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August 25, 2006  
000111-01

Russell E. Olsen  
Department of Ecology  
Toxics Cleanup Program  
3190 160th Avenue SE  
Bellevue, Washington 98008-5452

**Re:** Preliminary Investigation Work Plan  
Duwamish Shipyard, Inc. (Site #1429)  
5658 West Marginal Way SW, Seattle, Washington 98106

Dear Mr. Olsen:

As required by the Washington Department of Ecology (Ecology) in its letters dated July 10, 2006 and August 3, 2006, this *Preliminary Investigation Work Plan* (Work Plan) provides specifics on an investigation to determine the nature and extent of soil and groundwater contamination, if any, at the Duwamish Shipyard, Inc., (DSI) property (Property). We understand that Ecology is in the process of completing a Site Hazard Assessment. Ecology has indicated, based on that assessment, as well as an assessment by Ecology (in conjunction with the United States Environmental Protection Agency [EPA] source control team) of historical information, and the results of the investigative activities presented herein, that it may require DSI to enter into negotiations for an Agreed Order (AO) that would include an evaluation of potential pathways identified in the August 3, 2006 letter and, if warranted, further investigation of the Property and adjacent sediments.

This Work Plan is comprised of this letter and the attached supporting documents: Appendix A – Sampling and Analysis Plan (SAP), Appendix B – Quality Assurance Project Plan (QAPP), and Appendix C – Health and Safety Plan (HASP). These submittals were prepared in accordance with the requirements of the Model Toxics Control Act (MTCA) regulations (Chapter 173-340 of the Washington Administrative Code [WAC]) and the Underground Storage Tank (UST) regulations (Chapter 173-360 WAC).

### **Work Plan Objectives**

The purpose of this Work Plan is to investigate the nature and extent of potential soil and groundwater contamination on the Property and on land formerly owned by DSI. Specifically, the Work Plan is designed to include:

- A summary of the data available from previous independent remedial actions performed at the Property and land formerly owned by DSI;
- The identification of data gaps necessary to respond to the requirements of Chapter 173-360-399 WAC; and
- A plan to assess the need for further investigation and, if required, cleanup and regulatory closure under Ecology's MTCA and UST regulations, including implementation of the SAP and QAPP attached to this Work Plan.

### **Property Description and Use**

The Property occupies approximately 5 upland acres on the west bank of the Lower Duwamish Waterway (LDW) and is located at 5658 West Marginal Way SW in Seattle, Washington (Figure 1). The Property is either paved or covered with concrete-floored buildings. The Property is bordered to the north by the Alaska Marine Lines (AML) container facility and to the south by the Glacier Northwest Seattle Cement Facility. DSI also leases a graving dock from AML located directly adjacent to the northern DSI/AML property boundary. West Marginal Way is located immediately west of DSI, and AML owns additional staging property across this roadway. The Property is located in a highly industrialized area and is currently zoned for General Industrial (IG1 U/85) use. The eastern property boundary abuts the LDW. The LDW was placed by EPA on the National Priorities List (NPL or Superfund) list in September 2001. The preliminary boundaries of the LDW Superfund Site extend from the Turning Basin downstream to Harbor Island. The Property is located within this initial delineation (approximately between River Miles 1.3 and 1.4). In addition, the Property is listed on Ecology's Contaminated Sediment Sites List, which was first published in 1996.

#### *Property Ownership History*

DSI purchased the original property as a tax title purchase from King County in May 1941. It then purchased a submerged parcel from Commercial Waterway District #1 in 1960, which was a mooring area for logs and vessels. In 1964, DSI exchanged the large southern portion of this submerged parcel with the Port of Seattle (Port) for land adjacent to DSI's

southern boundary in order to allow the Port to develop a cement terminal. This parcel of land along the southern boundary was owned by the U.S. Government prior to the Port and was leased and operated by Reichhold, Inc. between 1945 and 1961 for the manufacturing of various resins and formaldehyde products. The following year, DSI purchased the parcel to the west of DSI's original tract from General Construction Company. This was part of a larger parcel later sold to AML in 1999. Figure 2 shows the historic property boundaries.

#### *DSI Ship Repair Activities*

DSI engages in the repair and maintenance of floating vessels and equipment, including tug boats, barges, dredges, fishing vessels, small passenger vessels, and other types of commercial vessels. It provides services to approximately 60 to 65 vessels per year. The hulls of the vessels repaired are generally constructed of steel and, infrequently, aluminum or fiberglass. DSI's ship repair services include machine and electrical work, carpentry, steel fabrication, pipe-fitting, sand blasting, pressure washing, and painting. The haul-out facilities at the Property include two steel drydocks and a graving dock (leased from AML).

The two steel drydocks are located along the shoreline, oriented generally in a north-south direction. Both drydocks have been updated to provide containment for pressure wash wastewater. Wastewater flows to one end of the drydock, where it is captured in a collection sump and pumped onshore to a Delta Pollution Control flocculation pretreatment system prior to discharge to the King County sanitary sewer.

The AML graving dock is 410 feet long and 138 feet wide. Repairs in the graving dock take place below the surface level of the river. Vessels are floated into the graving dock, then the tide gates are shut and the water is pumped out to create a dry work environment. Pumps are used to continuously keep the concrete floor of the dock dry due to leaking from the tide gates. DSI has installed a containment system to separate pressure wash water from the water that seeps in through the tide gate.

Originally, DSI only had a marine railway for docking vessels. The majority of the vessels were wooden fish boats. Boats would be pulled up on the railway and could be

sidetracked onto timbers on the shore. DSI frequently sidetracked boats in the fall, worked on them over the winter, and launched them in the spring. The work consisted mainly of wooden hull repairs and painting. DSI ended the sidetracking process in the late 1950s.

DSI acquired its first floating drydock in 1967. The floating drydock is a small, steel dock that is still in use by DSI. It acquired a second, larger wood drydock in approximately 1969. After this time, most of the vessel dockings were made on the drydocks. DSI sold the large wooden drydock in 1990 and replaced it with the current 1,000-ton steel drydock. Most of the vessels DSI currently repairs are of steel construction. Occasionally, it will work on aluminum hulls or fiberglass, but it no longer works on wooden vessels.

#### *Environmental Controls*

The stormwater system servicing the Property consists of 10 catch basins that convey water from the paved parking areas and active industrial areas to a 10-inch-diameter trunk line. This line then discharges to a sump located adjacent to the former marine railway. Stormwater enters the sump and is pumped through a centrifugal separator to remove grit prior to discharge via outfall (as shown on Figure 3). Incident rainfall is the only source of stormwater to the Property, as surface drainages are not allowed to enter the Property. The catch basins that receive runoff have been fitted with catch basin inserts and oil sorbent pillows. The system was constructed in the mid-1970s and is currently operated under National Pollutant Discharge Elimination System (NDPES) Permit No. WA-003093-7. This permit also regulates potential stormwater discharges from operations on the AML graving dock and the two movable drydocks used for repair of various vessels.

### **Independent Remedial Actions**

The purpose of this section is to summarize the past remedial actions that have been performed at the Property, including the decommissioning of two USTs and one independent remedial action. The location of these projects is shown on Figure 3.

#### *1986 Leaded Gasoline UST Closure*

In 1986, prior to the enactment of the UST regulations (Chapter 173-360 WAC), a 500-gallon UST, holding leaded gasoline, was closed in place. Based on available information,

that UST was first installed in the 1960s. This tank is located within close proximity to a 26KV, 100-foot-tall power pole and an adjacent building foundation. At the time of the UST closure, a representative from Seattle City Light visited the Property to assess the threat to the power pole. The representative concurred with DSI's concerns and recommended to the Seattle Fire Department that the UST be filled in place. At the time of closure, no subsurface samples were collected. Although closed in place, the UST does appear on the most recent UST list update that was issued on August 10, 2006.

*2000 Diesel and Gasoline UST Excavations*

In 2000, four USTs containing diesel fuel and unleaded gasoline were excavated and removed. Those four USTs were installed between 1968 and 1979. The excavation was performed by Quality Tank Service, Inc., a certified UST decommissioning contractor. The excavation was also supervised by Roy Kuroiwa, a professional engineer registered in the State of Washington. During the initial excavation, 60 cubic yards (cy) of soil was excavated with the USTs, prior to collection of bottom and sidewall soil samples. Seven of the initial confirmation samples contained concentrations of total petroleum hydrocarbons (TPH; diesel [TPH-Dx] and gasoline [TPH-G] range) and benzene above MTCA Method A industrial cleanup levels for soil. An additional 20 cy of soil was excavated from these locations and samples were recollected. Five of the second round of confirmation samples exceeded MTCA industrial cleanup levels. Four of the samples exceeded the TPH-G cleanup level and one exceeded the benzene cleanup level. These data are summarized in Table 1. No groundwater samples were collected as part of the confirmation sampling program.

**Table 1**  
**Summary of Confirmation Sampling Exceedances**

<b>Sample ID</b>	<b>Constituent</b>	<b>Concentration (mg/kg)</b>	<b>MTCA Industrial Cleanup Level (mg/kg)</b>
B3	TPH-G	170	100
B4(1)	TPH-G	800	100
B1(2)	Benzene	0.7	0.5
SS-1	TPH-G	140	100
SS-3(2)	TPH-G	300	100

*1993 Independent Remedial Action*

During the development of the parcel previously leased to and subsequently purchased by AML (shown as Areas A and B on Figure 2), soil affected by an unknown release of petroleum product was discovered. Historically, this area of the property now owned by AML and formerly owned by DSI was leased by DSI to various entities for storage of used machinery, parking of trucks and trailers, and storage and distribution of lumber. In August 1993, Environmental Services Limited performed a preliminary site assessment consisting of five soil borings, five test pits, and four monitoring wells (the only remaining well, MW4, is shown on Figure 3). The results indicated TPH constituents in soil and groundwater exceeding MTCA industrial cleanup levels. In response, DSI contracted with Hart Crowser, Inc. (HCI), in October 1993 to oversee the excavation of approximately 650 cy of soil.

During excavation of the affected soil, several restrictions (a 26KV buried powerline, a pad-supported power transformer foundation, the graving dock foundation, and the shallow groundwater table) were encountered, preventing completion of excavation of the delineated area. Upon removal, 12 soil confirmation samples were collected from the excavation sidewalls. All of these samples met MTCA industrial cleanup levels for semi-volatile organic chemicals (SVOCs) and eight were below MTCA industrial cleanup levels for TPH-G, TPH-Dx, and TPH-O (lubricant oil range). The excavation area was backfilled and capped with asphalt, and an additional monitoring well (shown as MW5 on Figure 3) was installed to assess downgradient groundwater quality.

Groundwater samples were collected from MW4 and MW5 over four events in 1994 (two wet and two dry) and one event in February of 1999. Analysis of the MW4 data, reported by HCI, indicated a 25 percent reduction in TPH concentrations, although they did not meet MTCA groundwater cleanup levels based on Method B for protection of surface water. Groundwater cleanup levels were calculated based on Method B for protection of surface water, and not drinking water standards, because the Property and surrounding properties are industrial and do not serve as a drinking water source. Furthermore, the LDW is not classified for use as a domestic water source. For all five sampling events, MW5 met MTCA groundwater cleanup levels for TPH. Benzene, toluene, ethylbenzene,

and xylenes (BTEX) were not found to be above detectable concentrations. No additional soil samples were collected after the remedial action was completed.

### **Data Gap Analysis**

Limited data exists regarding the nature and extent of concentrations of chemical constituents in soil and groundwater on the Property and land formerly owned by DSI that exceed MTCA cleanup levels. Previous investigations indicate that residual soil contamination from petroleum products may exist on the Property in the vicinity of the USTs removed in 2000 and the soils excavated in 1993. Potential impacts to groundwater within the immediate vicinity and downgradient of these remedial actions has not been fully evaluated. Although some degradation of organic contaminants has likely occurred since the remedial actions were performed, the collection of additional soil and groundwater samples is warranted to determine if contaminant migration has occurred as a result of historic releases from the now closed or removed USTs and/or historic ship repair activities on the Property.

Similarly, little information is available to address the potential that shallow groundwater and tidal influences at the Property may have impacted the stormwater system and adjacent sediments. However, DSI proposes that only stormwater solids sampling be performed as part of this Work Plan. The significance of other pathways identified in the August 3, 2006 letter (seep, stormwater, bank soils, and sediments) will be assessed in conjunction with available information (e.g., existing sediment quality data) and information collected under this Work Plan to determine the scope of any additional investigative activities. Ecology has already indicated that it may require DSI to enter into negotiations for an AO that would address the evaluation of all potential pathways identified in its August 3, 2006 letter.

### **Sample Locations and Analyses**

Based on our review of the available data and field reconnaissance, there will be 12 upland sampling locations, with two soil samples and one groundwater sample collected at each location (for a total of 24 soil and 12 groundwater samples). The sampling intervals are outlined in the SAP (Appendix A). The wells installed in 1993 will be redeveloped and sampled. Figure 4 shows the locations of each sample. The soil and groundwater exploration locations will be advanced using direct push (Geoprobe®) technologies. The collected soil and water samples will be submitted to the laboratory for chemical analyses. Samples will be analyzed for

appropriate constituents for groundwater and soil as set forth in the MTCA regulations as well as the metals analyte list contained in the Ecology Sediment Management Standards (SMS) (Chapter 173-204 WAC). Finally, solids from each of the catch basins and the stormwater system sump will be collected. Samples from the system sump will be analyzed for SMS constituents and TPH-G, TPH-Dx, and TPH-O. The remaining catch basin solids samples will be archived.

Chemical analysis will be performed according to the requirements as outlined in the SAP and will include sample analysis as well as quality assurance/quality control (QA/QC) measures, including calibration, duplicates, blanks, and spikes. Analysis will also include full data review, validation, and verification, and the production of electronic data deliverables.

### **Reporting**

The results of the sampling under this Work Plan will be documented in a *Preliminary Investigation Data Report*. This report will document all upland soil and groundwater sampling activities, including an evaluation of the chemical testing results screened against applicable regulatory criteria. Specifically, this report will include:

- A statement of the purpose of the investigation.
- A summary of the field sampling, field data, and laboratory analytical procedures (reference will be made to the QAPP). Deviations, whether intended or unintended, will be documented. Failure to meet sampling or data quality objectives of sufficient magnitude to lead to rejection of results will be documented, as necessary.
- A general vicinity map showing the location of the Property, with respect to familiar landmarks, and a sampling location map. Coordinates will be reported in an accompanying table for all locations.
- Tables summarizing the results of all chemical analyses, as well as all pertinent QA/QC data.
- Copies of complete laboratory data packages, as appendices or attachments.
- QA/QC reports, as appendices or attachments.
- Copies of applicable sections of the field log, as appendices or attachments.
- Copies of signed chain-of-custody forms, as appendices or attachments.



Data will also be formatted for submittal to Ecology's Environmental Information Management System database.

If you have any questions or would like to discuss this Work Plan further, we can be reached by telephone at 206-287-9130 or by e-mail at dtempleton@anchorenv.com or rdesrosiers@anchorenv.com. Otherwise, we look forward to written approval prior to initiation of these investigation activities.

Sincerely,

David Templeton  
Anchor Environmental, L.L.C.

Rebecca Desrosiers, P.E.  
Anchor Environmental, L.L.C.

Cc: Maura O'Brien, Department of Ecology  
David Larsen and Kyle McCleary, Duwamish Shipyard, Inc.  
Kim Maree Johannessen, Johannessen & Associates, P.S.

### References

Hart Crowser. 1994. Independent Remedial Action Report: Alaska Marine Lines Parcel.  
Technical report prepared for Duwamish Shipyard, Inc. June 29, 1994.

Hart Crowser. 1995. Seasonal Groundwater Monitoring Report: Alaska Marine Lines Parcel.  
Letter report prepared for Duwamish Shipyard, Inc. February 21, 1995.

Washington State Department of Ecology (Ecology). 2006a. Letter from Russell E. Olsen,  
Ecology to David Larsen, DSI. July 10, 2006.

Ecology. 2006b. Letter from Russell E. Olsen, Ecology to David Larsen, DSI. August 3, 2006.

**List of Figures**

Figure 1 – Vicinity Map

Figure 2 – Historic Property Boundaries

Figure 3 – Existing Stormwater System and Independent Remedial Action Areas

Figure 4 – Sample Location Plan

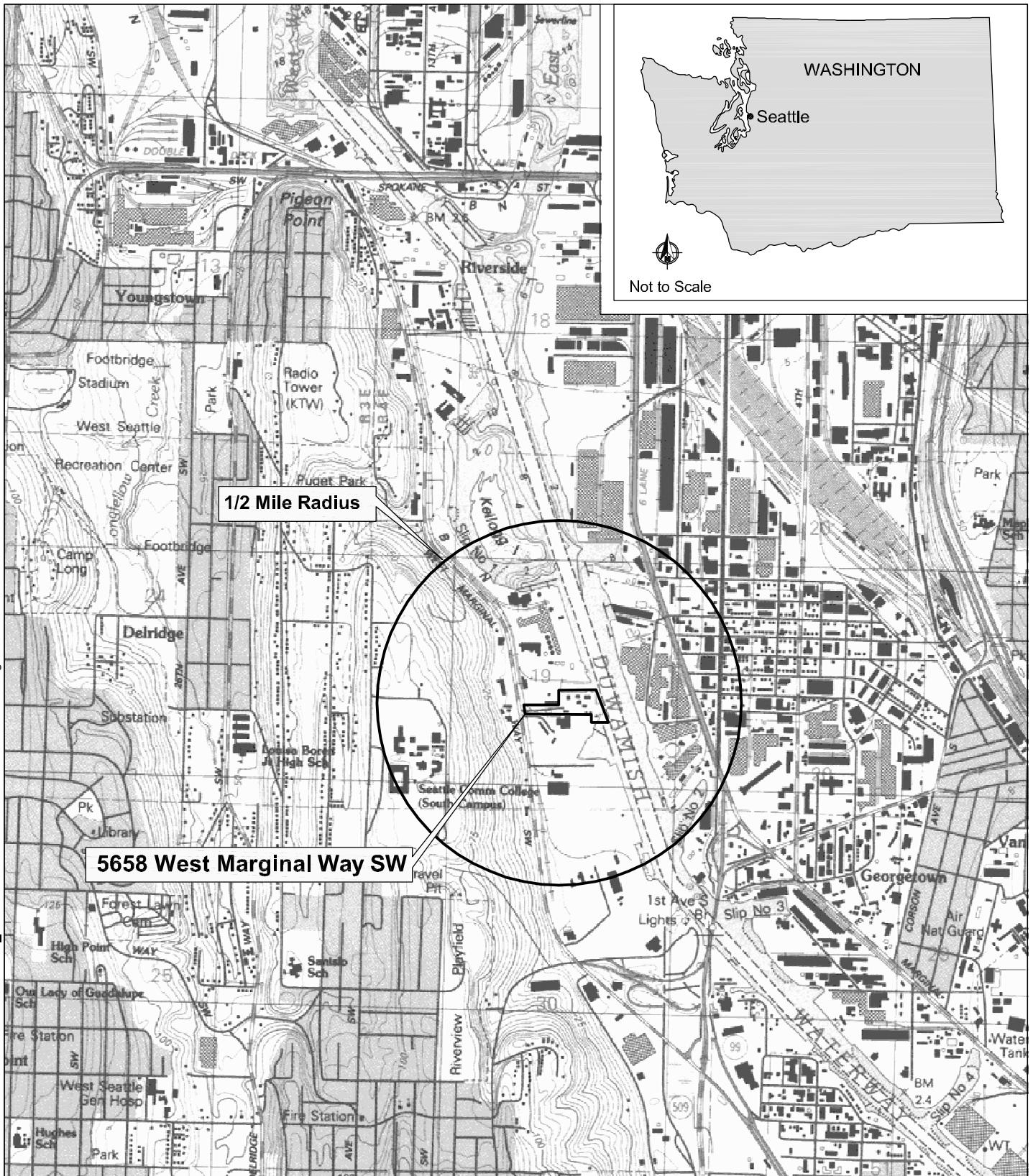
**List of Attachments**

Appendix A – Sampling and Analysis Plan

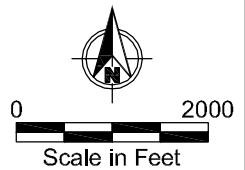
Appendix B – Quality Assurance Project Plan

Appendix C – Health and Safety Plan

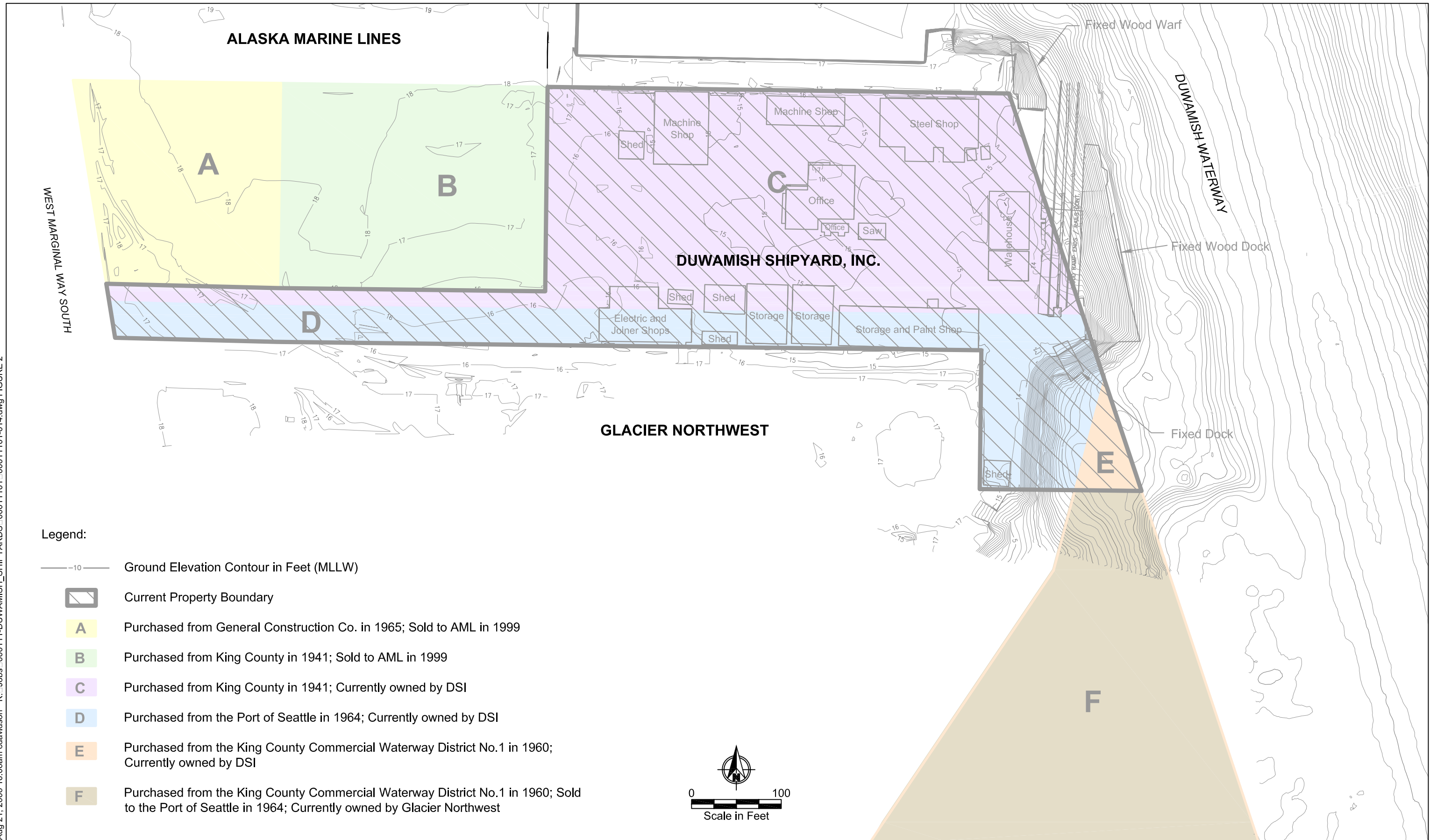
Jul 31, 2006 9:33am dholmer K:\Jobs\000111-DUWAMISH\_SHIPYARDS\_00011101\_00011101-001.dwg FIGURE 1






Note: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map of Seattle South, Washington.



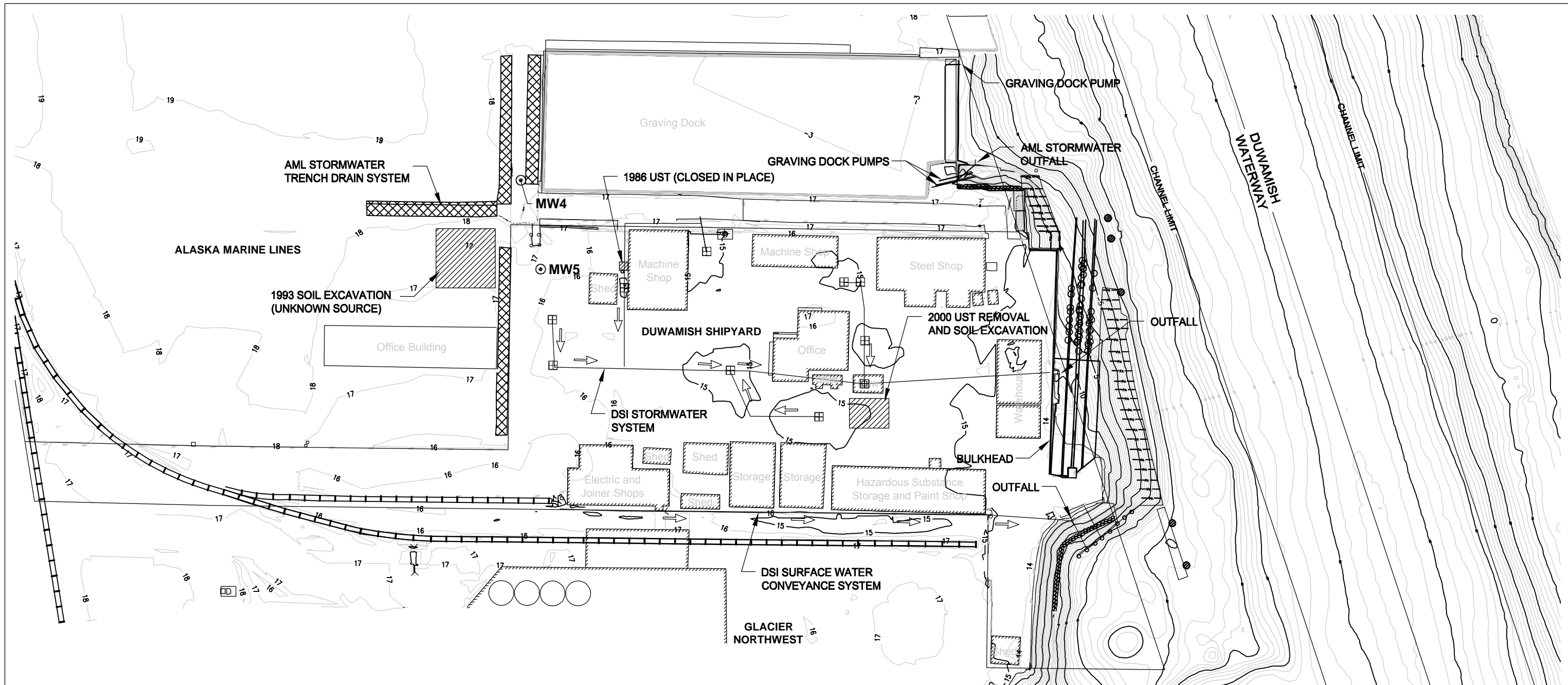
Aug 21, 2006 10:06am ctdavidson K:\Jobs\000111-DUWAMISH\_SHIPYARDS\00011101\00011101-014.dwg FIGURE 2



Legend:

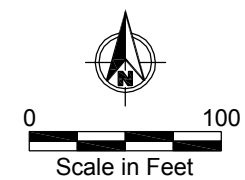
-  Ground Elevation Contour in Feet (MLLW)
-  Current Property Boundary
-  **A** Purchased from General Construction Co. in 1965; Sold to AML in 1999
-  **B** Purchased from King County in 1941; Sold to AML in 1999
-  **C** Purchased from King County in 1941; Currently owned by DSI
-  **D** Purchased from the Port of Seattle in 1964; Currently owned by DSI
-  **E** Purchased from the King County Commercial Waterway District No.1 in 1960; Currently owned by DSI
-  **F** Purchased from the King County Commercial Waterway District No.1 in 1960; Sold to the Port of Seattle in 1964; Currently owned by Glacier Northwest





Legend:

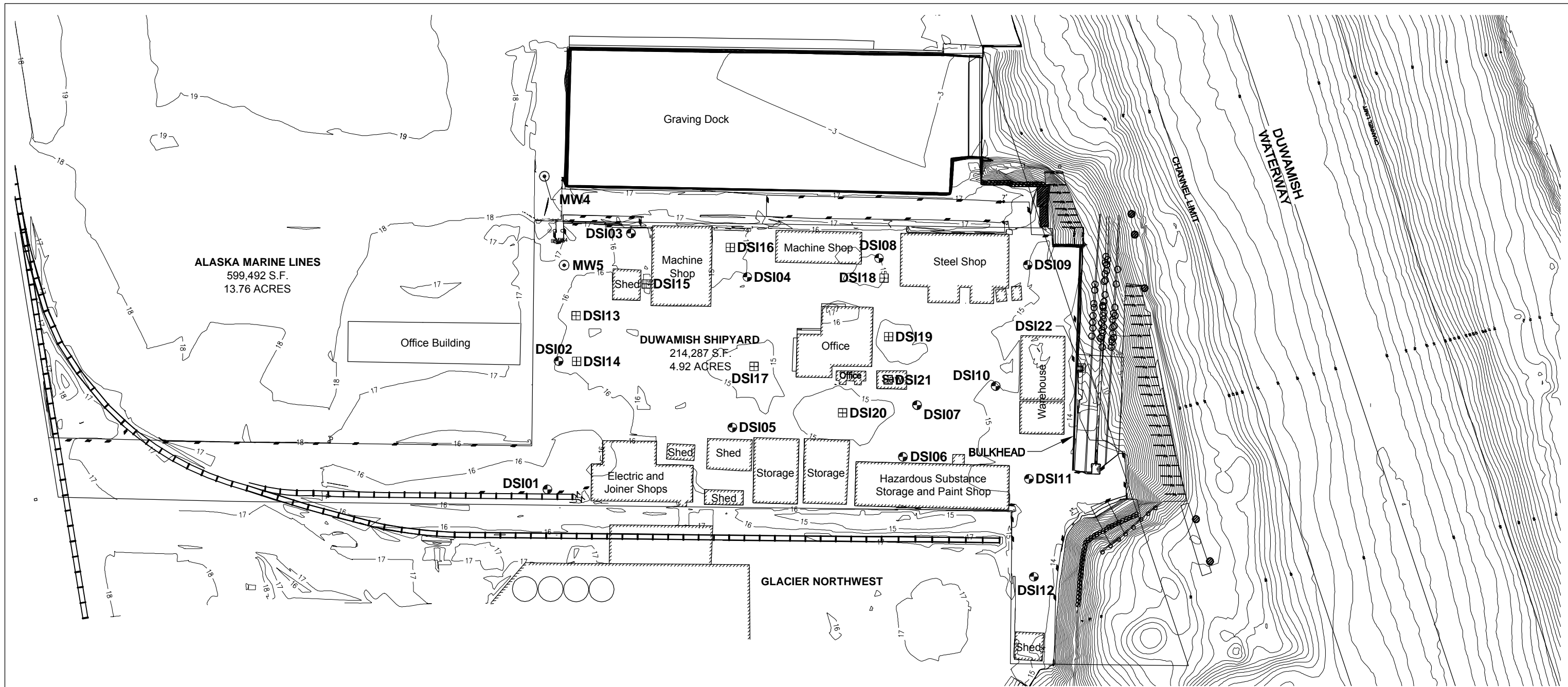
- As-Built Storm Line and Direction of Flow
- Top of Bank (TOB)
- Property Line
- Topographic and Bathymetric Contours in Feet (MLLW)
- Catch Basin Location
- Independent Remedial Action Areas
- Trench Drain
- MW4** Monitoring Well (Installed 1993 by others)



Notes:

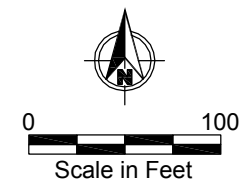
1. Location of underground structures has not been field verified with subsurface techniques such as cameras.
2. Horizontal Datum: Washington State Plane, North, NAD-83.

00011101-17.dwg



Legend:

- DSI07** Soil and Groundwater Exploration Location and Number
- MW4** Monitoring Well Location and Number
- DSI14** Catch Basin Sample Location and Number
- Top of Bank (TOB)
- Property Line
- Topographic and Bathymetric Contours in Feet (MLLW)



Note:  
Horizontal Datum: Washington State Plane, North, NAD-83.

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