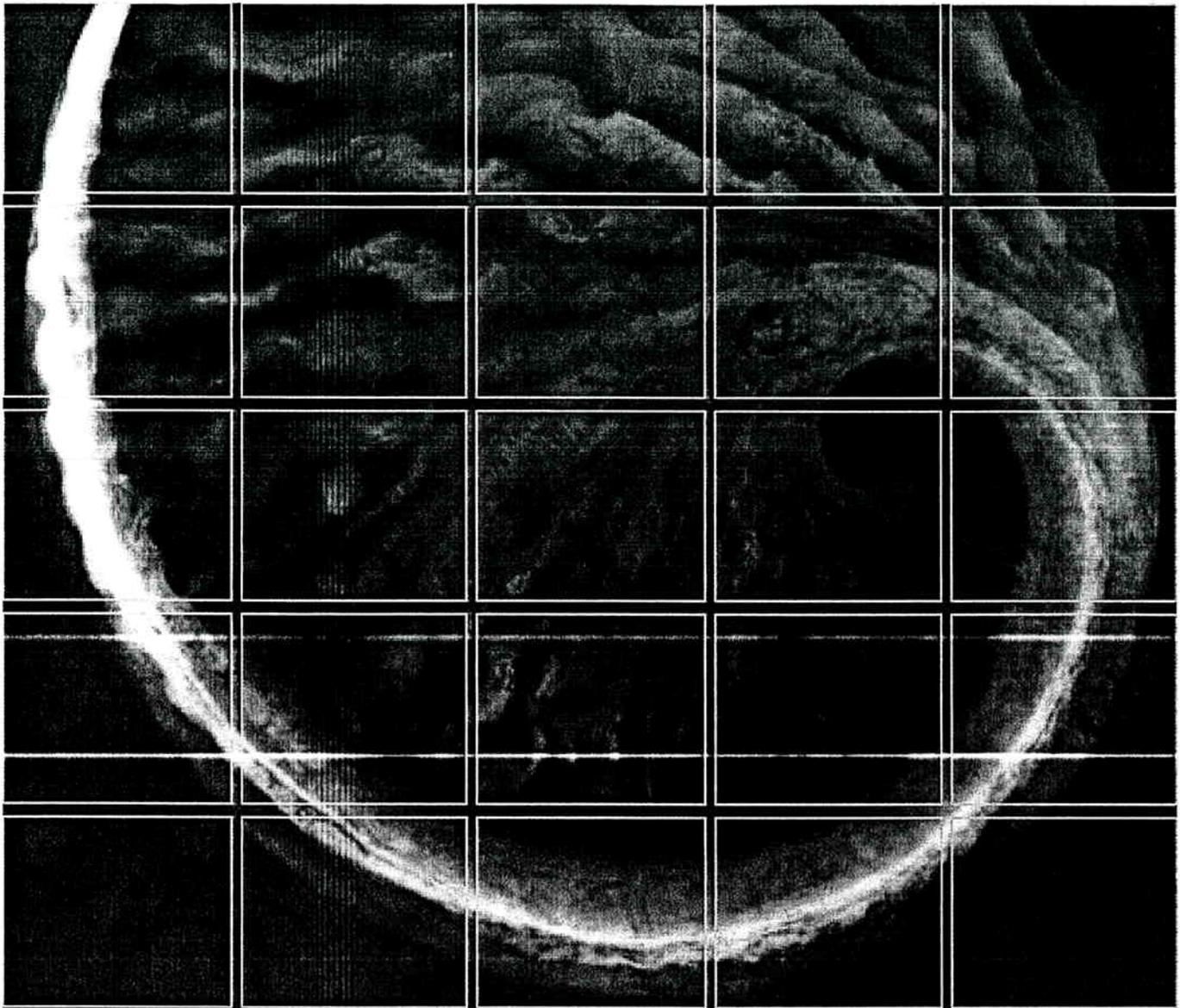


APPENDIX C

LEVEL I SITE ECOLOGY SCOPING REPORT



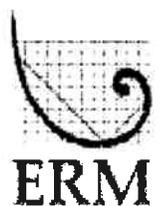
Level I Site Ecology Scoping Report

Arkema, Inc. Facility
Portland, Oregon

3 February 2005

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Portland, Oregon

3 February 2005

Project No. 0020423



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EXECUTIVE SUMMARY

On behalf of Arkema, Inc. (Arkema) (formerly ATOFINA Chemicals, Inc.), Exponent and ERM-West, Inc. (ERM) have conducted a Level I Ecological Risk Assessment (ERA) to evaluate conditions at the Arkema facility in Portland, Oregon (Figures 1 and 2). This Level I ERA was conducted in accordance with Oregon Department of Environmental Quality (ODEQ) guidance for an ERA (ODEQ 1997). Specifically, this report addresses risks associated with the developed portion of the site (Lots 3 and 4) and the riverbank above the mean high water line (Tract A). The Level I ERA applies to the portions of the Arkema facility that have not already been addressed in the *Environmental Summary Report; Lots 1 and 2* (ERM 2003).

The primary constituents of interest that are known or suspected of having been released at the Site include the pesticide p,p'-dichlorodiphenyltrichloroethane (DDT), its metabolites p,p'-dichlorodiphenylethane (DDD) and p,p'-dichlorodiphenylethylene (DDE), chlorobenzene (also referred to as monochlorobenzene or MCB), hexavalent chromium, and perchlorate. The areas on Lots 3 and 4 with elevated concentrations of these substances in soil and groundwater are paved or gravel covered, so there currently are limited opportunities for ecological receptors to be exposed to these substances. Potential ecological exposure could occur if these barriers are not maintained in the future; therefore, Arkema will actively manage the Site until redevelopment is complete or until property ownership is transferred to another party to prevent exposure to ecological receptors.

Terrestrial ecological habitat at the Site is limited to a narrow strip of vegetated riverbank along the Willamette River (Tract A), a potential future greenway easement, and a small portion of land adjacent to the top of the riverbank outside the property fence. These areas are primarily steeply sloping and covered with bank stabilization material that includes large chunks of concrete, asphalt, and other impervious material. Inorganic constituents, polycyclic aromatic hydrocarbons, and DDT, DDE, and DDD have been detected in soils in these areas. The vegetation community and associated wildlife that occur along the riverbank are typical of disturbed sites in the region and contain a high proportion of invasive/exotic species and species that are habituated to disturbed/urban conditions. This area is part of the riparian environment of the Willamette River, a contiguous migration corridor for certain sensitive species; therefore, it is considered a sensitive habitat.

During site visits by Exponent and ERM ecologists, all wildlife observed at and adjacent to the Site appeared to be healthy and there was no evidence that any receptors were experiencing overt adverse effects from any potential exposures to Site chemicals.

The absence of exposure pathways for terrestrial ecological receptors to contaminated environmental media situated within the developed portions of the Site (Lots 3 and 4) virtually eliminates the current risk to potential receptors. However, if the surface barriers (pavement and/or gravel cover) are removed in the future, exposure pathways will exist. The vegetated portion of the Site adjacent to the Willamette River (Tract A and the greenway area on Lots 3 and 4), where sampling has identified pesticides and inorganics in soils, could provide habitat for ecological receptors. Therefore, a Level II ERA is recommended to address bank-dwelling species exposure to soil contamination on Tract A and the greenway portions of Lots 3 and 4.

The primary constituents of interest (DDT, DDD, DDE, MCB, perchlorate, and hexavalent chromium) have been observed in four groundwater zones on the Site. Groundwater with elevated concentrations of these constituents does not discharge to the surface; therefore, there is no on-site exposure pathway. Groundwater may be discharging to the bottom of the Willamette River, so there is the possibility that ecological receptors in the Willamette River may be exposed to these substances. A source control evaluation (SCE) will be performed by Arkema for the upland portion of the Site to determine the need for remedial measures to control the migration of upland contaminants to the Willamette River (via groundwater and/or bank erosion/failure). Following completion of the SCE, potential residual risks from this source will be addressed in a separate in-water risk assessment that is being performed by the Lower Willamette Group.

1.0 EXISTING DATA SUMMARY

1.1 SITE LOCATION

The Arkema, Inc. (Arkema) facility (the "facility") is located at 6400 N.W. Front Avenue in Portland, Oregon, along the west bank of the Willamette River (Figure 1). This report addresses risks associated with the developed portion of the site (Lots 3 and 4) and the riverbank above the mean high water line (Tract A), collectively referred to as the "Upland property" or the "Site" (Figure 2). The Site is bordered on the east by the Willamette River, on the south by CertainTeed Roofing Products, on the west by Front Avenue, and on the north by Lots 1 and 2 (Figure 2). In this report, map directions refer to the layout of plant facilities rather than geographic directions, in order to remain consistent with usage at the Site, as defined in the *Elf Atochem Acid Plant Area Remedial Investigation and Feasibility Study Work Plan* (RI/FS Work Plan, Exponent 1998). For example, north (i.e., plant north) in the text and figures is equivalent to geographic northwest.

The Site occupies approximately 40 acres and is generally flat with surface elevations between 25 and 38 feet (National Geodetic Vertical Datum of 1929). An approximately 30-foot bluff occurs along the eastern side of the property, which forms the bank of the Willamette River.

1.2 SITE HISTORY

Various chemicals have been produced at the facility since 1941, including sodium chlorate, potassium chlorate, chlorine, sodium hydroxide, p,p'-dichlorodiphenyltrichloroethane (DDT), sodium orthosilicate, sodium hydroxide, magnesium chloride hexahydrate, ammonia, ammonium perchlorate, and hydrochloric acid. The facility was an operating chloro-alkali plant until 2001 when the entire facility was shut down. The facility was developed with buildings, paved roads, rail spur access, and associated tanks and piping in support of the former chloro-alkali manufacturing process. The facility was decommissioned and demolished in 2004. With the exception of an office building, the developed portion of the Site is now level and entirely covered with asphalt driveways, concrete slab foundations, crushed concrete, and an engineered cover.

Initial investigation activities at the Site focused on potential environmental concerns in the facility's Acid Plant area (Figure 2). In 1998, Arkema entered into a Voluntary Agreement (Oregon Department of Environmental Quality [ODEQ] No. ECVC-WMCVC-NWR-97-14, dated 26 August 1998) with ODEQ to address impacts to soil and groundwater in the Acid Plant area and in sediment in the Willamette River, adjacent to the Site (*Voluntary Agreement for Remedial Investigation/Feasibility Study*, ODEQ 1998). The Acid Plant area has historically contained the majority of chemical manufacturing and processing activities (Elf Atochem 1999). As part of the Voluntary Agreement, Arkema prepared the RI/FS Work Plan (Exponent 1998). The RI/FS Work Plan was approved by ODEQ in a letter dated 5 February 2003. This Level I Ecological Risk Assessment (ERA) was performed as part of the RI/FS completed at the Site. During the RI, the Chlorate Plant area was identified as an additional area of potential environmental concern.

The United States Environmental Protection Agency entered into an Administrative Order on Consent with a group of responsible parties known as the Lower Willamette Group (LWG) for the performance of an RI/FS to address in-water environmental issues for the Portland Harbor Superfund Site, which is adjacent to the facility. Arkema is a member of the LWG. Under the terms of the Administrative Order on Consent, the LWG is required to develop and implement an RI/FS work plan for the Portland Harbor Superfund Site. As a result, in-water ecological and human health risk assessments for the facility will be conducted by the LWG.

The following paragraphs provide a description of the operational histories of the two areas of concern at the Site.

1.2.1 *Acid Plant Area Operational History*

DDT was manufactured in the Acid Plant area from late 1947 to 1954. The raw materials used to manufacture the DDT included:

- Chloral (trichloroacetaldehyde);
- Chlorobenzene (also known as monochlorobenzene or MCB); and
- Oleum-104 percent (fuming sulfuric acid).

DDT was manufactured inside the former DDT process building (labeled as "Process" in the Acid Plant area on Figure 2). Manufacturing process

residues (MPRs) were discharged to a floor drain in the DDT process building during the initial startup. From 1948 to 1950, process residues were discharged directly to an MPR pond located northeast of the building. From 1950 to 1954, when DDT manufacturing ceased, the MPR was piped to an MCB recovery system and then into the shallow MPR pond. The recovery system reportedly was located immediately west of the former MPR pond. The recovery system consisted of a steam stripper, in which MCB was removed from the waste and returned to the process. The entire system was located on a curbed concrete slab. Wastes from the system reportedly were drained periodically to the former MPR pond. Reportedly, a trench was constructed off the northeastern corner of the former MPR pond in 1951 or 1952. This trench extended north about 300 feet.

The area designated as the Acid Plant area was used for all materials-handling operations associated with the manufacturing and handling of DDT and associated wastes.

In addition to DDT manufacturing operations, ammonium perchlorate operations were conducted in the former DDT process building from 1958 through 1962. This material was sold as a solid propellant for guided missiles. Some ammonium perchlorate handling took place in the No. 3 Warehouse, adjacent to the Acid Plant area to the southeast.

1.2.2

Chlorate Plant Area Operational History

Sodium chlorate manufacturing started in 1941 in its current location (Chlorate Plant area; Figure 2). Chlorate was produced by electrolysis of a sodium chloride solution. Sodium bichromate was added to the process as a corrosion inhibitor and to improve the electrical efficiency of the process. Chlorate solutions were shipped from the Site either by truck or barge. Truck loading occurred on the southern side of the Chlorate Plant area (Figure 2). Barge loading of chlorate solutions occurred at the No. 2 Dock.

Potassium chlorate manufacturing was initiated in the Chlorate Plant area in 1941. This operation was terminated in approximately 1978. Production operations were similar to sodium chlorate operations with the exception that potassium chloride was used as the source of salt rather than sodium chloride.

1.3 *SITE LAND USE*

1.3.1 *Current and Future Land Use*

The current and likely future land use of the Site is industrial. The Site is located in the heart of the Guild's Lake Industrial Sanctuary, zoned and designated "IH" for heavy industrial use. On 14 December 2001, the Portland City Council voted to adopt the Guild's Lake Industrial Sanctuary Plan (GLISP). The GLISP is intended to preserve industrial land in the area generally bounded by Vaughn Street on the south, St. Johns Bridge on the north, Highway 30 on the west, and the Willamette River on the east. The plan became effective on 21 December 2001.

The purpose of the GLISP is to maintain and protect this land as a dedicated area for heavy and general industrial uses. The plan's vision statement, policies, and objectives were adopted as part of Portland's Comprehensive Plan and are implemented through amendments to the City's Zoning Code. As a result of the GLISP, future land use at the Site will be industrial.

The nearest residential structures are located outside of the GLISP, approximately 0.3 miles west of the facility (Figure 1). Forest Park, a large, forested park, is located approximately 0.5 miles to the west of the Site. Heavy industrial land use surrounds the Site and isolates it from any residential areas and Forest Park (Figure 1).

Adjacent to the Site is an unused property that is also owned by Arkema. This property, known as Lots 1 and 2, is largely undeveloped and could provide upland wildlife habitat (Figure 3). On the northeastern edge of Lots 1 and 2 is a stand of black cottonwood trees, a willow thicket, and an area that is overgrown with scrub/shrubs. Trees and scrub/shrub overgrowth also exist on the western edge of Lot 1. The remainder of the property is vegetated with grasses or is currently bare.

Currently, the majority of land within Lots 3 and 4 is paved, gravel covered, or covered with building foundations. A small portion of Lots 3 and 4 in the greenway, adjacent to the top of the riverbank and outside the property fence, contains potential for ecological receptors. However, future remediation will likely result in covering more than half of the greenway in this area with a cap.

Tract A is located along the riverbank, above the mean high water line of the Willamette River. Tract A is steeply sloping and covered with large-sized rubble that is used for bank stabilization. A limited amount of

vegetation grows amongst the bank armoring material providing limited habitat to ecological receptors.

A future greenway has been proposed for the Site adjacent to the Willamette River. The greenway setback extends 50-feet landward from the top of the riverbank and consists of a 25-foot setback requirement and an additional 25 feet for future landscaping. This 50-foot wide strip will extend from the southern end of Lot 4 to the northern boundary of Lot 1. Due to security concerns, this area will not be accessible from off site and will be maintained as green space (Figure 3).

The extent of potential ecological habitat at the Site is limited to the small portion of Lots 3 and 4 adjacent to the top of the riverbank outside the property fence, Tract A, and the future greenway setback. Although potential ecological habitat is found on Lots 1 and 2, the assessment of those properties was performed separately and is not included in this study.

1.4

KNOWN OR SUSPECTED HAZARDOUS SUBSTANCE RELEASES

The primary constituents of interest (COIs) that are known or suspected of having been released to soil and groundwater at the Site include DDT and its metabolites DDD and DDE, MCB, perchlorate, and hexavalent chromium (Exponent 1998, ERM-West, Inc. [ERM] 2003, ERM 2004). Other volatile and semivolatile organic compounds, pesticides, and metals have been detected in low concentrations in soil or groundwater. However, the areas where these substances have been found in soil and groundwater are almost entirely paved or covered with buildings, so there are virtually no opportunities for ecological receptors to be exposed to these substances.

Unlike the rest of the Site, the potential ecological habitat (i.e., the small portion of Lots 3 and 4 adjacent to the top of the riverbank outside the property fence, Tract A, and the greenway setback) is not covered by a continuous covered surface and contains coverage of bank armoring, vegetation, and soil. Soil samples taken in this area contained detections of pesticides, polycyclic aromatic hydrocarbons, and several metals. Due to the ecological habitat in this area, although limited, it is possible that ecological receptors could contact soils containing these constituents.

1.5

SENSITIVE ENVIRONMENTS

The only sensitive environments, as defined by the Oregon Administrative Rule 340-122-115(50), that occur at the Site are the future greenway and the riparian environment of the Willamette River. Several species of anadromous salmonid fish are known to use the Willamette River adjacent to the Site as a migratory corridor. Potential impacts of Site conditions to the sensitive environments and river are being addressed in the upland source control evaluation (SCE) and, subsequently, in a separate assessment by the LWG.

1.6

THREATENED AND ENDANGERED SPECIES

The City of Portland recently completed an inventory of natural resources within and along the Willamette River from its confluence with the Columbia River to a point upstream of Ross Island (City of Portland 2000). Included within that inventory was a summary of information gathered from the Oregon Natural Heritage Program and the United States Fish and Wildlife Service on special status species and their documented or potential occurrence within the study area. Species of special interest, as defined for the purposes of that inventory, included state- and federally-listed, proposed, and candidate species, as well as federal "species of concern" and state "sensitive species." Inventory information on threatened and endangered species is provided in Appendix A.

The species of special interest identified as potentially inhabiting the City of Portland's study area included six plant, seven bird, two reptile, one amphibian, two aquatic invertebrate, four bat, and seven fish species. None of these species are known to occur at the Site and suitable habitat for these species does not occur at the Site. Several aquatic species (fish, herpetiles, and invertebrates) occur in the Willamette River adjacent to the Site and consideration of potential risks to these species and other aquatic receptors posed by conditions in the Willamette River will be addressed by the ongoing LWG in-water risk assessment. Prior to the LWG in-water risk assessment, Arkema will conduct an upland SCE to assess the need for remedial measure to control the migration of upland contaminants to the Willamette River.

2.0 *SITE VISIT SUMMARY*

Site visits were conducted by Nicholas Gard and David Livermore of Exponent on 28 April 1999 and Julia Tims of ERM on 19 June 2003, accompanied by Larry Patterson, Environmental Manager at Arkema's Portland facility. At the time of the site visits, the weather was clear with partially overcast skies. The temperature was between 65 and 70 degrees Fahrenheit. Exponent and ERM staff walked the entire property, including the entire length of the facility's shoreline along the Willamette River. Photographs were taken of key facility features and habitat areas. A photographic log is included in Appendix B. Checklists for Ecological Scoping and Evaluation of Receptor-Pathway Interactions were completed and are included in Appendix C. A map of the ecological habitats observed on the Site is presented on Figure 3.

2.1 *CONSTITUENTS OF INTEREST*

DDT, DDD, DDE, chromium, lead, zinc, polycyclic aromatic hydrocarbons, hexachloroethane, and alpha-BHC are the COIs for soil on and adjacent to the riverbank. Additional constituents were detected in soils on Lots 3 and 4, however, these areas are covered with building foundations and other barriers that prevent ecological contact with these soils. Distribution of COIs on the potential ecological habitat at the Site is presented on Figures 4 through 7.

Perchlorate, hexavalent chromium, DDT, DDD, DDE, and MCB are primary COIs for groundwater. There is no groundwater discharge to the surface at the Site; thus, the importance of COIs in groundwater will be deferred to the upland SCE and the LWG risk assessment.

2.2 *OBSERVED IMPACTS*

No impacts of COIs on plants or animals were observed during site visits conducted in 1999 or 2003. Vegetation is almost nonexistent on Lots 3 and 4 since most of the land is covered with buildings and paved areas. Herbaceous and shrub vegetation occurs on the upper edges of the riverbank. Lower sections of the riverbank are generally devoid of vegetation because of the extensive presence of riprap.

There are no waterbodies on the terrestrial portions of the Site of sufficient depth, breadth, or temporal permanency to support fish populations.

All wildlife observed at the facility or adjacent to it appeared to be healthy and there was no evidence that any receptors were experiencing overt adverse effects from any potential exposures to Site chemicals.

2.3

ECOLOGICAL FEATURES

The majority of the Site is covered by gravel and geosynthetics, asphalt, or concrete pavement and building foundations for facilities that formerly housed manufacturing facilities and these areas do not provide ecological habitat. Natural areas at the Site are limited to the riverbank adjacent to the Willamette River (Tract A; Figure 3).

The riverbank provides a limited amount of wildlife habitat, but much of the area shows the effects of physical disturbance (e.g., bank armoring) and is steeply sloped, covered with large chunks of concrete and asphalt that serve as riprap for much of its length, and natural vegetation is characterized by early successional species that thrive on disturbed areas. Soil sampling efforts of the riverbank have been hampered by the steep slope, the roughness of the riprap, and the lack of access to underlying soils due to nearly complete coverage of riprap materials along the riverbank.

Vegetation on the riverbank is growing between the pieces of riprap and is in an early successional stage and characterized by ruderal species (i.e., pioneer species that are typically first to colonize an area). Common plant species in this area include curly dock, white clover, wild chamomile, hairy cat's ear, Queen Anne's lace, common plantain, black mustard, teasel, Scotch broom, and Himalayan blackberry. The dominance of the vegetation community by these invasive weedy species has likely been exacerbated by the anthropogenic disturbance that the area has undergone.

Wildlife use of the riverbank adjacent to the facility appears to be minimal, possibly due to the steep nature of the riverbank, its disturbed nature, and the vegetation coverage. Some rodents and birds occur in the vegetated areas. During the site visit in 2003, ERM staff observed ring-billed gull (*Larus delawarensis*), California gull (*Larus californicus*), killdeer (*Charadrius vociferous*), American crow (*Corvus brachyrhynchos*), house sparrow (*Passer domesticus*), European starling (*Sternus vulgaris*), mourning dove (*Zenaida macroura*), and American robin (*Turdus migratorius*) along

the riverbank or flying over the Site. The gulls and killdeer were observed loafing in an open paved area near the center of the Site. At least one pair of Canada geese (*Branta canadensis*) and possibly common songbirds such as the song sparrow (*Melospiza melodia*) have been documented to nest at the Site in the past.

No mammals were observed during the site visit. Mr. Patterson indicated that nutria (*Myocastor coypus*) have been observed foraging along the shoreline of the Willamette River (within Tract A). Blacktail deer (*Odocoileus hemionus*) have been observed on the adjacent property in Lot 1 and are likely to utilize the future greenway and river bank near the northern boundary of Tract A for access to the river and potentially for cover. Because of the chain link fence that surrounds Lots 3 and 4, and the gravel cover of the Site, large mammalian use of the developed portion of the Site is not expected.

The shoreline of the Willamette River immediately adjacent to the Site, which is below the mean high water line and therefore excluded from this Level I ERA, was sandy without riparian, emergent, or submergent vegetation. Species that may occur along the shoreline, but were not observed during 1999 or 2003 site visits, include piscivorous wading birds (e.g., herons) and nutria. Consideration of risks to these potential receptors will be considered further in the LWG risk assessment.

2.4

ECOLOGICALLY IMPORTANT SPECIES/HABITATS

There are no unique ecological features present at the Site. The Willamette River adjacent to the facility may constitute ecologically important habitat for some salmonid and waterbird species; however, ecological risk issues associated with the Willamette River are being addressed in a separate assessment being conducted by the LWG and therefore, are not discussed in this report.

Wildlife species observed along the future greenway and Tract A included species typically associated with urban areas, such as Canada geese, gulls, and common songbirds. No wildlife was observed in the developed portion of Lots 3 and 4. ODEQ's Level I ERA guidance (ODEQ 1997) defines an ecologically important species as a local population that are valued by local stakeholders. Using this criterion, no ecologically important species were observed at the Site, and none are expected to occur on the developed portions of Lots 3 and 4 because of a lack of available habitat. However, Tract A and the future greenway constitute the riparian zone for the Willamette River and thus represent important

habitat in this area. Tract A (the riverbank) and the future greenway could support populations of migratory birds, waterfowl, amphibians, and mammals, etc. Using the ODEQ guidance, these species could be considered ecologically important.

2.4.1 *Threatened and/or Endangered Species and Their Habitats*

No species of special interest or their habitats are known to occur on the Site. The developed nature of the Site limits wildlife use to those species that are common to the region and adapted to urban environments. The portion of the Site along the Willamette River contains limited wildlife habitat (herbaceous and shrub vegetation) that is sparsely distributed and dominated by invasive/exotic species. Therefore, there is no suitable terrestrial habitat for species of special interest.

2.5 *EXPOSURE PATHWAYS*

The media of potential interest for the Level I ERA is uncovered surface soils on and near the riverbank. In the future, soils within the greenway may become a media of potential interest if the greenway is developed as a vegetated area.

Previous investigations have found that soils with elevated DDT, DDD, DDE, and MCB concentrations are localized around areas where DDT manufacturing and MCB recovery occurred (i.e., the Acid Plant area). This area is now covered by either gravel and geosynthetics, pavement, or building foundations, thereby eliminating potential exposure pathways to ecological receptors. In the terrestrial areas outside of the Acid Plant area, DDT and other COIs have either been found at low concentrations or were not detected. If COIs were present in surface soils, the primary exposure for potential terrestrial ecological receptors would be to surface soils through the food and incidental soil ingestion pathways. The absence of permanent waterbodies (i.e., lakes or ponds) at the Site excludes the possibility of exposure of terrestrial receptors via this route.

Although elevated concentrations of COIs occur in groundwater at the facility, there is no exposure pathway from groundwater to ecological receptors at the Site.

Groundwater may be discharging to the bottom of the Willamette River, so there is the possibility that ecological receptors in the Willamette River may be exposed to these substances. Moreover, the potential exists for COIs in the soil to migrate to the river via bank erosion and/or failure.

Therefore, Arkema will conduct an upland SCE prior to the LWG in-water risk assessment. The SCE will assess the need for remedial measures to control the migration of upland contaminants to the Willamette River.

3.0 *SUMMARY AND RECOMMENDATION*

3.1 *SUMMARY*

The presence of COIs at elevated concentrations in environmental media at the Site is limited to soil and groundwater that are located almost entirely beneath gravel and geosynthetics, pavement, or building foundations. Consequently, there are limited exposure pathways for terrestrial ecological receptors that may visit the developed portions of Lots 3 and 4.

Ecological habitat and, therefore, potential ecological exposure at the Site is limited to the narrow strip of vegetated riverbank along the Willamette River (i.e., Tract A, the greenway easement, and a small portion of Lots 3 and 4 located adjacent to the riverbank, outside the existing fence; Figure 3). Sensitive environments occur within the riparian zone of the Willamette. Threatened or endangered species do not occur within this habitat but may occur in the river. Because the riverbank is steeply sloped and heavily armored for much of its length, natural vegetation is denser on the upper sections of the slope, and wildlife use of the shoreline appears to be minimal. Nonetheless, exposure pathways from contaminated bank soil to terrestrial receptors could occur along the riverbank.

Potential migration of constituents from the Site to sensitive environments will be addressed in an upland SCE. Groundwater may be discharging to the bottom of the Willamette River, so there is the possibility that ecological receptors in the Willamette River may be exposed to these substances. Additionally, there is the potential for COIs in soil to migrate to the Willamette River via storm water runoff and bank erosion/failure. Following the upland SCE, potential risks from the upland sources will be evaluated in a separate in-water risk assessment conducted by the LWG.

3.2 *RECOMMENDATION*

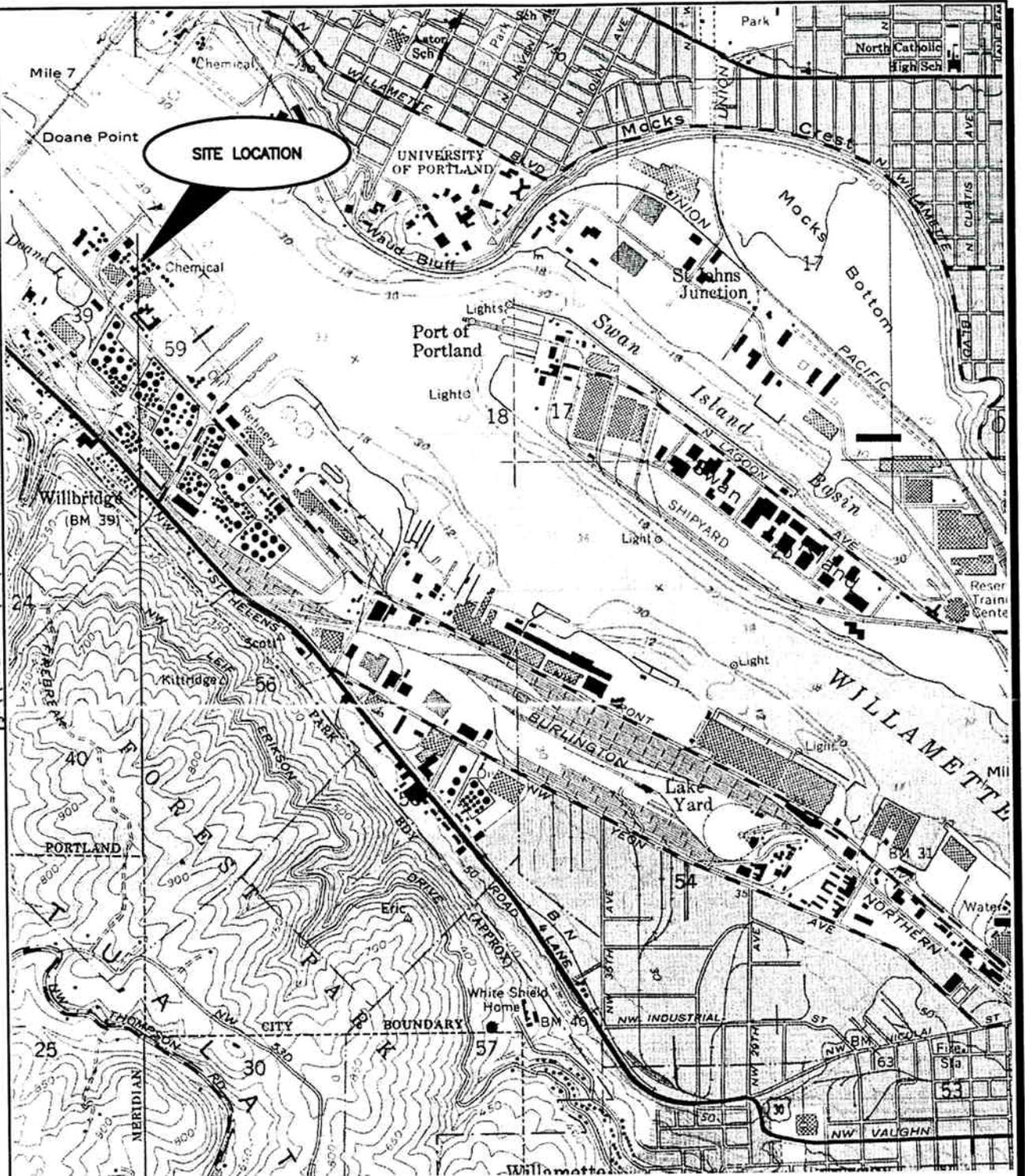
Based on the findings of this Level I ERA, ERM recommends proceeding to a Level II ERA to address bank-dwelling species exposure to soil contaminants on Tract A, the greenway easement on Lots 3 and 4, and the small portion of Lots 3 and 4 outside the existing fence.

REFERENCES

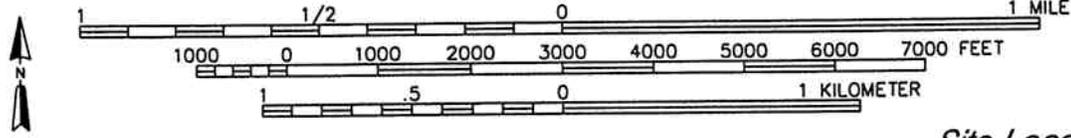
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Figures

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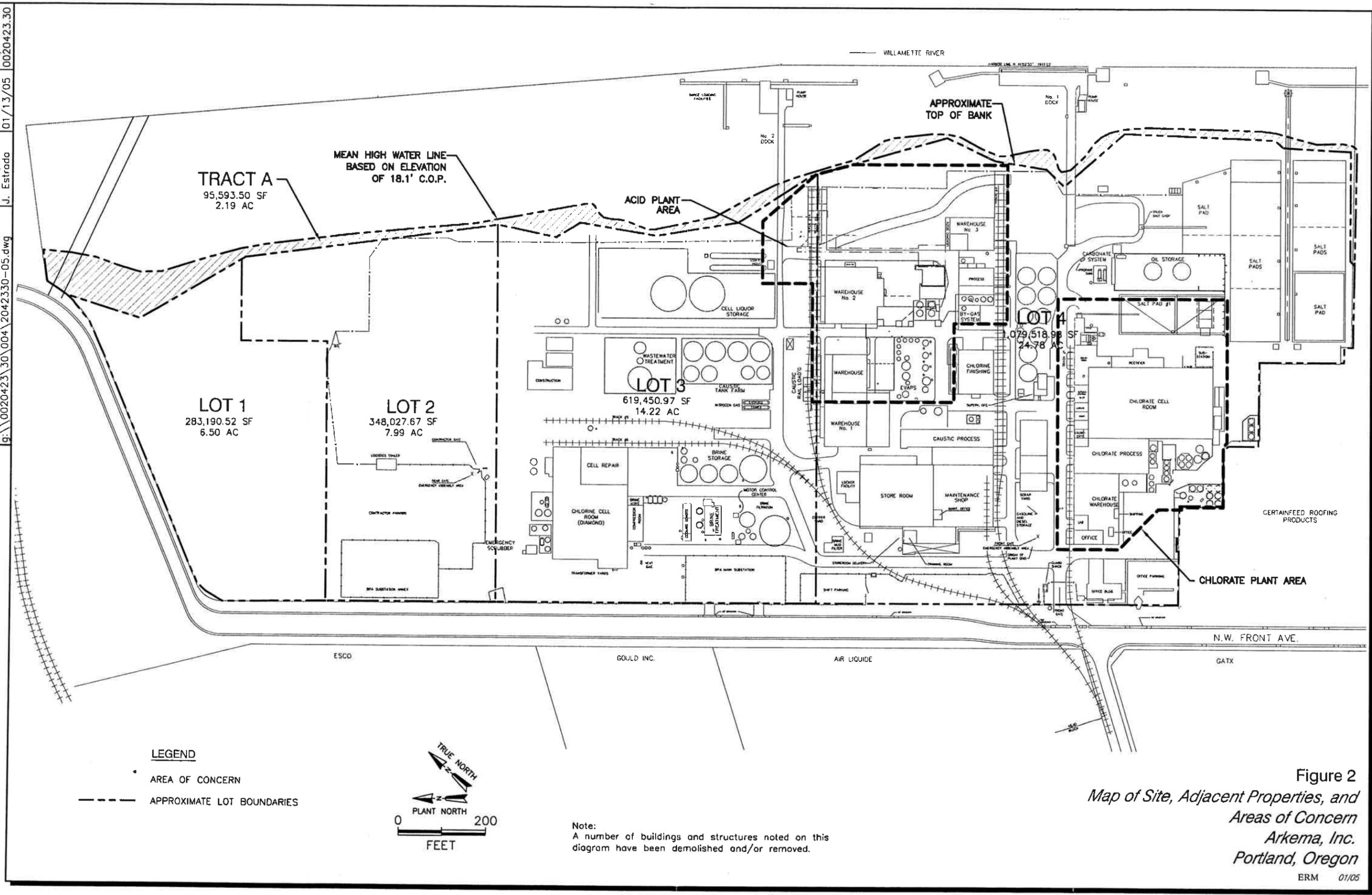
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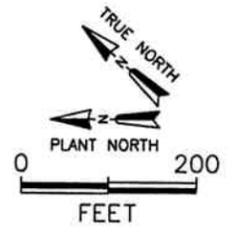
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Figure 1
 Site Location Map
 Arkema, Inc.
 Portland, Oregon

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 Drawn By: J. Estrada
 Date: 01/13/05
 Project No: 0020423.30

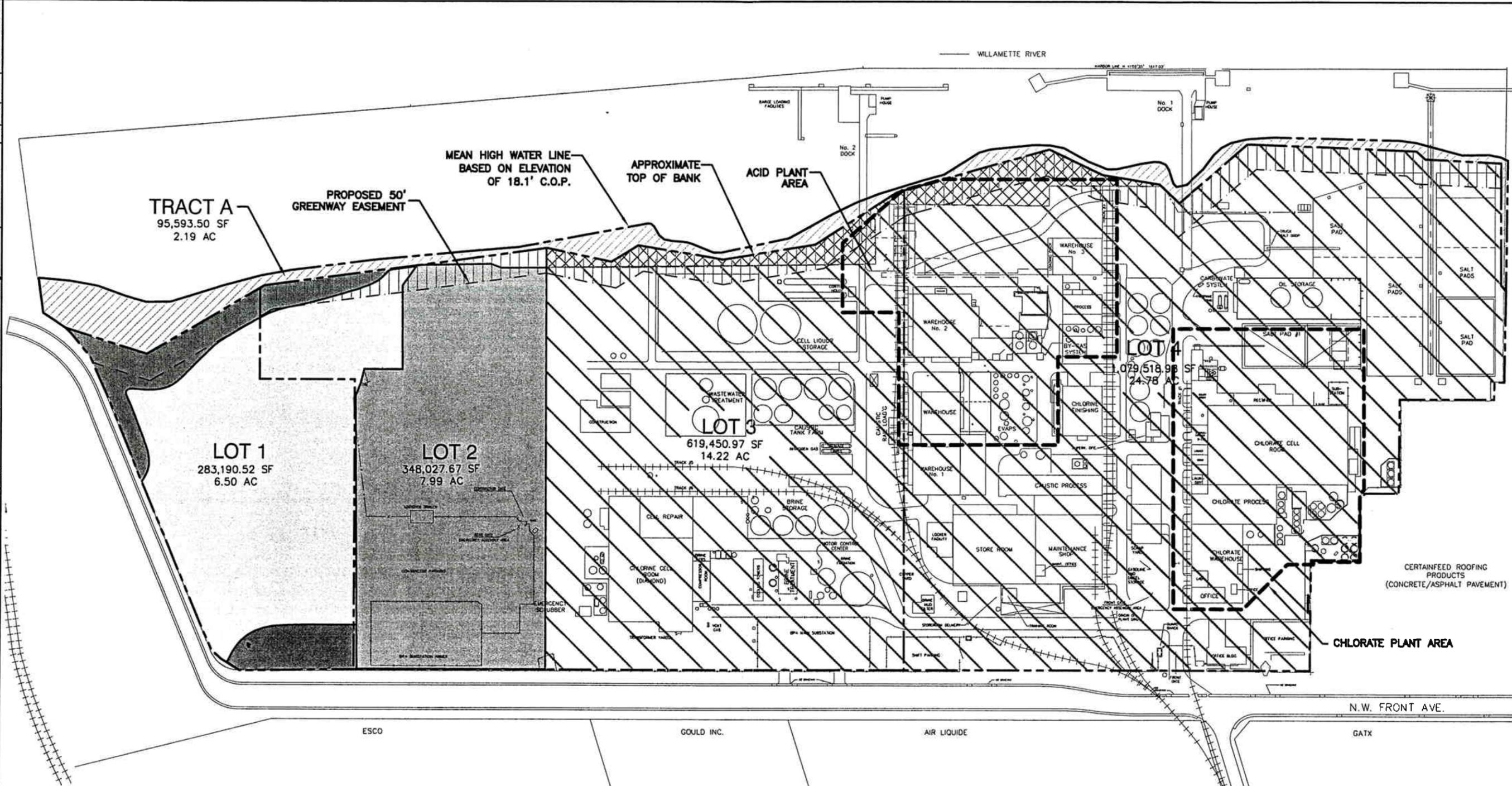


LEGEND
 ● AREA OF CONCERN
 - - - APPROXIMATE LOT BOUNDARIES



Note:
 A number of buildings and structures noted on this diagram have been demolished and/or removed.

Figure 2
 Map of Site, Adjacent Properties, and
 Areas of Concern
 Arkema, Inc.
 Portland, Oregon



LEGEND

- PORTION OF ARKEMA FACILITY ADDRESSED SEPARATELY
- GRAVEL/CRUSHED CONCRETE
 - GRASS AND SCRUB/SHRUB
 - MATURE TREES WITH SCRUB/SHRUB

- AREA OF CONCERN
- APPROXIMATE LOT BOUNDARIES

HABITAT COVER TYPES

- TRACT A - SCRUB/SHRUB AND RIPRAP
- LOTS 3 AND 4 - DEVELOPED AREA, COVER WITH BUILDINGS, PAVEMENT, OR GRAVEL
- LOTS 3 AND 4 - TOP OF RIVERBANK, GRAVEL WITH SPARSE GRASS AND SCRUB/SHRUB
- PROPOSED GREENWAY - MAINTAINED LANDSCAPING

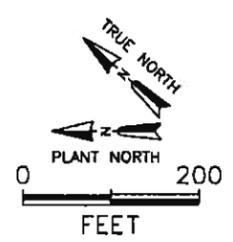
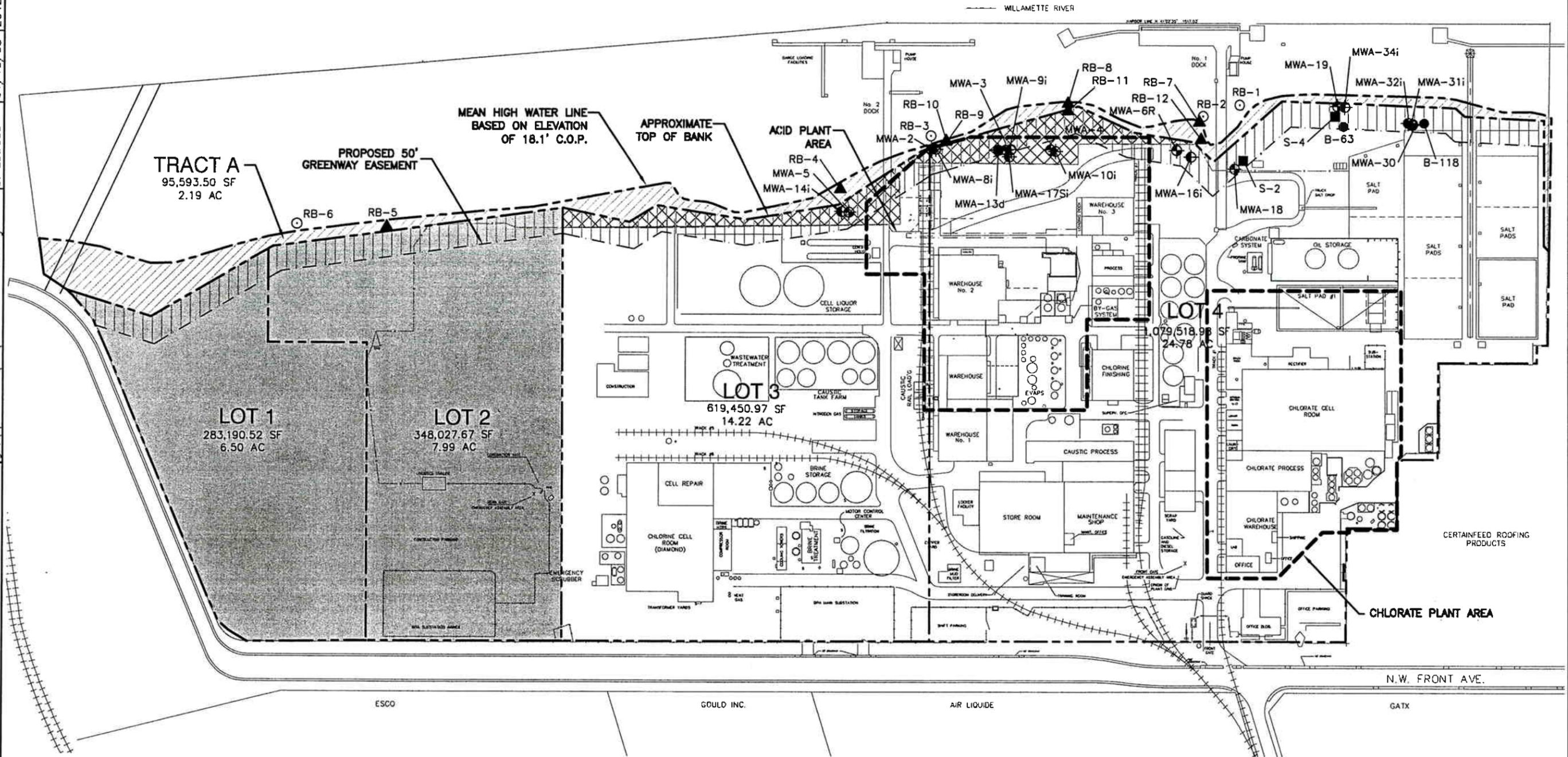


Figure 3
 Ecological Habitat Cover Type
 Arkema, Inc.
 Portland, Oregon



LEGEND

- PORTION OF ARKEMA FACILITY ADDRESSED SEPARATELY
- AREA OF CONCERN
- APPROXIMATE LOT BOUNDARIES

- MONITORING WELL SOIL SAMPLING LOCATION
 - SHALLOW ZONE
 - INTERMEDIATE ZONE
 - DEEP ZONE
- SOIL SAMPLING BORING LOCATION
- SURFACE SOIL SAMPLING LOCATION
- RIVERBANK SOIL SAMPLING LOCATION, TRACT A
- RIVERBANK SOIL SAMPLING LOCATION, BELOW MEAN HIGH WATER (IN-WATER)

HABITAT COVER TYPES

- TRACT A - SCRUB/SHRUB AND RIPRAP
- LOTS 3 AND 4 - TOP OF RIVERBANK, GRAVEL WITH SPARSE GRASS AND SCRUB/SHRUB
- PROPOSED GREENWAY - MAINTAINED LANDSCAPING

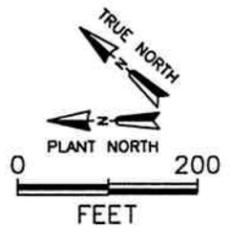
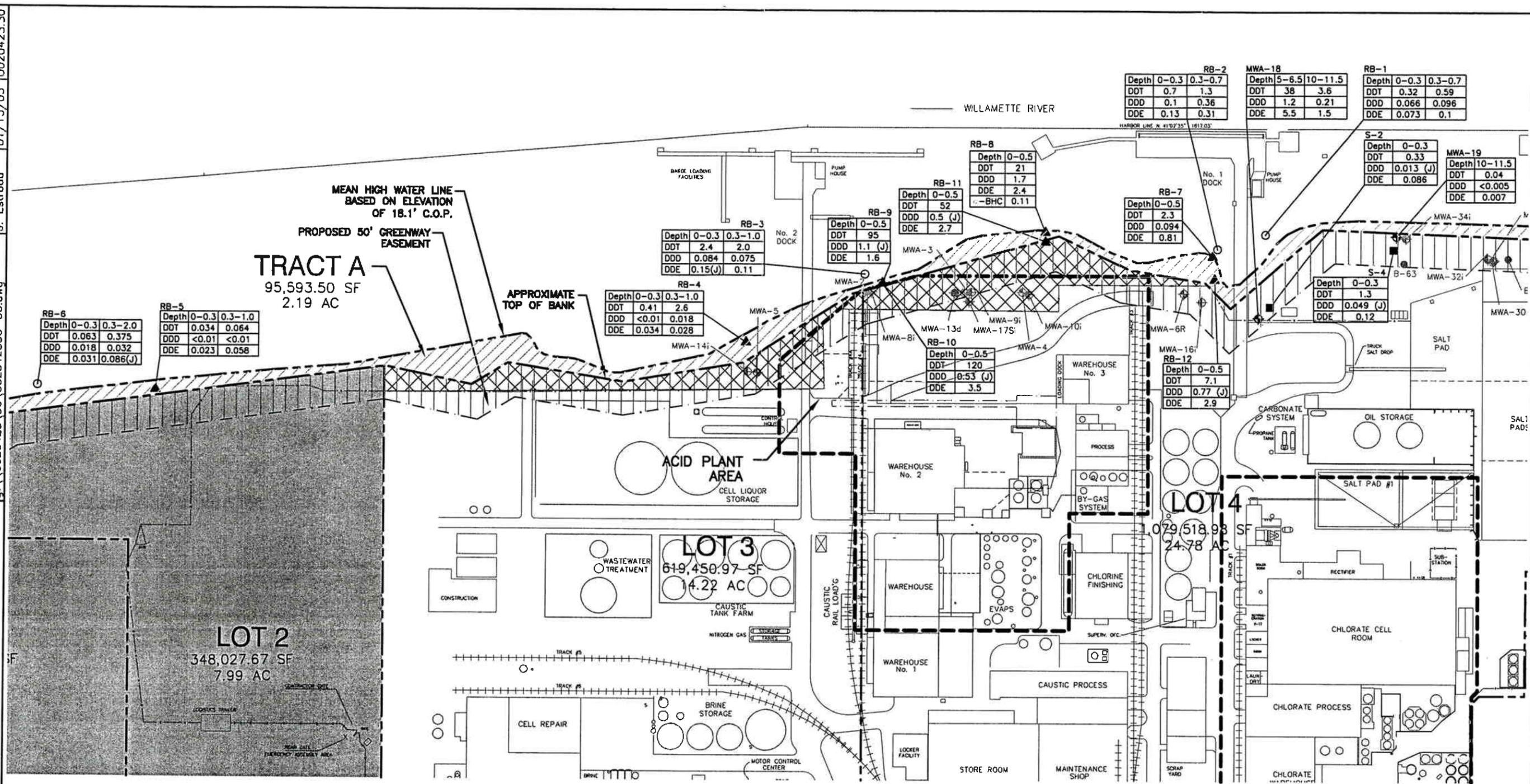


Figure 4
 Soil Sampling Locations in
 Area of Potential Ecological Habitat
 Arkema, Inc.
 Portland, Oregon

Project No. 0020423.30
 Date: 01/13/05
 Drawn By: J. Estrada
 CAD File: g:\0020423\002042330-06.dwg



LEGEND

- PORTION OF ARKEMA FACILITY ADDRESSED SEPARATELY
- AREA OF CONCERN
- APPROXIMATE LOT BOUNDARIES

- MONITORING WELL SOIL SAMPLING LOCATION
 - SHALLOW ZONE
 - INTERMEDIATE ZONE
 - DEEP ZONE
- SOIL SAMPLING BORING LOCATION
- SURFACE SOIL SAMPLING LOCATION
- RIVERBANK SOIL SAMPLING LOCATION, TRACT A
- RIVERBANK SOIL SAMPLING LOCATION, BELOW MEAN HIGH WATER (IN-WATER)

HABITAT COVER TYPES

- TRACT A - SCRUB/SHRUB AND RIPRAP
- LOTS 3 AND 4 - TOP OF RIVERBANK, GRAVEL WITH SPARSE GRASS AND SCRUB/SHRUB
- PROPOSED GREENWAY - MAINTAINED LANDSCAPING

Notes:
 Sample depths are in feet below ground surface.
 Concentrations are in mg/kg.
 Grey sample locations were not analyzed for pesticides.
 Results for RB-6 are averages of sample and duplicate sample.

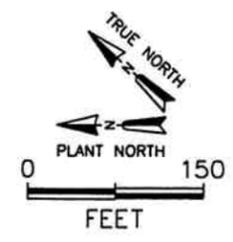


Figure 5
 Pesticide Concentrations in Soil (0-12' BGS)
 Arkema, Inc.
 Portland, Oregon

Project No. 20423.30
 Date: 01/13/05
 Drawn By: J. Estrada
 CAD File: g:\0020423\30\002042330-03.dwg

CHEMICAL ABBREVIATIONS

- B(a)A - Benzo(a)anthracene
- B(a)P - Benzo(a)pyrene
- B(a)F - Benzo(b)fluoranthene
- B(ghi)P - Benzo(ghi)perylene
- B(k)F - Benzo(k)fluoranthene
- CHRY - Chrysene
- D(ah)A - Dibenzo(a,h)anthracene
- FLOR - Fluoranthene
- HCE - Hexachloroethane
- I(123cd)P - Indeno(1,2,3-c,d)pyrene
- PYR - Pyrene
- B(2-EH)P - Bis(2-ethylhexyl)phthalate

Notes:
 Sample depths are in feet below ground surface.
 Concentrations are in mg/kg.
 Grey sample locations were not analyzed for VOCs, SVOCs, or petroleum hydrocarbons.

Depth	Concentration
0-0.5	
B(a)A	1.8
B(a)P	1.4
B(b)F	3.0
B(ghi)P	0.8
B(k)F	2.3
CHRY	1.9
D(ah)A	0.4
FLOR	2.1
HCE	2.2
I(123cd)P	1.0
PYR	1.4 (J)

Depth	Concentration
0-0.5	
B(2-EH)P	0.4

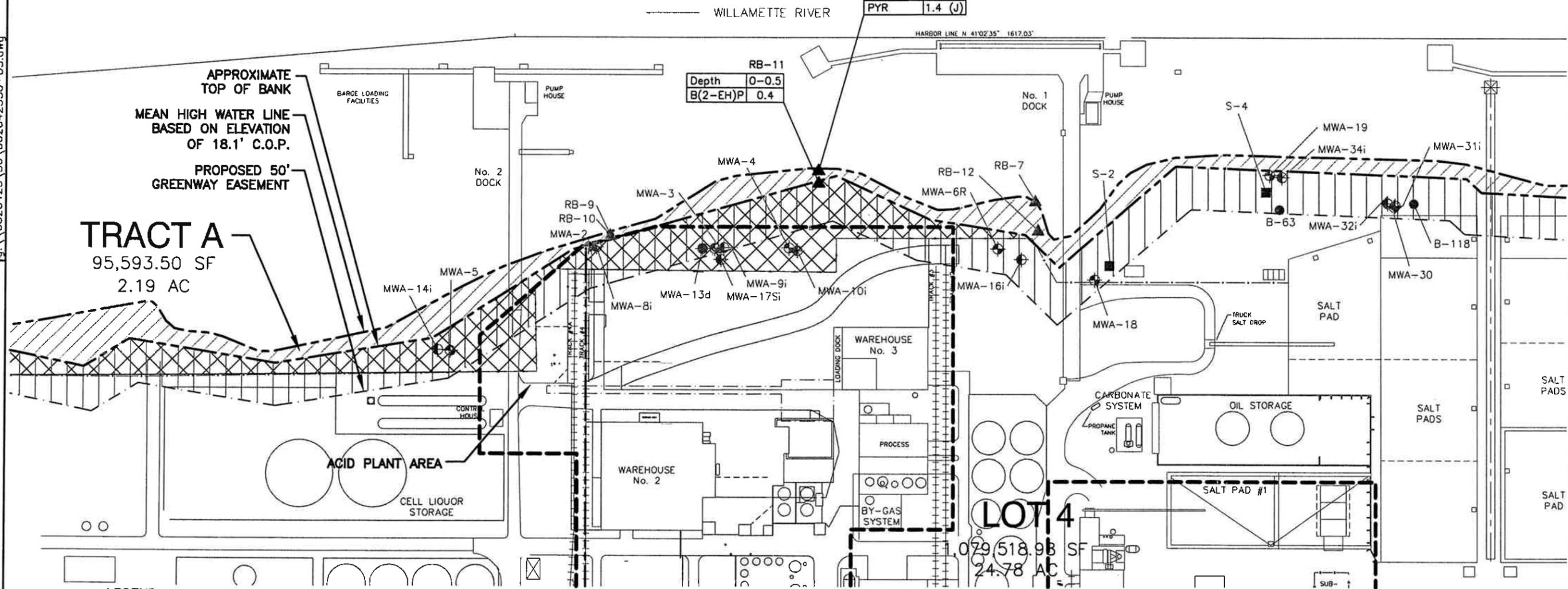


Figure 6
VOC, SVOC, and Petroleum Hydrocarbon
Concentrations in Soil (0-12' BGS)
 Arkema, Inc.
 Portland, Oregon

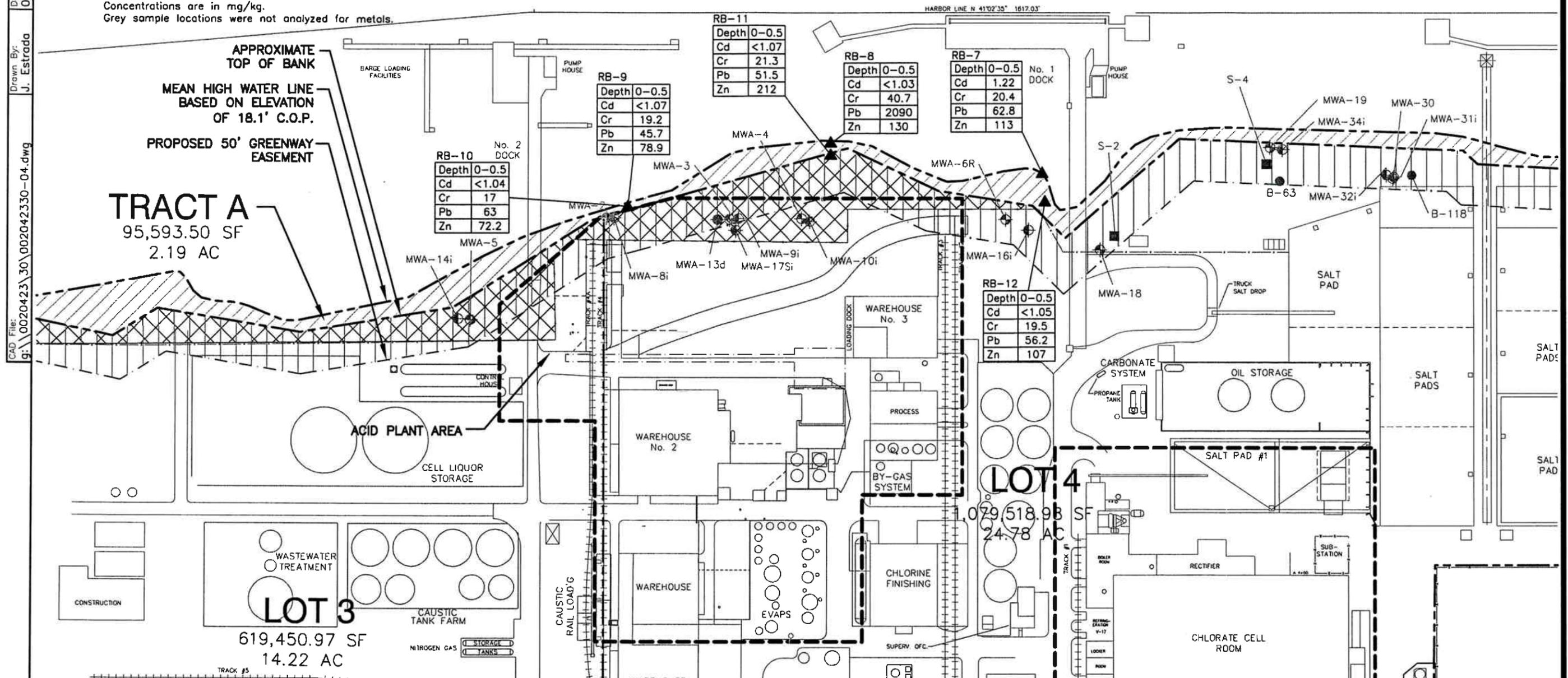
Project No. 0020423.30
 Date: 01/13/05
 Drawn By: J. Estrada
 CAD File: g:\0020423\30\002042330-04.dwg

CHEMICAL ABBREVIATIONS

Cd - Cadmium
 Cr - Chromium
 Pb - Lead
 Zn - Zinc

Notes:
 Sample depths are in feet below ground surface.
 Concentrations are in mg/kg.
 Grey sample locations were not analyzed for metals.

WILLAMETTE RIVER



LEGEND

- AREA OF CONCERN
- APPROXIMATE LOT BOUNDARIES
- MONITORING WELL SOIL SAMPLING LOCATION
 - SHALLOW ZONE
 - INTERMEDIATE ZONE
 - DEEP ZONE
- SOIL SAMPLING BORING LOCATION
- SURFACE SOIL SAMPLING LOCATION
- RIVERBANK SOIL SAMPLING LOCATION
- TRACT A - SCRUB/SHRUB AND RIPRAP
- LOTS 3 AND 4 - TOP OF RIVERBANK, GRAVEL WITH SPARSE GRASS AND SCRUB/SHRUB
- PROPOSED GREENWAY - MAINTAINED LANDSCAPING

HABITAT COVER TYPES

TRUE NORTH
 PLANT NORTH
 0 120 FEET

Figure 7
 Metals Concentrations in Soil
 Arkema, Inc.
 Portland, Oregon
 ERM 01/05

Appendix A

*Threatened and Endangered Species
Information*

OREGON NATURAL HERITAGE INFORMATION CENTER

Institute for Natural Resources



OREGON STATE UNIVERSITY
1322 SE Morrison Street
Portland, Oregon 97214-2423

October 29, 2003

Ann Baines
ERM, Inc.
350 Eagleview Boulevard, Suite 200
Exton, PA 19341

Dear Ms. Baines:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your Guild's Lake Industrial Sanctuary Project in Township 1 North, Range 1 East, Section 18, W.M.

Twelve (12) records were noted within a two-mile radius of your project and are included on the enclosed computer printout. A key to the fields is also included.

Please remember that the lack of rare element information from a given area does not mean that there are no significant elements there, only that there is no information known to us from the site. To assure that there are no important elements present, you should inventory the site, at the appropriate season.

Please note that at this time ORNHIC does not have comprehensive computerized records available for all anadromous fish in Oregon. I have listed below the species that may be present within the waterways contained in the project area. I have also included their listing by the National Marine Fisheries Service (NMFS). For more information on anadromous fish you may wish to contact NMFS at: 525 NE Oregon Street; Portland, Oregon 97232-2737. Please also note that the U.S. Fish and Wildlife Service now has jurisdiction over coastal cutthroat trout.

Coho salmon (Lower Columbia River)	<i>Oncorhynchus kisutch</i>	Candidate
Steelhead (Lower Columbia River)	<i>Oncorhynchus mykiss</i>	Threatened
Steelhead (Upper Willamette River)	<i>Oncorhynchus mykiss</i>	Threatened
Chinook salmon (Lower Columbia River)	<i>Oncorhynchus tshawytscha</i>	Threatened
Chinook salmon (Upper Willamette River)	<i>Oncorhynchus tshawytscha</i>	Threatened

This data is confidential and for the specific purposes of your project and is **not to be distributed**.

If you need additional information or have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Cliff Alton'.

Cliff Alton
Conservation Information Assistant

encl.: invoice (H-102903-CWAI)
computer printout and data key

NAME: COCCYZUS AMERICANUS OCCIDENTALIS
 COMMON NAME: WESTERN YELLOW-BILLED CUCKOO
 EO-CODE: ABNRB02022*026 LAST OBS: 1985 FED STATUS: C
 COUNTY(S): MULTNOMAH FIRST OBS: 1923-06-08 STATE STATUS:
 QUAD NAMES: PORTLAND LAT: 453712N ORNHP TRACK: Y
 PHYSIOGRAPHIC PROV: WV LONG: 1224300W PRECISION: G
 T-R-S: 002N001E 32 QUADCODE: 4512256 MINELEV (Feet): 10
 T-R-S COMMENTS:
 EO-RANK/COMM: D :
 DIRECTIONS: PORTLAND-ALONG THE COLUMBIA RIVER FROM THE MOUTH OF THE WILLAMETTE N TO WHAT IS NOW THE PORTLAND AIRPORT
 DESCRIPTION: COLUMBIA RIVER BOTTOMLANDS
 EO-DATA: 1985: 1 CUCKOO HEARD. 1940: 2 BIRDS ON 7-27. 1923: AT LEAST 12 BIRDS ON 6-8.
 EOTYPE:
 COMMENTS: OBSERVERS: MIKE HOUCK (1985), W.H. TELFER (1940), GABRIELSON AND JEWETT (1923).
 ANNUAL OBSERVATION:
 OWNER: PRIVATE
 MANAGED AREA:
 MANAGE COMM:
 PROT COMM:
 BEST SOURCE: HOUCK, MIKE. PORTLAND AUDUBON SOCIETY.

NAME: AGELAIUS TRICOLOR
 COMMON NAME: TRICOLORED BLACKBIRD
 EO-CODE: ABPBXB0020*002 LAST OBS: 1985 FED STATUS: SOC
 COUNTY(S): MULTNOMAH FIRST OBS: 1983 STATE STATUS: SP
 QUAD NAMES: PORTLAND LAT: 453550N ORNHP TRACK: Y
 PHYSIOGRAPHIC PROV: WV LONG: 1224305W PRECISION: M
 T-R-S: 001N001E 05 QUADCODE: 4512256 MINELEV (Feet): 20
 T-R-S COMMENTS:
 EO-RANK/COMM: C :
 DIRECTIONS: ST. JOHNS LANDFILL IN PORTLAND
 DESCRIPTION: DENSE HIMALAYAN BLACKBERRIES ADJACENT TO A BLIND SLOUGH W/ SPARSE TREE COVER ALONG THE SLOUGH MARGINS
 EO-DATA: 1985: A COLONY OF 20-30 BIRDS PRESENT DURING THE NESTING SEASON. 1983: 36 BIRDS OBSERVED 6/25-7/31,
 APPARENTLY NESTING.
 EOTYPE:
 COMMENTS: REPORTED BY HOUCK ET AL. THIS COLONY WOULD BE ABOUT 250 MI N OF THE CLOSEST NESTING AREAS IN THE ROGUE
 RIVER VALLEY
 ANNUAL OBSERVATION:
 OWNER: CITY
 MANAGED AREA:
 MANAGE COMM:
 PROT COMM:
 BEST SOURCE: HOUCK ET AL. 1983. AMERICAN BIRDS. 37(6):1022. HOUCK. 1985. PERSONAL COMMUNICATION W/ONHDB

NAME: ACIPENSER MEDIROSTRIS
 COMMON NAME: GREEN STURGEON
 EO-CODE: AFCAA01030*001 LAST OBS: FED STATUS: SOC
 COUNTY(S): CLATSOP FIRST OBS: STATE STATUS:
 COLUMBIA
 MULTNOMAH
 QUAD NAMES: CLATSOP SPIT LAT: 461350N ORNHP TRACK: N
 WARRENTON
 ASTORIA
 CATHLAMET BAY
 ROSBURG
 GRAYS RIVER
 SKAMOKAWA
 CATHLAMET
 NASSA POINT
 OAK POINT
 COAL CREEK

KELSO
 RAINIER
 KALAMA
 DEER ISLAND
 SAINT HELENS
 SAUVIE ISLAND
 LINNTON

VANCOUVER
PORTLAND
LAKE OSWEGO
GLADSTONE
OREGON CITY
MOUNT TABOR
CAMAS
WASHOUGAL
BRIDAL VEIL
MULTNOMAH FALLS
TANNER BUTTE
BONNEVILLE DAM

PHYSIOGRAPHIC PROV: CR
WV
WC

LONG: 1234945W

PRECISION:

T-R-S: 008N010W
008N009W
008N008W
009N008W
009N007W
008N006W
009N006W

QUADCODE: 4612421
4612328
4612327
4612326
4612336
4612335
4612334
4612324
4612323
4612322
4612321
4612228
4612218
4612217
4512287
4512277
4512267
4512257
4512266
4512256
4512246
4512245
4512235
4512255
4512254
4512253
4512252
4512251
4512158
4512168

MINELEV (Feet):

T-R-S COMMENTS:

EO-RANK/COMM: :

DIRECTIONS: COLUMBIA RIVER AND ESTUARY, UPSTREAM TO BONNEVILLE DAM. WILLAMETTE RIVER BELOW WILLAMETTE FALLS.

DESCRIPTION:

EO-DATA: NO COLLECTION INFORMATION AVAILABLE. GREEN STURGEON ADULTS ARE ABUNDANT AND THE NUMBERS ARE STABLE IN THE LOWER COLUMBIA RIVER. THEY ARE RARELY FOUND IN THE COLUMBIA RIVER FROM PUGET ISLAND (RM40) UPSTREAM TO BONNEVILLE DAM AND TO WILLAMETTE FALLS IN THE WILLAMETTE RIVER. (1995 ODFW BIENNIAL REPORT ON THE STATUS OF WILD FISH IN OREGON)

EOTYPE: YEAR-ROUND - fish

COMMENTS: GREEN STURGEON NOT ABUNDANT IN ANY PACIFIC COAST ESTUARY. LITTLE IS KNOWN ABOUT ITS LIFE HISTORY. THIS

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SPECIES MORE MARINE ORIENTED THAN WHITE STURGEON AND SPENDS LIMITED AMOUNT OF TIME IN FRESHWATER (EXCEPT PERHAPS EARLY JUVENILES AND SPAWNING ADULTS). B91NOA01ORUS.

ANNUAL OBSERVATION:

OWNER: STATE

MANAGED AREA:

MANAGE COMM:

PROT COMM:

BEST SOURCE: BIENNIAL REPORT ON THE STATUS OF WILD FISH IN OREGON. DECEMBER 1995. OREGON DEPARTMENT OF FISH AND WILDLIFE.

NAME: ONCORHYNCHUS KISUTCH POP 1

COMMON NAME: COHO SALMON (LOWER COLUMBIA RIVER/SW WASHINGTON COAST RUNS)

EO-CODE: AFCHA02031*037

LAST OBS: 1999-PRE

FED STATUS: C

COUNTY(S): COLUMBIA

FIRST OBS:

STATE STATUS: LE

MULTNOMAH

CLACKAMAS

COMMON NAME: CHINOOK SALMON - LOWER COLUMBIA RIVER FALL RUN
EO-CODE: AFCHA0205Y*006 LAST OBS: 1999-PRE FED STATUS: LT
COUNTY(S): CLACKAMAS FIRST OBS: STATE STATUS: SC
MULTNOMAH
COLUMBIA
QUAD NAMES: OREGON CITY LAT: ORNHP TRACK: Y
GLADSTONE
LAKE OSWEGO
PORTLAND
LINNTON
SAUVIE ISLAND

PHYSIOGRAPHIC PROV: LONG: PRECISION: M
T-R-S: QUADCODE: 4512235 MINELEV (Feet):
4512245
4512246
4512256
4512257
4512267

T-R-S COMMENTS:

EO-RANK/COMM: :
DIRECTIONS: SCAPPOOSE BAY & TRIBUTARIES, WILLAMETTE RIVER & TRIBUTARIES
DESCRIPTION:

EO-DATA: FALL RUN; ODFW DISTRIBUTION MAPS USED TO CREATE THE 1:24,000 COVERAGE
EOTYPE: REARING & MIGRATION - fish

COMMENTS: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND
DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR
REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF
CHINOOK IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING PRESENT.

ANNUAL OBSERVATION:

OWNER:
MANAGED AREA:
MANAGE COMM:
PROT COMM:
BEST SOURCE: 2000 ODFW GEOGRAPHIC RESOURCES DATA; MASSEY, JAY; BENNETT, DON; CALDWELL, DICK.

NAME: ONCORHYNCHUS MYKISS POP 27

COMMON NAME: STEELHEAD - LOWER COLUMBIA RIVER WINTER RUN

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EO-CODE: AFCHA02132*001 LAST OBS: 1999-PRE FED STATUS: LT
COUNTY(S): CLACKAMAS FIRST OBS: STATE STATUS: SC
MULTNOMAH
COLUMBIA
QUAD NAMES: OREGON CITY LAT: ORNHP TRACK: Y
GLADSTONE
LAKE OSWEGO
PORTLAND
LINNTON
SAUVIE ISLAND
SAINT HELENS

PHYSIOGRAPHIC PROV: LONG: PRECISION: M
T-R-S: QUADCODE: 4512235 MINELEV (Feet):
4512245
4512246
4512256
4512257
4512267
4512277

T-R-S COMMENTS:

EO-RANK/COMM: :
DIRECTIONS: SCAPPOOSE BAY, MULTNOMAH CHANNEL, WILLAMETTE RIVER
DESCRIPTION:

EO-DATA: WINTER RUN: ODFW DISTRIBUTIION MAPS USED TO CREATE THE 1:24,000 COVERAGE
EOTYPE: REARING & MIGRATION - fish

COMMENTS: DISTRIBUTION INFORMATION USED IN THIS EOR WAS DERIVED FROM ODFW GEOGRAPHIC RESOURCES DATA PRODUCED AND
DISTRIBUTED IN 1999. UNLESS SPECIFIC DATA EXISTS IN THE DATA FIELD, THE INFORMATION PRESENTED IN THIS EOR
REPRESENTS THE "BEST PROFESSIONAL JUDGMENT" BY ODFW'S DISTRICT FISHERIES BIOLOGIST; THE PRESENCE OF
STEELHEAD IN DESCRIBED AREAS SHOULD BE CONSIDERED UNDOCUMENTED BUT AS HAVING A POTENTIAL OF BEING
PRESENT.

ANNUAL OBSERVATION:

OWNER:
MANAGED AREA:
MANAGE COMM:

PROT COMM:
BEST SOURCE: 2000 ODFW GEOGRAPHIC RESOURCES DATA; MASSEY, JAY; BENNETT, DON.

NAME: CORYNORHINUS TOWNSENDII TOWNSENDII
COMMON NAME: PACIFIC WESTERN BIG-EARED BAT
EO-CODE: AMACC08015*071 LAST OBS: 1928-09-05 FED STATUS: SOC
COUNTY(S): MULTNOMAH FIRST OBS: 1914 STATE STATUS: SC
QUAD NAMES: PORTLAND LAT: 453220N ORNHP TRACK: Y
PHYSIOGRAPHIC PROV: WV LONG: 1223800W PRECISION: G
T-R-S: 001N001E 25 QUADCODE: 4512256 MINELEV (Feet): 150
T-R-S COMMENTS:
EO-RANK/COMM: D :
DIRECTIONS: PORTLAND - ON THE E SIDE
DESCRIPTION:
EO-DATA: ADULT MALE IN THE JEWETT COLLECTION WAS CAPTURED 9-5-28, A FEW MI FROM A CAVE ON THE E SIDE OF PORTLAND
THAT WAS USED BY HUNDREDS OF BATS IN 1914, BUT WAS LATER DESTROYED BY VANDALS
EOTYPE:
COMMENTS:
ANNUAL OBSERVATION:
OWNER: PRIVATE
MANAGED AREA:
MANAGE COMM:
PROT COMM:
BEST SOURCE: BAILEY. 1936. MAMMALS OF OREGON. MASSER & CROSS. 1981. NOTES ON THE DISTRIBUTION OF OREGON BATS

13:58:14 29 OCT 2003 NAME: CHRYSSEMY PICTA
COMMON NAME: PAINTED TURTLE
EO-CODE: ARAAD01010*022 LAST OBS: 1993-06 FED STATUS:
Page 6

COUNTY(S): MULTNOMAH FIRST OBS: 1985-06 STATE STATUS: SC
QUAD NAMES: PORTLAND LAT: 453655N ORNHP TRACK: Y
PHYSIOGRAPHIC PROV: WV LONG: 1224425W PRECISION: M
T-R-S: 002N001E 31 QUADCODE: 4512256 MINELEV (Feet): 10
T-R-S COMMENTS:
EO-RANK/COMM: A :
DIRECTIONS: SMYTH-BYBEE LAKES
DESCRIPTION: SUNNING LOGS & SNAILS ABUNDANT. NO OTHER TURTLE SPECIES PRESENT. BULLFROGS ABUNDANT
EO-DATA: 1993: 128 INDIVIDUALS OBSERVED. 1985: 1 PAINTED TURTLE OBSERVED.
EOTYPE:
COMMENTS: OBSERVERS: MARK HAYES AND DAN HOLLAND (1993). PHILLIP GADDIS AND CHAR CORKRAN (1985).
ANNUAL OBSERVATION:
OWNER: PRIVATE
MANAGED AREA:
MANAGE COMM:
PROT COMM:
BEST SOURCE: BRUCE, CHARLIE, ODFW BIOLOGIST.

NAME: EMYS MARMORATA MARMORATA
COMMON NAME: NORTHWESTERN POND TURTLE
EO-CODE: ARAAD02031*041 LAST OBS: FED STATUS: SOC
COUNTY(S): MULTNOMAH FIRST OBS: STATE STATUS: SC
QUAD NAMES: PORTLAND LAT: 453045N ORNHP TRACK: Y
PHYSIOGRAPHIC PROV: WV LONG: 1224130W PRECISION: G
T-R-S: 001S001E 04 QUADCODE: 4512256 MINELEV (Feet):
T-R-S COMMENTS:
EO-RANK/COMM: D :
DIRECTIONS: PORTLAND
DESCRIPTION:
EO-DATA: SPECIES RECORDED AT THIS SITE, PER ST. JOHN. DATES NOT SPECIFIED
EOTYPE:
COMMENTS:
ANNUAL OBSERVATION:
OWNER:
MANAGED AREA:
MANAGE COMM:
PROT COMM:
BEST SOURCE: ST. JOHN, ALAN. 1984. HERPETOLOGY OF THE LOWER WILLAMETTE VALLEY

NAME: FISHEROLA NUTTALLI
COMMON NAME: SHORTFACE LANX (=GIANT COLUMBIA RIVER LIMPET)
EO-CODE: IMGASL6010*003 LAST OBS: 1985 FED STATUS:
COUNTY(S): MULTNOMAH FIRST OBS: 1982 STATE STATUS:

KEY TO PRINTOUT

NAME AND COMMON NAME: The scientific and common name of the species.

EO-CODE (element occurrence code): Unique Heritage Program code for this occurrence. The first 10 characters are the code for the species, and the last 3 are the occurrence number.

COUNTY(S): County name(s)

QUAD NAMES: Name of the USGS 7.5' topographic quadrangle map(s) where the record is mapped.

PHYSIOGRAPHIC PROVINCE: Code for physiographic province.

BM = Ochoco, Blue and Willowa Mts.	BR = Basin and Range	CR = Coast Range
CB = Columbia Basin	EC = East slope of the Cascades	KM = Klamath Mountains
SP = Snake River Plains	WC = West slope and crest of the Cascades	WV = Willamette Valley

T-R-S: Township, Range and Section, with township first, range second and section third (a space appears between range and section). 004S029E 32 = Township 4S, Range 29E, Section 32. Fractional townships and ranges are further defined in the T-R COMMENTS field.

T-R-S COMMENTS: Comments relating to township, range or section(s), e.g. SE4NE4 or SENE=SE ¼ of the NE ¼.

LASTOBS: Last reported sighting date, in the form YYYY-MM-DD

FIRSTOBS: First reported sighting date for this occurrence in the form YYYY-MM-DD

LAT: latitude, North - in the form DDMSS **LONG:** longitude, West - in the form DDDMMSS

QUADCODE: Heritage Program code for the USGS 7.5' topo map.

FEDERAL STATUS:

U.S. Fish and Wildlife Service or National Marine Fisheries Service status:

LE = listed endangered	LT = listed threatened	SOC = species of concern
PE = proposed endangered	PT = proposed threatened	C = candidate for listing with enough data available for listing

STATE STATUS:

For animals, Oregon Department of Fish and Wildlife status:

LE =listed endangered	PE =proposed endangered	PT =proposed threatened
SC or C =sensitive-critical	SV or V =sensitive-vulnerable	SP or P =sensitive peripheral or naturally rare
SU or U =sensitive-undetermined		

For plants, Oregon Department of Agriculture status:

LE =listed endangered	LT =listed threatened	C =candidate
------------------------------	------------------------------	---------------------

ORNHP EOTRACK: We currently obtain locational information for only those elements marked with Y(es). Those species marked with N(o) or W(atch) have incomplete data since we do not currently actively track them.

PRECISION: Second (S) = exact location; Minute (M) = location known to nearest 1.5 miles; General (G) = location known to nearest 5 miles.

MINELEV: Minimum elevation, in feet (-1111=not determined).

EO-RANK/COMM: Relative quality of this occurrence (A=best site, B=good population or site, C=fair or small population, D=marginal or destroyed occurrence)

DIRECTIONS: Site name and direction to site

DESCRIPTION: Habitat information, e.g. aspect, slope, soils, associated species, community type, etc.

EO-DATA: Species and population biology - numbers, age, nesting success, vigor, phenology, disease, etc.

EOTYPE: For animals, type of occurrence (e.g. roost, nest, etc.)

COMMENTS: Miscellaneous comments

ANNUAL OBSERVATIONS: Summary of yearly observations

OWNER: federal, state, private, etc.

MANAGED AREA: BLM district, USFS Forest, Private Preserve, etc.

MANAGE COMM: Comments on how the site is managed.

PROT COMM (Protection Comments): Comments regarding protectibility and threats.

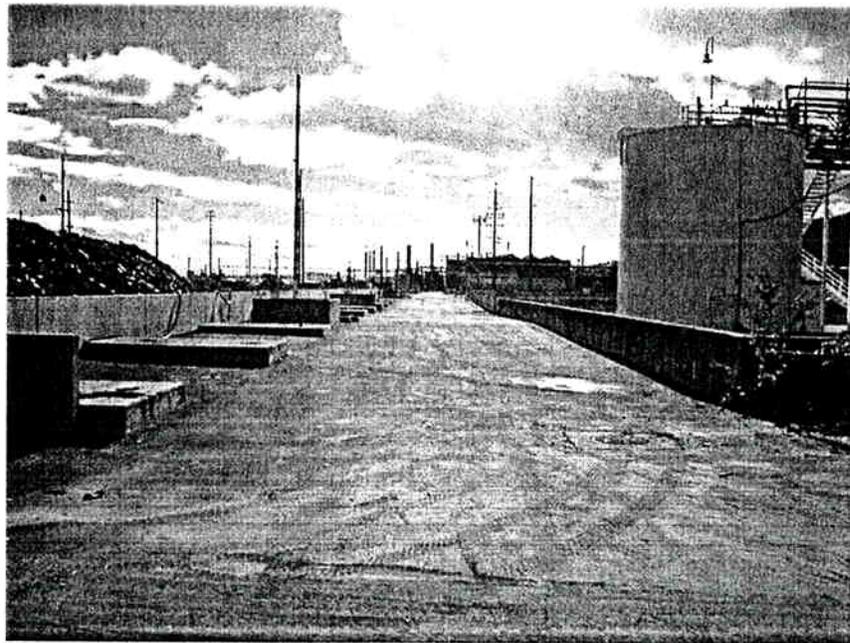
BEST SOURCE: Best source of information for this occurrence.

Appendix B

Photographic Log of Site Walk



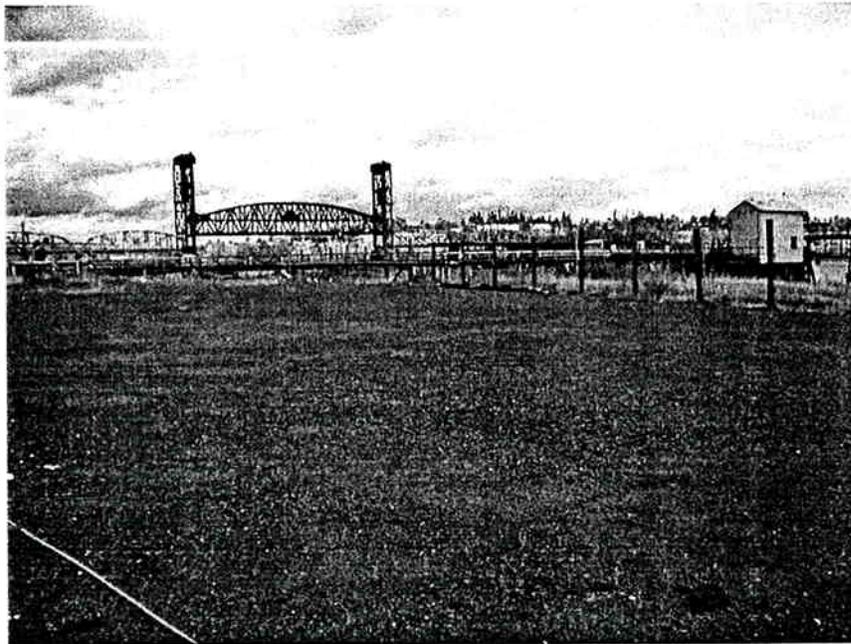
1. Lot 3 looking plant north toward Lot 2. Boundary between Lots 2 and 3 approximately located where white square and round tanks are located.



2. Lot 3 looking plant south toward the former Acid Plant Area and Lot 4.



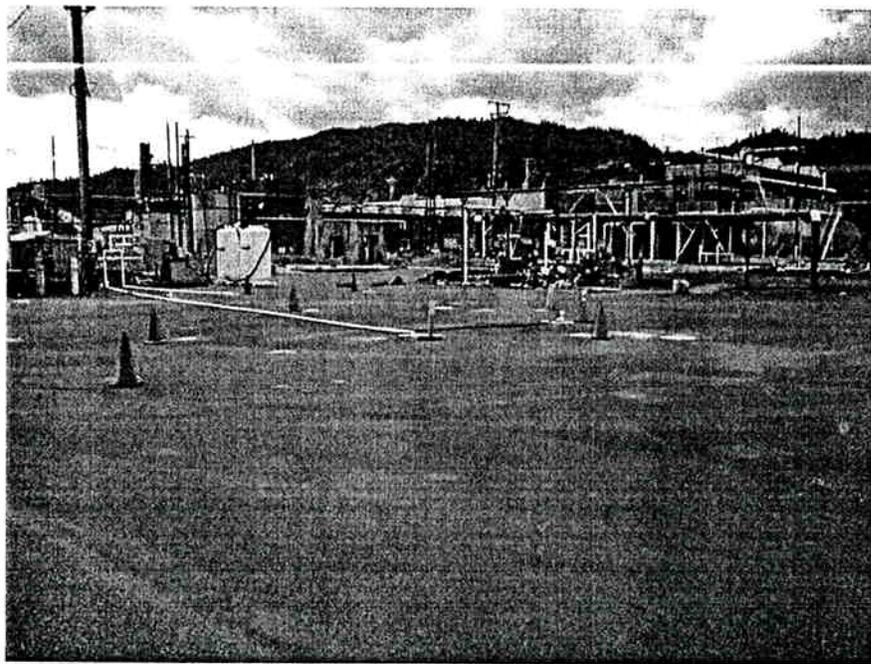
3. Lot 3 looking plant southeast toward the Acid Plant Area and the Willamette River. The Chlorine Finishing Building is on the right in the photograph.



4. Taken on Lot 4, in the temporary cover area east of the Acid Plant Area, looking plant northeast toward the No. 2 Dock. The gravel area in the foreground is a temporary cover system installed as part of the Phase I Soil Removal Interim Remedial Measure.



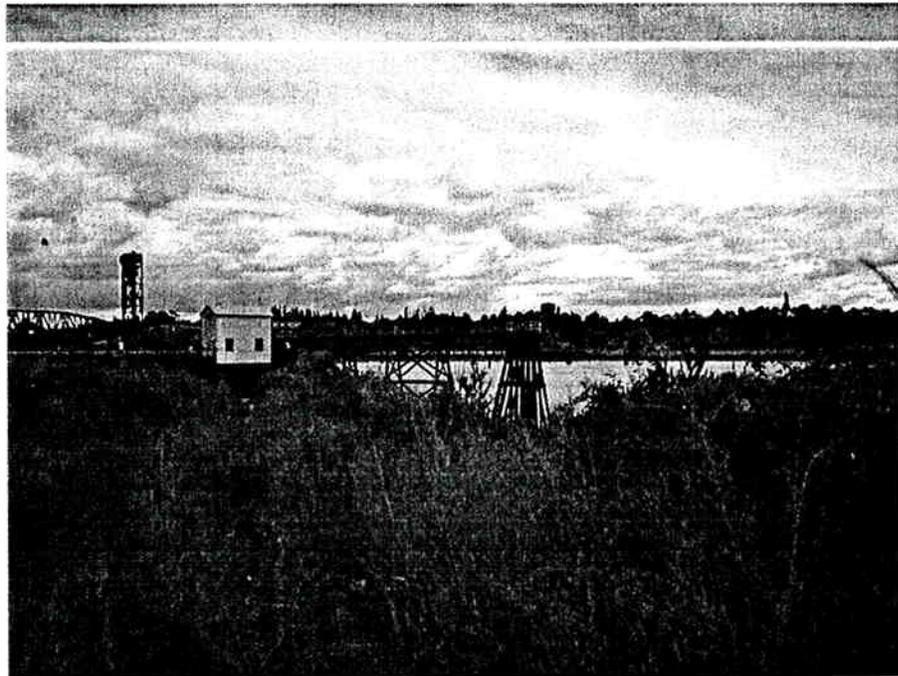
5. Lot 4 Caustic Process building (left) and Chlorine Finishing building (right). Looking plant north.



6. Lot 4 Dense Non-Aqueous Phase Liquid (DNAPL) pilot study area in the Acid Plant Area with Chlorine Finishing building (right) and Chlorate Cell Room (left) in the background. Looking plant southwest.



7. Tract A at the top of the river bank looking plant south toward Dock 2.



8. Tract A at the top of river bank looking plant northwest toward the No. 2 Dock.

Appendix C

Scoping Checklists

**ATTACHMENT 1
Ecological Scoping Checklist**

Site Name	ARKEMA facility
Date of Site Visit	04/28/99, 6/19/03
Site Location	6400 N.W. Front Avenue, Portland, OR
Site Visit Conducted by	Nicholas Gard and David Livermore (Exponent), Julia Tims (ERM)

Part 1

CONTAMINANTS OF INTEREST Types, Classes, Or Specific Hazardous Substances † Known Or Suspected	Onsite	Adjacent to or in locality of the facility †
DDT and metabolites (DDD, DDE) ^a	X	X
Polycyclic aromatic hydrocarbons ^a	X	
Alpha-BHC ^a	X	
Hexachoroethane ^a	X	
Cadmium ^a	X	
Chromium ^a	X	
Lead ^a	X	
Zinc ^a	X	

† As defined by OAR 340-122-115(30)

† As defined by OAR 340-122-115(34)

Part 2

OBSERVED IMPACTS ASSOCIATED WITH THE SITE	Finding
Onsite vegetation (None, Limited, Extensive)	N
Vegetation in the locality of the site (None, Limited, Extensive)	N
Onsite wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other (None, Limited, Extensive)	N
Wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other in the locality of the site (None, Limited, Extensive)	N
Other readily observable impacts (None, Discuss below)	N
<p>Discussion:</p> <p>Ecological habitat on the terrestrial portions of the facility is primarily constrained to riverbank on the edge of the Willamette River. The riverbank is steeply sloped and heavily armored along most of its length, with large slabs of concrete and asphalt and metal debris, which decreases the suitability of the area as ecological habitat. The upper surface of the bank and the upper parts of the bank slopes support vegetation (primarily grasses and a few small shrubs, such as Scotch broom and Himalayan blackberry). None of the riverbank vegetation shows signs of impaired growth or foliage die-back that could indicate adverse impacts associated with the COIs.</p> <p>Adjacent to the Site to the North is a separate property that is also owned by ARKEMA. No structures exist on the property and no manufacturing occurred there. This undeveloped site is covered with grasses and scrub/shrubs. While this property does provide habitat for ecological receptors, site related contaminants have been found only at low concentrations and are being addressed through a "No Further Action" Evaluation. Adjacent to the site to the South is the CertainTeed manufacturing facility. This facility is similar to former layout of the developed portions of Lots 3 and 4 with the entire property covered with manufacturing-related cover and no vegetation along the armored river bank. The CertainTeed site does not provide ecological habitat.</p>	

^a – Constituent was positively detected in riverbank soils above the mean high water line.

ATTACHMENT 1
Ecological Scoping Checklist (cont'd)

Part ③

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding
<i>Terrestrial – Wooded</i>	
Percentage of site that is wooded ^c	< 2 %
Dominant vegetation type (Evergreen, Deciduous, Mixed) ^b	D
Prominent tree size at breast height, i.e., four feet (<6", 6" to 12", >12") ^b	<6" to 12"
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other) ^b	B, M
<i>Terrestrial - Scrub/Shrub/Grasses</i>	
Percentage of site that is scrub/shrub ^c	≈ 5%
Dominant vegetation type (Scrub, Shrub, Grasses, Other) ^b	G/Sh- along river bank
Prominent height of vegetation (<2', 2' to 5', >5') ^b	G < 2', Sh: 2' to 5'
Density of vegetation (Dense, Patchy, Sparse) ^b	Riverbank: grass- D , shrubs: P
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other) ^b	Macro., B, Mammals
<i>Terrestrial – Ruderal</i>	
Percentage of site that is ruderal ^c	≈ 90%
Dominant vegetation type (Landscaped, Agriculture, Bare ground)	Pavement
Prominent height of vegetation (0', >0' to <2', 2' to 5', >5')	0'
Density of vegetation (Dense, Patchy, Sparse)	None
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	None
<i>Aquatic - Non-flowing (lentic)</i>	
Percentage of site that is covered by lakes or ponds ^c	< 5 %
Type of water bodies (Lakes, Ponds, Vernal pools, Impoundments, Lagoon, Reservoir, Canal)	Rain-filled depressions
Size (acres), average depth (feet), trophic status of water bodies	< 0.25 acre, < 1' deep
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	Su
Water discharge point (None, River, Stream, Groundwater, Wetlands impoundment)	N
Nature of bottom (Muddy, Rocky, Sand, Concrete, Other)	C and M
Vegetation present (Submerged, Emergent, Floating)	None
Obvious wetlands present (Yes / No)	N
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	Bird tracks

^b – Description refers to conditions in the greenway and Tract A above the mean high water line.

^c – Where percentages of the area of the "Site" are estimated, "Site" is interpreted to be Lots 3, 4 and Tract A, and the greenway of Lots 1-4 of the ARKEMA facility.

ATTACHMENT 1
Ecological Scoping Checklist (cont'd)

<i>Aquatic - Flowing (lotic)</i>	
Percentage of site that is covered by rivers, streams (brooks, creeks), intermittent streams, dry wash, arroyo, ditches, or channel waterway ^c	< 5 %
Type of water bodies (Rivers, Streams, Intermittent Streams, Dry wash, Arroyo, Ditches, Channel waterway)	R (Willamette R.), adjacent to site
Size (acres), average depth (feet), approximate flow rate (cfs) of water bodies	R: Size:NA^d Flow 31,000 cfs (mean daily flow)
Bank environment (cover: Vegetated, Bare / slope: Steep, Gradual / height (in feet))	V/S (Riverbank: 25-35')
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	R
Tidal influence (Yes / No)	Y
Water discharge point (None, River, Stream, Groundwater, Wetlands impoundment)	R
Nature of bottom (Muddy, Rocky, Sand, Concrete, Other) ^e	River bottom is Sand at shoreline, not checked at deeper depths
Vegetation present (Submerged, Emergent, Floating) ^e	None seen along river shoreline, not checked at deeper depths
Obvious wetlands present (Yes / No) ^e	N
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other) ^e	Macro., B, Mammals

^d – NA – Not applicable.

^e – Consideration of potential risks posed by conditions below the mean high water line and in the Willamette River adjacent to the site will be deferred to the ongoing LWG risk assessment.

**ATTACHMENT 1
Ecological Scoping Checklist (cont'd)**

<i>Aquatic – Wetlands</i>	
Obvious or designated wetlands present (Yes / No) ^e	Y- However, no functional wetlands are present above the Mean High Water line
Wetlands suspected as site is/has (Adjacent to water body, in Floodplain, Standing water, Dark wet soils, Mud cracks, Debris line, Water marks) ^e	F
Vegetation present (Submerged, Emergent, Scrub/shrub, Wooded) ^e	S
Size (acres) and depth (feet) of suspected wetlands	N/A
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	R
Water discharge point (None, River, Stream, Groundwater, Impoundment)	R
Tidal influence (Yes / No)	Y
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	Birds, Mammals

Part 4

ECOLOGICALLY IMPORTANT SPECIES / HABITATS OBSERVED
No ecologically important areas are identified on the facility except for the greenway, the riparian zone to the Willamette River and the River that flows adjacent to the northeastern boundary of the facility. The only surface water bodies in upland areas are shallow, ephemeral rain-filled depressions that do not support aquatic vegetation or fish. No functional wetlands are present on the site.
Terrestrial habitat is largely restricted to the riverbank and parts of the proposed greenway area located in Tract A. Much of this area shows evidence of prior physical disturbance associated with bank stabilization. Much of the area is covered with armor made from slabs of concrete interspersed with sparse grass cover, and invasive weedy species, primarily Scotch broom and Himalayan blackberries. A small stand of deciduous trees borders the shoreline on the northern boundary of the Site.
A number of bird species were seen at the facility. Canada geese were nesting along the riverbank (goslings observed and one goose found sitting on a nest) ^e . A starling was observed flying under Dock 1 while carrying nesting material. Other bird species seen included swallows, gulls, and mourning doves near the dock area.
In general, there are no unique ecological features associated with the terrestrial portion of the facility, and it is considered unlikely that the terrestrial portion supports local populations of vertebrate species.
The sparseness of the vegetation over much of the area affords minimal food or cover with the exception of the greenway area and Tract A. Vegetation in these areas would provide cover and food for birds and mammals.
Resident populations of amphibians are unlikely given the lack of permanent water bodies.

^e – Consideration of potential risks posed by conditions below the mean high water line and in the Willamette River adjacent to the site will be deferred to the Upland SCE and the ongoing LWG risk assessment.

ATTACHMENT 1
Ecological Scoping Checklist (cont'd)

ECOLOGICALLY IMPORTANT SPECIES / HABITATS OBSERVED

The riverbank along the Willamette River is steep and, for most of its length along the property boundary, it consists of large pieces of concrete and construction debris. The upper sections of the river bank are covered with grasses and patchily-distributed shrubs. The lower bench of the shoreline consists, in some sections, of flat sandy areas up to 20-30 ft wide ^c . The shoreline of these areas contains a lot of wood debris, but is otherwise bare, with no vegetation. Just upstream of the southern boundary of the site, adjacent to the CertainTeed Roofing Products facility, there is a small elevated portion of shoreline beside the inflow from Saltzman Creek that supports some sparse, short ground cover. No emergent or submerged vegetation was seen along the shoreline of the Willamette River adjacent to the site.

No sampling of fish populations in the Willamette was performed, although fish species representative of the Lower Willamette are likely to occur ^e .
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^a – Constituent was positively detected in riverbank soils above the mean high water line.

^b – Description refers to conditions in Tract A above the mean high water line.

^c – Where percentages of the area of the “Site” are estimated, “Site” is defined as Lots 3, and 4, and Tract A of the ARKEMA facility.

^d – NA – Not applicable.

^e – Consideration of potential risks posed by conditions below the mean high water line and in the Willamette River adjacent to the site will be deferred to the ongoing LWG risk assessment.

ATTACHMENT 2
Evaluation of Receptor-Pathway Interactions

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in surface waters? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via surface water?	Y		
When answering the above questions, consider the following: <ul style="list-style-type: none"> • Known or suspected presence of hazardous substances in surface waters. • Ability of hazardous substances to migrate to surface waters. • Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters. Aquatic receptors may be exposed through osmotic exchange, respiration or ventilation of surface waters. • Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters. • Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source. 			
Are hazardous substances present or potentially present in groundwater? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via groundwater?	Y		
When answering the above questions, consider the following: <ul style="list-style-type: none"> • Known or suspected presence of hazardous substances in groundwater. • Ability of hazardous substances to migrate to groundwater. • Potential for hazardous substances to migrate via groundwater and discharge into habitats and/or surface waters. • Contaminants may be taken-up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1m depth). • Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface. 	Y^a		

“Y” = yes; “N” = No, “U” = Unknown (counts as a “Y”)

^a – Willamette River

ATTACHMENT 2
Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in sediments? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via contact with sediments?	Y		
When answering the above questions, consider the following: <ul style="list-style-type: none"> • Known or suspected presence of hazardous substances in sediment. • Ability of hazardous substances to leach or erode from surface soils and be carried into sediment via surface runoff. • Potential for contaminated groundwater to upwell through, and deposit contaminants in, sediments. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods. Aquatic receptors may be directly exposed to sediments or may be exposed through osmotic exchange, respiration or ventilation of sediment pore waters. • Terrestrial plants may be exposed to sediment in an area that is only periodically inundated with water. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may have direct access to sediments for the purposes of incidental ingestion. Aquatic receptors may regularly or incidentally ingest sediment while foraging. 			
Are hazardous substances present or potentially present in prey or food items of ecologically important receptors? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via consumption of food items?	Y		
When answering the above questions, consider the following: <ul style="list-style-type: none"> • Higher trophic level terrestrial and aquatic consumers and predators may be exposed through consumption of contaminated food sources. • In general, organic contaminants with $\log K_{ow} > 3.5$ may accumulate in terrestrial mammals and those with a $\log K_{ow} > 5$ may accumulate in aquatic vertebrates. 	Y ^{a,c}		
Are hazardous substances present or potentially present in prey or food items of ecologically important receptors? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via consumption of food items?	Y ^a		
When answering the above questions, consider the following: <ul style="list-style-type: none"> • Higher trophic level terrestrial and aquatic consumers and predators may be exposed through consumption of contaminated food sources. • In general, organic contaminants with $\log K_{ow} > 3.5$ may accumulate in terrestrial mammals and those with a $\log K_{ow} > 5$ may accumulate in aquatic vertebrates. 			

“Y” = yes; “N” = No, “U” = Unknown (counts as a “Y”)

^a - Willamette River

^b - Potential for contact by endangered salmonids with sediments is unknown.

^c - Riparian zone to Willamette River

ATTACHMENT 2

Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
<p>Are hazardous substances present or potentially present in surficial soils? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via incidental ingestion of or dermal contact with surficial soils?</p>	Y		
<p>When answering the above questions, consider the following:</p> <ul style="list-style-type: none"> • Known or suspected presence of hazardous substances in surficial (~1m depth) soils. • Ability of hazardous substances to migrate to surficial soils. • Significant exposure via dermal contact would generally be limited to organic contaminants which are lipophilic and can cross epidermal barriers. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash). • Contaminants in bulk soil may partition into soil solution, making them available to roots. • Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil. 			
<p>Are hazardous substances present or potentially present in soils? AND Are ecologically important species or habitats present? AND Could hazardous substances reach these receptors via vapors or fugitive dust carried in surface air or confined in burrows?</p>	Y		
<p>When answering the above questions, consider the following:</p> <ul style="list-style-type: none"> • Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant $> 10^{-5}$ atm-m³/mol and molecular weight < 200 g/mol). • Exposure via inhalation is most important to organisms that burrow in contaminated soils, given the limited amounts of air present to dilute vapors and an absence of air movement to disperse gases. • Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that could be exposed to dust disturbed by their foraging or burrowing activities or by wind movement. • Foliar uptake of organic vapors would be limited to those contaminants with relatively high vapor pressures. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces. 			

“Y” = yes; “N” = No, “U” = Unknown (counts as a “Y”)

^c – Riparian zone to Willamette River

^d – The riverbank and greenway are not expected to support a large population of wildlife other than rodents or transient songbirds.