

West Hayden Island Planning Process

Local Impacts of Industrial Development

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Prepared for:
West Hayden Island
Community Working Group

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I. Introduction: Local Impacts of Industrial Development

The West Hayden Island Community Working Group (CWG) and Neighborhood groups living on and around Hayden Island stressed the importance of researching the local impacts of industrial development on the neighborhood's quality of life. The following research looks specifically at air quality, noise, light, and traffic related impacts, all of which are often associated with industrial development and considers measures that can be taken to lessen those impacts. In order to determine these focus areas, City staff conducted interviews and met with residents living in the following neighborhoods and associations: HiNoon, Hayden Island Manufactured Home Park, Bridgeton, St. Johns, Cathedral Park, East Columbia, Linnton, and the Pearl¹. Map 1 shows the general study area for this research, including the distances from residential neighborhoods to potential development on West Hayden Island.

This report also discusses recreational opportunities for the island since any future terminal development has the potential to integrate public access, recreational activities and preservation of wildlife corridors and natural areas. It is important to note that in the past couple of years other planning processes including the most recent East Hayden Island plan (2009) resulted in some useful information about what residents value about living on the island. Some common values included:

- the river lifestyle,
- a close-knit community,
- access to the water for viewing, swimming and boating
- improved connectivity on the island for walking and biking, additional parks and trails
- Access to nature and wildlife
- protection of open space for wildlife , and
- improving riparian health of the Columbia River and North Portland Harbor

These resident values should be considered as part of any future discussion on natural resource protection and/or recreational activities for the island.

While this research does not look at the economic benefits associated with marine industrial development, it is important to note that there are positive impacts of potential marine terminal development. According to Martin Associates 2007 report, *Economic Impacts of the Port of Portland*, activity due to the movement of marine cargo, air passengers and cargo and real estate activity at the Port's industrial and business parks contributes to the local and regional economy by providing employment and income to individuals, taxes to state, county and local governments and revenue to local and national firms engaged in producing goods and services². The project consultant, ENTRIX has completed an Economic Study for the project which explores the economic benefits and importance of maintaining and expanding the Port in Portland. In addition, ENTRIX is in the process of completing an Environmental Study which identifies the functional values of the natural resources on West Hayden island as well as researching the benefits and impacts of potential recreation development on West Hayden Island.

¹ City staff will continue to schedule meetings with other surrounding neighborhood groups to discuss concerns and their ideas for potential improvements to the island.

² Martin Associates, Economic Impacts of the Port of Portland, Jan 2007

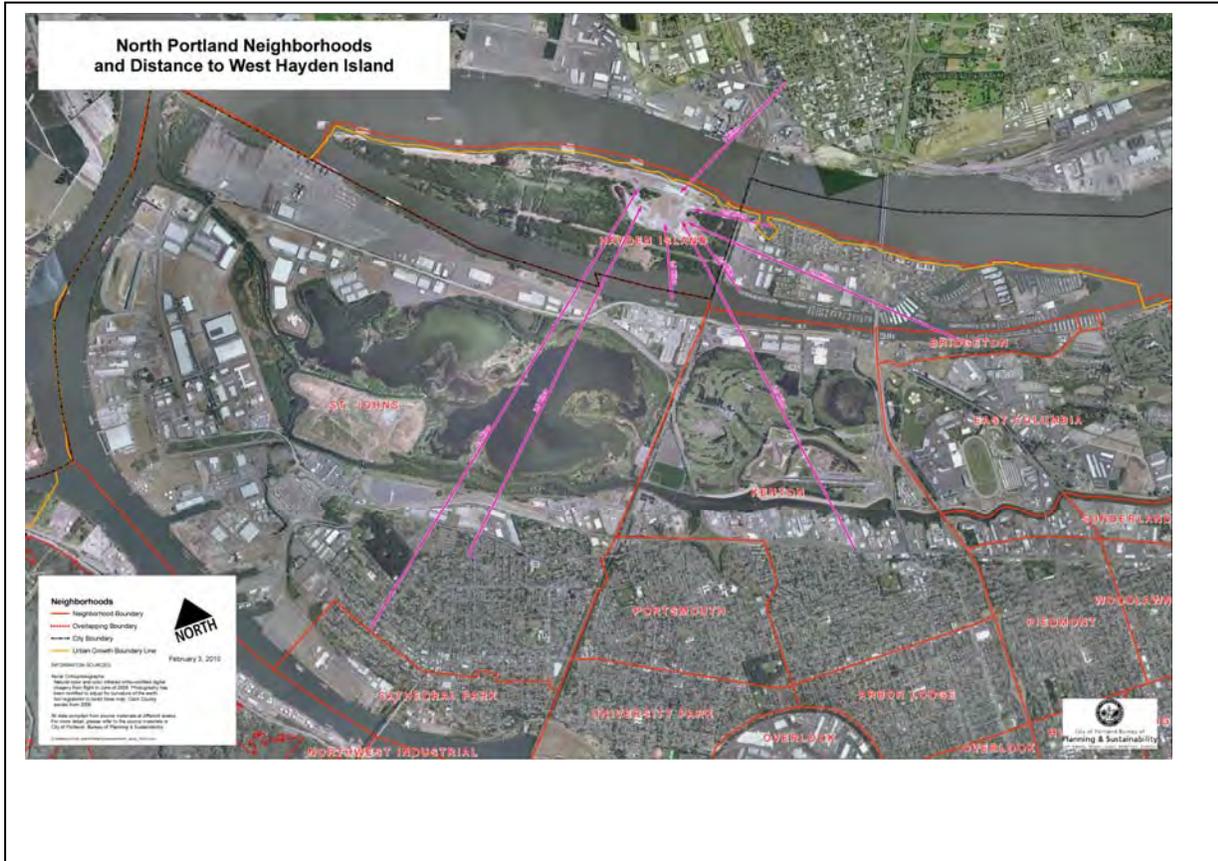
This report is broken down into the following sections:

- I) Research of local impacts of industrial development including: A. air quality, B. noise, C. light, and D.traffic. With each local impact discussion there are examples of how the issue is being addressed locally, at Ports nationally and internationally, and some potential approaches to consider moving forward.
- II) Recreational opportunities are explored with a brief review of the proposal from the 1999 process, an overview of residences desires based on the 2009 Hayden Island Plan, a look at other Ports integrate recreational activities into their marine terminals and some potential approaches for moving forward.
- III) Local regulatory approaches to mitigate local impacts
- IV) Appendices:
 - a) Case studies of ports and how they are addressing local impacts
 - b) Interviews: 1) Neighborhood groups that live adjacent to existing terminals and 2) Representatives at marine terminal facilities
 - c) Transportation Impacts memo by David Evans & Associates
 - d) Regulatory information from existing plan districts in the City of Portland
 - e) Bibliography of Resources

The intended purpose of this piece is to 1) share a range of local impacts of industrial development and 2) explore approaches and measures that the CWG can consider to reduce the local impacts of potential industrial development. In the event that this planning process proceeds to the next phase with concept planning and Plan District development, these approaches or measures could be used in the following ways:

- Define language for future development agreements,
- Provide guidance for plan district language; detailing certain restrictions and/or provisions that require additional studies prior to development,
- Identify areas where buffering between uses may be beneficial, and
- Provide ideas for non-regulatory approaches to maintain communication between local neighborhood groups, the Port of Portland and any future tenants.

Map 1: Study Area



IA. Air Quality

There are various sources that emit pollutants into the air. This section looks at two common emissions that occur at marine terminals; dust emissions that can come from grain terminals or other dry bulk terminals such as soda/potash terminals and diesel emissions from port operations. This summary provides more detail on dust emissions from grain terminals as that concern was specifically expressed by members of the HiNoon neighborhood group and the WHI Community Working Group.

Dust Emissions

The main pollutant of concern in grain or dry bulk storage and handling is fine particulate matter. Particle size is important because finer particles, less than 2.5 micrometers in diameter can spread quite a distance and according to DEQ cause the most concern for human health³. EPA and DEQ label this particulate matter as “criteria pollutants” and, if inhaled, may lead to health effects that generally aggravate cardiovascular and respiratory disease.

A grain or dry bulk terminal must maintain an air quality permit from DEQ for their facility emissions if they have a throughput of 10 tons or more per year⁴. A Standard Air Contaminant Discharge Permit through DEQ is good for five years⁵. Grain terminals may be required to do extensive monitoring and upgrade dust collection equipment, resulting in modifications to their DEQ permits, if emission requirements are not being met. Grain dust can occur at facilities during the loading, unloading, transfer and cleaning of the grain⁶. There are three general types of measures that are available to reduce emissions from grain handling and processing operations. These include modifications to facility design to prevent or inhibit emissions, capture/collection systems, and oil suppression systems that inhibit release of dust from the grain streams⁷.

During the 1999 West Hayden Island planning process, a grain terminal was part of the potential development plan. At that time the proposal was to store the grain in fully enclosed silos using baghouses at emission points⁸. An 80% dust control efficiency was assumed of all the fugitive dust emissions from grain loading and unloading, and a 99%

³ In 1996, EPA made revisions to the primary and secondary NAAQS for PM (particulate matter) to provide increased protection of public health and welfare. With regard to primary standards for fine particles (generally referring to particles less than or equal to 2.5 micrometers ([micro]m) in diameter, PM_{2.5}).

⁴ Grain and other dry bulk are very similar in the type of permits they have. The only difference would be the emission factors that are used to calculate emissions from the different products that are handled for their operations- personal communications with Tina Leppaluoto, DEQ, 3/31/10.

⁵ Department of Environmental Quality ACDP permit guidelines and requirements;
<http://www.deq.state.or.us/aq/permit/acdp/admin.htm>

⁶ Interview with Tina Leppaluoto, DEQ and fact sheet at

http://www.deq.state.or.us/news/publicnotices/uploaded/081104_5322_26-2807-PNE-11052008-AQ.pdf

⁷ US Army Corps of Engineers, Draft Environmental Impact Statement, Port of Portland Marine Cargo Facilities at West Hayden Island, page 3-22, November 2000.

⁸ Baghouses are dust collection systems with large filter tubes. The larger system also includes ventilation hoods connected to a central duct system that capture dust. They can be designed to be placed anywhere that dust is emitted. Per interview with Jim Johnson, NW District Manager, Donaldson Torit, Industrial Air Filtration, 3/17/10.

control was assumed for conveyors⁹. There continue to be advancements in the technology for capturing dust particulate.

Best Practices for Reducing Dust Emissions

Portland Harbor grain terminals have updated many of their dust collection systems to reduce emissions by updating baghouses with better filtration systems. The new grain elevator in Longview plans to use some of the newest technological advances, including a system called Powercore which is much smaller than the traditional baghouse and captures much finer dust particles resulting in very low to zero emissions. The Port of Kalama is expanding their facility and updating their traditional baghouse system, but with a new lower emissions filter system¹⁰.

Installing the most up to date baghouse systems can help lower emissions and save energy as many filter systems are becoming more efficient. Bag houses can be placed at any emissions point on the facility; however, controlling dust plumes during the ship loading process can be a challenge. Grain and dry bulk terminals around the US have experimented with different technologies to reduce the dust emissions during the loading process including:

- A bullet or adjustable gate at the end of the spouts that slows the grain and discharges it more slowly into a ship hold¹¹.
- Spraying grain with a food based oil product, or in the case of other dry bulk products there are similar de-dusting products that can be sprayed on the product.
- Using a large bag over the ship hold during loading
- Engineered industrial ventilation hoods and loading spouts that can be designed to limit this dust source.



The grain and dry bulk facilities are often required to hire a consultant to identify measures to mitigate for and correct dust emissions in excess of their permit¹². Appendix A provides additional measures that US Ports are applying to reduce dust emissions at two Ports.

Local Improvements to Reduce Dust Emissions

Kinder Morgan has received complaints of dust from their soda ash facility at Terminal 4. The permitting of and ongoing monitoring of facilities such as this one are extensive. DEQ does permit facility operations and depending on product and dust collection efficiencies there may be situations where low levels of fugitive dust may travel beyond industry property lines. In response to dust concerns by Kinder Morgan's' industrial

⁹ US Army Corps of Engineers, Draft Environmental Impact Statement, Port of Portland Marine Cargo Facilities at West Hayden Island, page 3-22, November 2000.

¹⁰ Per interview with Jim Johnson, NW District Manager, Donaldson Torit , Industrial Air Filtration , 3/17/10.

¹¹ Photo is from TEMCO Tacoma, provided by Bill Baxter Engineering Company

¹² Phone Conversation with Tina Leppaluoto, DEQ Permit Writer, 3/17/10

neighbor to the south Kinder Morgan proceeded in the following ways to address the issues:

- Area air sampling monitors were set up at the perimeter of the facility to monitor dust leaving the site.
- Bag house and /or dust collection efficiencies were improved
- Adjacent neighbor was invited to tour their facility and become familiar with the product and the operations¹³

Columbia Grain maintains a permit with DEQ and provides extensive, ongoing monitoring of their facility at Terminal 5, including the hiring of a consultant who provides ongoing opacity readings at the facility. Columbia Grain is allowed 20% emissions (not to be exceeded for three minutes per hour). Dust system upgrades the facility has implemented include:

- Upgrading 6 baghouses (of the 18 total at the facility), with more efficient filters, both for improved collection of dust emissions and also for their lower energy usage. With this upgrade, Columbia Grain has met Energytrust criteria and increased efficiency of their dust collection systems. The facility uses a local company to supply the new baghouse filters which can be laundered and reused.
- Applying a light application of food grade oil on the grain to reduce dust¹⁴.

Diesel Particulate Emissions

Marine terminals, depending on the operation, can be a source for a significant amount of diesel particulates. This can be generated from berthed ships, truck loading and circulation, railroads and other diesel equipment located at the terminal. Diesel particulate matter is one of the top 10 toxins in Oregon which are associated with an increased risk of many health issues, including, heart and lung disease and respiratory ailments such as asthma. There are strict state and federal regulations that govern allowable levels of diesel emissions. A number of Ports across the US are implementing programs to reduce these emissions at their terminal facilities. The case studies in Appendix A highlight some of these efforts.

Case Studies from US Ports to Improve Diesel Emissions

Many ports around the world are implementing measures to address diesel emissions. Some ports, such as Tacoma, Seattle and Metro/Vancouver have collaborated with adjoining communities in communal goal setting for the health of their common airshed. Some ports have instituted air quality monitoring equipment to measure progress toward their diesel emissions goals.

The vast majority of emissions-reducing measures are either:



Figure 1: On-Dock Rail. Source: Northwest Ports Clean Air Strategy

¹³ McMullin, Brent, Kinder Morgan, Personal communication with Rachael Hoy, BPS, 3/02/10. See Appendix B for neighborhood and industry summary discussions.

¹⁴ Cartmill, Randy, Columbia Grain, personal communication with Rachael Hoy, BPS, 2/23/10

- management practices specific to a type of activity (e.g. radio frequency identification system to reduce waiting times for trucks, or requiring berthed ships to plug into electric grid instead of using diesel engine),
- programmatic (e.g. creating an incentive program for off-site trucks that encourages “fleet modernization”),
- general measures (e.g. providing lower emission diesel fuel or biofuel), and/or
- value-added approaches (e.g. on-dock rail loading to reduce cargo transfers, truck miles traveled – and associated emissions – to increase efficiency to the customer).

Appendix A contains some brief overviews of US and European ports and their approaches to improving air quality from diesel emissions.

Potential Approaches to Consider Moving Forward:

- Installation of better bag houses and other new technological advances in dust control systems
- Placement of spouts further in ship holds during loading of material or installation of apparatus to slow material during exit from the spout (eg. adjustable gates or bullets)
- Conveyors enclosed and baghouses put at different emission points to pass through
- Enclosures of all material transfer sites
- Area monitoring on a regular basis
- Food oil based spray on grain and other de-dusting sprays for non agricultural products to reduce dust
- Improved efficiency of on site diesel engines
- Provision of electrical hookup for berthed ships to allow them to shut down engines
- Consideration of ‘direct to rail’ loading approaches

IB. Noise Pollution

Marine Terminals can be a source of noise pollution, both from on-site loading operations, and from the associated rail and truck traffic generated by the cargo distribution. This summary will focus on noise generated from railways and arterial cargo or truck freight movement since these are two noise sources that are often associated with industrial development. In addition, neighborhoods in close proximity to West Hayden Island have raised these as issues of concern through the current planning process.

North Portland Noise Study and WHO Noise Guidelines

The North Portland Noise Study, drafted in 2008, documented the main sources of sound and quantified specific levels of noise in North Portland Neighborhoods. The main sources identified include:

- Portland International Raceway (PIR)
- Railways
- Arterial cargo truck noise in residential neighborhoods
- I-5 traffic
- Airplane activity at Portland International Airport¹⁵

The study used a computer noise model to isolate individual noise sources because they found that the interaction of noises often made it difficult to study just one source at a time. The study also points out that wind and other atmospheric conditions can influence noise levels. Portland could be the first major US city to use noise maps to help direct future development decisions following in the footsteps of many European countries that have used this process in long range planning for years¹⁶.

The World Health Organizations (WHO) developed guidelines in 1999 for community noise and updated these guidelines in 2009 specifically focusing on the human health impacts of noise at night¹⁷. Excess noise can be a nuisance and impair a person's ability to understand what someone is saying, but on a more extreme level the World Health Organization has identified noise as a serious health hazard that can lead to medical conditions such as high blood pressure and heart disease. They note that noise can also negatively affect a person's sleep, attentiveness, problem solving and memory¹⁸.

WHO guidelines for community sound levels in 1999 indicated that interior nighttime sound levels over 45dBA can cause sleep disturbance with more than 10-15 events during the nighttime period¹⁹. The updated report completed by WHO in 2009 has

¹⁵ City of Portland, North Portland Noise Study (Draft), June 2008, page 27, prepared by The Greenbusch Group, Inc. and Paul Van Orden, City of Portland.

¹⁶ The North Portland Noise Study is in draft form and is in the process of being finalized pending additional funding, Paul Van Orden, personal communication, 3/26/10.

¹⁷ World Health Organization, Night Noise Guidelines for Europe, WHO Regional Office for Europe, <http://www.euro.who.int/Document/E92845.pdf>

¹⁸ World Health Organization, Website, <http://www.who.int/mediacentre/factsheets/fs258/en/>, accessed February 25, 2010.

¹⁹ Decibel levels or "dB" are a measure of sound loudness presented in a logarithmic scale. More information on decibel levels, sound pressure levels and relative loudness of different activities can be found in the City of Portland, North Portland Noise Study (Draft), June 2008 page 15.

lowered the threshold to 40dBA as the target for nighttime outdoor noise. Typical residential construction provides approximately 25dB of noise reduction for exterior noise sources.

Results of North Portland Noise Study

The City of Portland defines permissible sound levels by land use zones in code section 18.10.010. The maximum daytime noise levels between industrial and residential zones are 65 dBA. Maximum levels are reduced 5 dbA to 60 dBA during nighttime hours between 10 pm and 7 am. The following present some of the findings of the North Portland Noise study for rail and vehicle traffic.

Railway Horn Noise

Train horn noise at public grade crossings in many residential areas has been a source of frequent complaints. Noise data collected for train horn noise in Kenton exceeded 103 dBA. The study indicated that this would most likely result in levels as high as 70 dBA inside a residence with closed windows. Similar results related to train horn noise in Cathedral Park revealed sound levels within mid 60's dBA in residence with windows closed. Both of these levels exceeded the 2009 WHO level of 40 dBA at which sleep disturbance can occur and the City of Portland permissible sound levels.

Starting in 2010 the Federal Railroad Administration (FRA) is implementing new regulations that establish minimum (96 dBA) and maximum (110 dBA) train horn levels. In addition, the FRA has established a new method for sounding train horns at public grade crossings to lessen the impact on surrounding communities. The City's Noise Control Office will be monitoring sound levels of train horns with the implementation of the new regulations to see if there are any noticeable changes in and around some of the affected communities²⁰.

Vehicle Traffic Noise

Vehicle traffic is also a major contributor to noise in North Portland neighborhoods. Normal traffic flow often includes a mix of freight vehicles, buses, and motorcycles which can raise the level of disturbance. The North Portland Noise Study specifically looked at the freight corridors of North Columbia Boulevard, North Lombard, and North Going Streets. Monitoring of sound levels for traffic noise along these streets in the surrounding communities found that many of the readings exceeded City regulations, especially in Cathedral Park and St. John's. There are federal EPA and state of Oregon Department of Environmental Quality (DEQ) guidelines for permissible levels for motor vehicles operating on public roadways. The City follows the EPA guidelines for freight transport vehicles of 10,000lbs Gross Combination Weight Rating (GCWR), and all other vehicles must comply with State DEQ levels²¹.

The study found that St. John's and Cathedral Park Neighborhoods are impacted by regional and local truck traffic that use designated truck routes through the town center to get to the St John's Bridge; in addition, other streets that run through residential

²⁰ City of Portland, North Portland Noise Study (Draft), June 2008, page 25, prepared by The Greenbusch Group, Inc. and Paul Van Orden, City of Portland.

²¹ Ibid, page 27. EPA and DEQ maximum sound levels are provided by vehicle model year and minimum distance from road centerline.

neighborhoods are also used. In 2000, the Portland Office of Transportation completed the St. John's Truck Strategy which provides recommendations for improvements to reduce freight movement conflicts in residential neighborhoods. (Note, the Bureau of Transportation will be conducting a transportation modeling analysis looking at the scenario of a new bridge on West Hayden Island to serve any potential future terminal development. Part of this analysis will also look at the potential impact on adjacent neighborhoods and the St John's Bridge.)

Local Case Studies Addressing Noise Impacts

Cathedral Park Neighborhood Association and Toyota at Terminal 4 have been working together to try to resolve another noise issue that has been identified by the neighborhood. During the loading and unloading of vehicles on to train cars, a sharp banging noise results from the collision of steel bridge plats. The Toyota facility has worked with the Port, neighborhood groups and the City's Noise Control Office to search for ways to reduce this noise. Toyota has researched different options for padding the bridge plats that resulted in the testing of two different products.

- A plastic material that acts as a buffer between the plats, and
- A rubber coating at the ends of the bridge plats

Unfortunately both of these test products quickly wore off of the steel bridge plats. Toyota continues to research possible solutions to reduce this noise. According to Toyota, this issue seems to be seasonal. When there is leaf cover on the trees the percentage of neighborhood complaints goes down²². The City's Noise Control Office has indicated that a vegetated tree buffer of at least 100 feet should be maintained to lessen the impact of noise²³.

Kinder Morgan's Potash facility at Terminal 5 set up perimeter monitors throughout their facility and on Sauvie Island at property lines to determine the impact of their operations. The most impactful noise events were from air traffic, the grain elevator and train car movements to and from the grain elevators. The train car noise was primarily from the train cars bumping into one another during the loading and unloading process. Kinder Morgan indicated that they have worked to address the train car noises in the following ways:

- Initiated training programs with the Longshoreman's association to show them how to brake more appropriately to prevent train cars from colliding during loading and unloading.
- Developed a new strategy for using stored rail cars on the outer loop to act as a barrier or buffer from the noise while rail cars on the interior train loop are being unloaded and moved through the dumping process²⁴.

²² Corbin, Ron, Toyota, personal communication with Rachael Hoy, March 11, 2010. See Appendix B for neighborhood and industry summary discussions.

²³ Van Orden, Paul, Bureau of Development Services, personal communication with Rachael Hoy, March 19, 2010

²⁴ McMullin, Brent, Kinder Morgan, personal communication with Rachael Hoy, March 2, 2010

Port Case Studies

The majority of ports that have addressed noise levels are those with very proximate urban interface. Several European ports have formed a collaboration to reduce noise, its associated annoyance, and health problems of people living around port industrial areas, through a GIS noise mapping and ongoing management system.

The Natural Resource Defence Council (NRDC) has conducted much research on sustainable port practices. Regarding port site planning and expansions, NRDC recommends: “..at the very least new terminals should be located away from residential areas to protect communities from the pollution, noise, and other stressful effects of ports’ heavy industrial activities.”²⁵



Port of Tacoma

The Port of Tacoma has addressed noise in its Environmental Impact Statement.²⁶ This analysis provides a quantitative estimate of traffic-related noise impacts (including vehicle and rail traffic) and a qualitative discussion of environmental (construction and operational) noise. To help mitigate for noise impacts, the Port of Tacoma has purchased 31 acres of a buffer area between the Port and neighbouring residential areas with a plan to expand acreage.

Port of Long Beach

The Port of Long Beach has addressed noise as part of its NEPA permitting. It relates mostly to traffic and construction noise, not ongoing port activities. To reduce noise, monitoring during construction and temporary mitigation measures such as barriers are implemented during construction. Additional information on how Ports around the world are addressing noise can be found in Appendix A.

North Portland Noise Study Recommendations

The North Portland Noise Study recommends the mitigation measures for noise noted below. This summary focuses specifically on train horn and freight corridor noise. In addition, these recommendations are followed by a list of potential approaches that could be considered as part of a future development agreement or Plan District provision.

Railroad: Train Horn Noise

The Federal Railroad administration published the Final Rule on the use of Locomotive Horns at Highway-Rail Grade Crossings in 2005. This rule allows public authorities the option to establish quiet zones provided certain safety measures are in place and the crossing accident rate meets FRA standards. According to the study two types of quiet zones could apply to North Portland:

²⁵ NRDC Strategies to Clean Up U.S. Ports: <http://www.nrdc.org/air/pollution/ports/ports2.pdf>

²⁶ Port of Tacoma: <http://www.portoftacoma.com/feis>

- Full quiet zone with no horn noise 24 hours/day
- Partial quiet zone where a horn is silenced for a specified period, usually during nighttime hours
- In the event that a full quiet zone is not implemented, a wayside horn could be used to reduce the noise impact. The wayside horn is a stationary horn at the grade crossing which is sounded with the approach of a train. This replaces the train blowing its horn for ¼ mile prior to the crossing. The wayside horn is at the crossing, not on the train.

Other measures to consider include supplemental safety measures that include gate systems to provide closure at the crossing during a train or temporary closure of a crossing during nighttime hours to all vehicles.

Freight Corridors

- The traditional approach of noise walls are not recommended because they would disrupt view corridors on freight routes through some of the North Portland neighborhoods discussed above. The study recommends resurfacing these corridors with a quiet pavement to reduce noise.
- Adding building code requirements for residential structures built after January 2009 on North Columbia, North Lombard, and North Going.

Summary of Approaches to Considered Moving Forward:

- Mandated noise study that is coordinated by the City's Noise Control Office.
- Installation of sound level monitoring at marine terminal property lines. Coordinate with the City's Noise Control Office to implement a program to monitor throughout the year.
- Encourage sound insulation on new home construction or extensive updates
- Encourage use of sound barrier walls along railroad corridor where appropriate
- Provide a forested buffer between any future terminal and residential area
- If public grade crossings are part of any future development on WHI consideration of full or partial quiet zones should be implemented or at least require the use of a wayside horn.
- Longshoreman's association training to train on railcar braking techniques to avoid train car impacts.
- Restricting freight vehicles on local service streets and consider traffic calming devices such as turnabouts.

IC. Light Pollution

Excess light can cause a number of issues in particular for plants and wildlife. The damages to animal and plant life cycles and the interference with animal migrations and breeding are well documented. In addition, the amount of energy wasted with poor lighting design has a huge impact on greenhouse gas emissions.²⁷ Humans can experience increased fatigue because of excess light shining into the home at night from the surrounding environment. In addition, frequent exposure to glare raises safety concerns for drivers or those with impaired vision.

Marine Terminals have large exterior work and storage areas that are often illuminated for safety and security reasons as well as to allow 24-hour operation. This light can affect adjacent properties as well as wildlife in adjacent natural areas. This section will discuss some of the causes and effects of light pollution and shares some ideas for reducing light pollution, including a review of other regulations and ordinances. This is followed by case studies of local and national port responses to light pollution issues. The report concludes with a summary list of potential approaches that could be considered to address the light pollution issues.

Forms of Light Pollution

The International Dark-Sky Association (IDA) defines light pollution as: “Any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste²⁸. IDA identifies light pollution by categories including light trespass, over-illumination, glare, light clutter, and sky glow. Below is a brief description of each of these:

- Light trespassing is often used when referring to nuisance lighting and glare from one neighbor’s yard to another.
- Over illumination is often seen in commercial and industrial areas as well as downtown street lights.
- Glare can come from a number of different types of lights such as vehicle lights from an on-coming car or light from a neighbor’s front porch light.
- Light clutter is excessive lighting potentially from a variety of sources that can cause distraction; such as poorly spaced street and building lighting.
- Sky glow is a combination of all of the above especially poorly directed lighting that limits sight of night stars.

There can be a number of reasons for the light pollution noted above including 1) the type of light being used, 2) an inefficient fixture, 3) lack of understanding of how much light is needed, 4) incorrect installation of timers, or 5) lack of knowledge of how to direct or redirect lighting to meet lighting needs.

Some of the biggest offenders of light pollution include:

- City street lights

²⁷ Personal Communication with Jim Benya, Benya Lighting Design, March 30, 2010.

²⁸ International Dark Sky Association, web site,
<http://www.darksky.org/mc/page.do?sitePageId=55060&orgId=idsa>

- Signs (e.g. Times Square)
- Outdoor sales lighting (e.g gas stations, auto dealers)
- Industrial lighting

Some ways to control excess lighting include shielding lights, reducing light wattage, putting lights on timers, changing street light features and requiring light shields or redirection. Below are some examples of light fixtures used by commercial businesses and industry.



This light helps to limit glare and focuses light down.



This light is often used for roadways and parking lots. The Cutoff Enclosed light fixture reduces glare and uplight¹.

The Model Ordinance and Federal & State Standards

The Oregon Department of Energy was directed under House Bill 2628 to review a model lighting ordinance, that was put together by the International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IESNA). In addition this bill is reviewing current state statutes and provisions related to outdoor lighting and its impacts on energy efficiency and night brightness²⁹. In general, there can be federal and state standards that enforce lighting requirements. Any local ordinances need to take these federal and state laws into account. However, there are currently very few provisions in Oregon that establish specific regulations on outdoor lighting. The Oregon Occupational Safety and Health Division (OAR, Chapter 437) has general lighting provisions, but it defers to American National Standard Practices for Industrial Lighting.

There are no provisions or regulations that regulate the lighting fixture type for general outdoor lighting. This could enable local city-level codes to establish regulations on fixture types to help mitigate light pollution and light trespass to neighboring properties. In addition to fully shielding lights, another best practice is to develop a lighting plan, designed by a certified lighting specialists at the beginning of a project in coordination with facility and site planning experts³⁰.

²⁹ Oregon Lighting Report, Oregon Dept. of Energy), September 2008, Nicholas Papke, page 3.

³⁰ Personal Communication Jim Benya, Benya Lighting Design, March 30, 2010.

The Model Lighting Ordinance discussed above is under public review at this time, but some of the components of the ordinance include:

- A description of lighting zones of different stringencies to address different uses.
- A system for regulating lighting installations using a rating system called BUG (Backlight-Uplight-Glare) that prevents excessive lighting.
- A computer analysis option for complex lighting installations³¹

Outdoor Lighting Regulations in Other States

There have been several programs recently implement in other states to address light pollution. These include:

- Missouri Night Sky Protection Act, House Bill, 457: This bill calls for the reduction of light emitted into the night sky to near natural levels for specified protected places including certain parks and historic sights that contain camping, wilderness areas, and riverways. The states Department of Natural Resources must develop voluntary guidelines to achieve specified reduction rates starting in 2025.
- Washington, House Bill 1069: This bill contains standards and specifications for requiring the best technology available in all exterior lighting in order to reduce energy consumption and reduce light pollution. All new public and private outdoor lighting installed after July 1, 2010, in Washington must conform to the requirements of the bill. Any new or replacement outdoor lighting fixture must be fully shielded if the rated output of the outdoor lighting fixture is greater than 1,800 lumens. Mercury vapor lamps must be removed by July 1, 2010.
- New Hampshire House Bill 0585: Any state funded out door lighting greater than 1,800 lumens must be fully shielded. The state produced a dark sky policy to encourage local adoption of outdoor lighting regulations. The Public Utilities commission adopted a part night or midnight rate for unmetered street and area lighting³².

Local Ordinances in Oregon

In 2008, the City of Wilsonville used an earlier version of the Model Lighting Ordinance written by IDA and IESNA to update their lighting ordinance which applies to public, industrial, commercial and multi-family housing facilities. They have established five lighting zones and mapped boundaries of these zones as well as applied specific regulations within each zone including:

- maximum wattages allowed and specific lighting standards.
- light shielding types that can be used, and
- curfew times

The Oregon Department of Energy, House Bill 2628 recommends the incorporation of many of the Wilsonville ordinance provision in local codes and they consider it to be a

³¹ Oregon Lighting Report, Oregon Dept. of Energy), September 2008, Nicholas Papke

³² International Dark Sky Association's web site, www.darksky.org has a comprehensive list with links to state lighting ordinances around the US and Europe.

suitable example for regulating outdoor lighting under State building code; however, they note that the development of lighting zones needs to be further discussed at the level of the local municipality.

Eugene and Bend have both implemented ordinances that require new outdoor lighting installations to be shielded and that prohibit use of certain types of lighting. Some exemptions do apply depending on the type of businesses and federal lighting standards can override the local standards. Bend specifies a curfew for turning lights off and Eugene provides lighting standards for five specific land uses.

Currently the Portland zoning code has a glare standard under chapter 33.262 which states that glare may not directly or indirectly form reflection, cause illumination on other properties in excess of a measurement of 0.5 foot candles of light³³ and strobe lights visible from another property are not allowed. In addition, the city's environmental overlay zone restricts lights from shining into environmental resource areas.

Local Case Studies Addressing Light Pollution³⁴

Toyota Facility at Terminal Four: Toyota installed new lights throughout the facility as part of a facility upgrade in 2004. They received complaints from the adjacent Cathedral Park neighborhood because some of the light poles were the same height as the bluff causing light to shine directly into their homes. There were also complaints from the Linnton Community across the Willamette River. In response to the complaints, Toyota removed some of the lights, shielded others and redirected the lights down and away from residences. Toyota's Facility Manager noted that Toyota operates 24 hours/day and they must maintain some lighting on the facility at all times for security purposes; however, they also have started to turn off all other lights when they are not in use³⁵.

Kinder Morgan Potash Facility at Terminal Five: Kinder Morgan has worked with Sauvie Island residents to address concerns related to lighting and noise. Mr. McMullin noted that there are lighting challenges at industrial facilities because they must comply with OSHA regulations and make sure there is sufficient light for the safety of those loading ships and working on the dock. Some of the changes that have been made in response to community concerns include:

- Adding hoods to lights and angling lights down to limit glare on neighboring communities
- Automating the timing of lights on the ship loading equipment³⁶

Port Case Studies

The two US examples explored for this analysis were Port Canaveral Florida and the Port of Los Angeles. The Port of Canaveral's approach was developed to limit the Port's overall lighting impact on specific wildlife. The management plan sets standards for

³³ A foot-candle is how bright the light is one foot away from the source. A lumen is a unit of measurement of light. A lumen is equal to one foot-candle falling on one square foot of area.

³⁴ See Appendix B for neighborhood and industry summary discussions.

³⁵ Personal communication with Ron Corbin, Toyota, March 11, 2010.

³⁶ Personal communication with Brent McMullin, Kinder Morgan, March 2, 2010.

control of existing exterior lighting plus rules for the design of new or replacement site lighting systems. Most of the mitigation measures are not port-specific, but could be general to any large facility. The measures include:

- redirecting and shielding lighting,
- using lower-light bulbs,
- varying lighting height and intensity to match the use, and
- using motion detectors and timers.

The Port of Los Angeles 30-acre Harry Bridges Buffer area between residential communities and the Port facilities will incorporate "Dark Sky" compliant lighting design.³⁷ More information about these two examples can be found in Appendix A.

Potential Approaches to Consider Moving Forward:

- Using the minimum wattage and warm white tones while still to meeting federal/state standards.
- Turning lights off when not in use or using a timer or sensor to turn off lights.
- Improving lighting fixtures by using shields or cut off type lights, and angling lights to where they are needed.
- Consulting with a qualified lighting designer to design lighting plans for any future facility.
- Creating buffer areas with limited lighting directed to to sensitive land uses
- Implementing Model Lighting Ordinance created by International Dark Sky Association (IDA) and the Illuminating Engineering Society of North America (IESNA)

³⁷ <http://www.sasaki.com/what/portfolio.cgi?fid=437&page=6>

ID. Traffic Related Impacts

Marine Terminals can be a source of traffic in local communities from the associated rail and truck traffic generated by the cargo distribution. This summary will focus on:

1) traffic impacts to the Hayden Island communities with a new West Hayden island bridge and traffic impacts without a new bridge³⁸, 2) examples of how other Ports are addressing traffic impacts, and 3) potential approaches to consider moving forward.

Unlike many of the other local impacts considered in this document, there have been several past studies that have considered the traffic impacts of a marine terminal on West Hayden Island. The key traffic related concerns expressed by Hayden Island community members and surrounding neighborhoods in the 1999 Hayden Island planning process included:

- The potential for cut through traffic from the development project through the Hayden Island community
- The timing of a new WHI bridge connection to Marine Drive, and
- The impacts of construction traffic

The same concerns apply today and were expressed through the 2009 East Hayden Island plan. In addition, during this most recent planning process the Hayden Island community stressed the importance of improving access to the mainland and improving connectivity throughout the island. Four scenarios were discussed for an additional bridge to the mainland during this planning process and the consensus by the participants in the process was that the most appropriate location for any potential auxiliary bridge, would be west of the BNSF railroad bridge on West Hayden Island.

Some of the surrounding communities, including St. John's and Cathedral Park have expressed concerns about increased truck traffic with any new development on West Hayden Island, especially if a new bridge were built. Both of these neighborhoods have requested additional information on future traffic projections with any new WHI development and how it will impact their neighborhoods and the St. John's bridge. To address these concerns, additional traffic analysis will be conducted if this process moves forward to develop potential concept plans for West Hayden Island³⁹.

Traffic Analysis⁴⁰

The traffic analysis completed for the 2009 Hayden Island Plan assumed that West Hayden Island would develop at some point in the future, in addition to the proposed development pattern for East Hayden Island. Answering the question of whether or not West Hayden Island develops was not part of the Hayden Island Plan, but from a traffic analysis standpoint it was essential to understand the potential ramifications of that

³⁸ David Evans & Associates produced a transportation related memo for the City which addressed three of the original CWG questions related to transportation. A portion of the memo is shared here as it relates to community livability concerns related to traffic impacts of any new development on WHI. The DEA memo can be found in its entirety in Appendix C.

³⁹ If the Community Working Group determines that multiple uses are possible on WHI then additional traffic modeling will be done to analyze different development scenarios and potential mitigation measures for those impacts.

⁴⁰ The information that follows is an excerpt from the DEA memo unless otherwise noted.

development on the proposed Hayden Island street system and the new I-5/Hayden Island interchange proposed as part of the Columbia River Crossing (CRC) project.

Table 1 (below) summarizes the assumed trip generation for development on West Hayden Island under both build-out options that were assumed during the 1990s annexation process. Both options included an intermodal rail yard and dry-bulk terminal. Option 1 also assumed a container terminal, while Option 2 assumed an auto distribution facility. Option 1 would generate an estimated 116 inbound and 187 outbound trips (or 303 total trips) during the weekday P.M. peak hour, while Option 2, would generate an estimated 63 inbound and 93 outbound trips (or 156 total trips) during the weekday P.M. peak hour.

The traffic analysis for the Hayden Island Plan assumed build-out Option 2, under which West Hayden Island would develop as an automobile distribution facility, an intermodal rail yard, and a bulk terminal employing 45 people, both with and without a new auxiliary bridge. This analysis also assumed that improvements would be made to the I-5 interchanges on the island as the result of the CRC. The Level of Service calculations were based upon these improvements.

TABLE 1
Trip Generation for West Hayden Island Marine Terminal Development

LAND USE	A.M. PEAK		MIDDAY PEAK		P.M. PEAK		DAILY
	IN	OUT	IN	OUT	IN	OUT	
Build-out Option 1							
Container Terminal	186	122	256	220	70	158	4,010
Intermodal Rail Yard	25	26	48	48	21	24	840
Bulk Terminal (45 Employees)	25	5	25	5	25	5	260
Total All Vehicles	236	153	329	273	116	187	5,110
Trucks	175	118	225	192	69	132	2,970
Autos	61	35	87	81	47	55	2,140
Build-out Option 2							
Auto Distribution Facility	225	26	55	99	17	64	1,620
Intermodal Rail Yard	25	26	48	48	21	24	840
Bulk Terminal (45 employees)	25	5	25	5	25	5	260

Total All Vehicles	275	57	128	152	63	93	2,721
Trucks	30	25	49	41	21	20	740
Autos	245	32	79	111	42	73	1,980
Source: West Hayden Island Marine Terminal Development (Parametrix 1999).							

In summary, it is important to point out that the amount of traffic produced by a new terminal(s) and the impact on adjacent residential neighborhoods will vary depending on the type of terminal or combination of terminals being proposed and infrastructure needs. Also it is important to note that product delivered to a local market, within 500-800 miles from Portland, is often transported by truck⁴¹.

The various build out options that were analyzed for the previous Hayden Island processes would seem to indicate that a Container Terminal will generate more truck traffic than the dry bulk facility which will primarily move product from barge to rail⁴². The Port of Portland collects vehicle trips information from all of their terminals on a monthly basis. A current snapshot of vehicle trips at the Port of Portland terminals in 2009 shows us the following⁴³:

- Terminal 6: approximately 2,400 vehicle trips/day are generated including Hyundai, Honda, the Container Terminal and the break bulk facility.
- Terminal 5: approximately 700 vehicle trips/day are generated including Columbia Grain and the Canpotex potash facility.
- Terminal 4: approximately 1,000 vehicle trips/day are generated including Toyota, Kinder Morgan soda ash facility, and IRM liquid bulk facility.

Terminal 6 generates the most vehicle trips per day and approximately 50 percent is truck traffic.

Transportation Impacts without an Auxiliary Bridge

Without a new auxiliary bridge, all traffic generated from developing West Hayden Island would use North Hayden Island Drive and the I-5/Hayden Island interchange. The Transportation Analysis for the Hayden Island Concept Plan (2008) found that all of the intersections on Hayden Island would operate acceptably in the year 2030 without an auxiliary bridge, provided the CRC were built. The poorest Level of Service (LOS) is predicted to be "C," which meets the City of Portland's operational standard of LOS "D." The volume-to-capacity (v/c) ratios of the ramp terminal intersections are better than ODOT's maximum allowable v/c ratio standard of 0.85 specified in the Oregon Highway Plan (OHP) for ramp terminals.

⁴¹ Healy, Phillip, Port of Portland, personal communication, 4/2/10.

⁴² According to the 1999 Army Corps of Engineers Draft EIS, about 60% of all containerized cargo arrives at the Portland shipping terminal by truck from locations within the region and all import general cargo arriving in Portland is also distributed outward by truck. Some agricultural bulk facilities also generate byproducts that are trucked from the facility. For example, corn or wheat screenings and dust from collection systems are compressed into animal feed pellets that are exported and are also sold locally. Local distribution is handled by truck.

⁴³ These vehicle counts were provided by Phillip Healy, Senior Transportation Planner with the Port of Portland and include employee vehicles and truck traffic.

Transportation Impacts with a New Auxiliary Bridge

The traffic analysis for the Hayden Island Plan also assumed a scenario with an auxiliary bridge between Hayden Island and Portland. The southern connection would terminate at Marine Drive, an important freight route in Portland with nearby connections to I-5 and Port facilities. Marine Drive provides access to the Rivergate Industrial District west of I-5 and to the Columbia Corridor Industrial Area located on both the east and west sides of the highway. Marine Drive also provides access to OR 99E or NE Martin Luther King Jr. Boulevard, a freight route into Portland. The analysis focused on the P.M. peak period for the 2030 build-out period to assess the impact to the proposed Hayden Island street grid of diverting traffic from the Hayden Island interchange and the impact of that diversion to Marine Drive and to the Marine Drive interchange.⁴⁴

The traffic analysis assumed that most of the traffic generated from the Port of Portland marine terminal on West Hayden Island would use the new bridge for access and egress, because the bridge would provide the fastest and most direct freight route. In addition, a small percentage of traffic on the island originating from or destined to the area west of the I-5 interchange would also use the bridge, based on vehicle-trip origin and destination patterns. Traffic east of I-5 was assumed to not use the bridge because of the additional travel time that would be incurred by drivers taking that route. The total amount of traffic using the bridge would be approximately 290 vehicles during the P.M. peak hour, with a fairly even split between inbound and outbound vehicles. The net effect of the auxiliary bridge would be a minor reduction in traffic volumes at the I-5/Hayden Island interchange and would cause a corresponding marginal improvement in the level of service and the volume-to-capacity ratio at the interchange ramp terminals. In addition, there would be slightly less traffic on the local street network west of the I-5 interchange. However, there would be a very small increase in traffic volumes west along North Hayden Island Drive towards the auxiliary bridge and a very small increase in certain turning movements in the neighborhood. The slight increase in traffic volumes would occur along roads that carry little traffic and, therefore, would not have a significant effect on overall intersection performance on the island.

Traffic using the auxiliary bridge to access I-5 at Marine Drive to travel northbound on I-5 would increase overall traffic volume at the interchange by approximately 4 percent, slightly increasing delays at the ramp meter, extending the queue of vehicles on the on-ramp, and increasing the volume of traffic traveling east on Marine Drive to the interchange. Similar increases in volume would occur for other movements at the interchange. These increases would not significantly impact the traffic operations at the Marine Drive interchange because the increase in volume is quite small. If volumes were to grow to the point where there would be a larger increase in delay, it is likely that vehicles would divert back to using the Hayden Island interchange, until an equilibrium in travel time was reached between the two interchanges.

⁴⁴ Using the P.M. peak for the traffic analysis gives the best indication of how the bridge would affect traffic along Marine Drive and the I-5/Marine Drive interchange, because the total amount of traffic is at its highest point of the day. While the A.M. and Midday peak traffic assumptions are slightly higher from West Hayden in Table 1, the total amount of traffic already on the road system during those periods is lower than during the PM peak hour. The slightly increased A.M. and midday traffic estimates from West Hayden Island would not likely have a greater impact than the P.M. peak, given the lower existing traffic.

Economic Impacts/Benefits of a WHI bridge

The economic costs and benefits of the auxiliary bridge were not described separately from the economic costs and benefits of constructing the entire marine terminal. This study was done in 1999. Given the significant changes in the economy in the last ten years since the economic study was completed, the information provided in that 1990s analysis is likely very outdated. However, the construction of large infrastructure (such as bridges) provides construction-related employment, and local companies benefit from purchases of goods and services, thus benefiting the local economy. Additionally, given the large Portland metropolitan area, construction workers would most likely come from the area, and the additional income generated from the construction would be spent locally.

What role the new bridge would play in the economy of the area will likely depend on how West Hayden Island is developed and the rate at which traffic increases. If traffic increases dramatically, there is an economic benefit for the Port, because a new bridge will provide direct access to Marine Drive and the regional freight network rather than having to travel through the Hayden Island commercial area to reach I-5. A new bridge is also an economic benefit to East Hayden Island in that truck traffic is directed onto routes that are designed to handle it. If a bridge is not constructed and truck traffic uses the I-5/Hayden Island interchange, there could be some adverse economic impact to East Hayden Island. A concern for residents since the 1990s has been that adding truck trips onto East Hayden Island roads would make the area less desirable, particularly with the recent efforts to develop a neighborhood plan that does not support heavy truck use on East Hayden Island.

Livability Impacts/Benefits of a WHI bridge

The auxiliary bridge is only one component of a much larger project; issues of livability related to the bridge are directly related to how the bridge affects traffic on Hayden Island and Marine Drive and, indirectly, how that affects residential and commercial development in the vicinity of the existing I-5/Hayden Island interchange.

Without a Auxiliary Bridge to WHI

Without an auxiliary bridge, access to the proposed terminal site would be via a new road that would connect to North Hayden Island Drive at the point where the existing road crosses under the BNSF bridge. This extension of North Hayden Island Drive would be constructed to the City of Portland's industrial access road standards. All access to the terminal would be via North Hayden Island Drive and the I-5/Hayden Island interchange. During the West Hayden Island annexation discussions in the late 1990s, increased traffic, especially truck traffic, was the prime concern of local residents and members of the HiNoon Neighborhood Association. They described existing congestion on Hayden Island Drive and I-5 as a serious threat to the island's livability.

The amount of additional traffic generated from a marine terminal would be dependent on the type of facility that would be constructed on West Hayden Island. The Hayden Island Plan traffic analysis assumed an auto distribution facility for its analysis to compare the traffic impacts on the proposed Hayden Island road network as well as for

potential locations for the new bridge. The analysis concluded that, with the bridge, the amount of additional traffic generated from the facility would not significantly increase trips along North Hayden Island Drive. In the event West Hayden Island is developed without an auxiliary bridge, truck traffic will increase on North Hayden Island Drive from the terminal to the I-5/Hayden Island interchange through what is envisioned to be mixed-use, transit-oriented community.

While the small increases in traffic volumes and congestion that would occur with the development of the terminal would not likely result in a significant increase in the number of accidents or accident rates on Hayden Island streets, the potential truck traffic that would result from development on West Hayden Island could adversely affect the livability of the area and adversely affect the recent efforts by the City of Portland and Hayden Island residents and businesses to increase residential densities and mixed-use development opportunities on East Hayden Island. This adverse effect could particularly impact nearby residences and bicyclists and pedestrians that would have to contend with trucks from West Hayden Island.

With an Auxiliary Bridge to WHI

Constructing an auxiliary bridge on West Hayden Island benefits East Hayden Island residents and businesses, because it would reduce the amount of through truck traffic from the terminal on West Hayden Island onto roads, such as Marine Drive, that are already dedicated to freight. For East Hayden Island residents, the auxiliary bridge also provides an alternative to the I-5/Hayden Island interchange. For these reasons, the auxiliary bridge maintains the livability of East Hayden Island as the Hayden Island Plan envisions.

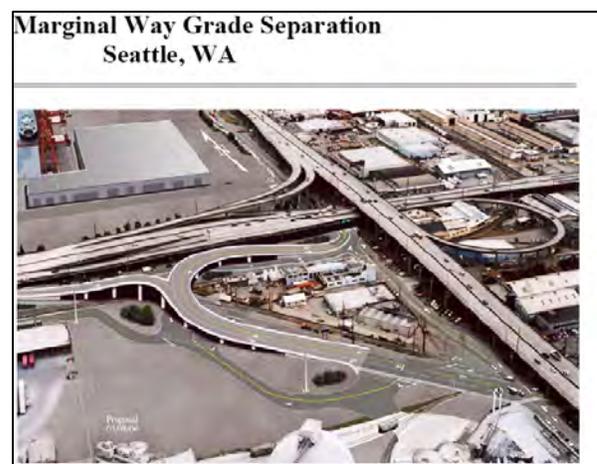
However, a bridge across to Marine Drive, would allow a greater opportunity for terminal truck traffic to use North Portland Road to access routes into St. Johns and Cathedral Park neighborhoods. Residents of these neighborhoods have concerns about the amount of truck traffic that utilizes their streets to get from the industrial areas to the St. Johns Bridge. Portland Transportation is currently exploring ways to encourage trucks to use designated routes. Any future plans for West Hayden Island would have to include additional traffic analysis on these routes to determine the potential effect on St. Johns, Cathedral Park and other surrounding areas that a marine terminal may have on their traffic.

Port Case Studies

Many ports have addressed traffic issues including internal circulation, noise and air quality as well as external transportation volume, routes and infrastructure capacity.

When addressing external routes, ports tend to propose large-scale measures such as:

- port-specific tunnels, bridges and rail spurs, and/or



- increasing the area’s capacity and efficiency by adding traffic lanes, grade-separated overpasses/underpasses/onramps, mandatory turn lanes, traffic signals and other standard measures.

Most ports researched address vehicle traffic by:

- prescribing truck routes to keep trucks off neighborhood streets,
- alter operating times to not be a noise nuisance to the community, and
- reduce truck idling at the perimeter access gates to reduce emissions.

Additional examples can be found in Appendix A.

Potential Approaches to Consider Moving Forward

The transportation analysis conducted during the 1999 West Hayden Island Planning process resulted in a number of traffic management strategies to reduce cut through traffic some of which are listed here and may continue to be relevant for the current planning process⁴⁵:

To reduce project traffic:

- Develop design solutions that make the connecting route less attractive from a travel time perspective. This includes streets that are curvilinear rather than straight.
- Utilize traffic calming techniques on Hayden Island Drive and/or lowering the speed limit on the street.
- Through a future transportation agreement between the City and the Port of Portland set strict limits on Port of Portland traffic on Hayden Island Drive

To reduce construction traffic:

- The Port would identify and reserve a suitable construction staging area in North Rivergate that could be used for the proposed barge access during the first phase construction, A barge delivery site on the south shore of West Hayden Island would also be identified.
- The rail and bridge connections to West Hayden Island would be constructed as some of the first elements of the project, so that this mode could be used for the delivery of materials and equipment
- Contractors would be required to use the barge and/or rail systems for the delivery of materials where feasible and cost-effective,
- Prior to construction of each marine terminal phase, the Port would ensure that a construction management plan is developed in collaboration with the City of Portland and HiNoon to address traffic, noise and vibration issues⁴⁶.

⁴⁵ Some of the recommendations in the WHI Area Plan dealt with seeking funding immediately for a new bridge because the Port had a potential tenant during that planning process. These recommendations are not listed above as well a series of recommendations for I-5 interchange upgrades in the vicinity are not listed. These upgrades are currently being addressed under the CRC project.

⁴⁶ WHI Area Plan 1999 (Draft), prepared by W&H Pacific and the City of Portland, July 1999

II. Recreational Access for Public Use

The purpose of this section is to provide some examples of how US Ports have integrated recreational access into their terminal designs and how other Ports have used recreation and conservation areas as buffer zones to residential areas. In addition to this section it is important to note that ENTRIX has provided a recreational analysis which focuses on regional recreation participation rates, development potential, compatibility of uses, and value of recreation on and around West Hayden Island. Also, the Port of Portland has provided research that explores the interface of public space and water access areas developed and operated by ports along the West Coast⁴⁷.

This section also includes a summary of the recreational planning and design that came out of the 1999 WHI planning process as well as a brief discussion of the recreational goals identified as part of the 2009 Hayden Island planning process.

Many ports have incorporated public access and recreational amenities into their facilities to:

- increase awareness and educate the public about Port facilities
- improve public access to the local waterways in industrial areas, and
- provide a buffer between industry and residential neighborhoods.

The examples range from public boat access ramps to multi-use plazas including museums and outdoor amphitheaters. Many ports offer shoreline trails and water-specific access and infrastructure such as moorages. Some ports are purchasing land specifically for recreational purposes that can have the added benefit of serving as noise and air pollution buffers and mitigation or conservation areas. Below are a few examples with more detail provided on these sites in Appendix A.

The Port of Los Angeles

The Port of Los Angeles has created a 30-acre community buffer from the TraPac container terminal expansion. Called the Harry Bridges Boulevard buffer zone, the buffer provides some distance between the community of Wilmington and the impacts from TraPac's terminal. A pedestrian/bicycle walkway and tree lined boulevard will be a part of the California Coastal Trail and will link the Buffer into the larger regional park system.

The Port of Seattle

The Port of Seattle owns and maintains more than 60 acres of parks and public access spaces as part of their portfolio. These range in size from less than one acre to 15 acres. The parks are managed by the Port's Marine Maintenance Department. These parks are often located immediately adjacent to working piers and terminals and provide public access for recreation and fishing. In addition to the acreage used for park and public access, the Port owns and operates several marinas. These marinas are used both for commercial fishing fleets as well as for pleasure craft.

⁴⁷ ENTRIX's draft recreational analysis is currently under review by the Technical Advisory Pool. A final version will be available at the end of May 2010 on the West Hayden Island project web site. The recreational research conducted by the Port of Portland titled, "Recreational Amenity Examples at Port Sites" can be found on the WHI project web site at <http://www.portlandonline.com/bps/index.cfm?c=49816&>

Port of Tacoma

Creating a buffer between residential and industrial areas to improve livability, the Port of Tacoma, a local conservancy and businesses came together to purchase approximately 31 acres of land to act as a buffer between the tidal flats adjacent to the port and a NE Tacoma residential neighborhood. The Friend's of Julia's Gulch have significant restoration plans for the site including the planting of several native species and the installation of a loop trail at the perimeter of the site for educational purposes.

1999 West Hayden Island Public Access and Recreational Activities

In the 1999 planning process for West Hayden Island, the recreational focus was on creating a low ecological impact in the areas with a proposed designation of open space. Passive recreational activities such as hiking, running, wildlife observation, nature study, canoeing or kayaking were deemed to be the most appropriate uses for West Hayden Island. Maps 2 and 3 from the draft West Hayden Island Area Plan provide a visual of the proposed open space areas. Map 2 shows an area, approximately 172 acres in size, west of the proposed bridge, which was proposed as a conservation area and mitigation site; no public access or recreational activities were allowed in this area. Map 3 shows an area, approximately 60 acres in size, east of the proposed bridge, which contained recreational trails, scenic viewpoints, a limited parking area, natural resource protection areas and wetland mitigation sites.

Hayden Island Plan 2009

Hayden Island residents stressed the importance of a bike-friendly and walkable community, in addition to having access to the Columbia River and Oregon Slough for viewing, swimming and boating. The plan also stresses the importance of environmental protection of natural resources. Protecting the Columbia River habitat for the many animals, birds, fish and plants of Hayden Island and restoring and protecting river banks are goals of the plan. While this planning process focused on East Hayden Island some stakeholders stressed the ecological value of West Hayden Island both locally and regionally and the need to strike a balance between natural resource protection and some level of passive recreation.

The natural, undeveloped character of the island has been described as an asset to Portland through past and present planning processes. While it presents residents with the opportunity to experience this type of landscape, it will be important to be aware of compatibility issues between some recreational uses and natural resource and wildlife protection goals that may be developed for the island moving forward.

Potential Approaches to Consider Moving Forward:

- Consider physical separation of potentially conflicting uses. For example, identify a recreational area and a separate conservation area.
- Consider recreational activities of most interest to Hayden island residents during site planning including motorized and non-motorized boat access, trails, picnic areas, restricted wildlife and natural areas.

- Consider East Hayden Island plan goals related to trail and park development to look for possible connections into WHI. Also consider access to water initiatives (re motorized/non motorized boat ramps) that may be underway on the Eastern part of the island.
- Consider open space (restricted public access areas) that may also act as a buffer between residential and industrial development.

Map 2: Potential Open Space and Recreation Designated Areas from 1999 Planning Process⁴⁸

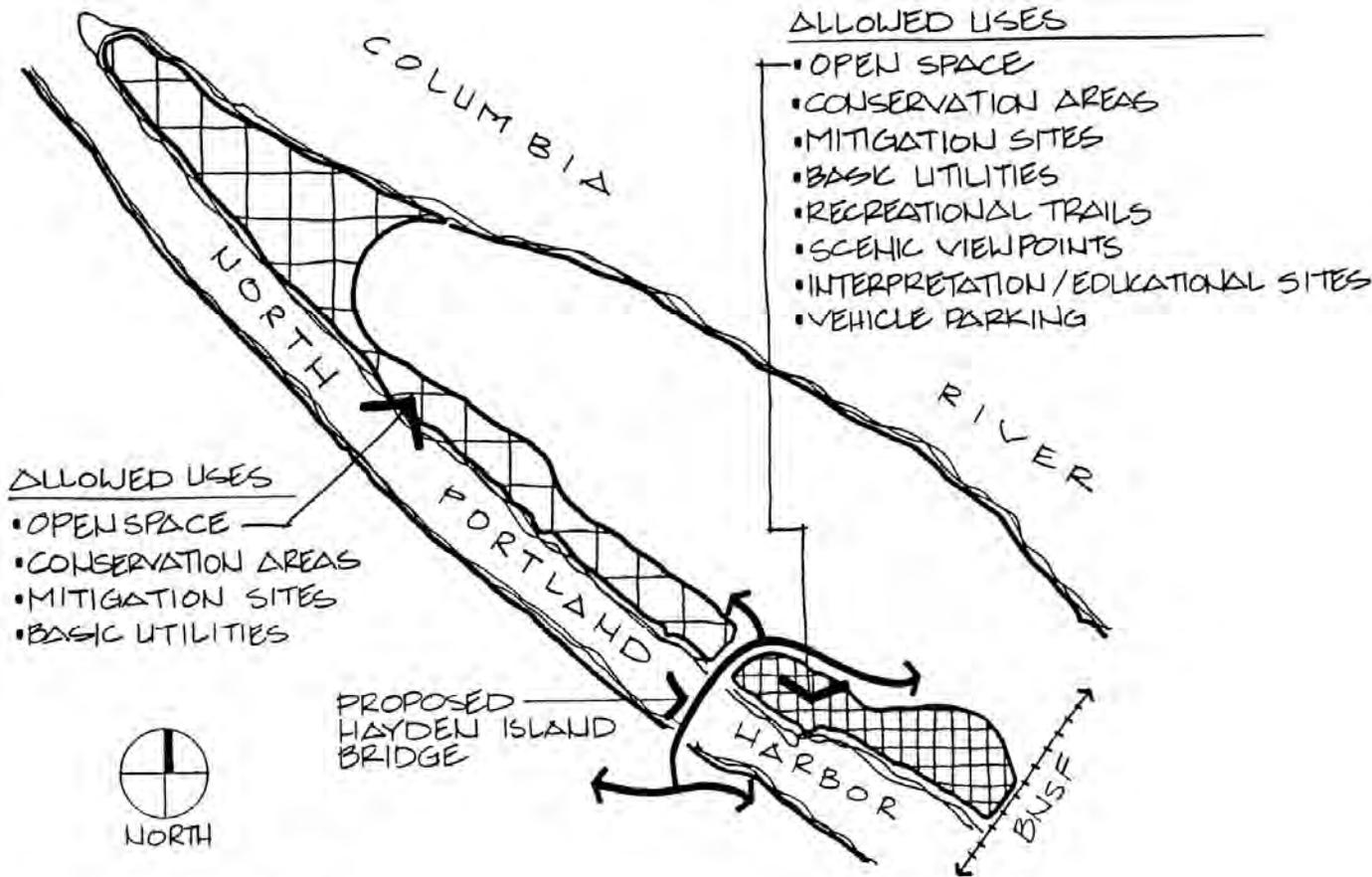


Figure 4-2 Open Space Subareas

⁴⁸ W&H Pacific, West Hayden Island Area Plan, 1999 DRAFT

Map 3: Potential Recreation Layout from 1999 Planning Process⁴⁹

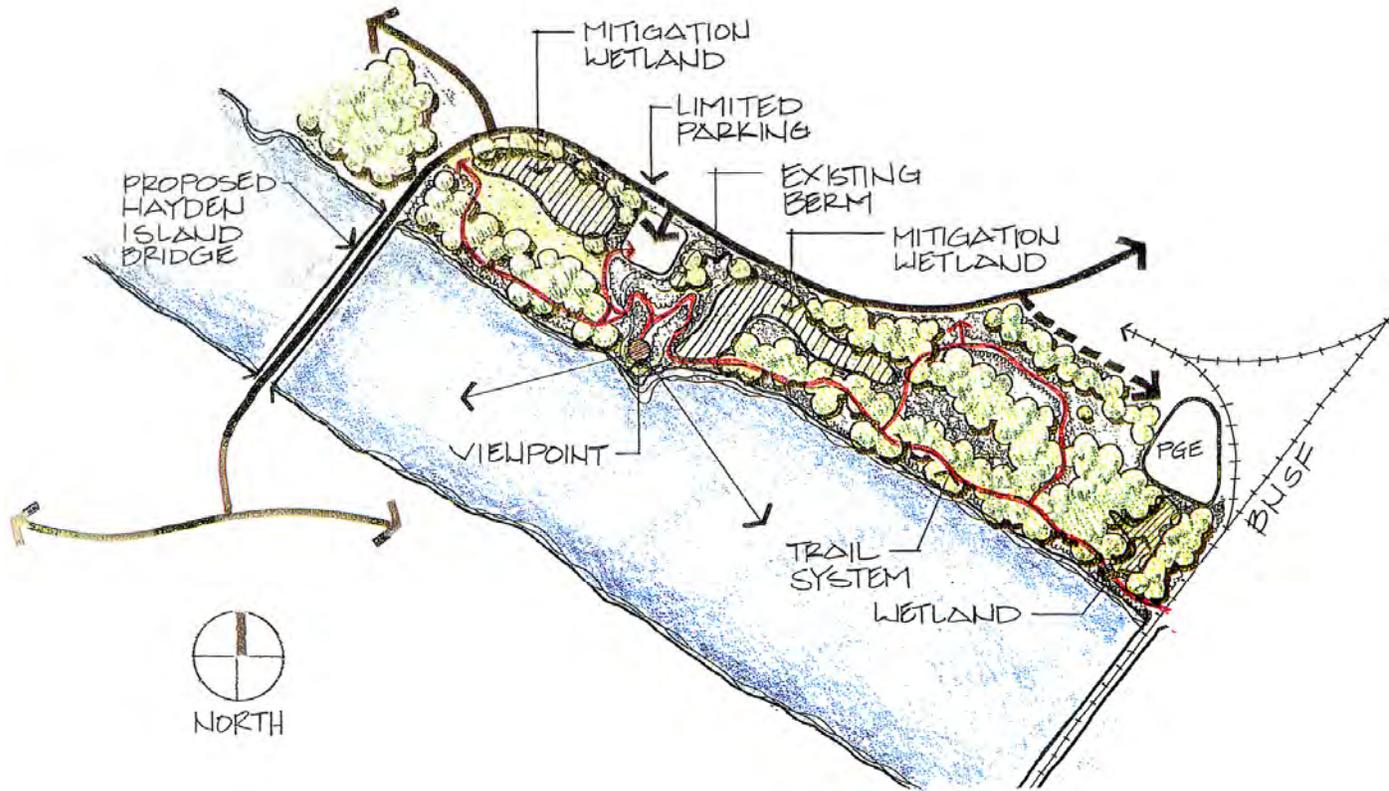


Figure 4-3 Conceptual Open Space/Recreation Plan for Area East of Proposed Bridge

⁴⁹ W&H Pacific, West Hayden Island Area Plan, 1999 DRAFT

III. Local Regulatory Measures to Mitigate Local Impacts

Several approaches have been taken by cities and ports to mitigate for their impact on the surrounding community. These can include regulatory measures that are written into a city's development code to ensure a certain level of setbacks or even an overall level of noise or light pollution. Examples of regulatory approaches by other jurisdictions have been provided in some of above studies of specific impacts. Another approach is a non regulatory approach where a port sets up a testing program for their impacts and/or sets up citizen groups to work with the port and the community on local impacts. Appendix A provides two examples of Ports that have set up longstanding community groups to help identify and address local impacts of industrial development. This section looks at various measures that the city, and others have undertaken, beginning with the city's experience in regulating local impacts through it's zoning code. (Additional information on the City's Existing Codes can be found in Appendix D.)

Regulatory Measures

One of the concerns of any proposed WHI development is the residential area's proximity to any potential marine terminal development. The city has a few provisions in the zoning code, and has specifically called out for buffering of uses in some plan districts. The provisions summarized below could provide ideas for future WHI regulations.

Base Zone Standards

Several base zones as well as some special overlay zones and provisions in plan districts require lower height limits and landscaping where higher intensity zones border lower intensity residential zones. These buffer areas only tend to be about 25 – 50-feet in width. Since these standards are all similar, they are not listed individually below.

Additional Use and Development Regulations

The city has a series of special development and use standards that can apply to certain uses. Specific provisions related to mining and waste related uses, and Off-site impacts could have relevance to planning for marine terminals.

Since mining and waste related uses often consist of large sites with considerable outdoor activity, the city's zoning code has special provisions requiring these uses to provide a Traffic Impact Study, and a Nuisance Mitigation Plan. These uses also have the largest setbacks within our code; 100 feet from property and street lot lines, and 200 feet from residentially zoned property lines.

The Zoning Code includes regulations that consider impacts on residential or open space zones from non-residential uses. These impacts include Noise, Vibration, Odor and Glare. Actual noise standards are located within a separate title. Since these impacts are often associated with specific events, the standards can often be difficult to enforce if the impact isn't happening at the time of measurement.

Overlay Zones

Certain overlay zones include provisions to address impacts from one use to another. These can include the buffer zone, environmental zones and the Portland International Airport Noise Impact Zone. Buffer zones are generally overlaid upon the edge of some industrial, employment and commercial zones. These buffer zones are generally only between 25 and 100 feet wide, and require landscaping, and limit storage and vehicle access. Considering the size of a marine terminal, it is likely that a buffer overlay may not be adequate. Environmental zones are intended to protect natural resources, and to accomplish this they generally require setbacks and limit outdoor lighting away from the resource area. The Portland Airport Noise overlay's primary function is to reduce the impact of aircraft noise on development. This overlay applies to parts of Hayden Island. Under this provision, new development requires noise insulation, a noise disclosure statement and a noise easement.

Neighborhood Plans and Plan Districts

Neighborhood Plans often contain action items that recommend that the various City Bureaus implement measures to ensure their success. As an example, the St. Johns Plan had several recommendations for Portland Transportation to analyze issues related to cut-through truck traffic that uses their neighborhood to get to the St. Johns bridge. While these types of recommendations don't always manifest themselves into the city's zoning code, they are created during the planning process and can result in specific requests that affect other bureau's workplans.

Generally, recommendations of a neighborhood plan that is intended to be implemented through the Bureaus of Planning and Development Services are often created through code provisions. Plan Districts often contain special provisions to reduce impacts between various uses. These can take the form of special use buffer provisions, such as those provided in the Guild's Lake Industrial district in the area where it adjoins the residential and commercial areas of Northwest. It can also result in special provisions limiting the size of certain uses to foster a pedestrian environment, such as those provided in Kenton, or it can provide special environmental regulations for the areas such as those illustrated in the Cascade Station, Columbia South Shore or River Plan. (For more information on these provisions, see Appendix X.)

Plan Districts can also be used to direct future development, without having specific regulations, provided that there be a provision for additional reviews and criteria for approval. This is what the Portland International Raceway (PIR) Plan District attempts to do. To ensure that development is sensitive to the environmental surroundings, the plan district establishes a Master Plan review process. This review would engage the surrounding community and stakeholders and would review impacts of any expansion at that time. The Master Plan process would consider traffic and environmental impacts among the list of criteria.

West Hayden Island has also undergone previous planning efforts, even having a draft plan district created for it in the late 1990's. This draft included standards affecting buffering and lighting, which was intended to limit impacts on neighbors and wildlife. There were also requirements for the recreational components to be built prior to completion of the terminal.

Summary

While some aspects of the above regulations may be applicable to a future WHI plan, many of the provisions attempt to address impacts of immediately adjoining properties, up to about 500 feet in distance. Any proposed marine terminal development on WHI would likely be located much further away from the closest residences (the manufactured home and house boat communities). There is already existing industrial development at the west end of Hayden Island plan district, and a BES sanitary sewer facility located west of the BNSF railroad tracks. Any proposed terminal would likely be located about ½ mile or further away. However, it is feasible that some areas adjacent to any terminal could receive open space (OS) zoning which also could be affected by adjoining impacts.

Another option would be to consider the merits of creating a master planning process similar to Portland International Raceway or Waste Related/Mining Uses, where specific off-site impacts could be addressed as part of a report submitted with master plan/conditional use review. This would also allow greater flexibility in the review based upon the type of development proposed. In addition, the planning process could contain action items for other bureaus such as Portland Transportation to conclude studies regarding impacts before any development is considered.