANALYSIS

The second portion of this Part Two analysis employs input-output economic data to investigate and expand upon the insights expressed by interview and focus group participants and recognized in Part One of the PHILS study. This section focuses on identifying the Portland metro economy's current and prospective *competitive advantage* and the clusters of economic activity for which the harbor is particularly well positioned. Also considered are the land use implications of industry trends and the quality of the harbor area's industrial land supply.

Competitive Advantage. To identify the industries for which the Portland metro areas offers the greatest competitive advantages – on both a regional and national scale – a series of screening criteria were applied to industry sectors. Five sets of *screening criteria* have been developed:

1. Current and changing *competitive position* – of the industry relative to the nation.
2. *Worker productivity* – and change in productivity.
3. *Value-added* output – measured in terms of value of output per labor hour.
4. *Economic impact* – measured by employment multiplier and/or forecast employment growth.
5. *Wage levels* – including changes over time compared to other industries in the metro area.

Taken together, nearly half of the industrial sectors portray the Portland-Vancouver metro area as being strongly competitive. Industry sectors meeting *four or more* of the criteria noted include:

Construction	**Instruments**
Lumber & Wood	Trucking & Warehousing
Paper Products	Water Transportation
Stone, Glass & Concrete	**Communications**
Industrial Machinery	**Electric, Gas & Sanitation**
Electronic Equipment	Wholesale Trade
Transportation Equipment	

As indicated by the **boldface** type, nine of these thirteen sectors are already well represented within Portland's harbor industrial area. Maintaining and enhancing the region's competitive position for these key sectors will be dependent on steps to preserve and enhance the capacity for Portland's harbor industrial users. The economic vitality of the entire region cannot be easily separated from the prospects of sectors for which the harbor area is particularly well suited.

Summary Economic Impact. Consistent with employment data developed by the Bureau of Planning for Part One, Portland's harbor industrial area currently has an employment base of 39,190 jobs. Of these, 34,270 (or 87%) are industrial jobs.

The harbor area's 34,270 industrial jobs *leverage* another 46,890 jobs throughout the metro area – for a total of 81,160 jobs directly and indirectly attributable to harbor area industries.

The full economic impact to the metro area of Portland's harbor area extends beyond these quantitative estimates. Businesses and residents regionwide are dependent on goods and services that often are uniquely provided by harbor area industries.

District Characteristics. Interviews with study area business leaders reveal a number of intra- and inter-industry relationships within the harbor area, as well as inside and outside the region. In effect, the Portland harbor industrial area currently functions similar to a *hub-and-spoke* district for several key industry groupings and clusters.

Study area activity has been dominated by a few large firms (hubs) such as Freightliner, Gunderson, Wacker, Oregon Steel Mills, ESCO, and Port of Portland. The ten largest harbor area private sector firms employ over 60% of the study area's workers. Due to extensive inter-firm relationships (spokes), these industry leaders also support a significant portion of the remaining workforce.

However, the harbor area may be in transition. While still dominated by large locally owned firms, the district increasingly appears to be shifting more to a *satellite platform* model, in which branch offices or plants are both supplied by and cater to customers outside of the industrial district. This is exemplified by the comment from a focus group participant – and supported by interviews – that the harbor's future may be more toward wholesale-distribution and transportation-oriented activities rather than manufacturing.

In the short term, this transition suggests a *hybrid district* comprised both of large locally owned firms as well as regional/branch plants. Yet the ongoing trend of local firms seeking national/international alliances (e.g. Freightliner) creates challenges for locally dominated sectors to remain competitive with a *hub-and-spoke model.* Also noted is the trend for non-local firms using Portland as a regional hub to serve the western states of Oregon, Washington, Idaho, and Montana.

In this report, inter-industry linkages have been *mapped* for the transportation equipment and metals manufacturing industry clusters – which still approximate the *hub-and-spoke* model. In contrast, a third cluster profiled – maritime industry – more closely approximates the model of a *satellite platform* district – with more diverse supplier and customer linkages both locally and globally.

Riverfront Site Constraints. In order to address the long-term viability of utilizing *riverfront* properties for continued maritime use, E.D. Hovee & Company developed a set of criteria for identifying potential site development constraints. *Threshold criteria* are appropriate zoning and minimum depth barge access. *Other criteria* considered include deep draft shipping, rail/street

access, lot depth, site contamination, compatible neighbors, environmental constraints, trail easements, flood plain, and scenic overlay height restrictions.

- Of the approximately 3,130 acres of riverfront property, an estimated 580 acres (19%) have no constraints – all located in Rivergate. The majority (51%) of riverfront properties comprising 1,600 acres have 1-3 constraints that could require some form of mitigation to remain suitable for maritime use.
- An estimated 270 acres (9%) has anywhere from 4-11 constraints. In some cases, the constraints noted may be amenable to remediation for river-dependent uses in a manner that allows private investment to proceed. In other instances, the constraints or cost to convert may exceed what industrial users find feasible in today's market.
- Finally, 670 acres (21% of the total) are deemed as not meeting minimal threshold constraints for suitable industrial zoning and direct barge access. This includes some river-related (but upland properties) that may be suitable for non-marine industrial activity.

Upland Sites. The harbor industrial area has another 2,400 acres of upland property – sites located inland and away from the Willamette and Columbia riverfronts. While a detailed quantitative and mapping assessment of these properties has not been conducted as part of this PHILS study, criteria that could be important to assess site suitability and constraints for industrial use include such factors as appropriate zoning, site size, rail/truck and transit accessibility, site contamination, and compatible neighbors. Undertaking such an assessment will require data not readily available to usefully and objectively assess upland site constraints – for a broader variety of parcels and potential uses than with riverfront sites.

Land Use Sensitivity. As Portland's harbor industrial area adapts to changing market and regulatory challenges, the type and intensity of industrial activity that chooses to locate in this area likely will be affected by three specific factors – availability of useable (ready-to-build) land, development and business occupancy costs, and viable alternative locations inside or outside the region.

Specifically noted is that the availability of Tier A ready-to-build property is currently extremely limited – at only 33 acres. At some riverfront sites, the combination of environmental and infrastructure requirements will be more costly than the resulting value of the land for industrial reuse – meaning that there is little to no incentive from a current or prospective owner to redevelop. Viable alternative locations are extremely limited within the region – particularly for marine terminal and heavy industrial uses – meaning that future relocations or major industry expansions would more likely occur outside the Portland metro area.

The degree to which these factors affect land demand in the harbor area may well differ with the perspective of each user or developer. However, for both existing and prospective riverfront and upland users, these considerations can be expected to challenge the harbor area's long-term viability and competitiveness.

In addition to the sensitivity factors noted above, two other sets of private business planning decisions have been identified – either of which could substantially affect both transportation and land-use planning for the harbor area long-term:

- Growing need of the two main rail carriers serving Portland to establish a several hundred acre *intermodal rail yard* – most likely outside the harbor area and possibly outside the metro area.
- Potential to eventually consolidate up to three existing *grain elevators* (including two near the Rose Quarter) at an alternate location on the lower Columbia – subject to needs for superior/expanded unit train service and ability to make a new facility investment that increases economic returns to the operator(s) long-term.

POLICY QUESTIONS

A series of policy questions to be addressed have been raised by this Part Two study – with *industry driven* perspectives drawn from industry interviews and focus groups.

All Harbor Industries. Many of the cost disadvantages faced by harbor industries – such as distance from major markets – may be beyond the influence of the Portland community to affect. Other factors – related to labor, infrastructure and regulation – may be more amenable to corrective public policy and action, although not without attendant public expense.

For riverfront and some nearby owners, issues most pressing today include uncertainty and potential cost associated with Superfund cleanup and maintenance of competitive multi-modal transportation (marine, rail, highway). For upland as well as waterfront industries, additional issues of concern include regional congestion (for employees and freight), encroachment of incompatible non-industrial uses, high cost and time delay for permitting, and perceived lack of city/regional public policy and community support.

If not addressed, these are issues that individually or collectively could cause harbor industries to relocate and/or disinvest over time. There appear to be two primary suggestions identified by those interviewed to proactively address industry concerns – expressed interest/interaction from the City followed by policies and investments that can make a demonstrable difference for harbor industries.

River-Dependent Industries. Relatively little demand for added industrial land is expected from the existing major industries interviewed – except for auto import facilities. However, if patterns of demand experienced in the past re-emerged (including significant new facilities located from outside the region), existing vacant riverfront sites north of the St. Johns Bridge could be depleted within as little as a 7-year period.

Limited availability of vacant riverfront sites (150 acres north of the St. Johns Bridge) occurs at a time when a greater number of sites on the Willamette River lie underutilized or vacant due to industry contractions or closures. The speed of site reuse likely depends on market recovery (from the current recession), Portland's changing competitive position for non-auto maritime uses, and regulatory conditions – especially cost liability resolution for Superfund sites.

Currently, 670 acres of riverfront land do not meet threshold criteria for river-dependent industrial use. Another 270 acres face multiple constraints. In summary, 30% of the 3,130 acres of riverfront land may be questionable for on-going river-dependent industrial or marine terminal use in the future.

In summary, appropriate public policy questions for riverfront sites are essentially four-fold:

- Determination of which sites are sufficiently constrained to no longer be suitable for river-dependent industrial use – whether now or in the future.
- Determination of whether to reserve suitable but vacant or underutilized riverfront sites for river-dependent industry or non-river-dependent industry for the long-term – even if river-dependent demand is not anticipated on the immediate horizon.
- Consideration of how to best allocate limited remaining riverfront sites (150 acres) north of the St. Johns Bridge – including possible actions to convert Tier B lands to Tier A status.
- Consideration of incentives for conversion of suitable but vacant or underutilized sites back to productive use – generating additional jobs and tax revenues.

Upland Industries. The primary issue distinctive to upland sites relates to maintenance of the existing industrial sanctuary. While continued sanctuary designation appears widely supported, there will continue to be questions surrounding the amount of flexibility that should be encouraged – for related commercial functions, corporate office, creative service/information technology, and business park/flex space applications. Transitional areas at the interface between harbor industrial districts and adjoining commercial or residential neighborhoods also may warrant consideration.

Portland Harbor's Future. Both business leaders and public policy makers will play a vital role in shaping the harbor's economic future. A significant number of the business leaders interviewed indicated they are uncertain about the economic/financial outlook of their companies and industry. These uncertainties stem from forces external and internal to the City of Portland. Local policy makers can directly influence the effect of internal forces by forging partnerships with the private sector to develop mutually beneficial harbor area economic development strategies.

Based on this industry-driven interview and focus group discussion process, a variety of alternative development permutations are viewed as possible. The development alternative that actually emerges will depend on how the Portland Harbor area is positioned to encourage on-going and future economic activity.

A continuation of current industry trends coupled with no significant change in the public policy and regulatory environment could result in limited re-investment or disinvestment in waterfront sites, with resolution of Superfund and related harbor planning and regulatory issues being a major factor. Continuation of the *status quo* also could result in more non-maritime activity and perhaps a shift over time from manufacturing to wholesale-distribution.

Policies and investments made by the public sector likely will affect the character of private investment, whether in transition toward an alternative set of economic activities or to revitalization of existing industries. Futures that diverge from the status quo most often mentioned by interview and focus group participants have involved discussion of industrial revitalization and/or transition:

- Efforts made to strengthen Portland's distinctive maritime niches, reposition harbor area manufacturing, reinvest in multi-modal transportation, maintain the harbor industrial sanctuary, and dramatically streamline current regulatory including greenway requirements could help to facilitate a *revitalization* of the harbor's traditional industries.
- *Transitioning* toward (or incorporating) a different set of industries/activities, while perhaps consistent with recent public policy and national market trends, would represent more of a departure from the status quo for Portland's harbor industrial area.

Concluding Observations. In conclusion, five overall observations are suggested from this preliminary review of public policy questions:

1. The future of Portland's harbor industrial area is less certain today than in even the recent past – due to the confluence of changing global market conditions and public policy.

2. What happens in the harbor area is of profound importance to the economic vitality of Portland and the entire metro area.

3. The future that happens can and will be strongly influenced by local public policy and investment decisions yet to be made.

4. An appropriate starting point for multi-agency public planning is to determine the maritime future of the Willamette River (below the Steel Bridge) and the Columbia River, followed by evaluation of Portland's realistic and desired future for traditional industries including transportation equipment and metals manufacturing.

5. The public policy course selected has the best opportunity for successful realization with active public/private sector collaboration.

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I. INTRODUCTION

As Part Two of the Portland Harbor Industrial Lands Study (PHILS), E.D Hovee & Company together with Parsons Brinckerhoff and The JD White Company, Inc. has conducted an assessment of the changing economic dynamics of the Portland harbor industrial area. This Part Two study has been prepared on behalf of City of Portland Bureau of Planning in partnership with the Portland Development Commission and Port of Portland.

A. BACKGROUND

The history of Portland is inextricably linked to commerce on the Columbia and Willamette Waterways. The City's first industrial activities were oriented to the river, the docks, stevedoring, warehousing, distribution and manufacturing activities.

As with other American waterfront cities, Portland's relationship to its riverfront has changed over the last three decades:

Economic Drivers:

- A primary driver for marine industrial land development has been the continued expansion of foreign trade. Historically, waterborne trade through the Columbia River has increased by about 3% annually. On average, over 200 acres of new industrial land have been needed each decade to keep pace with the volume of trade at the Port of Portland alone, even after redevelopment and joint venture strategies are considered.
- In recent years, interest in the marine industrial activities of the Portland Harbor area have increased markedly with expanded port traffic, a changed economic outlook, shrinking land supplies, neighborhood impact concerns, public interest in waterfront access, and issues associated with environmental quality of the Willamette River.

Marine Industrial Trends:

- Marine terminal and industrial land backup needs associated with maritime shipping have increased – placing more emphasis on larger Willamette River sites closer to the confluence with the Columbia and on Columbia River frontage.
- Some formerly marine dependent properties (e.g. Terminal One, McCormick Baxter) are now vacant and/or lightly used while other local industries (e.g. grain elevators, aggregate operations, shipyard repair) continue to rely on significant levels of Willamette water-borne commerce.
- Local industries today are relying on an increased array of transportation modes in addition to maritime shipping – including rail, truck, air, ecommerce and/or some combination of the above. Less clear have been the linkages between and the shifting reliance on these various modes of freight transport.
- Within the Pacific Northwest, the focus of regional distribution also has shifted in recent years from Portland to the Seattle-Tacoma metro area. This shift has occurred despite tax and location advantages for the Portland region – due to issues related to multi-modal transportation, the structure of related economic base activity, and suitable site availability.

Emerging Issues:

- West coast ports are dominated by a few activity centers. Portland's ability to compete with the major players is limited by the Columbia River channel's 40 foot depth, which severely constrains container shipping – as the container industry transitions to deeper draft vessels.
- The designation of Portland harbor as a Federal Superfund site, the channel deepening project, Port expansion in North Portland, and proposed future Port development of West Hayden Island for marine industrial use have captured the attention of the City, business community, neighborhood and citizen interests.
- Increased scarcity of metro area industrial sites is beginning to place a greater premium on maintenance and recycling of existing properties for continued if not more intense industrial use.
- Pending the outcome of these emerging issues, the future of some harbor-oriented industries has been called into question. Cost and uncertainty associated with issues such as Superfund and brownfield sites make the financial feasibility of continued use for industrial activity more tenuous. There is increasing discussion of re-focusing non-strategic river front sites for other forms of reuse ranging from open space to mixed-use development.

Cooperative Planning:

- The ongoing revitalization of Portland's Central City has brought new interest in reuse and redevelopment of selected waterfront sites for uses not related to maritime industry or transportation – for residential, lodging, retail, office, recreation and mixed-use development.
- The City has initiated the River Plan program to coalesce and focus harbor-related planning efforts into more of a common vision. The City and the Port are cooperating in this effort, with broader business and community representation through the River Economic Advisory Group.

B. PHILS PURPOSE

The Portland Harbor Industrial Lands Study (PHILS) is set within the context of these changing economic drivers, marine industrial trends, and emerging issues. This Part Two research project is intended to assess the future land needs of industries in the Portland Harbor area, focusing on river-dependent, freight-related, and other concentrated industries in this area.

The study has been prepared for the City of Portland Bureau of Planning, Portland Development Commission, and Port of Portland. The purpose of the study is to inform the City of the economic implications of potential revisions to land use policies in the Portland Harbor industrial areas, including a preliminary assessment of which lands should be reserved for river-dependent and river-related industry.

Related Strategic Planning. The study will inform the Portland Development Commission's work on industrial development strategies, supporting the update underway of Portland's

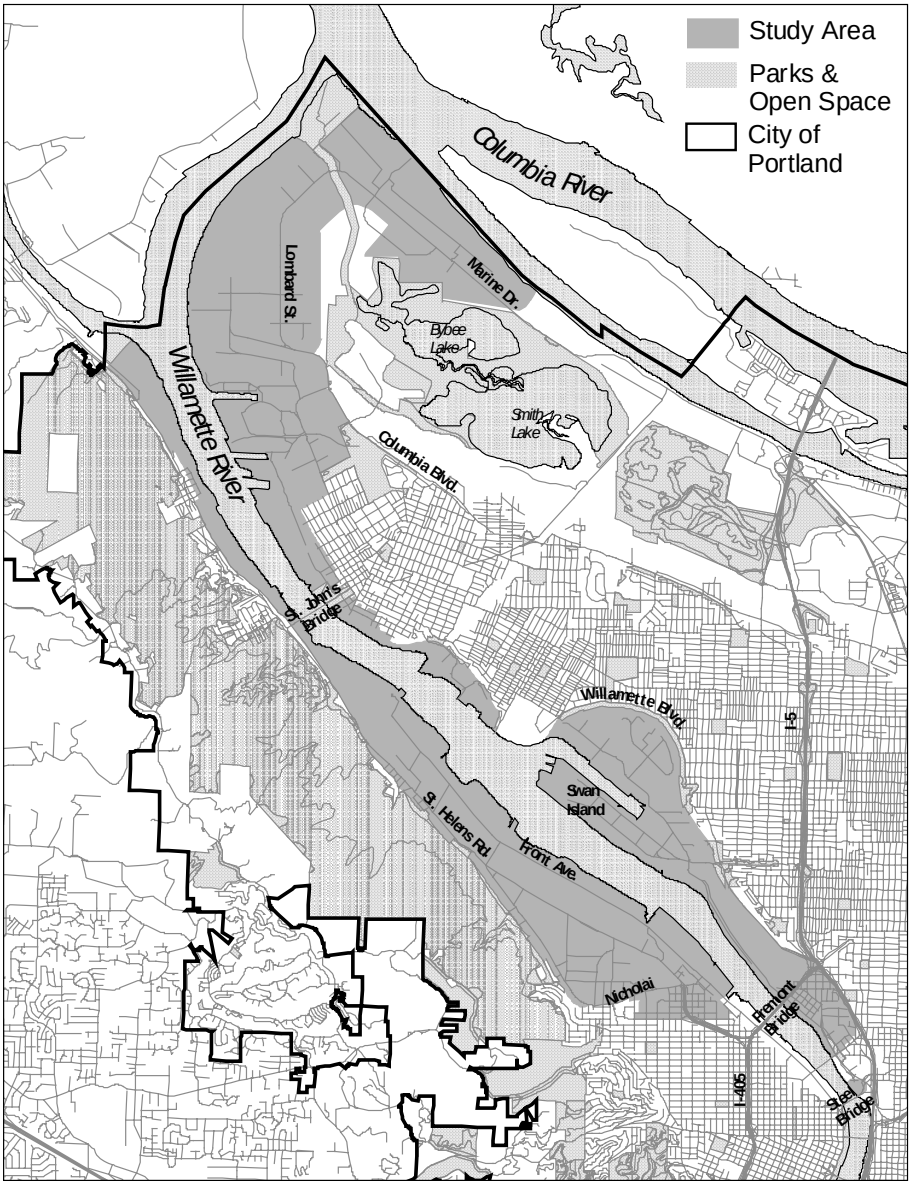
Economic Development Strategy. The PHILS study also will assist the Port of Portland by informing strategic decisions on land use, development, and planning for marine facilities.

A number of other related planning efforts will also benefit from the information collected from this PHILS research. This research is intended to inform the Portland Harbor Superfund Site project, as background research for harbor land use planning. PHILS will shed light on the land use and economic implications of major regional freight infrastructure projects under consideration, including maintenance dredging, channel deepening, and I-5 improvements.

PHILS Phasing. The PHILS study comprises two phases that have been conducted concurrently:

- *Part One*, prepared by Bureau of Planning staff, involves a contextual summary of industry patterns and trends in the study area – based on published information and data.
- *Part Two,* the consultant team's work, represents an in-depth analysis of why firms and industries are in the study area and what presence they may have in the harbor area of the future.

Study Area. The PHILS study area consists generally of the industrially zoned districts situated along Portland's Harbor – including the Guild's Lake, Linnton, Lower Albina, Swan Island, St. Johns, and Rivergate industrial areas.



Source: E.D. Hovee & Company.

This study area encompasses a total of 5,532 acres – including 3,133 acres of riverfront and 2,398 acres of upland property. The principal use of developed property in the study area has been and continues to be industrial – with most of the area designated by the City of Portland as *industrial sanctuary.*

Planning Challenge. The combination of the trends noted places new challenges before business and property owners throughout the Portland Harbor area. Changing industry dynamics and public planning issues pose new challenges and opportunities for policy makers as well.

Pivotal to the discussion at hand has been the question of whether Portland should adapt to current industry trends or plan for the contingencies of a longer 50-100 year time horizon. Also

important is the need to determine sites that should be reserved short- or long-term for maritime commerce versus those that might appropriately transition to other uses.

Approach to Analysis. The E.D. Hovee project team has viewed its consultant responsibility as essentially two-fold:

- In depth, *on-the-ground* assessment of issues and opportunities faced by a cross-section of industry leaders whose decisions will shape or reshape the future of Portland's waterfront.
- *Integrating* results of interviews with city provided Part 1 inventory, characterization and trend analysis.

The aim was to conduct the interview research and analysis thoroughly and in concert with the City's Part 1 analysis. Results are intended to be presented in a manner that is concise, clear and useful for affected industries, policy makers and the broader Portland community.

C. APPROACH TO PART TWO

Key elements of the Part Two PHILS research have involved interviews, focus groups and resulting analysis.

Interviews. This Part Two PHILS research is driven by an intensive interview process. The consultant team has conducted 80 interviews with business leaders from companies located within the Portland harbor industrial area. Questions were organized around eight topics:

- Historical background of firm or organization
- Current harbor-related marine, industrial or other activities
- Current location attributes
- Inter-industry linkages (vendor and customer) both locally and internationally
- Sources of competition in Portland, regionally and globally
- Industry changes and emerging trends (market, technology, transportation, distribution)
- Challenges, opportunities and plans (for the firm or organization)
- Concluding comments and suggestions

Focus Groups. Subsequent to conducting a majority of the business interviews, the consultant team facilitated two more in-depth focus groups: one with interested business leaders and another with the River Economic Advisory Group. The purposes for meeting with the focus groups were to ascertain the degree to which the results of the work completed to date was accurate, to identify issues affecting harbor businesses, and to outline policy considerations for maintaining the study area as an economically viable segment of the Portland economy.

Analysis. This Part Two study concludes by addressing the following:

- **Industry dynamics** – portrayed in two ways: a) using the firm mapping technique identified by the City in 2-3 different illustrative types of firms or organizations; and b)

applying the results of the database to an input-output economic model to assess the economic impacts of harbor industrial lands on the Portland metro area generally, and on key industry sectors (e.g. wholesale trade, manufacturing) more specifically.[i]

- **Land use implications** – involving preliminary estimates of expanding versus declining harbor industry sectors – together with associated building space and land acreage requirements. More detailed cross-tabs are used to characterize demand anticipated for riverfront properties by river segment, and for upland properties. Assessments include a description of land and location attributes critical to realization of demand projections.
- **Land use sensitivity** – discussion is focused on factors pivotal to affecting harbor area industrial activity. These factors include net useable acreage, cost of development/business occupancy and availability of viable alternative sites in and outside the Portland metro area.
- **Industrial site quality** – assessed via identification of threshold criteria and other factors that may constrain a site's suitability for industrial use – distinguishing properties for which on-going use is relatively certain versus sites for which reuse is less certain and focused on sites directly accessible to the Willamette or Columbia Rivers.
- **Policy questions** – characterized in terms of importance for riverfront and upland sites. Rather than framing these policy issues solely in either/or terms, policy implications of 2-3 attainable alternative Portland Harbor industrial scenarios are also considered – covering an approximately 20-year time horizon.

D. ORGANIZATION

The remainder of this study is organized around the following topics:

Part 1 PHILS Summary
Industry Interview Results
Harbor Industry Analysis
Policy Questions

Three appendices are provided with this Part Two PHILS report. *Appendix A* provides a copy of the industry interview questionnaire. *Appendix B* details results of the focus group discussion. *Appendix C* includes a site specific review of the riverfront constraints/use suitability analysis.

II. PART 1 PHILS SUMMARY

The City of Portland Bureau of Planning has conducted Part 1 of the Portland Harbor Industrial Land Study (PHILS). The Part 1 report reviews employment and land use trends over the last 20 years from within the Portland metropolitan area and focuses on an inventory of employment sectors and land uses specifically in the Portland Harbor area.

The Part 1 analysis has been instrumental to both inform and shape this Part Two research and interview report. A summary of results and implications from the Part 1 study is presented in this section.

A. EMPLOYMENT TRENDS

The Bureau of Planning performed a macro level analysis of the employment and land use trends within the region and Multnomah County. That analysis provides insight into the underlying changes occurring within Portland's economic base and where those changes are occurring.

Employment information covers regional trends, Multnomah County maritime employment and employment forecasts.

Regional Trends. The mix of industries and their location in the Portland metropolitan area has changed markedly over the last two decades. Manufacturing employment in the region experienced relatively modest average annual growth of 1.1%. However, the region's share of national manufacturing employment increased from 0.53% to 0.70%, as manufacturing growth has been slower elsewhere in the U.S. In effect, Portland's share of the nation's manufacturing base is increasing even as manufacturing represents a smaller component of the nation's total employment base.

Electronic manufacturing, construction trades, air transportation, and wholesale trade constitute the region's top job growth industries. The electronic manufacturing and construction trade sectors lead all industries with 20,140 and 21,920 added jobs between 1980 and 2000, respectively. Wholesale Trade added 18,520 jobs and air transportation with an additional 9,040 jobs.

The printing and publishing (+4,820), rubber and plastics (+3,100), and transportation equipment (+2,920) industries also added industrial jobs; however, job growth in these sectors has been more than offset by losses within lumber (-2,900), paper (-1,960), apparel and textiles (-920), and instruments (-10,630). Job losses in the apparel and textile sectors coincide with national trends, while lumber, paper, and instruments reflects a declining regional share of national employment – signaling a potential change in the region's national competitiveness for those sectors.

Multnomah County. Multnomah County is the Portland region's primary location of industrial jobs. However, its share of the region's industrial job base has fallen from 59% (1980) to 48% (2000), as it captured only 17% of the region's industrial job growth over the last two decades. Multnomah County's shrinking competitive share is due to:

- Multnomah County (including the City of Portland) being generally more built out than its more suburban neighbors.
- The particular mix of expanding and contracting industries in Multnomah County relative to the region. For example, the fastest-growing industry (electronics manufacturing) is concentrated in Washington County, while more of the slower growing and declining industries are concentrated in Multnomah County.
- Some industries experienced substantial employment cutbacks in Multnomah County, but expanded elsewhere in the region. Examples are durable goods wholesale, communication, industrial machinery, and fabricated metal products.

Maritime Employment. U.S. maritime employment has declined over the last two decades, as U.S. maritime operations have become less labor intensive and offshore competition has grown:

- Between 1980 and 1999, U.S. waterborne cargo tonnage increased by 0.9% per year even as related employment declined by 1.8% per year. In 2000, marine cargo handling employment accounted for 80% of all water transportation employment within the Portland Harbor study area.
- Between 1980 and 1999, the U.S. lost half of its shipbuilding and repair jobs, as less expensive offshore competitors (such as Korea) increased their market presence in U.S. for non-defense related shipbuilding and repair.

Employment Forecasts. According to Metro and Oregon Office of Economic Analysis, industrial job growth in the Portland metropolitan area is predicted to substantially outpace the national average, increasing the region's national competitiveness for industrial jobs. Employment is expected to get back *on track* with its historical growth trajectory as the recession ends, though the recovery in Oregon likely will lag the nation.

Wholesale trade, transportation, and electronics are expected to continue to lead the region in job growth. The region's shifting mix of manufacturing industries is projected to continue. Three out of four new manufacturing jobs are forecast to occur within the electronics sector. However, job reductions within food products, apparel and textiles, lumber, and paper industries are projected to persist over the next 30 years.

Based on the Metro forecast and the current mix of harbor area industries, transportation and wholesale trade could be expected to continue as leading job-growth sectors in the harbor area. Employment in metals and equipment industries will be mixed but potentially stable, with anticipated gains for industrial machinery exceeding modest reductions in transportation equipment and metals.

The harbor area may also capture a portion of the region's growth in other sectors such as electronics, printing and publishing, other durable goods (e.g. furniture and fixtures, concrete products), and other nondurable goods (e.g. rubber and plastics, chemicals, and petroleum products).[ii]

B. LAND USE TRENDS

Many U.S. cities have lost much of their central city industrial land to other uses as development pressure has led to conversion of industrial land to residential and commercial uses that command higher market land values. To date, this has not occurred extensively within the city of Portland as most of the city's industrial land is protected by the City's industrial sanctuary policy (*Comprehensive Plan* Policy 2.14), limiting the encroachment of non-industrial uses.

Citywide Changes. The city of Portland has 18,800 acres of industrially zoned land, approximately 11% is vacant. Over the last decade, the City has allowed only a limited amount of industrial land (2.5%) to convert to other uses. The majority of these conversions have been focused within four specific areas: a) 181st/Airport Way, b) Lents, c) Central Eastside, and d) River District. These latter two districts are located within Portland's Central City area.

Harbor Area Changes. According to a 1997 Port of Portland Industrial Land Study, approximately 3,730 acres (excluding West Hayden Island) of land is located along the Portland Harbor – 2,790 acres are in industrial use. Approximately 39% of the industrial land was in *marine cargo* uses, directly dependent on access to the Willamette and Columbia River system.

Between 1960 and 1997, the proportion of land in industrial or marine use has been relatively stable or growing in most of the harbor area except for:

- **River District –** the proportion of riverfront area in marine-related industrial use dropped from 65% in 1960 to none in 1997. This is largely due to the creation of the River District urban renewal area and termination of marine cargo activities at the Port of Portland's Terminal 1 facility.
- **North Beach Areas –** have transitioned from being primarily marine-related to public use or vacant. Much of the area south of the Railroad Bridge on the east bank of the Willamette is vacant due to marginal truck access and superfund cleanup liability. The area north of the Railroad Bridge, adjacent to St. John's Town Center, has converted to public use (e.g. Metro's Willamette Cove greenspace and the city of Portland's Water Pollution Control Laboratory).

According the 1997 study, only 7% (or 260 acres) of the land located long the Portland Harbor was vacant (defined as either undeveloped or unleased), down from 32% in 1990. However, vacancies have increased since 1997, reflecting the current economic recession and effects of the 1999 Portland Harbor Superfund Project.

Between 1990 and 1997, 160 acres were developed for industrial uses. All but 14 acres were for marine-related uses. Marine cargo developments included the Portland Bulk Terminal at T-5, the chassis yard and intermodal yard expansion at T-6, and the Ash Grove plant at Albina Rail Yard.

C. FREIGHT DISTRIBUTION

The movement of goods through the Portland Harbor area also has changed over the last four decades, reflective of changing market conditions and transportation technology. The Bureau of Planning has reviewed several studies to obtain a basic understanding of what changes have occurred and trends are forecasted over the next 30 years.

Marine Cargo. Cargo tonnage has generally increased over the last 40 years, with the 1970s being the peak period of growth. Between 1960 and 2000, marine cargo tonnage increased at an annual rate of 2.3%, primarily driven by growth in exports. Columbia River barge cargo increased at a similar rate (2.1% per year). However, cargo growth has been restricted to vessels with drafts greater than 18 feet, as outbound trips for vessels with less than 18 foot drafts have declined across all cargo types.

Portland has been capturing an increased share of marine cargo on the West Coast, with the exception of containers. Portland handles 21% of the West Coast's dry bulk goods, 19% of the automobiles, and 6% of breakbulks. However, Portland handles less than 2% of all West Coast container traffic, as Southern California is the dominate market. *Note:* Portland represents a niche container market driven by agriculture and forest product exports.

Over the next 30 years, DRI-WEFA is projecting an increase across all cargo types except liquid bulk. Increases in liquid fertilizers and chemicals are expected to be offset by declines in refined petroleum products. Declines in refined petroleum marine shipment are expected to occur with a transition back toward pipeline shipments.

Mode Split of Marine Cargo. Rail is the primary mode of transportation for *ocean bound* cargo, handling 51% of all tonnage. Another 26% is barged and 22% is trucked. Shipments are expected to increase across all modes of transportation; however, the proportion moving by barge is projected to decrease.

Trucking is the preferred method of transporting *non-ocean* freight, followed by rail and ships. Non-ocean tonnage is also projected to increase. However, the proportion trucked will decline as rail and ships capture an increased share of tonnage.

Rail Freight. Rail tonnage has increased by 1.8% per year over the last ten years. Preliminary forecasts being prepared as part of the I-5 Trade Corridor study anticipate rail tonnage to increase at an even greater 3.0%-3.5% annualized rate over the next ten years. Significant increases are expected for auto, grain, and bulk unit trains. This growth may place significant strains on regional rail capacity as the Pacific Northwest is recognized as having some of the most congested rail corridors in the nation – for both east-west and north-south freight movements.

Truck Traffic. Traffic volumes on the busier "truck streets" in the harbor area generally increased during the 1990s. The primary reason was development of vacant land in the Rivergate area. Swan Island's Going Street and Guild's Lake area's Yeon Avenue are the two highest volume streets in the harbor industrial area.

A 1999 *Commodity Flow Analysis* found that lumber, wood products and furniture accounted for 56% of regional truck freight. Food products accounted for another 18% and aggregate-related products represented 9%. All are products that are relatively heavy and bulky in relation to product value.

D. BUSINESS INVENTORIES

The Bureau of Planning also has conducted a more detailed analysis of the harbor area to garner an understanding of the current economic inter-dynamics and competing land needs of industries within the study area.

Approximately 940 private sector businesses are located within the Portland Harbor area, employing nearly 39,200 workers or one in eleven jobs in Multnomah County. Half of the study area's workers are employed by manufacturers, with another one-third in distribution (transportation and wholesale sectors).

Concentrated Industries. The harbor area has been in industrial use for nearly a century. Both its age and continuing competitive advantage as an industrial area has led to the diverse mix of businesses currently in operation. However, the harbor area has specific industry concentrations in transportation equipment, primary metals, petroleum products, and water transportation.

Over three-quarters of private sector manufacturing workers are employed in metals and equipment manufacturing; most work for primary metals and transportation equipment firms. Due to established supplier, subcontractor, and customer linkages, these industries have become highly interdependent upon one another.

Distribution industries (transportation and wholesale trade) employs 31% of study area workers. Water transportation is the most concentrated sector of the distribution industries, due to the proximity of deep water access. Wholesaling of alcoholic beverages, metals, petroleum products, chemicals, and furniture is also well represented.

River-Dependent Industries. Portland's Harbor is Oregon's freight transportation hub, connecting the seaport with regional barge routes, interstate highways, and transcontinental railroads. There is no similar place in Oregon with this confluence of significant intermodal transportation facilities – nor is there any expectation of development of a similar transportation hub elsewhere in the state for the foreseeable future.

Much of the harbor riverfront is lined with river-dependent industrial uses, which is a result of City policy reserving those properties for only river-related and river-dependent activities. River-dependent activities within the Portland harbor industrial area can be grouped into three categories:

- **Marine Cargo Terminals –** loading and unloading of commodities for trans-shipment or storage on land for eventual distribution.
- **Marine- or Vessel-Related Services –** includes barging, dredging, and cargo handling services, as well as naval and coast guard services.
- **Marine-Dependent Manufacturers –** including fabricators that rely upon marine facilities for transport of raw and finished products.

A 2001 study conducted for the Port of Portland estimated that almost 7,200 jobs depend on cargo moving through private and public port facilities.

E. PLANNING FOR INDUSTRY

Freight-related firms including transportation and wholesale activities that depend on the Harbor's multimodal transportation network for conducting business and infrastructure span the entire length of the harbor and the width of the adjacent industrial districts. Marine cargo terminals and other river-dependent industries extend from the grain terminals and concrete industries in Lower Albina to the container and auto facilities at Terminal 6. Rail lines run the length of both sides of the harbor with Albina and Lake rail yards situated within a few hundred feet of the river.

The "lower harbor" area of Rivergate is well situated to receive a significant portion of Portland's maritime industrial growth, with competitive advantages of large sites, vacant land, convenient rail access, and few superfund sites. However, the freight distribution complex is not yet necessarily moving northward. Transportation and wholesale firms remain densely concentrated in the "upper harbor" area (Guild's Lake, Swan Island, and Lower Albina). The investment represented by this existing transportation and distribution *infrastructure* could be expensive and logistically challenging to duplicate elsewhere – even with eventual relocation to the nearby Rivergate area.

Concentrated Industries. Within the distribution industries, petroleum and automobile terminals are tightly clustered around Port terminal facilities. The west side of the river in Linnton and Guild's Lake areas serves as Oregon's petroleum distribution hub receiving product via tankers and Olympic pipeline. Automobile terminals are situated in Rivergate and St. John's, where trains unloading Ford, GM, and Honda vehicles from the Midwest load vehicles from Asia (i.e. Honda, Hyundai, and Subaru) bound for inland U.S.

Major employers requiring large sites encompass most of the transportation equipment and primary metal industries. Many of these companies have riverfront facilities due to their historic dependence on the river for transporting products. There also are a number of smaller metals and equipment firms that are concentrated in the southern Guild's Lake and Lower Albina areas. Southern Guild's Lake and Lower Albina is also home to printing, publishing, and paper industries.

Land Area. Industrial sites within the Portland Harbor area vary widely in size. The *median* (50% being below or greater) property size is 2.2 acres. However, the large industrial sites within the study area bring *average* site size up to 8 acres. Utilities, primary metals, manufacturing, and water transportation uses tend to occupy sites that average 20 acres or greater.

Average employment density is 8.1 jobs per acre. Manufacturing has the highest employment density at 12.4 workers per acre; and utilities have the lowest job density at 0.5 employees per acre.

Vacant Lands. The Portland Harbor area comprises over 5,532 acres of industrial land – or nearly one-third of the City's industrial base. As of July 2000, 543 acres (or 10%) were undeveloped, vacant Tier A/B lands. Over one-half of the vacant land is located in Rivergate. Only 33 acres are free of constraints (Tier A), as over 90% of the vacant land is constrained by

landbanking, corporate ownership, access, unstable slopes, or taxlots smaller than 2 acres. The Port of Portland is the largest owner of these lands.

Recent industry contractions indicate that harbor area land and buildings available for lease may be increasing. Atrofina (59 acres), Time Oil (20 acres), and Alcatel (15 acres) have all either vacated sites or ceased operations. Considerations such as environmental contamination and associated regulations may hinder reinvestment in these sites. Vestas' interest in a 113 acre Rivergate site represents a potential reduction to the area's inventory of land available for lease. The Vestas project also illustrates the relatively *lumpy* and somewhat unpredictable nature of harbor area investment opportunity coming from outside the Portland metro area.

F. SUMMARY IMPLICATIONS OF PART ONE RESEARCH

The Portland metro area represents a growing share of the U.S. economy and industrial base. Over the last 20 years, the region has captured an increasing share of the nation's manufacturing employment. And marine facilities have captured an increased share of West Coast tonnage.

However, the region's ability to maintain or improve its competitiveness will depend part-in-parcel on how it addresses environmental issues, maintaining an adequate supply of industrial land (including large sites), continuing to make freight mobility improvements, and creating a positive business environment.

Industrial Base. Multnomah County, more specifically the City of Portland, will have to address these same issues to minimize additional erosion of its industrial base. As the region has increased its competitiveness nationally, Multnomah County has been falling behind, as:

- Multnomah County is generally more built out than its suburban neighbors;
- The particular mix of industries in Multnomah County have been stagnate or declining; and
- Some industries experienced substantial employment cutbacks in Multnomah County, but expanded elsewhere in the region – which may signal a decline in the county's ability to compete competitively with the rest of the region.

The harbor area is located at the heart of Portland's industrial/economic base. One-third of the City's industrial land is located within the Portland Harbor area and area employers provide one in eleven jobs countywide. More important is the harbor's intrinsic link to the regional and statewide economy – and to a certain degree the Pacific Northwest – as a distribution hub due to deep water access and multi-modal transportation infrastructure. While the region has been competitive nationally for industrial development – including for traditional heavy industry – it is not clear whether these trends will continue to benefit the harbor area in the future. Addressing questions of future industry plans is a major focus of the Part Two PHILS research.

Marine Terminals. Marine facilities in Portland have been capturing an increasing share of west coast marine cargo activity, except containers. Marine cargo business is forecast to continue to increase across all cargo types except petroleum. Some forecasters expect pipeline activity to increase coinciding with a decrease in vessel reliance.[iii]

Marine activity requiring drafts greater than 18 feet is also expected to grow. However, smaller vessels with less than 18 foot drafts are anticipated to remain unchanged and may decline slightly.

Policy & Planning. Unlike most central city industrial areas throughout the U.S., the Portland Harbor area has experienced only minor loss of industrial land to other competing uses. The primary reason is the City's *industrial sanctuary* policy that is designed to protect against encroachment of incompatible uses. Whether or not to maintain the *industrial sanctuary* policy in its current form may be an issue to be addressed through this planning process.

Another issue that is being assessed is whether to maintain waterfront property for water-related/dependent activities. Between 1990 and 1997, 160 acres of industrial land was developed in the harbor area. All but 14 acres were marine-related. This has equated to an annual absorption of 21 acres per year for marine activities.

All of these issues are part of two larger, more central questions for Portland's harbor industrial area. Simply stated, those questions are: Will Portland's harbor area continue as the focus for the region's maritime and heavy manufacturing activities? Or, is the harbor area transitioning to a different and as yet undefined future?

To better address these questions, Part Two of the Portland Harbor Industrial Land Study (PHILS) draws from the perspectives of a cross-section of industries currently conducting business in the harbor area – both river dependent and upland firms. It is to the results of these in-depth interviews that this analysis now turns.

III. INDUSTRY INTERVIEWS

The focus of this Part Two PHILS research is to obtain a more in-depth understanding of the characteristics of industries operating in Portland's harbor industrial area. This purpose has been accomplished through a series of interviews with a cross-section of area industries. The interview process has obtained information regarding current characteristics and operational issues as well as perspectives about future prospects for continued operation and investment.

The consultant team interviewed a selected target group of 80 business leaders within the Portland harbor industrial study area. Information obtained from the interviews provides some insight into the public policy and economic issues affecting area industries.

This evaluation is intended to provide the framework for discussing issues and potential public sector policies. A summary of common themes is provided in this section. A copy of the survey questionnaire is provided in Appendix A.

A. APPROACH TO INTERVIEWS

Due to the length and potentially sensitive nature of the interview questionnaire, a structured process was used to select, contact, conduct and tabulate responses from the interviews. Key features of the interview process have included:

- Identification of firms constituting a representative cross-section of harbor area industries by business type and location – with focus on larger firms or industry leaders within each major sector.[iv]
- Mailing of a letter inviting participation in the interview process – with the letter jointly signed by chief executive officers of the City of Portland Bureau of Planning, Portland Development Commission and Port of Portland.
- Follow-up personal contact to schedule an interview appointment by a consultant team representative – typically with the questionnaire e-mailed or faxed to the participating company in advance of the interview.
- Conduct of the interview with the company CEO or other primary decision maker, with interviews occurring on the premises of the participating company whenever possible.
- Entry of results into a computer database – for tabulation of both quantitative and qualitative responses.
- Calculation of *all group* averages – as a weighted average of those responding to a particular question.
- Aggregation of results so that comments are not directly attributable to any individual respondent – to maintain the confidentiality of proprietary information and opinions.

It is noted that the interview process, while yielding useful information, required a level of effort beyond what is typically required for one-on-one business interviews. This appears to be the case for a variety of reasons including: length of the interview questionnaire, proprietary nature of much of the information requested, time constraints of respondents, concerns over how the

results might be used, lack of familiarity with the river planning process, and/or concerns in participating in a local government initiated study.[v]

Despite these constraints, interviews were completed with firms representing one-third of Portland Harbor area employment. This report now proceeds to report results – as tabulated and reported both in quantitative and qualitative terms in response to the questions asked.

B. INDUSTRY PROFILE

Industries in the Portland Harbor area are divided into two distinct groups: a) river-dependent, with direct marine terminal access (primarily for liquid and dry bulk goods including Port and proprietary users); and b) non-river dependent firms.

Non-river dependent categories include wholesale/distribution, manufacturing, and land-holding activities. Manufacturing and wholesale/distribution businesses generally do not use the river as a convenient means to move products internally between various company-owned facilities, nor do they receive/send products indirectly, through marine facilities located in Portland or outside the region.

Of the 80 businesses interviewed, 25 (or 31%) are considered river-dependent. Most firms interviewed are either related to manufacturing (33) or wholesale/distribution activities (20).

Figure 1. Interviews Completed by Industry Grouping

Industry Group	# Interviewed
River-Dependent	**25**
Wholesale/Distribution	**20**
Manufacturing	**33**
Land-Holding	**2**
All Groups	**80**

Notes: Land-holding comprises respondents that are not currently engaged in industrial activities but own key parcels within the Portland Harbor area.

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., as of October 2002.

The manufacturing grouping is represented by seven industry clusters that comprise chemicals, electronics, food-related, metals, printing/publishing, transportation manufacturing, and specialty manufacturing industries. Wholesale/Distribution includes distribution centers, distribution service providers, recycling, and wholesalers. River-dependent encompasses aggregate firms, marine terminals, and supporting marine services.[vi]

Figure 2. Industry Cluster by Major Grouping

Industry Group	Industry Cluster (# of Interviews)
River-Dependent (25)	**Aggregate (6)**
	Marine Terminal (15)
	Marine Service (4)
Wholesale/Distribution (20)	**Distribution Center (9)**
	Distribution Service (6)
	Recycling (2)
	Wholesaler (3)
Manufacturing (33)	**Chemicals (3)**
	Electronics (1)
	Food-Related (4)
	Metals (6)
	Printing/Publishing (2)
	Transportation Manufacturing (5)
	Specialty Manufacturing (12)

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002. Above listing excludes two interviews with land-holding entities.

The non-river-dependent businesses typically have located in Portland's harbor industrial areas for one of two reasons:

- Transportation advantages (rail but primarily truck access to Central City and region)
- Historic reasons no longer necessarily applicable

Interconnectedness of harbor area industrial uses has developed over time and represents a significant competitive advantage for firms that are suppliers to or customers of other harbor industries. Examples of industry clusters include maritime bulks, metals, graphic arts/printing, and distribution.

Loss of a single major firm (e.g. Freightliner) could, in some cases, jeopardize supporting businesses. More detailed examples of inter-industry linkages are provided in Section IV of this report.

C. ECONOMIC BASE

As background information, respondents provided information about site usage, employment, other plant locations, and gross business revenues.

Site Usage. Portland's harbor area industries exhibit a pattern of remarkable longevity – often with deep roots in the harbor area. On average, those interviewed have operated at their current location for 32 years. The newest firm of those interviewed located in the harbor area three years ago. The railroads and barging services have had harbor area operations for 100+ years.

Figure 3. Site Usage

Industry Group	Average Years at Location	Average Site Size (acres)	Average Building Square Footage	Average # of U.S. Locations
River-Dependent	**31**	**64**	**60,611**	**38**
Wholesale/Distribution	**26**	**39**	**200,145**	**36**
Manufacturing	**35**	**27**	**264,139**	**28**
Land Holding	**51**	**30**	**99,875**	**0**
All Groups	**32**	**43**	**185,310**	**33**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

Average site size is 43 acres, median size is 20 acres. Armstrong Manufacturing, a small tool and equipment manufacturer has operations on the smallest site at one acre. Ross Island Sand & Gravel Company has the largest site at 499 acres. Generally, larger land users are river-dependent firms.

The typical respondent has 185,310 square feet of building space on-site. Larger building footprints are associated with manufacturing – but with relatively smaller site requirements. The smallest building footprints – albeit the largest sites – are associated with river-dependent uses.

River-dependent firms are most likely to have other facilities elsewhere in the U.S. and wholesale/distribution firms are most likely to have other facilities globally.

Employment. The firms interviewed employ almost 13,000 workers, most being employed full-time. The manufacturing sector employs the largest number (70%) of workers. River-dependent employers provide another 16% of the jobs, followed by wholesale distribution at 14%.

Figure 4. Current Employment by Industry Group

Industry Group	Full-Time	Part-Time	Total
River-Dependent	**2,012**	**105**	**2,117**
Wholesale/Distribution	**1,542**	**260**	**1,802**
Manufacturing	**8,951**	**90**	**9,041**
Land-Holding	**4**	**2**	**6**
All Groups	**12,509**	**457**	**12,966**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

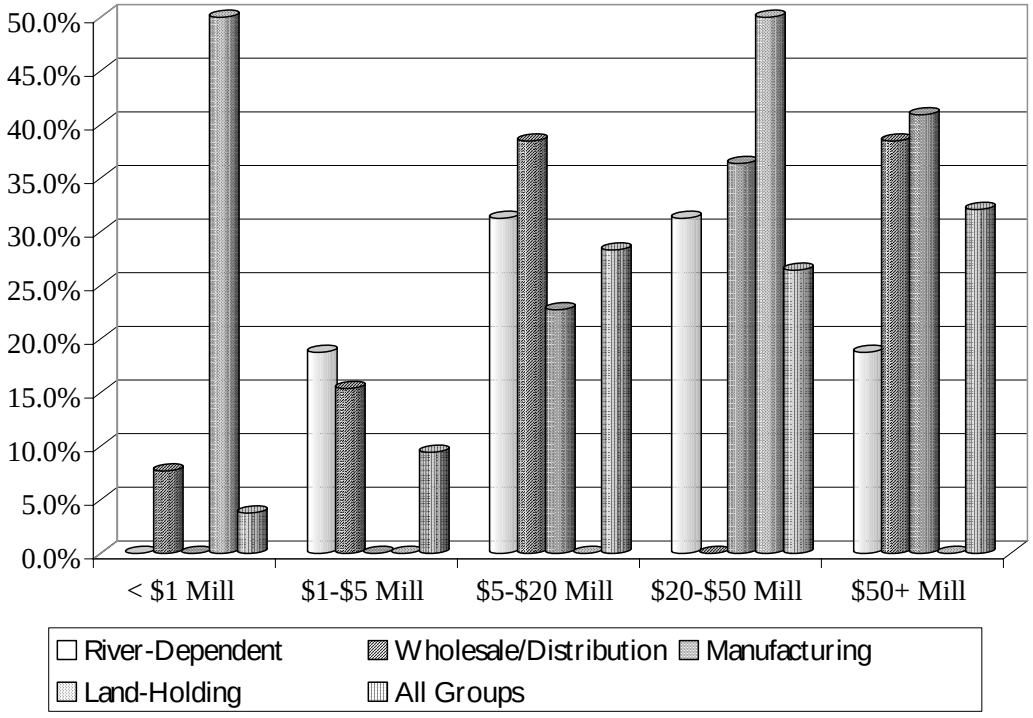
The more than 12,500 full-time employees for the firms interviewed represent 32% of the 39,200 jobs in Portland's harbor industrial area.

Gross Revenues. Nearly 60% of the firms interviewed produce over $20 million annually in gross revenues at their Portland Harbor sites – 26% at $20-$50 million and 32% at $50+ million. Another 28% generate between $5-$20 million each year. This finding is consistent with the survey sampling technique, emphasizing larger firms and industry leaders.

Manufacturers tend to generate higher revenues than the other industry groups. Over 75% of manufacturers surveyed report gross revenues of $20 million or more. In comparison, only 50% of river-dependent and 39% of wholesale/distribution firms have gross revenues greater than $20 million.

As a point of comparison, it is noted that the typical manufacturing firm in the City of Portland generates annual gross revenues of $15.6 million. On average wholesalers gross $7.5 million. Information is derived from the 1997 U.S. Economic Census as reported for the City of Portland. Gross business volume estimates are adjusted into 2002 dollars using the Portland-Vancouver consumer price index.

Figure 5. Annual Gross Business Revenues (in millions of $)



Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

In the last 3-5 years, revenues have increased for 32% of respondents, decreased for 24% and stayed the same for 21%. An additional 23% did not indicate a response. Revenues are more likely to have decreased for the manufacturing sector.

D. TRANSPORTATION & UTILITY INFRASTRUCTURE

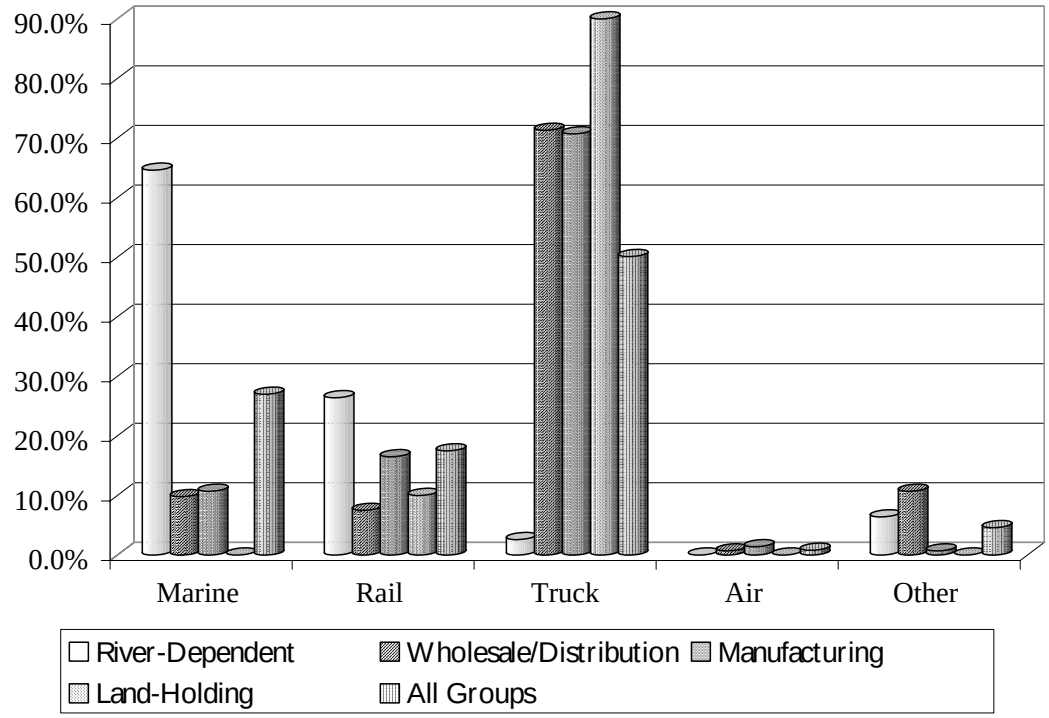
Inbound/outbound freight mobility data reported in this section represents unweighed average of responses by the firms interviewed. Data primarily represents frequency of mode use and should not be construed as referring to value or tonnage of shipments.

Inbound Freight. Products transported *into* the Portland harbor industrial area typically arrive by truck, with the exception of river-dependent operators, who typically rely more heavily on

marine facilities and rail. All industry groups utilize some combination of marine, rail, and truck services.

About 65% of in-bound shipments for river-dependent industries arrive by a marine-related transportation mode. For all other industry groupings, the level of marine transportation is considerably less, often below 10%. For harbor industries, air freight represents a relatively small proportion of in-bound shipments.

Figure 6. Long Haul Shipments into Harbor Area



Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

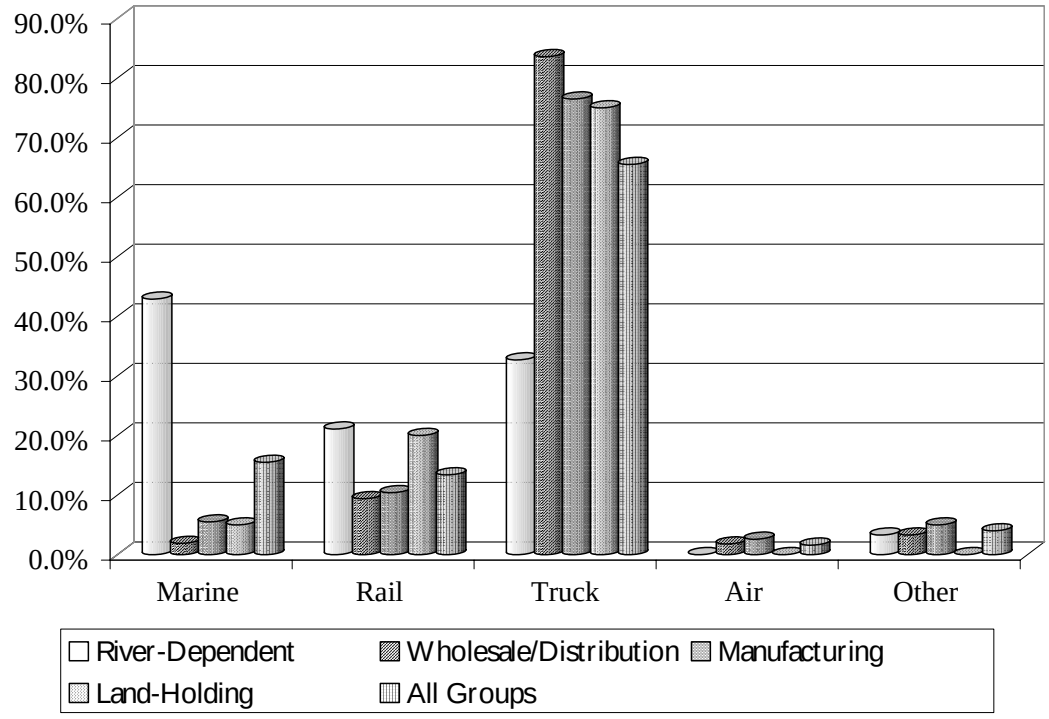
River-dependent transporters use truck for less than 5% of inbound freight, relying on marine shipments for about 65% and rail for about another 26%. All other industry groupings rely on truck shipment for the majority of their inbound freight activity.

Outbound Freight. Trucking is the preferred method for shipping products *out of* the harbor area. Rail and marine facilities are also used, but with less frequency than inbound shipments. The heavier reliance on trucking is due in large part to the local interindustry linkages between harbor firms and local/regional distribution centers.

No industry grouping relies on marine transportation as the primary source of outbound goods movement. This is true even of river-dependent uses, which (on average) use marine transportation for just over 40% of outbound freight movement. However, there are some portions of the river-dependent segment (notably grain elevators) for whom outbound marine transportation facilities are of paramount importance.

Of all industry groups, rail is of greatest importance for river-dependent uses (accounting for about 20% of outbound freight). As with inbound movements, air freight constitutes a relatively small proportion of outbound freight across all of the harbor area industry groupings.

Figure 7. Long Haul Shipments Out of Harbor Area



Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Marine Terminal Users. Of those making use of marine terminals, the following characteristics are noted.

Figure 8. Usage of Marine Terminals

Industry Group	On Site	In Harbor	Elsewhere	Berth Length (feet)*	Calls/ Year	Maximum Channel Depth Need
River-Dependent	**19**	**2**	**2**	**703**	**332**	**32**
Wholesale/Distribution	**1**	**7**	**1**	**–**	**–**	**–**
Manufacturing	**4**	**13**	**7**	**657**	**14**	**35**
Land Holding	**–**	**1**	**1**	**–**	**–**	**–**
All Groups	**24**	**23**	**11**	**692**	**268**	**33**

*Note: Data does not include docks located at Cascade General.

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

On the Willamette River south of the St. Johns Bridge, considerable diversity in required channel depth is noted – depending on the needs of different industry users. Key marine terminal

facilities include the Louis Dreyfus terminal (with a current minimum draft of 50 feet), the Swan Island Shipyard/Cascade General (40 foot draft on riverside, with drafts as shallow as 10 feet on channel side), Glacier Northwest (Albina site, which requires a 40 foot draft), Goldendale Aluminum Co. (38 foot draft), Shaver Transportation Company (requiring a 40 foot draft for servicing larger vessels), and possibly Terminal 2 break-bulk activities (30-40 foot depth). Barge activities (generally 15-20 foot draft) and liquid bulk (about 30 feet) require less in the way of maintained channel depth.

Materials or products shipped are indicated by the following representative listing.

Figure 9. Materials/Products Shipped Via Marine Terminals

Inbound	Outbound
River-Dependent:	River-Dependent:
Raw material e.g. grain, sand, gravel, limestone, petroleum products)	**Raw materials (e.g. grain, sand, gravel, soda ash, petroleum products)**
Finish goods (e.g. autos, ships, containers)	**Finished goods (e.g. autos, ships, containers)**
Wholesale/Distribution:	Wholesale/Distribution:
Apparel/footwear, paper, steel rail	**Frozen products, paper, baled pet plastic**
Manufacturing:	Manufacturing:
Raw materials (e.g. alumina ore, polysilicon, steel slabs & castings, coffee beans)	**Paint, pickles, beer, steel plate products, steel pipe, shingles, mattresses, electric motors, completed barges**
Finished goods (e.g. books, brass parts, glass shades, wheels, axles)	

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

The usage undertaken by marine terminal users today looks very different than it did 20 years ago. Most companies have either increased or decreased marine terminal usage in this time period.

A majority of firms indicate that use of marine terminals is expected to increase over the next 20 years. This increase is contingent upon several factors, most notably the influence of domestic and/or foreign market growth and modernization of facilities and/or equipment.

Transportation Issues. Fifty-eight percent of the respondents indicated issues or concerns with access to or quality of services for marine terminal, rail, trucking and/or air services. Issues listed include:

- Congestion and truck access
- Quality of rail service
- Infrastructure development and maintenance of both rail and roads
- Cost of transportation and labor
- Consolidation of transportation companies

Even river-dependent firms use marine transportation for less than 50% of outbound shipments. As with inbound activity, rail generally accounts for less than 20% of outbound freight activity. Use of air freight is relatively minor.

Utilities: Businesses interviewed typically use a wide range of utilities for their operations. There is no variation between industry clusters.

Future usage does vary by service and industry cluster.

- *Water* – nearly two-thirds of those responding indicated no change over the next 3-5 years. However, 38% of manufacturers report that they anticipate their water usage to increase. No major issues were noted regarding quality or quantity of service.
- *Sewer* – again, nearly two-thirds do not expect their sewer usage to change, but 36% of manufacturers' project an increase. As with water, no major issues were noted regarding existing service.
- *Electric* – fifty percent of respondents do not expect their electric usage to change, while the other 50% anticipate a growing need – two-thirds of those projecting increases are manufacturers.

  Two major issues were noted by respondents: power outages and costs. Comments made about power outages related to supply shortages experienced during 2001 and the business costs associated with downtime/restart-up of heavy machinery. Rising energy costs are of particular concern to manufacturers and certain marine terminal users as escalating costs affect their ability to deliver goods and services at a competitive price. In particular, metals firms and transportation equipment manufacturers have been especially hard hit as they struggle to maintain global competitiveness with lower cost Pacific Rim producers. A prime example is the demise of the aluminum industry with aluminum supplies now arriving from offshore producers.
- *Natural Gas* – fifty percent of firms indicated no change while the other 50% project increases – manufacturers account for three-quarters of all increases. No major concerns were noted.
- *Telecommunications* – over fifty percent of respondents expect their telecommunications usage to increase, with manufacturers leading the way. Several respondents mentioned issues with both quality and availability of telecommunication services. The primary issues surrounding availability is attributable to lack of high speed data/internal service. Quality of service relates to frustrations with customer service. Specific problems cited included line static and occasional outages. Some firms have employed cell phones as a back up means to minimizing business interruptions due to harbor area phone outages.

In general, a number of firms commented about the increasing cost of utilities. A few noted that utilities now represent over 10% of business operating costs. Firms are especially sensitive to rising utility costs, or other business expense, during the current economic recession as managers attempt to maintain or reduce operations expense.

E. LOCATION ATTRIBUTES

Business leaders were asked to identify both advantages and disadvantages of being located within the Portland harbor industrial area. A number of common themes emerge from interviews conducted to date.

Advantages. The question posed to those interviewed was: *Currently, what are the primary advantages for operating at this location?* Representatives identified seven common advantages to being located within the Portland harbor industrial area.

Access to a solid, intermodal transportation infrastructure is generally viewed as the greatest advantage across all industry groups. Frequently listed transportation advantages are "proximity to freeways" and the importance of the "convergence of all transportation modes." Close proximity to customers and vendors, followed by proximity to river, access to a skilled labor force, and low cost availability of land and building space also were frequently mentioned.

Industrial sanctuary designation appears to be a locational advantage primarily to manufacturers, but this should not be construed unimportant to other industry groups. A significant number of all respondents indicated a preference for reserving riverfront properties for maritime/industrial activities and a reservation about allowing industrial sites to convert to non-industrial uses.

Figure 10. Portland Harbor Area Location Advantages

Location Advantage	River Depend	Whsl Dist	Mfg	Misc	Total
Transportation infrastructure	**13**	**11**	**11**	**1**	**35**
Close proximity to customers/vendors	**5**	**6**	**10**	**1**	**21**
Central location to skilled workforce	**2**	**2**	**6**	**-**	**10**
Land/space availability/low cost	**2**	**4**	**2**	**-**	**8**
Proximity to river	**12**	**1**	**1**	**-**	**14**
Established industrial area	**-**	**-**	**4**	**-**	**4**
Unique property characteristics	**2**	**-**	**3**	**1**	**5**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Disadvantages. Unlike the location advantages, no clear cut indications emerge as to locational disadvantages within the Portland harbor industrial area. However, there are a number of issues that were mentioned with some frequency:

- Traffic congestion/constrained transportation network
- Proximity of residential areas
- General costliness of conducting business in Portland
- Not central to major consumer markets
- High labor costs
- Expensive real estate
- Limited channel depth/lack of container handlers

- Perceived lack of public transit
- Poorly configured marine terminals
- Bad connection to freeways/I-5
- Lack of city support
- Stringent environmental regulations
- Lack of dining
- Proximity to river
- Lack of room for expansion

The concerns with traffic congestion included many of Portland's main freeways such as I-5, I-405, Highway 26 and Highway 217. The main issues with freeway congestion are the interference of the timely transportation of freight and employee commute times.

Concerns also were voiced regarding the effectiveness of rail service. There is a desire for "longer unit trains," an increase in the number of switches per day, and "reciprocity" between BNSF and UP.

While no individual disadvantage was highly represented, a *common overall theme* throughout many of the interviews appears to be that Portland is now perceived as a difficult place to conduct business for several factors:

- High cost of doing business (both regulatory and market)
- Perceived anti-business sentiment
- Small economy/consumer market of Portland metro area
- Not central to major U.S. markets

A recurring comment throughout the interview process is the perception of Portland as "business unfriendly," especially from firms that have been *rooted* in the harbor area for decades. This perception stems from concerns regarding the cost of doing business and the feeling of being unwanted. Several firms stated that the combination of taxes, utilities, and environmental compliance costs are out of line with other metro areas, most notably in the south and east coast, such as North Carolina. For many firms, the competition is now more with urban or rural communities across the U.S., as well as offshore.

As one respondent surmised, "If the city wants to recruit and maintain industries to Portland they need to develop incentives (lower cost of taxes and utilities) as well as facilitate a streamlined permitting process." Another firm commented that "it costs $50 to correct a $15 problem."

Managers or owners of long-time local companies comment on public efforts to court new businesses, but view nothing comparable as being done directly for existing firms. The multiple layers of federal, state, and local government regulations make it difficult or costly to address issues such as environmental cleanup before a major problem occurs.

One small manufacturing firm cited an experience that while making a business trip to a customer in North Carolina, local public officials "rolled out the red carpet." They greeted company officials at the airport, dined them, and gave a community tour. At the end of the business trip, the Portland business manager was handed a one-page building permit application stating that they could literally start construction tomorrow. Company officials were surprised at how well they were treated, especially given the fact they are not a Fortune 500 firm.

When questioned about why the community had gone to so much trouble, local public officials stated they just wanted to attract firms with good paying jobs. The reason the company representative mentioned this North Carolina experience was the firm had just completed a recent expansion in Portland. The representative continued by stating that it took an extra 18 months to complete their Portland project, due to difficulties in working through Portland's permitting processes.

Comments made regarding Portland being a small market relate to the fact that many of the harbor area's major employers do not rely on Portland as their primary source of business. A number of manufacturing firms, specifically transportation equipment manufacturers, mentioned that the east coast and south constitute more significant customer markets for their industry.

Useful Life. For most firms – across all industry groupings – there are no significant constraints to the remaining useful life of current plan and equipment. The cycle time for reinvestment is considerably longer than for many of the region's *high tech* firms, for example. A number of respondents characterized remaining useful life as "indefinite." However, a number of the maritime/river-dependent users mentioned that their facilities need investment, but are not likely to make those decisions for another few years.

F. INTERINDUSTRY LINKAGES

Those interviewed were asked about vendor and supplier relationships service needs, industry/trade association representation, and actions that could be taken "to attract firms with whom you conduct business to Portland." Due to the proprietary nature of the questions, responses are noted primarily in broad form. This information was employed in the more detailed linkage analysis of Chapter Four.

Vendors & Customers. The following profiles are noted by industry group.

Figure 11. Vendor/Customer Relationships

Industry Group	Vendors	Customers
River-Dependent	**Aggregate sources, grain, auto and petroleum suppliers. Primarily transported to Portland by marine vessels and rail.**	**Local distribution for aggregate and petroleum products, primarily by truck. U.S. or global for auto and grain – by train and deep draft ships respectively.**
Wholesale/Distribution	**Local resources such as fuel, transportation services, and products from parent company.**	**Local and regional retail outlets/stores and goods/services to area industrial businesses.**
Manufacturing	**Refined products from outside the region, with exception of transportation equipment which purchases a few products (metals-related) from local suppliers.**	**Local retail/wholesale and manufacturing businesses. Larger firms (e.g. transportation equipment) sell most goods nationally.**
Land Holding	**NA**	**NA**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

The most notable major *vendor or customer trend* is continued industry consolidation creating uncertainty about where supplies will come from and whether or not current customer relationships will continue.

Services. A wide range of other services are provided to Portland harbor industries. Those commonly cited are financial, legal, and accounting. Many of these services are provided by Portland area firms. Exceptions are most likely with conglomerates that have services in-house or through parent company/headquarters.

Industry & Trade Associations. Most firms belong to both national and international trade organizations plus local industry or more general business organizations – such as the Chamber of Commerce (now Portland Business Alliance) or Associated Oregon Industries. Local/statewide membership may be for purposes of industry specific information and/or advocacy on local/statewide issues. Specific associations mentioned include:

American Foundry Society
American Waterways Operators
Associated Oregon Industries
Chamber of Commerce
Metals Service Center Institute
National Auto Dealers Association
Oregon Concrete & Aggregate Producers Association
Oregon Metals Industry Council
Oregon Natural Step Network
Oregon Petroleum Marketers Association
Pacific Maritime Association
Pacific Northwest Grain & Feed Association
Pickle Packers International
Printing Association of America
Shipbuilders Council of America
Specialty Coffee Association of America

Actions to Attract Vendors & Suppliers. For many of those interviewed, there is a perception that little could be done to significantly alter the current mix of vendor and customer relationships *in Portland.* This is typically for reasons including:

- An established mix of supplier/customer relationships

- Specialized nature of key suppliers – not likely to be readily duplicated in Portland
- Relatively small size of the Portland market
- Negative industry perceptions of Portland as a place to do business

Regarding the small size of the Portland market, one firm stated, "The manufacturing base isn't large enough to support a solid base of vendors to maintain competitive pricing." A number of firms cite issues with the center of their market located somewhere other than Portland. In some cases, that center is on the East Coast and Portland is "too far."

One small, but rapidly growing, manufacturing firm commented that they have to seek out suppliers in other regions around the U.S. and Canada. They indicated a willingness to invest in local companies to develop the technologies required locally. However, they want local and state government agencies to demonstrate willingness to partner with them or other local companies in working through the regulatory process. Basically, the interest in investment is coupled with an expressed desire for compliance with the regulatory process to feel like more of a "team effort."

For those who did note some level of opportunity, the following types of actions are suggested for vendors and customers:

- Streamlining regulatory process
- Providing certainty around environmental issues
- Developing a positive business environment
- Make transportation improvements
- Grow local economy

"Fine tuning the regulatory environment" and "streamlining the review and permit process" were stated by several firms, in order to enable their businesses to make changes in a timely manner. Financially, Portland requires a "higher cost to invest due to the slow city process."

Many firms stress the importance of developing a positive business environment. One firm expressed a desire for Portland to "foster and nurture" the "internal growth" of businesses. This firm specifically listed disadvantages as the high cost of land, the large quantity of paperwork, and the lack of support, where as other places have rolled out the "red carpet" and made them "feel wanted." The representative of another firm simply stated, "It is just a matter of letting us know you want us!"

G. COMPETITION

The changing competitive landscape may be critical to a firm's interests in remaining or expanding in Portland. For harbor industries that service local customers or clientele, global competitiveness is of lesser concern than for Portland businesses selling into the domestic or worldwide market.

As with the discussion of interindustry linkages, the presentation of interview results is aggregated and generalized to avoid disclosure of proprietary information.

Figure 12. Competitive Position of Harbor Industries

Industry Grouping	Competitive Position
River-Dependent:	
• **Local Market Oriented**	***Competitors* are in the Portland metro area** ***Advantages* of harbor location are multi-modal transportation and central location in region** ***Disadvantages* are transportation congestion and environmental costs/uncertainties associated wit harbor clean-up**
• **Domestic/Global Market Orientation**	***Competitors* are other west coast ports** **Portland *advantages* are at grade rail/barge east of the Cascades, multi-modal transportation and land for terminal operations (at Rivergate)** ***Disadvantages* are shrinking land availability, rail constraints and uncertainties over harbor dredging/cleanup**
Wholesale/Distribution:	
• **Local Market Oriented**	***Competitors* are other metro area wholesale/distribution facilities** ***Advantages* are quality goods and services, pricing, established business relationships, and e-commerce/technology** ***Disadvantages* include primarily transportation-related issues such as regional congestion or constrained infrastructure**
• **Domestic/Global Market Orientation**	***Competitors* are often located outside the metro area** ***Advantages* include multi-modal transportation, proximity to manufacturers and centrality to Pacific Northwest customer markets** ***Disadvantages* include distance from major U.S. markets, increased land costs, reduced availability of large sites, labor and regulatory issues**
Manufacturing	
	***Competitors* are located outside the immediate metro area** ***Advantages* are quality goods and customer service, pricing, technology, established business relationships, and R&D** ***Disadvantages* are high labor rates, regulatory costs (all levels), high cost of doing business, and Portland is a small market**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc. October 2002.

Commonly cited competitive advantages include quality goods and customer service, pricing, technology, established business relationships, and research and development (R&D). Most business representatives believe they provide better quality goods/services over their competitors. However, harbor area firms recognize that in order to be competitive in today's marketplace they have to provide superior customer service, establish strong business relationships with both vendors and customers, and provide the best quality for the customer's dollar.

Several firms stated that their customers are willing to pay a little more, with the customer knowing that they will receive exactly what they need. A few firms had temporarily lost business due to pricing; however, their customers returned because they received poor customer service and/or inferior product/service from an alternative source of supply.

Harbor firms realize that technology and R&D are important components to remaining competitive long-term. Many harbor area firms continue to refine or develop new products to

stay ahead of the competition. Examples range from developing new roofing materials to the creation of enclosed car carriers.

H. TRENDS & EMERGING ISSUES

Business leaders were asked to identify emerging trends or issues affecting their companies centered around seven specific topics. While there is significant variation, a few key trends are mentioned with frequency.

- **Consolidation & Mergers –** Many firms are continuing to deal with industry mergers/consolidation and trying to determine how they can remain in business. Portland harbor industries are both forging new global alliances and competing globally. Not only are local firms facing increased competition from national/global interests, but they also are being affected by consolidation of vendors and customers, as well as being absorbed by national conglomerates.

  One firm is finding "continued competitive growth by larger, better funded firms." Another firm cited increased difficulty in maintaining vendor relationships as suppliers are absorbed by large conglomerates. This shrinkage of the competitive base of mid-to-large size firms brings into question the ability to readily procure supplies and/or maintain a viable customer base.
- **Enhancing Transportation Network –** Several respondents cite the current transportation infrastructure as a key advantage of operating within the Portland harbor industrial area. However, long-term economic viability of the area will require continued enhancement of the transportation network. Enhancements include minimizing surface transportation congestion (for both freight and employee commutes), greater rail capacity (especially unit trains and rail reciprocity), and improved marine terminal facilities (from containers to bulk facilities). Firms realize the importance of the harbor's transportation network and the need for long-term investments.
- **Workforce –** Area employers express concern with their ability to access qualified, skilled labor. A number of firms interviewed cite inadequacies in the K-12 school system. As one business manager expressed, "Public schools don't provide links to manufacturing." Another indicated the need for public schools to offer opportunities to be trained in a broad set of skills, from welding to computers. Another growing concern is the rising cost of labor including benefits, such as healthcare and workers compensation.
- **Capital Investment –** Representatives of several firms question whether it is feasible or competitive to make major long-term investments in Portland. One firm has invested $4.5 million in its Portland foundries over the last few years, and over half of that investment has been for environmental regulations. As stated by the respondent, "Future capital invested in Portland will depend on the Portland plant's ability to compete in the worldwide markets." This competitiveness is hampered when a significant portion of new investment is aimed at regulatory compliance – which creates little added value to customers.

  Many of those interviewed expect to continue making minor investments to maintain their current competitiveness. Continued automation and integration of new technologies is pivotal for remaining in business.

Firms today are more reliant on e-commerce and telecommunications for reaching customers or buying from suppliers. Continued automation will likely lead to greater production, at least in the short-term. However, as traditional industries mature, fewer gains from automation may be realized, raising questions about long-term stability and viability.

I. CHALLENGES, OPPORTUNITIES & PLANS

Primary Challenges. When asked what is the most important challenge presently facing your firm's operation in regards to its current location, answers tended to be unique to each firm in question. However, these specific answers can be grouped into several common categories. Caution in interpreting these interview results is warranted – due to the location and industry specific nature of the comments received.

Local Infrastructure & Regulatory Environment:

- Anti-business environment – perception of not being wanted or frustrations resulting from bad regulatory experience
- Expensive place to conduct business (e.g. high taxes, stringent environmental regulations, difficult permitting, etc.) – refers to the combination of a down economy and rising regulatory costs
- Understanding, working and complying with regulations – including difficulties in working through malaise of local, state, and federal regulations
- Encroachment of non-industrial activity – specific to areas bordered by residential
- Traffic congestion – mostly with respect to the regional freeway and arterial system

Marine/Port Facilities:

- Channel deepening to maintain viable port facilities
- Better configuration of rail access to minimize site access issues
- Long-term ability to handle marine cargo demand and required facilities

Private Market Issues:

- Minimizing costs to be competitive – both regulatory and internal to firm
- Generating enough business to utilize existing capacity – Portland is a small market
- Finding adequate skilled and motivated labor
- Rising labor costs
- Keeping up with customer demand
- Penetrating new markets
- Finding unencumbered available land/space to meet long-term needs

Opportunities:

- Strategically positioned within Pacific Northwest – for example, warehouse/distribution firms can serve multiple markets from Northern California to Alaska to Western Montana
- Skilled workforce
- Flexible distribution network – built around the harbor's multi-modal transportation network and the interconnectedness/convergence of interstate highway, rail, and deep draft/marine systems
- Room to grow within an industrial sanctuary – minimizing conflicts between incompatible uses
- Business opportunities unique to firm interviewed, regardless of specific harbor area location

Future Plans. Most firms interviewed expect business operations to remain essentially the same over the near term of the next 3-5 years. Eight (out of 62) indicated they could potentially expand, six expect to reconfigure, and four indicate they are likely to downsize.

Over the longer term horizon of the next 5-20 years, most business representatives could not predict the "state" of their companies due to uncertainty regarding industry transitions/consolidations, Portland economy/business environment, and continued globalization. However, about one-eighth (11 firms) indicate a potential for expansion.

Figure 13. Operational Plans over the Next 3-5 & 5-20 Years

	Next 3-5 Years				Next 5-20 Years			
Industry Group	As-Is	Expand	Downsize	Reconfig.	As-Is	Expand	Downsize	Reconfig.
River-Dependent	**11**	**1**	**1**	**4**	**5**	**0**	**2**	**5**
Wholesale/Distribution	**14**	**2**	**1**	**1**	**6**	**4**	**1**	**1**
Manufacturing	**18**	**5**	**2**	**0**	**8**	**7**	**0**	**3**
Land-Holding	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
All Groups	**44**	**8**	**4**	**6**	**19**	**11**	**3**	**9**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Firms interested in expansion are most likely to be manufacturers. With few exceptions, the firms planning to expand in the harbor area all can do so on property they currently own or otherwise control.

While few of the businesses interviewed plan to relocate out of the harbor area, long-term commitment to the harbor area is less certain due to:

- Increased cost of doing business in Portland compared to the past (e.g. electricity, labor, transportation congestion, land/building space)

- Specific issues/concerns, perceptions, or frustrations with City, Port of Portland, and other regulatory agencies (e.g. permitting time/cost; lack of incentives for smaller, long-established business, etc.)

Frustration is often greatest with long-time established businesses who feel their contributions to Portland's economic vitality have been overlooked in recent years.

J. HARBOR AREA ISSUES

Each business representative was asked to identify whether or not a series of harbor related issues affect their business. Results for each issue covered are discussed in turn.

Portland Harbor Superfund. Of the issues probed, superfund concerns pose perhaps the greatest uncertainties for area industries, including some upland firms. One effect appears to be the indefinite delay of major capital investment that would be otherwise justified (e.g. modernization, vacant land utilization, and expansion).

The majority of representatives interviewed indicated that the *superfund* issue would either have no effect or a negative impact on their companies. Of those responding "no effect" or "uncertain," many expressed concerns that the City of Portland may try to spread the cost of cleanup over the entire district through a fee or tax. If a fee or tax were imposed, their response would change to a "negative effect."

Several business representatives also indicated that their firms will end up paying indirectly as the major defendants will seek to pass on their financial liabilities.

Another concern centers on the liability of the properties themselves. One land owner in the harbor area has "property available" for purchase but the "environmental issues are too big" and prospective buyers are advised not to invest. Another firm has limited the liability of its property through a transferable bond but has not yet made this potential marketing advantage known publicly.

Figure 14. Portland Harbor Superfund Effect

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**3**	**6**	**5**	**6**
Wholesale/Distribution	**-**	**3**	**6**	**8**
Manufacturing	**1**	**13**	**15**	**1**
Land-Holding	**-**	**2**	**-**	**-**
All Groups	**4**	**24**	**26**	**15**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Columbia Channel Deepening. About half of those responding – primarily manufacturers – indicate that the deepening of the Columbia River Channel will have no readily discernable effect on their business. However, a significant number thought the project would have a positive influence – mainly river-dependent and wholesale/distribution companies. Positive comments

included “enhancing Port traffic” and keeping Portland “competitive with Seattle and Long Beach.”

Figure 15. Effect of Columbia River Channel Deepening Project

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**11**	**1**	**7**	**1**
Wholesale/Distribution	**8**	**-**	**5**	**4**
Manufacturing	**8**	**2**	**16**	**3**
Land-Holding	**-**	**-**	**1**	**-**
All Groups	**27**	**3**	**29**	**8**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Even among the river-dependent industries, about one-half of respondents expect little effect on their business from channel deepening. This is primarily true for marine terminal business reliant on shallow draft vessels, e.g. barges.

Willamette Maintenance Dredging. Responses to this issue are similar to the Columbia Channel Deepening, with a slight majority indicating “no effect.” The majority responding “positive effect” tend to be river-dependent industries or companies that use the river for distribution. This is true even for river-dependent firms for whom marine transportation is no longer a major component of their business operations. “The move is important” and a number of firms “want to make sure it happens.”

Figure 16. Effect of Willamette River Maintenance Dredging

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**13**	**1**	**6**	**-**
Wholesale/Distribution	**5**	**-**	**9**	**3**
Manufacturing	**10**	**1**	**15**	**3**
Land-Holding	**1**	**-**	**1**	**-**
All Groups	**29**	**2**	**31**	**6**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

I-5 Trade Corridor Improvements. Overwhelmingly, most of the firms interviewed indicate that improvements to I-5 are a benefit to their firm’s operation. However, many of the firms interviewed appear to be not well informed about trade corridor planning underway. A number of representatives also indicated that improvements made to other regionally important freeways, such as Highway 26 Sunset Corridor and Highway 217, would benefit their firms as well as the broader region.

Figure 17. Effects of I-5 Trade Corridor Improvements

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**15**	**-**	**1**	**4**
Wholesale/Distribution	**15**	**1**	**-**	**1**
Manufacturing	**20**	**-**	**7**	**1**
Land-Holding	**-**	**-**	**1**	**-**
All Groups	**50**	**1**	**9**	**6**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Endangered Species & Clean Water Acts. Over 36% (23) indicated that the *Endangered Species and Clean Water Acts* have a negative effect on their operations. This is because most indicated increased regulations directly increase the cost of doing business, which cannot always be passed on to the consumer – hence reduced profitability of Portland operations. As the representative of one firm stated, changing regulations have made it "more costly to operate" but they were "committed to comply with the standards." About 30% (or 19) indicated these issues have no effect on their companies.

Figure 18. Effects of *Endangered Species & Clean Water Acts*

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**1**	**7**	**5**	**5**
Wholesale/Distribution	**2**	**1**	**6**	**7**
Manufacturing	**1**	**14**	**8**	**5**
Land-Holding	**-**	**1**	**-**	**-**
All Groups	**4**	**23**	**19**	**17**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

In addition to the cost implications, Portland businesses also express concern with the uncertainty caused by changing regulations or planning underway for which the outcome is as yet not determined.

Recreational Boating &Trail Access. The majority of those surveyed believe that recreational activities within the Portland harbor industrial area have no effect on their companies. However, many specified that additional river-recreation opportunities should be carefully selected as some business operations may not be conducive to recreation activities.

Negative effects appear to be of greatest concern for river-dependent firms. Negatives cited include conflicts between commercial vessels and recreational craft, with resulting safety and liability concerns. Examples of concerns noted include "smoking recreational boaters" and "conflicts with jet skis and barge tie lines."

Figure 19. Effects of Recreational Boating & Trail Access

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**-**	**4**	**14**	**2**
Wholesale/Distribution	**-**	**1**	**11**	**5**
Manufacturing	**1**	**3**	**16**	**7**
Miscellaneous	**1**	**1**	**-**	**-**
All Groups	**2**	**9**	**41**	**14**

Source: Business Interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Transition to Housing, Park, or Commercial Uses. Less than 10% of those interviewed thought the transitioning of harbor sites to non-industrial uses would be beneficial. A slight majority indicate that the transition to non-industrial uses would probably have a negative impact.

Reasons cited for this concern include encroachment of incompatible uses; potential increased business costs related to mitigation of noise, light, and other environmental conditions; the region's lack of industrial land (pricing and competition); and the attractiveness of operating within an "industrial sanctuary." As one respondent noted, a transition of riverfront property to housing would "take away the most positive aspect of being in the harbor area."

Figure 20. Effects of Transitioning to Non-Industrial Uses

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**2**	**9**	**6**	**5**
Wholesale/Distribution	**1**	**8**	**1**	**6**
Manufacturing	**2**	**10**	**9**	**8**
Land-Holding	**-**	**-**	**-**	**1**
All Groups	**5**	**27**	**16**	**20**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

While not directly asked, businesses seem to be generally supportive, with a few exceptions, of non-marine dependent use on the river, as long as it is industrial. There appears to be support for maintaining the industrial sanctuary to limit incompatible residential/mixed use, but perhaps on a selective or location-specific basis. *Note:* This is a topic that has been pursued further in focus group discussions.

Reserving Land for Maritime Industries. The majority of respondents indicate that reserving riverfront sites for maritime industries would have a positive effect on their companies for some of the same reasons indicated earlier for not transitioning sites. However, as noted many indicate a strong desire to place primary emphasis on maintaining the harbor area for industrial use, regardless of whether the riverfront use is river-dependent. A particular respondent expressed that reserving the land for industry "builds a stronger economy and more jobs."

Figure 21. Effects of Reserving Land Harbor Industrial Riverfront Sites

Industry Group	Positive Effect	Negative Effect	No Effect	Uncertain
River-Dependent	**12**	**-**	**6**	**1**
Wholesale/Distribution	**9**	**-**	**4**	**3**
Manufacturing	**10**	**4**	**8**	**5**
Land-Holding	**-**	**1**	**-**	**-**
All Groups	**31**	**5**	**18**	**9**

Source: Business interviews conducted by E.D. Hovee & Company, Parsons-Brinckerhoff, and The JD White Company, Inc., October 2002.

Other Issues. Other issues were noted by about 10% of the business representatives interviewed. Positive issues mentioned were maintaining Naito Parkway as a 4-lane industrial access roadway and the railroad crossing at Columbia.

Negative issues cited are quite diverse – including the planned temporary/construction closure of the St. Johns Bridge, air quality from car emissions viewed as more of a detriment than industry emissions, and cottonwood blowing into industrial plant equipment from trees planted by the City along the riverbank.

There is surprisingly strong interest in obtaining better transit service from a wide range of firms from Northwest to Rivergate. A growing portion of the labor force appears to be more dependent on transit. This need is becoming particularly critical for firms operating more than one shift or weekend hours.

K. FOCUS GROUP RESULTS

As a complement to company interviews, two focus group discussions were conducted on September 4, 2002, and on September 19. Purposes of the focus group sessions were to: (a) present and discuss results from industry interviews and associated analysis completed to date (about 50 interviews); and (b) discuss policy implications for Willamette River planning initiatives.

A detailed discussion of focus group results is provided as Appendix B to this report. What follows is a synopsis from the two focus group sessions.

Portland Business Climate – Today & Tomorrow: The purpose of the first topic was to encourage participants to begin talking about *big picture* issues and opportunities affecting Portland's overall business climate. Comments were solicited regarding the external environment (global/national) and Portland's competitive position (within the metro area). Comments made by focus group participants included:

- Competitiveness is seen as a critical issue for Portland businesses.
- Portland is not only *perceived* as a highest cost location, but is *in fact* a high cost location.

- There is a perception that the City and Port have adopted the attitude that if companies move anywhere in the region, it's good for the region – even if they don't stay in the City of Portland.
- There seems to be a "so what" public agency mind set – exemplified by the City's handling of the Columbia Sportswear corporate headquarters office relocation.
- Environmental regulatory encroachment is voiced as a growing concern.
- Does Portland have a continuing role as a major west coast port? What is that role?
- Portland's harbor area is "out of the mainstream" and receives little visibility or public interest. There is no *branding* of the harbor image or product.
- Portland now has a reputation of having no land to build on.
- Certainly Title 3 exacerbates the situation including the provision that you can't develop just one portion of a parcel.
- More than one company representative stated that the firm has expanded outside of Oregon, but not within the state.
- There was a comment that "there is nothing like a good recession to get people's attention." Another participant questioned whether this (focus on harbor industry and other economic development needs region-wide) is just "palliative" and short-term until the current recession ends.
- The anticipated *River Plan* can be a step in the right direction.

Harbor Questions & Discussion: The remainder of each focus group session was organized to provide background information and obtain participant input on four harbor area questions. Each question is presented, followed by preliminary findings from interviews and then representative participant comments.

Figure 22. Focus Group Questions & Discussion

Question: What Are the Major Trends & Issues Affecting Prospects for Portland's Harbor Area Industries?

Both changing private market forces and regulatory environment are having an effect on harbor area employers. Increasing costs (market and regulatory) coupled with economic uncertainty have companies worried about their long-term competitiveness/viability. Uncertainty around environmental, regulatory issues and the commitment level of local officials have further exacerbated problems. In short, if businesses feel local government is willing to work with them in maintaining their firm's viability they are apt to remain committed to Portland and continue to make local investments.

A brief summary of findings and focus group discussion follows:

Preliminary Findings:

- Business activity is expected to be stable through the recession but limited job growth is anticipated with economic recovery.
- Even with expansion, existing medium-larger firms anticipate minimal need for added industrial land.
- Remaining cost competitive emerges as the #1 issue for harbor area firms – extending beyond the current economic downturn; Portland increasingly is perceived as a high cost place to do business.
- Many long time manufacturers will reinvent their business model and operations over the next 10-20 years – to remain competitive domestically and globally.
- Local issues affecting business investment are noted as including:
  - ✓ Superfund uncertainty & competitive multi-modal transport – for *riverfront* owners.
  - ✓ Regional congestion (freight/employee) non-industrial encroachment, permitting public policy & community support – for *riverfront and upland* firms.

Focus Group Discussion:

- Other rural locations and some urban centers (even Denver) are perceived as less expensive.
- Questions are raised as to whether to keep an existing Portland harbor location.
- Business closures, e.g. Consolidated Freightways, hurt Portland competitiveness.
- Marine-oriented distribution firms require improved rail facilities – for unit trains with separated facilities.
- Environmental, labor, healthcare and energy all are concerns for Portland operations.
- Regulation and permitting fees are too high and the review process "is too long" – with no understanding of the private sector concept that "time is money."
- The superfund issue is described as a "huge black hole."

Question: Will the Mix of Harbor Industries Change?

Harbor area industries will continue to change in order to adapt and stay competitive in an ever changing marketplace that is increasingly becoming nationalized or global. To effectively compete, companies will morph in order to take advantage of strategic opportunities. How and where firms change depends in part on the opportunities available and where they can be the most competitive. Several infrastructure investments are important to the harbor and region. A summary of findings and discussion points is presented below:

Preliminary Findings:

- *River Dependent* – need multi modal access including 20+ foot depth barges, 30-40+ foot deep draft. These firms serve as suppliers and transporters to the entire metro area and state. Little near-term expansion is anticipated except for auto imports.
- *Wholesale Distribution* – separated between (a) serving Central City & metro area from a central location and (b) markets beyond the metro area. Firms that serve the local market likely will continue to value a harbor area location; demand for firms serving a regional or national market is more uncertain depending on comparative costs of business and inter-modal transport accessibility.
- *Manufacturing:*
  - ✓ Chemical & electronics – tend to supply to the region's industrial base, for whom a central harbor-area location with in-place capital investment remains important.
  - ✓ Printing/publishing – have and will continue to value Central City proximity & interaction though the industry is rapidly becoming more global.
  - ✓ Metals & transportation – significant inter-industry linkages noted are led by Freightliner, Esco, and Gunderson around whom prospects for a wide array other support firms are closely related.

  Mid/large manufacturer land needs are expected to be relatively modest; growth needs linked to the desire/capacity to accommodate smaller firms.
- Other Sectors Potentially Suited to Harbor Area:
  - ✓ Wood/plastics/fiber materials
  - ✓ High tech/bio tech
  - ✓ Creative Service/information technology

  Corporate headquarters & business parks

Focus Group Discussion:

- A number of *metal fab* companies are not making a profit, competition from China is intense and local labor is difficult to get.
- Portland no longer has F*ortune 500* companies; Nike is headquartered in Beaverton, not Portland.
- For marine terminals, the picture for autos is optimistic.
- It will prove difficult for Portland to overcome its reputation as a city that is "difficult to deal with."
- Major rail yards could move eventually to the fringe of the metro area as has occurred elsewhere in the U.S.
- Three grain elevators on the upper Willamette conceivably could relocate to a consolidated facility.
- Mocks Landing requires rail overcrossing seismic upgrades.
- Outside the Port areas, industries are not as well connected to the region's freeways.
- Portland wants "sustainable" industry; harbor area industries such as metals do considerable recycling but receive little recognition.

Uncertainties with planning and zoning deter development. Planning issues "shouldn't be debated forever."

Question: What Are the Needs & Issues Facing River-Dependent Industries & Sites?

River-dependent industries and sites are facing a number of issues that in part are related to long-term needs. Needs and issues range from regulatory to maintaining a viable working waterfront to lack of readily developable sites to private market forces.

Below is a synopsis of PHILS findings and focus group discussion:

Preliminary Findings:

- From existing operations, greatest demand of (100+ acres) as indicated by marine terminals (notably auto imports).
- Approximately 9% of 3,130 acres of riverfront property is classified as vacant (and within top two tiers of buildable land inventory) by Metro.
- Only 153 acres of tier A/B vacant riverfront land are situated north of the St. Johns Bridge.
- A site constraints evaluation has focused on threshold criteria of appropriate zoning and minimum depth barge access. Other criteria considered include deep draft shipping, rail/street access, lot depth, environmental contamination, compatible neighbors, wetlands, trail easements, flood plain, and scenic overlay.
- Capital investment may be deferred pending Superfund resolution.
- Harbor area firms express interest in reserving riverfront sites for industrial use (whether marine dependent or not).
- Reserving riverfront land for future generations also is an expressed or implied interest for a number of firms – even if demand for added riverfront activity is not readily foreseeable today.

Focus Group Discussion:

- A participant's company has purchased two new plants outside Oregon because it is easier to do business in other locations.
- Superfund uncertainties have affected lease negotiations with a major user of Port facilities.
- To be competitive, river land needs to be able to be used in a more timely fashion.
- How will Metro Goal 5 setbacks affect industry location and viability along the river?
- Portland needs continued job base of companies like Freightliner.
- Fewer ships are calling on the Port; it is important to try to prevent a "dying waterfront."
- The region needs a "more sophisticated way" of looking at riverfront land.
- New large river-dependent industries are locating outside Portland elsewhere on the Lower Columbia River.

Question: What Are the Needs & Issues Facing Upland Industries & Sites?

Upland industries and sites are facing a slightly different set of needs and issues. Maintenance of the City's industrial sanctuary policy is important for the harbor to remain a viable industrial district. Transition to knowledge base industries is desired, and raises questions concerning the education system's ability to effectively serve those industries. Establishing a program that creates interaction between public and private stakeholders could reinstate confidence in Portland being a desirable place to operate a business. A brief synopsis follows:

Preliminary Findings:

- There appears to be general consensus to continue exclusion of residential and large scale commercial from the industrial sanctuary.
- Less agreement is evident on how broadly "industrial" should be construed with flexibility for:
  - ✓ Only 153 acres of tier A/B vacant riverfront land north of the St. Johns Bridge
  - ✓ Support retail/service
  - ✓ Creative services/information technology
  - ✓ Business park/flex space
- Priority emphasis is desired from firms in all harbor area industrial district for roadway improvements for freight and employee commutes.
- Some shift from manufacturing to transportation dependent firms is expected, particularly if major manufacturing anchors downsize or terminate Portland operations.
- There is strong interest in improved transit – including shift workers.
- Greater evidence of public support is desired to build consensus for action to address issues of improved, faster, lower-cost permitting and addressing labor issues including workers comp/health care costs.
- Pro-active public decision-maker support also is desired for (a) more interaction with policy makers; and (b) policy/investment decisions *making a difference.*

Focus Group Discussion:

- Portland's future is not manufacturing but distribution to the Pacific Rim.
- The City needs to determine what it wants Portland's harbor area to be in the future.
- A priority should be to pursue knowledge-based industry. But what is the education system capable of turning out?
- The City "over regulates and under interacts."
- Portland should "have a calling program" with regular visits to business and industries.

Source: E.D. Hovee & Company. Compiled from focus group discussions of September 4 and 19, 2002. See Appendix B for added detail.

Summary Implications: The business interviews and focus group sessions unveiled several *big picture* issues and opportunities facing the harbor area as well as the region.

The 80 businesses interviewed employ about one-third of the district's workforce, as the questionnaire focused on medium to large firms. Nearly 60% of firms interviewed indicated that their harbor operations produce annual gross revenues of $20 million or more. One-third indicated revenues have increased over the last 3-5 years, while one-fourth indicated a decline – due primarily to a recessionary economy.

Business leaders noted a number of advantages to being located within the Portland harbor industrial area. Access to a solid, intermodal transportation infrastructure is generally viewed as the greatest advantage across all industry groups. Close proximity to customers and vendors, followed by proximity to river, locations central to a skilled labor force and low cost availability of land and building space also were frequently mentioned.

Industrial sanctuary designation appears to be a locational advantage primarily to manufacturers, but this should not be construed as not being important to the other industry groups. A significant number of all respondents indicated a preference for reserving riverfront properties for maritime/industrial activities and a reservation about allowing industrial sites to convert to non-industrial uses.

While no individual disadvantage was highly represented, a *common overall theme* throughout many of the interviews appears to be that Portland is (or has) become an undesirable place to conduct business (most strongly felt by deep-rooted firms) for several factors, as identified by those interviewed:

- High cost of doing business (both regulatory and market)
- Perceived anti-business sentiment
- Small economy/consumer market of Portland metro area
- Not central to major U.S. markets

Business leaders identified several emerging trends/issues affecting their companies such as consolidation and mergers, enhancement of the transportation network, access to qualified, skilled labor, and feasibility of long-term capital investments. Firms are faced with a number of challenges that fall under local infrastructure constraints, regulatory environment, long-term viability of marine facilities and private market issues (e.g. cost competitiveness, labor costs, penetrating new markets, unencumbered land, etc.). Opportunities noted include:

- Strategically positioned within Pacific Northwest
- Skilled workforce
- Distribution network
- Room to grow within an industrial sanctuary
- Business opportunities unique to firm interviewed, regardless of harbor area

Most firms interviewed anticipate business operations to remain the same over the next 3-5 years, with less certainty longer-term. Manufacturers are the most likely candidates to expand; only a few require additional land not currently under their control.

While few of the businesses interviewed plan to relocate out of the harbor area, long-term commitment to the harbor area is less certain due to:

- Increased cost of doing business in Portland compared to the past (e.g. electricity, labor, transportation congestion, land/building space).
- Specific issues/concerns with City, Port of Portland, and other regulatory agencies (e.g. permitting time/cost, lack of incentives for smaller, long-established business, etc.).

Business leaders were asked to give their opinion on the effect certain harbor-related issues would have on their firms:

- *Portland Harbor Superfund* – twenty-six indicated no effect, 24 expect adverse effects and 15 were uncertain.
- *Columbian River Channel Deepening* – twenty-nine do not anticipate any effects, while 27 indicated a positive effect.
- *Willamette River Maintenance Dredging* – thirty-one said no effect, as 29 expect positive results.
- *I-5 Trade Corridor Improvements* – nearly all expect a positive influence on business.
- *Endangered Species & Clean Water Acts* – twenty-three responded with a negative effect, 15 no effect, and 17 uncertain.
- *Recreational Boating & Trail Access* – forty-one said no effect and 14 were uncertain.
- *Transitioning to Non-Industrial Uses* – twenty-seven were against the idea and another 20 were uncertain about the impacts.
- *Reserving land for Maritime Industries* – thirty-one responded with a positive and 18 said no effect. Most just want land reserved for industrial use, maritime or otherwise.

IV. HARBOR INDUSTRY ANALYSIS

This analysis now shifts from the selected sample of interview and focus group respondents to a broader harbor industry analysis. This expanded review draws from interview results combined with quantitative analysis using regional input-output economic data.

A more in-depth review of underlying industry dynamics both regionally and within the Portland harbor industrial area is provided in this section. The analysis also evaluates the suitability of Harbor area industrial sites and land use sensitivities.

A. COMPETITIVE ADVANTAGES

Economic development opportunities that may be available for the Portland harbor industrial area will result in part from the Portland-Vancouver metro area's overall competitiveness in attracting industries relative to other regions nationwide. The Portland-Vancouver metro area is defined to include Clackamas, Multnomah, and Washington Counties in Oregon as well as Clark County in Washington State. The entire metro area is viewed as the most appropriate level of analysis because it functions as an integrated labor market, is the region used by Metro for planning purposes, and represents the core economic base.

The City's Part 1 study considered the region's current competitive advantage based solely on employment concentration. This Part Two report takes the analysis one step further by examining how the region's competitiveness has changed since 1990, as well as measuring its competitiveness across a broader number of important economic factors.[vii]

Regional Competitive Methodology. This Part Two assessment identifies the industries for which the Portland-Vancouver metro area has a *competitive advantage* with the greatest potential for success in attracting (or retaining) added business investment and employment. The end result of this analysis will be a determination of the industries that will most likely prosper and be best suited for the region with particular application to the harbor area.

Key information provided in this section comes from Minnesota IMPLAN Group's proprietary IMPLAN database and model.[viii] Information for 1999 is the most recent available, and is used to analyze current conditions. In some cases, 1990 data is also incorporated to identify the underlying structural changes and economic trends occurring since 1990.[ix]

A key measuring tool – or benchmark – used to analyze a local industry cluster's performance as compared to the nation is termed a *location quotient* (LQ). The LQ measures how competitive firms in the Portland metro area are to other firms operating in the same industry nationally. The LQ is computed as a ratio between the region and the nation.

An LQ of more than 1.00 indicates that the region outperforms the nation. For industries where the LQ is less than 1.00, the region underperforms the U.S. For example, if the output per worker for the transportation equipment industry is $361,800 in the Portland-Vancouver metro area and $320,000 nationwide, then the LQ would be 1.13 (or $361,800 + $320,000). An LQ below 1.0 means the industry could be at a competitive disadvantage and an LQ above 1.0 means the industry could have a competitive advantage.

Regional Employment Concentration. As of 1999, the metro area contained nearly 1.2 million jobs; 37% are industrial-related. The job base has increased by 32% since 1990.

While the industrial job base has been increasing in the region, a similar trend has occurred nationally but at a much slower rate. Between 1990 and 1999, the region's industrial employment increased by 23% versus 9% nationwide.

Figure 23. Concentration of Portland-Vancouver Metro Area's Employment Base

	PDX Metro Area		PDX Average Wage		United States		Jobs LQ	
Employment Sector	1999 Jobs	% Chg. 1990-99	1999	% Chg. 1990-99	1999 Jobs	$ Chg. 1990-99	1999	Chg. 1990-99
Construction	80,313	+28.3%	$44,200	+22.7%	10,976,290	+18.7%	1.04	- 0.02
Manufacturing	142,208	+14.3%	$55,800	+10.6%	19,125,967	- 2.6%	1.06	+0.07
20 Food products	8,449	- 4.7%	$39,600	- 12.9%	1,724,836	+2.6%	0.70	- 0.13
22 Textile mill products	1,376	- 17.0%	$40,200	+12.5%	567,371	- 19.5%	0.35	- 0.02
23 Apparel & textiles	2,599	- 15.1%	$18,200	- 25.1%	743,851	- 31.6%	0.50	+0.06
24 Lumber & wood	6,663	- 22.5%	$45,300	+2.9%	941,306	+10.6%	1.01	- 0.57
25 Furniture & fixtures	2,904	+7.4%	$30,700	- 11.0%	584,973	+10.9%	0.71	- 0.09
26 Paper products	6,053	- 25.9%	$56,900	- 18.3%	669,733	- 3.9%	1.29	- 0.55
27 Printing & publishing	12,101	+31.3%	$41,100	- 3.4%	1,665,500	- 3.0%	1.04	+0.20
28 Chemical products	1,683	+15.0%	$56,700	+0.9%	1,044,571	- 4.1%	0.23	+0.02
29 Petroleum products	332	- 31.1%	$54,900	- 27.4%	127,420	- 15.2%	0.37	- 0.13
30 Rubber & plastics	5,129	+47.7%	$35,300	- 13.1%	1,010,091	+13.0%	0.72	+0.12
31 Leather products	296	- 3.5%	$27,500	+41.5%	80,601	- 42.1%	0.52	+0.18
32 Stone, glass & concrete	3,382	+4.5%	$40,700	+21.8%	594,588	- 4.9%	0.81	+0.00
33 Primary metals	7,391	- 28.4%	$54,700	- 8.7%	698,865	- 7.0%	1.51	- 0.64
34 Fabricated metals prod.	12,136	+36.3%	$39,800	- 14.2%	1,572,816	+9.4%	1.10	+0.13
35 Industrial machinery	18,101	+22.9%	$65,000	+23.9%	2,164,051	+1.1%	1.19	+0.12
36 Electronic equipment	30,334	+104.0%	$80,400	+46.8%	1,691,104	- 0.1%	2.56	+1.18
37 Transport. equipment	12,629	+22.8%	$58,600	- 6.2%	1,902,800	- 5.2%	0.95	+0.14
38 Instruments	7,197	- 31.5%	$67,400	+22.9%	854,158	- 14.9%	1.20	- 0.44
39 Misc. manufacturing	3,453	- 3.2%	$27,500	+1.6%	487,332	+8.8%	1.01	- 0.24
Transportation	40,635	+35.0%	$39,400	- 13.6%	5,041,707	+34.1%	1.15	- 0.10
41 Transit	3,682	+34.9%	$23,900	- 8.4%	607,020	+46.9%	0.86	- 0.17
42 Trucking & warehousing	19,521	+5.9%	$40,400	- 12.6%	2,446,837	+22.0%	1.14	- 0.30
44 Water transportation	2,436	+56.7%	$56,400	- 14.4%	191,350	+1.7%	1.81	+0.52
45 Air transportation	9,958	+165.1%	$40,900	- 25.9%	1,230,284	+70.4%	1.15	+0.34
47 Transportation services	5,037	+39.1%	$35,700	- 7.2%	566,216	+31.7%	1.27	- 0.05
Communication & Utilities	88,150	+28.2%	$56,700	+4.6%	9,624,844	+11.4%	1.31	+0.06
48 Communication	9,776	+49.3%	$66,500	- 5.0%	1,467,423	+19.9%	0.95	+0.11
49 Electric, gas & sanitation	4,774	+20.1%	$85,200	+23.8%	697,084	- 12.4%	0.98	+0.19
Wholesale	73,600	+26.3%	$53,500	+4.1%	7,460,337	+12.8%	1.41	+0.03
Combined Industrial Sectors	424,906	+23.5%	$51,800	+7.3%	52,229,145	+9.0%	1.16	+0.04
All Employment Sectors	1,156,428	+31.9%	$36,700	+3.2%	164,835,917	+20.2%		

Note: LQ means Location Quotient. All figures are preliminary and subject to change.
Source: E.D. Hovee & Company using Minnesota IMPLAN Group's proprietary IMPLAN database and model.

Relative to the U.S., it appears that the Portland-Vancouver metro area has a high level of industrial activity. However, this is not true for all employment sectors, as the region has a high activity level (or potential competitive advantage) in only half of the industrial sectors noted above (such as electronic equipment, water transportation, and primary metals).

The highest level of activity, by far, occurs within the electronic equipment industry. The level of concentrated activity has in fact increased significantly since 1990. While primary metals is a relatively competitive industry, it has declined in its relative concentration of activity as compared to the U.S. The same is true for the lumber & wood products industry.

The *fastest-growing* industry in the Portland-Vancouver metro area is air transportation, which has gone from 3,756 jobs in 1990 to 9,958 in 1999. Other rapidly-growing industries have included electronic equipment, water transportation, communications, and rubber & plastics.

While industrial employment has not increased as rapidly as the Portland metro non-industrial job base, industrial jobs pay an average of $51,800 per year. This is more than 40% above the *average wage* for all employment sectors of $36,700. Average wages for industrial jobs also increased by more than 7% from 1990-1999 (in real or inflation adjusted terms), well above the 3% gain experienced for all employment sectors of the metro area economy.

There are a limited set of industry sectors that *score well* according to all of the following criteria:

- Average wage above the average for all Portland metro employment
- Wage increases exceeding the average for all sectors
- Industry concentration higher than the U.S. average (i.e. LQ greater than 1.00)
- Increased industry concentration (or LQ) in the 1990s

The four industry sectors that have met all of these criteria are industrial machinery, electronic equipment, communication & utilities, and wholesale trade. *Note:* The employment analysis presented in this section appears generally consistent with the City's Part 1 analysis. While specific estimates may differ, the results are similar.

Industry Productivity & Value-Added. Regionally, industrial workers are nearly on par with the rest of the nation in terms of *productivity* (measured as value of output produced per worker). In 1999, the average industrial worker in the metro area produced output valued at $141,100, only 2% below comparable national rates.

Portland area industries exhibiting relatively high rates of productivity compared to the U.S. include electronic equipment, lumber & wood, and industrial machinery. Productivity in these industries relative to the nation also has increased in recent years. The electronic equipment industry, with the highest productivity rate as compared to the U.S., has improved its productivity position with the fastest growth rate among all industrial-related sectors.

Figure 24. Average Productivity by Sector for Portland-Vancouver Metro Area (versus U.S.)

Employment Sector	1999 Output/ Worker	Location Quotient 1999	Location Quotient Change 1990-99	% of Output Value-Added 1999 PDX	% of Output Value-Added 1999 US	% of Output Value-Added Change 1990-99 PDX	% of Output Value-Added Change 1990-99 US
Construction	$119,400	1.08	+0.14	41.0%	39.0%	+3.6%	+0.7%
Manufacturing	$223,100	1.04	+0.13	40.4%	35.7%	+1.5%	- 3.4%
20 Food products	$288,500	1.02	+0.09	30.4%	26.8%	- 1.6%	- 0.2%
22 Textile mill products	$131,200	0.98	+0.02	42.6%	33.3%	+4.3%	+4.1%
23 Apparel & textiles	$99,900	0.91	- 0.04	25.5%	31.3%	- 15.4%	- 9.7%
24 Lumber & wood	$160,900	1.23	+0.08	38.2%	35.8%	+0.5%	+1.3%
25 Furniture & fixtures	$114,800	0.95	- 0.08	34.8%	36.3%	- 11.8%	- 8.9%
26 Paper products	$253,700	1.02	- 0.01	36.0%	33.8%	- 5.6%	- 2.8%
27 Printing & publishing	$122,600	0.93	- 0.00	44.0%	45.1%	- 8.2%	- 4.6%
28 Chemical products	$271,400	0.71	- 0.05	36.7%	43.5%	+1.3%	+5.1%
29 Petroleum products	$435,100	0.33	- 0.19	49.3%	16.7%	+26.1%	- 7.0%
30 Rubber & plastics	$165,600	0.97	+0.03	29.3%	32.3%	- 24.1%	- 20.0%
31 Leather products	$74,300	0.68	- 0.32	54.7%	47.6%	+23.3%	+9.8%
32 Stone, glass & concrete	$141,400	0.86	+0.00	41.1%	41.8%	+1.5%	- 5.0%
33 Primary metals	$201,100	0.79	- 0.13	34.7%	30.4%	+12.2%	+1.9%
34 Fabricated metal prod.	$146,800	0.94	- 0.03	45.7%	44.0%	+0.2%	+0.1%
35 Industrial machinery	$235,900	1.22	+0.17	32.9%	36.5%	- 14.5%	- 12.3%
36 Electronic equipment	$286,100	1.28	+0.28	57.8%	48.8%	+26.9%	+6.9%
37 Transport. equipment	$361,800	1.13	+0.14	23.9%	28.5%	- 14.6%	- 12.1%
38 Instruments	$189,400	1.00	+0.25	38.6%	37.0%	- 20.7%	- 19.7%
39 Misc. manufacturing	$94,300	0.87	+0.01	46.6%	51.8%	+6.8%	+10.5%
Transportation	$105,200	1.05	- 0.00	52.7%	52.7%	- 10.5%	- 5.5%
41 Transit	$47,100	1.04	+0.07	61.8%	60.7%	- 12.0%	- 7.0%
42 Trucking & warehousing	$116,800	1.08	- 0.03	46.1%	43.1%	- 20.2%	- 18.7%
44 Water transportation	$231,500	1.08	- 0.06	38.6%	34.4%	- 3.7%	+2.2%
45 Air transportation	$94,900	0.87	- 0.07	68.7%	69.2%	+10.5%	+12.8%
47 Transportation services	$62,300	0.88	- 0.08	73.3%	73.3%	+6.3%	+13.0%
Communication & Utilities	$54,600	0.70	+0.07	60.7%	60.0%	- 3.1%	- 1.4%
48 Communication	$260,000	0.87	- 0.09	55.5%	56.5%	- 22.2%	- 19.4%
49 Electric, gas & sanitation	$475,000	1.06	+0.08	66.6%	65.0%	+15.3%	+15.9%
Wholesale	$129,600	1.07	+0.09	71.0%	71.0%	- 8.6%	- 4.5%
Combined Industrial Sectors	$141,100	0.98	+0.13	47.9%	44.1%	+0.7%	- 1.2%
All Employment Sectors	$100,600	1.03	+0.13	57.2%	57.9%	- 1.7%	+0.3%

Note: All figures are preliminary and subject to change.

Source: E.D. Hovee & Company using Minnesota IMPLAN Group's proprietary IMPLAN database and model.

As compared to the nation, the Portland-Vancouver metro area's industrial sectors (taken together) produce a level of value-added output above the nation.[x] Out of the 28 industrial sectors identified, 13 out-performed the U.S. over the last decade. In effect, Portland's level of industrial value-added also has improved relative to the nation.

Export Orientation, Procurement & Multipliers. Traditionally, to be deemed *export-oriented*, an industry must export at least 50% of its output to purchasers outside the region. Taken as a whole, the region's industrial sectors come close the threshold as they export almost 50% of their output to communities outside the Portland-Vancouver metro area.

Figure 25. Export Orientation, Local Procurement, and Economic Impact by Sector

	% of Portland Output Exported		1999			
		Change	Local	Economic Multipliers (1999)		
Employment Sector	1999	1990-99	Procure.	Output	Income	Jobs
Construction	18.1%	+8.5%	100.0%	1.82	1.85	2.16
Manufacturing	69.3%	+48.7%				
20 Food products	45.5%	+38.5%	41.8%	1.72	2.74	3.42
22 Textile mill products	84.1%	+80.5%	7.0%	1.55	1.65	1.80
23 Apparel & textiles	10.4%	+5.1%	26.0%	1.63	2.34	1.72
24 Lumber & wood	26.7%	- 3.4%	80.4%	1.93	2.17	2.47
25 Furniture & fixtures	10.0%	- 2.4%	53.0%	1.74	2.03	1.90
26 Paper products	89.2%	+43.3%	11.8%	1.65	2.06	2.68
27 Printing & publishing	45.4%	+43.3%	43.7%	1.68	1.77	1.93
28 Chemical products	16.1%	+6.6%	21.4%	1.63	2.12	2.79
29 Petroleum products	1.9%	- 3.0%	12.4%	1.29	1.78	2.17
30 Rubber & plastics	100.0%	+99.7%	1.2%	1.66	2.15	2.14
31 Leather products	21.4%	+6.8%	10.5%	1.52	1.52	1.44
32 Stone, glass & concrete	87.5%	+80.1%	7.9%	1.70	1.90	2.04
33 Primary metals	96.2%	+65.8%	2.7%	1.60	1.83	2.27
34 Fabricated metal prod.	90.9%	+57.9%	10.5%	1.52	1.73	1.85
35 Industrial machinery	65.6%	+44.1%	32.6%	1.72	1.96	2.68
36 Electronic equipment	68.8%	+41.3%	63.1%	1.57	1.75	2.62
37 Transport. equipment	91.8%	+80.3%	7.4%	1.54	2.24	2.99
38 Instruments	49.0%	+36.8%	62.2%	1.82	1.87	2.63
39 Misc. manufacturing	87.1%	+67.7%	9.9%	1.60	1.80	1.63
Transportation	36.8%	- 4.8%				
41 Transit	27.6%	+3.2%	74.3%	1.72	1.55	1.40
42 Trucking & warehousing	19.5%	- 20.8%	99.6%	1.97	2.06	2.25
44 Water transportation	67.7%	+19.9%	100.0%	1.85	2.40	3.34
45 Air transportation	63.9%	+18.2%	46.2%	1.51	1.48	1.61
47 Transportation services	31.2%	- 15.7%	69.5%	1.71	1.50	1.55
Communication & Utilities	28.1%	+17.1%				
48 Communication	35.2%	+12.2%	54.7%	1.67	1.97	2.95
49 Electric, gas & sanitation	20.2%	+20.0%	93.8%	1.39	1.80	2.90
Wholesale	32.6%	- 6.5%	99.9%	1.61	1.58	1.96
Combined Industrial Sectors	49.6%	+28.0%				
All Employment Sectors	36.8%	+11.4%				

Note: All figures are preliminary and subject to change.

Source: E.D. Hovee & Company using Minnesota IMPLAN Group's proprietary IMPLAN database and model.

Twelve of 28 industry sectors reviewed appear to be export-oriented, with most of the other 16 showing very low proportions of their output being sold or delivered outside the region. The main reason the group as a whole does not quite meet the 50% benchmark is that this region's transportation industry, in particular trucking & warehouse – one of the region's largest employment sectors – is mostly locally focused.

Industries exporting more than 90% of their output outside the metro area include: rubber & plastics, primary metals, transportation equipment, and fabricated metal products. All four of these sectors have a strong presence in the harbor area. Another four industries showing a relatively high amount of export orientation include paper products, stone, glass & concrete, miscellaneous manufacturing, and textile mill products.

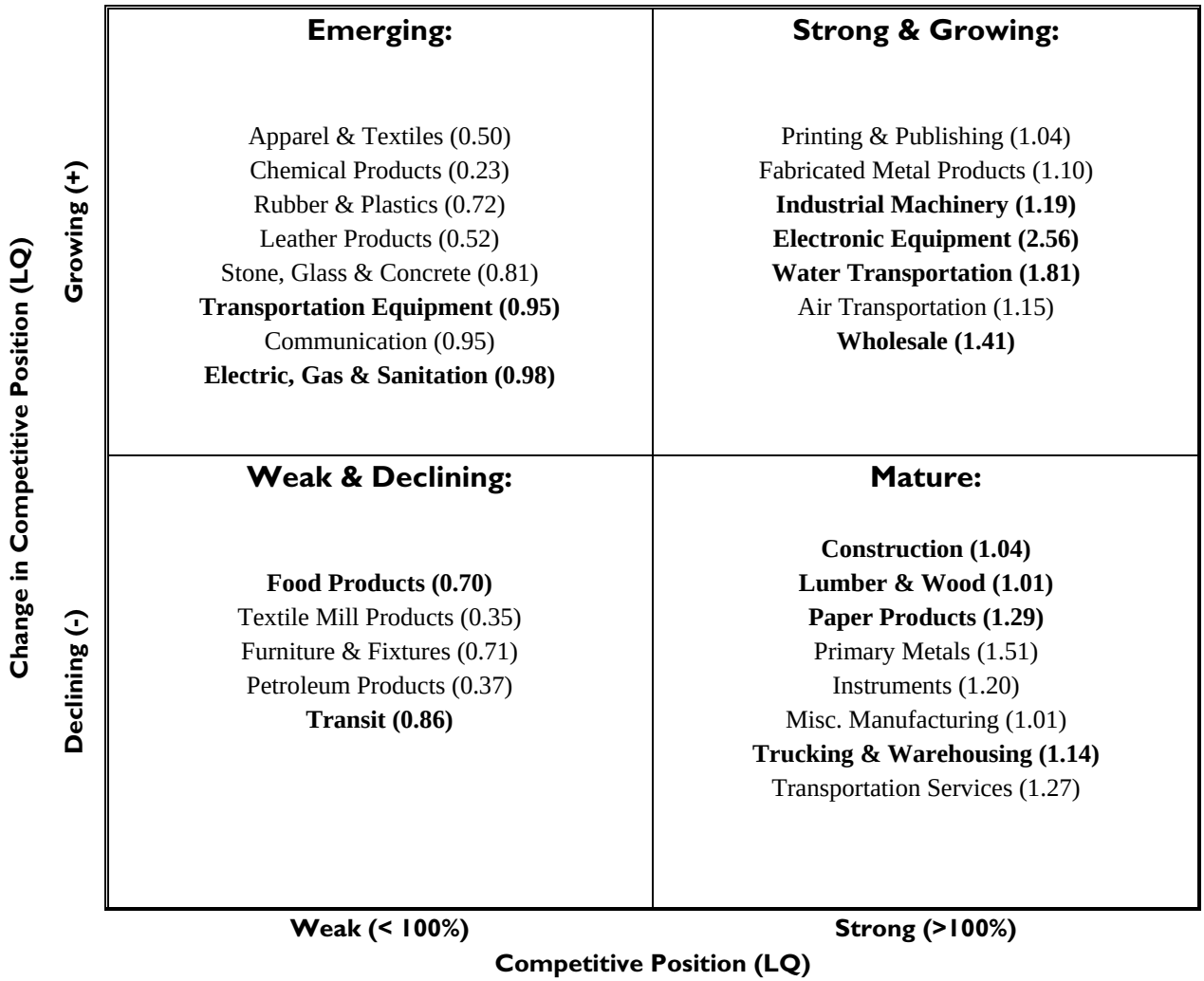
Industries making significant *local purchases* are generally found within transportation and wholesale sectors. However, there are a few manufacturers that also exhibit high levels of local purchasing, including lumber & wood, electronic equipment, and instruments.

Less than half of the industrial sectors have a *jobs multiplier* under 2.0 – in other words they support less than one job elsewhere in the Portland economy for every worker they directly employ. In fact, a number of industries support two or more indirect and induced jobs for every direct job. These sectors include food products, water transportation, transportation equipment – all of which have an active presence in Portland's Harbor industrial area. *Note:* Multipliers identified in the Planning Bureau's Part I analysis may differ, due to differences in geographic representation and data source.

Competitive Advantage Framework. The framework for evaluating potential competitive advantages is predicated on the assessment of the *current and changing competitive position* of various industry clusters in the region as compared to the nation. As indicated by the chart which follows, four distinctive *quadrants* of competitiveness can be identified:

- *Strong* and *growing* sectors represent industries that have an existing competitive presence in the metro area, exceeding the national average. For these sectors, the region's competitive position not only is above average, but has increased in recent years (from 1990–1999).
- In contrast, *weak and declining* industries are those that currently have below average representation; the region's competitive position for these sectors diminished even further between 1990 and 1999.
- A *mature* industry is one that currently maintains a strong and competitive position, but whose competitive position has decreased since 1990.
- Finally, *emerging* sectors are those that historically have maintained a below average competitive position but have achieved gains in competitive share since 1990.

Figure 26. The Portland-Vancouver Metro Area Competitive Advantage



Note: **Boldface** print items represent sectors with above average productivity. Percentages in parenthesis indicate employment location quotient (LQ) or competitive position relative to the nation.

Source: E.D. Hovee & Company, using IMPLAN input-output data sets, October 2002.

In reviewing the matrix classifications, the natural inclination might be to assume only "strong and growing" industries represent best industrial development opportunities. However, a more diversified *portfolio* approach should be considered. This would involve tailoring strategic decisions around:

- Limited effort – in terms of general marketing and response to inquiries – for *weak and declining* sectors (with the notable exception of the transit sector).
- Repositioning of the *mature* sectors – with emphasis on innovation, value-added diversification, improved work force skills and environmental stewardship.
- Targeted business recruitment, workforce training and infrastructure investment – for selected *emerging* industries

- Strategic business development and infrastructure support – targeted to specific industry-driven needs of *strong and growing* sectors.

Competitive Clusters. To identify the industries that the region has the greatest advantage in competing for versus other areas around the U.S., a series of screening criteria have been applied to the industry sectors identified. Five sets of screening criteria have been developed:

1. Current and changing *competitive position* of the industry – relative to the nation (as illustrated by the previous target industry matrix). The recommended target should *either* have a strong competitive position currently *or* demonstrate improvement in its competitive standing in recent years (since 1990).
2. *Worker productivity* and change in productivity – as quantifiable indicators of workforce suitability. To be recommended as a target industry, existing regional firms should *either* demonstrate high productivity comparable to other firms nationally *or* a rate of productivity increase more rapid than has been experienced by this industry sector nationwide.
3. *Percent of Output Value-Added* – with more than 50% indicating a majority of an industry's output value being created within the regional economy.
4. *Employment multiplier and/or forecast employment growth* – with the multiplier indicating the *ripple effect* that the sector provides as a stimulus to other supporting employment activity in the region. To be recommended as a target industry, the sector should demonstrate a relatively high employment multiplier.[xi]
5. *Wage levels* including changes over time – relative to other industries in the metro area. A target threshold of preference is given for jobs *either* paying at least the region-wide average annual wage of $36,700 *or* with positive wage growth from 1990–1999.

In the matrix chart that follows, industries are assigned a 1 for each criterion they meet. A zero is assigned for every criterion not met.

Figure 27. Screening Competitive Advantage Industries

	Employment LQ		Productivity LQ		% Value-	Jobs	Average Wage		LQ		% Value-	Jobs	Avg.	
Employment Sector	**1999**	**1990-99**	**1999**	**1990-99**	**Added**	**Mult.**	**1999**	**1990-99**	**Emp.**	**Prod.**	**Added**	**Mult.**	**Wage**	**Total**
Construction	1.04	- 0.02	1.08	+0.14	41.0%	2.16	$44,200	+22.7%	1	1	0	1	1	4
Manufacturing	1.06	+0.07	1.04	+0.13	40.4%		$55,800	+10.6%						
20 Food products	0.70	- 0.13	1.02	+0.09	30.4%	3.42	$39,600	- 12.9%	0	1	0	1	1	3
22 Textile mill products	0.35	- 0.02	0.98	+0.02	42.6%	1.80	$40,200	+12.5%	0	1	0	0	1	2
23 Apparel & textiles	0.50	+0.06	0.91	- 0.04	25.5%	1.72	$18,200	- 25.1%	1	0	0	0	0	1
24 Lumber & wood	1.01	- 0.57	1.23	+0.08	38.2%	2.47	$45,300	+2.9%	1	1	0	1	1	4
25 Furniture & fixtures	0.71	- 0.09	0.95	- 0.08	34.8%	1.90	$30,700	- 11.0%	0	0	0	0	0	0
26 Paper products	1.29	- 0.55	1.02	- 0.01	36.0%	2.68	$56,900	- 18.3%	1	1	0	1	1	4
27 Printing & publishing	1.04	+0.20	0.93	- 0.00	44.0%	1.93	$41,100	- 3.4%	1	0	0	0	1	2
28 Chemical products	0.23	+0.02	0.71	- 0.05	36.7%	2.79	$56,700	+0.9%	1	0	0	1	1	3
29 Petroleum products	0.37	- 0.13	0.33	- 0.19	49.3%	2.17	$54,900	- 27.4%	0	0	0	1	1	2
30 Rubber & plastics	0.72	+0.12	0.97	+0.03	29.3%	2.14	$35,300	- 13.1%	1	1	0	1	0	3
31 Leather products	0.52	+0.18	0.68	- 0.32	54.7%	1.44	$27,500	+41.5%	1	0	1	0	1	3
32 Stone, glass & concrete	0.81	+0.00	0.86	+0.00	41.1%	2.04	$40,700	+21.8%	1	1	0	1	1	4
33 Primary metals	1.51	- 0.64	0.79	- 0.13	34.7%	2.27	$54,700	- 8.7%	1	0	0	1	1	3
34 Fabricated metal prod.	1.10	+0.13	0.94	- 0.03	45.7%	1.85	$39,800	- 14.2%	1	0	0	0	1	2
35 Industrial machinery	1.19	+0.12	1.22	+0.17	32.9%	2.68	$65,000	+23.9%	1	1	0	1	1	4
36 Electronic equipment	2.56	+1.18	1.28	+0.28	57.8%	2.62	$80,400	+46.8%	1	1	1	1	1	5
37 Transport. equipment	0.95	+0.14	1.13	+0.14	23.9%	2.99	$58,600	- 6.2%	1	1	0	1	1	4
38 Instruments	1.20	- 0.44	1.00	+0.25	38.6%	2.63	$67,400	+22.9%	1	1	0	1	1	4
39 Misc manufacturing	1.01	- 0.24	0.87	+0.01	46.6%	1.63	$27,500	+1.6%	1	1	0	0	1	3
Transportation	1.15	- 0.10	1.05	- 0.00	52.7%		$39,400	- 13.6%						
41 Transit	0.86	- 0.17	1.04	+0.07	61.8%	1.40	$23,900	- 8.4%	0	1	1	0	0	2
42 Trucking & warehousing	1.14	- 0.30	1.08	- 0.03	46.1%	2.25	$40,400	- 12.6%	1	1	0	1	1	4
44 Water transportation	1.81	+0.52	1.08	- 0.06	38.6%	3.34	$56,400	- 14.4%	1	1	0	1	1	4
45 Air transportation	1.15	+0.34	0.87	- 0.07	68.7%	1.61	$40,900	- 25.9%	1	0	1	0	1	3
47 Transportation services	1.27	- 0.05	0.88	- 0.08	73.3%	1.55	$35,700	- 7.2%	1	0	1	0	0	2
Communication & Utilities	1.31	+0.06	0.70	+0.07	60.7%		$56,700	+4.6%						
48 Communication	0.95	+0.11	0.87	- 0.09	55.5%	2.95	$66,500	- 5.0%	1	0	1	1	1	4
49 Electric, gas & sanitation	0.98	+0.19	1.06	+0.08	66.6%	2.90	$85,200	+23.8%	1	1	1	1	1	5
Wholesale	1.41	+0.03	1.07	+0.09	71.0%	1.96	$53,500	+4.1%	1	1	1	0	1	4
Combined Industrial Sectors	1.16	+0.04	0.98	+0.13	47.9%		$51,800	+7.3%						
All Industries					57.2%		$36,700	+3.2%						

Notes: LQ denotes location quotient or competitive position relative to the entire nation. An LQ of over 100% exceeds the national average. In the five columns at the far right, 1 indicates the criterion is met. Otherwise 0 is shown. The last column indicates the number of threshold criteria met.

Source: E.D. Hovee & Company using IMPLAN.

Only the electronic equipment and electric/gas/sanitation industries meet all five criteria. However, another eleven industries met four of the five criteria. Taken together, nearly half of the industrial sectors portray the Portland-Vancouver metro area as being strongly competitive. Industries meeting *four or more* criteria include:

Construction	**Instruments**
Lumber & Wood	Trucking & Warehousing
Paper Products	Water Transportation
Stone, Glass & Concrete	**Communications**
Industrial Machinery	**Electric, Gas & Sanitation**
Electronic Equipment	Wholesale Trade
Transportation Equipment	

As indicated by the **boldface** type, nine of these thirteen sectors are already well represented within Portland's harbor industrial area. Maintaining and enhancing the region's competitive position for these key sectors will be dependent on steps to preserve and enhance the capacity for Portland's harbor industrial users.

Summary Economic Impact. Consistent with employment data developed by the Bureau of Planning for Part 1, Portland's harbor industrial area currently has an employment base of 39,190 jobs. Of these, 34,270 (or 87%) are industrial jobs.

The harbor area's 34,270 industrial jobs *leverage* another 46,890 jobs throughout the metro area – for a total of 81,160 jobs directly and indirectly attributable to harbor area industries.

Figure 28. Economic Impact of Portland Harbor Area Industry

	Jobs
Portland Harbor Area Industries (Direct)	**34,270**
Other Economic Activity Indirectly Supported in Portland Metro Area	**46,890**
Total Economic Impact to Portland Metro Area	**81,160**
Economic Impact Multiplier	**2.37**

Source: E.D. Hovee & Company, using IMPLAN and Bureau of Planning employment data.

The overall impact multiplier of 2.37 for harbor area industries exceeds the typical multipliers associated with service sector jobs. This is due to relatively high wages of harbor area firms coupled with extensive local inter-industry linkages – as revealed both by industry interviews and input-output data.

The full economic impact to the metro area of Portland's harbor area extends beyond what is represented by these quantitative estimates. Businesses and residents regionwide are dependent on goods and services that often are uniquely provided by harbor area industries.

B. CHANGING DYNAMICS OF HARBOR INDUSTRIES

Based on interviews conducted for this Part Two report, three industry clusters are of special interest for more detailed evaluation – transportation equipment manufacturing, metals, and

marine terminals. Before consideration of the inter-industry linkages that these clusters represent, we first describe an analytic framework for distinct characteristics and harbor industry linkages.

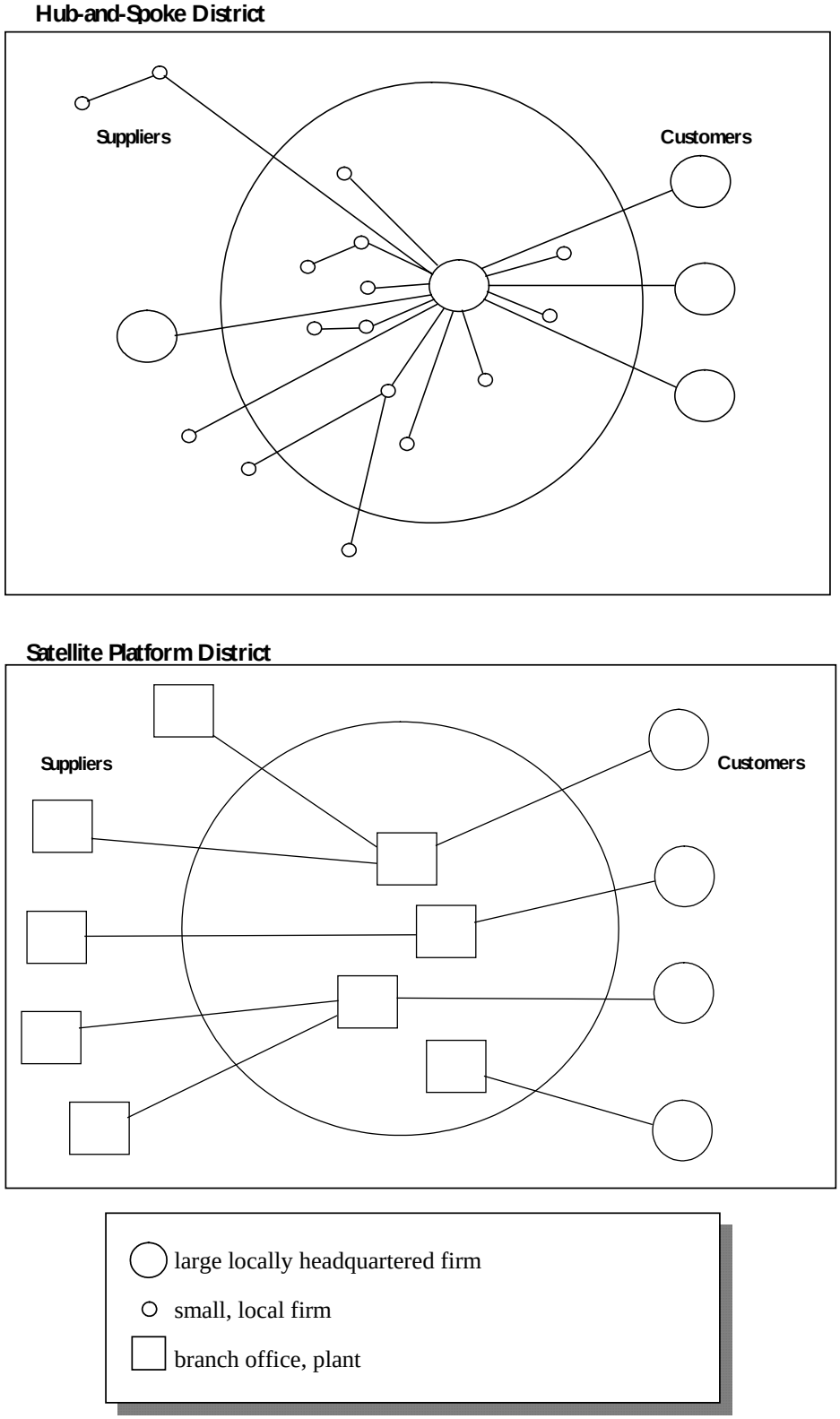
District Characteristics. As evidenced by Part 1 and 2 PHILS analysis, the Portland harbor industrial district represents an important and dynamic segment of the region's economy. Interviews with study area business leaders unveiled a number of intra- and inter-industry relationships within the harbor area, as well as inside and outside the region.

In thinking about the functioning of an industrial district, two alternative analytic frameworks are useful for consideration:

- A *hub-and-spoke* district – with large and often locally headquartered firms supplying customers often outside the district but with numerous local suppliers.
- A *satellite platform* district – with branch offices or plants served by suppliers and catering to customers largely located out of the industrial district.

The Portland harbor industrial area currently functions similar to a *hub-and-spoke* district.[xii] Study area activity has been dominated by a few large firms such as Freightliner, Gunderson, Wacker, Oregon Steel Mills, ESCO, and Port of Portland. The ten largest harbor area private sector firms employ over 60% of the study area's workers. Due to extensive inter-firm relationships, they also support a significant portion of the remaining workforce.

Figure 29. Industrial District Characteristics



Source: Ann Markus. "Sticky Places in Slippery Space: A Typology of Industrial Districts." *Economic Geography*, July 1996.

However, the harbor area may be in transition. While still dominated by large locally owned firms, the district increasingly appears to be shifting more to the satellite platform model. This is exemplified by the focus group comment that the harbor's future may be more toward wholesale distribution rather than manufacturing.

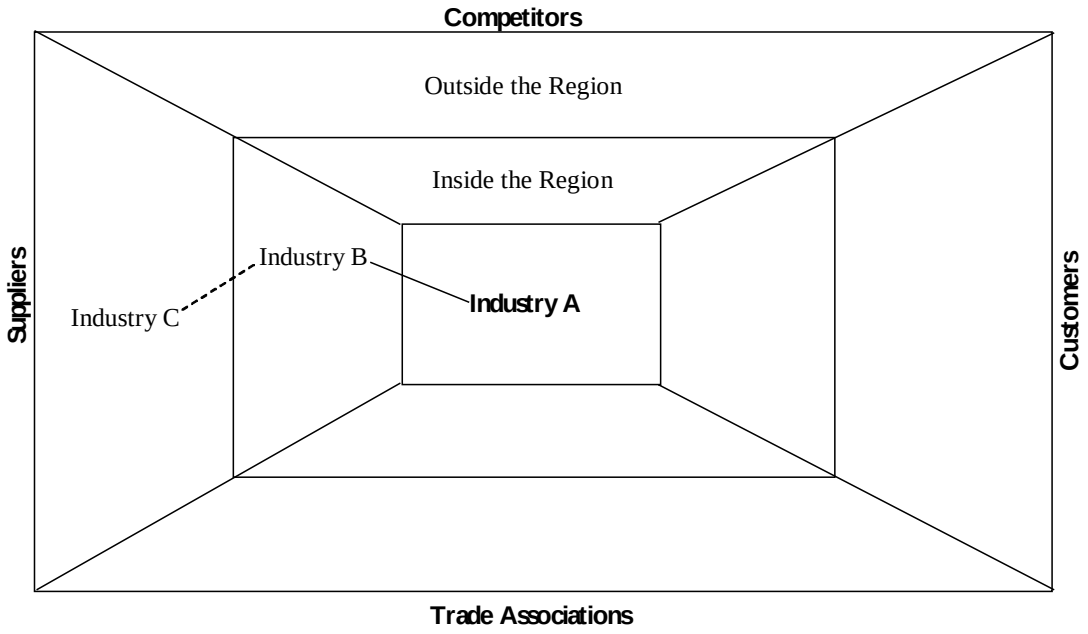
In the short term, this transition means a *hybrid district* of both large locally owned firms as well as regional/branch plants. Yet the ongoing trend of local firms seeking national/international alliances (e.g. Freightliner) creates challenges for locally dominated sectors to remain competitive with a *hub and spoke model.* Also noted is the trend for non-local firms using Portland as a regional hub to serve the western states of Oregon, Washington, Idaho, and Montana.

Harbor Industry Linkages. The business interviews revealed a number of industry linkages. Because the interview questionnaire primarily focuses on the three largest suppliers, customers, and competitors, the linkages depicted in this analysis likely underestimate the amount of interaction between harbor activities.

The Portland harbor industrial area has developed primarily around the district's major industrial/marine activities such as transportation equipment manufacturing (e.g. Freightliner, Gunderson, Zidell, etc.), petroleum products, metals, and marine terminals at the Port of Portland. In an effort to depict the business linkages between harbor industries, information collected from the business interviews is illustrated using a multi-firm/industry mapping diagram developed by the University of Minnesota.

The mapping diagram denotes inter-relationships by organizing activities into *four quadrants* and placing the subject activity in the center of the quadrants. Activities within the four quadrants are further divided between relationships identified within the local region versus outside the region. Linkages between specific activities are illustrated by the connecting lines: a) solid line for direct linkages with central activity in question and b) dashed line for linkages not directly associated with central activity.

Figure 30. Industry Mapping of Local and Non-Local Relationships



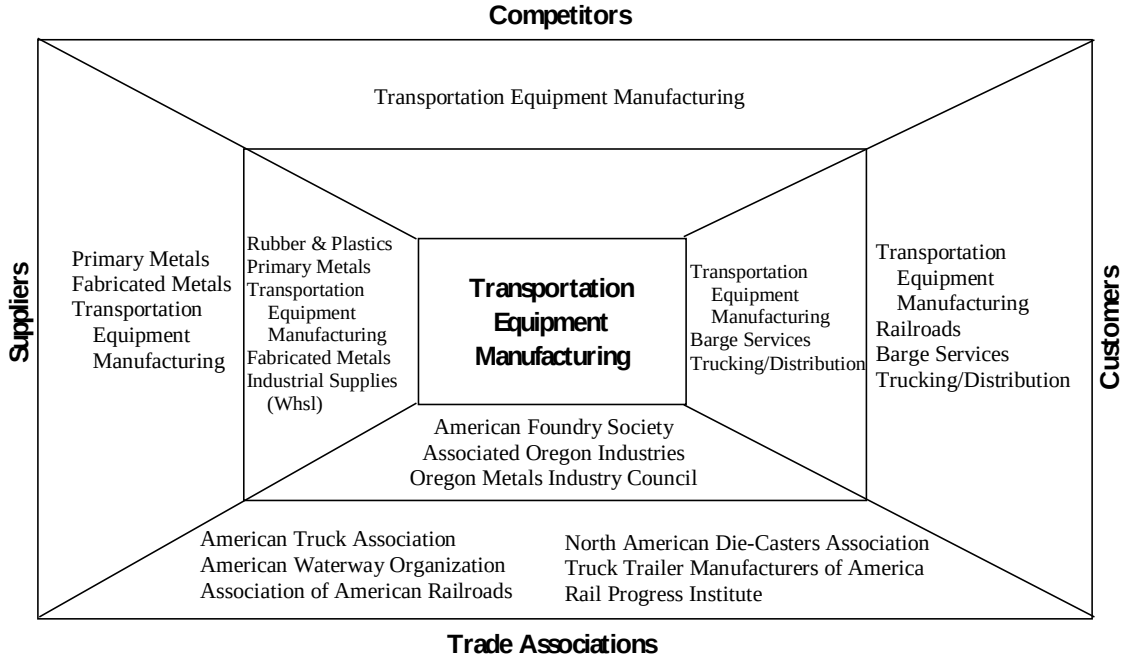
Source: Ann Markusen, et al. 1999. *Second Tier Cities: Rapid Growth beyond the Metropolis*. Minneapolis: University of Minnesota Press.

This mapping technique is now illustrated using survey data for three harbor area industry clusters – transportation equipment manufacturing, metals, and marine terminals.

Transportation Equipment Manufacturing. Harbor area firms comprise both major manufacturers of finished products (e.g. railcars, barges, car carriers and trucks) as well as component companies such as hubs. There are a number of intra- and inter-relationships between companies, especially with metals and truck-related manufacturers.

The six firms interviewed from the Transportation Equipment Manufacturing sector employ 3,680 full-time workers and likely support another 7,300 within the Portland-Vancouver metro area. All six have annual revenues of $20 million or more each.

Figure 31. Transportation Equipment Manufacturing Linkages



Source: E.D. Hovee & Company.

In Portland, transportation equipment manufacturers support a wide range of vendors – located in the harbor area and elsewhere throughout the metro area. Home grown firms such as Gunderson and Freightliner are industry leaders.

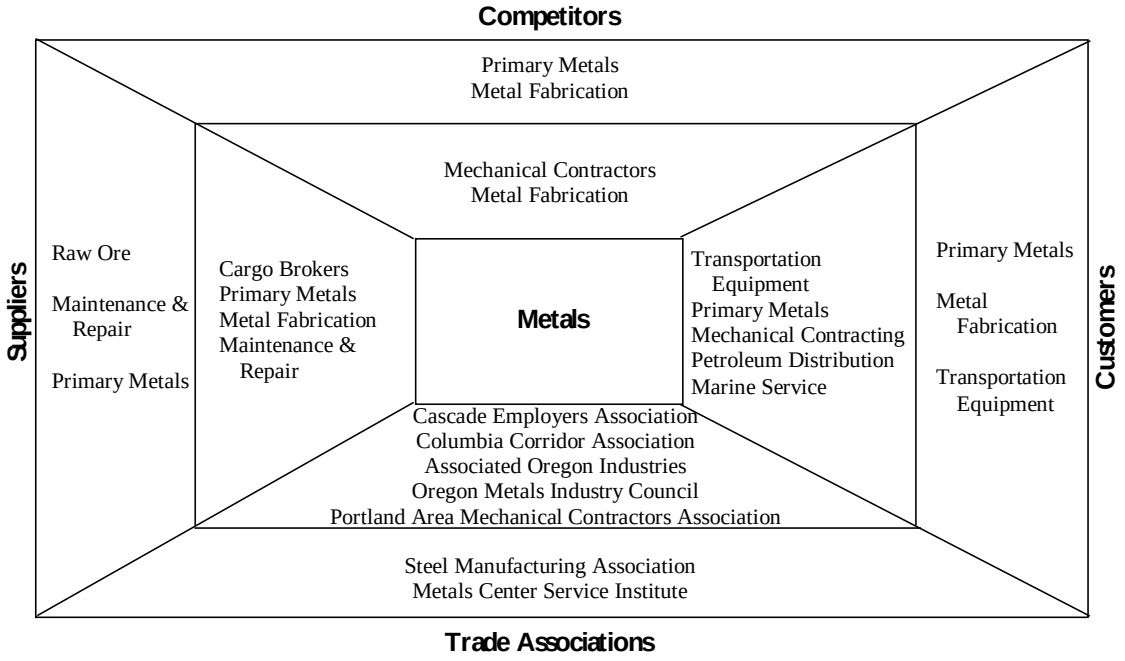
Curtailment or relocation of these operations would have substantial negative ripple effects throughout the metro economy. Conversely, efforts to stabilize and continue to grow these economic *powerhouses* in Portland would capitalize on the region's in-place infrastructure of supporting vendors and offer continued prospects for high wage employment benefiting Portland and the region.

Metals. The metals industry is an important segment of the regional economy. While the four harbor area firms interviewed employ only 850 workers, these firms provide a *foundation* for goods and services essential to a variety of other companies throughout the region and beyond.

The industry comprises both primary foundries as well as fabricators, with a slant toward steel products. The metals industry supplies goods and services to a variety of other harbor industries

such as transportation equipment, petroleum distribution and marine services. These firms also supply each other with goods and services.

Figure 32. Metal Industry Linkages



Source: E.D. Hovee & Company.

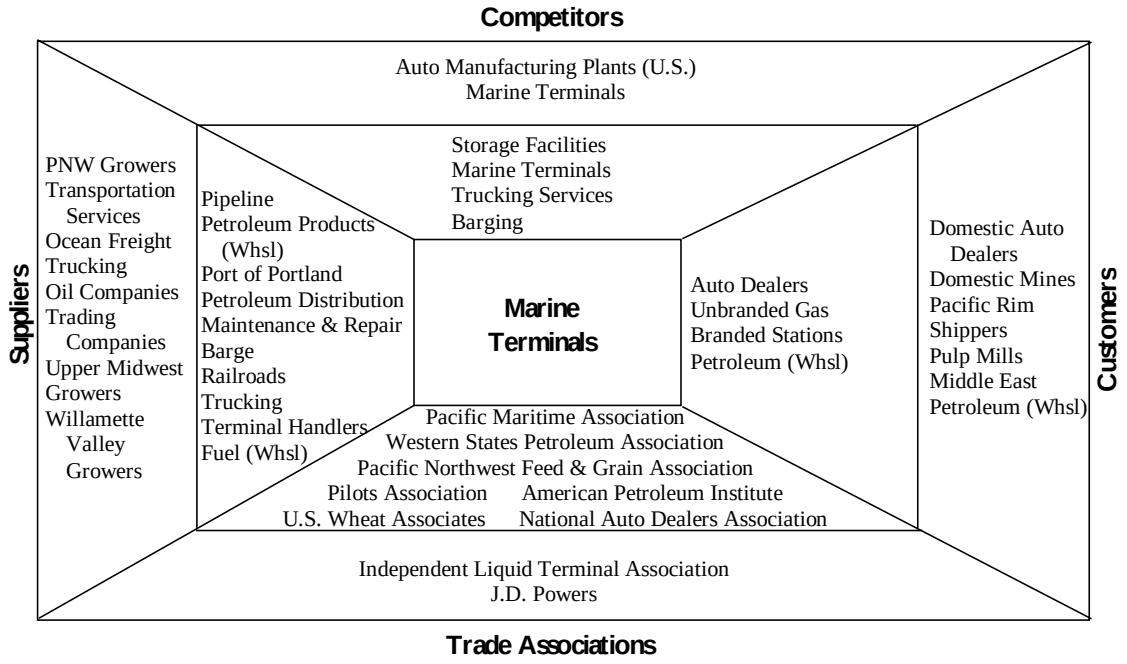
The metals cluster is increasingly research and technology oriented and comprises a wide range of firm types and sizes. Critical to continued competitiveness will be the capacity for continued quality and innovation to support product pricing above what foreign or domestic customers might offer.

As with transportation equipment, the ability to continue growing a strong, competitive (but specialized) metals industry in Portland will affect the region's ability to maintain and build a high wage economy. Most likely, industry strengthening and repositioning can occur only as the result of active public-private collaboration – with public support in targeted education/training, infrastructure investment, and regulatory reform.

Marine Terminals. Interviews were conducted with thirteen private sector businesses that utilize Port or proprietary marine terminal facilities in Portland's harbor industrial area. Activities include grain elevators, auto terminals, petroleum distribution, containers, and liquid bulk facilities. The marine terminals are more apt to be competitors than business affiliates – unlike the two previously discussed industry groupings. In fact, none of the terminal operators interviewed directly conduct business with one another.

The thirteen marine terminal businesses interviewed employ 780 workers directly on-site. However, they service an expansive region reaching as far as the upper Midwest of the U.S. – with exports to the Pacific Rim. Most of the terminals reporting gross revenues indicated $5-$20 million for their Portland harbor facility.

Figure 33. Marine Terminal Industry Linkages



Source: E.D. Hovee & Company.

In effect, the maritime industry cluster more closely approximates the model of a *satellite platform district* – with more diverse interindustry linkages both locally and globally. While marine terminal operators draw from a diverse set of customers and serve widely varying markets, they share similar needs for continued viability in the Portland harbor:

- Access to competitive multimodal transportation facilities.
- Availability of sites suitable for continued operations, modernization and expansion.
- Incentives to remain and re-invest in Portland harbor operations.

Portland's ability to maintain and benefit from this activity likely depends on greater understanding and supportive investment tailored both to the unique and common interests of its marine terminal users.

C. INDUSTRIAL SITES & SUITABILITY

To this point, the harbor industry analysis has focused on the demand side of industry potentials. The analysis now turns to supply side issues affecting the harbor area's regional competitiveness. At the core of the supply variables that can be affected locally is industrial site availability and suitability.

River-Dependent Use. In order to address the long-term viability of utilizing riverfront properties for continued maritime use, criteria were developed to identify potential site development constraints. The fourteen criteria appear on the following table, with the evaluation illustrated on the subsequent map.[xiii]

Of the approximately 3,130 acres of riverfront property, an estimated 580 acres (19%) have no constraints – all located in Rivergate. The majority (51%) of riverfront properties comprising 1,600 acres have 1-3 constraints that could require some form of mitigation to remain for maritime use.

Figure 34. Ranking Criteria for Evaluating Long-term Viability of Riverfront Properties for Marine Terminal Use

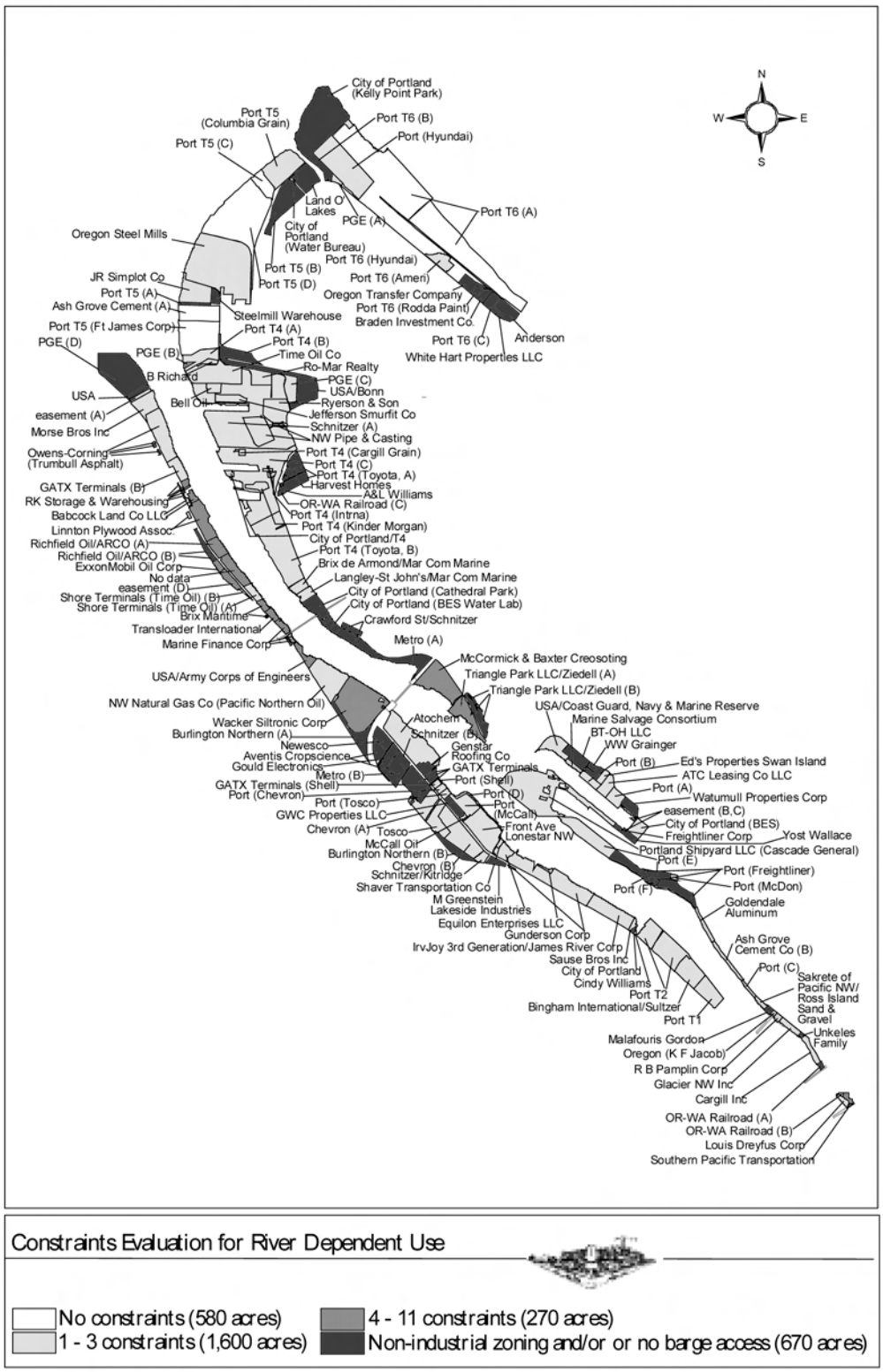
	Criteria	Constrained ⌖	Unconstrained ●
		THRESHOLD CRITERIA	
1.	**Appropriate Zoning**	Non-industrial zone.	Industrial zone (IH or IG).
2.	**Barge Access**	No existing dock and lacks mooring access with at least 20' draft within 150' of shore. Barge access extended to lots under same ownership/lease, adjacent to public ownership with barge access, or within taxlots with barge access.	Existing dock or 20' + draft within 150' of shore.
		ADDITIONAL CRITERIA	
3.	**Shoreside Barge Access**	No existing dock, and lacks mooring access with at least 20' draft for a length of 400' within 10' of shore.	Existing dock, or 20' + draft for a length of 400' within 10' of shore.
4.	**Ship Access**	No existing dock and lacks mooring access with at least 35' draft for a length of 400' within 10' of shore.	Existing dock or mooring access with at least 35' draft for a length of 400' within 10' of shore.
5.	**Rail Access**	No rail access.	Rail spur on property.
6.	**Truck Access**	Access by local streets through residential zones.	Site within truck district that has access to a regional trafficway, major street, or district collector in Portland *Comprehensive Plan*.
7.	**Appropriate Street Conditions**	Presence of steep topography and/or inadequately maintained access road.	Minimal topography, adequately maintained access road.

	Criteria	Constrained ⌖	Unconstrained ●
8.	**Sufficient Lot Depth**	Lot depth under 400'	Lot depth over 400'
9.	**Lack of Contamination**	Current or previous superfund site, high priority remedial investigation or clean-up, or high priority expanded preliminary assessment.	All other sites
10.	**Compatible Neighbors**	Linnton area taxlots adjacent to developed residential, commercial or mixed-use commercial zone.	Outside of Linnton, and no adjacent developed residential, commercial or mixed-use zoning.
11.	**Lack of Environmental Constraints**	30% or more site coverage by wetlands or river natural (n) overlay zoning.	Less than 30% wetland coverage and within river industrial (i) or river general (g) zoning.
12.	**Lack of Public Easement**	Existing trail (off street) at or near top of bank.	No off-street trail at or near top of bank.
13.	**Low Flood Risk**	More than 10% of aggregated lot within flood plain.	<10% within flood plain.
14.	**No Building Height Limitations**	Presence of height restrictions through the scenic overlay zone.	No scenic overlay zone.

Note: Criteria applied to taxlots directly fronting the river or with river access, grouped by ownership.

Source: E.D. Hovee & Company.

Figure 35. Constraints Evaluation for River-Dependent Use Map



Source: E.D. Hovee & Company

An estimated 270 acres (9%) has anywhere from 4-11 constraints. In some cases, the constraints may be amenable to remediation for river-dependent uses in a manner that allows private investment to proceed. In other instances, the constraints or cost to convert may exceed what industrial users find feasible in today's market.

Finally, 670 acres (21% of the total) are deemed as not meeting minimal threshold constraints of suitable industrial zoning and barge access. This includes sites (particularly upland properties) that may be suitable for non-marine industrial activity.

Upland Sites. The harbor industrial area has another 2,398 acres of upland property, or sites located inland and away from the Willamette and Columbia riverfronts. A detailed quantitative and mapping assessment of these properties has not been conducted as part of this study. This is for two reasons:

- The *criteria* important for evaluating constraints or suitability for non-river-dependent industrial use are different from and more varied than for river-dependent industrial activity.
- There is less data readily available to usefully and objectively assess upland site constraints.

Criteria that could be applied to assessing upland site limitations could be drawn from the following listing.

Figure 36. Potential Criteria for Upland Site Suitability

1. Appropriate zoning – industrial or employment zone.
2. Site size – can be more varied depending on business needs and whether developed for single user or as multi-tenant industrial park space.
3. Truck access – freeway connections and congestion.
4. Transit access – distance from bus stop and frequency/availability of service (including evening/weekend shifts).
5. Lack of contaminated sites – current or previous superfund designation high priority remedial investigation or cleanup, or high priority expanded preliminary assessment.
6. Compatible neighbors – proximity to residential or commercial uses that could be negatively affected by or object to industrial use (particularly at edges of the harbor industrial area).

Source: E.D. Hovee & Company.

D. LAND USE SENSITIVITY

The type and intensity of industrial activity that will locate within the Portland harbor area will be affected by several market and non-market factors. Three specific factors that will challenge the harbor area's long-term viability and competitiveness relate to availability of useable land, development and business occupancy costs, and viable alternative locations inside or outside the region.

Useable Land. A number of the river-dependent sites have constraints, which limits the amount of useable acreage for further maritime use/development. As noted earlier, only 580 acres have no constraints, most of which are owned by the Port of Portland and are located along the Columbia River at T-6. There is a significant amount of land (1,600 acres) that is encumbered

with 1-3 constraints. These sites tend to be privately owned/operated and are located along the Willamette River. There are only a few hundred acres that have a significant number of encumbrances (4-11 constraints). However, these sites are strategic for the Harbor's long-term maritime viability. These sites include Linnton, Oregon's petroleum hub, and McCormick Baxter properties.

In order for Portland to maintain a viable maritime industry, the public sector will need to work with the private sector to find feasible means for mediating the challenges facing the encumbered riverfront sites. Currently, it appears that the more constraints a site has the less investment (or more disinvestment) is occurring.

A specific example of the practical issues that site constraints pose – even for established industries – is provided by Portland's petro-chemical industry. At identified petroleum facility sites, interview results indicate that the expense of meeting environmental regulations has deterred private investment. Unless a constructive framework is developed to address many of the issues facing riverfront properties, Portland may experience relocation or displacement, over the long-term, as has occurred at other sites such as Linnton and McCormick Baxter.

Development/Business Occupancy Costs. One of the primary issues affecting the harbor area, as well as the entire City of Portland, relates to comparative costs of development and ongoing business operations. Some development costs are more specific to the harbor area (such as brownfield remediation) than the rest of Portland. However, if the harbor area is going to remain competitive with other industrial districts inside or outside the region, the issue of regulatory costs borne by the private sector appears increasingly critical to address.

Other studies conducted for sites within the harbor area have shown that industrial reuse on the Willamette River can have a negative land value. Negative land value occurs when the cost of environmental remediation and infrastructure *exceed* the competitive value of a land parcel ready for development.

When the land value goes negative, there is no incentive for the current land owner (or a prospective purchaser) to proceed with redevelopment. Industrial reuse is particularly vulnerable, since industry typically supports a lower land value than other private market uses – including residential and commercial reuse.

Studies completed for two sites in particular, McCormick Baxter and Terminal One North, indicate that without infusion of public sector resources, redevelopment for industrial (and perhaps even other higher value) use is infeasible, which means these sites are likely to remain vacant for at least the near term.

Viable Alternatives. Viable locations for various industries depends on the nature of the activity in question. The chart below identifies potential locations by industry cluster.

Figure 37. Alternatives for Industry Relocation

Within Portland Metro Area	Outside Metro Area
River-Dependent:	
Aggregate **Most likely along Columbia River, but greater increase in transportation costs due to heavier reliance on trucks.**	**Not feasible due to need to serve the local market (particularly construction activity).**
Marine Service **Follow marine terminal activity** **Close operations**	**Not feasible or already have operations in other major markets.**
Marine Terminals ***Autos*** **North of St Johns Bridge/Rivergate** **Hayden Island** **Vancouver**	**Seattle/Tacoma or other west coast ports.**
Grain **North of St Johns Bridge/Rivergate** **Hayden Island** **Elsewhere on lower Columbia River (Vancouver, Kalama, etc)**	**Most likely to California**
Petroleum **Vancouver (near pipeline); increased pipeline reliance (albeit with greater vulnerability to pipeline service disruption).**	**Already have facilities in other major markets.**
Other **North of St Johns Bridge/Rivergate** **Hayden Island** **Elsewhere on lower Columbia River (Vancouver, Kalama, etc)**	**Seattle/Tacoma** **California**
Wholesale/Distribution:	
Distribution Center **North of St Johns Bridge/Rivergate** **Hayden Island** **Airport Way** **Wilsonville** **Clark County**	**Seattle/Tacoma** **Eastern Oregon/Washington (I-82/84 corridors)** **California**
Distribution Service **Locate near distribution activity**	**Already have facilities in other major markets.**
Recycling **North of St Johns Bridge/Rivergate** **Hayden Island** **Elsewhere on lower Columbia River (Vancouver, Longview, etc)**	**Not feasible (without major transportation costs due to need to serve local consumer and business markets).**
Wholesaler **Locate closer to vendors** **Other industrial district**	**Not readily feasible for firms requiring immediate proximity to serve the Portland metro market.**

Within Portland Metro Area	Outside Metro Area
Manufacturing:	
Chemicals	
Other heavy industrial districts, as available	**Pipeline transportation (not currently in place).**
Close operations	**Already have facilities in other major markets.**
Electronics	
Gresham	**Other high-tech centers elsewhere in U.S. or globally**
Hillsboro	
Clark County	
Food Related	
Rivergate	**Counties at edge or beyond metro area (e.g. Columbia, Cowlitz).**
Vancouver	
Otherwise difficult due to lack of heavy industrial zoning in metro area.	**Relocate out of Pacific Northwest.**
Metals	
Rivergate	**Counties at edge or beyond metro area (e.g. Columbia, Cowlitz).**
Vancouver	
Otherwise difficult due to lack of heavy industrial zoning in metro area.	**Relocate out of Pacific Northwest.**
Printing-Publishing	
Any industrial district in metro area (but with inferior Central City proximity).	**Seattle**
Specialty Manufacturing	
Most industrial districts, except heavy industrial activities.	**Seattle**
Difficulty for heavy industrial activities.	**Locally focused operations would cease to exist.**
Transportation Manufacturing	
NW Industrial District	**East Coast, Midwest or foreign production.**
Swan Island	
Rivergate	
Clark County	
Difficulty for heavy industrial activities.	

Source: E.D. Hovee & Company.

Transportation & Land Use Planning. Three sets of private business planning decisions have been identified – either of which could substantially affect both transportation and land-use planning for the harbor area long-term:

- Growing need of the two main rail carriers serving Portland to establish a several hundred acre intermodal rail yard – most likely outside the harbor area and possibly outside the metro area.
- Surface transportation is important to harbor industries as trucking is the method most frequently used to transport goods in and out of the harbor. Maintaining efficient flow of traffic within the harbor area and on the region's freeway network is critical to retaining existing businesses as well as attracting new features.
- Potential to eventually consolidate up to three existing grain elevators (including two near the Rose Quarter) at an alternate location on the lower Columbia – subject to needs for

superior/expanded unit train service and ability to make a new facility investment that increases economic returns to the operator(s) long-term.

E. LAND DEMAND

Future demand for industrial land within the Portland Harbor area will be affected by both public policy and private market forces. Policy issues include the public's commitment to sustaining the Harbor's locational advantages (e.g. multi-modal transportation network, viable maritime industry, industrial sanctuary, etc.) as well as working with the private sector to resolve the uncertainties/issues facing area businesses (e.g. superfund, regulatory process, etc.). The land demand analysis provided in this Part Two study relies partially upon information presented in the Bureau of Planning's Part One analysis and interview results reported in Chapter III of this document.

The harbor area has 543 acres of vacant (undeveloped) industrial land. Only 33 acres are readily developable (Tier A) as 510 acres are constrained in some manner (Tier B).[xiv] Of the 543 vacant acres, 294 acres are located along the waterfront and 249 acres are comprised of upland sites.

Figure 38. Portland Harbor Vacant Industrial Lands (2000)

	Tier A	Tier B	A & B
Waterfront	12.2	281.9	294.1
Upland	21.2	227.9	249.0
Total	33.3	509.8	543.0

Source: Metro, E.D. Hovee & Company.

The next chart reports vacant land by harbor subarea as reported in PHILS Part One; totals vary slightly (by 4 percent) from total land vacancy figures above due to varying methodologies. However, the general conclusions derived from both sets of data are consistent. This vacant land inventory by subarea allows land availability to be matched with projected job growth by district for a more specific land needs analysis.

Figure 39. Vacant Industrial Lands by Subarea (2000)

District	Tier A	Tier B	A&B
Linnton	2.1	19.6	21.7
Guild's Lake	1.2	97.7	98.9
Rivergate	26.2	323.5	349.7
St. Johns	3.7	66.3	70.0
Swan Island	0.0	26.1	26.1
Lower Albina	0.0	0.0	0.0
	33.1	533.2	566.4

Note: Inventory does not include underutilized sites that may redevelop.

Source: Metro, as reported by Part One PHILS report.

Metro is projecting an added 10,460 jobs for the Portland Harbor area. This equates to an added 523 jobs per year over the next 20 years. Sixty-three percent are anticipated for the Rivergate area.

Figure 40. Portland Harbor Area Employment Forecast

District	2000	2020	00-20
Linnton	799	1,358	559
Guild's Lake	12,155	13,039	884
Rivergate	8,755	15,345	6,590
St. Johns	6,682	7,670	988
Swan Island	10,491	11,158	667
Lower Albina	2,335	3,109	774
All Districts	41,218	51,680	10,462

Note: Data based on Metro's TAZ boundaries that do not exactly represent harbor boundaries.
Source: Metro.

Employment growth will occur at both existing occupied and vacant sites. Assuming all added employment was to occur at current harbor area employment densities (8 jobs per acre), nearly 1,310 acres would be required to house all 10,460 new workers. The harbor area has only 566 acres of vacant Tier A/B land.

Businesses will accommodate additional employees on already occupied sites by reconfiguring operational layouts, adding additional shifts, or housing space currently not utilized (or being used inefficiently). A number of firms interviewed indicated they would be more likely to add an additional shift or ramp up operations during off-peak hours before considering expansion. Concerns over inadequate transit service increase when considering expanded operational hours beyond a typical "day shift," which could be a constraining factor to future employment growth

Figure 41. Portland Harbor Jobs Forecast vs. Vacant Industrial Land

District	Job Growth	Land (Acres)*	Vacant Land
Linnton	559	70	21.7
Guild's Lake	884	111	98.9
Rivergate	6,590	824	349.7
St. Johns	988	124	70.0
Swan Island	667	84	26.1
Lower Albina	774	97	0.0
All Districts	10,462	1,310	566.4

Note: Job growth projections were divided by 8 jobs per acre to estimate associated land area.
Source: E.D. Hovee & Company using Bureau of Planning.

Very few businesses interviewed indicated they had plans of expanding over the next 3-5 years or longer 5-20 year time horizon. Uncertainty surrounding current economic conditions, continued nationalization/globalization of the marketplace, and several local regulatory issues contributed to their inability to project beyond current needs. However, a few firms did indicate expansion plans. All together only 33 acres are anticipated over the next 3-5 years and 17 acres over the next 5-20 years. *Notes:* This excludes identified need for a 500-acre intermodal rail hub.

The Bureau of Planning has completed analysis of land demand for river-dependent activities. In each of the last four decades, 200 acres of riverfront property was developed for maritime

activities. This equates to an annual average absorption of 20 acres. Assuming a similar trend was to continue over the next 20-30 years, 400-600 acres of riverfront industrial property could be needed to sustain an economically viable working waterfront. Assimilating this amount of riverfront property could prove challenging, and brings into question the potential of using nearby upland sites – including potential future consideration of industrial land reserves associated with the west end of Hayden Island.

V. POLICY QUESTIONS

The analyses completed for both Part One and Two studies have surfaced a number of policy issues that should be addressed as the City carries forward its Portland harbor planning efforts. As noted at the beginning of this Part Two PHILS report, results are also expected to be important for Portland's updated economic development strategy and for marine facilities planning by the Port of Portland.

The Bureau of Planning proposed policy questions for this study to address. Additional related policy issues have surfaced from the industry interviews and economic research conducted for this Part Two PHILS report. These Part Two results are termed "survey results."

Policy questions addressed are grouped into four major topic areas covering: a) all harbor area industries, b) river-dependent industries, c) upland industries, and d) alternative futures.

A. ALL HARBOR AREA INDUSTRIES

Further understanding of three questions posed by the Bureau of Planning will be important in deciding which alternative future is the more viable – whether from a market-driven or public policy perspective. The first question relates to overall trends and issues for harbor industries, the second to the potentially changing mix of harbor area business activity, and the third to overall policy implications.

1. What are the major trends and issues affecting business and employment prospects for Portland's harbor area industries?

- *What are the major industry trends affecting Portland harbor area industries? To what extent will harbor firms be in the same business 5-10 years from now? In what ways may the face of business change? And, what are the long-term implications for the Portland harbor industrial area?*

  While the national economic downturn has dramatically affected Oregon and the metro area, Portland's harbor industries generally appear to be holding their own. On average, reported employment is up by about 7% for full-time employees and down 5% for part-time employees compared to 3-5 years ago.

  While stable on the downside, these businesses (generally the larger employers in the harbor area) also do not expect to be adding substantial numbers of new jobs as the economy rebounds. Average gains of 9% for full-time and 30% for part-time employees are projected over the next 3-5 years. These gains would bring full-time employment back slightly ahead of pre-recession levels; more substantial growth potential appears to lie with part-time jobs.

  While considerable investment is occurring or is expected, both river-dependent and larger upland firms that plan to expand generally can do so without need for additional harbor area industrial land. Some industries – such as transportation and metals manufacturing – may essentially reinvent themselves over the next 10-20 years. All firms

that serve a national or global market are facing extraordinary competitive pressures – particularly to be more cost competitive.

- *Has Portland changed from a low-moderate cost to high cost city for business? If so, are these trends beyond local/regional control or can Portland's cost competitiveness be improved? Can cost disadvantages be offset by technological innovation and industry leadership? What supportive actions can be taken by the City, Port and other regional and state agencies?*

  Finding ways to remain cost-competitive appears to be the *#1 issue* facing Portland harbor area industries. The challenge is particularly intense for these firms because they generally perceive Portland as no longer a low-moderate but rather a high cost city from which to do business – compared to their industry peers. The reasons vary by firm and include such factors as wage and benefit costs, cost of land, distance from market/transportation cost, underinvestment in transportation and education infrastructure, and the combined cost, uncertainty and perceived anti-business character of state/local regulation.

  Some of these cost disadvantages – such as distance from market – may be beyond the influence of the Portland community to affect. Other factors – related to labor, infrastructure and regulation – may be more amenable to corrective public policy and action, although not without attendant public expense.

- *What harbor area issues are most affecting business planning and investment decisions now? In what ways? What issues potentially could become major tipping points – causing business to disinvest in the harbor area? How can these issues be addressed pro-actively, responding to critical business concerns and interests?*

  For riverfront and some nearby owners, issues most pressing today include uncertainty and potential cost associated with superfund cleanup and maintenance of competitive multi-modal transportation (marine, rail, highway). For upland as well as waterfront industries, additional issues of concern include regional congestion (for employees and freight), encroachment of incompatible non-industrial use, high cost and time delay for permitting, and perceived lack of city/regional public policy and community support.

  If not addressed, these are issues that individually or collectively could cause harbor industries to relocate and/or disinvest over time. There appear to be two primary means to proactively address industry concerns – expressed interest/interaction from the City followed by policies and investments that can make a demonstrable difference for harbor industries.

2. How will the mix of industries change in the harbor area to 2030?

- *Map the primary inter-firm and inter-industry linkages that keep particular industry segments in the harbor area.*

Key linkages for major harbor area industry groupings are summarized as follows:

- ✓ *River-Dependent* – Aggregate firms require multi-modal access including convenient local street access to major street networks. Firms must be linked to both Columbia River sites in order to transport aggregate materials (generally barged in for shallow 15-20 foot draft), and to Central City/metro area construction sites. Marine terminal/service firms require deeper draft facilities of 30-40+ feet, multi-modal access, and significant site depth. These firms are widely linked as suppliers to the region's gas/petroleum product distribution network; regional manufacturing, wholesale and retail industries; and as transporters of products ranging from Portland metro industrial goods to Pacific Northwest/Midwest agricultural commodities.

- ✓ *Wholesale/Distribution* – Firms can be generally classified as two types: a) those serving metro area business and consumer needs, thereby placing premium value on a central regional (including Central City) location together with ready freeway access; and b) distribution centers/transshipment facilities serving markets largely located outside the metro area. For this second group, intermodal connections and competitive business cost factors are of greater importance than a central location.

- ✓ *Manufacturing* – Harbor area chemical and electronics companies are suppliers to a wide spectrum of the metro area's high tech and general manufacturing industrial base. Food-related companies also are diverse, and vary in their utilization of regional agriculture for a regional/global market versus a local/metro market. Printing/publishing firms benefit from proximity to the Central City and from interaction with close-by suppliers and customers.

  Metals and transportation firms have substantial in-place capital investment, often requiring intermodal transportation capability for bulk products, and draw on extensive vendor-supplier relationships with other similar firms as well as wholesalers and transporters in the harbor area. The long-term viability of the harbor metals/transportation clusters is closely aligned with operations of local industry leaders – notably Freightliner, Esco and Gunderson. These linkages will be illustrated with greater detail in the final report.

  All harbor area manufacturing clusters (except printing/publishing) typically require heavy to general industrial zoned land that may not be readily available or suitable elsewhere in the Portland metro area. Metro's 2000 Buildable Industrial Lands Inventory identifies only 238 vacant Tier A acres designated for heavy industrial use throughout the region, much of which appears to be comprised of relatively small development parcels. Including Tier B land brings the regional total of vacant heavy industrial inventory to just over 1,500 acres.

- *Are the land needs of these industry clusters growing, stable, or declining and by how much (e.g., acres per year to 2030)?*

Land needs vary depending on the general industry grouping and more detailed cluster under consideration:

- ✓ *River-Dependent* – Little near-term expansion demand from existing firms/operations in the Portland harbor area is foreseen, with the possible exception of auto import facilities. Relocation demand is possible depending on factors such as market pressures for existing close-in sites, resolution of superfund and dredging issues, and results of the *River Renaissance Plan*.

- ✓ *Wholesale/Distribution* – Demand has been and is expected to remain strong, consistent with historically low vacancy rates for close-in distribution space. Demand will remain particularly active with firms primarily serving the Central City/Portland metro market, assuming reasonable levels of local arterial and freeway congestion are maintained. The need for Portland harbor area distribution facilities serving a broader regional to global market is more uncertain, and depends on factors such as the competitive cost of business in Portland and suitable transportation access compared to other site alternatives considered.

- ✓ *Manufacturing* – Land needs for the industries surveyed ranges from none to modest expansion, as most firms report the ability to accommodate expansion needs on-site. However, the interview sample excludes smaller firms that may be currently generating strong land demand, both for new locations and expansion.

- *What other growing industries are well suited to the harbor area because of its location advantages (e.g., truck access in central location) and what are their likely land needs (e.g., acres per year)?*

  Survey Results: For this response, the analysis draws not only from the survey results to date but other related research conducted by our firm. Some opportunities can be clearly discerned; others are more speculative. Therefore, no specific land demand projections are made at this time. For discussion purposes, it is assumed that comprehensive plan designations/zoning may be changed to meet the needs of the industries described.

  - ✓ *Regional Distribution* – This assumes that Portland regains competitive share lost to Seattle-Tacoma over the last 20 +/- years. Factors pivotal to successful repositioning include available and reasonably priced land, strengthened Port/maritime activities, transition of more freight to rail (with the Columbia River as a more attractive east-west route), and supportive economic development programs.

  - ✓ *Transportation/Metals* – If these existing harbor area industry clusters remain in Portland, many of these businesses likely will be dramatically reconfigured over the next 10-20 years. These industries are expected to move toward more leading technology R&D, prototype development, testing, marketing and administrative functions.

  - ✓ *Wood, Plastic and other Fiber Material Technologies (including end products such as furniture)* – This assumes a renewed priority to re-capitalize on Portland's historic

forest products dominance, this time with *green products* and engineered composites most likely leading the way.

- ✓ *High Tech/Bio Tech* – The harbor area could be positioned to attract firms that: a) support existing high tech and the emerging biotech/lifescience cluster (i.e. vendors and contractors); and b) major fab operations (as in semiconductors similar to Wacker).

- ✓ *Creative Services & Information Technology (including film & video)* – While likely centered in Portland's Central City, close-in portions of the harbor area present some opportunity due to the strong presence of the existing printing/publishing cluster. Large isolated land sites could prove attractive for larger footprint uses as for a sound stage facility. Attracting more of this investment activity likely requires adjustments to the existing industrial sanctuary.

- ✓ *Corporate Headquarters & Business Park Facilities* – Prime sites could include riverfront locations no longer suited for river-dependent activity and too expensive (when all site costs are considered) to justify industrial reuse. Accommodation or recruitment of this emerging cluster would also require modifications to existing industrial sanctuary policy.

3. What planning and policy issues are important to address for harbor industries?

- *What is the composite industrial land demand for riverfront and upland industrial sites?*

  This question is difficult to address from interview data – because interview information does not cover needs of smaller industries and/or potential new firms not currently located in the harbor area. However, Metro employment forecasts provide one possible indicator of industrial land need – assuming regional growth allocations are realized.

  Within Metro's regional land inventory, there are only 33 acres of vacant Tier A land plus another 510 acres of vacant Tier B sites. This includes both river and upland sites. At absorption rates consistent with the Metro employment forecast, the Tier A inventory would be depleted within less than one year and the entire Tier A/B inventory within 9 years. This assumes that Tier B lands can be readily converted to Tier A status within the absorption time period indicated.

  If this demand materializes, it can be expected from three primary sources: auto-oriented marine terminals, smaller industries in the harbor area with potential to expand, and firms not currently present in the harbor area or metro region.

- *What types of public infrastructure investments are important to continued vitality of harbor area industries?*

  For both river dependent and upland firms, continued investment in the region's multi-modal transportation system is of critical importance to industry competitiveness. I-5 Trade Corridor and congestion relief on the region's freeway and arterial network is of interest to a wide range of businesses. Improved transit service also is identified as a growing interest.

  While of greatest significance for river-dependent firms continued competitiveness of the harbor area's intermodal capability also affects related upland industries – especially

transportation and distribution firms. This includes initiatives to maintain and improve Portland facilities and intermodal rail capabilities.

- *How can local authorities minimize regulatory costs?*

  The cost, time delays and uncertainties associated with permitting coupled with the perceived lack of public agency and community support for traditional industry are major sources of frustration for many business owners – especially those with deep roots in the Portland community. Streamlining the permitting process in a manner that produces a predictable outcome within a reasonable timeframe is of critical importance to address both on-going maintenance needs and reinvestment in new or upgraded facilities. Providing assistance in working through the complex web of local, state, and federal regulations would go a long way toward rebuilding a positive relationship/image with area businesses.

- *What can be done to present Portland as a business friendly community?*

  Businesses indicate that addressing industry concerns can be proactively addressed by: a) interaction with City and Port policy and decision-makers, followed by b) City policy and investment commitments that can make a demonstrable difference for harbor area industries.

B. RIVER-DEPENDENT INDUSTRIES

Two questions are of primary importance in planning for the needs of Portland's river-dependent industry – virtually all of which is encompassed by the Willamette/Columbia harbor area defined for this study. The first question relates to the amount of land required; the second to most suitable locations.

1. How much land is needed for expansion of river-dependent industry to 2030?

- *The 1997 Harbor Land Use Inventory found a 21-acre per year average of marine industrial development on previously vacant land since the previous 1990 inventory. Is that acres-per-year trend likely to be similar over the next 30 years?*

  Future demand for marine industrial land will likely be driven primarily by users not currently located in the Portland Harbor area, possibly coupled with relocation and expansion of a limited set of existing Portland Harbor area industries.

  Based on interviews completed to date, there appears to be little net new land demand on at least the near term horizon from existing river-dependent industries, with the exception of auto import facilities. Future demand from external and relocation sources can come in large increments (e.g. a Vestas-type use) but is difficult to predict in advance. A key policy issue is whether to reserve marine industrial uses for future needs that can not be readily foreseen. Policy for the harbor area should address the importance of maintaining a working waterfront and determine what is required to sustain an economically viable maritime trade – both short-term and over a longer 50-100 year time horizon.

- *How much 30-year demand for land is for 50+-acre, ship-access sites? How much for 5+-acre, barge-access sites?*

In general, firms that were interviewed had difficulty projecting land needs 30 years out. Those that did venture an opinion generally indicate little to no need for added land. Most firms also report adequate expansion potential on their existing site for at least the near term (3-5 years). The greatest near-term land demand increase is projected by marine terminals, which estimated a combined total demand increase of 100+ acres. Minimal increases in land demand (not currently controlled) have been projected by manufacturers (metals, electronics and specialty) – for a total by those reporting of just under 20 acres. This demand was reported by manufacturing firms currently located on water access sites. The exception is with rail distribution, reporting a long-term need for an additional 500 acres – not expected to be readily accommodated within the harbor area and perhaps not in the Portland metro area.

- *Will there be a glut of vacant riverfront land as a result of the Superfund project (e.g., Atofina, Time Oil) or industry contraction (e.g., Alcatel, Cascade General)?*

  Land data collected over the past two years preliminarily suggests an estimated 294 acres of vacant (unbuilt) riverfront/direct river access property that is not in active use, with the possible exception of minor storage activities. These sites comprise about 9% of the approximately 3,133 acres in Portland's industrial harbor area that directly front the Willamette or Columbia Rivers, or have river access (as illustrated by the land constraints mapping conducted with this analysis).

  It is noted that this inventory does not include sites that are built but currently vacant – whether for sale or lease. Also noted is that, while the extent to which sites are underutilized due to Superfund or other factors has proven difficult to quantify, survey results clearly suggest that opportunities for redevelopment are contingent upon achieving greater clarity as to public/private responsibilities for remediation and the associated private property owner cost.

  The constraints mapping of Section III to this report indicates an estimated 670 acres of land not well suited for river-dependent industrial activity. Another 270 acres is identified as having 4-11 constraints. These sites are most *at risk* of transitioning from active river-dependent/industrial use in the future – depending on long-term economic prospects and regulatory conditions.

  For at least the immediate (3-5 year) future, it appears likely that more land along the Willamette Riverfront will be vacant or underutilized. Even sites with existing businesses may not operate to their full potential or capacity as new investment is deferred.

  Underinvestment in riverfront sites can be attributed to both market and regulatory considerations. The recession has been particularly challenging for capital goods and trade-related industries – which characterize the industries of Portland's harbor area. With economic recovery, a longer-term challenge will be Portland's competitive position for trade and industrial investment.

  This longer-term competitive posture will be affected by decisions about key regional investments as for channel deepening and maintenance, and ultimate resolution of major

policy/planning issues – notably superfund liability. If resolution of these issues places Portland's riverfront industries at an increased competitive disadvantage, riverfront site underinvestment could become more pronounced than they are at present. Conversely, if resolution is achieved allowing for an adequate financial return on investment, currently vacant and underutilized sites could come back on-line with active river-dependent and/or other industrial use.

- *If the existing River Industrial Zone was substantially reduced (e.g., to the T-4 to T-6 area of the Peninsula), how soon would competing industrial uses deplete the available supply of vacant harbor riverfront land?*

  This response assumes that the proposed reduction is for river-dependent uses (along Willamette and Columbia frontage) and that there are no other significant changes in upland industrial sanctuary designations.

  Metro's 2000 industrial buildable lands inventory identifies 152 acres of Tier A/B vacant riverfront north of the St. Johns Bridge (roughly equal to the land between the Port's T-2 and T-4). Of this amount, only 12 acres are designated as Tier A with 140 acres classified as Tier B.

  In comparison, developed riverfront industrial land south of the St. John's Bridge is estimated to total just under 760 acres (also based on 2000 data). While this amount of development could not be accommodated with waterfront sites alone, the ability to at least partially accommodate potential relocation need is expanded if upland sites are included.

  The inventory of all vacant Tier A land north of the St. Johns Bridge (river plus upland sites) is 32 acres. Tier B sites add 362 acres. Best case, this inventory of river-oriented and upland sites would be adequate to handle only about one-half of the acreage of current river-dependent industries south of the St. Johns Bridge.

  In summary, the speed with which riverfront land north of the St. John's Bridge is absorbed will primarily depend on: a) expansion of T-4 related auto import facilities; b) any relocation demand from river-dependent (and possibly other) industries south of T-4 on the Willamette; and c) accommodation of external demand from river-dependent users not currently located in Portland's industrial harbor area. If demand continued at the historical (90-97) pace of 21 acres per year, Tier A and B riverfront sites could be depleted in as little as 7 years.

2. What locations make sense to reserve for river-dependent industry?

- *Which lands are the most advantageous, which are moderately advantageous, and which are marginally suited to meet future demand for river-dependent industrial use?*

  The results of a preliminary riverfront sites constraints review are described in the criteria/matrix and map attached as Appendix C to this report. Fourteen criteria recommended on a preliminary basis to assess site suitability for river-dependent use are:

Threshold Criteria:

- ✓ Appropriate zoning
- ✓ Barge access

Additional Criteria:

- ✓ Shoreside barge access
- ✓ Ship access (deep draft)
- ✓ Rail access
- ✓ Truck access
- ✓ Appropriate street conditions
- ✓ Sufficient lot depth
- ✓ Lack of contamination
- ✓ Compatible neighbors
- ✓ Lack of environmental constraints
- ✓ Lack of public easement
- ✓ Low flood risk
- ✓ No building height limitation

- *How long will the delay of major capital investment in the Superfund project area continue?*

  Based on comments of those interviewed, major capital investment is generally likely to be postponed at least until there is more certainty as to affected private owner cost responsibilities. If the time period for clear assignment of costs is extended indefinitely, some existing operating businesses may make decisions to effectively disinvest in existing Portland Harbor facilities.

  In situations where private Superfund related cost responsibilities exceed private owner resources, some remaining facilities could be closed. If private clean-up costs plus demolition exceed underlying land values consistent with property zoning, affected current and future vacated sites could remain underutilized indefinitely, unless land use redesignations allowing high value uses or public funding support for remediation occurred.

- *Should riverfront sites be considered for non-river-dependent uses? If so, for what uses and under what conditions?*

  While this question was not directly asked in the interviews, there appears to be definite majority interest in having the City continue to preserve the working harbor area for industrial use. This interest is further supported by focus group discussion. If river-dependent use is no longer likely (at some river sites), conversion to another non-water dependent industrial use is generally preferred over conversion to significant retail, office, residential or mixed use.

Conversion of riverfront land to non-river-dependent industrial use will commit the land to this use for a significant period of time, but not in perpetuity. Depending on the anticipated useful and depreciable life of the investment made, these sites would likely become available for reconversion to river-dependent uses – if demand materializes – over a 20-50 year time period.

A minority of interviewees would support mixed use at selected high amenity sites and some would like more commercial services to area firms (such as dining) situated within the industrial sanctuary. For example, maintaining river-dependent industry in Linnton may prove problematic due to narrow depth of industrial land, nearby adjoining residential use, and closure/curtailment of some of the more dominant historical industrial uses.

C. UPLAND INDUSTRIES

Upland industries are defined as those firms located on sites without direct frontage or immediate site access to the Willamette and Columbia Rivers. Issues and needs associated with upland industries are not as central to Portland's River Plan process, but are important to understand because of the interconnected nature of river-dependent with upland industrial activity. Harbor area industries are also somewhat unique in the metro area – because they are located on the largest repository of land designated for heavy industrial activity not readily accommodated elsewhere in the region.

1. What are the land needs, policies and priorities for upland (non-river) sites?

- *Should industrial sanctuary policy in Portland's harbor area be revisited? Should mixed use including commercial/residential activity be allowed? Under what conditions?*

  There appears to be general consensus from those interviewed that residential and large scale commercial retail should not be allowed in an industrial sanctuary. There is less agreement as to how broadly the term "industrial" should be construed – particularly in an era when many businesses are blurring the traditional boundary between industrial and commercial functions.

  Some would favor more zoning flexibility for related commercial employment functions, including corporate office, creative services/information technology and business park/flex space applications. Others prefer maintaining existing distinctions, fearing that more flexibility will compromise the ability for some existing businesses to continue industrial operations in the manner to which they have been accustomed. If greater flexibility is desired, broadening employment uses could occur as *transition elements* along the fringes of the district where industrial and non-industrial uses abut.

- *What transportation network improvements are important to upland industries?*

  As with riverfront industries, upland firms are interested in improved transportation – particularly roadway improvements both for freight and employees. This includes I-5 Trade Corridor and other congestion relief to the region's freeway and arterial network. There is perhaps surprisingly strong interest in obtaining better transit service for firms situated in locations ranging from NW Portland to Rivergate. An increasing proportion of

the industrial labor force – especially entry level including shift workers – is dependent on transit.

D. PORTLAND HARBOR'S FUTURE

Both business leaders and public policy makers will play a vital role in shaping the harbor's economic future. A significant number of the business leaders interviewed indicated they are uncertain about the economic/financial outlook of their companies and industry. These uncertainties stem from forces external and internal to the city of Portland.

Other than promoting a favorable business environment, local policy makers may have few means to assist companies in coping with *external forces* (e.g. condition of the national economy, globalization, federal policies, etc.). However, local policy makers can directly influence the effect of *internal forces* by forging partnerships with the private sector to develop mutually beneficial harbor area economic development strategies.

Based on the industry-driven interview and focus group discussion process utilized for this Part Two industrial lands study, a variety of alternative development permutations are viewed as possible. The development alternative that actually emerges will depend on how the Portland Harbor area is positioned to encourage on-going and future economic activity.

A continuation of current industry trends coupled with no significant change in the public policy and regulatory environment could result in limited re-investment or disinvestment in waterfront sites, with resolution of Superfund and related harbor planning and regulatory issues being a major factor. Continuation of the *status quo* could result in more non-maritime activity and perhaps a shift over time from manufacturing to wholesale-distribution.

Figure 42. Portland Harbor Futures

	Riverfront	Upland
Status Quo		
Characteristics:	• Continue current industry trends • No major public policy/regulatory changes	
Implications:	• More non-maritime activity (including vacated sites) • Limited site reinvestment or gradual disinvestment (pending Superfund resolution)	• Possible shift from manufacturing to wholesale-distribution
Industrial Revitalization		
Characteristics:	• Balanced, multi-modal transportation investment • Industrial sanctuary maintenance • Regulatory streamlining	
Implications:	• Strengthened maritime niches • Stable to expanded West Coast competitive position	• Targeted harbor industry cluster strategies (esp. manufacturing) • Continued strength in traditional industry (versus U.S.)
Industrial Transition		
Characteristics:	• Multi-modal transportation investment (highway & transit emphasis) • Broadened set of industry clusters & non-industrial activities • Consistency with local public policy and national/global market trends	
Implications:	• Deemphasized deep draft marine (esp. on the upper Willamette) • Selective site transition to non-industrial use	• Diminished importance of metals/transportation clusters • Increased wholesale/distribution (truck related) & new industry clusters
Other Futures		
Characteristics:	• Some combination of the above futures or a course as yet not identified • Multiple strategies tailored to specific harbor subareas and/or industry clusters	
Implications:	• Depends on the strategy mix implemented for riverfront land	• Depends on the strategy mix implemented for upland sites

Assertive policies and investment from the public sector could lead to responsive private sector investment. These policies and investments undoubtedly will affect the character of private activity, whether in transitioning toward an alternative set of economic activities or to revitalization of existing industries. Futures that diverge from the status quo most often mentioned by interview and focus group participants have involved discussion of industrial revitalization and/or transition:

- Efforts made to strengthen Portland's distinctive maritime niches, reposition harbor area manufacturing, reinvest in multi-modal transportation, maintain the harbor industrial sanctuary, and dramatically streamline current regulatory including greenway requirements could help to facilitate a revitalization of the harbor's traditional industries. However, this move toward *industrial revitalization* essentially represents a countertrend to broader U.S. economic changes away from an industrial based economy coupled with local/regional policies viewed as discouraging investment in private heavy industrial and

marine terminal investment. The Portland region has successfully resisted the national trend toward deindustrialization, and continued success could prove challenging even with recovery from the current recession.

- Transitioning toward (or incorporating) a different set of industries/activities, while perhaps consistent with recent public policy and national market trends, would represent more of a departure from the status quo for Portland's harbor industrial area. An *industrial transition* approach involves consideration of multiple strategic choices such as de-emphasizing marine cargo (except barge and shallow draft ship activity) within the upper Willamette (south of the St. Johns Bridge), diminishing importance of metals/transportation manufacturing clusters, increasing wholesale/distribution activity (primarily truck-related), and/or transitioning selected river sites to non-industrial use (with some combination of commercial, residential, mixed use and open space/recreation).

These potential futures are not necessarily mutually exclusive. One approach could be taken for one portion of the harbor area, another for a different portion. Whether the course selected leads to status quo, industrial revitalization, industrial transition, or some other alternative, decisions made by both policy makers and private industry will be instrumental to shape the long-term economic future of the harbor area. In deciding the appropriate course, the harbor's short and long-term economic importance both to the region and rest of Oregon should be actively considered.

E. SUMMARY OBSERVATIONS

Five concluding observations are suggested by this preliminary review of public policy questions:

1. *The future of Portland's harbor industrial area is less certain today than in even the recent past – due to the confluence of changing global market conditions and public policy.* Market conditions of importance center on extreme global competitive pressures that will extend beyond the recent economic downturn. Globalization affects traditional bulwarks of the harbor area ranging from metals, transportation equipment and printing manufacturing to ship calls for grain, breakbulk and dry-bulk cargo, autos and petro-chemicals. Public policy issues are wide-ranging – including questions related to deepening of the Columbia River channel, maintenance dredging of the Willamette, uncertain resolution of harbor Superfund issues, and growing requirements renewed multi-modal transportation infrastructure investment.

2. *What happens in the harbor area is of profound importance to the economic vitality of Portland and the entire metro area.* This is for two reasons: a) high wages of harbor area industries; and b) interconnectedness of harbor industries and transportation functions of the harbor area to businesses and industries located throughout the metro area. No other place in the Portland region or the state of Oregon has the ability to provide the multi-modal transportation capacity of Portland's harbor; no other place can readily accommodate the heavy industries which have been engines of growth and economic vitality – even during periods of economic downturn.

3. *The future that happens can and will be strongly influenced by local public policy and investment decisions yet to be made.* Planning activities of particular importance at present are the Portland River Plan, city-wide economic development strategy, and Port of Portland harbor facilities planning now underway. An important threshold question is whether to continue to actively support maintenance of the harbor area's competitive position for river-dependent and upland industry that can not readily be accommodated elsewhere in the region, or to seek a new vision for some or all of Portland's harbor area.

4. *An appropriate starting point for multi-agency public planning is to determine the maritime future of the Willamette River (below the Steel Bridge) and the Columbia River, followed by evaluation of Portland's realistic and desired future for traditional industries including transportation equipment and metals manufacturing.* If the community prioritizes investment in a strong maritime future, there are multiple options as to where that maritime sector is best accommodated. However, the level of public-private investment and the risk is substantially increased if the decision is to transition deep-draft and/or other river-dependent/industrial uses north of the St. Johns Bridge. Introduction of mixed use concepts along the Willamette north of the Steel/Fremont Bridges also substantially complicates the task of maintaining a viable competitive position for maritime commerce and upland industrial.

5. *Whatever course is selected has the best opportunity for successful realization with active public/private sector collaboration.* Private market interests for river-dependent industry can be substantially thwarted by perceived or real lack of public policy support – as the current harbor Superfund uncertainty demonstrates. Similarly, an aggressive public planning approach to change the face of some or all of the Willamette riverfront will be compromised if not perceived to be in the economic interests of current riverfront owners and industrial users – as demonstrated by continued presence of grain elevators in immediate proximity to the Central City Rose Quarter. Recommended hallmarks of a public-private approach should include clear public policy objectives, regulatory certainty, significant new infrastructure investment, and corresponding private commitment for reinvestment consistent with mutually acceptable planning objectives.

APPENDIX A. INDUSTRY INTERVIEW QUESTIONNAIRE

Portland Harbor Industrial Land Study – Business Questionnaire

Your interest in participating with the *Portland Harbor Industrial Land Study* is most appreciated. Please complete the questionnaire as fully as possible before the interview. The interview will be an opportunity to clarify any questions and to further discuss your firm's ongoing role in Portland's harbor area.

Feel free to skip questions for which you do not have information, or to involve others in your organization as needed. For items not applicable to your firm, simply indicate NA in the space provided.

Your responses will be aggregated so that results are not attributable to a particular firm. The only information that may be described by firm is current site area (acreage), current employment, and on-site marine terminals. Please let the interviewer know if any of these items should remain as proprietary information. **Again, thank you for taking the time to participate in this important study for the Portland Harbor industrial area.**

Name _____ **Position _____**

Firm/Organization _____ **Phone _____**

Address _____ **Fax _____**

City _____ State ____ Zip _____ **E-mail _____**

Interviewed by _____ **Date of Interview _____**

Background Information:

1. What are the primary *goods and/or services* that you manufacture and/or sell from this site?

   Primary: _____ Secondary: _____

2. How many *years* have you operated at this location? _____ years

3. Please estimate current *land area and building space* at this site.

   Land: _____ acres (site area)

   Building Area: Office _____ sq. ft. Manufacturing _____ sq. ft.

   Distribution/Shipping _____ sq. ft. Other (specify_____) _____ sq. ft.

4. Please provide a brief *chronology* of on-site development and significant changes in uses or operations over the time that your firm has been located at this site: _____

   _____

5. How many people are *employed* at this property?

   Currently: _____ full-time _____ part-time

3-5 years ago: _____ full-time _____ part-time

Anticipated 3-5 years from now: _____full time _____ part time

6. At how many *other locations* does this firm have other plants or facilities?

   _____ in the U.S. _____ outside the U.S.

   How many are in the Pacific Northwest? _____

   What percentage of total firm-wide revenues does this Portland operation represent? _____%

7. What is the approximate annual *gross business revenue* provided from this site? (check one)

   ☐ less than $1 million ☐ $1-$5 million ☐ $5-$20 million ☐ $20-$50 million ☐ over $50 million

   In the last 3 years, have business revenues:

   ☐ Increased ☐ Decreased ☐ Stayed the same

Harbor and Related Infrastructure:

8. Please estimate the portion of your inbound and then outbound *shipments* using the following modes of transportation. We are interested in the major forms of *long-haul* shipping rather that local pick-up and delivery:

	Long Haul Shipments	
Mode of Transportation	Inbound	Outbound
Marine	**_____%**	**_____%**
Rail	**_____%**	**_____%**
Truck	**_____%**	**_____%**
Air Transport	**_____%**	**_____%**
Other (specify _____)	**_____%**	**_____%**
Total	**100 %**	**100 %**

9. Do you make use of *marine terminal* facilities:

   ☐ on your property ☐ in the Portland Harbor area ☐ elsewhere (specify _____)

10. What materials or products do you have *shipped via marine* terminal facilities?

    Inbound (inputs): _____

    Outbound (products): _____

11. Has your use of marine terminal facilities *changed* in the last 20 years? ☐yes ☐no

    If yes, describe how:_____

    _____

12. Do you expect your firm's use of marine terminal facilities will change in the next 20 years?

☐ yes ☐ no If yes, how? _____

_____

13. If your company makes *direct use* of marine terminal facilities, please describe:

    Shipping (berth length): _____ feet Depth of channel required: _____ feet

    Estimated ship calls per year: _____ ships

    Seasonal periods of greatest terminal activity: _____

14. Does your firm face any *issues or concerns* with access to or quality of services for marine terminal, rail, trucking and/or air services? ☐ yes ☐ no

    If yes, please describe: _____

    _____

    _____

15. Please indicate your firm's current and planned future usage of the following utility services for *industrial process* (i.e. non-domestic, non-office related) purposes (check all that apply):

Type of Utility/Service	Current Use for Industrial Process	Future Planned Needs			Comments
		Increase	Decrease	No Change	
Water	☐	☐	☐	☐	_____
Sewer	☐	☐	☐	☐	_____
Electric Power	☐	☐	☐	☐	_____
Natural Gas	☐	☐	☐	☐	_____
Telecommunications	☐	☐	☐	☐	_____

Do you face any *issues or concerns* with the quantity or quality of service for any of these utilities?

☐ yes ☐ no If yes, please describe: _____

_____

Location Attributes:

16. To the best of your knowledge, why was this facility *originally sited* in the Portland metro area?

    _____

    And why sited in the *harbor area?* _____

17. Currently, what are the primary *advantages* for operating at this location? _____

_____

_____

18. What are the primary *disadvantages* of operating at this location (and reasons)? _____

_____

_____

19. What is the anticipated remaining *useful life* of existing plant and equipment facilities? _____

_____

20. Does your firm need to be located on or in close *proximity* to the river/harbor area? ☐ yes ☐ no

    If yes, please describe: _____

21. If your company were to consider a new facility, would this investment most likely occur in:

    ☐ City of Portland ☐ Elsewhere in metro area ☐ Outside metro area

    If you were to look beyond the City of Portland, what other areas would likely be considered?

    _____

Interindustry Linkages (Locally & Globally):

22. Who are your 3 major *vendors* currently?

	Name of Vendor	Products/Services	Primary Plant Location of Vendor	Method of Shipment Used
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Recent & anticipated trends: _____

23. Please provide similar information for your 3 most important *customers*.

	Name of Customer	Products/Services Purchased	Customer Location	Primary Shipment Method
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Recent & anticipated trends: _____

24. Please indicate up to *three services* critical to the success of your firm's operations at this location. (*Note:* examples include financial, legal, accounting, business consulting, travel services, etc.)

	Type of Service	Location of Service Provider (in/outside Portland)
A.	_____	_____
B.	_____	_____
C.	_____	_____

25. Identify *industry or trade associations* on which your firm relies for industry information and/or advocacy. _____

_____

Which of these organizations is active at the *local or regional* (Portland and Pacific Northwest) geographic level? _____

26. What *actions* could be taken to attract firms with whom you conduct business to Portland as:

Vendors _____

Customers _____

Competition:

27. Who are the major *competitors* for your firm's primary product or service?

	Name of Firm	Location of Competitor (in/outside Portland)	Comments
A.	_____	_____	_____
B.	_____	_____	_____
C.	_____	_____	_____

28. What are the primary competitive *advantages* that your firm offers relative to your major competitors?

Currently: _____

Next 3-5 years: _____

5-20 years: _____

29. To what degree are these advantages currently or prospectively related to your firm's operation in the *Portland Harbor* industrial area? _____

_____

30. What are the principal *disadvantages* that your firm faces relative to its major competition?

    Currently: _____

    Next 3-5 years: _____

    5-20 years: _____

31. To what degree are these disadvantages related to your firm's current operations or location within *Portland Harbor* industrial area?

    _____

Industry Trends & Emerging Issues:

32. Please describe any significant *trends* on the horizon that might affect your industry and/or firm related to:

    Customer and client markets _____

    Vendor sourcing _____

    Transportation & distribution _____

    Labor (availability, skills & productivity) _____

    Capital Investment _____

    Technology _____

    Other (please specify) _____

Challenges, Opportunities and Plans:

33. What is the most important *challenge* presently facing your firm's operation at this location? _____

    _____

    _____

34. What is the most important *opportunity* currently available for your firm at this location? _____

    _____

    _____

35. Please describe any *plans* that your company presently anticipates for this location (e.g. expansion, contraction, relocation, and reconfiguration) together with anticipated job, building and land requirements.

Timeframe	Type of Change	# of Jobs Added/Lost	Building Space Square Feet	Land Area (Acres)
Next 3-5 yrs	_____	_____	_____	_____
5-20 yrs	_____	_____	_____	_____

Comments: _____

_____

36. Is the site at which this firm operates *adequate* to accommodate expanded or reconfigured operations?

    Next 3-5 years: ☐ yes ☐ no ☐ uncertain

    5-20 years: ☐ yes ☐ no ☐ uncertain

    If no or uncertain, please describe any issues that limit suitability of your current site: _____

    _____

37. If your firm's operations were to relocate from this site, what would be your *land and location needs*?

    _____

    How could these needs be accommodated by other property located:

    In the Portland harbor area _____

    Elsewhere in the metro area _____

38. If this operation is being considered for *downsizing*, are there opportunities to sell or lease portions of your site for other purposes? Please describe: _____

    _____

39. What governmental actions could help *facilitate* your firm's existing operations and/or future plans?

    _____

40. Please provide any *additional information* pertinent to your future operations including anticipated land and building needs at this location. Specific information or examples are appreciated.

    _____

    _____

41. The City of Portland and the region currently are facing a number of *harbor issues* that could affect Portland harbor area industries. Based on information currently available to you, please give us your assessment of the anticipated effects from each of the following issues on your firm's ability to maintain competitive operations or expand in the harbor area:

Issue	Positive Effect	Negative Effect	No Effect	Uncertain	Examples or Comments
Portland Harbor Superfund	☐	☐	☐	☐	_____
Columbia Channel Deepening	☐	☐	☐	☐	_____

Willamette Maintenance Dredging	☐	☐	☐	☐	_____
I-5 Trade Corridor Improvements	☐	☐	☐	☐	_____
Endangered Species and Clean Water Acts	☐	☐	☐	☐	_____
Recreational boating and trail access	☐	☐	☐	☐	_____
Transitioning harbor sites to housing, park or commercial uses	☐	☐	☐	☐	_____
Reserving harbor industrial riverfront for maritime industries	☐	☐	☐	☐	_____
Other (specify_____ _____)	☐	☐	☐	☐	_____

Other Comments and Suggestions:

42. Are there any critical *messages* that you would like us to communicate back to the sponsors of the study (City of Portland, Portland Development Commission, Port of Portland)?

_____

_____

43. Do you have any further *suggestions* for uses of this Portland Harbor Industrial Land Study?

44. Please identify *anyone else* that you recommend we contact: _____

45. At the completion of the interview process, we anticipate conducting two *focus groups* to review results, as well as discuss findings and policy implications for Portland's industrial harbor area. Would you be interested in participating in an approximately 90-minute focus group session?

☐ yes ☐ no If yes, identify person to be contacted:

Name _____ Phone _____ E-mail _____

APPENDIX B. FOCUS GROUP DISCUSSION

As part of the Portland Harbor Industrial Lands Study (PHILS), two focus group discussions were conducted. Focus Group #1 was conducted on September 4, 2002, with representatives of harbor area industries. Focus Group #2 was held with the River Economic Advisory Group and interested industry representatives on September 19.

FOCUS GROUP PURPOSES

Purposes of the focus group sessions were to: (a) present and discuss results of what was learned to date from the industry interviews and associated analysis and (b) discuss policy implications for Willamette River planning initiatives.

PARTICIPANTS

Participants in the two focus group sessions are listed as noted below.

Person	Organization
Focus Group #1:	
Carol Grant	**Northwest Pipe**
Wayne Thomas	**Sulzer**
Ron Corbin	**Toyota**
Steve Barrager	**Grubb & Ellis**
Bob Short	**Lower Albina Council/Glacier Northwest**
Steven Shain and Bill Gobel	**Zidell**
Debbie Deetz	**Oregon Steel and Columbia Corridor Association**
Wayne Cozad	**Cascade General**
Focus Group #2:	
Tom Wright	**Group Mackenzie, North Macadam Business Assn.**
Wayne Kingsley	**Portland Spirit, Central Eastside Industrial Council**
Rod McDowell	**OMSI, Central Eastside Industrial Council**
Cindy Cato	**Associated General Contractors**
Howard Werth	**Gunderson**
Greg Peden	**Portland Business Alliance**
Don Grigg	**Parsons Brinckerhoff**
Brian Campbell	**Port**
Elissa Gertler, Fred Wearn	**PDC**
Deborah Stein, Sallie Edmunds, Barb Grover, Barbara Hart, Steve Kountz	**Bureau of Planning**

Both focus groups were facilitated by John White and Eric Hovee. At the second session, introductory comments and wrap-up items were covered by Steve Kountz, Bureau of Planning.

FOCUS GROUP TOPICS

A similar agenda was followed for each of the two focus groups. Each session lasted approximately 1 ½ hours.

Portland Harbor Industries – Focus Group Topics

1. **Introduction & Focus Group Purposes (John White, The JD White Company, Inc.)**
    - Participant introductions
    - Purpose of focus group
    - Your participation
2. **Overview of Portland Harbor Industrial Land Study (Eric Hovee, E.D. Hovee & Company)**
    - Part 1 Bureau of Planning inventories and trends
    - Part 2 industry interviews
    - Relationship to Portland River Plan
3. **Portland Business Climate – Today & Tomorrow (Group Discussion with John White & Eric Hovee, Facilitators)**
    - External environment – global/national
    - Portland's competitive position – metro and city
4. **Harbor Questions & Discussion (Group Discussion)**
    - Major trends affecting harbor area business and employment prospects
    - Changing mix of harbor area industries
    - Land needed for expansion and priority sites to reserve for river dependent industry
    - Planning & policy issues for upland (non-river) sites
    - Other topics of group interest
5. **Wrap-Up & Next Steps (Eric Hovee)**

We now proceed to provide discussion topics and groups responses – in the order of the discussion topics noted. For each topic (except the project overview), information as presented to the attendees is presented followed by comments from Focus Group #1 and Focus Group #2. Comments are generally arranged in the order discussed.

OVERVIEW OF PORTLAND HARBOR INDUSTRIAL LANDS STUDY

The following background information was briefly presented in outline format:

Purpose – Assess industry dynamics and future land needs for the Portland Harbor area, focusing on:

- ✓ River-dependent
- ✓ Freight-related
- ✓ Other concentrated industries

Participation – City of Portland Bureau of Planning
Portland Development Commission
Port of Portland

Part 1 – Bureau of Planning prepared:

- ✓ Inventories of industries & land uses
- ✓ Job, land use & freight distribution trends
- ✓ Location needs & regional role of harbor industries

Part Two – E.D. Hovee & Company with Parsons Brinckerhoff & The JD White Company, Inc.:

- ✓ Industry interviews – profile, trends & uses
- ✓ Harbor industry dynamics, sites & land use
- ✓ Policy questions – river-dependent & upland

Next Steps – Industrial Lands Study a key background document for (a) Portland River Plan; (b) Port Marine Terminals Master Plan; (c) PDC's Economic Development Strategy.

PORTLAND BUSINESS CLIMATE – TODAY & TOMORROW

The purpose of the first topic was to encourage participants to begin talking about *big picture* issues and opportunities affecting Portland's overall business climate. Comments were solicited regarding the external environment (global/national) and Portland's competitive position (within the metro area).

Focus Group #1 Discussion:

- Competitiveness is a critical issue for Portland businesses. Industrial land can be anywhere – in Portland or suburban locales. There is some concern that more businesses may move to Vancouver. There is concern with the environmental overlay zone constraints in Portland especially the Columbia Corridor.

- There is a perception that the City and Port have adopted the attitude that if companies move anywhere in the region, it's good for the region – even if they don't stay in the City of Portland.
- The River Plan can be a step in the right direction.
- One focus group participant has issues with DEQ. A ship ties up sometimes using a waterfront moorage on a lease basis but not directly serving this firm's needs as a waterfront industry.
- Environmental regulatory encroachment is voiced as a growing concern.
- There seems to be a "so what" public agency mind set – exemplified by the City's handling of the Columbia Sportswear corporate headquarters office relocation.
- A key question: does Portland want to continue to be aggressively in the business of being a major West Coast port?
- A related question is posed as to whether Portland wants environmental protection zones or industry. The answer does not need to be *either or* but could be *both and*…… However, the emphasis is currently perceived as unbalanced toward environmental control.
- Vacancies for industrial use are up in Portland but there is still strong demand for available land because of the tight urban growth boundary. However, this also means that the cost of the land base is increasingly high compared to other alternative locations. For example, does it make more sense for medium/heavy industry to relocate to Centralia, Washington?
- The now-vacant Alcatel site has an approximately $8.5 million building. It was stated that the Port will not provide a quoted ground lease rate until there is a serious inquiry. The ability for Alcatel to sign its lease depends upon Port approval of the specific user.
- Portland's harbor area is "out of the mainstream" and receives little visibility or public interest. There is no *branding* of the harbor image or product. Worse, there is very little understanding of the contributions that the harbor industries make to the general economy and to business. For example, one does not see signage on packages if this is a product "delivered by Zidell barge." Another example: there is a disconnect from the need for the petroleum tank farm and the gas with which somebody fills their SUV.
- For an industry such as ship repair, on-going industry viability is clearly linked to the labor market. It is not possible to compete with Singapore which has wage rates of $8 per day.
- For another metals manufacturer, availability of skilled labor is crucial. "It's real work," which deters many young people from entering a more physically demanding occupation.
- Another long-time company currently needs 75 workers but can only get about 52. It used to be that the firm would attract and retain second and third generation workers but no longer because this is not viewed as a valued occupation.
- Gravel and cement have been cheap but won't be when the readily accessible Santoosh deposits run out. For example, in Puget Sound, sand & gravel is now being barged in from Canada.

- Another industry representative noted that Portland is not *perceived* as a highest cost location but is *in fact* a high cost location. The term *perceived* is too generous.

Focus Group #2 Discussion:

- John White observed that considerable difficulty was experienced in obtaining commitments from businesses to be interviewed for this study. Part of the reason was uncertainty over how the results would be used.
- A focus group participant noted that this uncertainty as to how the results were to be used gave them pause to participate. However, this firm decided to go ahead after attending the August meeting. It was stated there is a desire that they did "not want the information to be used against us."
- A part of the resistance to participation stems from City and Metro planning approaches that appear to be leading to greater restrictions on industries within the harbor industrial area. The Columbia Corridor sited was an example of environmental issues such as increased animal habitat. The "list of exactions is long." Also there are certain disagreements about whether an industry should be considered as "river-dependent."
- Noted by one participant is a sense of "hostility" between planners and business people. "Do you really need that?"
- Portland has a reputation of having no land to build on. On the west side, Intel can not obtain land needed for additional employee housing. Within the harbor area, Freightliner has opened a new production facility in North Carolina because of difficulties in dealing with the City of Portland.
- Certainly Title 33 exacerbates the situation including the provision that you can't develop just one portion of a parcel.
- Elissa Gertler with PDC commented that the citywide economic development strategy will address constrained sites and improvements in the harbor area. Deborah Stein with the Bureau of Planning noted that the Bureau is currently involved in a regulatory improvement project.
- A company representative with Gunderson stated that the firm has expanded in Portland but not elsewhere in Oregon. They have experienced considerably more of a partnership relationship with facilities in Texas and Nova Scotia, but this has yet to occur in Oregon. However, the Oregon Economic Development Department did help Gunderson with its rail car maintenance facility in Springfield in the early 1990s. In Texas, assistance has been provided to lead the company through the state agency requirements and also identify grant funding opportunities.
- There was a comment that "there is nothing like a good recession to get people's attention." Another participant questioned whether this is just "palliative" and short-term until the current recession ends.

HARBOR QUESTIONS & DISCUSSION

The remainder of each focus group session was organized to provide background information and obtain participant input on four harbor area questions. Each question is presented, followed

by preliminary findings from interviews completed to date (about 50) and then participant comments with each focus group.

<u>Question:</u> What Are the Major Trends & Issues Affecting Prospects for Portland's Harbor Area Industries?

Preliminary Findings:

- Stable through recession but limited job growth anticipated with economic recovery.
- Even with expansion, existing medium-larger firms anticipate minimal need for added industrial land.
- Remaining cost competitive emerges as the #1 issue – extending beyond the current economic downturn; Portland increasingly is perceived as a high cost place to do business.
- Long time manufacturers will reinvent their business model and operations over the next 10-20 years.
- Local issues affecting business investment:
    - ✓ Superfund uncertainty & competitive multi-modal transport – for *riverfront* owners
    - ✓ Regional congestion (freight/employee) non-industrial encroachment, permitting, public policy & community support – for *riverfront and upland* firms.

Focus Group #1 Discussion:

- For one focus group participant, even Denver is perceived as a less expensive location. Currently this firm is in the process of changing much of its order process to Kansas where from which the freight is cheaper.
- With environmental regulations there are "so many entities that want a piece of the pie." It is noted that high tech companies have more "bad stuff" from an environmental perspective on their sites than many more traditional heavy industries these days.
- The closure of Consolidated Freightways may hurt transportation competitiveness from Portland. The "fallout is just starting."
- A company owned by one of the participants makes pipe fittings, a commodity product. This company is faced with global pressures and dumping issues and is difficult to be competitive from Portland. This firm buys plate from a local manufacturer but structural steel is imported.

Focus Group #2 Discussion:

- One participant noted that they have a plant in the harbor area and are questioning whether to keep that location.

- Environmental labor and energy issues are noted as concerns for their operation. Medical coverage costs in Portland have now surpassed comparable cost in other areas of the country.
- Regulatory and permitting fees are not too high in Portland but the Port process "is too long." In North Macadam, there is the question of what is the setback? Uncertainties with questions such as these create project delays. The sentiment expressed is that agencies such as the City Planning Bureau don't operate with an understanding of the private sector concept that "time is money."
- Gunderson is fearful the superfund will affect its marine operations. Already there is a cost of hundreds of thousands of dollars per year for a study without any particular implementation. Part of Gunderson's problem is created by the nearby BES outfall. Overall, the superfund issue represents a "huge black hole" although the firm has tried to be proactive in dealing with this and other environmental issues. EPA has helped to facilitate by providing answers within a two-week period, but the City has taken longer." Fortunately, however, these issues have not yet affected ongoing operations.
- Don Grigg with the consultant team (Parson Brinckerhoff) described somewhat different issues for marine-oriented distribution firms. A main priority is rail. More freight is shifting to unit trains that require separated facilities. Businesses need the right location that can accept these more expanded rail operations. Cost is not as much a driver, although, for auto importers improved service and related BES drainage cost all have become an issue. Longshore labor and work rules historically have been represented a cost disadvantage for Portland and this continues.

<u>Question:</u> Will the Mix of Harbor Industries Change?

Preliminary Findings for Existing Harbor Industries:

- *River-Dependent* – need multi-modal access including 20+ foot depth barges, 30-40+ foot deep draft. Suppliers and transporters to entire metro area and state. Little near-term expansion except auto imports.
- *Wholesale Distribution* – separated between (a) serving Central City & metro area from central location and (b) markets beyond metro area– with demand more uncertain depending on comparative cost of business and inter-modal transport accessibility
- *Manufacturing:*
  - ✓ Chemical & electronics – suppliers to regional industrial base
  - ✓ Printing/publishing – Central City proximity & interaction
  - ✓ Metals & transportation – inter-industry linkages led by Freightliner, Esco, and Gunderson

  Mid/large manufacturer land needs modest; growth needs linked to desire/capacity to accommodate smaller firms.

Other Sectors Potentially Suited to Harbor Area:

- ✓ **Regional distribution**
- ✓ **Transportation/metals**
- ✓ **Wood/plastics/fiber materials**
- ✓ **High tech/bio tech**
- ✓ **Creative Services/information technology**
- ✓ **Corporate headquarters & business parks**

Focus Group #1 Discussion:

- A City Commissioner reportedly is unfavorable toward our firm since receiving a tax break.
- Six to seven metal fabs in the Portland area are not making a profit currently. China is "kicking our butt daily." This industry is likely to increasingly go off shore for lead orders.
- Also noted is that it is increasingly difficult to get metals-related labor in Portland.
- Portland has no *Fortune 500* companies. Nike should not be counted because it is not headquartered in Portland but in Beaverton.
- Corporate headquarters and business parks make sense in North Macadam but not in Albina. It is noted that the Triangle Park vacant property below the University of Portland was the location for the filming of "The Hunted."
- There currently is a more optimistic picture for autos. Containers are more profitable for ports and require less footprint area of land. The Columbia River looks increasingly competitive for the auto business; however, Portland does not have a lot of upland/dockside space. The 30-foot draft is not an issue for this type of cargo. Portland is competitive for auto imports except to serve the southern U.S. for which entry in southern California is more competitive. Auto imports can expect to be stable over the next 15 years but with potential market shift from other west coast cities to Portland.
- It will prove challenging for Portland to overcome its reputation as a city that is "difficult to deal with." On the plus side, Portland is probably the most competitive west coast city "cost wise" for auto import activity.
- Metal companies are "working so hard to make so little." Very little, if any, substantial expansion can be expected.
- There currently is a potential client for a 400,000 sq. ft. distribution center. Portland can be competitive if the client can come to grips with the Port of Portland. The Port does not have the vested interest that a private owner would have to make the deal happen.
- Swan Island has seen sustained growth in distribution from companies like Federal Express; however, there is only one way in and out to Mocks Landing over the Union Pacific rail line.
- An estimated $2.5 million of infrastructure is required to upgrade the Mocks Landing over cross into seismic standards. This includes an extra $1 million dollars needed to assure that there will be no disruption to the railroad. This may be funded through an LID as no City participation is expected for this type of project.
- Outside the Port areas, industries are noted to be not as well connected to the region's freeways.

Focus Group #2 Discussion:

- Portland wants "sustainable" industry. But what does this mean? Portland metals firms do considerable recycling. The system could almost be considered as a "closed loop" but this contribution gets little recognition elsewhere in the community.
- Gunderson is spending capital to maintain its operations and cut costs. The competition now is really with Canada and Mexico rather than only other plants sites due to NAFTA (the North America Free Trading Agreement).
- Oregon Steel has one of the most automated facilities in the world based upon purchase, reuse and recycled steel. However, the plant is now reportedly doing less melting and more rolling.
- It was noted that Freightliner has an office 75 feet from the river's edge but in North Macadam the greenway setback proposal is now for 150 feet. Uncertainties with zoning and planning affect the ability to proceed with development. This issue "shouldn't be debated forever."
- While the City is actively recruiting Vestas, this is still an industry that involves a typical industrial production process to manufacture a "long pipe and blade."
- The national trucking company, JB Hunt, is making greater use of train car facilities.
- Don Grigg observed that there is potential for major rail yards to move eventually to the fringe of the Metro area as has occurred elsewhere in the country. Burlington Northern is also considering a mega rail yard located between Portland and Seattle. If there were to be a new regional facility outside the City, some firms that rely heavily on rail freight might relocate as well. Example would be UPS.
- Three grain elevators on the Upper Willamette are now under one common ownership and could potentially look to relocate to a consolidated facility. This could be in Portland, for example, the vicinity of Terminal 4, or it could be elsewhere on Lower Columbia River at a site that offers unit train and barge as well as deep draft access.

<u>Question:</u> What Are the Needs & Issues Facing River-Dependent Industries & Sites?

Preliminary Findings:

- From existing operations, greatest demand (100+ acres) by marine terminals.
- Approximately 9% of 3,130 acres of riverfront property classified as vacant (and within top two tiers of buildable land inventory) by Metro.
- Only 153 acres of tier A/B vacant riverfront land north of the St. Johns Bridge.
- Site constraints evaluation focuses on threshold criteria of appropriate zoning and minimum depth barge access. Other criteria considered include deep draft shipping, rail/street access, lot depth, environmental contamination, compatible neighbors, wetlands, trail easements, flood plain, and scenic overlay.
- Capital investment may be deferred pending Superfund resolution.
- Interest in reserving riverfront sites for industrial use (whether marine dependent or not)

- Reserving riverfront land for future generations – even if demand is not readily foreseeable today.

Focus Group #1 Discussion:

- One Rivergate firm has recently purchased two new plants – both outside the State of Oregon in part because it is easier to do business in those locations. This is an indication of their future direction.
- For an auto importer, superfund uncertainties are posing a major issue in reaching a lease with the Port that will be acceptable to the firm. This example illustrates the potentially widening impact on the ability to effectively market Portland sites. This firm might well reconsider its choice to be in Portland if it were made again today.
- Oregon Steel is an example of a firm that is not water-dependent for marine terminal use but is water-dependent from the standpoint that the company uses Willamette River water in their industrial process and also has a discharge permit. In other words, being river-dependent does not mean just ship access.
- To be competitive it will be more important to be able use more river land in a timely fashion.
- Otherwise, Portland can easily miss the "business window" of a particular company for investment.
- The Freightliner wind-tunnel issue was "too drawn out." The approval process proved extremely expensive. It makes no sense to require planting the trees where ships are being tied up which the City has requested.
- How will Metro Goal 5 setbacks affect industry location and viability along the river? There is concern that Metro may not be coordinating well with the City. It is going to be impossible to preserve river-dependent land if it's impossible to actually locate, build or expand industry along the river.
- Portland needs the continued job base of a major company like Freightliner. A more business-friendly approach might have helped to keep the manufacturing in Portland rather than having the plant shut and the business shifted to North Carolina. This is affecting regional metal fabrication activity. For example, one firm in Oregon City was 60 percent dependent upon Freightliner business.
- There is concern that the City has been approaching Freightliner on a piece-meal basis with no sense of priority to the significance of the employment base that this company represents and its extensive local subcontractor supplier relationships.
- The upcoming St. Johns Bridge closure is a concern although it is expected to be of short duration. The notion of a bicycle path on this bridge does not make sense since the bridge is not wide enough to accommodate bicycles plus vehicular traffic. This was cited as another example of the City making decisions that result in it being harder to do business here.
- There was discussion of planning to redo Russell Street in the Lower Albina industrial area. A comment was made that the people want the road to be "cute and boutiquey." This does not make sense in an industrial area. Portland needs to look at the big picture as to what priority improvement make the most sense for the funding available.

Focus Group #2 Discussion:

- Portland has vacant sites on the river, not elsewhere. Eric Hovee noted that there is not much other heavy industrially-zoned land elsewhere in the Portland Metro area. A significant portion of the heavy industrial land base is situated directly within Portland's harbor industrial area.
- It was suggested that the solution is to provide additional vacant buildable industrial inventory elsewhere, including the possibility of expansion to the suburbs.
- Fewer ships call on the Port of Portland. An example cited is that Gunderson has 1,100 foot long dock that has been used in past for rental berthage, for example, by ships waiting in the Harbor. There is less need for short-term rental moorage now, although Gunderson uses this also for its own barge building purposes.
- What's the plan to revitalize marine terminal use in the Portland waterfront? It is important to try to stop and prevent a "dying waterfront."
- There do not appear to be many surprises with the draft map showing river industrial site constraints. However, it was noted that some Port sites indicated as no constraints do in fact have some land constraints. While the Port's master planning focuses on direct cargo facilities, a key question is how much land is needed for other river-dependent non-cargo-related activities?
- Brian Campbell with the Port of Portland indicated that the industrial harbor is expected to remain a working harbor. The Port will support land expansion also in the metro area. The region needs a "more sophisticated" way of looking at riverfront land including the marine needs of occasional users.
- Don Grigg suggested a similar need for more sophisticated criteria for riverfront sites. One option would be to do more clustering of sites.
- A major question is what do we want our industrial base to be? The strategy that results needs to reflect Portland's answer to that question. Prioritize industries to be targeted plus support what is here now.
- It was noted that new large marine water-dependent industries locating in the region (such as U.S. Gypsum) in Rainier are finding sites elsewhere on the Lower Columbia out of the metro area. This is for reasons including lower cost of land and labor and more conducive permitting processes.
- Even if a regional rail yard is built, Albina yard would likely be retained as part of rail to truck distribution center.
- Railroads nationally are shedding equipment (like phone companies). They are maintaining a core fleet with other operations increasingly contracted to third parties. Real estate property managers for the rail companies are focused on industries that generate rail traffic. Repair functions such as previously existing at Albina Yards have been relocated to more rural communities such as Hermiston.

<u>Question:</u> What Are the Needs & Issues Facing Upland Industries & Sites?

Preliminary Findings:

- General consensus to continue exclusion of residential and large scale commercial from the industrial sanctuary
- Less agreement on how broadly "industrial" should be construed with flexibility for
  - ✓ Corporate office
  - ✓ Support retail/service
  - ✓ Creative services/information technology
  - ✓ Business park/flex space
- Priority emphasis on roadway improvements for freight and employee commutes
- Shift from manufacturing to transportation dependent firms
- Strong interest in improved transit – including shift workers
- Desired public support for improved, faster, lower-cost permitting and addressing labor issues including workers comp/health care costs
- Pro-active public support desired for (a) more interaction with policy makers; and (b) policy/investment decisions making a difference

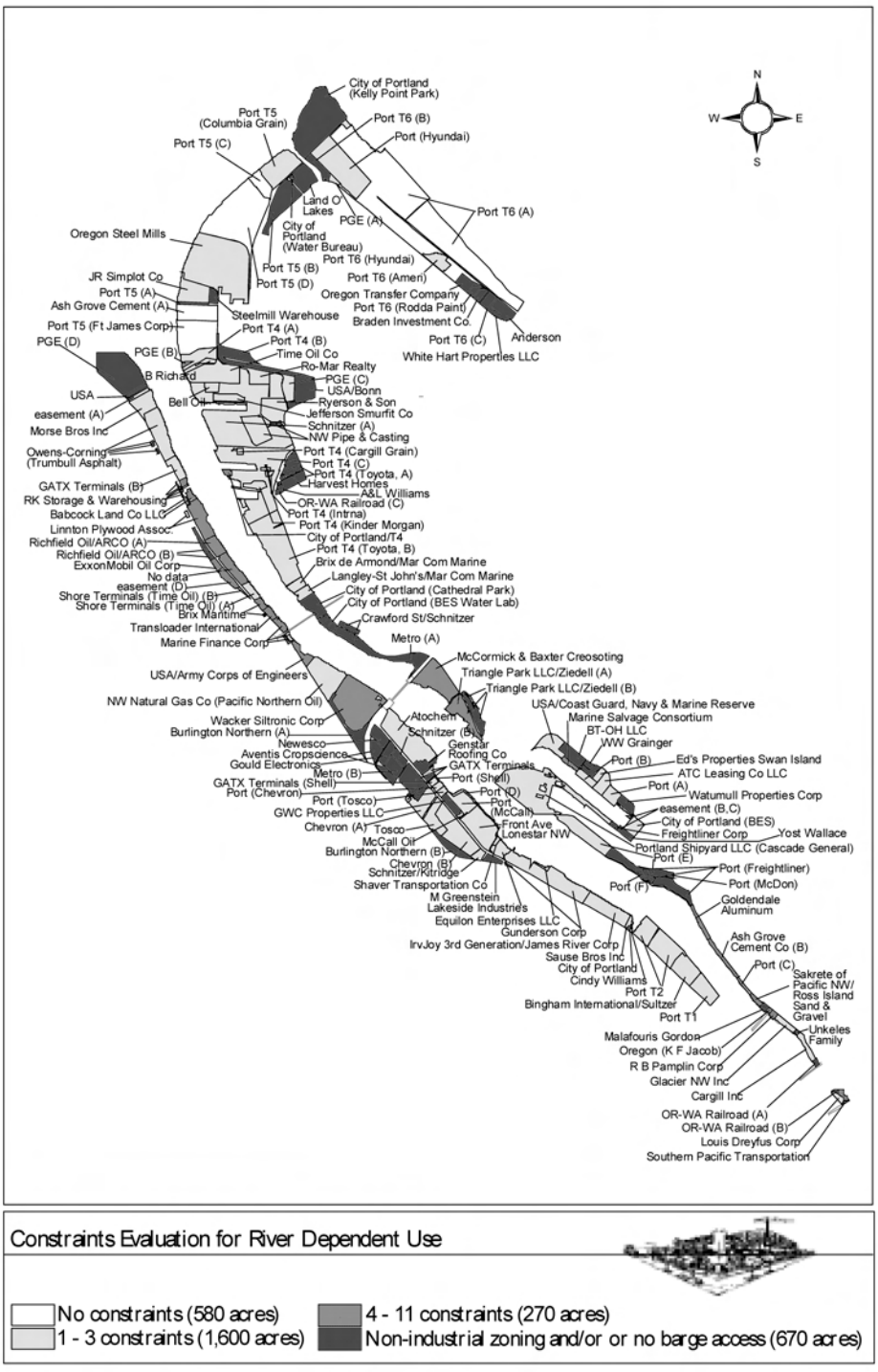
Focus Group #1 Discussion:

- Portland's future is not manufacturing but rather distribution to the Pacific Rim. However, there seems to be no city or state desire to create the road infrastructure needed to accommodate this shift in industrial activity.
- City government needs to decide what it wants the Portland Harbor area to be in the future. There is virtually no direction right now. It was suggested that the City wants jobs without industries.
- Is it the City's goal to determine future business and marketplace activity or to support businesses that are here? The City could have a priority both to *serve existing* businesses and *attract* a more select set of target industries.
- Bio-tech may look good 50 years from now but is not likely to deliver much in the way of net new employment short-term.
- A City priority should be to work with who is here or to pursue knowledge-based industries. But, what is the education system capable of turning out?
- There is clear interest in more interaction with elected officials. Currently, the sense is the City "over regulates and under interacts." The opposite approach should be taken – more of a broader policy focus but accompanied by more interaction with policy makers looking at the specific issues and opportunities associated with individual property and business opportunities.

Focus Group #2 Discussion:

- The first participant comment – many of the problems would fall away if we can "generate love" especially between the City and private business community.
- Portland should have been addressing the problem of its harbor-related industries back when times were good in 1997-1998. There were warning signs on the horizon even then. An example was the issues that the aluminum industries faced that affected Portland's metals complex.
- A focus group participant noted in their 75-80 years in business in Portland, only once in the last ten years did a public sector representative come calling on us and that was in the last few weeks.
- Portland should "have a calling program" with regular visits to businesses and industries to see what their needs and issues are.
- It was suggested that the "code maintenance" program be shifted to "code change" for consideration.
- A final suggestion – make more effort for us to get policy makers inside our Portland harbor industrial plants.

APPENDIX C. RIVERFRONT SITE CONSTRAINTS REVIEW



Source: E.D. Hovee & Company.

Proposed Ranking Criteria for Aggregated River Access Taxlots for Marine Terminal Use

Criteria applied to taxlots directly fronting the river or with river access, grouped by ownership.

	Criteria	Constrained ●	Unconstrained ○	Notes
			THRESHOLD CRITERIA	
1.	**Appropriate Zoning**	Non-industrial zone.	Industrial zone (IH or IG).	
2.	**Barge Access**	No existing dock, and lacks mooring access with at least 20' draft within 150' of shore. Barge access extended to lots under same ownership/lease, adjacent to public ownership with barge access, or within taxlots with barge access.	Existing dock or 20' + draft within 150' of shore.	
			ADDITIONAL CRITERIA	
3.	**Shoreside Barge Access**	No existing dock, and lacks mooring access with at least 20' draft for a length of 400' within 10' of shore.	Existing dock, or 20' + draft for a length of 400' within 10' of shore.	This criteria is a more restrictive version of the threshold barge access criteria and addresses the scenario in which new docks face substantial permitting challenges.
4.	**Ship Access**	No existing dock, and lacks mooring access with at least 35' draft for a length of 400' within 10' of shore.	Existing dock, or mooring access with at least 35' draft for a length of 400' within 10' of shore.	
5.	**Rail Access**	No rail access.	Rail spur on property.	Remains non-threshold due to the reasonable percentage of ship cargo that does not leave the harbor via rail.
6.	**Truck Access**	Access by local streets through residential zones.	Site within truck district that has access to a regional trafficway, major street, or district collector in Portland *Comprehensive Plan*.	This assumes that development review poses obstacles for industrial development that is not accessed via streets with these designations. Remains non-threshold due to the reasonable percentage of ship cargo that does not leave the harbor via truck. Waiting for data to evaluate.

7.	**Appropriate Street Conditions**	Presence of steep topography and/or inadequately maintained access road.	Minimal topography, adequately maintained access road.	Evaluated through limited first hand experience; further field work necessary to comprehensively evaluate taxlots.
8.	**Sufficient Lot Depth**	Lot depth under 400'	Lot depth over 400'	Adjacent smaller lots under same ownership exempted.
9.	**Lack of Contaminatio n**	Current or previous superfund site, high priority remedial investigation or clean-up, or high priority expanded preliminary assessment.	All other sites	Evaluated according to June 2002 DEQ Portland Harbor Upland Cleanup Site map.
10.	**Compatible Neighbors**	Linnton area taxlots, and lots adjacent to developed residential, commercial or mixed-use commercial zone.	Outside of Linnton, and no adjacent developed residential, commercial or mixed-use zoning.	Conflict over Linnton industry is receiving increasing public attention. Incompatible adjacent zoning represents pressure to convert from industrial use.
11.	**Lack of Environmenta l Constraints**	30% or more site coverage by wetlands or river natural (n) overlay zoning.	Less than 30% wetland coverage and within river industrial (i) or river general (g) zoning.	
12.	**Lack of Public Easement**	Existing trail (off street) at or near top of bank.	No off-street trail at or near top of bank.	
13.	**Low Flood Risk**	More than 10% of aggregated lot within flood plain.	<10% within flood plain.	
14.	**No Building Height Limitations**	Presence of height restrictions through the Scenic Overlay zone.	No Scenic Overlay zone.	

Constraints Evaluation for River Dependent Use

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A&L Williams	○	●	●	●	○	○	○	●	●	○	○	○	○	○
Anderson	○	●	●	●	○	○	○	○	○	○	○	○	○	○
Ash Grove Cement Co (A)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ash Grove Cement Co (B)	○	○	○	○	●	○	●	●	○	○	○	○	●	●
ATC Leasing Co LLC	○	○	●	●	○	○	○	○	○	○	○	○	●	○
Atochem North America Inc	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Aventis	○	●	●	●	●	○	○	○	●	○	○	○	○	○
Aventis	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Babcock Land Co LLC	○	○	●	●	●	○	○	●	○	●	○	○	●	○
Babcock Land Co LLC	○	○	●	●	●	○	○	●	○	●	○	○	○	○
Bell Oil	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Bingham International/Sultzer	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Braden Investment Co	○	●	●	●	○	○	○	○	○	○	○	○	○	○
Brix De Armond/Mar Com Marine	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Brix Maritime Co	○	○	○	○	●	○	○	●	●	○	○	○	○	●
Brix Maritime Co	○	●	●	●	●	○	○	●	○	○	○	○	○	●
BT-OH LLC	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Burlington Northern (A)	○	●	●	●	●	○	○	○	○	○	●	○	○	○
Burlington Northern (B)	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Cargill Inc.	○	○	○	○	●	●	○	●	○	○	○	○	○	○
Chevron (A)	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Chevron (B)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
City of Portland	○	●	●	●	●	○	○	●	○	○	○	○	○	○
City of Portland/BES	○	○	○	○	●	○	○	○	○	○	○	○	●	○
City of Portland/BES Water Lab	●	○	●	●	●	●	○	○	○	○	○	●	●	○
City of Portland/Cathedral Park	●	○	○	○	●	○	○	○	○	○	○	●	●	●
City of Portland/Kelly Point Park	●	○	○	○	●	○	○	○	○	○	○	○	●	○
City of Portland/T4	○	○	●	●	●	○	○	●	○	○	○	○	○	○
City of Portland/Water Bureau	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Crawford Street Corp/Schnitzer	●	○	●	●	●	●	○	●	●	○	○	○	●	●
Crawford Street Corp/Schnitzer	●	○	●	●	●	●	○	●	●	○	○	○	○	○

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
easement A	○	○	●	●	●	○	○	○	○	○	○	○	○	○
easement B	○	●	●	●	●	○	○	●	○	○	○	○	○	○
easement C	○	●	●	●	●	○	○	●	○	○	○	○	○	○
easement D	○	○	○	○	●	○	●	●	○	●	○	○	○	○
Ed's Properties Swan Island	○	○	●	●	○	○	○	○	○	○	○	○	○	○
Equilon Enterprises	○	○	○	○	●	○	○	●	○	○	○	○	●	○
ExxonMobile Oil	○	○	○	○	●	○	○	●	●	●	○	○	○	○
Freightliner Corporation	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Front Ave LLP	○	○	○	○	○	○	○	○	●	○	○	○	○	○
GATX Terminals	○	●	●	●	○	○	○	○	○	○	○	○	●	○
GATX Terminals	○	●	●	●	○	○	○	○	●	○	○	○	○	○
GATX Terminals	○	●	●	●	●	○	○	●	○	○	○	○	○	○
GATX Terminals (Shell)	○	○	○	○	●	○	○	●	○	○	○	○	●	○
GATX Terminals Corp (B)	○	○	○	○	●	○	○	○	●	●	○	○	○	○
Genstar Roofing Co	○	●	●	●	○	○	○	○	○	○	○	○	●	○
Glacier Northwest Inc	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Goldendale Aluminum	○	○	○	○	○	○	●	●	●	○	○	○	●	○
Gould Electronics	○	●	●	●	○	○	○	○	●	○	○	○	○	○
Gunderson Inc	○	○	○	○	●	○	○	○	●	○	○	○	○	○
Gunderson Inc	○	●	●	●	●	○	○	●	○	○	○	○	○	○
GWC Properties LLC	○	●	●	●	○	○	○	●	○	○	○	○	○	○
Harvest Homes	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Irvjoy 3rd Generation/James River	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Jefferson Smurfit Corp	○	○	○	○	○	○	○	●	●	○	○	○	●	○
JR Simplot Company	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Lakeside Industries	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Land O' Lakes	○	●	●	●	●	○	○	○	○	○	○	○	●	○
Langley-St. John's/Mar Com Mar	○	○	○	○	●	○	○	○	●	○	○	○	●	○
Linnton Plywood Assn	○	○	○	○	●	○	○	●	○	●	○	○	○	○
Linnton Plywood Assn	○	○	○	○	●	○	●	○	●	●	○	○	●	○
Louis Dreyfus Corporation	○	○	○	○	○	○	○	●	○	●	○	○	○	○
M Greenstein	○	●	●	●	●	○	○	●	●	○	○	○	○	○
Malafouris Gordon	○	●	○	○	●	○	●	●	○	○	○	○	●	●

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Marine Finance Corp	○	○	○	○	●	○	○	●	●	○	○	○	●	●
Marine Finance Corp	○	○	○	○	●	○	○	●	○	○	○	○	○	●
Marine Finance Corp	○	○	○	○	●	○	●	●	○	○	○	○	○	●
McCall Oil & Chemical Corp	○	○	○	○	●	○	○	●	○	○	○	●	○	○
McCormick & Baxter Creosoting	○	○	○	○	○	●	●	○	●	●	○	○	○	○
Metro (A)	●	○	●	●	●	●	●	●	●	●	○	○	●	●
Metro (B)	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Morse Bros Inc	○	○	○	○	●	○	○	○	●	○	○	○	○	○
Newesco	○	●	●	●	●	○	○	○	○	○	○	○	○	○
No ownership data	○	○	○	○	●	○	●	●	○	●	○	○	●	●
Northwest Pipe & Casting	○	○	○	○	○	○	○	○	●	○	○	○	●	○
NW Natural Gas Co	○	○	○	○	○	○	○	○	●	○	○	○	●	●
NW Pipe Co	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Oregon (K F Jacob)	○	○	●	●	●	○	○	●	○	○	○	○	●	●
Oregon Steel Mills Inc	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Oregon Transfer Co	○	●	●	●	○	○	○	○	○	○	○	○	○	○
Oregon Washington Railroad (A)	○	●	●	●	●	●	○	●	○	●	○	○	○	●
Oregon Washington Railroad (B)	○	○	●	●	○	○	○	●	○	●	○	○	○	○
Oregon-Washington Railroad (C)	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Owens-Corning (Trumbull Asphalt)	○	○	○	○	●	○	○	○	●	○	○	○	●	○
Owens-Corning (Trumbull Asphalt)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Owens-Corning (Trumbull Asphalt)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Owens-Corning (Trumbull Asphalt)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
PGE (A)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
PGE (B)	○	○	●	●	●	○	○	●	○	○	○	○	●	○
PGE (C)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
PGE (D)	●/○	○	●	●	●	○	○	○	●	●	●	○	●	○
Port (A)	○	○	○	○	○	○	○	○	○	○	○	○	●	○
Port (Americ)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Port (B)	○	○	○	○	●	○	○	●	○	○	○	○	●	○
Port (C)	○	○	●	●	●	○	●	●	○	○	○	○	●	●
Port (Chevron)	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Port (D)	○	○	○	○	●	○	○	●	○	○	○	○	●	○

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Port (E)	○	○	○	○	○	○	○	○	○	○	○	○	●	○
Port (F)	●	○	○	○	●	○	○	●	○	○	○	●	●	○
Port (Freightliner)	●	○	●	●	●	○	○	●	○	○	○	●	●	○
Port (Freightliner)	●	○	●	●	●	○	○	●	○	○	○	●	●	○
Port (Freightliner)	●	○	●	●	●	○	○	●	○	○	○	●	○	○
Port (G)	●	○	●	●	●	○	○	●	○	○	○	●	○	○
Port (Hyundai)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Port (McCall)	○	○	○	○	●	○	○	○	●	○	○	○	○	○
Port (McDon)	●	○	●	●	●	○	○	●	○	○	○	●	○	○
Port (Shell)	○	○	○	○	●	○	○	●	○	○	○	○	●	○
Port (Tosco)	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Port T1	○	○	○	○	○	○	○	○	●	●	○	○	○	○
Port T2	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Port T2	○	○	○	○	○	○	○	○	○	○	○	○	●	○
Port T4 (A)	○	○	●	●	●	○	○	○	○	○	○	○	○	○
Port T4 (B)	○	●	●	●	●	○	○	○	○	○	●	○	●	○
Port T4 (C)	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Port T4 (Cargill Grain)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Port T4 (Intrna)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Port T4 (Intrna)	○	○	○	○	●	○	○	●	○	○	○	○	○	○
Port T4 (Intrna)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Port T4 (Kinder Morgan)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Port T4 (Toyota)	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Port T4 (Toyota, A)	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Port T4 (Toyota, B)	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Port T5 (A)	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Port T5 (B)	○	●	●	●	●	○	○	○	○	○	○	○	○	○
Port T5 (C)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Port T5 (Columbia Grain)	○	○	○	○	○	○	○	○	○	○	○	○	●	○
Port T5 (D)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Port T5 (Ft James)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Port T6 (A)	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Port T6 (A)	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Port T6 (B)	●○	●	●	●	●	○	○	●	○	○	○	○	●	○
Port T6 (C)	○	●	●	●	○	○	○	○	○	○	○	○	○	○
Port T6 (Rodda Paint)	○	●	●	●	○	○	○	○	○	○	○	○	○	○
Portland Shipyard LLC/Cascade	○	○	○	○	●	○	○	○	●	○	○	○	●	○
R B Pamplin Corp	○	○	●	●	●	○	○	●	○	○	○	○	●	○
R Blickle	○	○	●	●	●	○	○	○	○	○	○	○	○	○
Rhone-Poulenc	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Richfield Oil/ARCO (A)	○	○	○	○	●	○	●	○	●	●	○	○	○	●
Richfield Oil/ARCO (B)	○	●	●	●	●	○	●	●	○	●	○	○	○	●
Richfield Oil/ARCO (B)	○	●	●	●	●	○	●	●	○	●	○	○	○	○
RK Storage & Warehousing Inc.	○	○	●	●	●	○	○	●	○	●	○	○	●	○
RK Storage & Warehousing Inc.	○	○	●	●	●	○	○	●	○	●	○	○	○	○
RK Storage & Warehousing Inc.	○	○	●	●	●	○	○	●	○	●	○	○	○	○
RK Storage & Warehousing Inc.	○	○	●	●	●	○	○	●	○	●	○	○	○	○
Ro-Mar Realty of Oregon	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Ryerson & Son	○	○	○	○	●	○	○	○	○	○	○	○	●	○
Sakrete of Pacific NW (Ross Is	○	○	●	●	●	○	●	●	○	○	○	○	●	●
Sause Bros Inc	○	○	○	○	●	○	○	●	○	○	○	○	●	○
Schnitzer (A)	○	○	○	○	○	○	○	○	●	○	○	○	●	○
Schnitzer (B)	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Schnitzer Invest/Kitridge	○	○	●	●	●	○	○	○	○	○	○	○	○	○
Shaver Transportation Co	○	○	○	○	●	○	○	○	●	○	○	○	●	○
Shore Terminals LLC (A)	○	○	○	○	●	○	○	○	○	○	○	○	●	●
Shore Terminals LLC (B)	○	●	●	●	●	○	●	●	○	○	○	○	○	○
Southern Pacific Transportation	○	●	●	●	○	○	○	●	○	●	○	○	○	○
Steelmill Warehouse	○	●	●	●	●	○	○	●	○	○	○	○	○	○
The Marine Salvage Consortium	○	○	○	○	●	○	○	●	●	○	○	○	●	○
Time Oil Co	○	○	○	○	○	○	○	○	●	○	○	○	○	○
Tosco	○	○	○	○	●	○	○	○	○	○	○	○	○	○
Transloader International	○	○	●	●	●	○	○	●	○	○	○	○	●	●
Triangle Park LLC/Zidell (A)	○	○	○	○	●	●	●	●	●	○	○	○	●	○
Triangle Park LLC/Zidell (B)	○	●	●	●	●	●	●	●	○	●	●	○	○	○
Triangle Park LLC/Zidell (B)	○	●	●	●	●	●	●	●	○	●	●	○	○	○

Property Owner/Lessee	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Triangle Park LLC/Zidell (B)	○	●	●	●	●	●	●	●	○	●	●	○	○	○
Unkeles Family	○	●	●	●	●	●	○	●	○	○	○	○	○	○
USA	○	●	●	●	●	○	○	○	○	○	○	○	●	○
USA/Army Corps of Engineers	○	○	○	○	●	○	○	●	●	○	○	○	○	●
USA/Bonne	○	●	●	●	●	○	○	○	○	○	○	○	○	○
USA/Coast Guard, Navy, Marine	○	○	○	○	●	○	○	○	●	○	○	○	●	○
W&B Smith	○	●	●	●	●	○	○	●	○	○	○	○	○	○
W&C Harold	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Wacker Siltronic Corp	○	○	●	●	●	○	○	○	●	○	○	○	○	○
Watumull Properties Corp	○	●	●	●	○	○	○	●	○	○	○	○	●	○
White/Hart Properties LLC	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Willians Cindy &	○	○	○	○	●	○	○	●	○	○	○	○	○	○
WW Grainger	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Yost Wallace H	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Property owners not labeled on map (small properties)														
City of Portland	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Container Corp	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Michael Bosch	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Neil Feinstein	○	●	●	●	●	○	○	●	○	○	○	○	○	○
No ownership data	○	●	●	●	●	○	○	●	○	○	○	○	○	○
No ownership data	○	○	●	●	●	○	○	●	○	○	○	○	○	○
Ray Blackford	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Webb Smith	○	●	●	●	●	○	○	●	○	○	○	○	○	○
Zidell	○	○	●	●	●	○	○	●	○	○	○	○	○	○

Criteria Legend:

1. Appropriate Zoning
2. Barge Access
3. Shoreside Barge Access
4. Ship Access
5. Rail Access
6. Truck Access
7. Appropriate Street Conditions
8. Sufficient Lot Depth
9. Lack of Contamination
10. Compatible Neighbors
11. Lack of Environmental Constraints
12. Lack of Public Easement
13. Low Flood Risk
14. Building Height Limitations

ENDNOTES

[i] E.D. Hovee & Company maintains proprietary software of the IMPLAN input-output economic model developed by the University of Minnesota and USDA Forest Service. Harbor-wide results may be extrapolated from survey findings matched to Bureau of Planning provided data (employment) for the harbor industrial area.

[ii] Metro has forecast 10,460 more jobs within the Portland Harbor Area over the next 20 years. Rivergate is projected to become the largest employment center within the Portland Harbor area, adding 6,590 jobs – capturing nearly 65% of the harbor study area's job growth. Guild's Lake and Swan Island, the study area's largest employment centers, are forecast to add only 880 and 670 jobs respectively.

[iii] Interviews with key petroleum industry businesses suggests a somewhat different trend which is discussed in a later section of this PHILS Part 2 report.

[iv] Interviews should not be construed as representing a statistically valid sample due to the sample size of 80 firms and focus on industry leaders. The cross-section approach is useful to identify major trends and issues, with more emphasis on qualitative observations than quantitative or statistical sample reliability.

[v] Assuring confidentiality of results has been pivotal in obtaining responses from a number of those interviewed for either (or both) of two reasons:

- Non-disclosure of proprietary information to potential competitors
- Opinions that may be perceived as incompatible with those of sponsoring public agencies (e.g. Columbia channel deepening)

[vi] There are additional firms that may rely on the river, for example, for water rights or use but that are classified in other sectors if they do not engage in on-site marine transportation. From this survey, firms not classified as river-dependent have indicated other important relationships to the river including water rights for process water/fire protection.

[vii] Employment data utilized in this section includes proprietors and others not typically covered by unemployment insurance. Conversely, the City's Part 1 analysis only included covered workers.

[viii] IMPLAN is an economic model providing information that identifies the relationships between multiple economic sectors at the county level. The model was developed for the USDA Forest Service and draws on a national database from the U.S. Bureau of Economic Analysis and provides data for 528 economic sectors.

[ix] The IMPLAN database provides information for 528 industries. These industries have been aggregated into employment sectors by two-digit SIC. Employment sectors are clustered into industries that have similar activities (i.e. produce-related goods, perform similar services, or naturally link to one another). The same definitions used for the Portland-Vancouver metro area have been applied to the U.S. in order to accurately assess the region's performance against nationwide activities.

[x] Value-added is important because it measures the amount of local processing (or value-added) to goods produced and/or services provided by the industry. The higher the level of value-added, the more wealth being created within the local economy.

[xi] For this analysis, the threshold for a high employment multiplier is set at 2.00, that is, at least two jobs created directly and indirectly in the region for every direct new job in the sector considered.

[xii] See Markusen, Ann, "Sticky Places in Slippery Space: A Typology of Industrial District," *Economic Geography*, Volume 72, Issue 3 (Jul., 1996), 293-313.

[xiii] These criteria have been reviewed with representatives of PDC, the Port of Portland, and City Bureau of Planning – and were further reviewed in two focus group sessions.

[xiv] Tire A are tax lots greater than one acre that have no identified constraints. Tier B sites are tax lots greater than 2 acres constrained by "land banked" corporate ownership, access, or unstable soils.