Evaluation of Environmental Conditions At Candidate Industrial Sites Regional Industrial Inventory Project Portland Metropolitan Area, Oregon

Prepared for:
Group Mackenzie

August 2, 2012
1901-00

Ash Creek Associates
A Division of Apex Companies, LLC
APEX

Ash Creek Associates, Inc.
Environmental and Geotechnical Consultants

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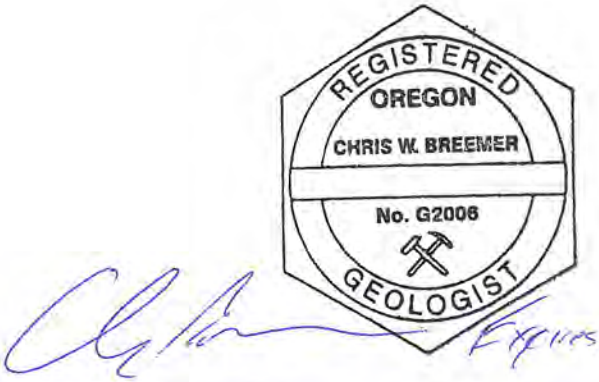

Chris Breemer, R.G.
Principal, Ash Creek Associates

3015 SW First Avenue
Portland, Oregon 97201-4707
(503) 924-4704 Portland
(360) 567-3977 Vancouver
(503) 943-6357 Fax
www.ashcreekassociates.com

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Appendices

1.0 Project Understanding

Ash Creek Associates, Inc. (Ash Creek) prepared this assessment of environmental conditions at prospective industrial development sites on behalf of Group Mackenzie for a coalition of organizations, including the Oregon Business Development Department, the Portland Business Alliance, Metro, the Port of Portland, and the Oregon Chapter of NAIOP. This report evaluates for the potential that hazardous substances (including petroleum hydrocarbons) may be present at 11 properties in the Portland metropolitan area. As appropriate for each property, conceptual costs for environmental assessment and remediation are presented. The properties are each at least 25 acres in area and are candidates for industrial development.

The properties were selected for evaluation by the Project Management Team, based on a detailed study of prospective industrial development sites in the Portland metropolitan area. Maps showing the locations and boundaries of the sites are included in Appendix A. Group Mackenzie prepared conceptual site development plans for each of the sites and these were used by Ash Creek as part of the assessment.

Where potential impacts by hazardous substances were identified, Ash Creek developed conceptual cost estimates for assessment and remediation. The cost estimates and schedules are conceptual in nature because: (1) they are based on a limited review of publicly available files; (2) Ash Creek staff did not enter the subject properties or interview property owners; and (3) collection and analysis of environmental media (soil, sediment, groundwater, air) was not performed. The information presented herein, along with a number of factors, will be considered by Group Mackenzie to assess overall development costs for the prospective development sites.

The Project was funded in part with Oregon State Lottery Funds administered by the Oregon Business Development Department. The Port of Portland, the Portland Business Alliance, the State of Oregon, the project funding partners, or their consultants make no representations or warranties, express or implied, concerning the properties described herein, or the accuracy, adequacy, or completeness of the information contained in this report. Prospective purchasers, tenants, and others shall perform, and rely solely upon, their own independent due diligence with respect to the properties.

2.0 Scope of Services

Ash Creek was provided with a list of prospective development sites. Ash Creek completed the following scope of services for each candidate site:

1. Obtained and reviewed historical aerial photographs.
2. Reviewed the Oregon Department of Environmental Quality (DEQ) Facility Profiler and the Environmental Cleanup and Site Information (ECSI) online databases of sites with known or suspected use or releases of hazardous substances.

3. Performed a site reconnaissance to observe current conditions and to obtain photographs of the subject properties and surrounding facilities of interest.
4. For properties that are listed in the DEQ Facility Profiler or ECSI databases due to releases of hazardous substances (confirmed or suspected), Ash Creek obtained and reviewed readily available relevant files.
5. In cases where hazardous substances are suspected or confirmed, Ash Creek developed a cost estimate and schedule for anticipated environmental assessment and remediation activities.

3.0 Methods

3.1 Review of Historical Aerial Photographs

Ash Creek obtained historical aerial photographs of each site from the University of Oregon or local government. Photographs were requested for 10-year intervals; however, due to limitations of the aerial photography collections, the interval between aerial photographs varies. Photographs were generally available for the period between the 1930s and present. Each photograph was reviewed for historical land uses and activities at the target properties and adjacent properties to assess the potential for environmental impacts from the depicted activities/land uses. In general, the resolution of the aerial photography is only sufficient to identify large-scale land uses and activities. For example, features such as small aboveground storage tanks (ASTs), commonly used for the storage of gasoline and diesel, and individual chemical drums, are generally not visible on aerial photographs.

3.2 Review DEQ Facility Profiler

DEQ maintains an online geo-referenced database of confirmed and suspected contaminated properties in Oregon – the "Facility Profiler". Ash Creek identified each of the subject properties in the Facility Profiler system to determine if DEQ has records of hazardous materials storage or releases at the subject properties or at nearby properties. Listings that indicate conditions that could pose a risk to the subject properties were further evaluated through a review of DEQ files (see Section 3.4).

3.3 Site Reconnaissance

An Ash Creek representative visited and photographed each site and visually assessed the properties for conditions or activities that may indicate that hazardous substances have impacted the sites. The site reconnaissance was performed from public rights of way. Ash Creek representatives did not knowingly enter private property or interview site owners or occupants.

3.4 File Review

Ash Creek reviewed files maintained by DEQ for facilities/properties that could pose a risk to the target properties. Files were selected for review based on information presented in the DEQ Facility Profiler system. For relatively simple DEQ listings (for example, residential heating oil tank releases), the file review was performed using online DEQ databases (i.e., the ECSI and the Leaking Underground Storage Tank [LUST] databases). For more complex listings, hard copies of pertinent files were reviewed.

3.5 Conceptual Assessment and Remediation Cost Estimate

Ash Creek developed assessment and remediation cost estimates for each property where hazardous substance contamination is suspected or confirmed. The cost estimates are based on the background information obtained during the activities described in Sections 3.1 through 3.4. Assessment cost estimates are based on DEQ and U.S. Environmental Protection Agency (EPA) guidance for remedial investigations, and our experience in the region.

The scope and cost for remediation of contaminated properties in Oregon is normally determined through a risk-based decision making process. Under this process, site-specific cleanup standards are established for an impacted property, based on a thorough evaluation of current and reasonably likely future land and water uses. Generally, cleanup standards are more stringent (and remediation costs are higher) at sites in residential areas, where children or infants may be exposed to hazardous substances, relative to sites in industrial areas, which are normally occupied by adults for a more limited duration.

Unless stated otherwise, Ash Creek made the following assumptions when developing remediation cost estimates for each target property:

1. Groundwater will not be used for any beneficial purpose, because it is assumed that all of the site are currently served by municipal supplies or will be served in the future;
2. Land use will be consistent with traded sector development in an industrial or office configuration;
3. Disturbed portions of the target properties will be covered with buildings, asphalt-concrete, concrete, and small landscaped areas following future development;
4. Given assumptions 1 through 3, the sites will be devoid of ecologically valuable habitat; therefore, ecological receptors will not be exposed to hazardous substances at the site; and
5. Remediation will be performed consistent with DEQ requirements and by using a presumptive remedy[1] that is likely to be effective and is reasonable in cost.

[1] U.S. EPA, Presumptive Remedies – Policies and Procedures. Presumptive Remedies: Policy and Procedures http://www.epa.gov/superfund/policy/remedy/presump/pol.htm

If these assumptions are incorrect, assessment and remediation costs could vary significantly from the estimates presented herein.

4.0 Site Summaries

Information about historical land uses and hazardous substance conditions at each target property, photographs, and supporting information, is compiled in Appendices B through L. A summary of information about hazardous substance impacts and potential investigation/remediation costs for each site is included in Section 5.

5.0 Summary

The following table summarizes site conditions, conceptual assessment and remediation costs, and timeframes for assessment and remediation at each site.

Table I – Summary of Property Conditions

Site	Site Name	Possible Hazardous Substance Impacts	Range of Investigation and Remediation Costs[2]	Remediation Permitting and Timeframe
2	Time Oil Company	Soil and groundwater contamination resulted from petroleum storage and handling, waste oil storage, and wood treatment chemical (PCP) blending operations. Soil and/or groundwater contamination are assumed to impact the entire site.	$754,000[3]	3-6 months
13	ICDC LLC and Entercom	Virtually the entire property was used for agricultural purposes between at least 1935 and present. Residual pesticides may be present in soil. Investigation of the magnitude and extent of pesticide impacts will be necessary prior to site development.	$15,000	3 months

2 A range of costs is presented when the magnitude and extent of impacts, if any, is unclear. Refer to Appendices B through L for cost assumptions and details.

3 The estimated remediation costs do not include long-term costs for extraction and treatment of contaminated groundwater.

Site	Site Name	Possible Hazardous Substance Impacts	Range of Investigation and Remediation Costs[2]	Remediation Permitting and Timeframe
15/16	UPS and Cereghino	Virtually the entire property was used for agricultural purposes between at least 1935 and present. Residual pesticides may be present in soil. Investigation of the magnitude and extent of pesticide impacts will be necessary prior to site development.	$15,000	3-6 months
19	Port of Portland TRIP	The property is included on the National Priority List (NPL; Superfund) due to releases from a Reynolds/Alcoa aluminum processing facility that historically operated at the site. Extensive remediation has been performed, resulting in the removal of the majority of hazardous substances from the site. Residual impacts remain in soil and groundwater at the site. Impacted soil, which is present on approximately 16 acres of the site, must be removed from the site or covered with clean fill. Future development must be performed in accordance with the Consent Order for the site.	$3,025,000	3-6 months
24	Jean Johnson	Virtually the entire property was used for agricultural purposes between at least 1936 and present. Residual pesticides may be present in soil. Investigation of the magnitude and extent of pesticide impacts will be necessary prior to site development.	$15,000	3-6 months
29	Clackamas County Development	The property was used for residential, agricultural, aggregate mining, equipment maintenance, composting, and other purposes between at least 1938 and present. Oil-range hydrocarbons and other hazardous substances are present in small areas of soil. The impacted soil, which appears to occupy less than 1 percent of the total site area, should be remediated prior to or during site development.	$25,000	3 months

Site	Site Name	Possible Hazardous Substance Impacts	Range of Investigation and Remediation Costs[2]	Remediation Permitting and Timeframe
33	Coffee Creek	Virtually the entire property was used for agriculture purposes between at least 1936 and present. Residual pesticides may be present in soil. Residential/farm ASTs and/or underground storage tanks (USTs), used for storing gasoline, diesel, or heating oil, may be present at the site. Investigation of the magnitude and extent of pesticide and petroleum impacts, if any, may be necessary prior to site development. If ASTs/USTs are present, they should be decommissioned and remediated (if releases have occurred) prior to development.	$35,000 to $155,00	3-6 months
37	Orr Family Farm	Approximately 20 percent of the property was used for agriculture purposes between at least 1936 and present. Residual pesticides may be present in soil. Residential/farm ASTs and/or USTs, used for storing gasoline, diesel, or heating oil, may be present at the site. Investigation of the magnitude and extent of pesticide and petroleum impacts, if any, may be necessary prior to site development. If ASTs/USTs are present, they should be decommissioned and remediated (if releases have occurred) prior to development.	$25,000 to $45,000	3-6 months

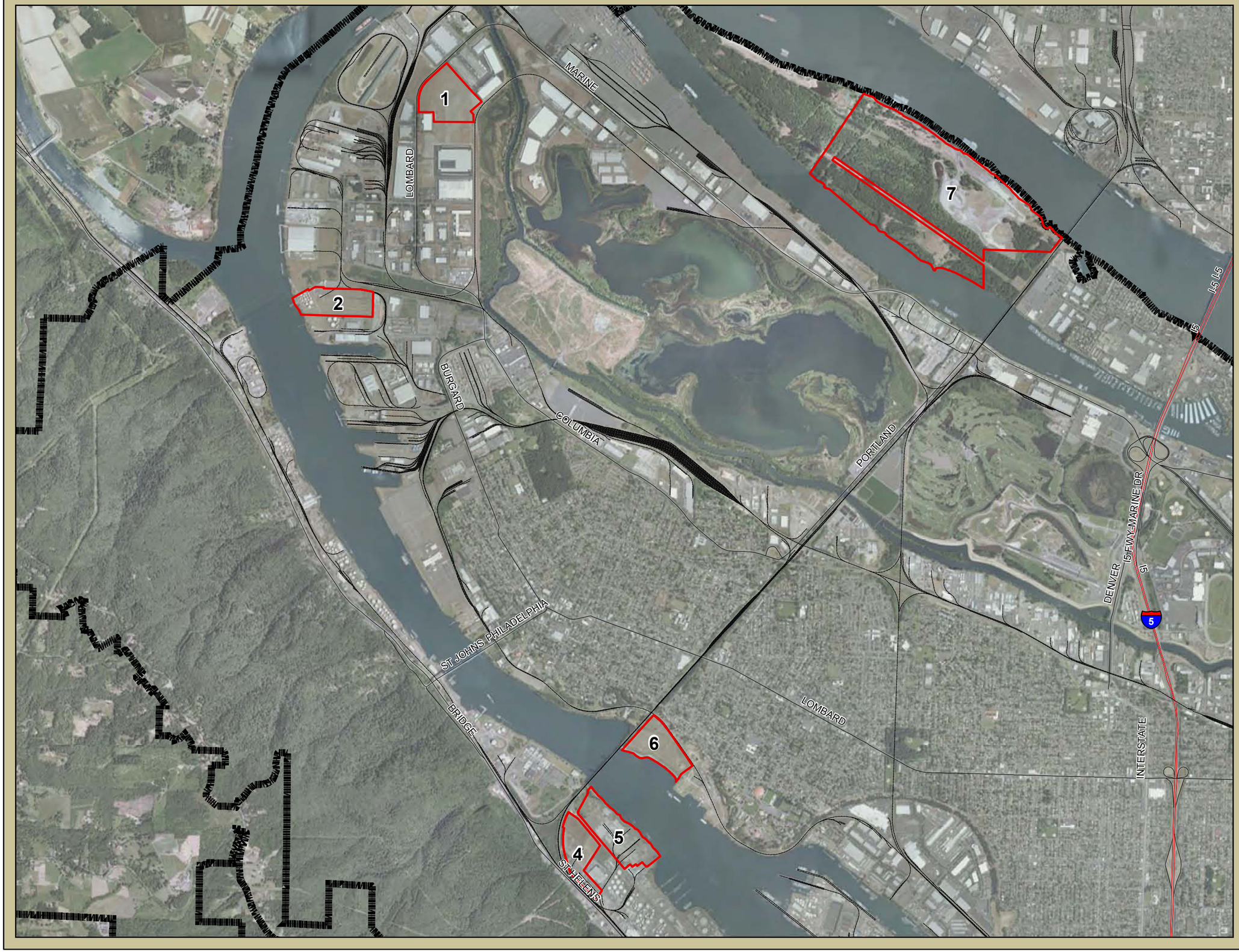
Site	Site Name	Possible Hazardous Substance Impacts	Range of Investigation and Remediation Costs[2]	Remediation Permitting and Timeframe
55/56	East Evergreen	Virtually the entire property was used for agriculture purposes between at least 1936 and present. Residual pesticides may be present in soil. Residential/farm ASTs and/or USTs, used for storing gasoline, diesel, or heating oil, may be present at the site. Investigation of the magnitude and extent of pesticide and petroleum impacts, if any, may be necessary prior to site development. If ASTs/USTs are present, they should be decommissioned and remediated (if releases have occurred) prior to development.	$30,000 to $120,000	3-6 months
62	Rock Creek	Virtually the entire property was used for agriculture purposes between at least 1936 and present. Residual pesticides may be present in soil. A heating oil UST was possibly decommissioned at the site in 2002. Residential/farm ASTs and/or USTs, used for storing gasoline, diesel, or heating oil, may be present at the site. Investigation of the magnitude and extent of pesticide and petroleum impacts, if any, may be necessary prior to site development. If ASTs/USTs are present, they should be decommissioned and remediated (if releases have occurred) prior to development.	$30,000 to $120,000	3-6 months
104	Hillsboro Urban Reserves	Virtually the entire property was used for agriculture purposes between at least 1936 and present. Residual pesticides may be present in soil. Residential/farm ASTs and/or USTs, used for storing gasoline, diesel, or heating oil, may be present at the site. Investigation of the magnitude and extent of pesticide and petroleum impacts, if any, may be necessary prior to site development. If ASTs/USTs are present, they should be decommissioned and remediated (if releases have occurred) prior to development.	$30,000 to $120,000	3-6 months

Appendix A

Regional Industrial Inventory Maps

Regional Industrial Inventory Project
October 27, 2011

Map 1
North Portland



Potential Industrial Site

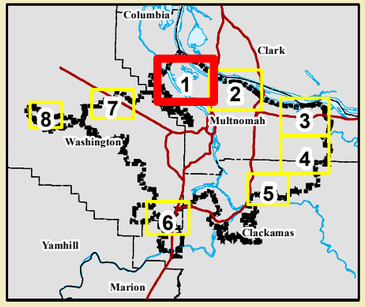
Urban Growth Boundary

0 1,400 2,800 5,600 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



GROUP MACKENZIE
PORTLAND, OR | SEATTLE, WA | VANCOUVER, WA
RiverEast Center | 1515 Water Avenue, Suite 100 | Portland, OR 97214
PO. Box 14310 | Portland, OR 97293
T: 503.224.9560 | F: 503.228.1285 | www.groupmackenzie.com

Date: 10/27/11
File: SiteReview_10.27.2011.mxd

Map Created by: GF
Project No: 2110160

Regional Industrial Inventory Project
October 27, 2011

Map 2
Portland International Airport

Potential Industrial Site

Urban Growth Boundary

0 1,400 2,800 5,600 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Coniic

Location Map

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PORTLAND, OR | SEATTLE, WA | VANCOUVER, WA
RiverEast Center | 1515 Water Avenue, Suite 100 | Portland, OR 97214
P.O. Box 14310 | Portland, OR 97293
T: 503.224.9560 | F: 503.228.1285 | www.groupmackenzie.com

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Map Created by: GF
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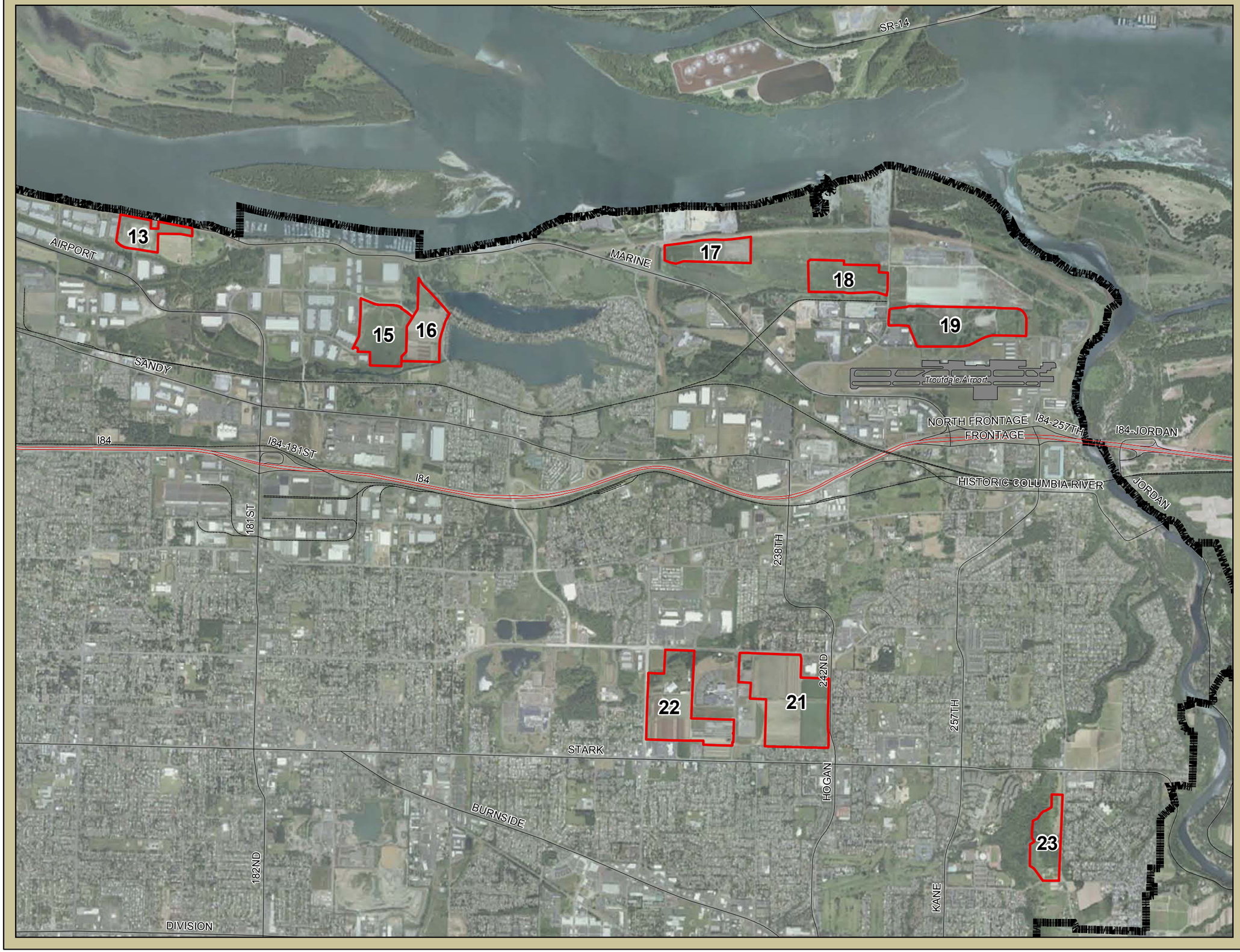
Regional Industrial Inventory Project
October 27, 2011

Map 3
East Multnomah County



Potential Industrial Site

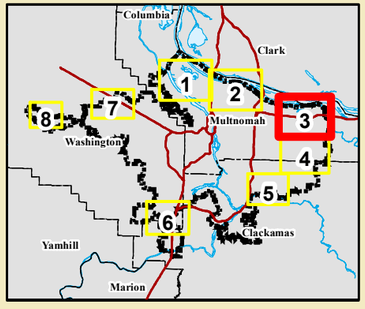
Urban Growth Boundary

0 1,300 2,600 5,200 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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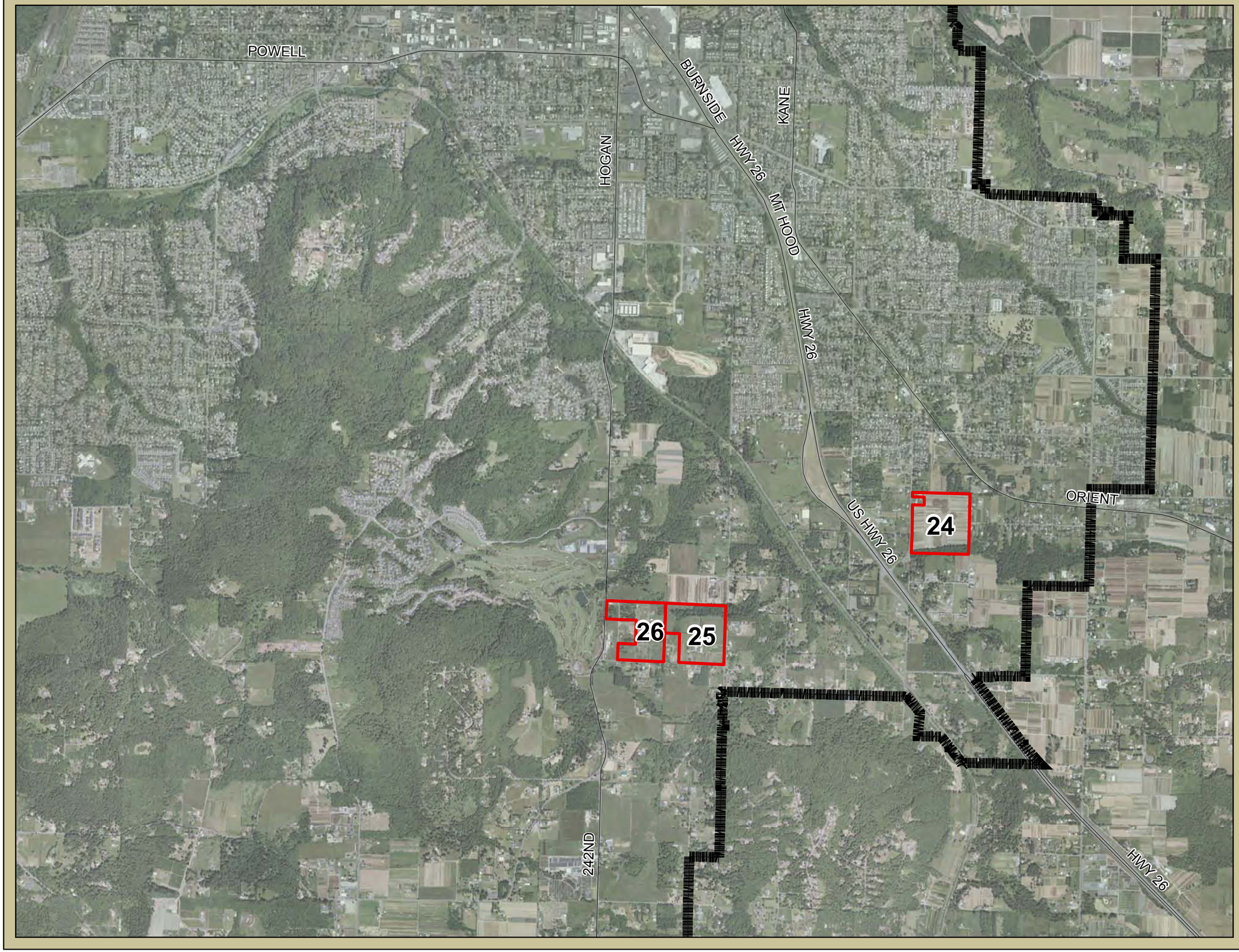


Regional Industrial Inventory Project
October 27, 2011

Map 4
E Gresham

Potential Industrial Site

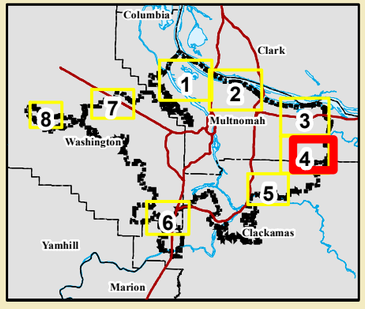
Urban Growth Boundary

0 1,000 2,000 4,000 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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P.O. Box 14310 | Portland, OR 97293
T: 503.224.9560 | F: 503.228.1285 | www.groupmackenzie.com

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Map Created by: GF
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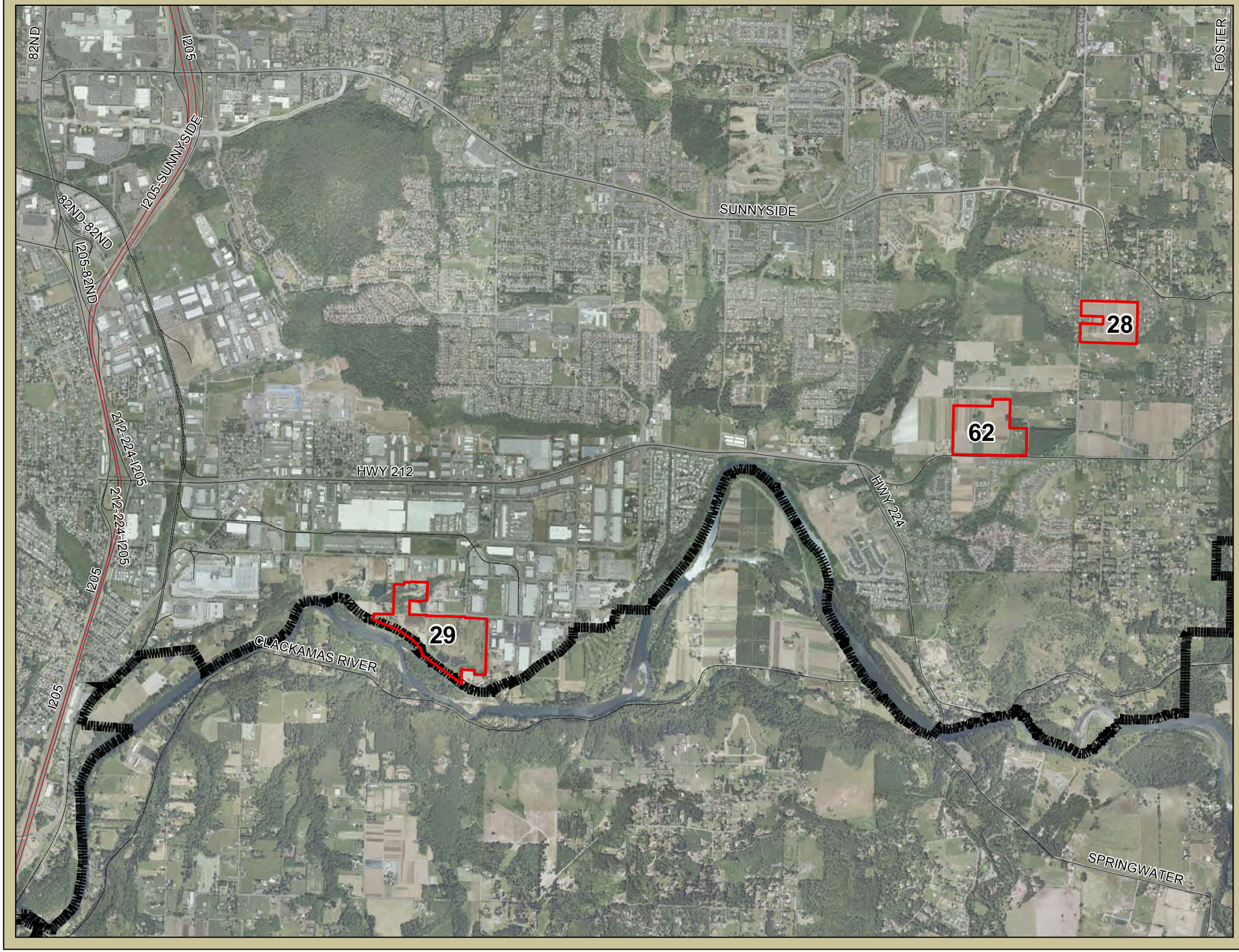


Regional Industrial Inventory Project
October 27, 2011

Map 5
Clackamas County

Potential Industrial Site

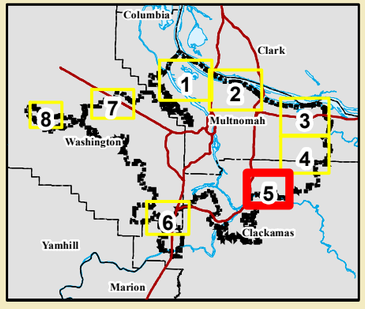
Urban Growth Boundary

0 1,050 2,100 4,200 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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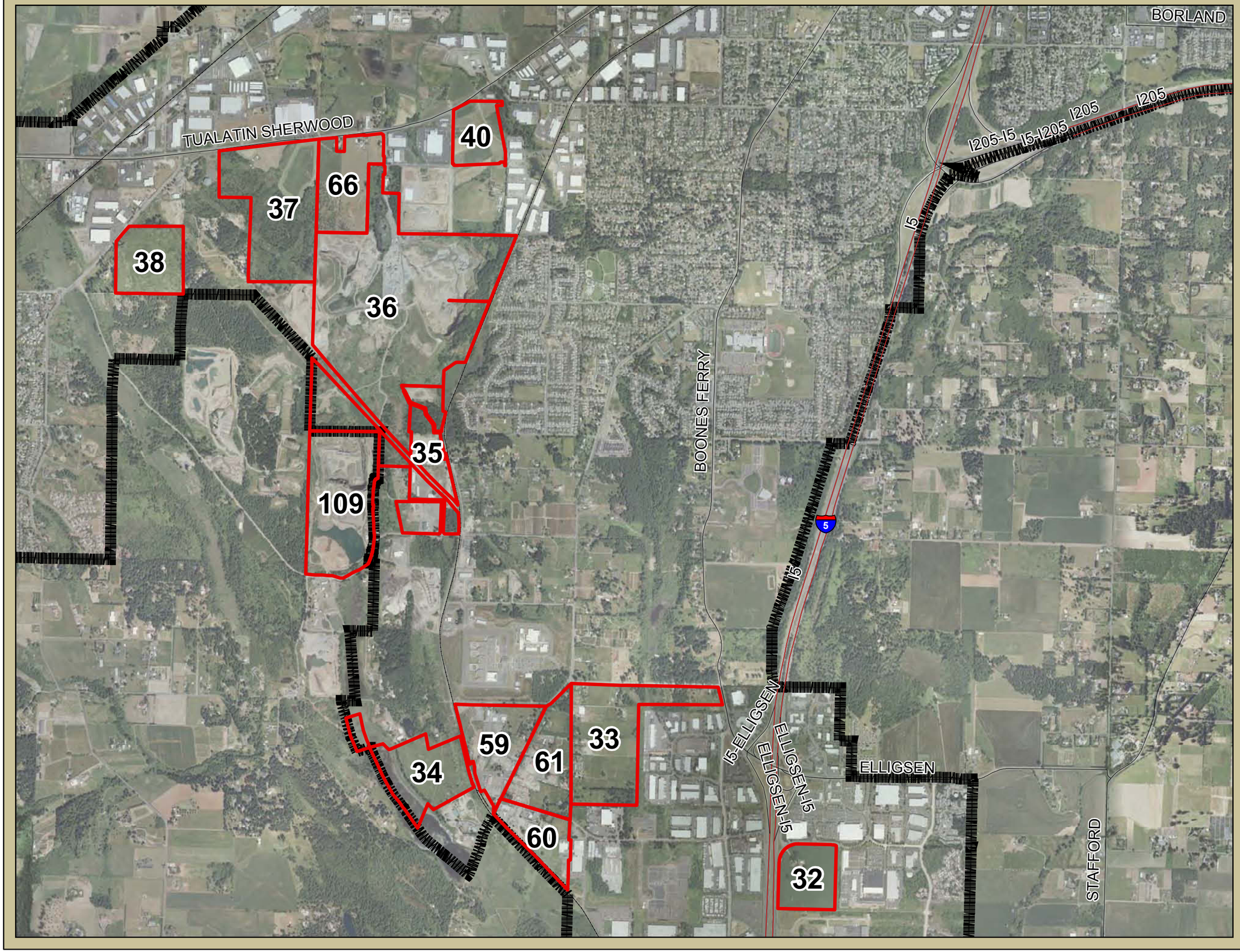


Regional Industrial Inventory Project
October 27, 2011

Map 6
Tualatin, Sherwood & Wilsonville

Potential Industrial Site

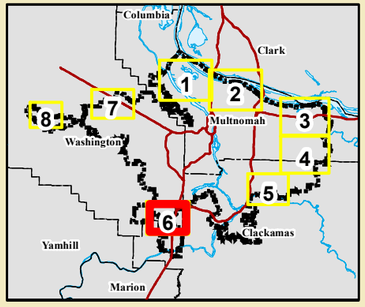
Urban Growth Boundary

0 900 1,800 3,600 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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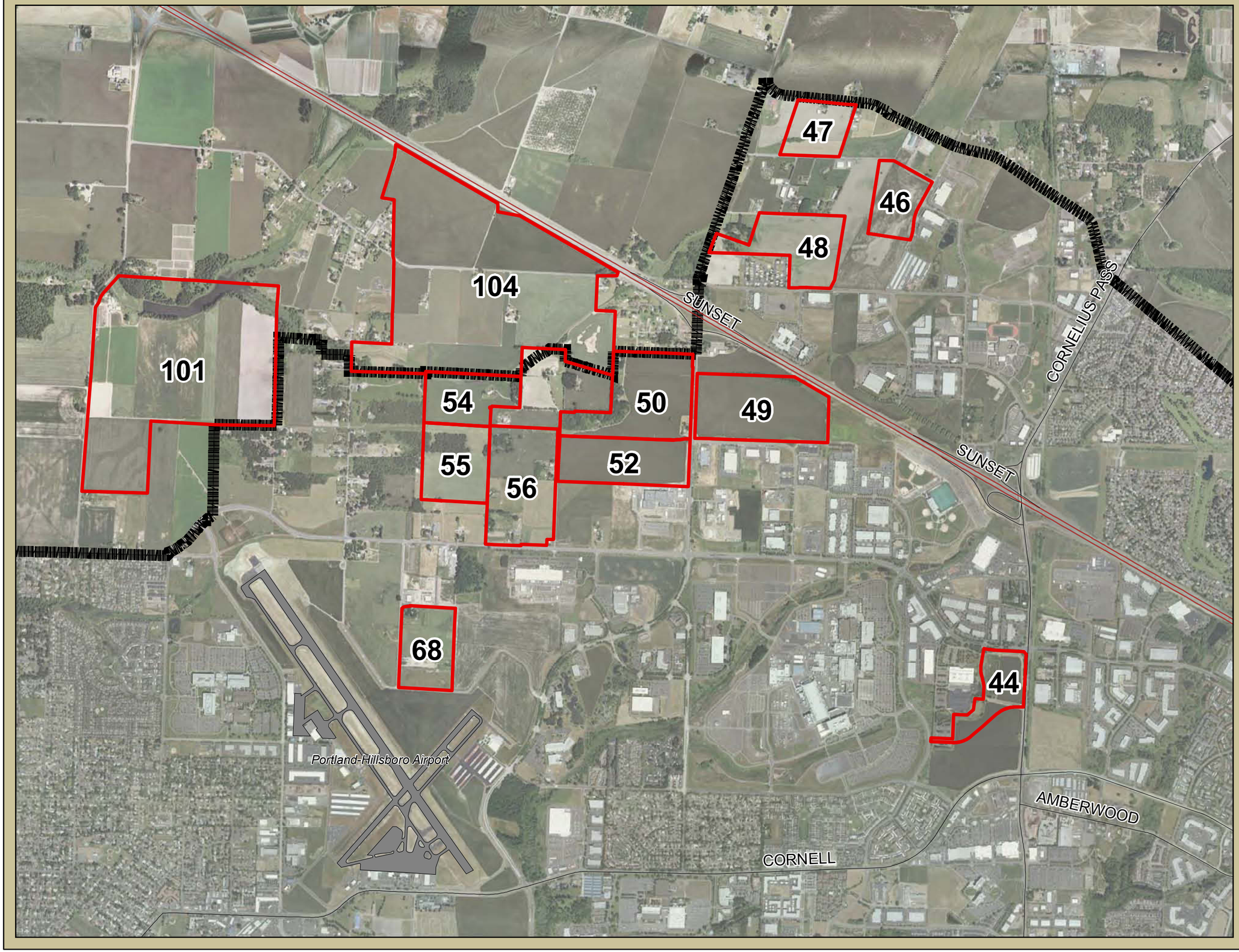


Regional Industrial Inventory Project
October 27, 2011

Map 7
Hillsboro

Potential Industrial Site

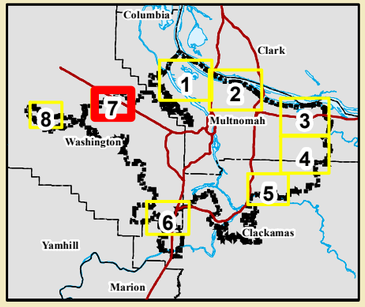
Urban Growth Boundary

0 900 1,800 3,600 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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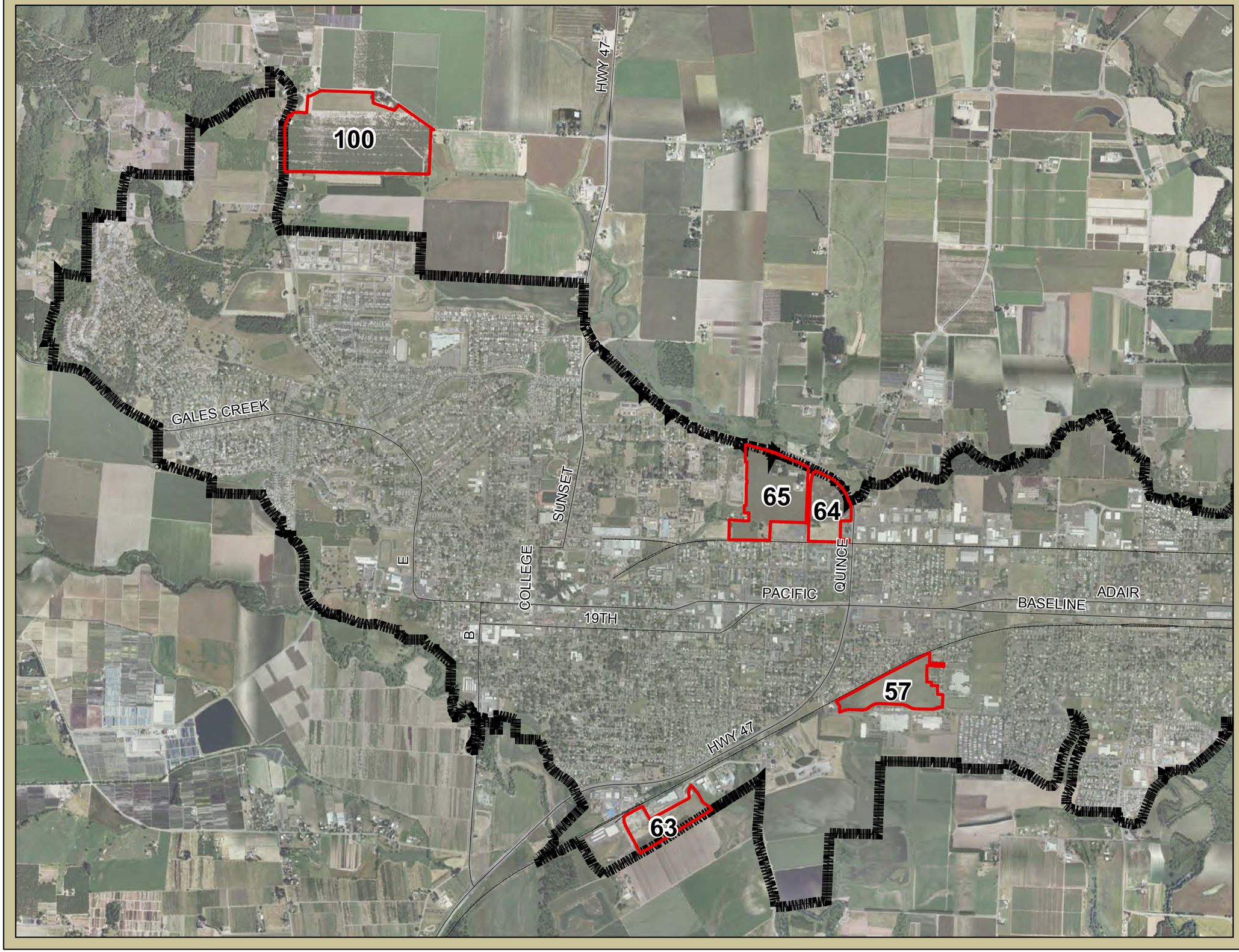


Regional Industrial Inventory Project
October 27, 2011

Map 8
Forest Grove

Potential Industrial Site

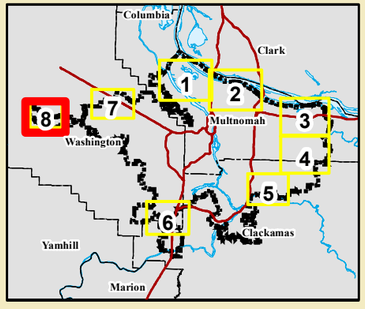
Urban Growth Boundary

0 1,000 2,000 4,000 Feet

Source Data
Metro RLIS Lite Base Data, August 2011

Geographic Projection Information
NAD 83 HARN, Oregon North
Lambert Conformal Conic

Location Map



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PO. Box 14310 | Portland, OR 97293
T: 503.224.9560 | F: 503.228.1285 | www.groupmackenzie.com

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Appendix B

Site 2: Time Oil Site Summary

Appendix B —Site 2: Time Oil Site Summary

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Attachments

Appendix B —Site 2: Time Oil Site Summary

This Appendix presents a summary of information about environmental conditions at site 2.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – The 1936 historical aerial photograph suggests that the site was recently disturbed (likely filled).

1944 – The Main Terminal Tank Farm is present in the northwest portion of the site, along with the dock structure. The remainder of the site and the property to the south and east has been developed for the Oregon Shipbuilding Corporation shipyard (the "shipyard"). The shipyard portion of the site appears to be a storage area and includes a series of railroad spurs and roads. The majority of the property to the north remains undeveloped, although what appears to be an electrical transmission tower is present.

1948 – The site appears generally unchanged, except that the shipyard appears to be unused. A dock structure south of the site is now present. It is difficult to determine, but it appears that the railroad spurs have been removed.

1956 – Above-ground storage tanks (ASTs) have been constructed on the Bell Terminal Tank Farm. The property immediately east of the Bell Terminal Tank Farm appears to include a small landfill. A second electrical transmission tower is present north of the site.

1964 – Additional ASTs have been added to the Main Terminal Tank Farm and the Bell Terminal Tank Farm. The landfill on the property immediately east of the Bell Terminal Tank Farm appears be absent.

1970 – The ASTs used by Crosby & Overton in the 1980s have been constructed. The shipyard-era roads on the eastern portion of the site are darker (e.g., wet or oiled). There appears to be ponded water northeast of the Bell Terminal Tank Farm.

1980 – The Aviation Gasoline Storage Area ASTs have been constructed. An additional AST has been added to each of the Main Terminal and Bell Terminal tank farms. A building is present north of the site along with a third electrical transmission tower. The Premier Edible Oils (PEO) tank farm has been constructed west of the Bell Terminal Tank Farm.

1990 – No significant changes are visible at the site. A ship is berthed at the on-site dock and rail cars are present on the spur adjacent to the warehouse.

Appendix B —Site 2: Time Oil Site Summary

1998 – The ASTs used by Crosby & Overton in the 1980s have been removed. The soil stockpile adjacent to the PCP mixing area has been constructed. A ship is berthed at the on-site dock. Vegetation has been removed from the eastern portion of the site.

2005 – No significant changes are visible at the site. The PEO tank farm has been removed.

2.0 Review of DEQ Facility Profiler

The Time Oil Company (TOC) site is identified in the DEQ Facility Profiler as being listed on the confirmed release list (CRL) and assigned DEQ Environmental Cleanup and Site Information (ECSI) number 170.

The site was operated as a petroleum products storage terminal from the 1940s through 2001. Other historical activities at the site included (1) pentachlorophenol (PCP) product formulation and storage (Koppers Co.) from 1967 to 1982; and (2) waste oil storage by Crosby and Overton in the 1980s. Remedial Investigation (RI) activities have been ongoing since 1995. Soil and groundwater contamination resulted from petroleum storage and handling, waste oil storage, and PCP blending operations. Contaminants of Interest (COI) at the site include total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), metals, and PCP. Several phases of soil remediation were performed between 1995 and 2011. Groundwater remediation, consisting of a pump-and-treat system, was implemented in 2000 and continues to operate. The on-site above-ground storage tanks (ASTs) were demolished and removed in 2009. TOC is currently preparing a Source Control Evaluation (SCE) and Risk Assessment Work Plan.

3.0 Site Reconnaissance

The site was observed on January 31, 2012 from public rights of way adjacent to the site. The majority of the site is undeveloped (i.e., vegetated) and generally vacant with exception of a few buildings. A photograph log is included in Attachment B.

4.0 File Review

Ash Creek reviewed publicly available files to further evaluate the potential for contamination at the site.

TOC has divided the Site into three parcels for their work toward regulatory closure:

1. East Property (21 acres) – No structures are present on the East Property, but this area was historically part of the shipyard during World War II. This area and a portion of the Central Property received a DEQ no further action (NFA) determination in 2003. The NFA determination is contingent upon continued use of the site for industrial purposes, which limit suitable habitat for

sensitive ecological receptors. An equitable servitude and deed restriction was recorded on the property.

2. Central Property (13.5 acres) - Includes the former Bell Terminal, the undeveloped western portion of the East Property located directly north of the Bell Terminal, and the former Aviation Gasoline Storage Area; and
3. West Property (17.5 acres) - Includes the former Main Terminal, the former PCP mixing area, and remaining property to the west of the central property.

Tank Farm Areas. A surface soil removal action was conducted in 2011 to reduce on-site contaminant concentrations, in support of the forthcoming risk assessment. Residual concentrations of TPH (up to 20,000 milligrams per kilogram [mg/kg]) and PAHs remain on-site. Concentrations of TPH, above the DEQ Clean Fill Criteria (100 mg/kg), are present from the ground surface to the full depths explored. The highest relative concentrations were detected at the capillary fringe in each tank farm. There is the potential that petroleum constituents are present in soil below 10 feet below ground surface (bgs) at concentrations that exceed screening levels for vapor intrusion. Lead concentrations that exceed the DEQ Clean Fill Criteria (17 mg/kg) are present across the tank farms.

East Property. Although the East Property has received an NFA, the determination was based on the cleanup standards at the time of work (e.g., 1 mg/kg industrial cleanup standard for PAHs). There are likely locations that contain contaminants at concentrations that exceed current DEQ Risk-Based Concentrations (RBCs), requiring that soil be managed as part of property redevelopment.

PCP Formulation Area. Soil remediation activities removed PCP-impacted soil in the former warehouse and mixing area, but residual soil with PCP is present below approximately 13 feet. Few dioxin/furan soil samples have historically been collected, but the available data suggest that dioxins/furans may be present in soil at concentrations that exceed DEQ RBCs. A groundwater treatment system was installed in 2000 to limit further migration of PCP-impacted groundwater in the upper and lower water-bearing zones. Redevelopment of this area will require proper management of impacted soil and groundwater, if encountered (i.e., dewatering). Any redevelopment will also need to accommodate the continued operation of the groundwater treatment system and the presence of monitoring wells on the property. If the configuration of the groundwater treatment/monitoring system is not compatible with development plans, modification of the treatment/monitoring system will be required.

Former Crosby & Overton Leasehold. Historical releases from the ASTs and overall poor housekeeping led to contamination on this former leasehold. Soil remediation activities have been completed, but residual contamination remains (under approximately 1.5 feet of backfill). Residual contamination is likely present in some locations at concentrations that exceed current RBCs, requiring that soil be properly managed during property redevelopment.

Subsurface Physical Obstacles. During the summer and fall of 2009, the remaining ASTs, two loading racks, and associated aboveground piping were removed from the site. Some underground piping was also removed, but a large portion of the underground piping remains in place. Following is a summary of these utilities from the *Tank Farm Demolition Completion Report*:

- A network of at least three buried Transite® asbestos-containing pipelines connect the former Main Terminal and former Bell Terminal Tank Farm Areas. The Transite® pipelines are believed to be about 3 feet bgs.
- A buried natural gas pipeline apparently runs from the Main Gate to the approximate northwest corner of the former Bell Terminal Tank Farm, and then east.
- Underground product piping (coated with non-asbestos-containing insulation) that historically connected the former boiler unit with former Tanks 14501 and 15005 (located in the northwest corner of the Main Terminal Tank Farm) was capped and left in place.
- Three 8-inch-diameter underground product pipelines extending from the southeast corner of the former Main Terminal to the northwest corner of the former Bell Terminal were capped (using a welding torch) and left in place.
- A 10-inch-diameter underground product pipeline extending west from the central portion of the former Bell Terminal was capped and left in place.

5.0 Summary of Environmental Conditions

The Facility has a long industrial history, with environmental impacts related to petroleum storage and transfer, PCP formulation activities, and tenant areas (i.e., Crosby & Overton). Although surface soil removal actions have been completed to ready the Facility for a risk assessment, there is likely residual contamination (at concentrations above DEQ RBCs and clean fill criteria) that will require management during redevelopment (e.g., dewatering, special soil handling, potential off-site disposal, etc.). Due to residual volatile constituents in soil, the potential for vapor intrusion issues should also be considered during development (e.g., passive building venting or targeted soil gas sampling). Based on the limited file review, the active groundwater treatment system at the site appears to effectively mitigate the potential for PCP migration to the Willamette River. To maintain source control, and prevent migration of impacted groundwater to the adjacent Portland Harbor Superfund Site, the groundwater treatment system must be maintained and active in the foreseeable future.

The aboveground tank farm equipment has been removed but a number of pipelines were left in place (including buried Transite® asbestos-containing pipelines).

6.0 Conceptual Assessment and Remediation Cost Estimate and Schedule

Extensive assessment and remediation efforts have been completed at the Site. Those efforts have included the following:

- Excavation of 1,500 cubic yards of soil from the east parcel;
- Excavation of 6,400 cubic yards of soil and multiple phases of in situ chemical oxidation (ISCO) injection in the former PCP mixing area;
- Excavation of 300 cubic yards of soil from the former Crosby & Overton tank area;
- Excavation of 7,000 cubic yards of soil from targets areas of the Site in 2011; and
- As of February 2010, approximately 80 million gallons of groundwater have been treated and discharged to the sanitary sewer (approximately 6 million gallons annually).

Although environmental remediation efforts have been conducted, impacted soil remains on-site and must be managed as part of property redevelopment. The potential for vapor intrusion also must be addressed during the redevelopment process (through sampling and analysis of soil vapor and/or through installation of vapor mitigation systems at building locations).

The following estimate of assessment and remediation costs includes: (1) costs accrued to date, and (2) anticipated future costs.

6.1 Future Costs

The following estimate of future costs was prepared using the following conceptual redevelopment model. A preliminary drawing prepared by Group Mackenzie is included in Attachment C.

- Metal manufacturing/process operation that utilizes water, rail, and truck modes of transportation.
- Three buildings and lay down yard areas. Rail service to the northern-most building.
- Land-based crane system that would be used to off load from a vessel (e.g., barge or ship) at the dock.
- Balanced cut and fill in order to bring the land surface to an elevation of 31 feet NAVD88 and the building pads to an elevation of 32 feet (one foot above the flood plain). The proposed soil cut areas presented on the conceptual design include light petroleum contamination.

The additional tasks and associated costs required to address hazardous substance impacts for the conceptual redevelopment scenario are summarized below.

Appendix B —Site 2: Time Oil Site Summary

Groundwater Treatment System. The groundwater treatment system must remain in operation as a source control measure to prevent migration of impacted groundwater to the Willamette River. However, the costs for operation and maintenance of the system and discharge of extracted water to the City of Portland sanitary sewer ($3,720,000[1]) are not included in this remediation cost estimate because these costs are not required to make the site development-ready (the objective of this project). Rather, this cost will be part of ongoing maintenance and would likely be subject to negotiation between present and future property owners.

Capping Contaminated Soil. Impacted soil will be excavated from cut areas and placed in portions of the site scheduled for filling (i.e. underneath building footprints and other operations areas). DEQ requires a Solid Waste Letter of Authorization (SWLA) prior to the removal and permanent placement of impacted soil at the site. It will be necessary to install a cap over the impacted soil. We assume that the cap will consist of asphalt or cement concrete pavement (including building foundations), clean soil, or a combination of these materials. The cap will be protective of human health by preventing direct contact with the soil and by preventing movement of the soil. A Soil Management Plan (SMP) will be necessary to address risks associated with construction worker exposure and to address long-term requirements for inspection and maintenance of the caps (e.g., annual inspections, sealing observed cracks, etc.). Alternatively, clean soil could be imported to the site and used to raise selected areas above the flood plain elevation, reducing the risk of construction worker exposure to impacted media.

Increased Depth of Soil Cut. It may be necessary to increase the depth of the soil cut at removal areas to accommodate placement of a cover layer of clean imported soil in those areas. The increased cut depth can be accommodated in the cut and fill balance. The clean imported soil may be required to provide suitable habitat material for wetland features.

Decommissioning and Modification of Well Network. Eighty-five groundwater monitoring well wells are located at the site. It is likely possible to decommission some of the wells to accommodate development plans, however a portion of the well network must be maintained. It may also be necessary to move some wells to accommodate construction activities. Costs associated with these costs are included in Table 1.

Table 1 – Assessment and Remediation Costs for Site 2

Cost	Description
$10,000	SWLA for placement of lightly petroleum contaminated soil under cap
$25,000	Soil gas investigation for soil placed under building footprints (as necessary based on DEQ request as part of SWLA negotiation)

[1] Present value, based on 3% annual discount rate; assumes $350,000 per year for 15 years.

$10,000	Preparation of SMP
No Cost[2]	Installation of cap
$74,000[1]	Annual cap inspection and O&M (assumes $5,000 per year for 20 years)
No Cost[3]	Dewatering during construction.
$300,000[4]	Placement of habitat cap in former tank farms deep cut areas (as necessary).
$250,000	Abandonment/modification of 85 flush-mount and above-grade groundwater monitoring well monuments and wells.
$85,000	Environmental oversight during cut and fill activities from contaminated areas (assumes 40 days of oversight)
$754,000	Total *

* Does not include handling and disposal of historical pipelines that were left in place (including buried Transite® asbestos-containing pipelines) as part of site demolition.

6.2 Other Costs

The summary of assessment and remediation costs was developed based on a limited review of publicly available files and is limited to costs required to address impacts at upland portions of the site during redevelopment. The groundwater treatment system operates at the upland portion of the site, and thus, the costs for operating that system are included in this estimate. However, it is reasonably likely that the groundwater treatment system would not be required, or could be reduced in scope, were it not for the need to prevent migration of impacted groundwater to the Willamette River.

A preliminary review of river bottom bathymetry adjacent to the Site suggests that the river is approximately 40 feet deep. Consequently, we assume that the depth is sufficient for marine vessel access to the dock and no costs for dredging are included. The Port of Portland (Port) plans to provide estimated costs (i.e., permitting, construction, water quality monitoring, and habitat mitigation) associated with removal of the existing dock and construction of a new dock.

The site is adjacent to the Portland Harbor Superfund Site and is considered a potential contributor to contamination in the Portland Harbor. As a result, owners and operators of the site (future, current and/or former) may be assessed some share of the costs for conducting the remedial investigation and implementing a remedy in the Portland Harbor. The remedy for the Portland Harbor Superfund Site has not

[2] Costs for installation of a cap are not included, based on the assumption that a cap, consisting of cement- or asphalt-concrete will be installed during development, regardless of the presence of impacted soil.

[3] Dewatering costs are not included because the scope of dewatering is unknown and it is assumed that the existing groundwater extraction system and permits can be used for dewatering.

[4] Costs for habitat fill assume one foot of clean import.

been selected and the allocation for investigation/remediation costs is ongoing; therefore, it is not possible to estimate what amount of those costs, if any, will be apportioned to owners/operators of the site.

6.3 Schedule and Permitting

Groundwater remediation is ongoing at the site and is expected to continue for approximately 15 years. The groundwater remediation activities should have little to no effect on a development schedule for the site because those activities can continue during and after development.

The most significant remediation effort that will be required for development of the site will be the soil handling and placement under the cap. We anticipate the schedule to negotiate the SWLA with DEQ could occur in approximately three to six months. The placement of the cap and other handling of impacted soil would be performed during overall redevelopment of the Site and these efforts are not included in the schedule.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 2 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Portland, Oregon

Photo No: 1 **Photo Date:** Jan. 31, 2012 **Orientation:** South **Description:** Field at site, viewed from North Time Oil Road. View to the south.	
Photo No: 2 **Photo Date:** Jan. 31, 2012 **Orientation:** West **Description:** Field at site, along with several on-site structures, viewed from North Time Oil Road. View to the west.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 2 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Portland, Oregon

Photo No: 3	
Photo Date: Jan. 31, 2012	
Orientation: Southwest	
Description: Field at site, viewed from North Time Oil Road. View to the southwest.	
Photo No: 4	
Photo Date: Jan. 31, 2012	
Orientation: Southeast	
Description: Field at site, viewed from North Time Oil Road. View to the southeast.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 2 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Portland, Oregon

Photo No: 5	
Photo Date: Jan. 31, 2012	
Orientation: East	
Description: Field at site, viewed from North Time Oil Road. View to the east.	

Attachment C

Conceptual Redevelopment Drawing

CUT 3'
ELEV=28'

FLOODPLAIN BOUNDARY

FLOOD PLAIN / MITIGATION AREA

MANUFACTURING / FABRICATION
300,000 SF

FF ELEV = 32
FILL IN FLOODPLAIN : 1'
FILL TO BUILDING PAD : 2'

OFFICE
30,000 SF

PARKING

LOT ELEV
31
FILL IN FLOODPLAIN:
3'

FLOOD PLAIN / MITIGATION AREA

CUT 4'
ELEV=24'

GUARD SHACK

CUT 6'
ELEV=26

YARD

250

200

FLOODPLAIN BOUNDARY

YARD AREA
YARD ELEV = 31
FILL IN FLOODPLAIN : 1'

FF ELEV= 32
FABRICATION
125,000 SF
FILL IN FLOODPLAIN: 1'
FILL TO BUILDING PAD: 2'

250
500
200

FABRICATION
125,000
FF ELEV=32
FILL IN FLOODPLAIN: 1'
FILL TO BUILDING PAD: 2'

YARD AREA

FLOOD PLAIN / MITIGATION AREA
CUT 6'
ELEV = 26'

FLOODPLAIN BOUNDARY

OVER HEAD CRANE

BAYS

SET BACK

0 50 100 200

TIME OIL STUDY

GROUP MACKENZIE

FEB 23, 2012

211 0160. 01

FEMA FLOOD ELEVATION = 31 FT

PROJECTED FILL IN FLOODPLAIN: 42,000 ± cy

PROJECTED CUT IN FLOODPLAIN: 43,000 ± cy

Appendix C

Site 13: ICDC LLC and Entercom Site Summary

Appendix C —Site 13: ICDC LLC and Entercom Site Summary

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Attachments

Appendix C —Site 13: ICDC LLC and Entercom Site Summary

This Appendix presents a summary of information about environmental conditions at site 13.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1935 – The site is used for agricultural purposes, with the exception of a small area at the south side of the site. A stream channel or irrigation ditch, oriented in a west-east alignment, appears to bisect the site. A roadway is parallel to the north side of the site. A forested area is south of the site.

1948 – The site and surrounding areas appear generally unchanged, with the exception that the forested area at the southern portion of the site has been cleared and is in agricultural use.

1956 – No significant changes are visible at the site or at surrounding areas.

1964 – No significant changes are visible at the site or at surrounding areas.

1970 – No significant changes are visible at the site or at surrounding areas..

1980 – No significant changes are visible at the site or at surrounding areas.

1990 – No significant changes are visible at the site. Land west of the site has been cleared and graded.

1998 – No significant changes are visible at the site, although it is unclear if the site remains in agricultural uses. Several large buildings and parking areas have been constructed west and south of the site. NE Cameron Road and NE Airport Way have also been built west and south of the site.

2005 – No significant changes are visible at the site. Land southeast of the site has been graded. Several large buildings and parking areas have been constructed southwest of the site, near NE Airport Way.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

Appendix C —Site 13: ICDC LLC and Entercom Site Summary

3.0 Site Reconnaissance

The site was observed on January 17, 2012 from public rights of way. The site was undeveloped and fallow at the time of the site reconnaissance. No buildings are present at the site. Irrigation systems were not in place during the site reconnaissance; therefore, it is unclear if water is supplied to the site by an on- or off-site well or other source(s). A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed for the site because the site is not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. Crops apparently consisted of grasses and cover crops until sometime before 1998. The exact types of crops grown at the site are unclear based on the review of aerial photography. It is unclear if agricultural uses are ongoing. Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorine, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

An assessment for residual pesticide concentrations in soil should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for soil management and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to pesticides in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

Appendix C —Site 13: ICDC LLC and Entercom Site Summary

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the estimated cost for an assessment of residual pesticide concentrations in soil is approximately $15,000. A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

No permitting is required to perform an assessment of pesticide conditions at the site. A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 13 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 1	
Photo Date: Jan. 17, 2012	
Orientation: East	
Description: Field at site, viewed from off-site property adjacent and west of the site. View to the east.	
Photo No: 2	
Photo Date: Jan. 17, 2012	
Orientation: East	
Description: Field at site, viewed from off-site property adjacent and west of the site. View to the east.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 13 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 3	
Photo Date: Jan. 17, 2012	
Orientation: North	
Description: Field at site, viewed from intersection of NE 166th Avenue and NE Cameron Boulevard. View to the north.	
Photo No: 4	
Photo Date: Jan. 17, 2012	
Orientation: Southeast	
Description: Field at site, viewed from off-site property adjacent and west of the site. View to the east.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 13 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 5 **Photo Date:** Jan. 17, 2012 **Orientation:** South **Description:** Field at site, viewed from NE Marine Drive. View to the south.	
Photo No: 6 **Photo Date:** Jan. 17, 2012 **Orientation:** South **Description:** Field at site, viewed from NE Marine Drive. View to the south.	

Appendix D

Site 15/16: UPS and Cereghino Site Summary

Appendix D — Site 15/16: UPS and Cereghino Site Summary

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Appendices

Appendix D — Site 15/16: UPS and Cereghino Site Summary

This Appendix presents a summary of environmental conditions at sites 15 and 16. Site numbers 15 and 16 are contiguous and were evaluated as a single property.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1935 – The site appears to be used for agricultural purposes.

1948 – The site appears flooded. Non-inundated areas appear to be used for agricultural purposes.

1956 – The site appears to be used for agricultural purposes.

1964 – No significant changes are visible.

1970 – No significant changes are visible.

1980 – No significant changes are visible.

1990 – No significant changes are visible.

1998 – No significant changes are visible.

2005 – No significant changes are visible.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

3.0 Site Reconnaissance

The site was observed on December 7, 2011 from public rights of way. The site is currently in agricultural use. Crops appear to consist of vegetables (pumpkins and lettuce, during the site reconnaissance) and grasses. A drainage channel from Fairview Lake is located adjacent to the south side of the site. A shed, used for storing irrigation piping, and possibly other materials, is present at the northeast corner of the Site.

Appendix D — Site 15/16: UPS and Cereghino Site Summary

A polyethylene storage tank is adjacent to the south side of the shed. The use of the tank is unclear, but may include fertilizer mixing. A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed for the site because the site is not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1935. The exact types of crops grown at the site are unclear based on the review of aerial photography. Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorines, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

An assessment of residual pesticide concentrations in soil should be performed prior to site development. This assessment should be conducted site-wide, including at locations near the polyethylene tank. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper soil management and for protection of worker health and the environment. The cost for an assessment[1] of residual pesticide concentrations in soil is in the range of $15,000.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to contaminants in soil via direct contact. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

[1] Assessment costs are estimated based on guidance provided in, *Guidance for Evaluating Residual Pesticides on Lands Formerly Used for Agricultural Production*, Oregon Department of Environmental Quality, 2006.

6.0 Conceptual Assessment and Remediation Cost Estimate

Based on the assumptions listed above, the estimated cost for an assessment of residual pesticide concentrations in soil is approximately $15,000. A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

No permitting is required to perform an assessment of pesticide conditions at the site. A pesticide assessment can be completed in less than three to six months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 15/16 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 1	
Photo Date: Dec. 7, 2011	
Orientation: North	
Description: Agricultural area viewed from NE Portal Way. A buried natural gas pipeline marker is visible in the foreground.	
Photo No: 2	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Agricultural area viewed from NE Portal Way.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 15/16 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 3	
Photo Date: Dec. 7, 2011	
Orientation: Southwest	
Description: Cabbage field viewed from NE Interlachen Lane.	
Photo No: 4	
Photo Date: Dec. 7, 2011	
Orientation: South	
Description: Cabbage field viewed from NE Interlachen Lane.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 15/16 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 5	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Pumpkin field viewed from NE Riverside Parkway.	
Photo No: 6	
Photo Date: Dec. 7, 2011	
Orientation: Southwest	
Description: Irrigation shed and water tank near NE Interlachen Lane.	

Appendix E

Site 19: Port of Portland TRIP Site Summary

Appendix E —Site 19: Port of Portland TRIP Site Summary

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Attachments

Appendix E —Site 19: Port of Portland TRIP Site Summary

This Appendix presents a summary of information about environmental conditions at site 19, which is a portion of the Port of Portland (Port) Troutdale Reynolds Industrial Property (TRIP). Site 19 consists of two parcels (Lots 7 and 8).

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1935 – The site is used for agricultural purposes. A stream channel crosses the central portion of the site. A few small buildings, possibly dwellings, are present at the west side of the site.

1948 – The central portion of the site, known as the South Wetland, appears flooded. The buildings at the west side of the site have been removed. Some ground disturbance has occurred at the central-east portion of the site in the vicinity of the area subsequently referred to as the South Landfill. The Reynolds/Alcoa facility (the facility) has been constructed north of the Site. The Troutdale Airport has been constructed south of the site.

1955 – No significant changes are visible.

1961 – The facility has expanded to include a small area at the northern portion of the site. No significant changes are visible.

1970 – Expansion of the facility is visible at the north side of the site. A roadway has been constructed in a west-east alignment across much of the site. A drainage channel has been constructed at the site, in a northwest-southeast alignment, near the facility.

1980 – A large building, part of the Reynolds/Alcoa facility has been constructed at the north portion of the site.

1990 – A cryolite pond, part of the Reynolds/Alcoa facility, is visible at the north portion of the site. Several large buildings have been constructed west and southwest of the site.

1998 – Additional commercial development is visible west, southwest, and southeast of the site.

2005 – The Reynolds/Alcoa facility has been removed and the site has been graded.

Appendix E —Site 19: Port of Portland TRIP Site Summary

2.0 Review of DEQ Facility Profiler

The site is identified in the DEQ Facility Profiler database as a National Priority List (NPL, or Superfund) facility due to releases of hazardous substances that occurred as a result of historical aluminum processing activities. The Facility profiler indicates that the site has been the subject of remediation and assessment activities for many years; therefore the volume of files maintained for the site by DEQ is extensive. The historical use of the site, and investigation and remediation activities are summarized in Section 5.

3.0 Site Reconnaissance

The site was observed on December 27, 2011 from public rights of way. The site is currently undeveloped and generally vacant. A natural gas pipeline valve structure is present at the south side of the site near NW Graham Road. It appears that the buried natural gas pipeline traverses a portion of the site. A drainage ditch, which generally runs in a west-east alignment, is present at the central portion of the site. The property north of the site (also part of the former Reynolds/Alcoa facility) is occupied by a Federal Express distribution center. The Troutdale airport is present south of the site. Vacant parcels are present west and east of the site. A photograph log is included in Attachment B.

4.0 File Review

Ash Creek has performed extensive environmental services at the site on behalf of the current property owner, the Port. Ash Creek reviewed internal files and files maintained by the Port to prepare the following summary of environmental conditions (Section 5) and the conceptual cost estimate for assessment and remediation (Section 6).

5.0 Summary of Environmental Conditions

The site is located in Troutdale and Fairview, Oregon, north of the Troutdale Airport and southwest of the confluence of the Columbia and Sandy Rivers. The former Reynolds/Alcoa facility consists of approximately 693 acres; however, the portion of the facility that is the subject of this report (Lots 7 and 8) is approximately 54 acres. Topography at the site is generally flat, with some minor relief toward the north and northeast. The majority of former Reynolds/Alcoa facilities were located north of the site.

The Facility was originally developed as an aluminum reduction plant for the U.S. government in 1941 to support wartime production of aluminum. The plant operated at varying production capacities through 1991, when operations were temporarily curtailed. Plant operations were restarted in 1998, but were curtailed again in 2000 after Alcoa acquired the Facility. The facility was closed permanently in July 2002.

Appendix E —Site 19: Port of Portland TRIP Site Summary

Facility operations (including past waste disposal, spills, leaks, and other releases) caused soil and groundwater contamination at TRIP. The historical releases included process and non-process wastes and residues. Process wastes were primarily associated with the former aluminum reduction plant (located north of Parcels 7 and 8). Non-process wastes included demolition debris, scrap equipment, and construction materials. Contaminants that were associated with these wastes included fluoride, cyanide, antimony, arsenic, beryllium, chromium, lead, nickel, polynuclear aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). The site was placed on the EPA National Priorities List (Superfund) in 1994 and investigation and sampling activities at the site began that same year. A significant number of removal and remedial actions independent of and prior to the plant demolition process were completed. These actions (resulting in the removal of more than 230,000 tons of material) were conducted prior to July 2002, when the closure of the facility was announced. The demolition of the facility occurred between 2003 and 2005, and resulted in the removal of 116,000 tons of additional material from the facility. The material removed was the major source of contamination to the underlying groundwater zones and its removal significantly reduced the potential for contaminant migration.

Groundwater remediation, consisting of a pump-and-treat system, was initiated in 2004 and is ongoing. The EPA issued a Record of Decision (ROD) in 2006, which sets forth the requirements for future groundwater remediation, soil and groundwater management, and groundwater use restrictions. A consent decree to implement the ROD was executed by the United States and Reynolds Metals Company in 2008. An Easement and Equitable Servitude (EES), which was applied to the property in 2007, also sets forth requirements for future activities at the site. The EES specifically includes a requirement to comply with a contaminated media management plan (CMMP) that was prepared for the site. The Port acquired TRIP in 2007.

In summary, as of approximately 2005, a number of removal actions had been completed at the Facility. Those actions removed the bulk of impacted soil; however, soil containing low to moderate concentrations of contaminants remains at the site and elevated concentrations of some contaminants (particularly fluoride) remain in groundwater at the facility. A groundwater pump-and-treat remediation system is operating at the facility; however, none of the extraction wells are included in the boundaries of the subject site. The pump-and-treat system is expected to operate for at least eight more years. Other remediation required at the site in the future includes capping of impacted soil in the South Wetlands. In addition to the remediation efforts listed above, long-term management of contaminated media is required at the site.

Appendix E —Site 19: Port of Portland TRIP Site Summary

6.0 Conceptual Assessment and Remediation Cost Estimate and Schedule

Extensive assessment and remediation efforts have been completed at the facility. Those efforts have included the removal of approximately 350,000 tons of impacted soil, treatment of groundwater, and removal of the former aluminum processing facilities. Most of these activities occurred outside of the boundaries of the subject site. The following estimate of assessment and remediation costs is limited to projected future costs. The historical costs incurred by the Port, Reynolds/Alcoa, and other parties are not included in the cost estimate.

Future environmental assessment/remediation tasks for the site include: (1) removal of contaminated organic soil from the South Wetlands, (2) removal or modification of several groundwater monitoring wells; and (3) possibly, treatment of water extracted during dewatering efforts. Each of these tasks and estimated costs are described below.

Removal of Contaminated Organic Soil. Several types of hazardous constituents have been detected in surface soil at the South Wetlands. These constituents include fluoride, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, and some metals. These constituents pose some risk to human health; therefore, prior to development and occupational use of the South Wetlands, the wetlands must be covered with at least one foot of clean fill. The costs for placement of a one-foot-thick layer of clean fill are not included in this estimate of environmental assessment/remediation costs because placement of structural fill will be required to raise the site grade above the flood level, regardless of the presence of contamination in soil.

Shallow soil in the South Wetlands is highly organic; therefore, it is likely that the shallow soil material will not provide suitable load-bearing properties for future development. To prepare that area for placement of structural fill, we assume that it will be necessary to remove the upper one foot of impacted organic-rich soil. Assuming that the soil is classified as non-hazardous special waste, it can be disposed of at a RCRA Subtitle D facility, such as the Waste Management Hillsboro Landfill. The Port has estimated that approximately 40,000 cubic yards of impacted soil will need to be removed from the South Wetland. Assuming the material weighs approximately 1.5 tons per cubic yard, and loading, transport, and disposal cost $50/ton, the total costs for removing the impacted soil from the South Wetlands will be approximately $3 million.

Alternatively, excavated impacted soil from the South Wetlands can be reused at the site; however, the re-use of that material is subject to significant restrictions such as the finished elevations (may not exceed 18 feet NGVD) and the requirement for at least one foot of clean cover. Therefore, it may not be feasible to re-use that material on-site under many development scenarios and we assume it will be removed from the site.

Appendix E —Site 19: Port of Portland TRIP Site Summary

Decommissioning/Modification of Monitoring Wells. Several groundwater monitoring well are located at the site. It is likely possible to decommission some of the wells to accommodate development plans, however, it may be necessary to maintain a portion of the well network. It may also be necessary to move some wells to accommodate construction activities.

Dewatering. If dewatering is necessary during development, it may be necessary to treat the water prior to discharge. Costs for future treatment and discharge of water are not included in this remediation cost estimate because the magnitude of required dewatering, if any, is unclear.

Groundwater Remediation. Groundwater remediation is ongoing at the facility; however, none of the groundwater remediation infrastructure is present at the subject site and there is no requirement to remediate groundwater at the site. Therefore, future costs for groundwater remediation at the greater TRIP property are not allocated to the subject site.

The following table summarizes the range of historical and projected assessment and remediation costs for Site 19.

Table I – Assessment and Remediation Costs for Site 19

Estimated Cost	Activity
$3,000,000	Projected costs for removal and off-site disposal of impacted surface sediment from the South Wetlands.
$25,000	Decommission/modify groundwater monitoring wells at site.
$3,025,000	Total

6.1 Schedule and Permitting

The most significant remediation effort that will be required for development of the site will be the removal of impacted organic-rich soil from the South Wetlands and placement of at least one-foot of clean fill over the excavated area. The removal of impacted soil and placement of clean fill must be conducted prior to or upon initiation of the development activities. We anticipate that the impacted soil can be removed and fill emplaced in approximately three to six months.

Because a Consent Order and contaminated media management plan have been established for the site, remediation-specific permitting, with the exception of a landfill disposal permit, is not required to remove impacted media from the South Wetlands and to place clean fill in that area. However, it will be necessary to coordinate with DEQ prior to and during that work. Other non-remediation permits will be required, such as wetland mitigation and grading permits.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 19 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 1	
Photo Date: Dec. 27, 2011	
Orientation: Northwest	
Description: Field viewed from NW Graham Road.	
Photo No: 2	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Field and drainage channels viewed from NW Sundial Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 19 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 3	
Photo Date: Dec. 27, 2011	
Orientation: Southeast	
Description: Field viewed from NW Swigert Way.	
Photo No: 4	
Photo Date: Dec. 27, 2011	
Orientation: Southwest	
Description: Job trailer, viewed from NW Swigert Way.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 19 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Troutdale, Oregon

Photo No: 5	
Photo Date: Dec. 27, 2011	
Orientation: North	
Description: Field viewed from NW Graham Road. A natural gas pipeline valve is located in the fenced area.	
Photo No: 6	
Photo Date: Dec. 27, 2011	
Orientation: Northeast	
Description: Field viewed from NW Graham Road.	

Appendix F

Site 24: Jean Johnson Site Summary

Appendix F — Site 24: Jean Johnson Site Summary

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Attachments

Appendix F — Site 24: Jean Johnson Site Summary

This Appendix presents a summary of information about environmental conditions at site 24.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – The northern and western portions of the site are in agricultural use. The land appears to be used for cover crops. It appears that forest has been recently cleared from the southern portion of the site. The eastern portion of the site remains forested. An off-site dwelling and at least one small accessory structure are visible near the northwest corner of the site, adjacent to SE 267th Ave. A number of other residential structures are visible in the vicinity of the site. A railroad track appears to occupy the current Orient Road alignment.

1948 – The site appears generally unchanged, with the exception that the southern portion of the site has been converted to agricultural uses. Significant changes are not visible at surrounding properties. Orient Road has been constructed.

1956 – No significant changes are visible at the site. Some forest has been cleared from areas east and south of the site.

1964 – No significant changes are visible. Additional residential structures have been constructed near the site.

1970 – Forested areas have been removed from the east side of the site and that area has been converted to agricultural use. No other significant changes are visible.

1980 – No significant changes are visible at the site. Dense residential development is visible north of the site.

1990 – Agricultural uses at the site appear to consist of nursery stock, rather than cover crops. Increasing residential development is visible north of the site.

1998 – No significant changes are visible at the site. Increasing residential development is visible north of the site.

2005 – No significant changes are visible at the site.

Appendix F — Site 24: Jean Johnson Site Summary

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

3.0 Site Reconnaissance

The site was observed on December 7, 2011 from nearby public rights of way. The site is currently in agricultural use, specifically for raising nursery stock. No buildings are present at the site. Irrigation systems were not in place during the site reconnaissance; therefore, it is unclear if water is supplied to the site by an on- or off-site well or other source(s). A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed for the site because the site is not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. Crops apparently consisted of grasses and cover crops until sometime before 1990. Subsequently, the site was used for growing nursery stock. The exact types of crops grown at the site are unclear based on the review of aerial photography. Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorines, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

An assessment for residual pesticide concentrations in soil should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for soil management and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to pesticides in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands,

ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is approximately $15,000. A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

No permitting is required to perform an assessment of pesticide conditions at the site. A pesticide assessment can be completed in three to six months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 24 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 1	
Photo Date: Dec. 27, 2011	
Orientation: Northeast	
Description: Agricultural area viewed from SE 267th Avenue.	
Photo No: 2	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area viewed from SE 267th Avenue.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 24 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 3	
Photo Date: Dec. 27, 2011	
Orientation: Southeast	
Description: Agricultural area viewed from SE 267th Avenue.	
Photo No: 4	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area viewed from SE 267th Avenue.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 24 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Gresham, Oregon

Photo No: 5 **Photo Date:** Dec. 27, 2011 **Orientation:** Southeast **Description:** Agricultural area viewed from SE 267th Avenue.	
Photo No: 6 **Photo Date:** Dec. 27, 2011 **Orientation:** Northeast **Description:** Agricultural area viewed from SE 267th Avenue.	

Appendix G

Site 29: Clackamas County Development Site Summary

Appendix G —Site 29: Clackamas County Development Site Summary

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Appendix G —Site 29: Clackamas County Development Site Summary

This Appendix presents a summary of information about environmental conditions at site 29. The site is irregular in shape and consists of 12 tax lots. When necessary, the following discussion of environmental conditions at the site refers to tax lots based on the last four digits of their Clackamas County identification (e.g., tax lot 1200).

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. This review is based on aerial photography included in *Phase I Environmental Site Assessment* (ESA), *Emmert Site, 12000 SE Capps Road, 11436 SE Capps Road, 16590 SE 114th Avenue, Clackamas, Oregon* (Kleinfelder, 2009). The photography was used with the permission of Clackamas Business and Economic Development Services, the user of the Phase I ESA. Copies of aerial photography are included in Attachment A.

1938 – The majority of the site is in agricultural use; however, a small area at the northwestern portion of the site is forested. Crops appear to consist of cover crops. A few small structures are visible at the central portion of the site. Surrounding land is generally in agricultural use or forested.

1948 – The site appears generally unchanged.

1956 – No significant changes are visible at the site, with the exception that a small structure has been constructed near the northern and northwest boundaries of the site.

1964 – It appears that a small structure was demolished and a medium-size building was constructed at the central portion of the site

1974 – No significant changes are visible at the site, with the exception that a small structure has been constructed near the northeast boundary of the site, a medium-size building was constructed at the north portion of the site, and two medium-size structures were constructed near the north boundary of the site.

1979 – Several ponds and a commercial/industrial facility have been constructed off-site, near the northwest boundary of the site. A couple of small structures are visible at the southwest portion of the site.

1983 – An aggregate mining and processing business is operating adjacent to the southeast portion of the site. Stockpiled gravel is present at the easternmost site parcels.

1989 – The aggregate mining operations have expanded to include additional portions of the site. Some of the on-site borrow pits are flooded.

Appendix G —Site 29: Clackamas County Development Site Summary

1996 – Agricultural land at the southwest portion of the site has been converted to industrial uses. A number of stockpiles of material are visible. Much of the aggregate-mining area has been graded and appears unused. Several off-site commercial/industrial buildings have been constructed near the north and east sides of the site.

2004 – Gravel mining and processing is no longer occurring at the site. Much of the former aggregate mining/processing area is covered with immature vegetation. Additional commercial/industrial development has occurred off-site, near the north and east boundaries of the site.

2.0 Review of DEQ Facility Profiler

The Site is included in several Facility Profiler listings, including:

- Emmert Industrial Corporation - 11811 SE Hwy 212;
- Clackamas Compost Products – 11620 SE Capps Road;
- Capps Road Business Park – 12000 SE Capps Road; and
- Coles, John – 12075 SE Vernon Street.

Nearby facilities included in the Facility Profiler database for releases of hazardous substances include:

- Surgichrome, Inc. - 16569 SE 115th Ave; and
- Precision Roof Trusses - 11550 SE Jennifer Street.

The risks and impacts that these listed facilities pose to the subject site were evaluated durng Phase I and II ESAs that were conducted at the site in 2009 and 2010, respectively. These documents are discussed in Section 4.

3.0 Site Reconnaissance

The site was observed on March 5, 2012 from nearby public rights of way. Due to the large size of the site and the limited access at the perimeter of the site, it was difficult or impossible to view some portions of the property. The site is currently vacant, with the exception of: (1) the Clackamas Compost Products facility, which uses the southwest portion of the site for storing, processing, and blending of compost products; and (2) a vacant single-family dwelling, which was most recently used as an office building. The southeastern portion of the site, which was historically used for aggregate mining and processing, is flat and covered in many areas by immature vegetation. Some unused heavy equipment is present at the north-central portion of the site, adjacent to SE Capps Road. A photograph log is included in Attachment B.

Appendix G —Site 29: Clackamas County Development Site Summary

4.0 File Review

Phase I and II ESAs, prepared in 2009 and 2010, respectively, were reviewed to evaluate environmental conditions at the site.

4.1 Phase I ESA

Kleinfelder, Inc. performed a phase I ESA at the site in 2009. Kleinfelder identified the following recognized environmental conditions (RECs) or potential RECs:

- A 275-gallon oil UST was reportedly decommissioned at the site (Clackamas Sand and Gravel parcel 2202) in 1986. The method of decommissioning (i.e. removal or in-place) was not reported and confirmation analytical data were unavailable to Kleinfelder.
- An open, uncovered truck maintenance facility, operated by DB Trucking, was observed at the site (tax lot 1200) in 2009. Oil staining was visible on a concrete slab in the maintenance area. The truck maintenance area was identified as a potential REC due to the potential for spills and leakage of hazardous substances to impact soil at the margins of the slab.
- A "hobby type maintenance shop" was also identified at tax lot 1200. This facility was identified as a potential REC due to the observed use of hazardous substances, and staining observed on the floor.
- An exterior maintenance area, operated by Clackamas Compost Products (tax lot 1800), was identified as a potential REC due to the use and possible spillage of hazardous substances.
- Reportedly, 10 to 15 feet of fill was placed at the site to reclaim former aggregate mining areas. Information about the source and quality of the fill was reportedly unavailable. Kleinfelder did not identify the fill as an REC; however, they did report that is was considered a possible "environmental concern".
- A metal plating facility, Surgichrome, Inc., historically operated adjacent to the north boundary of the site tax lot 1500. Hazardous substances have been released at the Surgichrome property, and impacted groundwater has been detected (primarily chromium). The Oregon Department of Environmental Quality (DEQ) is currently implementing remediation and monitoring at the facility.

4.2 Phase II ESA

Kleinfelder performed a Phase II ESA in 2010 to further evaluate the conditions identified during the Phase I ESA. Assessment activities completed by Kleinfelder included collection of 20 soil samples from surface soil and test pits for laboratory analyses. Lab data were compared to DEQ Risk-Based Concentrations (RBCs) for selected exposure scenarios. Kleinfelder's findings, are summarized below:

- Oil, polycyclic aromatic hydrocarbons (PAHs), and metals were detected in soil near the DB Trucking maintenance area (tax lot 1200). PAH concentrations exceeded RBCs for commercial/industrial exposure to soil.
- Soil samples collected from the septic drain field and the "hobby type maintenance shop" area, at tax lot 1200 contained several hazardous substances, but the concentrations did not exceed commercial/industrial RBCs.
- Lube oil, PAHs, VOCs, and metals were detected in soil collected at the Clackamas Compost Products maintenance area (tax lot 1800). The concentration of oil exceeded the RBC for commercial exposure.
- Samples of fill from the former Clackamas Sand and Gravel properties (tax lots 1900, 2100, 2101, 2200, 2301, and 2500) did not contain hazardous substances at concentrations that exceed commercial/industrial RBCs.
- Soil samples collected near abandoned heavy equipment at tax lot 2200 contained lube oil, PAHs, and metals at concentrations that exceed commercial/industrial RBCs.

Kleinfelder recommended excavation and disposal of a limited quantity of impacted soils (estimated at 81 cubic yards) before or during redevelopment. Alternative soil management options for these soils include: 1) capping with minimum of 3 feet of clean soil hardscape, or buildings; 2) disposal at a regulated landfill; or 3) treating onsite. Kleinfelder concluded that if the impacted soil is not removed prior to site development, the construction contractor and subcontractors that come in contact with or disturb the soil will need hazardous material awareness training.

5.0 Summary of Environmental Conditions

Information obtained during Phase I and II ESAs indicate that the site is impacted by hazardous substances (primarily oil and related compounds) at several distinct areas of the site. Groundwater impacts have not been identified, with the exception of impacts related to the off-site Surgichrome facility. Surgichrome impacts are being addressed by DEQ.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to hazardous substances in soil. Under this scenario, the impacted soil could likely be left in-place and covered with an appropriate cap (i.e., asphalt or cement concrete). If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within impacted areas, remediation may be required.

Despite the option to leave contaminated media on-site, development may be simplified and overall costs reduced, if the contaminated soil is removed from the site prior to development. Under this preferred

alternative, contaminant-specific development plans and specially trained development personnel would not be required. Furthermore, the need for future management of impacted soil would be removed.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, additional assessment is not required. The costs for removal and off-site disposal of impacted soil (assume 120 tons) would likely be in the range of $25,000, including a small amount of post-removal soil sampling and analysis. Remediation, including sampling and analysis can be completed in less than three months. The remediation can be performed prior to or during redevelopment activities. Regardless of the timing of that work, properly trained personnel should be used to implement the work. No permitting is required to perform the listed remediation activities at the site.

Attachment A

Aerial Photographs


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1938


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1948


1956


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1964


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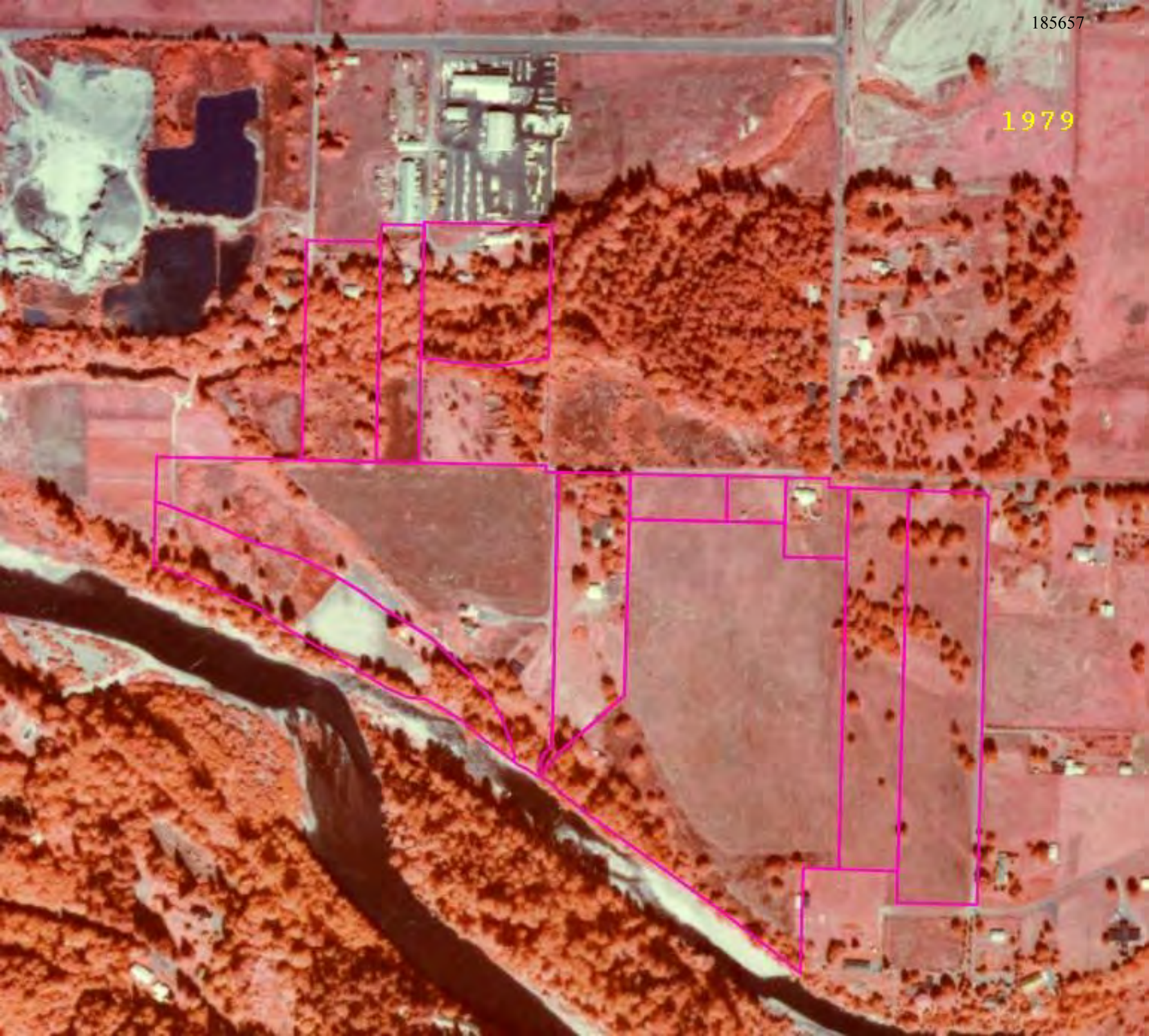
1974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1979

1983

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1996

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2004

Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 29 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Clackamas, Oregon

Photo No: 1	
Photo Date: March. 6, 2012	
Orientation: South	
Description: Unused dwelling/office adjacent to SE Capps Road.	
Photo No: 2	
Photo Date: March. 6, 2012	
Orientation: South	
Description: Heavy equipment storage area adjacent to SE Capps Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 29 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Clackamas, Oregon

Photo No: 3	
Photo Date: March. 6, 2012	
Orientation: Southwest	
Description: Clackamas Compost Products facility, at southwest portion of the site.	
Photo No: 4	
Photo Date: March. 6, 2012	
Orientation: West-southwest	
Description: Former Clackamas Sand and Gravel pit, viewed from SE Wilde Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 29 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Clackamas, Oregon

Photo No: 5	
Photo Date: March. 6, 2012	
Orientation: Southwest	
Description: Former Clackamas Sand and Gravel pit, viewed from SE Wilde Road.	
Photo No: 6	
Photo Date: March. 6, 2012	
Orientation: West	
Description: Former Clackamas Sand and Gravel pit, viewed from SE Wilde Road.	

Appendix H

Site 33: Coffee Creek Site Summary

Appendix H —Site 33: Coffee Creek Site Summary

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Attachments

Appendix H —Site 33: Coffee Creek Site Summary

This Appendix presents a summary of information about environmental conditions at site 33.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – Approximately the west half the site is used for agricultural purposes. Crops mostly appear to consist of grasses or other cover crops. The eastern half of the site consists of undeveloped forest land. Approximately four buildings, which appear to be dwellings, are visible at the west side of the site, near SW Garden Acres Road. A number of smaller structures, possibly consisting of barns or other agriculture support buildings, are present in the vicinity of the buildings. Several small orchards are visible in the vicinity of the buildings.

1948 – Approximately half of the forested area that was visible on the 1936 aerial photograph has been removed and converted to agricultural use. An electrical transmission corridor is visible adjacent to the east side of the site. A number of structures, which appear to support the electrical transmission lines, are present southeast of the site.

1956 – No significant changes are visible at the site. A small amount of additional development is visible in the electrical transmission corridor.

1964 – No significant changes are visible, with the exception that several small structures have been added near the northeast corner of the site.

1970 – No significant changes are visible at the site. Property east of the site has been graded to prepare for industrial development.

1980 – No significant changes are visible at the site. Several large structures have been constructed east of the site.

1990 – A small area adjacent to and south of the site has been converted from farmland to a parking/equipment storage area. Several new structures have been added at the western portion of the site. Commercial development areas have expanded east of the site, with approximately ten new structures visible.

1998 – A portion of the Peters Road alignment, south of the site, has moved to the north.

Appendix H —Site 33: Coffee Creek Site Summary

2005 – No significant changes are visible at the site. The Coffee Creek Correctional Facility has been constructed northwest of the site.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

3.0 Site Reconnaissance

The site was observed on December 7, 2011 from public rights of way adjacent to the site. The site is currently in residential use. Several dwellings, a horse boarding/training facility, and several greenhouses are present at the west side of the site, near SW Garden Acres Road. Dwellings are surrounded by open areas, some of which are used for pasture. Outbuildings and detached garages are present at most of the properties, near the dwellings. Obvious potential sources of contamination, such as ASTs and USTs, were not visible during the site reconnaissance; however, views of the site were obscured in a number of locations by dense vegetation and structures. The dwellings are in a rural area without obvious signs of a municipal sanitary sewer system, suggesting that septic systems are in use at the site. A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed because the site is not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. Crops apparently consisted primarily of grasses and cover crops; however, some small orchards and several greenhouses are/were present at the west side of the site. The exact types of crops grown at the site are unclear based on the review of aerial photography. Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorines, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

Small (200- to 1,000-gallon) ASTs and USTs, used for storing petroleum hydrocarbon fuel (gasoline, diesel, and heating oil) are common at residential and farm properties. ASTs and USTs were not visible during the site reconnaissance; are not visible on the aerial photographs; and the DEQ Facility Profiler database does not indicate that ASTs and/or USTs are present at the site. Despite the absence of tank records or other indications, ASTs and USTs may be present at the site (in use or decommissioned). Because ASTs/USTs are common sources of environmental contamination, the potential for leaking ASTs/USTs is considered an environmental concern.

An assessment for residual pesticide concentrations in soil, particularly in the vicinity of the greenhouses, and for petroleum ASTs/USTs (and possible releases) should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper tank decommissioning, soil management and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to pesticides in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

If ASTs and/or USTs are present at the site, it will be necessary to decommission the tanks and possibly remediate associated contamination, if any. Assessment and remediation for small residential/farm petroleum tanks is commonly simple and limited to shallow soil. In some cases, however, residential/farm tank releases affect groundwater or other sensitive environments, increasing the complexity and costs of assessment and remediation.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is approximately $15,000, and the costs for an AST/UST assessment, including subsurface sampling, is in the range of $20,000.

The cost for remediation of petroleum impacts, if any, from residential/farm ASTs/USTs is difficult to constrain without site-specific information. For planning purposes, however, it is reasonable to assume that small residential/farm heating oil/diesel USTs/ASTs can be decommissioned for approximately $5,000 to $10,000 each and remediation of petroleum impacted soil can be performed for approximately $10,000 to

Appendix H —Site 33: Coffee Creek Site Summary

$20,000 for each release area. Therefore, assuming that four ASTs/USTs are present at the site, combined decommissioning and remediation costs may range between $20,000 and $120,000.

A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

In summary, the cost for an assessment of pesticides in soil is likely to be in the range of $15,000. An assessment for AST/UST impacts will likely cost approximately $20,000. The cost for decommissioning and remediation of petroleum ASTs/USTs (assuming four small residential/farm tanks are present) may range between $20,000 and $120,000. Assuming that pesticide and AST/UST assessments are completed for $35,000 and AST/UST decommissioning and remediation costs fall between the low and high estimates (i.e., the average, or $70,000), total costs will be in the range of $100,000. If the magnitude and extent of contaminant impacts at the site, if any, are large or sensitive environments or groundwater are impacted, assessment and remediation costs may increase.

A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management. Small residential/farm ASTs and USTs, used for storing petroleum hydrocarbon fuels, can commonly be assessed and remediated in less than six months. Assuming AST/UST impacts are limited to soil, and not groundwater, remediation normally can be completed concurrent with site development activities. In some cases, overall UST/AST decommissioning and remediation costs can reduced by using equipment and personnel that have been mobilized for other general site preparation and development tasks.

No permitting is required for assessment activities or for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In summary, based on the assumptions described above, the timeframe for assessment and remediation should be less than six months.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 33 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Wilsonville, Oregon

Photo No: 1	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Dwelling at the east side of Garden Acres Road.	
Photo No: 2	
Photo Date: Dec. 7, 2011	
Orientation: Southeast	
Description: Barn at the east side of Garden Acres Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 33 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Wilsonville, Oregon

Photo No: 3	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Barn at the east side of Garden Acres Road.	
Photo No: 4	
Photo Date: Dec. 7, 2011	
Orientation: Southeast	
Description: Horse pasture at the east side of Garden Acres Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 33 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Wilsonville, Oregon

Photo No: 5	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Dwelling at the east side of Garden Acres Road.	
Photo No: 6	
Photo Date: Dec. 7, 2011	
Orientation: Southeast	
Description: Dwelling at the southeast side of Garden Acres Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 33 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Wilsonville, Oregon

Photo No: 7	
Photo Date: Dec. 7, 2011	
Orientation: Southeast	
Description: Greenhouses at the east side of Garden Acres Road.	
Photo No: 8	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Barn and dwelling at the east side of Garden Acres Road.	

Appendix I

Site 37: Orr Family Farm Site Summary

Appendix I —Site 37: Orr Family Farm Site Summary

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Attachments

Appendix I —Site 37: Orr Family Farm Site Summary

This Appendix presents a summary of information about environmental conditions at site 37.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – Approximately the northern half the site is used for agricultural purposes. Crops mostly appear to consist of grasses or other cover crops. The southern half of the site consists of forest land, which appears to be immature, possibly indicating recent forestry practices. One to two dwellings are present in a cluster at the northwest corner of the site. An unpaved roadway appears to be present between the forested southwest corner of the site and agricultural areas at the north portion of the site. Surrounding properties consist of forest land and agriculture land.

1947 – The site appears generally unchanged. A utility transmission corridor has been constructed south and west of the site. Land north of the site, across the Tualatin-Sherwood Highway, has been cleared for agricultural use.

1955 – Approximately two additional structures have been constructed in the cluster at the northwest corner of the site. Additional forest has been cleared, and a dwelling has been constructed north of the site.

1964 – A utility corridor, oriented in a northwest-southeast alignment, has been constructed across the southern portion of the site. Apparent dwellings and outbuildings have been constructed in two clusters to the west and south of the southwest corner of the site. An additional utility corridor (the third of three) has been constructed south of the site.

1970 – The site appears generally unchanged, with the exception that a small area of forest at the central portion of the site appears to have been removed.

1980 – The site appears generally unchanged. Forest has been removed from land south of the site. A small commercial building has been constructed north of the site, across the Tualatin-Sherwood Highway.

1990 – The site appears generally unchanged. Forest has been removed from land southeast of the site.

1998 – The site appears generally unchanged. Forest has been removed from land east of the site. Several large structures have been constructed north and west of the site. The Tualatin-Sherwood Highway alignment has been altered northwest of the site.

Appendix I —Site 37: Orr Family Farm Site Summary

2005 – A pond and drainage channel have been constructed at the northeast portion of the site. Additional commercial development has occurred north and west of the site.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified at the site. The Facility Profiler lists a facility, located approximately 1,200 feet west of the site, as a contaminated property – Endicott Trucking Company, 21410 SW Dahlke Ln., Sherwood (DEQ Environmental Cleanup and Site Information [ECSI] number 1599). This listing is discussed in Section 4.7.4.

3.0 Site Reconnaissance

The site was observed on December 27, 2011 from public rights of way. Most of the site consists of undeveloped forest land; however, the northeast portion of the site is in agricultural use (cover crops) and a dwelling and several outbuildings are present at the northwest portion of the site, near the Tualatin-Sherwood Highway. Obvious potential sources of contamination, such as ASTs and USTs, were not visible during the site reconnaissance; however, developed areas were distant from public rights of way and views of the site were obscured in a number of locations by vegetation and structures. The dwellings are in a rural area without obvious signs of a municipal sanitary sewer system, suggesting that septic systems are in use at the site. Land to the north, northeast, and northwest of the site is occupied by a number of commercial and light industrial facilities. A photograph log is included in Attachment B.

4.0 File Review

DEQ's ECSI database was reviewed to obtain information about environmental conditions at the Endicott Trucking Co. property (21410 SW Dahlke Ln., Sherwood) The ECSI listing indicates that the Endicott Trucking Co. property is impacted by diesel, oil, and other substances, spilled as a result of poor housekeeping practices when the property was used as a truck repair facility. The ECSI report also indicates that petroleum-impacted soil, generated at an off-site property was stockpiled at the Endicott Trucking Co property. DEQ files do not indicate that any investigation or cleanup has occurred at the property. Based on the information presented in the ECSI database and the distance between the subject site and the Endicott Trucking Co. property, it appears unlikely that the releases at the Endicott trucking Co. property will affect the subject site.

Appendix I —Site 37: Orr Family Farm Site Summary

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. Crops apparently consisted primarily of grasses and cover crops. The exact types of crops grown at the site are unclear based on the review of aerial photography. Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorines, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

Small (200- to 1,000-gallon) ASTs and USTs, used for storing petroleum hydrocarbon fuel (gasoline, diesel, and heating oil) are common at residential and farm properties. ASTs and USTs were not visible during the site reconnaissance; are not visible on the aerial photographs; and the DEQ Facility Profiler database does not indicate that ASTs and/or USTs are present at the site. Despite the absence of tank records or other indications, ASTs and USTs may be present at the site (in use or decommissioned). Because ASTs/USTs are common sources of environmental contamination, the potential for leaking ASTs/USTs is considered an environmental concern.

An assessment for residual pesticide concentrations in soil and for petroleum ASTs/USTs (and possible releases) should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper tank decommissioning, soil management, and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to pesticides in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

If ASTs and/or USTs are present at the site, it will be necessary to decommission the tanks and possibly remediate associated contamination, if any. Assessment and remediation for small residential/farm petroleum tanks is commonly simple and limited to shallow soil. In some cases, however, residential/farm tank releases affect groundwater or other sensitive environments, increasing the complexity and costs of assessment and remediation.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is approximately $15,000, and the costs for an AST/UST assessment, including subsurface sampling, is in the range of $10,000.

The costs for remediation of petroleum impacts, if any, from residential/farm ASTs/USTs is difficult to constrain without site-specific information. For planning purposes, however, it is reasonable to assume that small residential/farm heating oil/diesel USTs/ASTs can be decommissioned for approximately $5,000 to $10,000 each and remediation of petroleum impacted soil can be performed for approximately $10,000 to $20,000 for each release area. Therefore, assuming that one AST or UST is present at the site, combined decommissioning and remediation costs may range between $5,000 and $20,000.

A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

In summary, the costs for an assessment of pesticides in soil are likely to be in the range of $15,000. An assessment for AST/UST impacts will likely cost approximately $10,000. The cost for decommissioning and remediation of petroleum ASTs/USTs (assuming one small residential/farm tanks are present) may range between $5,000 and $20,000. Assuming that pesticide and AST/UST assessments are completed for $25,000 and AST/UST decommissioning and remediation costs fall between the low and high estimates (i.e., the average, or $12,500), total costs will be in the range of $37,500. If the magnitude and extent of contaminant impacts at the site, if any, are large or sensitive environments or groundwater are impacted, assessment and remediation costs may increase.

A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management. Small residential/farm ASTs and USTs, used for storing petroleum hydrocarbon fuels, can commonly be assessed and remediated in less than six months. Assuming AST/UST impacts are limited to soil, and not groundwater, remediation normally can be completed concurrent with site development activities. In some cases, overall UST/AST decommissioning and remediation costs can reduced by using equipment and personnel that have been mobilized for other general site preparation and development tasks. No permitting is required for assessment activities of for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In summary, based on the assumptions described above, the timeframe for assessment and remediation should be less than six months.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 37 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Tualatin, Oregon

Photo No: 1	
Photo Date: Dec. 27, 2011	
Orientation: South	
Description: Agricultural area, dwelling, and accessory structures viewed from SW Tualatin-Sherwood Road.	
Photo No: 2	
Photo Date: Dec. 27, 2011	
Orientation: Southeast	
Description: Agricultural area and dwelling viewed from SW Tualatin-Sherwood Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 37 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Tualatin, Oregon

Photo No: 3	
Photo Date: Dec. 27, 2011	
Orientation: South	
Description: Agricultural area viewed from SW Tualatin-Sherwood Road.	
Photo No: 4	
Photo Date: Dec. 27, 2011	
Orientation: Southeast	
Description: Agricultural area viewed from SW Tualatin-Sherwood Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 37 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Tualatin, Oregon

Photo No: 5	
Photo Date: Dec. 27, 2011	
Orientation: South	
Description: Agricultural area viewed from SW Tualatin-Sherwood Road.	
Photo No: 6	
Photo Date: Dec. 27, 2011	
Orientation: Southwest	
Description: Agricultural area viewed from SW Tualatin-Sherwood Road.	

Appendix J

Site 55/56: East Evergreen Site Summary

Appendix J — Site 55/56: East Evergreen Site Summary

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Appendix J — Site 55/56: East Evergreen Site Summary

This Appendix presents a summary of information about environmental conditions at sites 55/56. Sites 55 and 56 are contiguous prospective development sites. For this evaluation, they were treated as a single site.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – The majority of the site appears to be used for agricultural purposes. Crops appear to consist of grasses and cover crops. Forest land is present at the northwest corner of the site and along a drainage channel at the southwest corner of the site. Dwellings and ancillary structures (farm buildings) are present in three clusters at the site.

1947 – No significant changes are visible.

1955 – A small portion of forest land at the northwest corner of the site has been converted to agriculture use.

1963 – A field at the southwest portion of the site has apparently been converted to nursery or orchard use.

1970 – No significant changes are visible.

1980 – Several small structures have been constructed at the southwest portion of the site.

1990 – No significant changes are visible.

1998 – A small structure has been constructed adjacent to and east of the southeast corner of the site. A large building (currently occupied by Solar World) has been constructed south of the site, on the south side of NW Evergreen Road.

2005 – No significant changes are visible.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

Appendix J — Site 55/56: East Evergreen Site Summary

3.0 Site Reconnaissance

The site was observed on December 7, 2011 from public rights of way. The site is currently in residential/agricultural use. Dwellings and farm buildings are present in three clusters at the site, near Evergreen Road, near and NW 253rd Avenue, and at the central portion of the site. It was not possible to closely observe the structures due to their distance from public rights of way. The dwellings and buildings are surrounded by farmed areas with cover crops. Obvious potential sources of contamination, such as ASTs and USTs, were not visible during the site reconnaissance. The dwellings are in a rural area without obvious signs of a municipal sanitary sewer system, suggesting that septic systems are in use at the site. A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed for the site because the site is not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. The types of crops grown at the site are unclear based on the review of aerial photography; however, agricultural uses apparently consisted primarily of grasses and cover crops. An orchard or nursery occupied the southwest portion of the site.

Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorines, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

Small (200- to 1,000-gallon) ASTs and USTs, used for storing petroleum hydrocarbon fuel (gasoline, diesel, and heating oil) are common at residential and farm properties. Indications of ASTs and USTs were not visible on the aerial photographs or during the site reconnaissance, and the DEQ Facility Profiler database does not indicate that ASTs and/or USTs are present at the site. Despite the absence of tank records or indications of ASTs/USTs, ASTs and USTs may be present at the site (in use or decommissioned). Because ASTs/USTs are common sources of environmental contamination, the potential for leaking ASTs/USTs is considered an environmental concern.

Appendix J — Site 55/56: East Evergreen Site Summary

An assessment for residual pesticide concentrations in soil and for petroleum ASTs/USTs (and possible releases) should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper tank decommissioning, soil management, and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to contaminants in soil via direct contact. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

If ASTs and/or USTs are present at the site, it will be necessary to decommission the tanks and possibly remediate contamination, if any. Assessment and remediation for small residential/farm petroleum tanks is commonly simple and limited to shallow soil. In some cases, however, residential/farm tank releases can affect groundwater or other sensitive environments, increasing the complexity and costs of assessment and remediation.

6.0 Conceptual Assessment and Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is in the range of $15,000, and the costs for an AST/UST assessment, including subsurface sampling, is in the range of $15,000. The costs for remediation of petroleum impacts, if any, from residential/farm ASTs/USTs are difficult to constrain without site-specific information. For planning purposes, however, it is reasonable to assume that small residential/farm USTs/ASTs can be decommissioned for approximately $5,000 to $10,000 each and remediation of petroleum impacted soil can be performed for approximately $10,000 to $20,000 for each release area. Therefore, assuming that three ASTs/USTs are present at the site, combined UST/AST decommissioning and remediation costs may range between $15,000 and $90,000.

A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

Appendix J — Site 55/56: East Evergreen Site Summary

In summary, the costs for an assessment of pesticides in soil are likely to be in the range of $15,000. An assessment for AST/UST impacts will also likely cost approximately $15,000. Thus, the cost for assessment, decommissioning and remediation of petroleum ASTs/USTs (assuming three small residential/farm tanks are present) may range between $30,000 and $105,000. Assuming that pesticide and AST/UST assessments are completed for $30,000 and AST/UST decommissioning, and remediation costs fall between the low and high estimates (i.e., the average, or $52,500), total costs will be in the range of $82,500. If the magnitude and extent of contaminant impacts at the site, if any, are large or sensitive environments or groundwater are impacted, assessment and remediation costs may increase.

A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management. Small residential/farm ASTs and USTs, used for storing petroleum hydrocarbon fuels, can commonly be assessed and remediated in less than six months. Assuming AST/UST impacts are limited to soil, and not groundwater, remediation normally can be completed concurrent with site development activities. No permitting is required for assessment activities of for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In some cases, overall UST/AST decommissioning and remediation costs can reduced by using equipment and personnel that have been mobilized for other general site preparation and development tasks. No permitting is required for assessment activities of for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In summary, based on the assumptions described above, the timeframe for assessment and remediation should be less than six months.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 55/56 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 1	
Photo Date: Dec. 7, 2011	
Orientation: North	
Description: Agricultural fields viewed from NW 253rd Avenue.	
Photo No: 2	
Photo Date: Dec. 7, 2011	
Orientation: North	
Description: Agricultural fields and a stormwater ditch viewed from NW 253rd Avenue..	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 55/56 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 3	
Photo Date: Dec. 7, 2011	
Orientation: West	
Description: An agricultural field, barn and accessory structures at the southeast portion of the site, viewed from NW 253rd Avenue.	
Photo No: 4	
Photo Date: Dec. 7, 2011	
Orientation: Northwest	
Description: View of an agricultural field, with a dwelling and farm structures visible in the background. The photograph was taken from NW 253rd Avenue.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 55/56 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 5	
Photo Date: Dec. 7, 2011	
Orientation: South	
Description: A dwelling and barn at the east side of the site, viewed from NW 253rd Avenue.	
Photo No: 6	
Photo Date: Dec. 7, 2011	
Orientation: West	
Description: Taken from NW 253rd Avenue, on the East boarder of the lot, looking West toward an agricultural field containing grass.	

Appendix K

Site 62: Rock Creek Site Summary

Appendix K —Site 62: Rock Creek Site Summary

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Attachments

Appendix K —Site 62: Rock Creek Site Summary

This Appendix presents a summary of information about environmental conditions at site 62.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – The site is in agricultural use. Cover crops appear to be present over most of the site, although small orchard areas are present in the central and southeast portions of the site. Two clusters of small structures, which appear to consist of dwellings and outbuildings, are present at the site; one cluster is in the southeast corner and the other is in the central area. Several small buildings are visible north, south, and southwest of the site.

1945 – The site appears generally unchanged.

1948 – The site appears generally unchanged.

1956 – A small building was added to the cluster at the southeast corner of the site. Several buildings were removed from the property north of the site.

1961 – Two small structures were added to the cluster at the central area of the site.

1970 – The site appears generally unchanged.

1980 – Several small buildings were constructed in a cluster at the east-central portion of the site.

1990 – Several buildings, which appear to be dwellings, were constructed in the vicinity of the site.

1998 – A residential development was constructed southwest of the site.

2005 – No significant changes are visible.

2.0 Review of DEQ Facility Profiler

A leaking heating oil UST incident (DEQ File No. 03-02-5509) was identified by the DEQ Facility Profiler at the property at 14850 SE 162nd Avenue. The Facility Profiler map suggests that the incident corresponds to

the subject site; however, Clackamas County records[1] indicate that the listed address does not currently exist and if it did exist, it would be at least 200 feet north of the subject site. Therefore, it is unclear if the incident documented by DEQ File No. 03-02-5509 occurred at the site or an off-site location.

The DEQ online LUST report for the incident indicates that a heating oil release was reported to DEQ in March 2002 and the released was cleaned up by April 2002. Reportedly the release was limited to soil. Based on information provided by DEQ, it appears that the LUST incident poses little risk to the site, regardless of whether it occurred at the site or on a nearby property.

3.0 Site Reconnaissance

The site was observed on December 27, 2011 from public rights of way near the site. The site is currently in residential/agricultural use. Dwellings and farm buildings are present at the central portion of the site, the east portion of the site, and the southeast portion of the site near Highway 212. It was not possible to closely observe the structures at the site due to their distance from public rights of way. The dwellings and farm buildings are surrounded by farmed areas, some of which were planted with cover crops and others that were fallow at the time of the site reconnaissance. Obvious potential sources of contamination, such as ASTs and USTs, were not visible during the site reconnaissance. The dwellings are in a rural area without obvious signs of a municipal sanitary sewer system, suggesting that septic systems are in use at the site. A photograph log is included in Attachment B.

4.0 File Review

The online LUST file for 14850 SE 162nd Avenue was reviewed, as discussed in Section 2.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. The types of crops grown at the site are unclear based on the review of aerial photography; however, agricultural uses apparently consisted primarily of grasses and cover crops.

Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorine, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at

[1] http://web5.co.clackamas.or.us/taxmap/

concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

The DEQ Facility Profiler database indicates that a heating oil UST was historically present at 14850 SE 162nd Avenue; however, it is unclear if the release occurred at the subject site and, regardless of the release location, it was reportedly cleaned up to DEQ's satisfaction.

Small (200- to 1,000-gallon) ASTs and USTs, used for storing petroleum hydrocarbon fuel (gasoline, diesel, and heating oil) are common at residential and farm properties. ASTs and USTs were not visible during the site reconnaissance; are not visible on the aerial photographs; and the DEQ Facility Profiler database does not indicate that ASTs and/or USTs are present at the site. Despite the absence of tank records or other indications, ASTs and USTs may be present at the site (in use or decommissioned). Because ASTs/USTs are common sources of environmental contamination, the potential for leaking ASTs/USTs is considered an environmental concern.

An assessment for residual pesticide concentrations in soil and for petroleum ASTs/USTs (and possible releases) should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper tank decommissioning, soil management and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to contaminants in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

If ASTs and/or USTs are present at the site, it will be necessary to decommission the tanks and possibly remediate contamination, if any. Assessment and remediation for small residential/farm petroleum tanks is commonly simple and limited to shallow soil. In some cases, however, residential/farm tank releases can affect groundwater or other sensitive environments, increasing the complexity and costs of assessment and remediation.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is in the range of $15,000, and the costs for an AST/UST assessment, including subsurface sampling, is

Appendix K —Site 62: Rock Creek Site Summary

in the range of $15,000. The costs for remediation of petroleum impacts, if any, from residential/farm ASTs/USTs are difficult to constrain without site-specific information. For planning purposes, however, it is reasonable to assume that small residential/farm heating oil/diesel USTs/ASTs can be decommissioned for approximately $5,000 to $10,000 each and remediation of petroleum impacted soil can be performed for approximately $10,000 to $20,000 for each release area. Therefore, assuming that three ASTs/USTs are present at the site (one at each building cluster), combined UST/AST decommissioning and remediation costs may range between $15,000 and $90,000.

No costs are included for the release at 14850 SE 162nd Avenue, because: (1) it is unclear if the release at 14850 SE 162nd occurred at the subject site; and (2) the release has been cleaned up to DEQ's satisfaction.

A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

In summary, the costs for an assessment of pesticides in soil are likely to be in the range of $15,000. An assessment for AST/UST impacts will also likely cost approximately $15,000. The cost for decommissioning and remediation of petroleum ASTs/USTs (assuming three small residential/farm tanks are present) may range between $15,000 and $90,000. Assuming that pesticide and AST/UST assessments are completed for $30,000 and AST/UST assessment, decommissioning, and remediation costs fall between the low and high estimates (i.e., the average, or $52,500), total costs will be in the range of $82,500. If the magnitude and extent of contaminant impacts at the site, if any, are large or sensitive environments or groundwater are impacted, assessment and remediation costs may increase.

A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management. Small residential/farm ASTs and USTs, used for storing petroleum hydrocarbon fuels, can commonly be assessed and remediated in less than six months. Assuming AST/UST impacts are limited to soil, and not groundwater, remediation normally can be completed concurrent with site development activities. In some cases, overall UST/AST decommissioning and remediation costs can reduced by using equipment and personnel that have been mobilized for other general site preparation and development tasks. No permitting is required for assessment activities of for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In summary, based on the assumptions described above, the timeframe for assessment and remediation should be less than six months.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 62 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Clackamas, Oregon

Photo No: 1	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area viewed from SE 162nd Avenue.	
Photo No: 2	
Photo Date: Dec. 27, 2011	
Orientation: Northeast	
Description: Agricultural area viewed from SE 162nd Avenue.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 62 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Clackamas, Oregon

Photo No: 3	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area and accessory structures viewed from SE 162nd Avenue.	
Photo No: 4	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area, dwelling, and accessory structures viewed from SE 162nd Avenue.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 62 **Client:** Group MacKenzie
Project Number: 1901-00 **Loca** **tion:** Clackamas, Oregon

Photo No: 5	
Photo Date: Dec. 27, 2011	
Orientation: East	
Description: Agricultural area viewed from SE 162nd Avenue.	
Photo No: 6	
Photo Date: Dec. 27, 2011	
Orientation: Southeast	
Description: Agricultural area viewed from SE 162nd Avenue.	

Appendix L

Site 104: Hillsboro Urban Reserves Site Summary

Appendix L —Site 104: Hillsboro Urban Reserves Site Summary

Table of Contents

Attachments

Appendix L —Site 104: Hillsboro Urban Reserves Site Summary

This Appendix presents a summary of information about environmental conditions at site 104.

1.0 Aerial Photography Review

A summary of historical activities at the site, based on a review of aerial photography, is presented below. Copies of aerial photography are included in Attachment A.

1936 – The majority of the site is in agricultural use. Crops appear to generally consist of grasses and cover crops. Forest land is present at the western portion of the site and along drainages elsewhere at the site. Dwellings and ancillary structures (possibly farms or shop buildings) are present in two clusters at areas of the site.

1947 – A structure has been constructed at the southwest portion of the site, adjacent to NW Sewell Road. U.S. Highway 26 has been constructed adjacent to and north of the site.

1956 – Most forested areas have been removed from the site. Several small new structures have been constructed in the vicinity of other buildings at the site.

1963 – Several small new structures have been constructed in the existing building clusters at the site.

1970 – No significant changes are visible.

1980 – No significant changes are visible.

1990 – A small structure has been constructed at the west-central portion of the site.

1998 – Several new structures have been constructed in the clusters at the west side of the site.

2005 – No significant changes are visible.

2.0 Review of DEQ Facility Profiler

No regulatory listings for facilities that appear to pose a significant environmental risk were identified for properties at or adjacent to the site.

Appendix L —Site 104: Hillsboro Urban Reserves Site Summary

3.0 Site Reconnaissance

The site was observed on December 7, 2011 from public rights of way near the site. The site is currently in residential/agricultural use. Dwellings and farm buildings are present at the site, near NW Sewell Road and NW Meek Road, and in the central portion of the site, north of NW 253rd Avenue. It was not possible to closely observe the structures due to their distance from public rights of way. The dwellings and farm buildings are surrounded by farmed areas, some of which were planted with cover crops; others were fallow at the time of the site reconnaissance. Obvious potential sources of contamination, such as ASTs and USTs, were not visible during the site reconnaissance. The dwellings are in a rural area without obvious signs of a municipal sanitary sewer system, suggesting that septic systems are in use at the site. A photograph log is included in Attachment B.

4.0 File Review

A file review was not performed because the site and nearby properties are not included in DEQ's listings of properties with documented or suspected hazardous substance impacts.

5.0 Summary of Environmental Conditions

Aerial photography indicates that the site has been in agricultural use since at least 1936. The types of crops grown at the site are unclear based on the review of aerial photography; however, agricultural uses apparently consisted primarily of grasses and cover crops.

Pesticides and herbicides (pesticides) that were commonly applied to crops in Oregon include inorganic, organochlorine, and organophosphate compounds. The pesticide residues most often detected in Oregon soil are lead, arsenic, cadmium, and mercury (inorganic compounds); and DDT, dieldrin, and toxaphene (organic compounds). Studies have shown that pesticides may accumulate on agricultural lands at concentrations that exceed acceptable risk levels. Analytical data are unavailable to confirm whether residual pesticides are present in soil at the site.

Small (200- to 1,000-gallon) ASTs and USTs, used for storing petroleum hydrocarbon fuel (gasoline, diesel, and heating oil) are common at residential and farm properties. ASTs and USTs are not visible on the aerial photographs and the DEQ Facility Profiler database does not indicate that ASTs and/or USTs are present at the site. Despite the absence of tank records or indications on aerial photography, ASTs and USTs may be present at the site (in-use or decommissioned). Because ASTs/USTs are common sources of environmental contamination, the potential for leaking ASTs/USTs is considered an environmental concern.

An assessment for residual pesticide concentrations in soil and for petroleum ASTs/USTs (and possible releases) should be performed prior to site development. The information obtained during the assessment can be used to determine whether the site is impacted, and if so, to plan for proper tank decommissioning, soil management and for protection of worker health and the environment during future development activities.

Assuming the site is developed for industrial purposes, the majority of the site is likely to be covered with asphalt-concrete or concrete surfaces, preventing human and ecological exposure to contaminants in soil. Under this scenario, assuming moderate levels of pesticide impacts, remediation to address pesticides in soil is not likely to be necessary. If redevelopment plans include the construction or alteration of wetlands, ponds, or other significant natural habitat within areas formerly used for agriculture and impacted by pesticides, pesticide concentrations are high, or significant human/ecological exposure is expected, additional pesticide remediation may be necessary.

If ASTs and/or USTs are present at the site, it will be necessary to decommission the tanks and possibly remediate contamination, if any. Assessment and remediation for small residential/farm petroleum tanks is commonly simple and limited to shallow soil. In some cases, however, residential/farm tank releases can affect groundwater or other sensitive environments, increasing the complexity and costs of assessment and remediation.

6.0 Conceptual Remediation Cost Estimate

Based on the assumptions listed above, the costs for an assessment of residual pesticide concentrations in soil is in the range of $15,000, and the costs for an AST/UST assessment, including subsurface sampling, is in the range of $15,000. The costs for remediation of petroleum impacts, if any, from residential/farm ASTs/USTs are difficult to constrain without site-specific information. For planning purposes, however, it is reasonable to assume that small residential/farm heating oil/diesel USTs/ASTs can be decommissioned for approximately $5,000 to $10,000 each and remediation of petroleum impacted soil can be performed for approximately $10,000 to $20,000 for each release area. Therefore, assuming that three ASTs/USTs are present at the site, combined UST/AST decommissioning and remediation costs may range between $15,000 and $90,000.

A remediation cost estimate was not prepared for pesticides in soil because asphalt-concrete, concrete pavement, and building foundations will presumably be installed during industrial development of the site, preventing human and ecological exposure to pesticides in soil and removing the need for other remediation efforts. If pesticide-impacted soil is removed from the site during earthwork activities, additional handling/disposal costs may be incurred.

Appendix L —Site 104: Hillsboro Urban Reserves Site Summary

In summary, the costs for an assessment of pesticides in soil are likely to be in the range of $15,000. An assessment for AST/UST impacts will also likely cost approximately $15,000. The cost for decommissioning and remediation of petroleum ASTs/USTs (assuming three small residential/farm tanks are present) may range between $15,000 and $90,000. Assuming that pesticide and AST/UST assessments are completed for $30,000 and AST/UST assessment, decommissioning, and remediation costs fall between the low and high estimates (i.e., the average, or $52,500), total costs will be in the range of $82,500. If the magnitude and extent of contaminant impacts at the site, if any, are large or sensitive environments or groundwater are impacted, assessment and remediation costs may increase.

A pesticide assessment can be completed in less than three months. The pesticide assessment should be performed prior to initiating site preparation/development activities because the assessment data should be used to inform decisions regarding worker health and safety and soil management. Small residential/farm ASTs and USTs, used for storing petroleum hydrocarbon fuels, can commonly be assessed and remediated in less than six months. Assuming AST/UST impacts are limited to soil, and not groundwater, remediation normally can be completed concurrent with site development activities. In some cases, overall UST/AST decommissioning and remediation costs can reduced by using equipment and personnel that have been mobilized for other general site preparation and development tasks. No permitting is required for assessment activities of for decommissioning of small unregulated residential/farm ASTs, although DEQ reporting is required for most UST work. If larger, regulated USTs are decommissioned, it will be necessary to notify DEQ prior to the decommissioning activities. In summary, based on the assumptions described above, the timeframe for assessment and remediation should be less than six months.

Attachment A

Aerial Photographs


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Attachment B

Photograph Log

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 104 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 1	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Agricultural fields at the west side of the site, viewed from NW Sewell Road. A dwelling and accessory structures are visible in the background.	
Photo No: 2	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Agricultural fields at the west side of the site, viewed from NW Sewell Road. A dwelling and accessory structures are visible in the background.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 104 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 3	
Photo Date: Dec. 7, 2011	
Orientation: Northwest	
Description: Agricultural fields at the west side of the site, viewed from NW Meek Road.	
Photo No: 4	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Agricultural fields, a dwelling, and accessory structures at the central portion of the site, viewed from NW Meek Road.	

ATTACHMENT B
PHOTOGRAPH LOG

Project Name: Regional Industrial Inventory Project - Site 104 **Client:** Group MacKenzie
Project Number: 1901-00 **Location:** Hillsboro, Oregon

Photo No: 5	
Photo Date: Dec. 7, 2011	
Orientation: South	
Description: Agricultural fields, a dwelling, and accessory structures at the central portion of the site, viewed from NW Meek Road.	
Photo No: 6	
Photo Date: Dec. 7, 2011	
Orientation: East	
Description: Agricultural fields, a dwelling, and accessory structures at the southwest portion of the site, viewed from NW Sewell Road.	

JOHNSON REID
LAND USE ECONOMICS

PURPOSE AND METHODOLOGICAL OVERVIEW

In a world economy with shorter product life cycles, highly technical and costly capital improvements, and a globally competitive market, firms requiring large industrial sites are growing more sensitive to market timing and site flexibility. In today's economy, the Portland Metropolitan area is competing on a global scale in the recruitment and retention of large and expanding firms; with these firms increasingly unable or willing to overcome challenging site development issues. In their site selection, firms face many choices in many cities, acting rationally to locate in the least costly and challenging locations. This new paradigm raises questions about the competitiveness of our regional land inventory. Until sites are marketed as user ready, is there a truly effective supply for large industrial site demand from the perspective of traded-sector firms seeking to locate or expand in our region? It was recently discovered that the metro area has only a handful of 25-100+ acre sites suitable for shovel ready development[1]. With this in mind, it would be prudent to consider factors which limit industrial land choice, and develop strategies for improving and diversifying industrial land supply within our urban growth boundary and reserves areas.

Herein lays the function of this analysis—to move beyond a classically planning-driven approach to land evaluation, and underscore the *market-driven* realities of our regional land inventory. Simply put, our analysis evaluates Phase II sites from the perspective of market participants. This term market participant can include a host of entities, including land owners, end-users, land developers, and public agencies, among others. This is a critically important point of view; as in reality, *market participants* facilitate development activity, which is fundamentally dictated by economic and fiscal constraints.

This perspective allows us to expand on a simple *inventory* of large industrial sites, and better understand the variety of constraints which limit industrial "choice". Here, we recognize the dynamic between the costs of improving lower tier sites, the market's willingness to provide private investment, and the eventual economic and fiscal benefits of having user ready sites. In doing so, we inform policy decisions at all levels of government, as well as in the business community. Topics can range from the assessment of risk, to the marginal fiscal and community benefits of public capital investment.

In the pages below, we provide a narrative describing our methodological approach to both determining market viability and forecasting associated economic and fiscal benefits.

Market Viability Analysis Methodology

This analysis evaluates the costs associated with the identified constraints of Phase II sites *in relation to* the future value of the site. This "cost-value" approach translates the sum of development costs into an assessment of the market's ability or inability to bring sites to a user ready (Tier 1) status.

In their investment decisions, market participants will evaluate the balance of dollar costs[2], time, and risk against the future value of the investment. Presented numerically.

$$Future\ Value \geq \sum(Dollar\ Cost, Time, Risk) \quad (1.1)$$

When this equation holds true, and the future value of a site outweighs or is at least equal to the sum of costs associated with site development, the market will tend to produce development activity in the long-run, all else equal. But this balance does not always hold true. Particularly for sites with considerable constraints; the equation is reversed:

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[1] *Portland Business Alliance. Land Availability, Limited Options, An Analysis of Industrial Land Ready for Future Employers, April 2012.*

[2] *Including acquisition*

JOHNSON REID
LAND USE ECONOMICS

1.2 $$Future\ Value\ <\ \sum(Dollar\ Cost, Time, Risk)$$

In this condition, a number of outcomes could occur. When the differential between cost and value is narrow, enough time may pass for future land values to appreciate to a level which may persuade market activity[3]. Alternatively, a market participant with a lower risk and time threshold may emerge. However, when the differential is large relative to future value, the potential reward is not sufficient to encourage private investment. In this instance, the more likely scenario is for the site to remain in an unusable condition—or eventually transition to a higher use (justifying higher future value).

With this basic foundation in mind, we evaluate each half this balance individually below. We then reconcile this value/cost balance to determine the aforementioned differential, and elaborate on its meaning and implications on site readiness.

Our evaluation process starts with an assumption of each site beginning in a best case scenario; that is, owners are motivated and sites are aggregated. We understand this is clearly not always the case, and recognize aggregation as a costly obstacle to site development. However, aggregation costs and timing are difficult to estimate and therefore are not included in the analysis; for this analysis we erred on the side of a conservative cost estimate.

Costs: Dollar Cost, Time, and Risk

Our cost analysis evaluated the development constraints precluding Tier 1 status. Examples include wetland mitigation, environmental cleanup, transportation, and infrastructure. Group Mackenzie provided dollar costs (Hard Costs) and development schedules (time) for each identified constraint. We then consider Soft Costs[4], and utilized the development schedules for each activity to calculate the time cost of money[5]. Development schedules were also used to quantify the cost of risk[6]—the premium required to encourage investment. Taken together, these baseline inputs determine the total cost of bringing the site to Tier 1. Stated numerically:

1.3 $$Total\ Site\ Development\ Cost\ =\ \sum(Hard\ Cost, Soft\ Cost, Time\ Cost, Risk\ Premium)$$

In addition to site development, we must also consider an acquisition price an entity would pay a current land owner for sites "as-is". This is a difficult assumption to make, as it does not indicate the residual "value" of the land from a purely market perspective. Rather, it represents the price a land owner would reasonably enter contract as a strike price today. In reality, the real strike price is going to vary widely by site. Absent every aggregated site being listed on the open market, we have no true way of knowing what this will be. As a necessary supplement, we assumed that an across the board strike price of $4.50 per-square-foot would reasonably encourage land owners to enter contract negotiations. Therefore, the entire right side of equations 1.1 and 1.2 is represented by the following:

1.4 $$\sum(Dollar\ Cost, Time, Risk) = (Strike\ Price + Total\ Site\ Development\ Cost)$$

[3] *Although land appreciation generally requires increasing scarcity relative to demand.*

[4] *Calculated at 20% of Hard Costs. Represent architectural, engineering, legal, fees etc.*

[5] *Calculated at a 7% annualized rate from the period dollars are spent in the development schedule to site completion.*

[6] *Risk thresholds were estimated linearly as 2.5% for every 6 months of development time, from a 24 month basis of 15%. For example, a site with a site development period of 24 months would be associated with a 15% return on costs, while a site with a 30 month development timeline would require a 1.75% return. Risk premiums were grossed up by 1/6th for site with moderate brownfield remediation and by 1/3rd for sites requiring significant brownfield remediation.*

Future Value:
On the left side of equations 1.1 and 1.2, we calculate the future market value of each site as a Tier 1 site; in other words, after site development activities have occurred. The future value of a site is simply a function of its current value as-if a Tier 1 site, time, and an assumed land appreciation (or depreciation) rate. Again, numerically:

1.5 $$Future\ Value\ = Current\ Tier\ 1\ Price(1 + Appreciation\ Rate)^t$$

Where t = Site Development Period

Time in this case is the actual site development period provided by Group Mackenzie, and our land appreciation rate is consistent with 30-year growth in inflation[7]. However, our assumption of current Tier 1 value for each site required more diligence. This assumption was derived out of both quantitative and qualitative elements[8]. Where available, we began with comparable sale and listing prices by submarket. This information provided a sound basis, but data points were limited and land deals are often highly unique. Therefore, two alternative sources of information were consulted; the industrial real estate brokerage team at CBRE and member brokers of the local SIOR chapter. Each of the Phase 2 sites where discussed with these experts and a price was identified for market ready, similar sized sites in each of the submarkets where the sites where located. Their responses were combined with the physical data to determine a market ready price[9].

Reconciliation of Value and Costs:
Finally, we reconcile equation 1.1 to determine the differential between the future value of a site and its associated costs. This differential represents the "Market Viability Gap" or "Surplus" of the site. Numerically:

1.6 $$MV = Future\ Value - \sum(Dollar\ Cost, Time, Risk)$$

Where MV is negative, a viability gap exists; the cost to acquire and provide infrastructure exceeds expected market value. Where MV is positive, the site should attract the interest of the market—within the construct of this model.

Therefore, whereas they exist, we look to identify "market viability gaps" of constrained sites. We quantify these gaps to understand "how far away" the site is from market viability. Because we have an assumption of land appreciation, we can quantify this assumption both in terms of dollars and market timing. This allows us to understand the magnitude of the gaps, and begin thinking about solutions to improve market viability.

To this end, we developed a model that allows us to isolate the marginal impacts of every variable informing our analysis. This allows us to answer a whole host of questions. For example, we can answer, "What is the marginal impact on market viability of providing transportation infrastructure to Site-X?"; or "How much faster is Site-X viable if a land owner is willing to accept a $4.00 strike price?"; or even "How much assistance is necessary to encourage private investment to improve Site-X to Tier 1?". Through this process, we developed a key metric that indicates overall market viability. This metric effectively answers this final question, and quantifies the dollar "gap assistance" that would attract the market's interest today.

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[7] *As measured by the Consumer Price Index.*

[8] *For this assumption, we enlisted the help of Mike Wells, Managing Direct of the Portland CBRE office.*

[9] *This price was then reviewed by the consultant team and Kirk Olsen of Dermondy Properties, and a member of the Project Management Team, for a final determination.*

Economic and Fiscal Impact Methodology

Now that we have quantified the necessary gap that sites would require for improvement, we must consider the potential benefits those catalytic investments could generate. This process begins with the assumption of a Tier 1 site and motivated end user. This analysis is theoretical in nature, as Group Mackenzie has produced concept plans on each site to represent a conceptual end user. Based on what we know about how these types of industries operate, and the costs of building their facilities[10], we can derive economic and fiscal estimates of these activities. This analysis considered the following impacts:

Economic Impacts from site development, facility construction, and on-going operations:

- Business Revenues, *(Direct, Indirect/Induced)*
- Jobs, *(Direct, Indirect/Induced)*
- Payroll Wages, *(Direct, Indirect/Induced)*

Fiscal Impacts from site development, facility construction, and on-going operations :

- Property Tax Revenues from Real Property
- State Payroll Tax from Payroll Wage Impacts

This analysis did not consider the impacts of personal property taxes on equipment and capital. For large users, the assessment of such property is determined on an individual basis, with complicated measures of depreciation, value, and incentives. Again, our analysis erred on the side of conservative estimates vs. speculating on these broadly varying impacts. We note that these investments can be significant, especially among high-tech and clean-tech users. As such, our findings are highly conservative.

IMPLAN Economic Impact Methodology:

To model the economic impacts of various activities, JOHNSON REID utilized IMPLAN (IMPact for PLANning)[11] input/output multiplier model methodology. Developed by the Forest Service to assist in land and resource management planning, IMPLAN is an economic impact model designed for analyzing the effects of industry activity (employment, income or business revenues) upon all other industries in an economic area.

Economic impact analysis generally seeks to assess changes in overall economic activity within a specific geographic area as a result of a change in one or many specific activities; in this case, site development, facility construction, and on-going business activity. The ripple effect of a gain or loss in economic activity is identified in three stages: *Direct Impacts*, *Indirect Impacts* and *Induced Impacts*.

- *Direct Impacts:* The actual change in activity affecting a local economy. For example, if a new high-tech building is constructed, direct economic impacts comprise the business revenues for that firm/user, as well as the jobs required by that business and the labor income paid.
- *Indirect Impacts:* The response of all other local businesses within the geographic area to the direct impact. Continuing the previous example, indirect impacts of a high-tech user would comprise revenues for related venders, i.e. materials wholesalers, subcontractors, etc., and the jobs and labor income thereby generated.
- *Induced Impacts:* The response of households within the geographic area affected by direct and indirect impacts. In the given example, induced impacts would be the increase in all categories of spending by households in the geography directly or indirectly employed by the businesses' activities.

[10] *Per-Square-Foot construction cost by facility type were provided by Group Mackenzie*
[11] *Minnesota IMPLAN Group (MIG), Inc., Stillwater, Minnesota.*

Because IMPLAN's multiplier approach recognizes the relationship between revenues, jobs, and payroll, only one input is needed to determine the others. Therefore, job estimates could be used to determine business revenues, or vice versa. Below we describe our approach to estimating each activity type.

Site Development:
We calculated economic impacts based on the dollar cost and site development schedules provided by Group Mackenzie. Hard and soft impacts were considered separately and summed.

Facility Construction:
We began with estimates of facility construction costs for different types of structures (e.g. production, office) provided by Group Mackenzie. These dollar costs were inputs in the IMPLAN model to produce jobs and payroll estimates. However, we needed to make assumptions of the rate to which firms in different industries absorb space. We wanted to avoid making hypothetical phasing estimates of conceptual plans. Therefore, all of our facility construction and on-going impacts are related to a linear build-out over a determined period of time. But what rate do different industries absorb space? We evaluated case studies of large industrial expansion from around the region to determine typical absorption periods. This ranged from all development in one-year for warehouse & distribution to as much as 120,000 per year for cleantech in Hillsboro.

On-Going Activity:
As mentioned above, on-going impacts are included in the model at the rate of facility construction. Direct job impacts were used as the IMPLAN input for on-going operations. To create direct job estimates we utilized average employment densities outlined in Metro's Urban Growth Report[12].

Fiscal Impacts:
Our analysis considered only taxes on real property and state payroll tax associated with payroll impact estimates outlined above.

Property Tax Impacts:
Property tax revenues were calculated on the *net-new* assessed value created by facility construction. Future assessed values were estimated by applying the cost of replacement to the changed property ratio (CPR) for industrial development in each respective county. For example, in year-one if there were a $1,000,000 facility improvement on a site in Multnomah County, that increase in real market value would be multiplied by 0.876 (the industrial CPR in Multnomah County) to determine assessed value. Property taxes are levied[13] on assessed values by the according millage rate for each site. We assume a maximum annual assessed value increase on existing land and improvements of 3% in accordance with Measure 50.

State Payroll Tax Impacts:
State payroll taxes are applied to all taxable income[14] according to the state's current 2012 tax rates[15]. Payroll taxes were considered on payroll associated with the direct, indirect, and induced impacts of all construction and on-going activities.

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[12] *Metro, 2009-2030 Urban Growth Report, January 2010.*
[13] *Where a site is located in an Enterprise Zone, property tax impacts are frozen for five years beginning with the first year of facility construction.*
[14] *Taxable income is assumed to be 75% of total payroll wage. Reduction accounts for federal withholding, standard deductions, and other miscellaneous deductions.*
[15] *Oregon Department of Revenue, Oregon Withholding Tax Formulas, January 2012*

Site 13 ICDC Entercom

Portland, Oregon

Warehouse & Distribution

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		48.5 Acres	
Net Developable Size:		46 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*28 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$742,200**	**$0.37**
Off-Site	*Water:*	*$23,000*	*$0.01*
	Sewer:	*$18,000*	*$0.01*
	Stormwater:	*$18,000*	*$0.01*
	Transportation:	*$0*	*$0.00*
On Site	*Wetland Mitigation:*	*$105,000*	*$0.05*
	Slope Mitigation:	*$0*	*$0.00*
	Building Pad Surcharge:	*$563,200*	*$0.28*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$15,000*	*$0.01*
Soft Costs:		**$148,440**	**$0.07**
Time Costs:		**$54,925**	**$0.03**
Threshold Return (Risk):		**$148,056**	**$0.07**
TOTAL SITE DEVELOPMENT COSTS:		**$1,093,620**	**$0.55**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$12,893,168	$6.43
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$11,799,547	$5.89
Assumed Acquisition/Strike Price:		$9,016,920	$4.50
Feasibility Gap/Surplus:		$2,782,627	$1.39
MARKET TIME TO FEASIBILITY:		**-5.9 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY

Data Not Applicaple. The Site does not have a Market Viability Gap

* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS	
Build-Out Period:	1.0 Years
Facility Size:	864,800 Sq. Ft.
Investment in Real Property:	$25,944,000
Use Type:	W&D

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-2)	*Direct:*	2.9	$360,000	$120,000
	In/Ind:	1.9	$240,000	$120,000
Facility Construction (Year 3)	*Direct:*	248.6	$25,920,000	$13,320,000
	In/Ind:	158.3	$20,400,000	$6,480,000

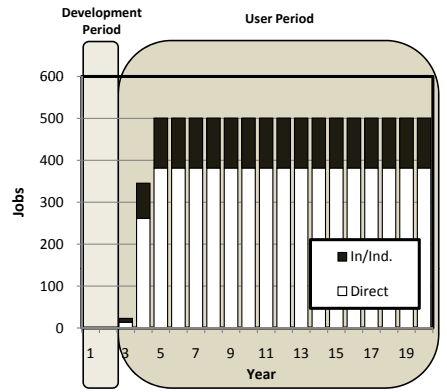
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$26,800,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 4+)	*Direct:*	382	$27,500,000	$17,100,000
	In/Ind:	119	$16,100,000	$4,900,000
	Total:	***501***	***$43,600,000***	***$22,000,000***

"When fully developed the project will have an estimated 1,004 employees on site producing $332 million in annual economic activity. Indirect and Induced impacts would support an additional 1,395 jobs and $216 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,100,000	$900,000
In/Ind:	$300,000	Not Available
Total:	**$1,400,000**	**$900,000**

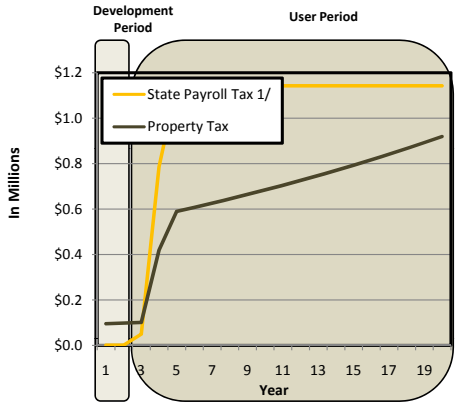
"When fully developed, the project will support $7.9 million in payroll tax and $2.3 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$19,100,000	$12,600,000
In/Ind:	$5,500,000	Not Available
Total:	**$24,600,000**	**$12,600,000**

"Over a 20-year period the project will create $91.4 million in payroll tax revenue and $23.3 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 29 Clackamas County

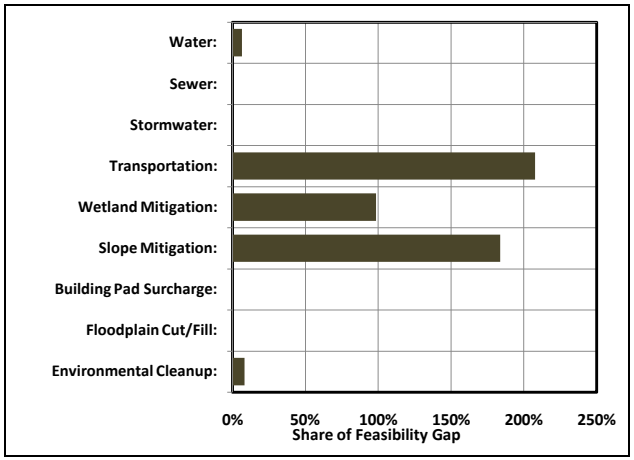
Clackamas, Oregon

General Manufacturing

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		61.93 Acres	
Net Developable Size:		40 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*21 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$1,603,000**	**$0.92**
Off-Site	*Water:*	*$20,000*	*$0.01*
	Sewer:	*$0*	*$0.00*
	Stormwater:	*$0*	*$0.00*
	Transportation:	*$665,000*	*$0.38*
On Site	*Wetland Mitigation:*	*$308,000*	*$0.18*
	Slope Mitigation:	*$585,000*	*$0.34*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$25,000*	*$0.01*
Soft Costs:		**$320,600**	**$0.18**
Time Costs:		**$57,371**	**$0.03**
Threshold Return (Risk):		**$263,400**	**$0.15**
TOTAL SITE DEVELOPMENT COSTS:		**$2,244,371**	**$1.29**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$9,640,047	$5.53
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$7,395,676	$4.24
Assumed Acquisition/Strike Price:		$7,840,800	$4.50
Feasibility Gap/Surplus:		($445,124)	($0.26)
MARKET TIME TO FEASIBILITY:		**3.3 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS	
Build-Out Period:	13.0 Years
Facility Size:	472,500 Sq. Ft.
Investment in Real Property:	$39,690,000
Use Type:	General Manufacturing

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-2)	*Direct:*	8.3	$1,080,000	$480,000
	In/Ind:	5.4	$720,000	$240,000
Facility Construction (Year 3-15)	*Direct:*	29.3	$3,000,000	$1,560,000
	In/Ind:	18.6	$2,400,000	$720,000

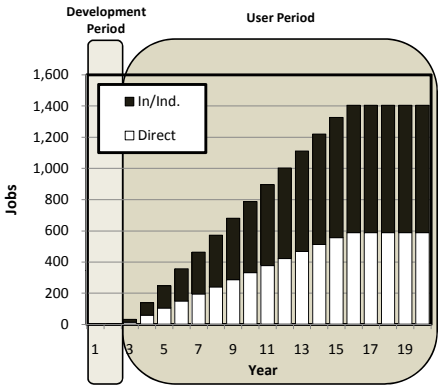
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$41,600,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 16+)	*Direct:*	588	$194,400,000	$26,600,000
	In/Ind:	817	$126,600,000	$42,700,000
	Total:	***1,405***	***$321,000,000***	***$69,300,000***

"When fully developed the project will have an estimated 1,004 employees on site producing $332 million in annual economic activity. Indirect and Induced impacts would support an additional 1,395 jobs and $216 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,800,000	$1,000,000
In/Ind:	$2,900,000	Not Available
Total:	**$4,700,000**	**$1,000,000**

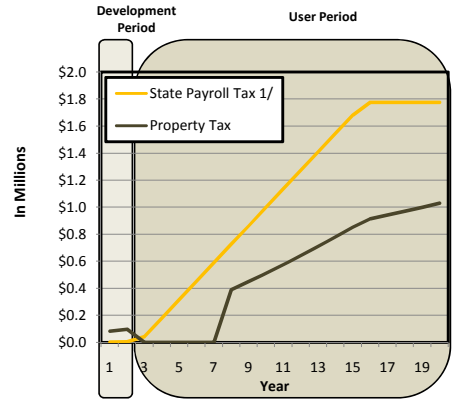
"When fully developed, the project will support $7.9 million in payroll tax and $2.3 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$20,100,000	$10,000,000
In/Ind:	$32,100,000	Not Available
Total:	**$52,200,000**	**$10,000,000**

"Over a 20-year period the project will create $91.4 million in payroll tax revenue and $23.3 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 55-56 EVERGREEN

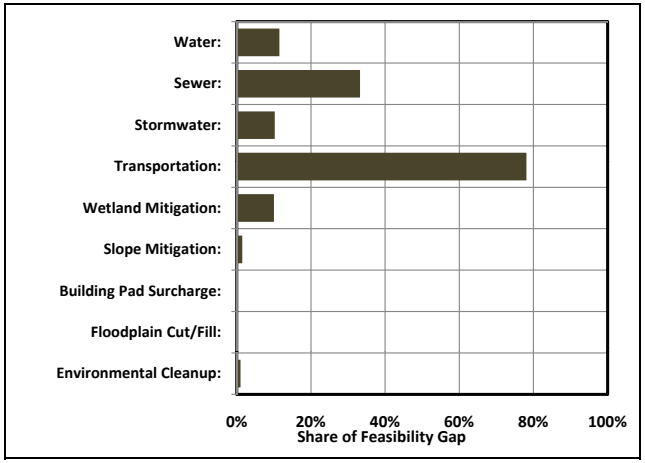
Hillsboro, Oregon

Globally Scaled Clean Tech

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		116.6 Acres	
Net Developable Size:		116.6 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*33 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$13,095,800**	**$2.58**
Off-Site	*Water:*	*$1,032,000*	*$0.20*
	Sewer:	*$2,986,800*	*$0.59*
	Stormwater:	*$919,500*	*$0.18*
	Transportation:	*$7,070,000*	*$1.39*
On Site	*Wetland Mitigation:*	*$875,000*	*$0.17*
	Slope Mitigation:	*$130,000*	*$0.03*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$82,500*	*$0.02*
Soft Costs:		**$2,619,160**	**$0.52**
Time Costs:		**$784,105**	**$0.15**
Threshold Return (Risk):		**$2,940,000**	**$0.58**
TOTAL SITE DEVELOPMENT COSTS:		**$19,439,064**	**$3.83**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$28,955,449	$5.70
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$9,516,385	$1.87
Assumed Acquisition/Strike Price:		$22,855,932	$4.50
Feasibility Gap/Surplus:		($13,339,547)	($2.63)
MARKET TIME TO FEASIBILITY:		**15.6 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	14.0	Years
Facility Size:	1,692,000	Sq. Ft.
Investment in Real Property:	$173,712,000	
Use Type:	Clean Tech	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-3)	*Direct:*	43.2	$5,760,000	$2,640,000
	In/Ind:	28.0	$3,720,000	$1,200,000
Facility Construction (Year 3-16)	*Direct:*	118.9	$12,360,000	$6,360,000
	In/Ind:	75.7	$9,720,000	$3,120,000

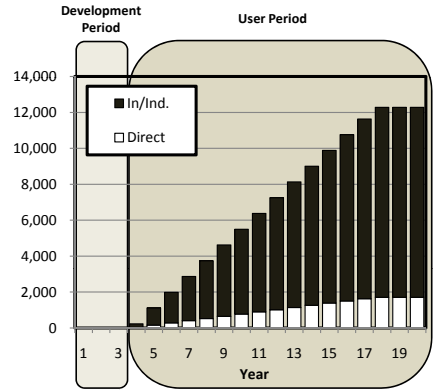
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$189,400,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 17+)	*Direct:*	1,714	$1,211,300,000	$232,100,000
	In/Ind:	10,564	$1,592,700,000	$516,000,000
	Total:	***12,278***	***$2,804,000,000***	***$748,100,000***

"When fully developed the project will have an estimated 1,714 employees on site producing $1.2 billion in annual economic activity. Indirect and Induced impacts would support an additional 10,564 jobs and $1.6 billion in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$15,600,000	$4,300,000
In/Ind:	$34,400,000	Not Available
Total:	**$50,000,000**	**$4,300,000**

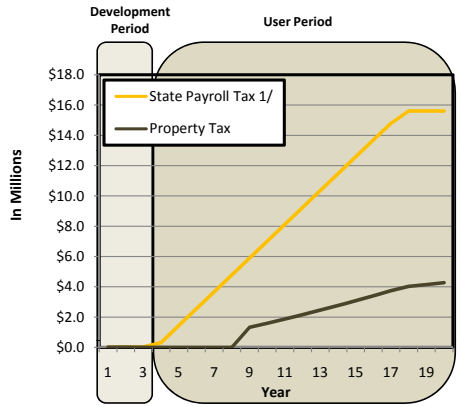
"When fully developed, the project will support $50 million in payroll tax and $4.3 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$152,600,000	$35,000,000
In/Ind:	$335,900,000	Not Available
Total:	**$488,500,000**	**$35,000,000**

"Over a 20-year period the project will create $488 million in payroll tax revenue and $35 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 62 Rock Creek

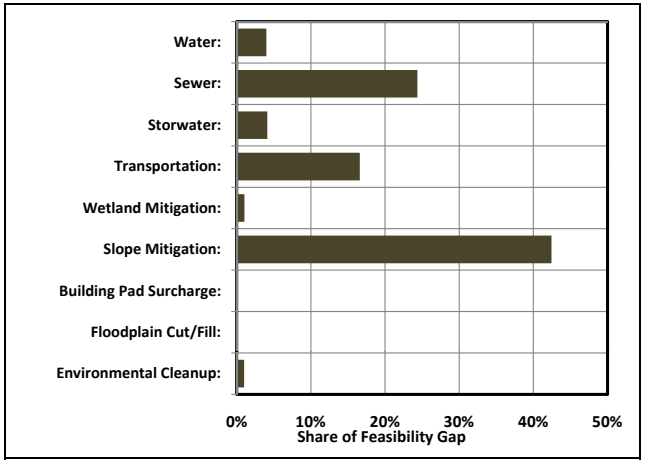
Happy Valley, OR

High-Tech User

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		40.83 Acres	
Net Developable Size:		34.18 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*30 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$8,218,500**	**$5.52**
Off-Site	*Water:*	*$350,000*	*$0.24*
	Sewer:	*$2,172,000*	*$1.46*
	Stormwater:	*$360,000*	*$0.24*
	Transportation:	*$1,480,000*	*$0.99*
On Site	*Wetland Mitigation:*	*$88,000*	*$0.06*
	Slope Mitigation:	*$3,686,000*	*$2.48*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$82,500*	*$0.06*
Soft Costs:		**$1,643,700**	**$1.10**
Time Costs:		**$578,480**	**$0.39**
Threshold Return (Risk):		**$1,725,885**	**$1.16**
TOTAL SITE DEVELOPMENT COSTS:		**$12,166,565**	**$8.17**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$5,857,121	$3.93
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		($6,309,443)	($4.24)
Assumed Acquisition/Strike Price:		$6,699,964	$4.50
Feasibility Gap/Surplus:		($13,009,407)	($8.74)
MARKET TIME TO FEASIBILITY:		**42.1 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:		9.0 Years
Facility Size:		580,200 Sq. Ft.
Investment in Real Property:		$62,118,000
Use Type:		High-Tech

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-3)	*Direct:*	29.8	$3,960,000	$1,800,000
	In/Ind:	19.4	$2,520,000	$840,000
Facility Construction (Year 3-12)	*Direct:*	66.1	$6,960,000	$3,600,000
	In/Ind:	42.1	$5,400,000	$1,680,000

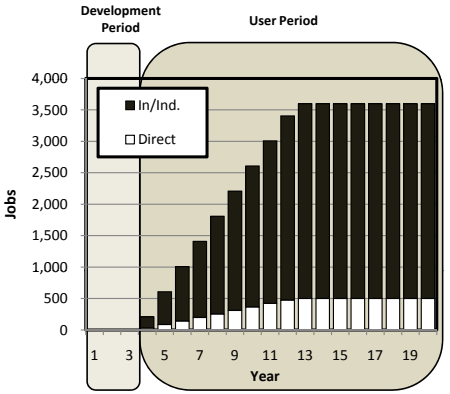
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$72,000,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 13+)	*Direct:*	502	$355,100,000	$68,000,000
	In/Ind:	3,097	$466,900,000	$151,300,000
	Total:	***3,599***	***$822,000,000***	***$219,300,000***

"When fully developed the project will have an estimated 502 employees on site producing $355 million in annual economic activity. Indirect and Induced impacts would support an additional 3,097 jobs and $467 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$4,600,000	$1,500,000
In/Ind:	$10,100,000	Not Available
Total:	**$14,700,000**	**$1,500,000**

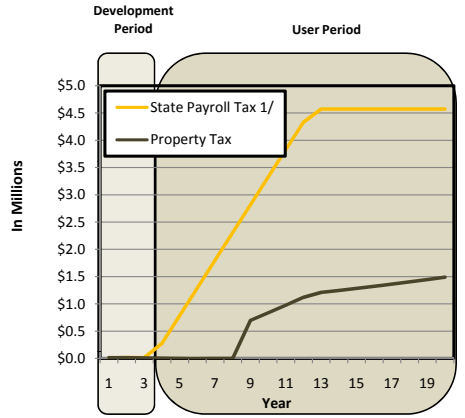
"When fully developed, the project will support $14.7 million in payroll tax and $1.5 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$57,400,000	$14,400,000
In/Ind:	$126,200,000	Not Available
Total:	**$183,600,000**	**$14,400,000**

"Over a 20-year period the project will create $183 million in payroll tax revenue and $14.4 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 2 Time Oil

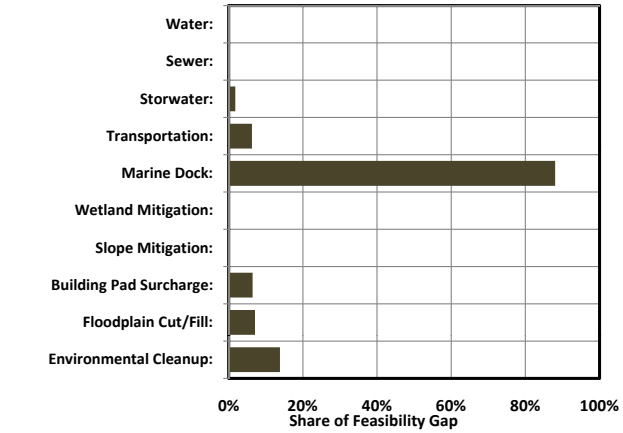
Portland, Oregon

River Dependent Heavy Manufacturing

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		51.7 Acres	
Net Developable Size:		39.4 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*72 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$19,155,200**	**$11.16**
Off-Site	*Water:*	*$36,000*	*$0.02*
	Sewer:	*$30,000*	*$0.02*
	Stormwater:	*$300,000*	*$0.17*
	Transportation:	*$1,080,000*	*$0.63*
	Marine Dock:	*$14,180,000*	*$8.26*
On Site	*Wetland Mitigation:*	*$0*	*$0.00*
	Slope Mitigation:	*$0*	*$0.00*
	Building Pad Surcharge:	*$1,029,600*	*$0.60*
	Floodplain Cut/Fill Mitigation:	*$1,745,600*	*$1.02*
	Environmental Cleanup:	*$754,000*	*$0.44*
Soft Costs:		**$3,831,040**	**$2.23**
Time Costs:		**$2,370,664**	**$1.38**
Threshold Return (Risk):		**$10,726,912**	**$6.25**
TOTAL SITE DEVELOPMENT COSTS:		**$36,083,816**	**$21.02**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$13,352,817	$7.78
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		($22,730,999)	($13.24)
Assumed Acquisition/Strike Price:		$7,723,188	$4.50
Feasibility Gap/Surplus:		($30,454,187)	($17.74)
MARKET TIME TO FEASIBILITY:		**46.3 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS	
Build-Out Period:	13.0 Years
Facility Size:	580,000 Sq. Ft.
Investment in Real Property:	$54,180,000
Use Type:	General Manufacturing

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-6)	*Direct:*	7.5	$960,000	$480,000
	In/Ind:	4.9	$600,000	$240,000
Facility Construction (Year 7-19)	*Direct:*	39.9	$4,200,000	$2,160,000
	In/Ind:	25.4	$3,240,000	$1,080,000

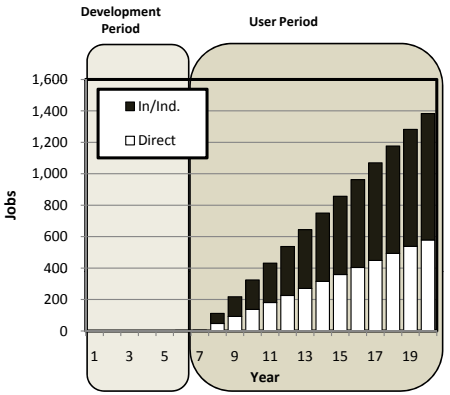
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$77,200,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 20+)	*Direct:*	579	$191,500,000	$26,200,000
	In/Ind:	804	$124,700,000	$42,100,000
	Total:	***1,384***	***$316,200,000***	***$68,300,000***

"When fully developed the project will have an estimated 579 employees on site producing $191 million in annual economic activity. Indirect and Induced impacts would support an additional 804 jobs and $124 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,700,000	$800,000
In/Ind:	$2,800,000	Not Available
Total:	**$4,500,000**	**$800,000**

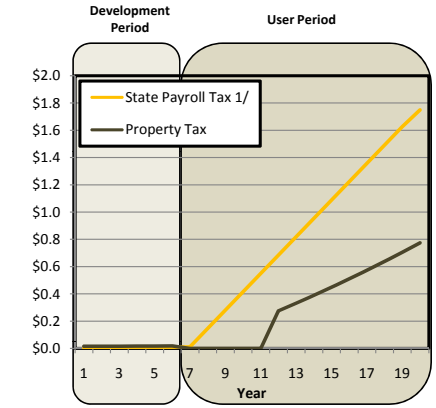
"When fully developed, the project will support $4.5 million in payroll tax and $800,000 in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$12,400,000	$4,700,000
In/Ind:	$19,700,000	Not Available
Total:	**$32,100,000**	**$4,700,000**

"Over a 20-year period the project will create $32.1 million in payroll tax revenue and $4.7 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 15-16 UPS/Cereghino

Gresham, Oregon

General Manufacturing

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		93.08 Acres	
Net Developable Size:		74.45 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*42 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$3,053,500**	**$0.94**
Off-Site	*Water:*	*$17,000*	*$0.01*
	Sewer:	*$40,000*	*$0.01*
	Stormwater:	*$0*	*$0.00*
	Transportation:	*$0*	*$0.00*
On Site	*Wetland Mitigation:*	*$1,387,500*	*$0.43*
	Slope Mitigation:	*$0*	*$0.00*
	Building Pad Surcharge:	*$1,594,000*	*$0.49*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$15,000*	*$0.00*
Soft Costs:		**$610,700**	**$0.19**
Time Costs:		**$383,893**	**$0.12**
Threshold Return (Risk):		**$824,445**	**$0.25**
TOTAL SITE DEVELOPMENT COSTS:		**$4,872,538**	**$1.50**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$21,609,655	$6.66
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$16,737,117	$5.16
Assumed Acquisition/Strike Price:		$14,593,689	$4.50
Feasibility Gap/Surplus:		$2,143,428	$0.66
MARKET TIME TO FEASIBILITY:		**0.0 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY

Data Not Applicaple. The Site does not have a Market Viability Gap

* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	16.0	Years
Facility Size:	1,060,000	Sq. Ft.
Investment in Real Property:	$98,700,000	
Use Type:	General Manufacturing	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-4)	*Direct:*	7.9	$1,080,000	$480,000
	In/Ind:	5.1	$720,000	$240,000
Facility Construction (Year 4-19)	*Direct:*	59.1	$6,120,000	$3,120,000
	In/Ind:	37.6	$4,800,000	$1,560,000

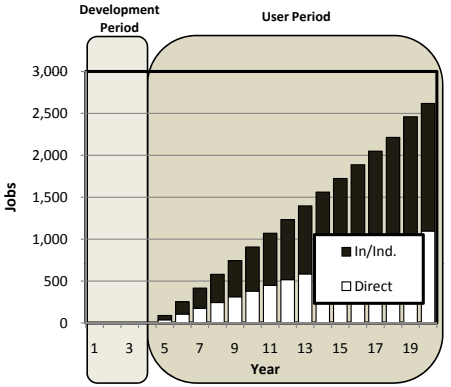
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$102,400,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 20+)	*Direct:*	1,094	$361,800,000	$49,600,000
	In/Ind:	1,520	$235,700,000	$79,500,000
	Total:	***2,615***	***$597,500,000***	***$129,100,000***

"When fully developed the project will have an estimated 1,094 employees on site producing $361 million in annual economic activity. Indirect and Induced impacts would support an additional 1,520 jobs and $235 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$3,300,000	$1,900,000
In/Ind:	$5,300,000	Not Available
Total:	**$8,600,000**	**$1,900,000**

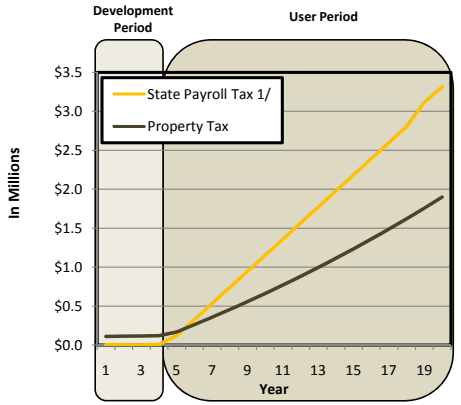
"When fully developed, the project will support $8.6 million in payroll tax and $1.9 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$26,900,000	$16,100,000
In/Ind:	$42,900,000	Not Available
Total:	**$69,800,000**	**$16,100,000**

"Over a 20-year period the project will create $69.8 million in payroll tax revenue and $16.1 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 19 Port TRIP

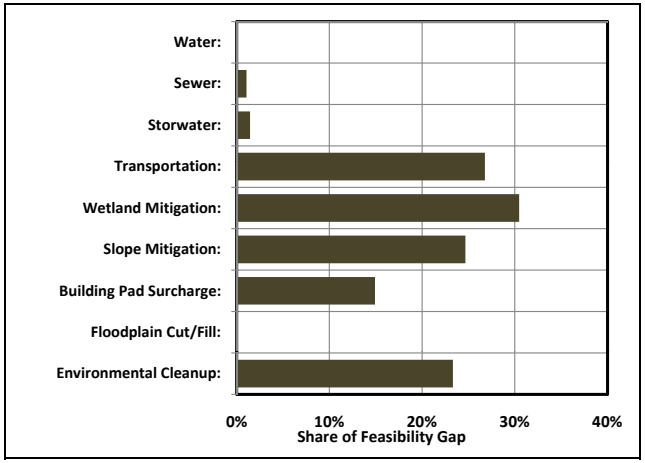
Troutdale, Oregon

Warehouse & Distribution

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		53.9 Acres	
Net Developable Size:		53.9 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*75 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$20,237,250**	**$8.62**
Off-Site	*Water:*	*$14,000*	*$0.01*
	Sewer:	*$187,500*	*$0.08*
	Stormwater:	*$255,000*	*$0.11*
	Transportation:	*$4,825,000*	*$2.06*
On Site	*Wetland Mitigation:*	*$5,494,750*	*$2.34*
	Slope Mitigation:	*$4,750,000*	*$2.02*
	Building Pad Surcharge:	*$1,686,000*	*$0.72*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$3,025,000*	*$1.29*
Soft Costs:		**$4,047,450**	**$1.72**
Time Costs:		**$4,827,922**	**$2.06**
Threshold Return (Risk):		**$11,730,625**	**$5.00**
TOTAL SITE DEVELOPMENT COSTS:		**$40,843,247**	**$17.40**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$14,157,131	$6.03
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		($26,686,116)	($11.37)
Assumed Acquisition/Strike Price:		$10,565,478	$4.50
Feasibility Gap/Surplus:		($37,251,594)	($15.87)
MARKET TIME TO FEASIBILITY:		**50.0 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS	
Build-Out Period:	1.0 Years
Facility Size:	1,020,000 Sq. Ft.
Investment in Real Property:	$30,600,000
Use Type:	W&D

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-6)	*Direct:*	29.4	$3,840,000	$1,800,000
	In/Ind:	19.1	$2,520,000	$840,000
Facility Construction (Year 7)	*Direct:*	293.3	$30,600,000	$15,720,000
	In/Ind:	186.7	$24,000,000	$7,680,000

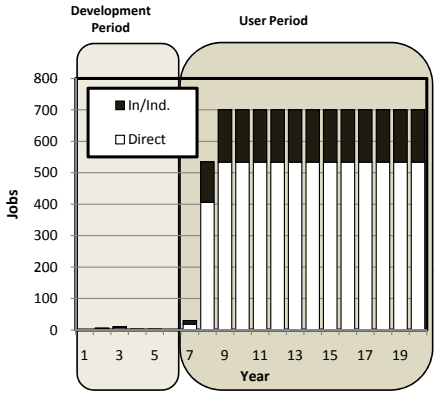
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$54,900,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 8+)	*Direct:*	534	$38,500,000	$24,000,000
	In/Ind:	166	$22,500,000	$6,900,000
	Total:	***700***	***$61,000,000***	***$30,900,000***

"When fully developed the project will have an estimated 534 employees on site producing $38.5 million in annual economic activity. Indirect and Induced impacts would support an additional 166 jobs and $22.5 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,600,000	$600,000
In/Ind:	$500,000	Not Available
Total:	**$2,100,000**	**$600,000**

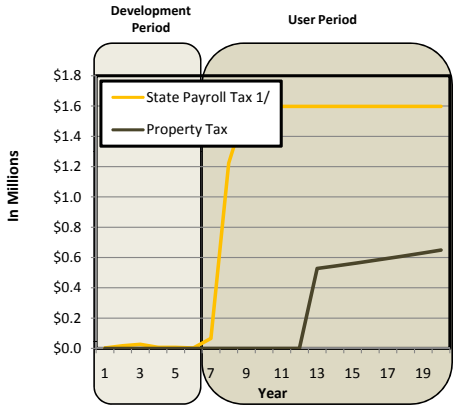
"When fully developed, the project will support $2.1 million in payroll tax and $600,000 in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$20,500,000	$4,700,000
In/Ind:	$5,900,000	Not Available
Total:	**$26,400,000**	**$4,700,000**

"Over a 20-year period the project will create $26.4 million in payroll tax revenue and $4.7 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 24 Jean Johnson

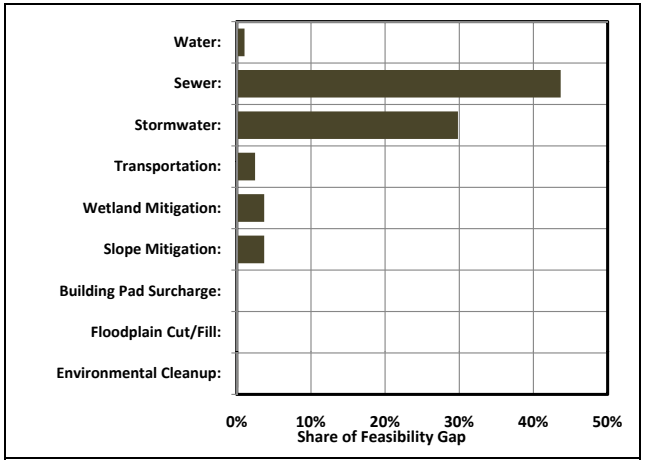
Gresham, Oregon

High-Tech User

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		37.17 Acres	
Net Developable Size:		33.82 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*42 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$8,677,200**	**$5.89**
Off-Site	*Water:*	*$100,200*	*$0.07*
	Sewer:	*$4,268,000*	*$2.90*
	Stormwater:	*$2,914,000*	*$1.98*
	Transportation:	*$250,000*	*$0.17*
On Site	*Wetland Mitigation:*	*$788,000*	*$0.53*
	Slope Mitigation:	*$342,000*	*$0.23*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$15,000*	*$0.01*
Soft Costs:		**$1,735,440**	**$1.18**
Time Costs:		**$673,634**	**$0.46**
Threshold Return (Risk):		**$2,342,844**	**$1.59**
TOTAL SITE DEVELOPMENT COSTS:		**$13,429,118**	**$9.12**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$4,908,251	$3.33
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		($8,520,867)	($5.78)
Assumed Acquisition/Strike Price:		$6,629,396	$4.50
Feasibility Gap/Surplus:		($15,150,263)	($10.28)
MARKET TIME TO FEASIBILITY:		**51.2 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	9.0	Years
Facility Size:	620,000	Sq. Ft.
Investment in Real Property:	$59,856,000	
Use Type:	High Tech	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-4)	*Direct:*	22.5	$3,000,000	$1,440,000
	In/Ind:	14.6	$1,920,000	$600,000
Facility Construction (Year 4-12)	*Direct:*	63.7	$6,600,000	$3,480,000
	In/Ind:	40.6	$5,160,000	$1,680,000

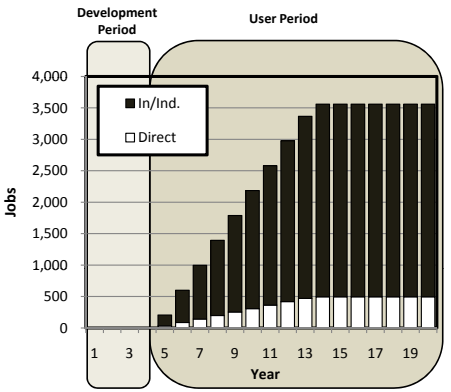
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$70,300,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 13+)	*Direct:*	497	$351,300,000	$67,300,000
	In/Ind:	3,064	$462,000,000	$149,700,000
	Total:	***3,561***	***$813,300,000***	***$217,000,000***

"When fully developed the project will have an estimated 497 employees on site producing $351 million in annual economic activity. Indirect and Induced impacts would support an additional 3,095 jobs and $462 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$4,500,000	$1,100,000
In/Ind:	$10,000,000	Not Available
Total:	**$14,500,000**	**$1,100,000**

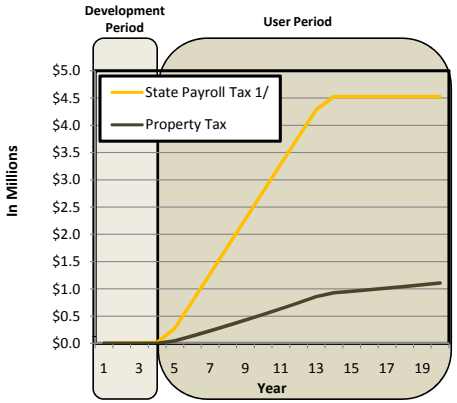
"When fully developed, the project will support $14.5 million in payroll tax and $1.1 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$52,200,000	$11,000,000
In/Ind:	$114,900,000	Not Available
Total:	**$167,100,000**	**$11,000,000**

"Over a 20-year period the project will create $167 million in payroll tax revenue and $11 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 33 Coffee Creek

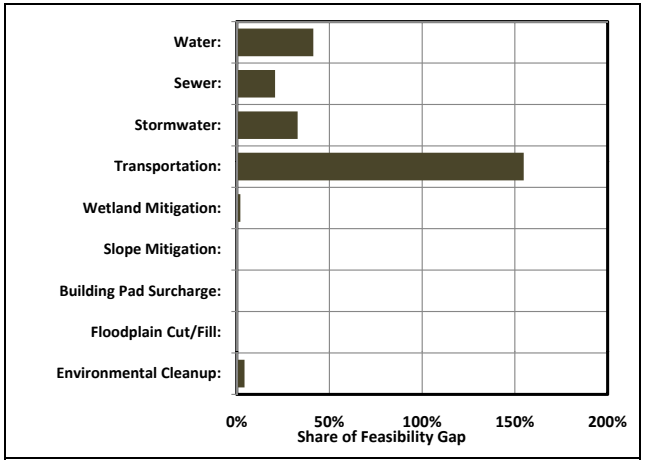
Wilsonville, Oregon

Business Park

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		85.23 Acres	
Net Developable Size:		68.33 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*24 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$6,452,500**	**$2.17**
Off-Site	*Water:*	*$1,040,000*	*$0.35*
	Sewer:	*$520,000*	*$0.17*
	Stormwater:	*$826,500*	*$0.28*
	Transportation:	*$3,920,000*	*$1.32*
On Site	*Wetland Mitigation:*	*$46,000*	*$0.02*
	Slope Mitigation:	*$0*	*$0.00*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$100,000*	*$0.03*
Soft Costs:		**$1,290,500**	**$0.43**
Time Costs:		**$241,432**	**$0.08**
Threshold Return (Risk):		**$1,161,450**	**$0.39**
TOTAL SITE DEVELOPMENT COSTS:		**$9,145,882**	**$3.07**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$18,961,631	$6.37
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$9,815,749	$3.30
Assumed Acquisition/Strike Price:		$13,394,047	$4.50
Feasibility Gap/Surplus:		($3,578,298)	($1.20)
MARKET TIME TO FEASIBILITY:		**7.9 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	12.0	Years
Facility Size:	1,073,800	Sq. Ft.
Investment in Real Property:	$87,592,800	
Use Type:	General Manufacturing	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-2)	*Direct:*	29.3	$3,840,000	$1,800,000
	In/Ind:	19.0	$2,520,000	$840,000
Facility Construction (Year 3-14)	*Direct:*	70.0	$7,320,000	$3,720,000
	In/Ind:	44.5	$5,760,000	$1,800,000

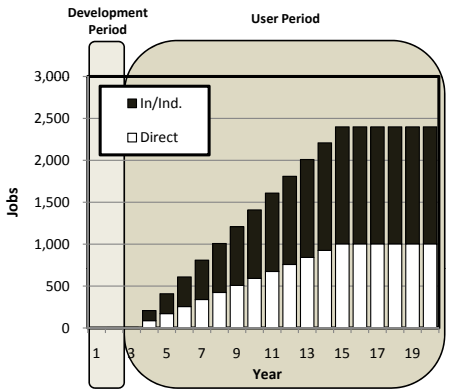
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$95,300,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 15+)	*Direct:*	1,004	$332,100,000	$45,500,000
	In/Ind:	1,395	$216,300,000	$73,000,000
	Total:	***2,400***	***$548,400,000***	***$118,500,000***

"When fully developed the project will have an estimated 1,004 employees on site producing $332 million in annual economic activity. Indirect and Induced impacts would support an additional 1,395 jobs and $216 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$3,000,000	$1,900,000
In/Ind:	$4,900,000	Not Available
Total:	**$7,900,000**	**$1,900,000**

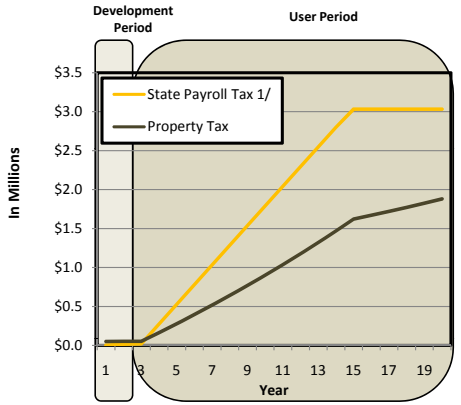
"When fully developed, the project will support $7.9 million in payroll tax and $2.3 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$35,100,000	$19,300,000
In/Ind:	$56,200,000	Not Available
Total:	**$91,300,000**	**$19,300,000**

"Over a 20-year period the project will create $91.4 million in payroll tax revenue and $23.3 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 37(a) Orr Family A

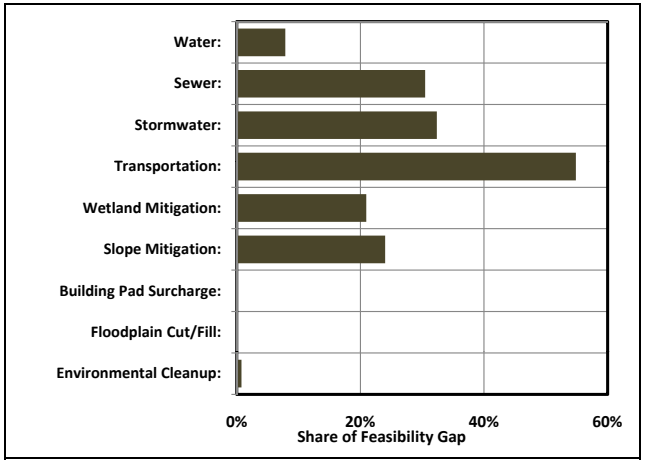
Sherwood, Oregon

General Manufacturing

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		46.36 Acres	
Net Developable Size:		42.84 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*36 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$4,501,750**	**$2.41**
Off-Site	*Water:*	*$207,000*	*$0.11*
	Sewer:	*$805,000*	*$0.43*
	Stormwater:	*$855,000*	*$0.46*
	Transportation:	*$1,480,000*	*$0.79*
On Site	*Wetland Mitigation:*	*$525,000*	*$0.28*
	Slope Mitigation:	*$611,000*	*$0.33*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$18,750*	*$0.01*
Soft Costs:		**$900,350**	**$0.48**
Time Costs:		**$322,648**	**$0.17**
Threshold Return (Risk):		**$1,080,420**	**$0.58**
TOTAL SITE DEVELOPMENT COSTS:		**$6,805,168**	**$3.65**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$11,228,914	$6.02
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$4,423,746	$2.37
Assumed Acquisition/Strike Price:		$8,397,497	$4.50
Feasibility Gap/Surplus:		($3,973,751)	($2.13)
MARKET TIME TO FEASIBILITY:		**13.3 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	15.0	Years
Facility Size:	789,500	Sq. Ft.
Investment in Real Property:	$73,518,000	
Use Type:	General Manufacturing	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-3)	*Direct:*	13.6	$1,800,000	$840,000
	In/Ind:	8.8	$1,200,000	$360,000
Facility Construction (Year 4-18)	*Direct:*	47.0	$4,920,000	$2,520,000
	In/Ind:	29.9	$3,840,000	$1,200,000

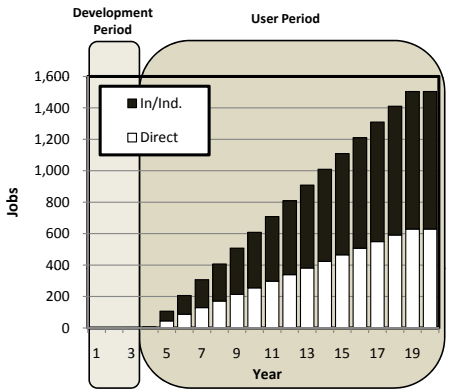
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$78,900,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 19+)	*Direct:*	630	$208,200,000	$28,500,000
	In/Ind:	875	$135,600,000	$45,700,000
	Total:	***1,504***	***$343,800,000***	***$74,200,000***

"When fully developed the project will have an estimated 630 employees on site producing $208 million in annual economic activity. Indirect and Induced impacts would support an additional 875 jobs and $135 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,900,000	$1,400,000
In/Ind:	$3,100,000	Not Available
Total:	**$5,000,000**	**$1,400,000**

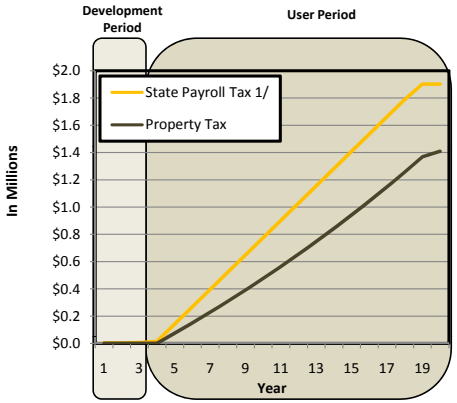
"When fully developed, the project will support $5 million in payroll tax and $1.4 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$17,300,000	$11,600,000
In/Ind:	$27,600,000	Not Available
Total:	**$44,900,000**	**$11,600,000**

"Over a 20-year period the project will create $44.9 million in payroll tax revenue and $11.6 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 37(B) Orr Family B

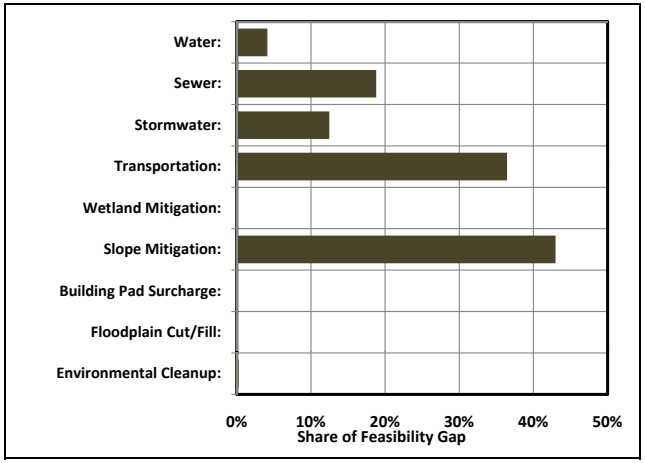
Sherwood, Oregon

Business Park

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		49.9 Acres	
Net Developable Size:		29.59 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*25 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$9,203,250**	**$7.14**
Off-Site	*Water:*	*$333,000*	*$0.26*
	Sewer:	*$1,488,000*	*$1.15*
	Stormwater:	*$1,006,000*	*$0.78*
	Transportation:	*$2,940,000*	*$2.28*
On Site	*Wetland Mitigation:*	*$12,000*	*$0.01*
	Slope Mitigation:	*$3,405,500*	*$2.64*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$18,750*	*$0.01*
Soft Costs:		**$1,840,650**	**$1.43**
Time Costs:		**$481,325**	**$0.37**
Threshold Return (Risk):		**$1,699,697**	**$1.32**
TOTAL SITE DEVELOPMENT COSTS:		**$13,224,922**	**$10.26**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$7,545,796	$5.85
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		($5,679,126)	($4.41)
Assumed Acquisition/Strike Price:		$5,800,232	$4.50
Feasibility Gap/Surplus:		($11,479,358)	($8.91)
MARKET TIME TO FEASIBILITY:		**33.4 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	7.0	Years
Facility Size:	398,000	Sq. Ft.
Investment in Real Property:	$26,268,000	
Use Type:	Business Park/General Man	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-2)	*Direct:*	40.1	$5,280,000	$2,520,000
	In/Ind:	26.0	$3,360,000	$1,200,000
Facility Construction (Year 3-9)	*Direct:*	36.0	$3,720,000	$1,920,000
	In/Ind:	22.9	$3,000,000	$960,000

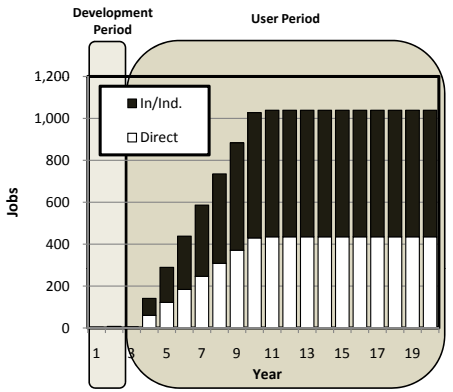
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$37,300,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 10+)	*Direct:*	435	$143,800,000	$19,700,000
	In/Ind:	604	$93,700,000	$31,600,000
	Total:	***1,039***	***$237,500,000***	***$51,300,000***

"When fully developed the project will have an estimated 435 employees on site producing $143 million in annual economic activity. Indirect and Induced impacts would support an additional 604 jobs and $93.7 million in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$1,300,000	$600,000
In/Ind:	$2,100,000	Not Available
Total:	**$3,400,000**	**$600,000**

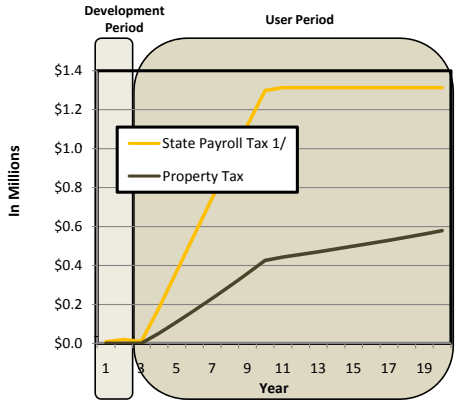
"When fully developed, the project will support $3.4 million in payroll tax and $600,000 in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$18,400,000	$6,700,000
In/Ind:	$29,400,000	Not Available
Total:	**$47,800,000**	**$6,700,000**

"Over a 20-year period the project will create $47.8 million in payroll tax revenue and $6.7 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only

Site 104 Hillsboro U.R.

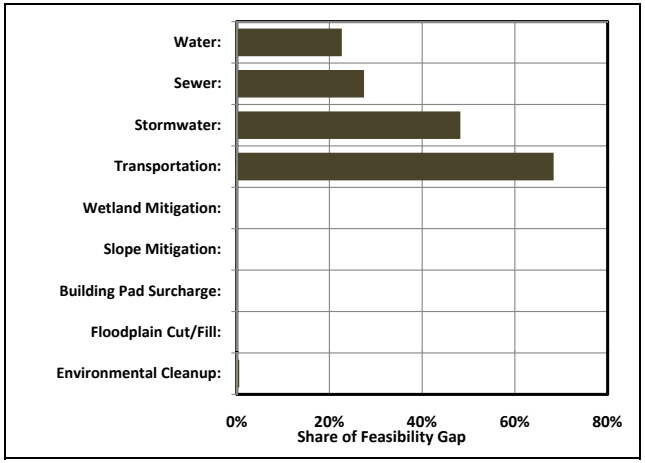
Hillsboro, Oregon

Clean-Tech

Market Feasibility Analysis

PHYSICAL CHARACTERISTICS			
Site Size:		320 Acres	
Net Developable Size:		309.4 Acres	
SITE DEVELOPMENT PARAMETERS			
Site Development Timeline:		*48 Months*	
		$	**$/sq. ft.**
Hard Costs:		**$30,097,000**	**$2.23**
Off-Site	*Water:*	*$4,077,000*	*$0.30*
	Sewer:	*$4,940,000*	*$0.37*
	Stormwater:	*$8,687,500*	*$0.64*
	Transportation:	*$12,310,000*	*$0.91*
On Site	*Wetland Mitigation:*	*$0*	*$0.00*
	Slope Mitigation:	*$0*	*$0.00*
	Building Pad Surcharge:	*$0*	*$0.00*
	Floodplain Cut/Fill Mitigation:	*$0*	*$0.00*
	Environmental Cleanup:	*$82,500*	*$0.01*
Soft Costs:		**$6,019,400**	**$0.45**
Time Costs:		**$2,420,681**	**$0.18**
Threshold Return (Risk):		**$9,029,100**	**$0.67**
TOTAL SITE DEVELOPMENT COSTS:		**$47,566,181**	**$3.53**
INCOME/SALE ANALYSIS			
Estimated Value at Development Ready:		$79,765,995	$5.92
MARKET FEASIBILITY ANALYSIS			
Residual Land Basis:		$32,199,814	$2.39
Assumed Acquisition/Strike Price:		$60,648,588	$4.50
Feasibility Gap/Surplus:		($28,448,774)	($2.11)
MARKET TIME TO FEASIBILITY:		**14.4 Years**	

MARGINAL IMPACTS of SITE CONSTRAINTS ON SITE FEASIBILITY



* Impacts will not sum to equal 100% as they are not mutually exclusive.

Economic and Fiscal Impact Analysis

FACILITY CHARACTERISTICS		
Build-Out Period:	15.0	Years
Facility Size:	3,083,000	Sq. Ft.
Investment in Real Property:	$334,890,000	
Use Type:	Clean Tech	

ECONOMIC IMPACT ANALYSIS FINDINGS

Average Annual Construction Impacts

		Jobs	Economic Activity	Payroll
Site Development (Year 1-4)	*Direct:*	68.2	$9,000,000	$4,200,000
	In/Ind:	44.3	$5,760,000	$1,920,000
Facility Construction (Year 5-19)	*Direct:*	214.0	$22,320,000	$11,520,000
	In/Ind:	136.2	$17,520,000	$5,640,000

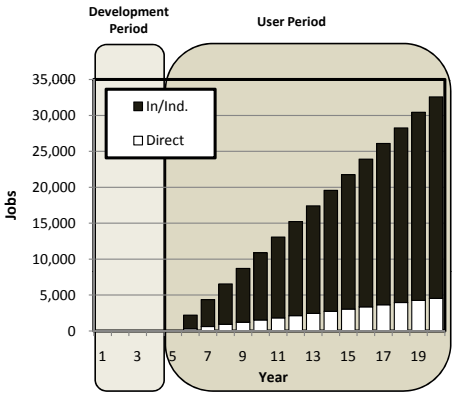
TOTAL INVESTMENT IN LAND AND IMPROVEMENTS: **$371,000,000**

Total Annual Operations Impacts @ Full-Capacity

		Jobs	Economic Activity	Payroll
On-going Operations (Year 20+)	*Direct:*	4,548	$3,214,200,000	$615,900,000
	In/Ind:	28,030	$4,226,300,000	$1,369,300,000
	Total:	***32,579***	***$7,440,500,000***	***$1,985,200,000***

"When fully developed the project will have an estimated 4,548 employees on site producing $3.2 billion in annual economic activity. Indirect and Induced impacts would support an additional 28,030 jobs and $1.9 billion in economic activity."

ANNUAL EMPLOYMENT LEVEL (ALL IMPACTS)



FISCAL IMPACT ANALYSIS FINDINGS

Annual Fiscal Impacts at Full-Capacity

	Payroll	Property
Direct:	$41,400,000	$9,200,000
In/Ind:	$91,300,000	Not Available
Total:	**$132,700,000**	**$9,200,000**

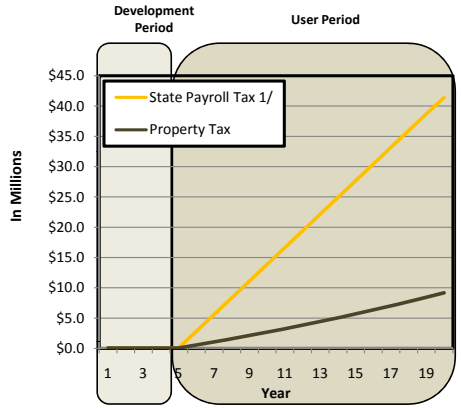
"When fully developed, the project will support $132 million in payroll tax and $9.2 million in property taxes annually."

Cumulative 20-Year Tax Creation

	Payroll	Property
Direct:	$332,200,000	$69,300,000
In/Ind:	$731,300,000	Not Available
Total:	**$1,063,500,000**	**$69,300,000**

"Over a 20-year period the project will create $1 billion in payroll tax revenue and $69 million in property tax revenue."

ANNUAL TAX REVENUE (DIRECT IMPACTS ONLY)



1/ Direct Impacts Only