

Soil, Groundwater, and Tier II Vapor Intrusion Assessment Report

**Parcel 40
Port of Tacoma**

Project Number: 013PT-006 TO3

**Prepared for:
Port of Tacoma
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Tacoma, WA 98421**

January 27, 2022

Prepared by:



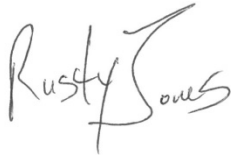
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Project Number: 013PT-006 TO3

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1 Introduction

This document presents a Tier II vapor intrusion (VI) site assessment and the results of a soil and groundwater investigation performed by Crete Consulting Incorporated, PC (CRETE) on behalf of the Port of Tacoma (Port) at the Parcel 40 Maintenance Building (site)¹. The Site is located at 1675 Lincoln Avenue, Tacoma, Washington 98421 (Figure 1). It is currently leased to SSA Terminals and operated as a maintenance facility for a marine cargo terminal. The property is listed (Facility Site ID 66987611) with the Washington State Department of Ecology (Ecology). This report documents investigation activities conducted during 2020 and incorporates data from multiple previous investigations and interim actions.

1.1 Property History

The Site appears to have been undeveloped until the 1920s (tacomaMAP 2021). The adjacent property² to the east was owned, developed, and operated as a railyard between 1905 and 1980 by Chicago, Milwaukee, St. Paul, and Pacific Railroad Company. The railyard was the company's primary west coast facility for train maintenance and repair (Ecology 1991). According to the 1940, 1950, and 1973 aerial imagery, rail lines associated with the railyard crossed onto the northern corner of the Site (tacomaMAP 2021).

In the 1930s, the True's Oil Company constructed a 1.25 million gallon above-ground fuel storage tank on the subject property. In 1942 Chicago, Milwaukee, St. Paul, and Pacific Railroad Company purchased the True's Oil Company facility (Appendix A, drawing 5A-531). Available aerial imagery and historical drawings from the 1940s show the tank surrounded by an earthen berm for secondary containment (tacomaMAP 2021, Appendix A). Several pipelines ran to and from the tank area; available drawings show pipes labeled "Diesel oil," "Oil & Steam," and "Steam (Ret.);" (Port of Tacoma 1983). Select historical documents are included in Appendix A. The timing of tank construction is consistent with the beginning of widespread use of diesel locomotives. Figure 2 illustrates the former location of the True's Oil tank and piping; historical fuel storage tank locations are pulled from historical documents (Appendix A). In 1979, the Port acquired the property from Union Pacific Railroad, successor to the Chicago, Milwaukee, St. Paul, and Pacific Railroad Company. The True's oil tank was removed in about 1981 and the associated piping located in the vicinity of Building 600 is believed to have been removed in about 1984 (Port of Tacoma 1983; Appendix A). The extent of underground piping removal in this area is not known.

The current Site infrastructure was constructed in the early 1980s during property redevelopment for Tacoma Terminals, Inc. (known later as Sealand, Maersk, and finally APMT), a marine terminal operator. The primary structure is a large service garage now known as Building 600 (McGranahan et al. 1984). The northeast end of Building 600 was built over the former footprint of the True's Oil tank (Figure 2). Construction included installation of a 3,000-gallon

¹ Tax parcel no. 8950000221 and 8950000231.

² Tax parcel no. 5000350690.

waste oil underground storage tank (UST) on the south side of Building 600 and the installation of a 20,000-gallon diesel UST and a 1,000-gallon gasoline UST at a fuel shed located about 70 to 120 east of the easternmost corner of Building 600. The 3,000 gallon waste oil UST was removed in 1998. The diesel and gasoline USTs are still in use by the current tenant, SSA Marine, to fuel hustlers and trucks³.

The Site surface is currently paved with asphalt and concrete and is generally flat at an elevation of approximately 18 to 19 feet Mean Lower Low Water (MLLW). To the north is East 11th Street and further north is the marine terminal yard. To the east is a paved lot where terminal cargo is staged adjacent to Milwaukee Way and the South Intermodal Yard. To the south is Lincoln Avenue, where truck traffic enters/exits the Port terminals. To the west is the Puyallup River, which flows north to Commencement Bay.

1.2 Previous Cleanup Activities

In August 1983, a strong fuel odor was noted in a test pit completed to support property redevelopment. The test pit (TP-20) was located in the area where the 3,000-gallon waste oil tank was later installed (Hart Crowser 1983).

In the late 1990s, a lube oil line running between the fuel shed and Building 600 was discovered to be leaking by terminal personnel. The line was subsequently abandoned in place. The dates of release, the release volume, and abandonment methods are unknown (GCI 2000).

In December 1998, the 3,000-gallon waste oil UST was removed to meet new Ecology guidelines. During tank excavation a strong diesel odor was noted and free petroleum product was visible on the surface of the groundwater. The assessment report concluded that the release encountered in the excavation of the waste oil tank was from previous releases and was not due to a release from the waste oil tank (CETI 1999). A Phase 2 investigation including soil sampling and monitoring well installation with subsequent groundwater sampling was conducted in January 2000 (GCI 2000). The investigation found that the soil and groundwater contained diesel- and oil-range petroleum. Following that investigation, the Port reported the discovery of soil and groundwater containing diesel and oil at the Site to Ecology (Port of Tacoma 2000). Additional investigation work, led by the Port, culminated in a focused feasibility study that presented a preferred remedial action of monitored natural attenuation in conjunction with a passive free product recovery system (Geoengineers 2001, 2002).

Passive skimming activities to recover free product were conducted at the Site by Shaw Environmental from May 2002 through at least November 2003 (termination period undetermined). Skimming activities were conducted using a peristaltic pump and tubing extended into the free product at recovery wells ITC-RW-1 and ITC-RW-2. A total of 16 gallons of

³ AMPT vacated the property in 2017, SSA Marine took occupancy shortly thereafter.

free product was recovered during this documented period (Shaw 2003). There are no records of free product recovery after December 2003. The last groundwater sampling event was conducted in November 2002.

In 2019, soil and groundwater sampling was conducted by Anchor QEA on behalf of the Port to support decommissioning of the remaining 20,000-gallon diesel UST and the 1,000-gallon gasoline UST. Decommissioning was being pursued by the Port due to the age of the two tanks. A UST assessment was completed in August 2019 (Anchor QEA 2020). During the same period, a round of groundwater samples was collected from the groundwater monitoring well network installed in early 2000s (Anchor QEA 2019). Soil and groundwater samples were analyzed for gasoline-range organics (TPH-GRO), diesel- and oil-range organics (TPH-DRO/ORO) and benzene, toluene, ethylbenzene, and xylenes (BTEX). The UST report suggested that the impacts near the USTs were likely associated with historical contamination related to petroleum storage tanks and pipelines. Benzene was detected above the vapor intrusion groundwater screening criteria at monitoring well GEI-MW-1 (Figure 2), located just outside the eastern wall of Building 600⁴. The report identified data gaps in the groundwater plume mapping and recommended performing a tidal study, sampling for natural attenuation indicators, and a vapor intrusion assessment at Building 600 due to the presence of elevated benzene at monitoring well GEI-MW-1 (Anchor QEA 2019).

1.3 Adjacent Properties

The eastern adjacent site is known as the Former Milwaukee Way Railyard⁵ and was owned by Union Pacific Railroad until 1995. The property is currently owned by the Port of Tacoma and is listed as Cleanup Site 5002 and Facility ID 1251 with Ecology. The Former Milwaukee Railyard had historical petroleum hydrocarbon contamination with up to 3 separate plumes of free phase product, primarily diesel fuel. Contaminated soils have been excavated from the site and free product removal has been conducted by multiple methods. Additionally, wood preserving chemicals, such as pentachlorophenol, chromium, and arsenic have been reported in the soil and groundwater (Ecology 2021). Ecology has determined that NAPL remains in the groundwater at this site (Ecology 2011) and the remaining residual NAPL is not impacting groundwater (Shaw 2008).

A former 14,000-gallon diesel UST and associated loading racks on the Railyard were located approximately 200 feet to the northeast of Building 600 and an area of known contamination was documented in the Prospective Purchaser Consent Decree (Ecology 1995) as indicated on Figure 2. Documented contamination included a TPH soil concentration of 46,000 mg/kg at 7 feet

⁴ Benzene results from GEI-MW-1 were 42.2 µg/L (sample collection on August 21, 2019), compared to the MTCA Method C Cancer vapor intrusion screening level of 24 µg/L.

⁵ Also known as the Union Pacific Railroad site.

below ground surface (bgs) at AGI TP-40 (AGI 1990), located immediately north of the former diesel UST and free product located slightly further to the northeast.

1.4 Site Screening Levels

The site qualifies as an industrial property (WAC 173-340-745), therefore industrial screening levels are appropriate for the site. Site soil data are compared to Model Toxics Cleanup Act (MTCA) industrial screening levels and site groundwater data is compared to screening levels protective of surface water, vapor intrusion, and groundwater exposure.

Vapor data results are compared to MTCA screening levels and American Conference of Governmental Industrial Hygienists (ACGIH) screening levels for Total Petroleum Hydrocarbons (TPH) air-phase petroleum hydrocarbons. Screening levels are presented on the analytical data summary tables (Tables 1 through 5).

2 Investigation Activities and Results

Groundwater monitoring well redevelopment and sampling activities conducted in 2019 (AnchorQEA 2019) confirmed the presence petroleum contamination in soil and groundwater and also identified benzene in groundwater at GEI-MW-1 exceeding the vapor intrusion screening level. The investigation activities described herein were designed to define the extent of soil and groundwater contamination and assess vapor intrusion. All work was completed based on the *Direct Push Soil, Groundwater, and Tier II Vapor Intrusion Assessment Work Plan* (CRETE 2020). This section discusses the results of the vapor intrusion assessment (Section 2.1) and the soil and groundwater investigation (Section 2.2).

2.1 Vapor Intrusion Assessment

The vapor intrusion assessment followed *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Ecology 2009). The guidance outlines a two-tiered approach; Tier I: compare shallow groundwater concentration data to generic groundwater screening levels (SLs) to evaluate the need for further VI assessment; and, Tier II: conduct indoor air sampling. CRETE conducted a Tier I and Tier II VI assessment. The Tier II assessment and the soil and groundwater sampling plan is documented in the *Direct Push Soil, Groundwater, and Tier II Vapor Intrusion Assessment Work Plan* (CRETE 2020).

The vapor intrusion pathway was assessed by collecting and analyzing groundwater samples for volatile organic compounds in and around the area of elevated benzene detected in monitoring well GEI-MW-1 in 2019 (Tier I) and by performing subsequent ambient and indoor air sampling in Building 600 (Tier II). A site-specific TPH MTCA cleanup level was calculated for screening the indoor air results. Measured TPH concentrations (sum of APH ranges and VOCs) exceeded the site-specific TPH screening level in all five indoor air samples (Table 1). As a result, the consultant recommended that the Port plan for a proactive solution to minimize vapor intrusion (EMB 2020). The Port decided to install a sub-slab depressurization system (SSDS). The SSDS is designed to achieve lower sub-slab air pressure relative to indoor air pressure by using fans or a blower to draw air from beneath the slab. During design and permitting work for the SSDS, two sub-slab vapor samples were collected to evaluate the potential need for a Puget Sound Clear Air Agency (PSCAA) permit and emission controls. The data are provided in this report for reference. Design and permitting of the SSDS are discussed in a separate report (CRETE 2021).

2.1.1 Tier I: Volatile Organic Compound Groundwater Sampling

Based on the 2019 identification of benzene in groundwater at GEI-MW-1 that exceeded the vapor intrusion screening level, groundwater samples were collected from select monitoring wells to assess whether other volatile organic compounds could also present a vapor intrusion risk. In March 2020, low-flow groundwater samples were collected from 4 monitoring wells (GEI-MW-1, GEI-MW-5, GEI-MW-8, and GEI-MW-9) and one recovery well (ITC-RW-1) and submitted

to Friedman & Bruya (FBI) for analytical testing. ITC-RW-1 exhibited measurable free phase product (0.89-foot thickness) and was initially sampled in the field, but the sample was not submitted for analysis due to presence of free phase product. Samples were submitted for analysis of volatile organic constituents (VOCs) by EPA Method 8260 (conducted by FBI) and volatile petroleum hydrocarbons (VPH) by Method NWVPH (conducted by Freemont Analytical laboratories). Groundwater sample results from the well GEI-MW-1 indicated that benzene and volatile petroleum hydrocarbons (VPH) are present at concentrations above the MTCA groundwater screening level for protection of indoor air (24 micrograms per liter [$\mu\text{g/L}$] and 6.4 $\mu\text{g/L}$, respectively). Measured benzene concentrations in groundwater from GEI-MW-1 ranged between 35.7 $\mu\text{g/L}$ (March 26, 2020) and 42.2 $\mu\text{g/L}$ (August 21, 2019; AnchorQEA 2019). VPH (Aliphatic (C8-C10) + (C10-C12)) was detected at 2 site wells, GEI-MW-1 and GEI-MW-9 at concentrations of 268.2 $\mu\text{g/L}$ and 201.3 $\mu\text{g/L}$, respectively. Well locations are shown on Figure 2. Based on these exceedances of the screening criteria, a Tier II assessment was performed.

2.1.2 Tier II: Indoor and Ambient Air Sampling

In July 2020, EMB Consulting, LLC performed indoor and ambient air sampling at Building 600. Sampling was conducted over a holiday weekend (July 4 and 5) when Building 600 was not in use. A brief summary of the results is presented below. The full report is provided in Appendix B. Sample locations are indicated on Figure 3 and analytical results are provided in Table 1.

Two ambient air samples were collected, one from the upwind side of Building 600 (east) and one downwind (west). The ambient air samples did not have detectable concentrations of VOCs, with the exception of naphthalene, which was detected in both samples.

Four indoor air samples were collected: one in each working bay (east and west), one in the central office area, and one in the parts room. VOCs were detected above laboratory reporting levels (RLs) in all indoor samples, but none were detected at concentrations above the MTCA Method C indoor air screening levels for industrial properties. VOCs commonly found in paint (toluene, ethylbenzene, and xylenes) were identified in higher concentrations in the West Bay of Building 600, which is close to the paint booth. Sample locations are shown in Figure 3.

Air-Phase Petroleum Hydrocarbon (APH) EC5-8 aliphatics and EC9-12 aliphatics were detected in all indoor air samples. APH EC9-10 aromatics were not identified in any indoor air sample above the RL. The default MTCA indoor air screening level for TPH compounds (or APH fractions) is 140 $\mu\text{g/m}^3$. A site-specific TPH MTCA cleanup level of 310 $\mu\text{g/m}^3$ was calculated for screening the APH results. APH ranges and detectable VOCs exceeded the site-specific TPH screening level in all five indoor air samples (Table 1). The APH EC5-8 aliphatic concentrations are higher in the west portion of Building 600 than the east portion; APH EC9-12 aliphatics are higher in the east portion of the Building 600 than the west portion. The reason for this difference cannot be determined based on the available data. There were chemicals present in east and west building bays, but not in the central areas sampled (offices). Many of the chemical products onsite are petroleum based, but considering the types and volumes of products observed, these chemical

products are not likely to generate concentrations of APH aliphatics identified across the building space. Based on the results of the indoor air assessment, it appears likely that petroleum hydrocarbons in soil and groundwater beneath the building are impacting indoor air through vapor intrusion (EMB 2020).

2.1.3 Sub-Slab Vapor Sampling

In October 2020, two sub-slab samples were collected from below the concrete slab of Building 600. One sample was collected in the Parts Room (SSV-Parts) and one sample was collected in the East Bay (SSV-E Bay), as shown on Figure 3. These data are provided in Table 1 and Appendix B. APH EC5-8 aliphatics were detected beneath the East Bay while APH EC9-12 aliphatics were detected below the Parts Room. MTCA does not have final screening levels for sub-slab samples; draft values are included in the Guidance for Evaluating Soil Vapor Intrusion in Washington State (Ecology 2018a) and a generic TPH sub-slab screening level of 4,700 µg/m³ was provided in Implementation Memorandum 18 (Ecology 2018b). The TPH results for the sub-slab samples were below this screening level. Sub-slab sample results were not detected above laboratory reporting limits for BTEX compounds and laboratory reporting limits were below sub-slab screening levels (Table 1). Although the sub-slab vapor samples were below screening levels, TPH was above the screening level in indoor air and benzene, TPH-GRO, and TPH-DRO were present above cleanup levels in soil and groundwater adjacent to and likely below the building, including the presence of free product. Additional sub-slab vapor sampling would likely encounter elevated concentrations since sub-slab and indoor air sample results can vary spatially and temporally depending on many factors (e.g. barometric pressure and trend, temperature, warehouse bay doors open/closed).

2.2 Soil and Groundwater Investigation

Soil and groundwater sampling were conducted from March 2020 through November 2020 in the following phases.

- March 26, 2020: Tier I VOC sampling, discussed in Section 2.1.1, included collection of groundwater samples from 5 site monitoring wells, GEI-MW-1, GEI-MW-5, GEI-MW-8, GEI-MW-9 and ITC-RW1; analytical results are summarized in Table 2.
- June 12 and August 5 through 6, 2020: Two days of direct push investigation were performed to collect soil and groundwater from borehole and temporary wells (Section 2.2.1) to refine the understanding of site conditions and the extent of subsurface contamination; analytical results are summarized in Tables 3 and 4.
- October 4, 2020: Two additional monitoring wells (MW-10 and MW-11) were installed to address data gaps (Section 2.2.2), and water level and light non-aqueous phase liquid (LNAPL) gauging was conducted on October 25, 2020 (Section 2.2.3).

- November 2020: A tidal study (November 2 through 6) and groundwater sampling (November 19 through 20) of the monitoring well network (ten wells) were conducted (Sections 2.2.4 and 2.2.5). Groundwater samples were collected from all site monitoring wells (GEI-MW-1, GEI-MW-2, GEI-MW-3, GEI-MW-4, GEI-MW-5, GEI-MW-6, GEI-MW-8, GEI-MW-9, MW-10 and MW-11). Table 5 summarizes analytical results and Table 6 summarizes field parameters.

Borehole logs are provided in Appendix C. Groundwater sampling forms are included in Appendix D. Laboratory reports for soil and groundwater data are provided in Appendix E.

2.2.1 Direct Push Investigation

The initial direct push mobilization on June 12, 2020 included five boreholes in the immediate vicinity of GEI-MW-1 along the northeast side of Building 600 to determine the extent of elevated benzene in groundwater (SB-1 through SB-5), and four locations around the remaining perimeter of the building to define the extent of the elevated TPH in groundwater (SB-6 through SB-9). The second mobilization on August 5 and 6, 2020 included eight borehole locations and was intended to fill in data gaps and step out from locations with known impacts (SB-10 through SB-16). ESN Northwest, a Washington licensed driller, used a direct push technology (DPT) soil coring rig to collect soil and groundwater samples. Soil borehole locations are shown on Figure 4.

Soil cores were collected on 5-foot intervals to a depth of 15 feet bgs at all locations. Four locations, SB-01D, SB-08D, SB-10D, and SB-12D were advanced to 25-feet bgs for investigation into the saturated zone.

Various hydrocarbon odors and/or sheens were noted at 5 to 15 feet bgs at SB-01, SB-03, SB-05, SB-06, at 4.5 to 15 feet bgs at SB-02, SB-04, at 10.9 to 15 feet bgs at SB-07, and at 6.5 to 15 feet bgs at SB-09, 7.7 to 15 feet bgs at SB-11, and 3.8 to 14 feet bgs at SB-13 (See borehole logs in Appendix C for specific observations). Based on PID-screening measurements and odor and visual observations, up to two soil samples were collected from each soil borehole. Where there was no indication of contamination, a soil sample was collected at the water table. Soil sample depths and results are provided in Table 3 and the laboratory reports are provided in Appendix E.

All soil samples from SB-01 through SB-05, and SB-09 were analyzed for diesel- and oil-range organics (TPH-DRO/ORO) by Method NWTPH-Dx, gasoline range organics (TPH-GRO) by Method NWTPH-Gx, and for BTEX by EPA Method 8021 in areas of suspected benzene impacts. Soil samples from SB-06, SB-07, and SB-08 were analyzed for TPH-DRO/ORO. Soil sample depths and results are provided on Table 3 and the laboratory report is provided in Appendix E.

Grab groundwater samples were collected from all soil borehole locations using a stainless steel screen lowered into the borehole. Dedicated HDPE tubing and a peristaltic pump were used to purge the temporary well for typically 5 to 10 minutes or until the purge water became generally less turbid, whichever occurred first. Temporary wells were screened from 11 to 15 feet bgs.

Deeper grab groundwater samples were collected at 21 to 25 feet bgs at SB-01D, SB-08D, SB-10D, and SB-12D. All grab groundwater samples were analyzed for TPH-DRO/ORO (with and without silica gel column [SGC]), TPH-GRO, and BTEX.

Results are summarized in Tables 3 and 4, sample locations are shown on Figure 4, and laboratory reports are provided in Appendix E.

2.2.1.1 June and August 2020 Direct Push Soil Analytical Results

Soil concentrations of TPH-DRO/ORO (combined diesel- and oil-range petroleum) exceeded the MTCA Method A screening level of 2,000 mg/kg at 9 borehole locations; concentrations ranged from 44,700 mg/kg (duplicate of location SB-03-10) to below the RL of 250 mg/kg. Soil concentrations of TPH-GRO exceeded the MTCA Method A screening level of 30 mg/kg at 8 borehole locations; concentrations ranged from 3,000 mg/kg (location SB-01-09) to below the RL of 5 mg/kg. A review of chromatograms suggests that the TPH-GRO concentrations are the result of a middle distillate rather than gasoline. These data are discussed further in Appendix F.

Benzene, ethylbenzene, and total xylenes exceeded screening levels from soil samples collected from borehole SB-03-10 (and the duplicate sample) and SB-04-08; ethylbenzene exceeded the screening level in a soil sample collected from SB-01-09. These three locations are co-located with the highest TPH-DRO/ORO and TPH-GRO exceedances.

2.2.1.2 June and August 2020 Direct Push Groundwater Analytical Results

Temporary groundwater grab samples were collected at 2 depths, approximately 12 feet bgs and 25 feet bgs. Deep groundwater grab samples were collected from soil borehole locations SB-01, SB-08, SB-10 and SB-12, these are noted with a “D” in the sample name shown on Table 4.

Shallow groundwater concentrations of TPH-DRO/ORO analyzed without silica gel cleanup exceeded the MTCA Method A groundwater screening level of 500 µg/L at 14 of 16 borehole locations. Detected concentrations of TPH-DRO/ORO ranged from 610 µg/L (location SB-8) to 62,000,000⁶ µg/L (location SB-05). The sample from SB-05 was influenced by the presence of free phase hydrocarbons; the next highest TPH-DRO/ORO concentration was 1,700,000 µg/L (location SB-3). Groundwater samples were also analyzed with silica gel cleanup. Of the groundwater samples detected above screening levels without silica gel cleanup, only the groundwater sample from SB-8 was below screening levels with the silica gel cleanup.

Deep groundwater concentrations of TPH-DRO/ORO analyzed without silica gel cleanup exceeded the MTCA Method A groundwater screening level of 500 µg/L at 3 of the 4 borehole locations. Concentrations detected at SB-10D were below the screening level (detection of 400

⁶ Groundwater concentration of 62,000,000 µg/L TPH-DRO/ORO indicative of free phase hydrocarbons present. Field notes for this groundwater sample (SB-05-0620) indicate moderate to strong hydrocarbon odor, hydrocarbon sheen, and “yellowish, oily water” on purged sample water.

µg/L). All deep groundwater samples were below screening levels (SB-01D, SB-8D, and SB-12D) when silica gel cleanup was used.

Shallow direct push groundwater sample concentrations of TPH-GRO exceeded the MTCA Method A groundwater screening level of 800 µg/L at 7 locations as shown on Table 4. Detected concentrations of TPH-GRO ranged from 7,500 µg/L (at location SB-05) to 280 µg/L (at location SB-13). Direct push groundwater sample concentrations of benzene exceeded the screening level of 1.6 µg/L at 3 locations (SB-01, SB-05, and SB-09); concentrations ranged from 22 µg/L (SB-01) to non-detect. A review of chromatograms suggests that the TPH-GRO concentrations are the result of a middle distillate rather than gasoline. These data are discussed further in Appendix F.

Deep direct push groundwater sample concentrations of TPH-GRO and BTEX compounds were below the MTCA Method A groundwater screening levels.

2.2.2 Monitoring Well Installation

Following the results of the direct push investigation, two additional groundwater monitoring wells were installed to better define the downgradient extent of the groundwater impacts toward the Puyallup River. MW-10 was installed along the western end of Building 600, downgradient of impacted areas and near borehole location SB-08. MW-11 was installed to the south of soil boreholes SB-11 and SB-12. TPH-DRO/ORO concentrations in groundwater were near the CUL in SB-8 and were elevated at SB-11 and SB-12. Well locations are shown on Figure 4.

On October 4, 2020, CRETE and Holocene Drilling, a Washington licensed driller, installed the monitoring wells using hollow stem auger drilling methods. A 1.5 feet length split-spoon core sample was collected every 2.5 feet in depth starting at 2.5 feet bgs for limited logging and sampling purposes.

Soils were logged and PID-screened for organic vapor impacts. Monitoring well logs for MW-10 and MW-11 can be found in Appendix C. Well depths and screened intervals are provided in Table 6. One soil sample was collected from the MW-11 borehole at the vadose/saturated zone interface. The sample was analyzed for TPH-DRO/ORO, TPH-GRO, and BTEX. Soil sample results are provided on Table 3 and the laboratory report is provided in Appendix E. Results from the one soil sample collected at MW-11 were non-detect for all analytes.

2.2.3 October Site-Wide Gauging

On October 25, 2020 CRETE conducted site-wide gaging of static groundwater elevations at all ten monitoring wells and two recovery wells. LNAPL was observed at 3 wells, monitoring well GEI-MW-9 (0.02 feet thickness) and recovery wells ITC-RW-1 (0.82 feet thickness) and ITC-RW-2 (2.29 feet thickness).

2.2.4 Tidal Study

Between November 2 and November 6, 2020, CRETE conducted a tidal study at Parcel 40 using the existing monitoring well network (GEI-MW-1, GEI-MW-2, GEI-MW-3, GEI-MW-4, GEI-MW-5, GEI-MW-6, GEI-MW-8, GEI-MW-9, MW-10 and MW-11). Monitoring well locations used in the tidal study and the net groundwater flow path are shown on Figure 5. The tidal study was conducted to evaluate the extent of tidal influence across the Site and to develop appropriate tidal lag times for sampling of tidally influenced monitoring wells. Methods and results of this tidal study are provided in Appendix G. Results are summarized in Section 3.2.

2.2.5 November 2020 Monitoring Well Groundwater Sampling

On November 18 through November 20, 2020, CRETE collected groundwater samples from all ten monitoring wells (GEI-MW-1 through GEI-MW-6, GEI-MW-8, GEI-MW-9, MW-10, and MW-11)⁷ using low-flow sampling methods. Groundwater samples were collected between 2 and 4.5 hours after low-tide based on the tidal study efficiency and lag times in conjunction with tides measured at the NOAA station 9446484 in Tacoma, WA during the November 18 to 20 sample period. All groundwater samples were analyzed for TPH-DRO/ORO (with and without SGC), TPH-GRO, and BTEX. Groundwater monitoring results are presented in Table 5 and monitoring well field parameters are presented in Table 6. Groundwater sampling forms are included in Appendix D.

Detected concentrations of TPH-DRO/ORO in groundwater samples without SGC ranged from 370 µg/L (GEI-MW-4/5) to 30,600 µg/L (GEI-MW-1) and exceeded the screening criteria at 7 monitoring wells. Groundwater concentrations exceeded the TPH-GRO MTCA Method A screening level at 1 monitoring well at a concentration of 1,700 µg/L (GEI-MW-1). Concentrations of TPH-DRO/ORO with SGC ranged up to 8,500 µg/L (GEI-MW-1) and exceeded the MTCA Method A screening level at 3 monitoring wells.

At GEI-MW-1, the concentration of benzene, 46 µg/L, exceeded the screening level. Concentrations of toluene, ethylbenzene, and total xylenes were detected above the RLs at GEI-MW-1 but below screening levels. There were no other monitoring wells with BTEX concentrations above the laboratory RLs (Table 5).

LNAPL was observed at ITC-RW-1, ITC-RW-2, and GEI-MW-9 on October 25, 2020 (Table 6). ITC-RW-1 and ITC-RW-2 were not sampled during November 2020 due to product thickness. GEI-MW-9 did not exhibit LNAPL on November 20, 2020 and was sampled with the other wells.

⁷ Monitoring well identification GEI-MW-7 is not used at the site.

2.2.6 Investigation-Derived Waste

Throughout the 2020 investigations, all decontamination wash and rinse waters, soil core cuttings, well installation cuttings, and purged groundwater was captured and containerized in 15-gallon and 55-gallon drums, labelled, and temporarily staged at the Site. On November 23, 2020, DH Environmental collected the containers of waste, transported them to Lafarge North America at 5400 West Marginal Way in Seattle for disposal.

3 Site Conditions

This section presents site geological and hydrogeological conditions and overall groundwater flow patterns.

3.1 Geology

The Site was originally a tidal marsh within the Puyallup River delta. Typical reference documents regarding filling activities in the tide flats, such as the Geology of the Port of Tacoma, do not provide documentation for this area (Hart Crowser 1974). A review of available historical aerial photography suggests that some filling, and construction of True's Oil tank, was completed sometime between 1931 and 1940 (tacomaMAP 2021).

The remainder of the Site area appears to have been filled in the early 1980s associated with marine terminal site redevelopment and construction of the current structures. In the immediate vicinity of Building 600, the upper 3 to 5 feet of fill consist of Building 600 preload material that was reused as structural fill (Appendix A; Port of Tacoma 1983).

The former tidal marsh surface was not distinguishable from the above fill material in most boreholes advanced at the site. At monitoring well location MW-11 a distinct clayey silt unit was identified at 10 feet bgs, likely representing the former tidal marsh surface. In some boreholes, a thin silt unit about 1 foot thick was identified between 7 and 10 feet below grade. In other boreholes, the silt content increased at about 7.5 to 11.5 feet below grade and the lithology was described as a sandy silt or silty sand. Decomposed wood or root matter was observed at 13.8 feet below grade at SB-08 and at 14.3 feet below grade at SB-10, suggesting organic plant material, likely from the marsh.

The soil unit above the former tidal marsh surface consists predominantly of gravelly sand to sand, consistent with structural fill placement, with some construction debris. The soil unit below the former tidal marsh consists of fine- to coarse-grained sand and silty sand. These units will be referred to as the "Upper Sand" and "Lower Sand".

3.2 Hydrogeology

Groundwater occurs in the Upper Sand under unconfined conditions and in the Lower Sand under confined or semi-confined conditions, due to the intermittent clayey-silt units. Groundwater at the site appears to flow toward the Puyallup River to the west/southwest and to the north towards East 11th Street, with an apparent groundwater divide to the east-northeast of Building 600. The northward component of groundwater flow is consistent with the groundwater flow direction report for the Milwaukee Railyard (Shaw 2008). Net groundwater elevation contours are presented in Figure 5.

3.2.1 Site Groundwater Levels

Depth to groundwater at the Site is generally in the range of 8 to 12 feet bgs. Based on transducer data from the tidal study, groundwater elevations appear to fluctuate as much as about 3 feet through a tidal cycle, with the largest rate of change seen at MW-10, the well closest to the Puyallup River. Water level depths and elevations for the November groundwater sampling event are presented in Table 6. Tidal study procedures, results, and data analysis are documented in Appendix G.

3.2.2 Groundwater Flow

To determine the Site groundwater flow direction(s), data from the tidal study (Appendix G) was used calculate net groundwater flow. The water elevation data recorded from 5:06 PM on November 2 through 9:24AM on November 6 was averaged at each well where the data was recorded and the data were contoured to map the average water elevations. Figure 5 depicts the net groundwater flow determined from this tidal study. Groundwater flow on the western half of the site flows west/southwest towards the Puyallup River. Groundwater flow to the east and northeast of Building 600 generally flows north with a groundwater high, or mound, at the very east end of Building 600.

4 Conceptual Site Model

This section summarizes the nature and extent of contamination, suspected sources, and identifies potential human and environmental risk exposure pathways present on the Site. The purpose of the conceptual site model (CSM) is to synthesize the findings of the site investigation so that the CSM can be used as a tool to identify data gaps and to develop and evaluate cleanup approaches.

4.1 Nature and Extent of Contamination

The Site has been impacted by releases from historical petroleum operations at the property resulting in elevated concentrations of TPH-DRO/ORO, TPH-GRO, and benzene in soil and groundwater, and air-phase TPH contributions to indoor air at Building 600.

4.1.1 Groundwater

This discussion of the nature and extent of groundwater contamination incorporates data from samples collected from direct push boreholes in June and August 2020 and samples from monitoring wells collected in March and November 2020.

Groundwater concentrations exceed the MTCA Method A TPH-DRO/ORO screening level in 17 of the 20 direct push groundwater samples when SGC was not used. Groundwater concentrations of TPH-DRO/ORO were below the MTCA Method A screening level at SB-10, SB-10D, and SB-16, the locations closest to the Puyallup River. When SGC was used, concentrations of TPH-DRO/ORO at SB-01D, SB-08, SB-08D, and SB-12D fell below the MTCA Method A screening level.

The existing monitoring well network generally bounds the extent of TPH-DRO/ORO and TPH-GRO contamination with two exceptions. Based on TPH-DRO/ORO with silica gel cleanup, GEI-MW-8 exceeds screening criteria to the north and GEI-MW-9 exceeds screening criteria to the south. Figures 6 and 7 illustrate the TPH-DRO/ORO groundwater plume both without and with silica gel cleanup, respectively.

Groundwater concentrations of TPH-GRO exceed the MTCA Method A screening level in 7 of 20 direct push groundwater samples. TPH-GRO groundwater exceedances were focused around the eastern half of Building 600 with one notable exception at SB-14, shown on Figure 8. Benzene in groundwater was detected above the screening criteria at three locations (SB-01, SB-04, and SB-09), shown on Figure 9. For the temporary groundwater samples collected during this investigation, concentrations of benzene ranged up to 22 µg/L, toluene up to 10 µg/L, ethylbenzene up to 27 µg/L, and total xylenes up to 38 µg/L. Toluene, ethylbenzene and total xylenes were not detected above screening levels from groundwater samples collected from the direct push boreholes.

Benzene was detected in groundwater samples collected from GEI-MW-1 in March 2020 (28 µg/L) and November 2020 (46 µg/L); results exceeded the MTCA Method A and marine surface

water screening criteria. GEI-MW-1 was the only monitoring well to exhibit detections of BTEX above laboratory reporting limits in March or November 2020.

4.1.2 Soil

Soil concentrations from the 2020 investigation exceed MTCA Method A screening levels for TPH-GRO and TPH-DRO/ORO (Table 3 and Figure 10). The highest TPH-GRO results (3,000 mg/kg, SB-01) and TPH-DRO results (44,700 mg/kg, duplicate of SB-03) are generally associated with the eastern half of Building 600 with a few exceptions. SB-13, located northeast of Building 600 and near the Former Milwaukee Railyard also had elevated concentration of both TPH-GRO (1,400 mg/kg) and TPH-DRO/ORO (12,000 mg/kg). There are data points with reported TPH-DRO concentrations below MTCA Method A industrial SLs (GEI-MW-2, GEI-MW-6, P40-UST-01, P40-UST-02) that separate SB-13 from the Building 600 contamination suggesting that the impacts at the site may be from a two separate releases.

Soil concentrations along the northwestern and western areas of the site are not impacted with hydrocarbons or BTEX and reported values are SB-07, SB-08, SB-10, and SB-16 in this area are below laboratory RLs. Soil concentrations of TPH-DRO (8,000 mg/kg; duplicate concentration of 9,400 mg/kg) and TPH-GRO (1,500 mg/kg) at SB-11 in the southwest area of the Building 600 exceed screening criteria.

In the soil samples collected during the 2020 investigation, concentrations of benzene ranged up to 14 mg/kg, toluene up to 5 mg/kg, ethylbenzene up to 20 mg/kg, and total xylenes up to 24 mg/kg. Concentrations of BTEX compounds in soil exceed MTCA Method A screening levels at SB-01, SB-03, and SB-04; no other locations exceed MTCA screening levels. No BTEX soil exceedances were observed or noted in the active UST pad area investigation conducted by Anchor QEA in August 2019 (Anchor QEA 2020).

4.1.3 Vapor

Vapors samples collected at the site, discussed in Section 2.1, included indoor air and sub-slab vapor. All indoor air samples contained APHs in the range of C5 through C8 (APH EC5-8 aliphatics) and C9 through C12 (APH EC9-12 aliphatics) above the site-specific TPH MTCA Method C cleanup level of 310 µg/m³ (Table 1, Figure 3). Though Building 600 is used for equipment maintenance and it is known that products used during routine operations in the building contain TPH, the levels detected in the indoor air samples are not thought to be from these products only (EMB 2020).

Sub-slab samples were collected from two locations in the building; one sample was collected in the Parts Room (SSV-Parts) and one sample was collected in the East Bay (SSV-E Bay) as shown on Figure 3 and Table 1. APH EC5-8 aliphatics were detected beneath the East Bay while APH EC9-12 aliphatics were detected below the Parts Room. These APH results were below the Ecology TPH screening level. Sub-slab sample results were not detected above laboratory reporting limits for BTEX compounds and laboratory reporting limits were below sub-slab screening levels (Table 1). Although the sub-slab vapor samples were below screening levels, TPH was above the

screening level in indoor air and benzene, TPH-GRO, and TPH-DRO were present above cleanup levels in soil and groundwater adjacent to and likely below the building, including the presence of free product. Sub-slab and indoor air sample results can vary spatially and temporally depending on many factors (e.g. barometric pressure and trend, wind, temperature). Due to this uncertainty in air concentration measurements and the presence of significant soil and groundwater contamination, it is reasonable to expect that sub-slab vapor contamination is present and contributing to indoor air.

Groundwater data from GEI-MW-1 indicates that benzene exceeds the vapor intrusion groundwater screening level (GEI-MW-1; Figure 1).

4.1.4 Contaminants of Concern

Contaminants that have been detected above screening levels at Parcel 40 are benzene, ethylbenzene, xylenes, TPH-GRO, and TPH-DRO/ORO. Benzene exceeded screening levels in soil and groundwater while ethylbenzene and xylenes only exceeded screening levels in soil. TPH-GRO and TPH-DRO/ORO exceeded screenings levels in soil and groundwater plus TPH exceeded screening levels in indoor air. As discussed in Appendix F, although TPH-GRO exceeded screening levels in soil and groundwater, there is no known historical use of gasoline at the property and a closer look at the TPH-DRO/ORO results indicates that the TPH-GRO response may have been due to high concentrations of a middle distillate, such as diesel.

4.1.5 Sources

Historical petroleum operations at the site include a number of potential sources (Figure 2):

- The 1.25 million gallon True's Oil above-ground diesel storage tank; including the pump area and associated "oil" and diesel pipelines
- The former 14,000-gallon diesel UST and loading rack located at the former Milwaukee Railyard
- Several "oil" and "oil and steam" pipelines that may have carried heavier-end petroleum products such as Bunker C for fueling locomotives prior to diesel use
- The former lube oil line and documented leak
- The former 3,000-gallon waste oil tank associated with Building 600
- The existing 20,000-gallon diesel and 1,000-gallon gasoline USTs and fueling area

The primary source of contamination in the Building 600 area appears to be historical operation of the True's Oil diesel tank. Operation of the True's Oil tank included smaller tanks within the secondary containment berm, various fuel lines, the pump house, and septic tank. The highest soil and groundwater concentrations are centered at the former tank and generally decrease with distance from the tank. The True's Oil tank also appears to have supplied diesel fuel to the nearby 14,000-gallon diesel UST and tank car loading rack on the former Milwaukee Railyard to the east (Figure 2). Petroleum contamination and a free product plume were previously identified on the Milwaukee Railyard in the vicinity of this fueling area. Although this area was not a focus

of the Building 600 investigation, evidence of contamination associated with the former Milwaukee Railyard was identified at SB-13. Reports prepared for the former Milwaukee Railyard indicate free phase product remains at the site and remediation activities have ceased (Ecology 2011, Hart Crowser 2015). Testing indicated that NAPL at the former Milwaukee Railyard site has been depleted of water-soluble hazardous constituents (Shaw 2008).

Several “oil” and “oil and steam” notations are present on historical drawings in reference to pipelines. These notations suggest that heavier-end TPH, such as Bunker C fuel, were present. This would be consistent with locomotive fueling prior to the advent of the diesel locomotive. Other than the lube oil line, discussed below, TPH impacts discovered in the area appear consistent with diesel. As a result, it does not appear that these pipelines contributed to petroleum contamination of soil and groundwater.

The lube oil line leak noted in the late 1990s (GCI 2000) is also a known source of petroleum contamination. Soil impacted with TPH-ORO likely associated with this leak is located in a small area along the south side of Building 600 as identified on Figure 10.

The former waste oil tank and the existing diesel and gasoline USTs do not appear to be sources of petroleum contamination. During removal of the waste oil UST, it was noted that the tank was in good condition with minimal evidence of scaling, pitting, or rusting (CETI 1999). A contaminated soil sample from the tank excavation was tested and found to contain diesel. A sample of sludge from the waste oil tank contained primarily TPH-ORO, consistent with the anticipated contents. These analytical data indicate that soil contamination outside the tank is not consistent with the contents of the waste oil tank.

The existing diesel and gasoline fiberglass USTs are tested annually in accordance with the current regulations, most recently in May and June 2021. The tanks, lines, spill bucket, overflow prevention system, and leak detection system were all determined to be operating properly.

The shallow groundwater table is encountered from 8 to 12 feet bgs. Groundwater flow at the site appears to be toward the Puyallup River to the west/southwest and to the north towards East 11th Street. The dissolved groundwater plume appears to be primarily in the Upper Sand unit and has migrated in the direction of groundwater flow.

4.2 Exposure Assessment

This section identifies potential human and ecological exposures to contaminated media at the site. Consistent with WAC 173-340-350(1), exposure scenarios are identified that assist in the selection of a cleanup action that will “protect human health and the environment (including, as appropriate, aquatic and terrestrial ecological receptors)” (WAC 173-340-350(8)(c)(i)(A)). To evaluate cleanup actions, applicable cleanup standards must be determined. As outlined in WAC 173-340-700(5), to select the appropriate cleanup standards for cleanup actions, the following criteria must be evaluated:

- Nature of the contamination
- Potentially contaminated media

- Current and potential land and resource uses
- Current and potential receptors
- Current and potential pathways of exposure.

The nature of contamination and impacted media were described in Section 2.3. This section describes current and potential receptors and pathways of exposure, based on current and potential land and resource uses.

4.2.1 Current and Potential Land and Resource Uses

Cleanup levels must derive from reasonable maximum exposures, defined as the “highest exposure that is reasonably expected to occur at a site under current and potential future site use” (WAC 173-340-708(3)(b)). This section identifies the current and future potential uses of resources where contaminated media are known or suspected to be present. The resources under consideration are land, groundwater, and surface water.

4.2.2 Groundwater

Protection of drinking water is not applicable to this Site because the shallow groundwater is not potable. It is expected to remain non-potable in the future under the Model Toxics Control Act (MTCA) and local regulations because:

- Neither the Site nor groundwater in its vicinity is a current source of drinking water.
- Under Washington Administrative Code (WAC) 173-340-720(2)(b), neither the Site nor groundwater in its vicinity is a potential future source of drinking water because groundwater contains natural background levels of specific conductivity above the state and local secondary maximum contaminant level of 0.7 mS/cm (WAC 246-290-310(3)(a) and Tacoma-Pierce County Health Department Environmental Health Code Chapter 3 Drinking Water).
- Site groundwater will not migrate into groundwater that is a current or potential source of drinking water.
- A domestic supply well would not be placed in the vicinity of Parcel 40 (WAC-173-340-720(2)(d)). State and local codes prohibit the construction of drinking water wells in the vicinity of the Parcel 40 via WAC 246-290-130(1) which requires drinking water supplies to come from the highest quality source (which at the Site is the municipal water supply system) and via WAC 290-135(2)(b) which specifies a minimum 100-foot drinking water well setback from surface water, roads, utilities, and buildings.

Protection of marine surface water is an applicable pathway because shallow groundwater at the Site flows toward and discharges into the brackish waters of the Puyallup River and the marine waters of Commencement Bay. The marine surface water quality pathway will incorporate criteria for both the protection of aquatic organisms and humans consuming aquatic organisms.

The groundwater to industrial indoor air pathway is relevant because the Parcel 40 is zoned Port Maritime Industrial by the City of Tacoma and is likely to remain industrial for the foreseeable

future. Additionally, the Site's current and future land uses include occupied industrial/commercial buildings. Vapor intrusion is discussed further in Section 4.2.4.

4.2.3 Soil

Parcel 40 is currently zoned Port Maritime Industrial and future land use plans are for industrial use, therefore, cleanup levels for industrial land use are applicable. Soil must also not leach to groundwater at concentrations that would cause groundwater to exceed acceptable levels. Parcel 40 is excluded from a terrestrial ecological evaluation per WAC 173-340-7491 (1)(b) since all contaminated soil is covered by buildings or pavement. Based on this exclusion, a simplified terrestrial ecological evaluation has not been performed but an institutional control will be required.

Soil direct contact risk is mitigated across much of the Parcel 40 area by complete asphalt or concrete coverage. Soil direct contact could still occur during subsurface excavations for utility work or construction. Existing paving is protective of industrial workers.

4.2.4 Vapor

Vapor intrusion risk is a concern where soil or groundwater is impacted with VOCs above SLs adjacent to enclosed breathing spaces. Benzene is present above SLs in the vicinity of Building 600. Based on the results of the indoor air assessment, it appears likely that petroleum hydrocarbons in soil and groundwater beneath the building are impacting indoor air through vapor intrusion (see Section 2.1). The Port has installed a sub-slab depressurization system (SSDS) to mitigate the potential vapor intrusion risk.

4.2.5 Potential Receptors and Exposure Pathways

The exposure pathways at the Site for human health or the environment are:

- Direct contact with soil by industrial maintenance, utility, or construction workers
- Soil leaching to groundwater
- Groundwater discharge to surface water and exposure to aquatic organisms and humans consuming aquatic organisms (through bioaccumulation)
- Inhalation of indoor air containing contaminants volatilized from groundwater and soil (VI) by onsite office workers and industrial maintenance workers.

Inhalation of indoor air containing contaminants is a relevant exposure pathway but one that was addressed by installation of the SSDS (CRETE 2021).

4.3 Cleanup Standards

MTCA provides the framework for evaluating and selecting cleanup actions. Within this framework are threshold requirements that must be met by all cleanup actions. The threshold requirements for cleanup actions, as defined in WAC 173-340-360(2)(a), are to:

1. Protect human health and the environment
2. Comply with cleanup standards (WAC 173-340-700 through 173-340-760)
3. Comply with applicable state and federal laws (WAC 173-340-710)
4. Provide for compliance monitoring (WAC 173-340-410 and 173-340-720 through 173-340-760)

This section develops appropriate cleanup standards to be protective of human health and the environment, and the locations at which to apply these cleanup standards (the points of compliance) (#1-2 above). The third requirement, comply with applicable or relevant and appropriate requirements (ARARs), is not discussed in this document, but would need to be evaluated during site cleanup and or development. The fourth requirement to provide for compliance monitoring, is discussed in Section 5.

4.3.1 Cleanup Levels

Cleanup levels for affected media at the Site were evaluated in accordance with MTCA and take into consideration exposure pathways and receptors based on current and likely future uses of the Site. Because the Site is located in a developed commercial/industrial setting with buildings, paved parking lots, and roads, the Site qualifies for a TEE exclusion under WAC 173-340-7491(1)(b).

The exposure scenarios that are relevant to the development of cleanup standards to protect human health and the environmental at Parcel 40 are:

- Direct contact with soil by industrial maintenance, utility, or construction workers
- Soil leaching to groundwater
- Groundwater discharge to surface water and exposure by aquatic organisms and humans consuming organisms
- Inhalation of indoor air containing contaminants volatilized from groundwater and soil (VI) by onsite office workers and industrial maintenance workers.

MTCA (WAC 173-340-360(c)(ii)(A)) states that groundwater sources shall be treated or removed, including removal of free product consisting of petroleum and other light nonaqueous phase liquid (LNAPL) from the groundwater using normally accepted engineering practices. MTCA defines free product as “a nonaqueous phase liquid that is present in the soil, bedrock, ground water or surface water as a distinct (sic) separate layer” (WAC 173-340-200). Free product has been measured in ITC-RW-1 and ITC-RW-2 and intermittently in GEI-MW-9. Sorbent socks were placed in wells ITC-RW-1, ITC-RW-2, and GEI-MW-9 on December 29, 2020 to remove accumulated free product.

4.4 Point of Compliance

A point of compliance is that point or location on a property where the CULs must be attained in each medium of concern. Preliminary points of compliance for the Site were established in accordance with WAC 173-340-740(6) for soil and WAC 173-340-720(8) for groundwater.

The point of compliance for soil cleanup levels based on direct contact is throughout the Property to 15 feet bgs. The point of compliance for soil cleanup levels based on protection of groundwater is throughout the property.

Shallow groundwater at Parcel 40 discharges either to the Puyallup River or Commencement Bay. For properties near, but not abutting, surface water, a conditional point of compliance may be “located as close as practicable to the source, not to exceed the point or points where ground water flows into the surface water” (WAC 173-340-720(8)(d)(ii)). For Parcel 40, groundwater compliance will be assessed at wells located within the property boundary or closer to the source.

5 Recommendations

Recommended cleanup and monitoring activities are:

- Install a sub-slab depressurization system at Building 600 to address any potential vapor intrusion. Installation occurred in the Summer and Fall of 2021. System startup is anticipated in February 2022.
- Install an additional groundwater monitoring well in the vicinity of SB-11 to fill dissolved plume data gap between GEI-MW-10 and GEI-MW-11.
- Routine groundwater monitoring sampling of the well network.

To the north of Building 600, TPH-DRO/ORO at SB-13, SB-14, and GEI-MW-8 may be attributable to former Milwaukee Railyard activities. Additional investigation may be warranted to better define boundary or overlap between the two petroleum releases sites.

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Tables

**Table 1 Summary of Indoor Air, Ambient Air, and Sub-Slab Vapor Sample Results
Port of Tacoma - Parcel 40**

				Sample Location Sample ID Sample Duration									
MTCA Screening Level (indoor air) Method C	DOSH PEL (8hr TWA) ^a	ACGIH GGVs for Hydrocarbons	Ambient West	Ambient East	Indoor - West Bay 13	Indoor - Parts Office	Indoor - NW Office	Indoor - East	Indoor - East (duplicate)	Subslab Vapor Parts Room	Subslab Vapor East Bay	MTCA Sub- Slab Soil Gas Screening level Method B	
			<u>AW040720</u> 09:54 to 09:54 7/4 - 7/5/2020	<u>AE040720</u> 10:04 to 10:04 7/4 - 7/5/2020	<u>IWB13040720</u> 10:13 to 10:13 7/4 - 7/5/2020	<u>IPO040720</u> 10:23 to 10:23 7/4 - 7/5/2020	<u>INW0FF040720</u> 10:31 to 10:31 7/4 - 7/5/2020	<u>IE040720</u> 10:37 to 10:37 7/4 - 7/5/2020	<u>IE100040720</u> 10:37 to 10:38 7/4 - 7/5/2020	<u>SSV-Parts</u> 16:48 to 16:53 10/27/2020	<u>SSV-E Bay</u> 17:17 to 17:22 10/27/2020		
Analytes	all values in units of µg/m ³												
Analysis for Volatile Compounds By EPA Method TO-15													
Benzene	3.20	3,190	NV	<0.32	<0.38	0.58	0.74	0.51	0.79	0.78	<1	<2.6	11
Toluene	5000	376,810	NV	<19	<23	39	<23	<19	<19	<19	<60	<150	76,000
Ethylbenzene	1000	434,190	NV	<0.43	<0.52	14	6.3	5.1	1.3	1.3	<1.4	<3.6	15,000
m,p-Xylene	100	434,190	NV	<0.87	<1	63	30	25	5.5	5.3	<2.8	<7.1	1,500
o-Xylene	100	434,190	NV	<0.43	<0.52	19	9.8	8.3	2.1	1.7	<1.4	<3.6	1,500
Naphthalene	0.74	52,430	NV	0.16	0.12	0.39	0.36	0.34	0.32	0.36	<0.84	<2.1	2.5
Analysis For Volatile Compounds By Method MA-APH													
APH EC5-8 aliphatics	NV	NV		<30	<36	240	160	110	130	130	<130	1,900	NV
ACGIH C5-8 aliphatics	NV	NV	1,500,000										
APH EC9-12 aliphatics	NV	NV		<35	<42	1,500 ^c	1,200 ^c	1,100 ^c	2,600 ^c	2,700 ^c	230	<410	NV
ACGIH C9-15 aliphatics	NV	NV	1,200,000										
APH EC9-10 aromatics	NV	NV		<25	<30	<25	<30	<25	<25	<25	<80	<200	NV
ACGIH C9-15 aromatics	NV	NV	1,200,000										
TPH ^d	310			111	130	1,901	1,460	1,293	2,784	2,883	507	2,679	4,700

Notes:

NV = No Value

MTCA = Model Toxics Control Act

DOSH = Washington State Division of Occupational Safety and Health

PEL = Permissible Exposure Limit

EPA = Environmental Protection Agency

APH = Air-Phase Petroleum Hydrocarbons

MA-APH = Massachusetts Department of Environmental Protection Method for the Determination of Air-Phase Petroleum Hydrocarbons

^a DOSH PELs are cited in units of parts per million for the analytes listed. The PELs have been converted to units of $\mu\text{g}/\text{m}^3$ for the purpose of this report.

^b The GGVs listed in Table 1 are reproduced from Column B of the ACGIH Table 1 Group Guidance Values found in Appendix H of the ACGIH publication, 2019 Threshold Limit Values and Biological Exposure Indices.

^c The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

^d TPH is based on Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings Implementation Memorandum No. 18, dated January 10, 2018. The indoor air TPH screening level assumes compounds not detected are present at the full reporting limit. The sub-slab screening level is based on the Method B indoor air screening level of 140 $\mu\text{g}/\text{m}^3$ and the standard attenuation factor of 0.03.

8hr TWA = 8 hour Time-Weighted Average

ACGIH = American Conference of Governmental Industrial Hygienists

GGVs - Group Guidance Values

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

TPH = Total Petroleum Hydrocarbons

Table 2 Monitoring Well Groundwater Analytical Results - March 2020
Port of Tacoma - Parcel 40

Parameter	MTCA Groundwater Screening Level Method C	Marine Surface Water Screening Level	Source of Marine Surface Water Screening Level	GEI-MW1 (See Note 5)	Duplicate GEI-MW-1 (GEI- MW39-0320)				ITC-RW1-0320 (See Note 4)
				03-26-20	03-26-20	03-26-20	03-26-20	03-26-20	03-26-20
	ug/L	ug/L		ug/L	ug/L	ug/L	ug/L	mg/kg	
Volatile Organic Constituents (VOCs; EPA Method 8260)									
1,2,4-Trimethylbenzene	180	NV	---	3.1	3.1	1.0 U	1.0 U	1.0 U	10 U
1,2-Dichlorobenzene	1,600	800	See Note 1	1.2	1.3	1.0 U	1.0 U	1.0 U	10 U
1,3-Dichlorobenzene	NV	2	See Note 1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	21
1,4-Dichlorobenzene	81	22	See Note 2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	19
Benzene	8	1.6	See Note 3	28/35.7	28	0.35 U	0.35 U	0.35 U/20 U	6 U
Chlorobenzene	350	200	See Note 1	4.1	4.2	1.0 U	1.0 U	2.6	14
Ethylbenzene	1,800	31	See Note 1	5.6/20 U	5.5	1.0 U	1.0 U	1.0 U	10 U
Isopropylbenzene (Cumene)	NV	NV	---	2.9	2.8	1.0 U	1.0 U	1.8	10 U
Naphthalene	350	4,900	See Note 2	1.2/20 U	1.1	1.0 U	1.0 U	1.0 U	10 U
n-Propylbenzene	NV	NV	---	2.9	2.9	1.0 U	1.0 U	1.5	10
o-Xylene	3,500	NV	---	5.4/20 U	5.2	1.0 U	1.0 U	1.0 U	10 U
p-Isopropyltoluene	NV	NV	---	1.6	1.5	1.0 U	1.0 U	1.0 U	49
sec-Butylbenzene	NV	NV	---	1.0 U	1.0 U	1.0 U	1.0 U	2.2	16
Toluene	1,400	130	See Note 1	2.8/20 U	2.9	1.0 U	1.0 U	1.0 U	10 U
Fuel Additives									
1,2-dibromoethane (EDB)	2.7	NV	---	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	10 U
1,2-dichloroethane (EDC)	42	NV	---	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	10 U
Methyl tert-butyl ether (MTBE)	240	NV	---	1.0 U/20 U	1.0 U	1.0 U	1.0 U	1.0 U/20 U	10 U
Volatile Petroleum Hydrocarbons (VPH)									
Aliphatic Hydrocarbon (C5-C6)	NV	NV	---	40 U	NA	NA	NA	40 U	NA
Aliphatic Hydrocarbon (C6-C8)	NV	NV	---	87.9	NA	NA	NA	20 U	NA
Aliphatic Hydrocarbon (C8-C10)	NV	NV	---	37.2	NA	NA	NA	29.3	NA
Aliphatic Hydrocarbon(C10-C12)	NV	NV	---	231	NA	NA	NA	172	NA
Aromatic Hydrocarbon (C8-C10)	NV	NV	---	138	NA	NA	NA	50 U	NA
Aromatic Hydrocarbon (C10-C12)	NV	NV	---	505	NA	NA	NA	343	NA
Aromatic Hydrocarbon (C12-C13)	NV	NV	---	896	NA	NA	NA	461	NA

Notes:

Yellow = Shading denotes values above ONE MTCA Screening level

Orange = Shading denotes values above BOTH MTCA Screening levels

Bold = detections

ug/L = micrograms per liter

mg/kg = milligram per kilogram

U = laboratory reporting limit

NV = no value

NA = not analyzed

Note 1 - MTCA Surface Water Human Health Marine Waters 40 CFR 131.45 Screening Level

Note 2 - MTCA Surface Water Method B Cancer Screening Level

Note 3 - MTCA Surface Water Human Health Marine Waters 173-201A WAC Screening Level

Note 4 - ITC-RW1 had 0.89-ft thickness of free product on sample date of 3/26/2020.

Note 5 - Split samples to two labs (Friedman & Bruya value/Fremont Analytical value)

Table 3 Soil Analytical Results - 2020
Port of Tacoma - Parcel 40

				Parameter							
Sample ID	Date Sampled	Sample Depth (ft bgs)	Units	Diesel Range Organics (DRO)	Lube Range Oil (ORO)	DRO/ORO (Diesel + Lube Oil)	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A Screening Level			mg/kg	see total	see total	2,000	30	0.03	7	6	9
SB-01-09	6/12/20	9 to 10	mg/kg	23,000	1600 x	23,000	3,000	0.2 U	0.2 U	7	24
SB-02-09.5	6/12/20	9.5 to 10	mg/kg	3,800	390 x	3,800	600	0.2 U	0.2 U	1.6	2.3
SB-03-10	6/12/20	10 to 11	mg/kg	27,000	3100 x	27,000	2,400	14	3.8	20	20
Dup (SB-03-10)	6/12/20	10 to 11	mg/kg	40,000	4,700	44,700	2,000	1.3	5	13	17
SB-04-08	6/12/20	8 to 9	mg/kg	15,000	1100 x	15,000	2,800	0.2 U	0.2 U	7.9	20
SB-05-09.5	6/12/20	9.5 to 10	mg/kg	9,500	750 x	9,500	600	0.1 U	0.1 U	1.7	2.1
SB-06-09	6/12/20	9 to 10	mg/kg	15,000	490 x	15,000	NA	NA	NA	NA	NA
SB-07-07.5	6/12/20	7.5 to 8.5	mg/kg	50 U	250 U	250 U	NA	NA	NA	NA	NA
SB-08-09	6/12/20	9 to 10	mg/kg	50 U	250 U	250 U	NA	NA	NA	NA	NA
SB-09-07.5	6/12/20	7.5 to 10	mg/kg	18,000	610	18,610	NA	NA	NA	NA	NA
SB-10-05	8/5/20	5 to 6	mg/kg	50 U	250 U	250 U	5 U	0.02 U	0.02 U	0.02 U	0.06 U
SB-11-09	8/5/20	9 to 10	mg/kg	8,000	550 x	8,000	1,500	0.02 Uj	0.1 U	3.3	2.6
Dup (SB-11-09)	8/5/20	9 to 10	mg/kg	9,400	640 x	9,400	1,500	0.02 Uj	0.1 U	2.9	2.3
SB-12-10	8/5/20	10 to 11	mg/kg	150	250 U	150	36	0.02 U	0.02 U	0.02 U	0.06 U
SB-13-09	8/5/20	9 to 10	mg/kg	12,000	860 x	12,000	1,400	0.02 Uj	0.1 U	2.0	1.7
SB-14-09	8/5/20	9 to 10	mg/kg	50 U	250 U	250 U	5 U	0.02 U	0.02 U	0.02 U	0.06 U
SB-15-08	8/5/20	8 to 8.5	mg/kg	50 U	250 U	250 U	5 U	0.02 U	0.02 U	0.02 U	0.06 U
SB-16-05	8/5/20	5 to 6	mg/kg	50 U	250 U	250 U	5 U	0.02 U	0.02 U	0.02 U	0.06 U
MW-11-10-11.5	10/4/20	10 to 11.5	mg/kg	50 U	250 U	250 U	5 U	0.02 U	0.02 U	0.02 U	0.06 U

Notes:

Yellow = Shading denotes values above the MTCA Screening level

MTCA Method A industrial/protection of groundwater vadose (default)

Bold = detections

mg/kg = milligram per kilogram

U = laboratory reporting limit

NV = no value

NA = not analyzed

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

Table 4 Direct Push Groundwater Analytical Results - 2020
Port of Tacoma - Parcel 40

Sample ID	Date Sampled	Units	Parameter										
			Diesel Range Organics (DRO)	Lube Range Oil (ORO)	DRO/ORO (Diesel + Lube Oil)	DRO - SGC	ORO - SGC	DRO/ORO - SGC (Diesel + Lube Oil)	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethylbenzene	Total Xylenes
MTCA Method A/C Industrial Groundwater Screening Level		ug/L	see total	see total	500	see total	see total	500	800	8	1,400	1,800	3,500
MTCA Method B Marine Surface Water Screening Level		ug/L	NV	NV	NV	NV	NV	NV	NV	1.6	130	31	NV
SB-01-0620	6/12/20	ug/L	690,000	25000 U	690,000	620,000	25000 U	620,000	4,100	22	10 U	25	30 U
SB-01D-0620	6/12/20	ug/L	880	250 U	880	470	250 U	470	100 U	1 U	1 U	1 U	3 U
SB-02-0620	6/12/20	ug/L	78,000	25000 U	78,000	77,000	25000 U	77,000	1,800	1 U	1 U	1	4.2
Dup (SB-02)	6/12/20	ug/L	94,000	25000 U	94,000	97,000	25000 U	97,000	830	1 U	1.1	1 U	4.0
SB-03-0620	6/12/20	ug/L	1,700,000	64,000 x	1,700,000	1,700,000	72,000 x	1,700,000	4,100	1 U	10	27	3 U
SB-04-0620	6/12/20	ug/L	25,000	3,100 x	25,000	12,000	2500 U	12,000	1,600	81	4.6	19	14
SB-05-0620 (see note1)	6/12/20	ug/L	62,000,000	1,500,000 x	62,000,000	71,000,000	2,000,000 x	71,000,000	7,500	1.1	3.4	1 U	38
SB-06-0620	6/12/20	ug/L	18,000	2500 U	18,000	15,000	2500 U	15,000	750	1 U	1 U	1.5	3 U
SB-07-0620	6/12/20	ug/L	1,100	250 U	1,100	550	250 U	550	100 U	1 U	1 U	1 U	3 U
SB-08-0620	6/12/20	ug/L	280	330	610	55 x	290	290	100 U	1 U	1 U	1 U	3 U
SB-08D-0620	6/12/20	ug/L	640	250 U	640	310	250 U	310	100 U	1 U	1 U	1 U	3 U
SB-09-0620	6/12/20	ug/L	54,000	2500 U	54,000	61,000	2500 U	61,000	3,500	3.2	1 U	11	9.3
SB-10-0820	8/5/20	ug/L	50 U	250 U	250 U	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
SB-10D-0820	8/6/20	ug/L	400 x	250 U	400 x	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
SB-11-0820	8/5/20	ug/L	7,200	250 U	7,200	5,900	250 U	5,900	430	1 U	1 U	1 U	3 U
SB-12-0820	8/5/20	ug/L	3,600	1,300	4,900	2,600	1300	3,900	100 U	1 U	1 U	1 U	3 U
SB-12D-0820	8/6/20	ug/L	1700 x	380 x	2,080	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
SB-13-0820	8/5/20	ug/L	12,000	1,400 x	12,000	9,000	960 x	9,000	280	1 U	1 U	1 U	3 U
Dup (SB-13)	8/6/20	ug/L	16,000	1,900 x	16,000	12,000	1400 x	12,000	320	1 U	1 U	1 U	3 U
SB-14-0820	8/5/20	ug/L	150,000	6200 x	150,000	130,000	5,600 x	130,000	1,200	1 U	1 U	3.0	3 U
SB-15-0820	8/5/20	ug/L	2,900	410 x	2,900	2,900	330 x	2,900	100 U	1 U	1 U	1 U	3 U
SB-16-0820	8/5/20	ug/L	50 U	250 U	250 U	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U

Notes:

MTCA Screening Level Method A for TPH and Method C for BTEX

Yellow = Shading denotes values above surface water MTCA screening level

Orange = Shading denotes values above groundwater MTCA screening levels

Bold = detections

ug/L = micrograms per liter

U = laboratory reporting limit

NV = no value

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Note 1 - Sample SB-05-0620 is likely influenced by the presence of free phase hydrocarbons present. Field notes for this groundwater sample indicate moderate to strong hydrocarbon odor, hydrocarbon sheen and "yellowish, oily water" on purged sample water.

Table 5 Monitoring Well Groundwater Analytical Results - November 2020
Port of Tacoma - Parcel 40

Monitoring Well ID	Date Sampled	Units	Parameter										
			Diesel Range Organics (DRO)	Lube Range Oil (ORO)	DRO/ORO (Diesel + Lube Oil)	DRO - SGC	ORO - SGC	DRO/ORO - SGC (Diesel + Lube Oil)	Gasoline Range Organics (GRO)	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MTCA Method A/C Industrial Groundwater Screening Level		ug/L	see total	see total	500	see total	see total	500	800	8	1,400	1,800	3,500
MTCA Method B Marine Surface Water Screening Level		ug/L	NV	NV	NV	NV	NV	NV	NV	1.6	130	31	NV
GEI-MW-1	11/19/20	ug/L	25,000	5600	30,600	8,500	320 x	8,500	1700	46	6.7	22	14
GEI-MW-2	11/20/20	ug/L	1500 x	330 x	1,830	50 U	250 U	250 U	360	1 U	1 U	1 U	3 U
GEI-MW-3	11/19/20	ug/L	430 x	540 x	970	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
GEI-MW-4	11/20/20	ug/L	370 x	250 U	370	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
GEI-MW-5	11/19/20	ug/L	370 x	250 U	370	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
GEI-MW-6	11/19/20	ug/L	270 x	440 x	710	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
GEI-MW-8	11/19/20	ug/L	2400 x	820 x	3,220	550	250 U	550	130	1 U	1 U	1 U	3 U
GEI-MW-9	11/20/20	ug/L	2,900	250 U	2,900	920	250 U	920	360	1 U	1 U	1 U	3 U
MW-10	11/19/20	ug/L	720 x	430 x	1,150	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
DUP-1120 (MW-10)	11/19/20	ug/L	730 x	400 x	1,130	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
MW-11	11/19/20	ug/L	150x	250 U	150	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U

Notes:

MTCA Screening Level Method A for TPH and Method C for BTEX

Yellow = Shading denotes values above ONE MTCA Screening level

Orange = Shading denotes values above BOTH MTCA Screening levels

Bold = detections

ug/L = micrograms per liter

U = laboratory reporting limit

NV = no value

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

Table 6 Monitoring Well Construction and Field Parameters - November 2020
Port of Tacoma - Parcel 40

Well ID	Date	Initial Depth to Water (feet BTOC)	Final Depth to Water (feet BTOC)	Depth to LNAPL (feet BTOC)	Measured Total Depth (feet BTOC)	Well Screen Interval (feet bgs)	Temperature (degrees C)	Specific Conductance (uS/cm)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	pH (S.U.)	Turbidity ^a (NTU)	Total Dissolved Solids (mg/L)	Sampling Purge Rate (mL/min)
GEI-MW-1	11/19/2020	10.00	11.21	NP	15.28	4-14	13.6	2,697	-86.8	0.21	6.62	407 Clear	1753	<=150
GEI-MW-2	11/20/2020	9.10	9.53	NP	14.90	5-15	16.8	905	-95.1	0.25	7.65	307 Clear	588	<=200
GEI-MW-3	11/18/2020	8.61	NM	NP	8.66	4-14	15.0	2630	-121.8	0.19	7.00	522 Clear	1704	>=200
GEI-MW-4	11/20/2020	9.75	10.49	NP	15.08	4-14	14.3	2225	-114.9	0.26	7.37	617 Clear	1446	<=175
GEI-MW-5	11/19/2020	9.60	14.79	NP	9.81	4-14	15.7	2458	-78.2	0.25	6.91	596 Clear	1594	150
GEI-MW-6	11/19/2020	9.26	9.44	NP	15.40	6-16	15.2	1924	-80.4	0.18	6.72	638 Clear	1252	<=175
GEI-MW-8	11/19/2020	8.85	8.90	NP	15.05	5-15	16.0	1473	-84.6	0.09	6.65	547 Clear	962	<=250
GEI-MW-9	11/20/2020	10.44	10.73	NP	15.42	4-14	17.9	1,263	-100.0	0.23	7.36	198 Clear	820	<=175
MW-10	11/19/2020	10.58	10.66	NP	NM	7-17	16.1	2,583	-134.8	0.20	7.15	793 Clear	1678	175
MW-11	11/18/2020	10.28	11.15	NP	NM	5-15	14.7	2,235	210.0	0.31	6.51	228 Clear	1454	100
ITC-RW-1 ^b	10/25/2020	10.47	NM	9.65	NM	5-15	NM	NM	NM	NM	NM	NM	NM	NM
ITC-RW-2 ^b	10/25/2020	12.14	NM	9.85	NM	5-15	NM	NM	NM	NM	NM	NM	NM	NM

Notes:

a. Turbidity measurements through flow cell and water quality meter do not appear accurate and qualitative description provided.

b. Well not gauged during November 2020. Gauging data from 10/25/2020.

NM - Not measured

NP - Not present

BTOC - Below top of casing (designated measuring point/mark or north side of casing)

bgs - below ground surface

C - Celsius

uS/cm - micro-Siemens per centimeter

mg/L - milligrams per Liter

S.U. - Standard Units

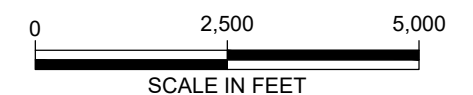
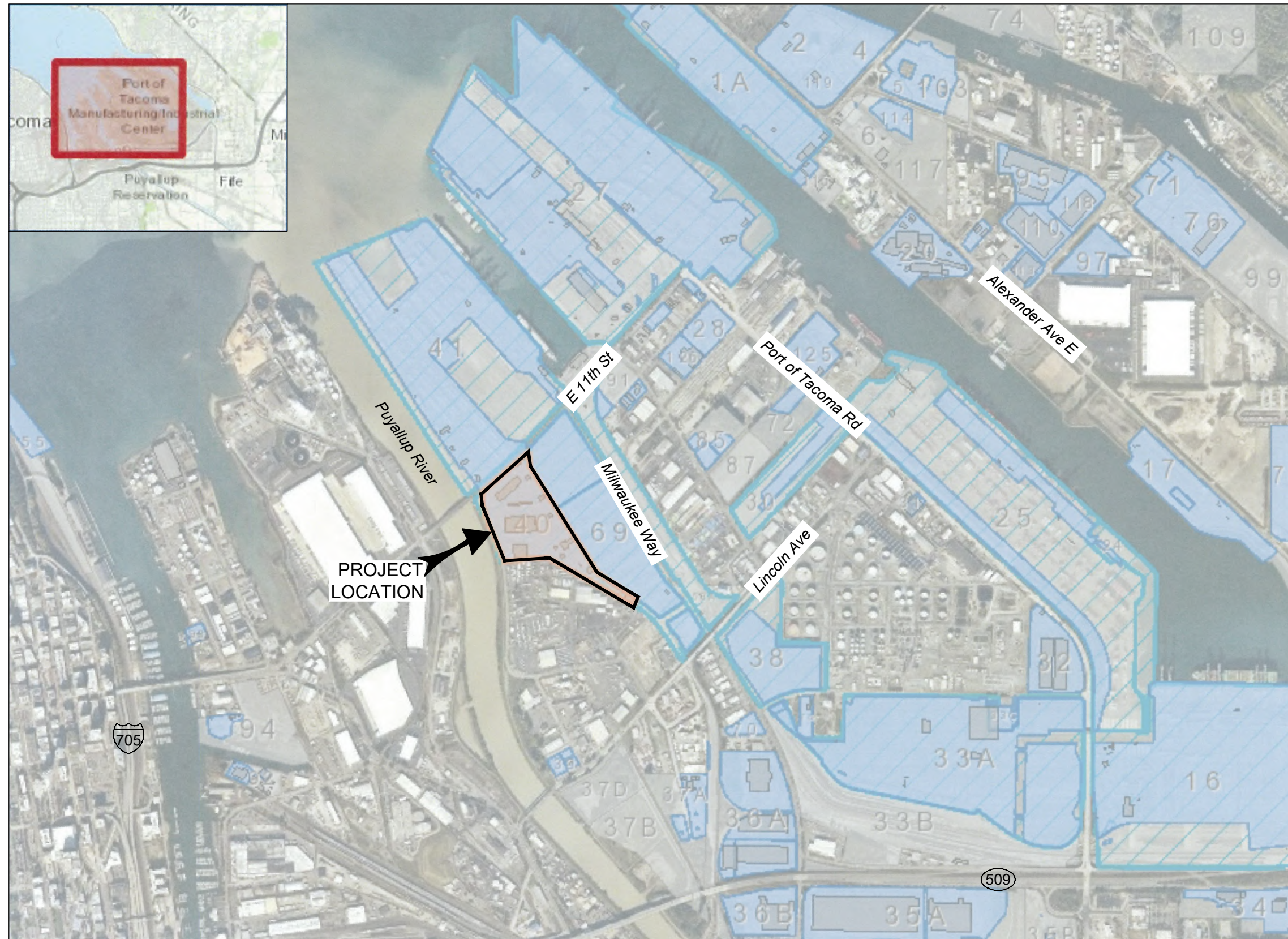
mV - millivolts

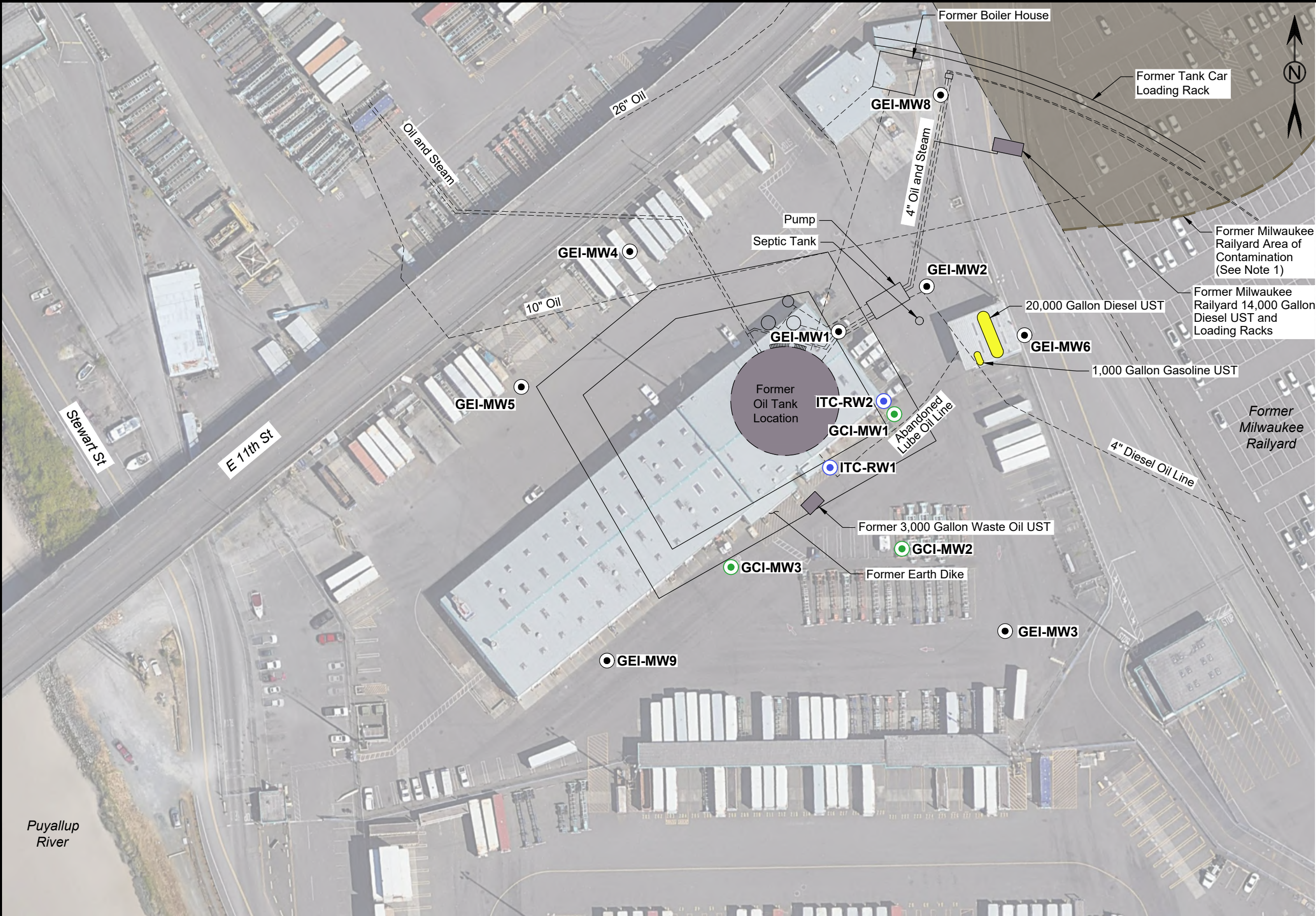
NTU - Nephelometric Turbidity Units

mL/min - milliliters per minute

All water quality parameters are final instrument readings after low-flow sampling stabilization and immediately prior to sampling.

Figures





LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Abandoned or Damaged Monitoring Well (Not Sampled)

Existing Monitoring Well (Not Sampled)

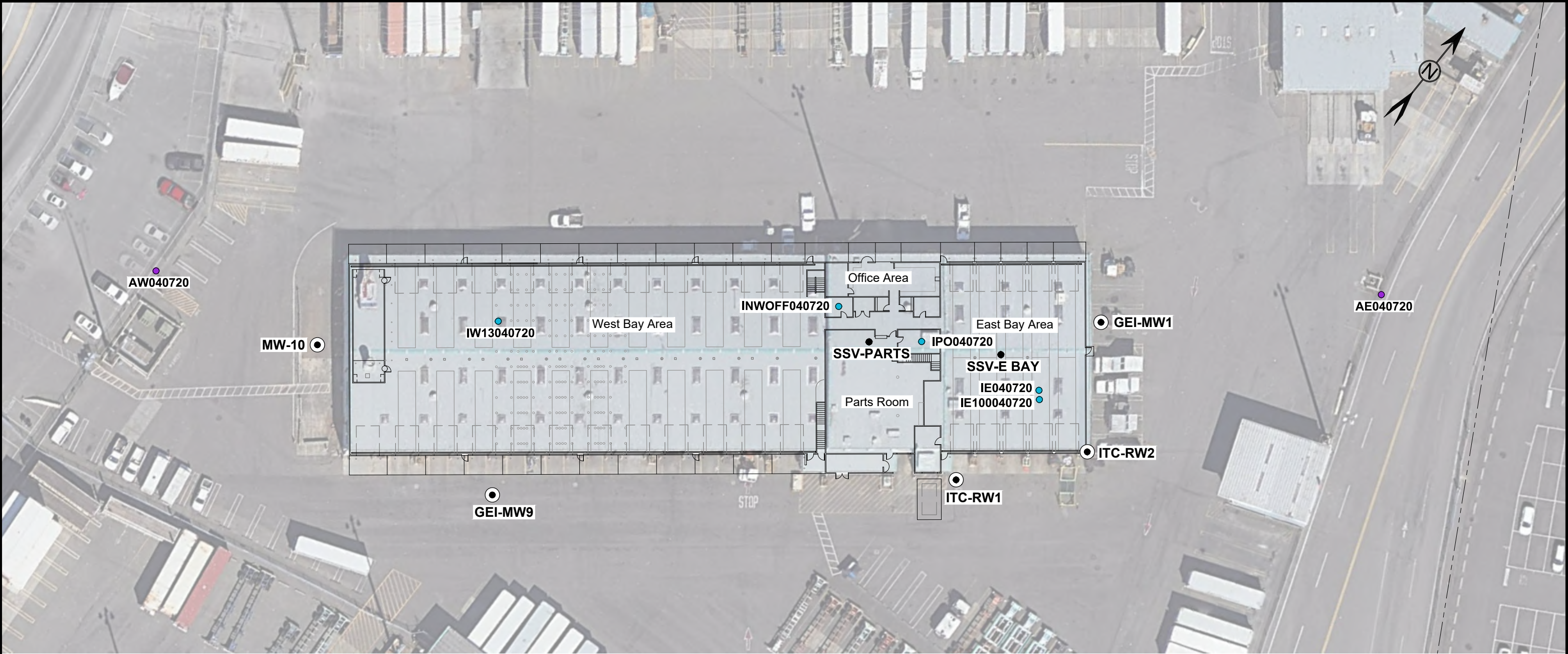
Approximate Site Boundaries

- NOTES
1.

Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.
2.

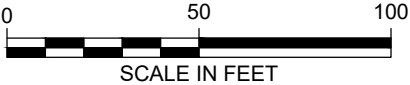
Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.

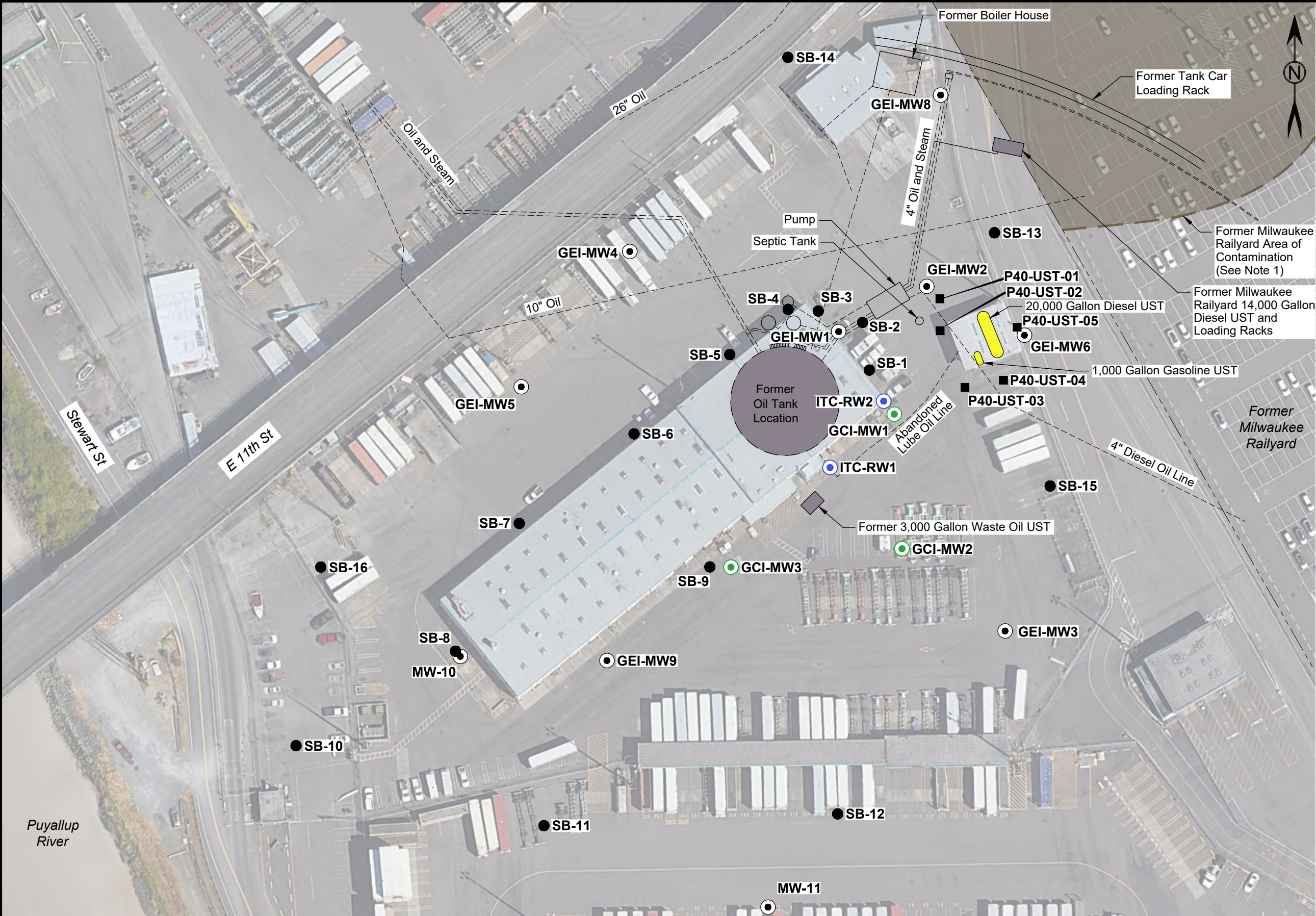




LEGEND

- Subslab Vapor Sample
- Ambient Air Sample
- Indoor Air Sample
- Existing Monitoring Well



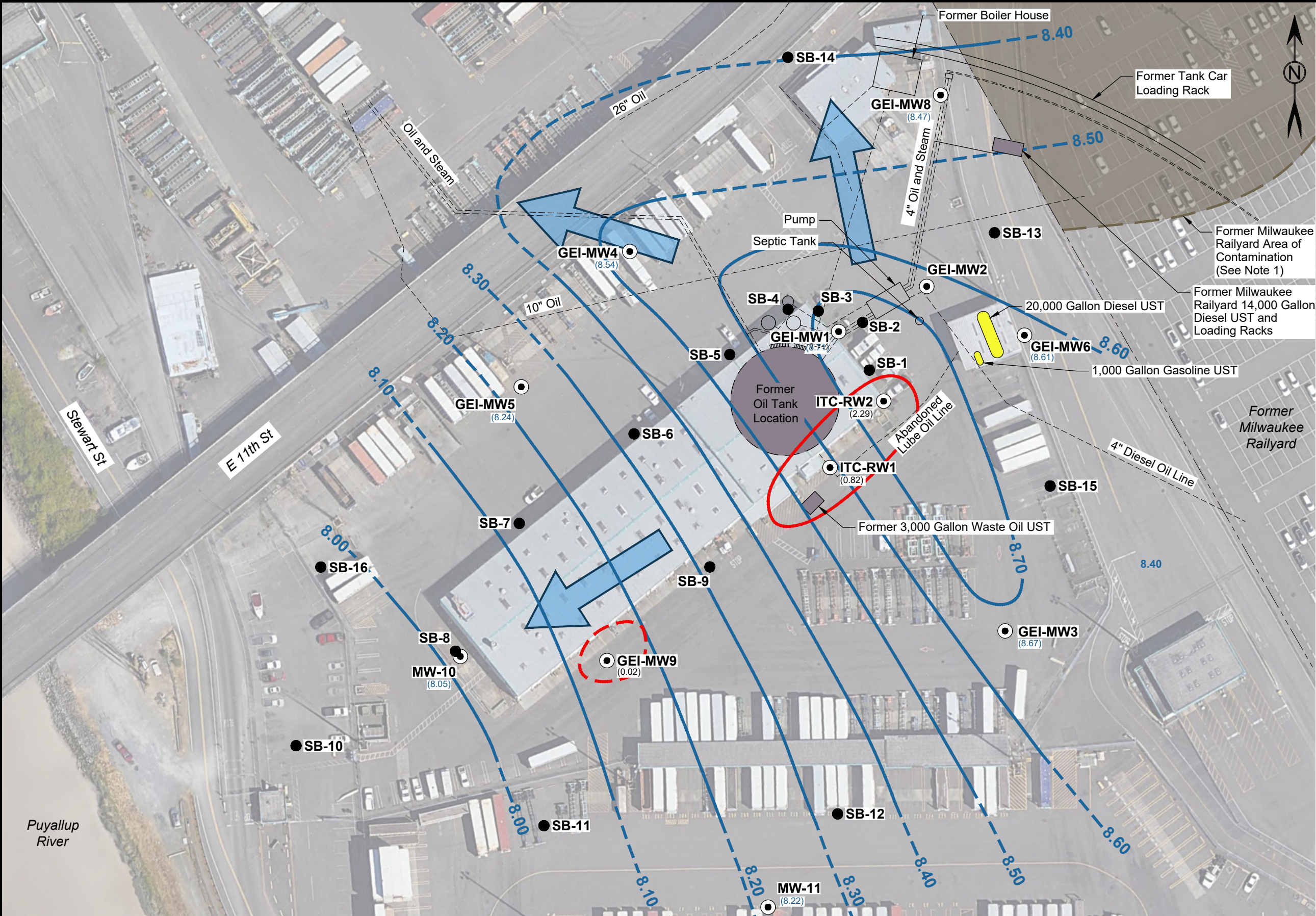


LEGEND

- Historical Fuel Storage
- Active UST
- Existing Monitoring Well
- Existing Boring
- Existing Soil and Groundwater Sample
- Abandoned or Damaged Monitoring Well (Not Sampled)
- Existing Monitoring Well (Not Sampled)
- Approximate Site Boundaries

- NOTES**
- Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.
 - Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.





LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Investigation Soil Boring

Groundwater Contour
(Dashed where Inferred)

(8.61)

Averaged Groundwater
Elevation at Monitoring Well
over Tidal Study Period
(feet MLLW)

Groundwater Flow Direction

LNAPL Plume

Intermittent LNAPL

(0.82)

LNAPL Thickness

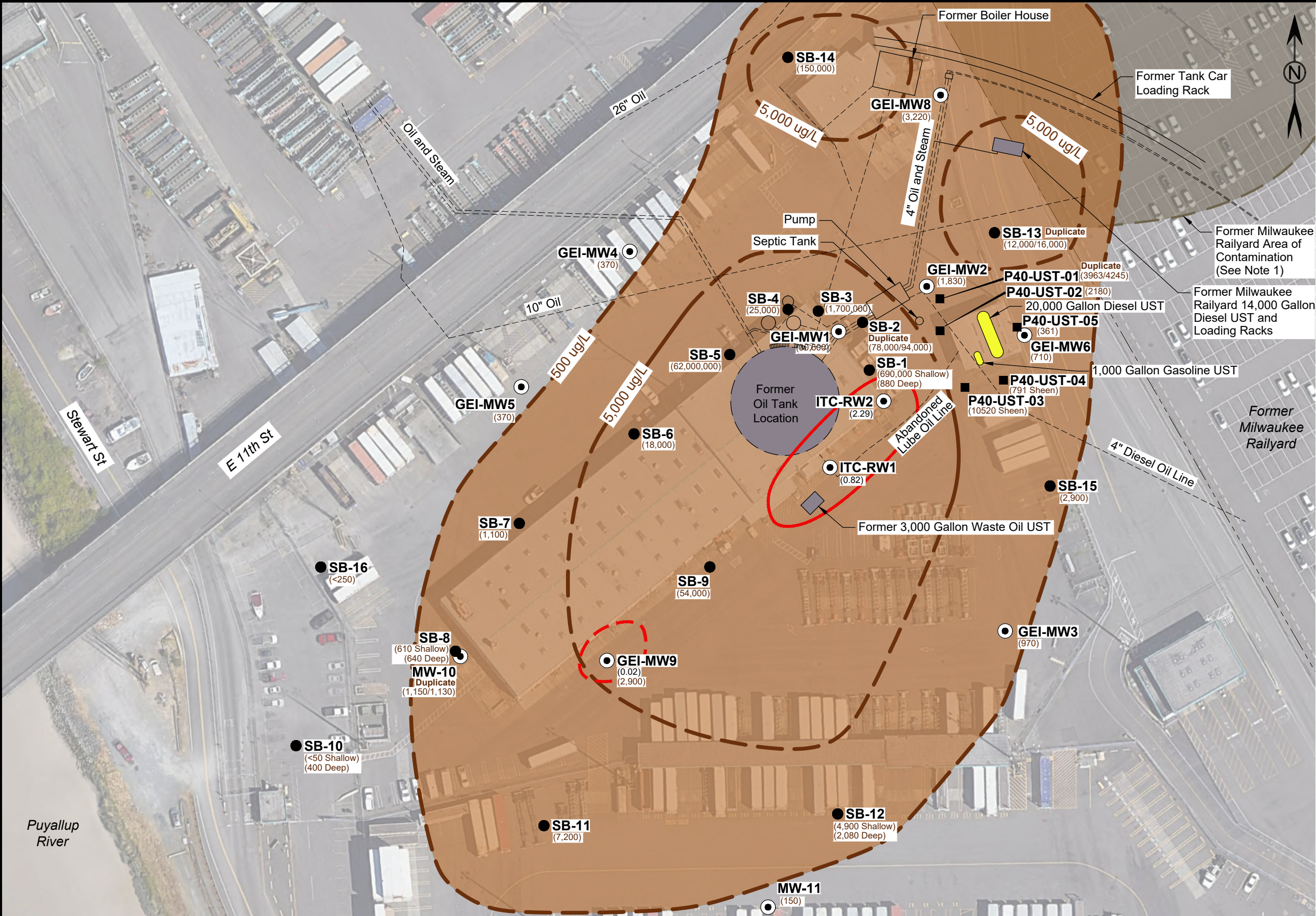
Approximate Site Boundaries

- NOTES**
1.

Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.
2.
- Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.

3.





LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Existing Boring

Previous Soil and Groundwater Sample

DRO/ORO Concentration in Groundwater Monitoring Wells (Dashed where Inferred)

(920)

Concentration of DRO/ORO in Groundwater (micrograms per liter) without use of Silica Gel Column for Cleanup

Groundwater DRO/ORO Concentrations Exceeding MTCA Method A

LNAPL Plume

Intermittent LNAPL

(0.82)

LNAPL Thickness

Approximate Site Boundaries

NOTES

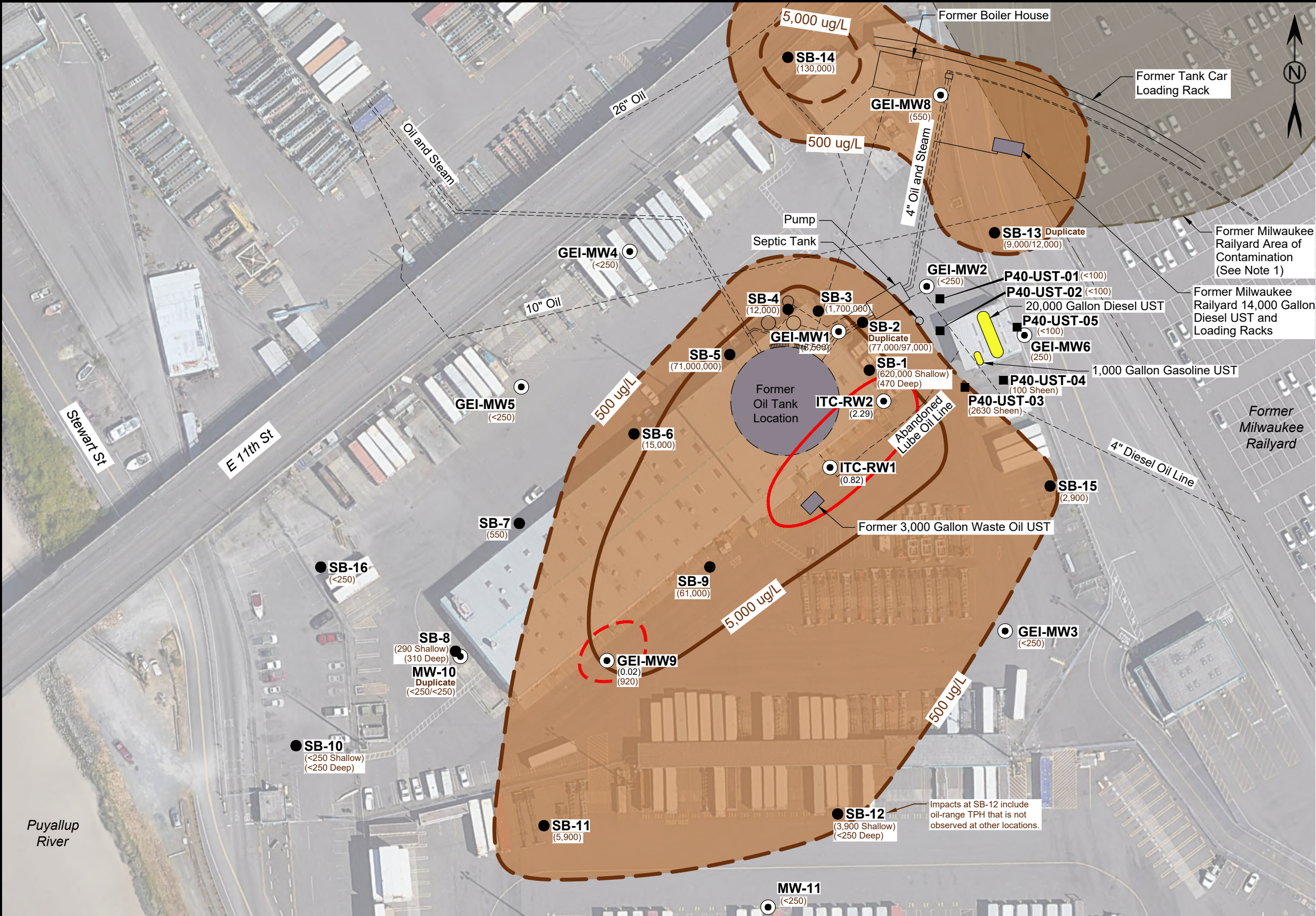
1. Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.

2. Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.

3. Monitoring well groundwater sampled November 18-20, 2020. P40-UST sample locations sampled on August 30, 2019. SB-01 through SB-09 sample locations collected on June 12, 2020. SB-10 through SB-16 sample locations sampled on August 5, 2020.

080160

SCALE IN FEET



LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Existing Boring

Previous Soil and Groundwater Sample

DRO/ORO Concentration in Groundwater Monitoring Wells (Dashed where Inferred)

(920)

Concentration of DRO/ORO in Groundwater (micrograms per liter) with use of Silica Gel Column for Cleanup

Groundwater DRO/ORO Concentrations Exceeding MTCA Method A

LNAPL Plume

Intermittent LNAPL

(0.82)

LNAPL Thickness

Approximate Site Boundaries

NOTES

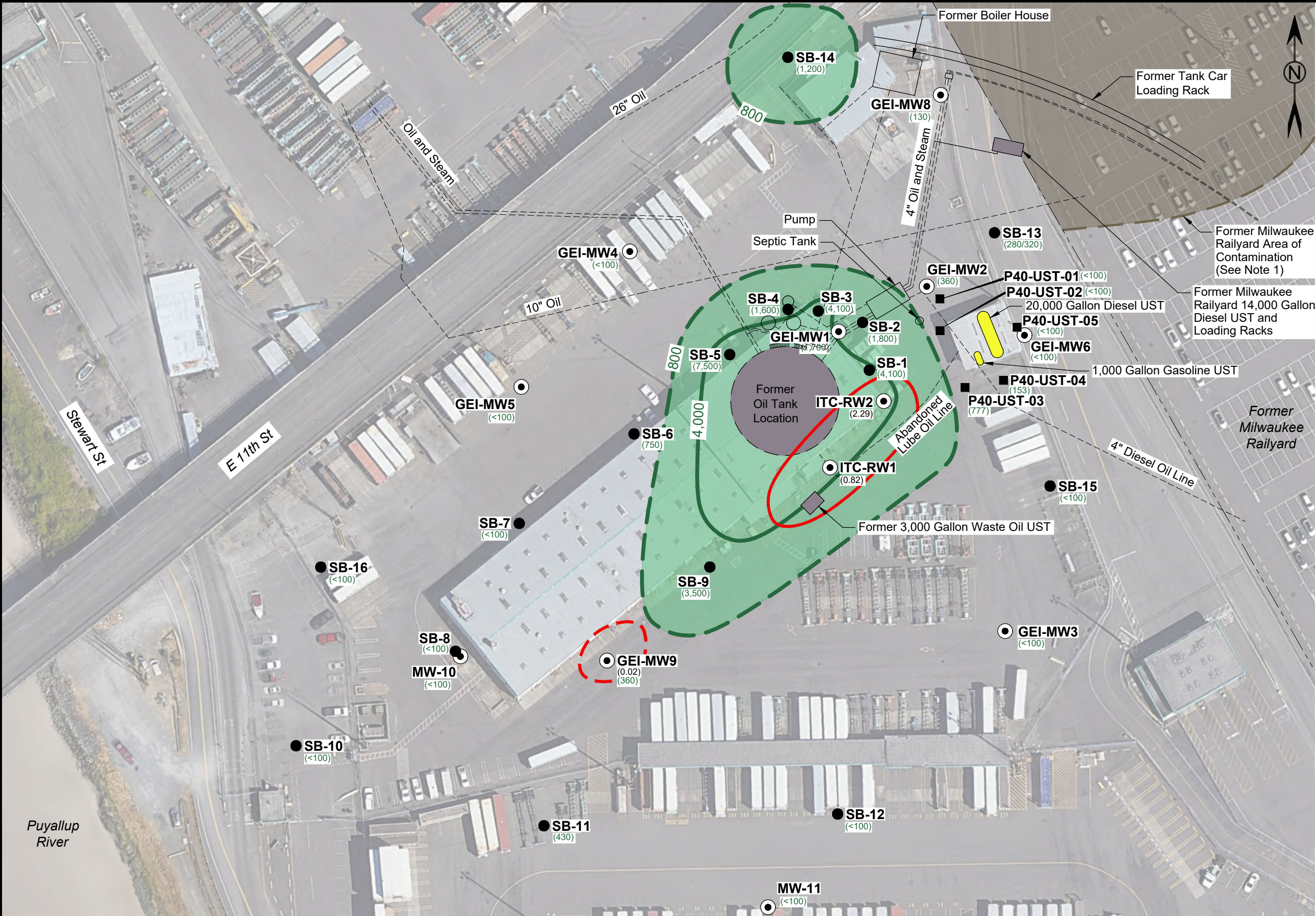
1. Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.

2. Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.

3. Monitoring well groundwater sampled November 18-20, 2020. P40-UST sample locations sampled on August 30, 2019. SB-01 through SB-09 sample locations collected on June 12, 2020. SB-10 through SB-16 sample locations sampled on August 5, 2020.

080160

SCALE IN FEET



LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Existing Boring

Previous Soil and Groundwater Sample

GRO Concentration in Groundwater Monitoring Wells (Dashed where Inferred)

(920)

Concentration of GRO in Groundwater (micrograms per liter)

GRO Concentrations Exceeding MTCA Method A

LNAPL Plume

Intermittent LNAPL

(0.82)

LNAPL Thickness

Approximate Site Boundaries

NOTES

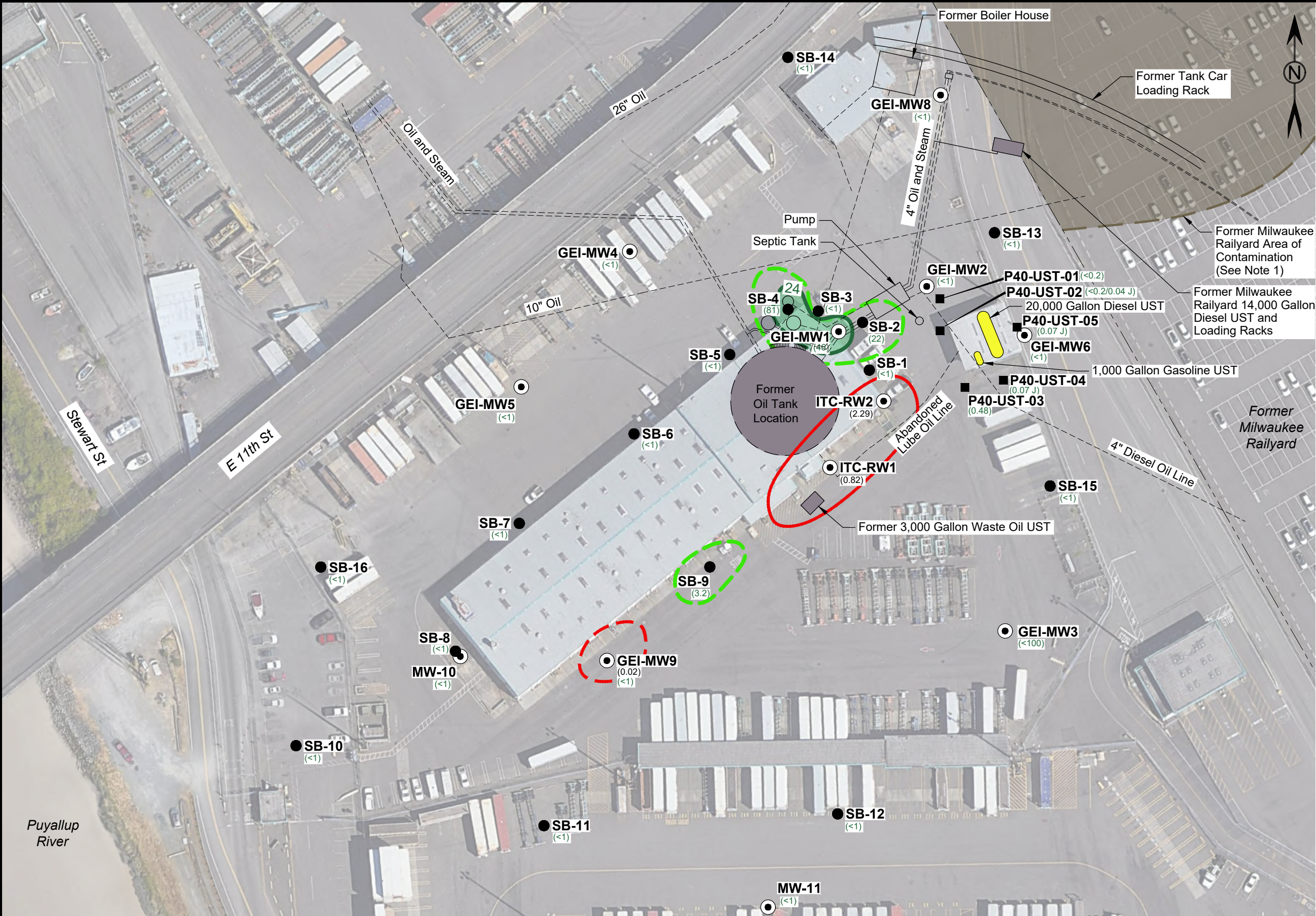
1. Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.

2. Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.

3. Monitoring well groundwater sampled November 18-20, 2020.
P40-UST sample locations sampled on August 30, 2019.
SB-01 through SB-09 sample locations collected on June 12, 2020.
SB-10 through SB-16 sample locations sampled on August 5, 2020.

080160

SCALE IN FEET



LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Existing Boring

Previous Soil and Groundwater Sample

(920)

Concentration of Benzene in Groundwater (micrograms per liter)

Benzene Concentrations Exceeding MTCA Method C Vapor Intrusion Screening Level

Benzene Concentration Exceeds Surface Water Quality Criteria

LNAPL Plume

Intermittent LNAPL

(0.82)

LNAPL Thickness

Approximate Site Boundaries

NOTES

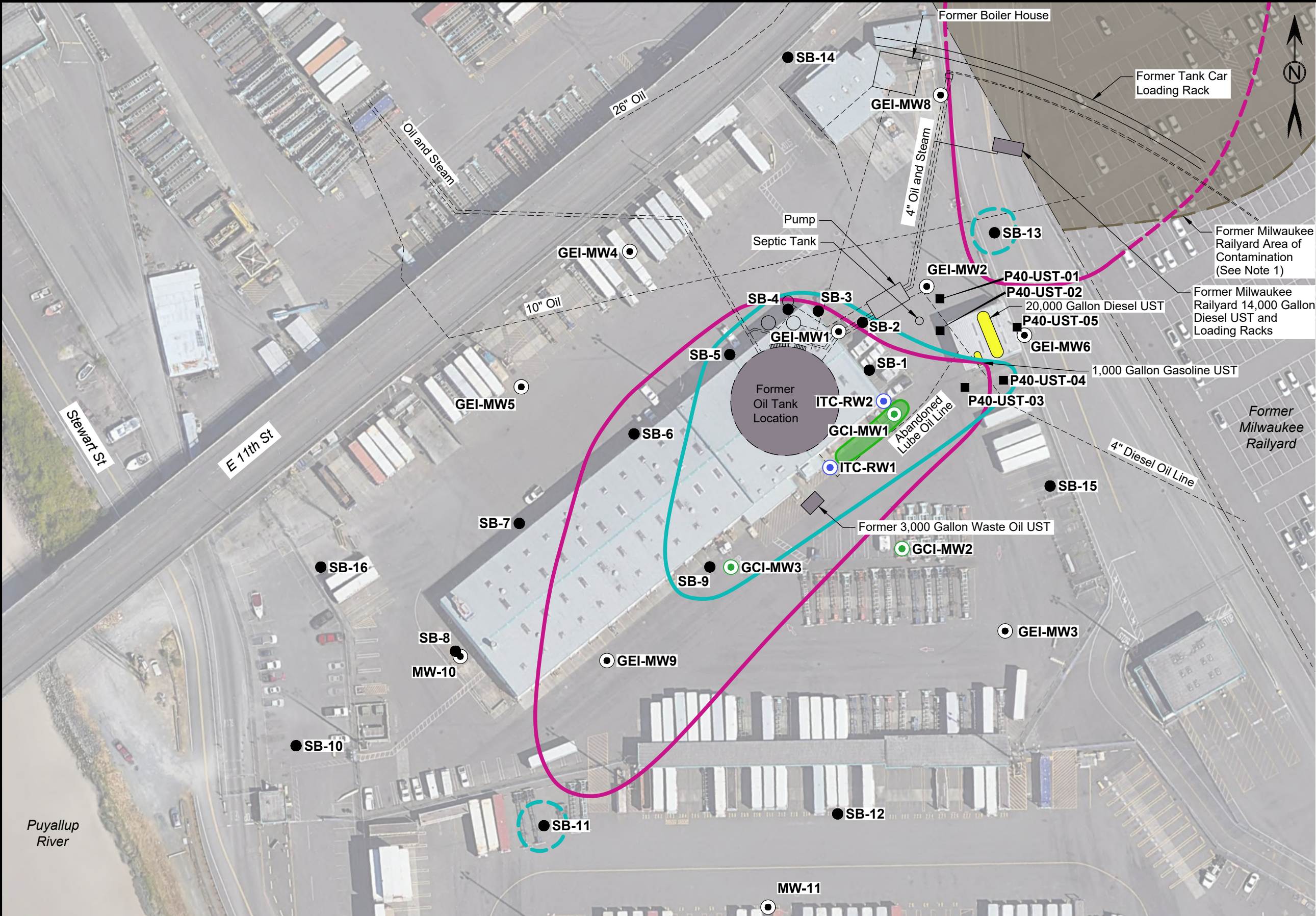
1. Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.

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3. Monitoring well groundwater sampled November 18-20, 2020. P40-UST sample locations sampled on August 30, 2019. SB-01 through SB-09 sample locations collected on June 12, 2020. SB-10 through SB-16 sample locations sampled on August 5, 2020.

080160

SCALE IN FEET



LEGEND

Historical Fuel Storage

Active UST

Existing Monitoring Well

Existing Boring

Previous Soil and Groundwater Sample

Abandoned or Damaged Monitoring Well (Not Sampled)

Existing Monitoring Well (Not Sampled)

Lube Oil Release (ORO > 10,000 mg/kg)

DRO > 10,000 mg/kg (Dashed where Inferred)

GRO > 500 mg/kg (Dashed where Inferred)

Approximate Site Boundaries

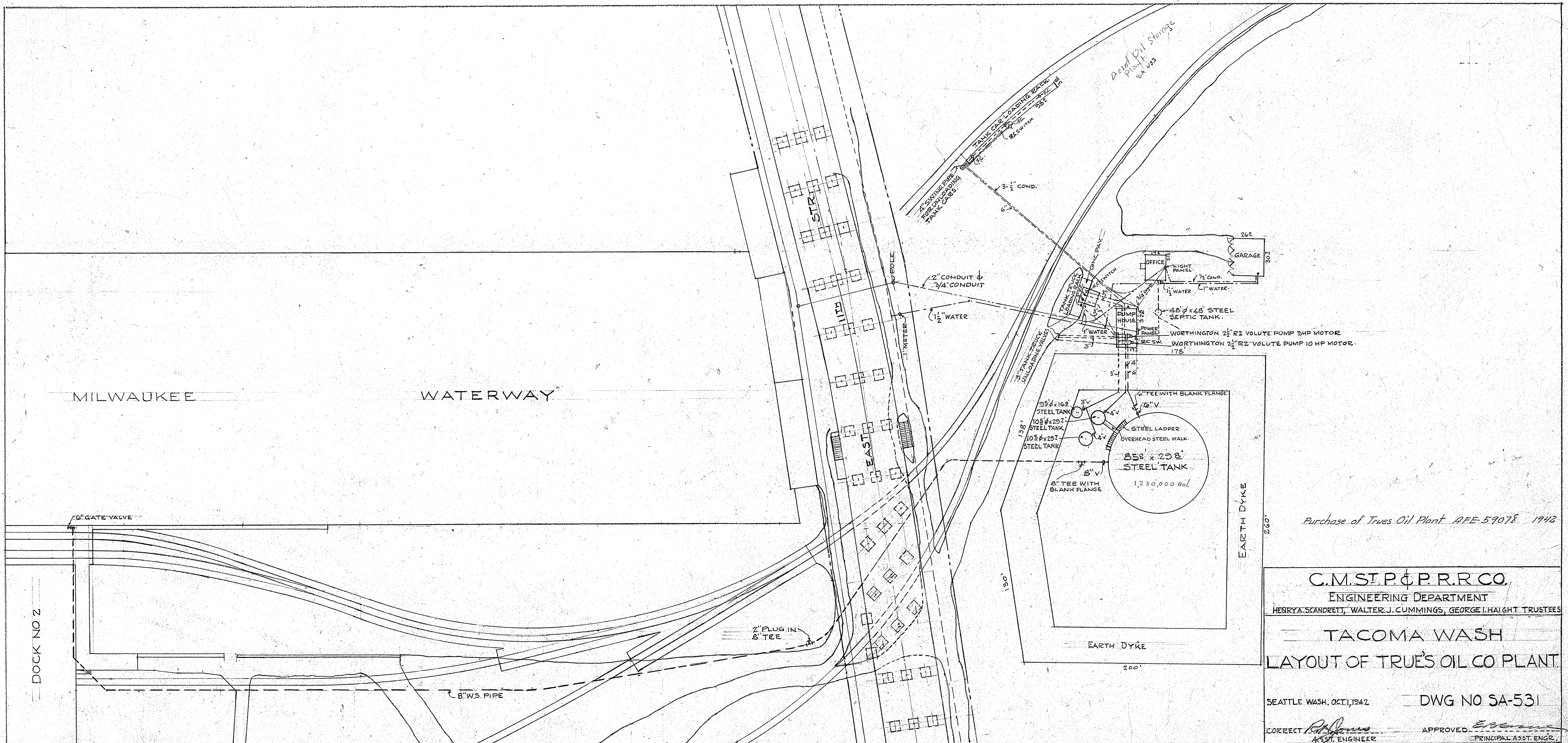
- NOTES**
1. Area of contamination approximated from Prospective Purchaser Consent Decree Re: Milwaukee Railway Site, Attachment C, Figure 1. No. 95-2-02280-0 (Ecology 1995). Figure 1 identifies this area as free product but it is suspected that the figure legend is incorrect. Area of contamination is the approximate extent of soil with total petroleum hydrocarbon concentrations exceeding 1,000 mg/kg.

2. Historical petroleum infrastructure includes former True's Oil and Milwaukee Railway facilities identified and located based on drawing numbers SA-531, SA-552, EP-3863-23, and EP-3865-23-C3 provided in Appendix A.



Appendix A

Select Historical Documents



Purchase of True's Oil Plant AFE-59078 1942

C.M. ST. P. & P. R. R. CO.

ENGINEERING DEPARTMENT

HENRY A. SCANDRETT, WALTER J. CUMMINGS, GEORGE I. HAIGHT, TRUSTEES

TACOMA WASH
LAYOUT OF TRUE'S OIL CO PLANT

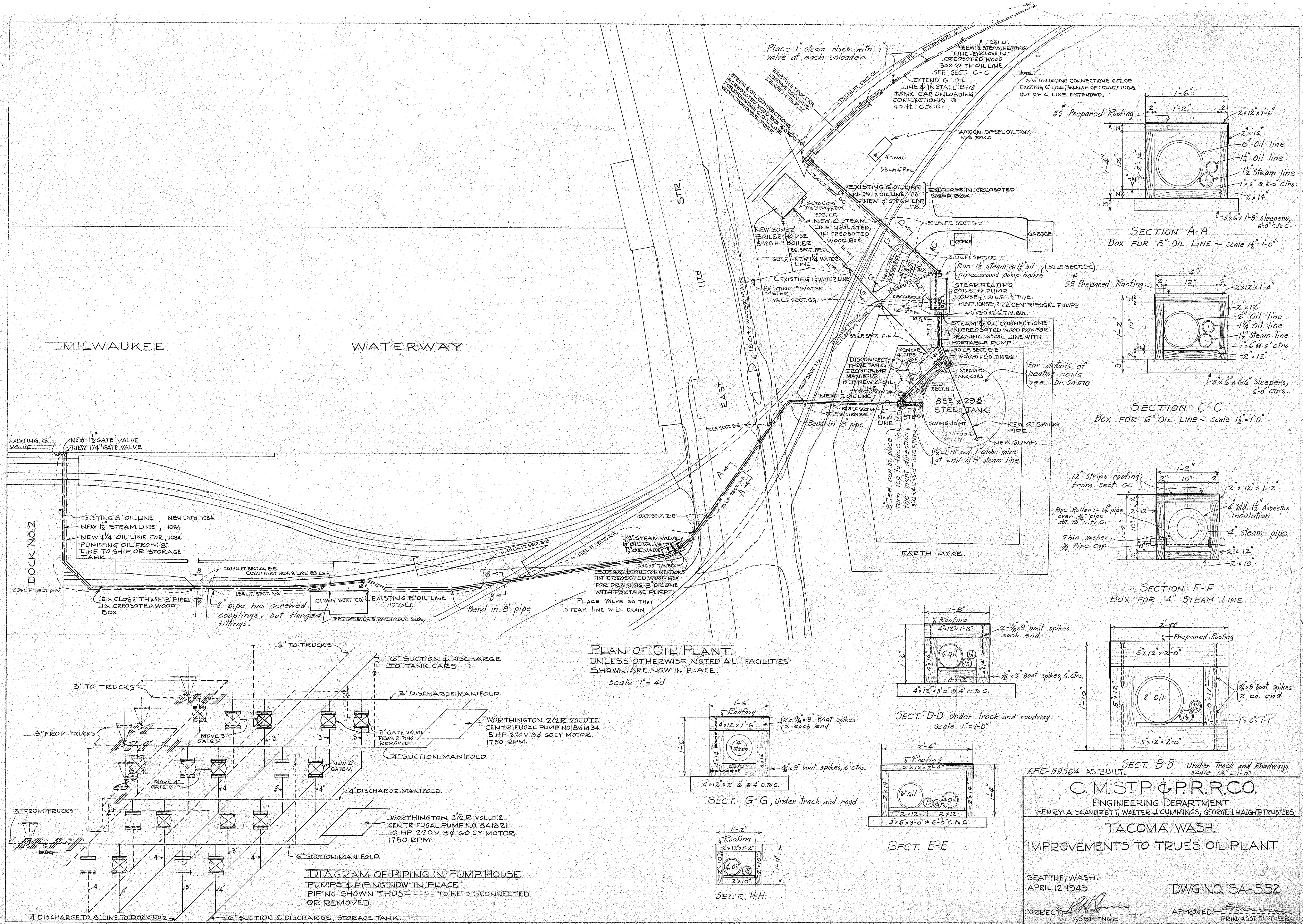
SEATTLE WASH, OCT 1, 1942

DWG NO SA-531

CORRECT *[Signature]*
ASST. ENGINEER

APPROVED *[Signature]*
PRINCIPAL ASST. ENGR.

File 429-6/12



PORT OF TACOMA

SITE FACILITIES FOR TACOMA TERMINALS INC. CONTAINER TERMINAL CONTRACT NO. 550

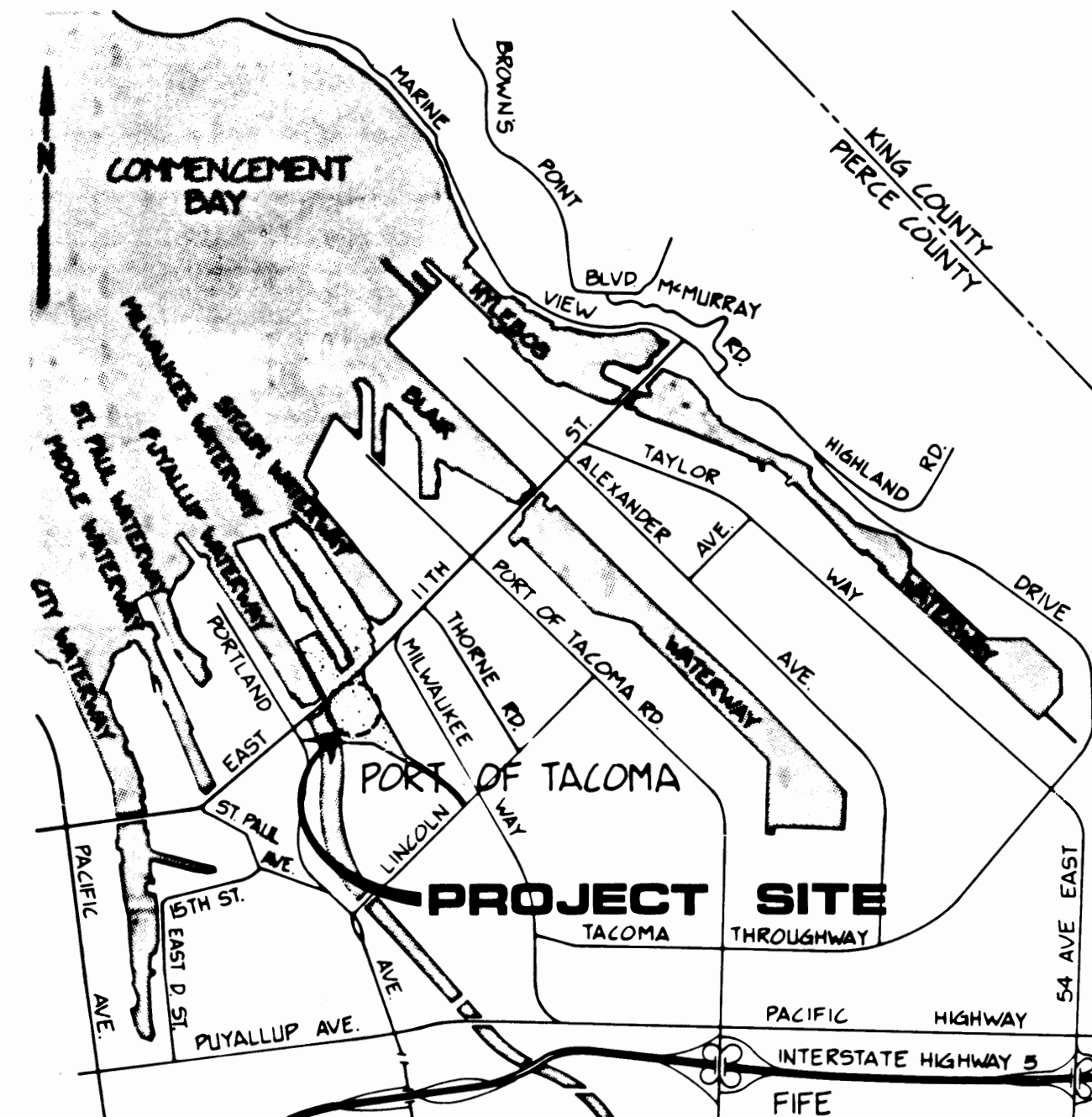
PORT COMMISSION:

ROBERT G. EARLEY
JACK A. FABULICH
JOE E. FAKER
JOHN A. MCCARTHY
PATRICK O'MALLEY

PORT STAFF:

RICHARD DALE SMITH
EXECUTIVE DIRECTOR
JOHN J. TERPSTRA, P.E.
PROJECT MANAGER
ROBERT L. MACLEOD, P.E.
CHIEF ENGINEER

**PORT of
TACOMA
U.S.A.*****



VICINITY MAP N.T.S.

CIVIL & ELECTRICAL CONSULTANTS:
WHITACRE ENGINEERS, INC.
2124 SOUTH "K" STREET
TACOMA, WASHINGTON

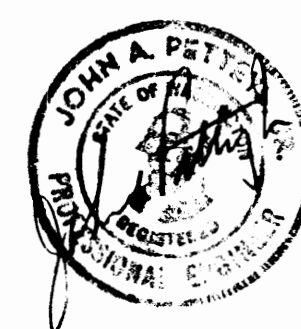
GEOTECHNICAL CONSULTANTS:
HART-CROWSER & ASSOC., INC.
SEATTLE, WASHINGTON

ISSUED FOR CONSTRUCTION 4/5/84

INDEX OF DRAWINGS:

DRAWING NO.	SHEET NO.	SHEET TITLE
EP-3865-23	1	Cover Sheet
EP-3865-23-G1	2	Site Plan & General Notes
EP-3865-23-C1	3	Plan
EP-3865-23-C2	4	Plan
EP-3865-23-C3	5	Plan
EP-3865-23-C4	6	Plan
EP-3865-23-C5	7	Plan
EP-3865-23-C6	8	Typical Sections
EP-3865-23-C7	9	Typical Sections & Details
EP-3863-23		Reference Drawing

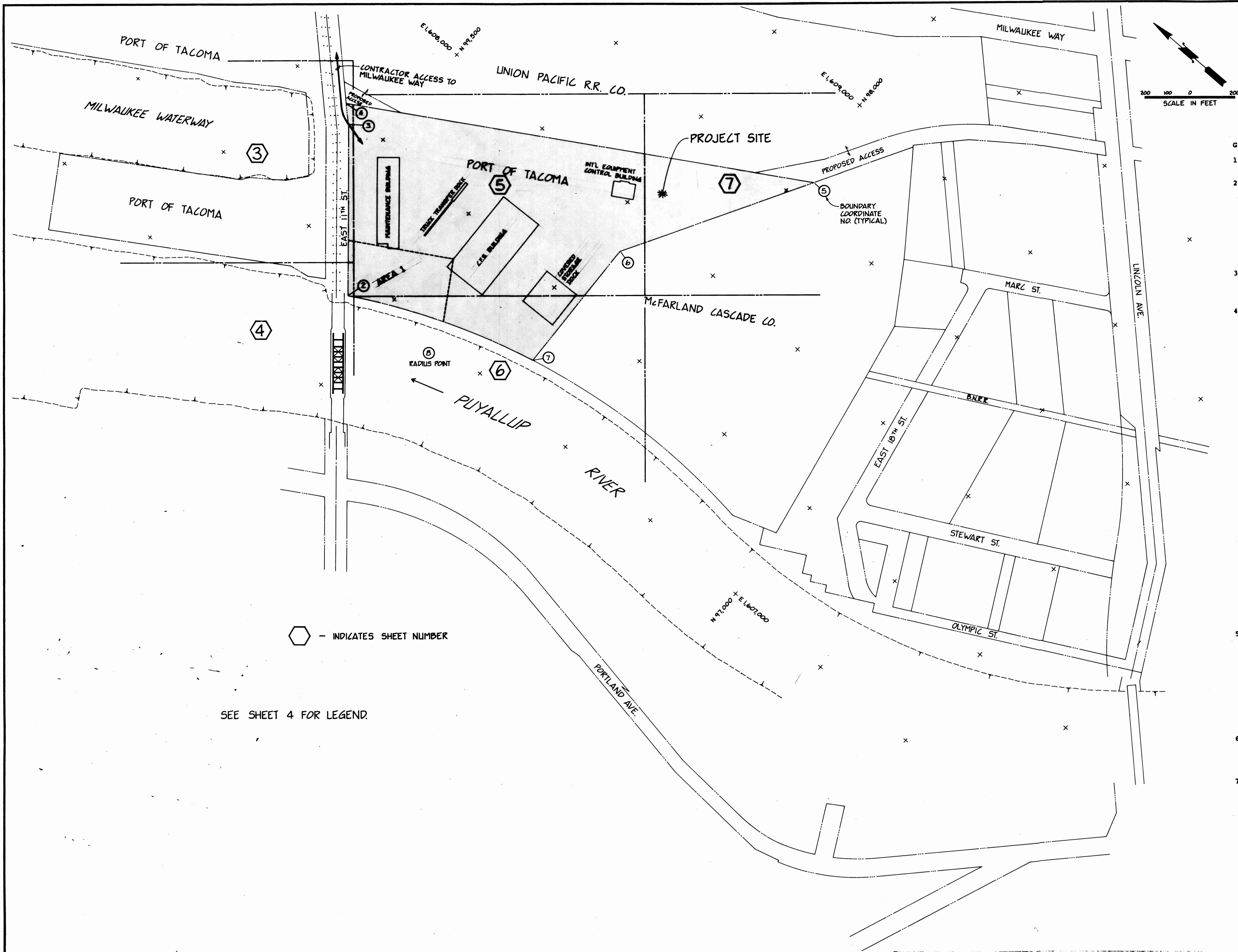
DRAWN <u>RHT</u>	PORT OF TACOMA	
DATE <u>12-27-83</u>	TACOMA TERMINALS, INC.	
CHECKED <u>J.T.P.</u>	C.F.S. AREA EARTHWORK	
DATE <u>12-7-83</u>	COVER SHEET	
CHECKED <u>J.P.</u>		
DATE <u>12/21/83</u>		
CONT. NO. <u>550</u>		
FIELD BOOK (S)	SCALE	DRAWING NO.
APPROVED <u>[Signature]</u>	12/21/83	EP-3865-23
PROJECT MANAGER <u>[Signature]</u>	DATE	SHEET 1 OF 9
CHIEF ENGINEER <u>[Signature]</u>	DATE	



Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 SO. "K" STREET P.O. BOX 5677
TACOMA, WASHINGTON 98405 (206) 272-5144



MARK	REVISION	BY	APP.	DATE
	ISSUE FOR CONSTRUCTION	J.T.P.	J.P.	4-5-84



GENERAL NOTES

- Vertical datum for this project is Mean Lower Low Water (M.L.L.W.) as established by the Port of Tacoma.
- Existing ground elevations shown on these drawings were obtained from the following:
 - Field topographic surveys prepared by the Port of Tacoma.
 - Aerial topographic surveys prepared by Aerial Mapping Co., Boise Idaho, for Whitacre Engineers in July 1983.
 - Miscellaneous field topographic surveys to augment (a) and (b) above by Whitacre Engineers in November 1983.
- The locations of underground utilities shown within the limits of this project are approximate and were obtained from available records. The actual existence of these utilities is unknown. Depths are unknown.
- The general sequence of construction activities is as follows:
 - Perform required clearing, grubbing, stripping, excavation, etc.
 - Place structural fill material to a minimum elevation of 15 feet (M.L.L.W.), as specified. The westerly portion of the existing Maintenance Building preloaded may be utilized.
 - Place structural and preloaded fill to specified lines and grades for C.F.S. Building.
 - Perform item (c) above for all other buildings to be preloaded.
 - Allow for settlement of filled areas to occur until the Engineer authorizes removal of preloaded fill material. During this time, other activities may take place:
 - Demolition and removal of buried utilities, slabs, etc.
 - Spread easterly portion of the existing Maintenance building preloaded into Area 1 and other areas as required.
 - Additional importing and placement of structural fill material outside of the building areas may occur if the contractor anticipates that this additional material will be required to complete site grading after the preloaded fill material is re-spread as structural fill.
 - Remove preloaded fill material and re-spread onsite as structural fill to complete site subgrade preparation for C.F.S. Building and 50 feet outside thereof.
 - Perform item (f) above for all other preloaded building areas.
 - Complete all other site grading as specified.
- The boundary of the project site, and the limits of work (excluding easements for slopes, ditches, etc.) are defined by the following coordinates:

Coordinate No.	Northing	Easting
2	99,148.74	1,606,877.52
3	99,633.87	1,607,445.11
4	99,789.30	1,607,517.69
5	97,917.31	1,608,603.85
6	98,371.71	1,607,818.86
7	98,345.87	1,607,196.95
8	97,608.74	1,604,175.57

- Prior to commencement of construction, the Contractor shall provide the Engineer a plan for site access (haul routes, etc.) for review and approval. Consideration must be made in this plan for protection of utilities, structures, neighboring properties, waterways, and public right-of-ways.
- If the Contractor chooses a water route for fill importation, the Milwaukee Waterway will be the designated delivery point. The Contractor is advised that cargo handling in this area is under the jurisdiction of I.L.W.U. Local No. 23 and should contact the business agent.

SEE SHEET 4 FOR LEGEND.

ISSUED FOR CONSTRUCTION 4/5/84

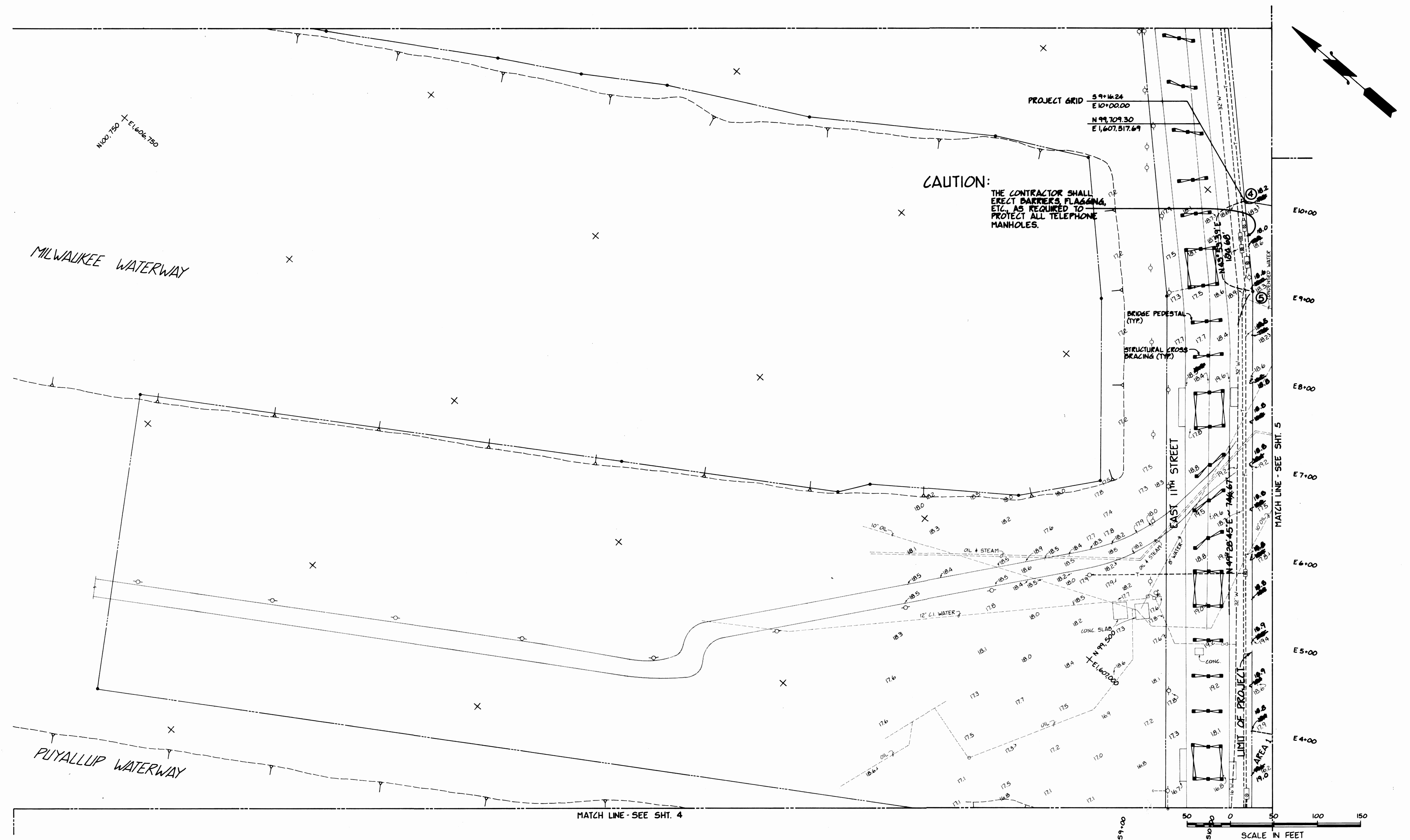


Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 SO. "K" STREET, P.O. BOX 9877
TACOMA, WASHINGTON 98402 (206) 278-2044



MARK	REVISION	BY	APP.	DATE
	ISSUE FOR CONSTRUCTION	J.P.		4-5-84

DRAWN: RNT		DATE: 12-27-83	
CHECKED: J.P.		DATE: 12-27-83	
CHECKED: J.P.		DATE: 4/5/84	
CONT. NO.: 550		FIELD BOOK (B)	
APPROVED: [Signature]		DATE: 12/29/83	
PROJECT MANAGER: [Signature]		DATE: 4/12/84	
SCALE: NOTED		DRAWING NO.: EP-3865-23-61	
SHEET: 2 OF 9			



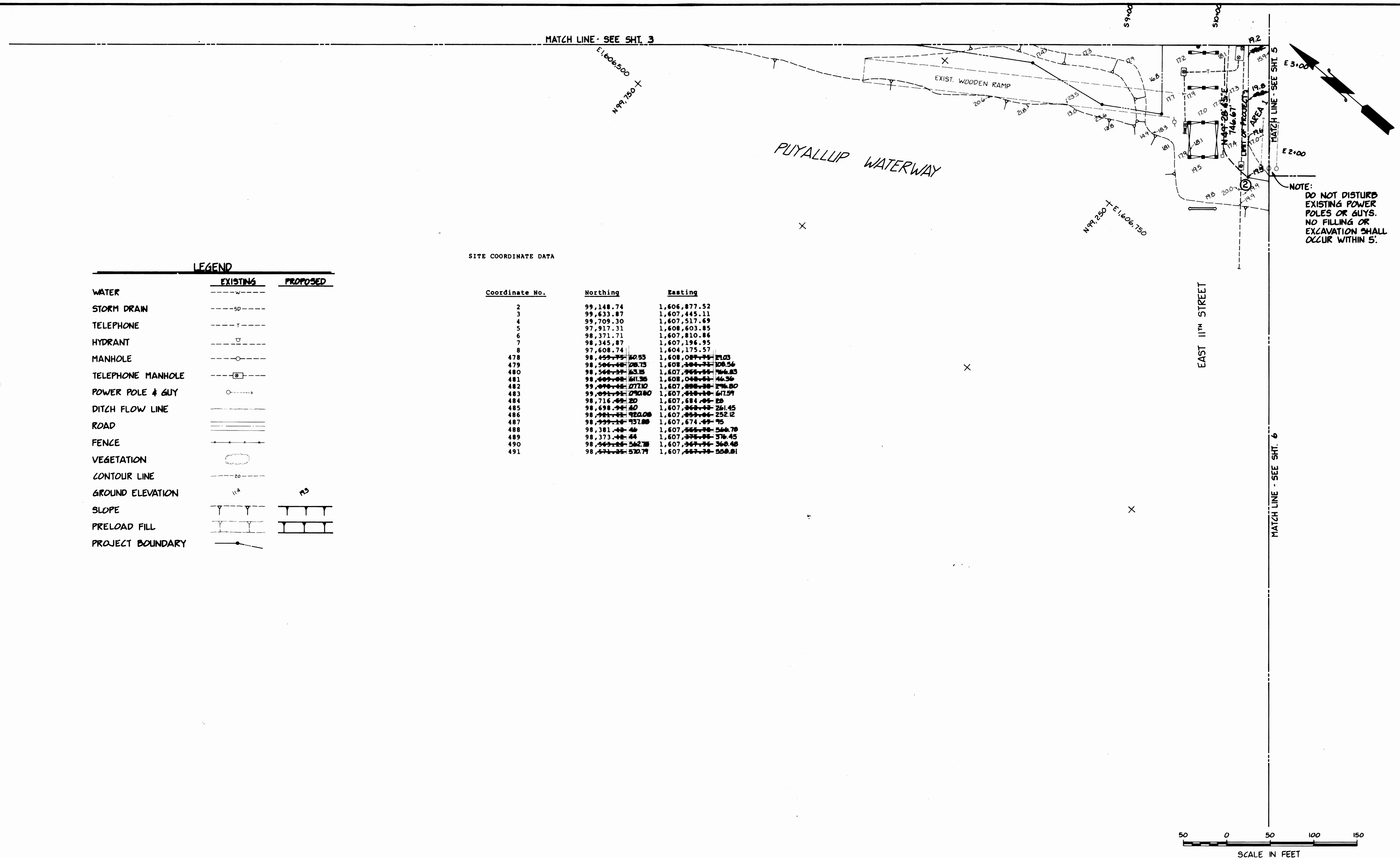
ISSUED FOR CONSTRUCTION 4/5/84



Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 SO. 'K' STREET P.O. BOX 5677
TACOMA, WASHINGTON 98405 (206) 272-5144



		FIELD BOOK 17		DATE	
		APPROVED		DRAWING NO.	
ISSUE FOR CONSTRUCTION		T.P.	4-5-84	12/29/83	
REVISED GRADES		T.O.	4-5-84	DATE	
		PROJECT MANAGER		12/29/83	
		CHECK ENGINEER		DATE	
MARK	REVISION	BY	APP.	DATE	SHEET 3 OF 9

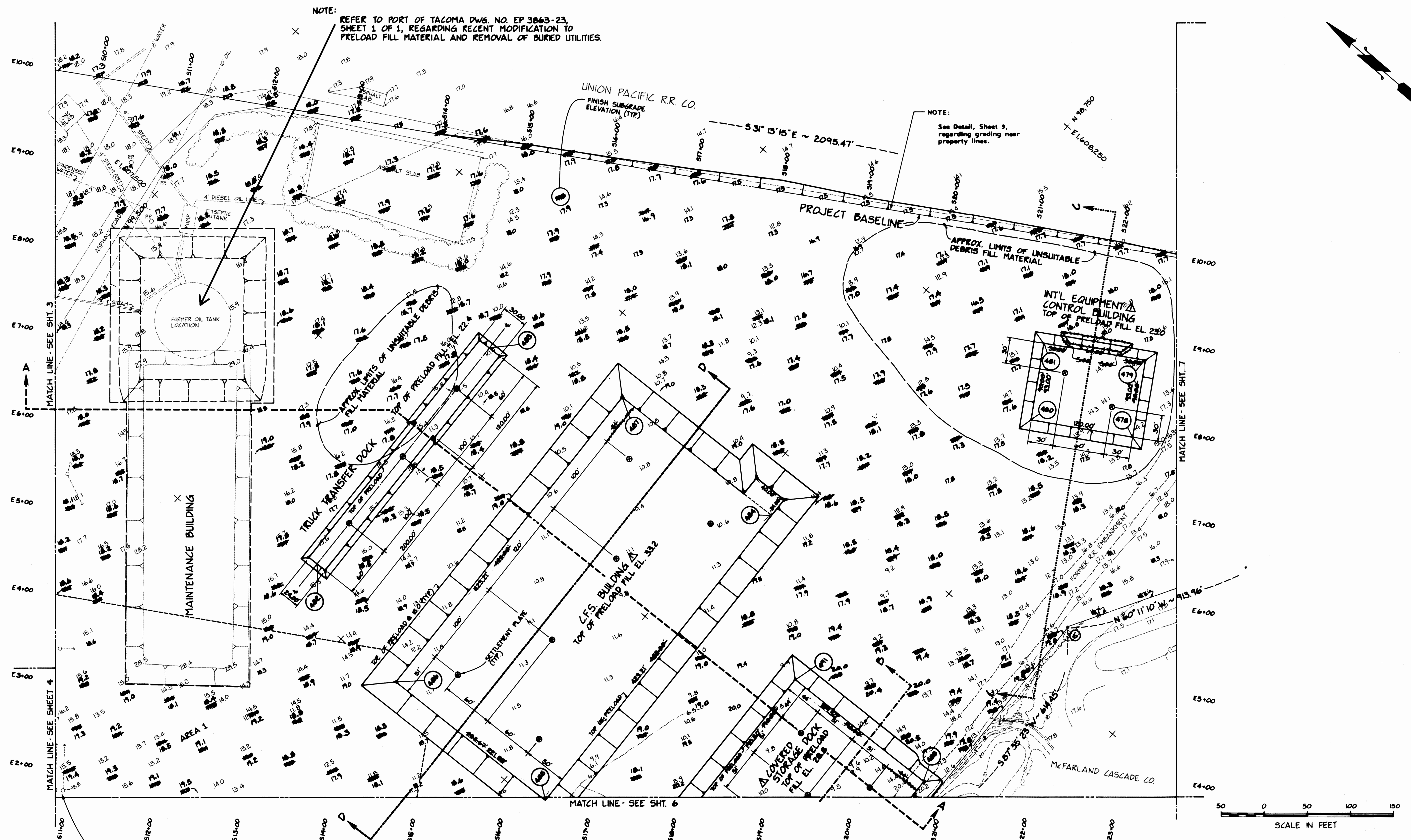


Whitacre Engineers, Inc.
 Consulting Engineering & Land Planning
 2124 SO. K STREET P.O. BOX 5477
 TACOMA, WASHINGTON 98405 (206) 272-5144

ISSUED FOR CONSTRUCTION 4/5/84

ISSUE FOR CONSTRUCTION	8-7-0	4-5-84
REVISED GRADES; CHANGE COORDS.	8-7-0	4-5-84
MARK	REVISION	BY APP. DATE

DRAWN RT DATE 12-27-83		PORT OF TACOMA TACOMA TERMINALS, INC. C.F.S. AREA EARTHWORK PLAN	
CHECKED J.P. DATE 12-27-83		SCALE NOTED	
CHECKED J.P. DATE 12/27/83		DRAWING NO. EP-3865-23-C2	
CONT. NO. 550		SHEET 4 OF 9	
FIELD BOOK (S)		APPROVED [Signature] 12/29/83 [Signature] 12/29/83	



NOTE: DO NOT DISTURB EXISTING POWER POLES OR GUYS. NO FILLING OR EXCAVATION SHALL OCCUR WITHIN 5'.



Whiteacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 30th Street P.O. Box 5477
Tacoma, Washington 98405 (206) 272-5144

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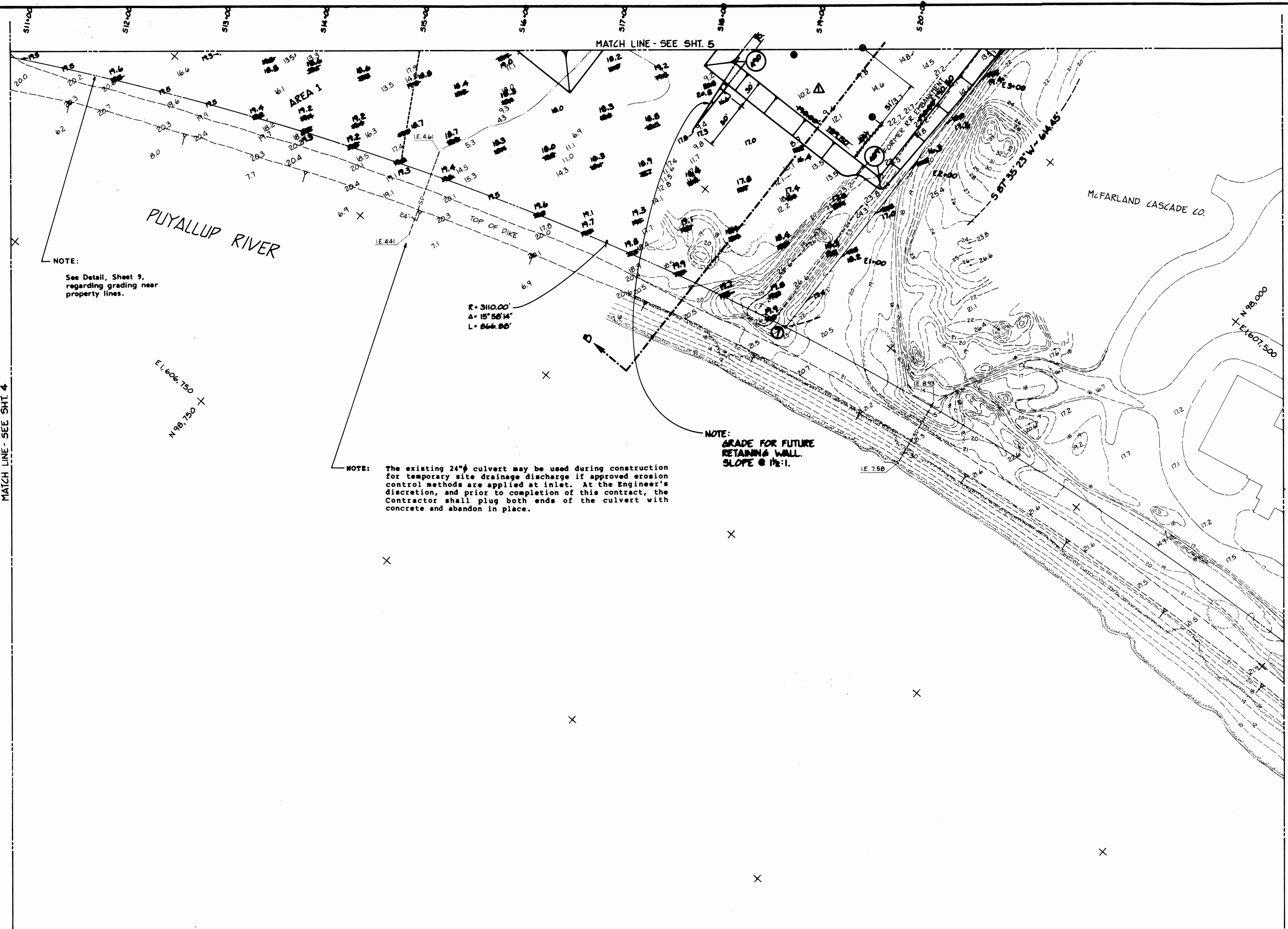
REVISION	BY	DATE
1. ISSUE FOR CONSTRUCTION	JLP	4-5-84
2. REVISED GRADES; PRELOAD DPL	JLP	4-5-84
3.		
4.		
5.		

DRAWN	EST
DATE	12-27-83
CHECKED	JLP
DATE	12-27-83
CHECKED	JLP
DATE	12-27-83
CONT. NO.	380

PORT OF TACOMA **TACOMA TERMINALS, INC.** **C.F.S. AREA EARTHWORK** **PLAN**

APPROVED	12/29/83	SCALE	NOTED
DATE		DRAWING NO.	EP-3865-23-C3
DATE		SHEET	5 OF 9

MATCH LINE - SEE SHT. 4



NOTE:
See Detail, Sheet 9,
regarding grading near
property lines.

NOTE: The existing 24" culvert may be used during construction
for temporary site drainage discharge if approved erosion
control methods are applied at inlet. At the Engineer's
discretion, and prior to completion of this contract, the
Contractor shall plug both ends of the culvert with
concrete and abandon in place.

NOTE:
GRADE FOR FUTURE
RETAINING WALL.
SLOPE @ 1 1/2:1.

R = 3110.00'
Δ = 15° 56' 14"
L = 866.80'

50 0 50 100 150
SCALE IN FEET

ISSUED FOR CONSTRUCTION 4/5/84



Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 SO. N. STREET P.O. BOX 5677
TACOMA, WASHINGTON 98405 (206) 272-5144

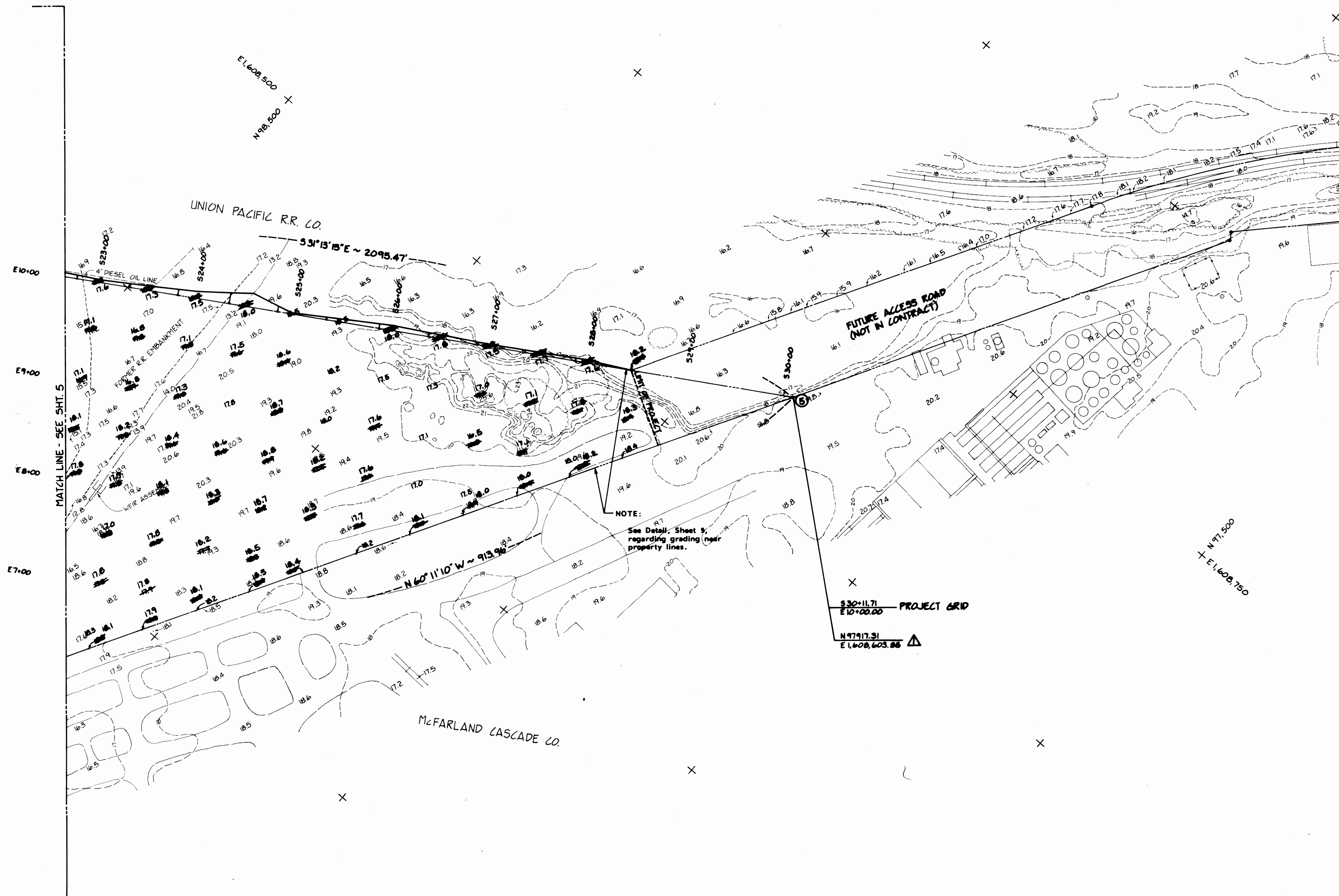


REVISION	BY	APP	DATE
ISSUE FOR CONSTRUCTION	J.T.P.		4-5-84
REVISED GRADES; PRELIM D.M.	J.T.P.		4-5-84

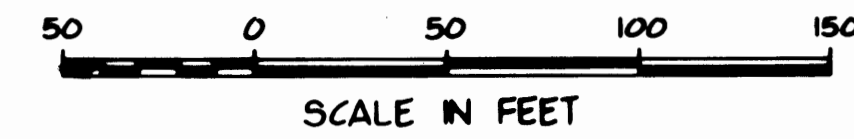
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DATE	12-27-83
CHECKED	J.T.P.
DATE	12-27-83
CHECKED	J.T.P.
DATE	12-27-83
CONT. NO.	560

PORT OF TACOMA
TACOMA TERMINALS, INC.
C.F.S. AREA EARTHWORK
PLAN

APPROVED	J.T.P.	12/29/83	SCALE	NOTED
DRAWING NO.				
EP-3865-23-C4				
SHEET	6	OF	9	



NOTE:
See Detail, Sheet 9,
regarding grading near
property lines.



ISSUED FOR CONSTRUCTION 4/5/84



Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
2124 SO. "K" STREET P.O. BOX 5077
TACOMA, WASHINGTON 98406 (206) 272-9444



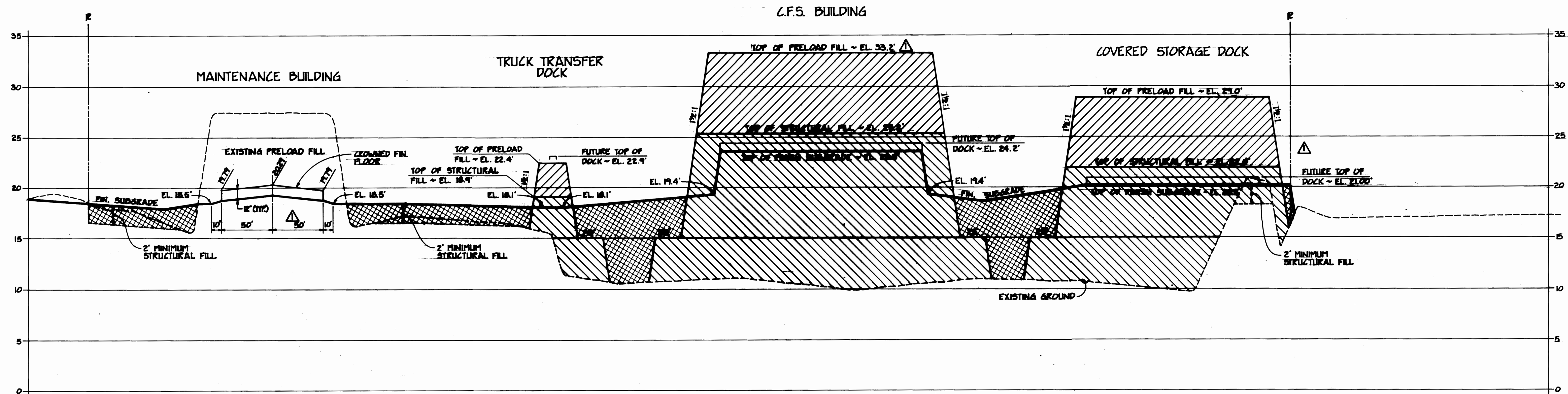
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REVISED GRADES, CHANGE COORD.	J.T.P.	4-5-84
MARK	REVISION	BY APP. DATE

DRAWN	RM
DATE	12-27-83
CHECKED	J.T.P.
DATE	12-27-83
CHECKED	J.T.P.
DATE	12-27-83
CONT. NO.	580

PORT OF TACOMA
TACOMA TERMINALS, INC.
C.F.S. AREA EARTHWORK
PLAN

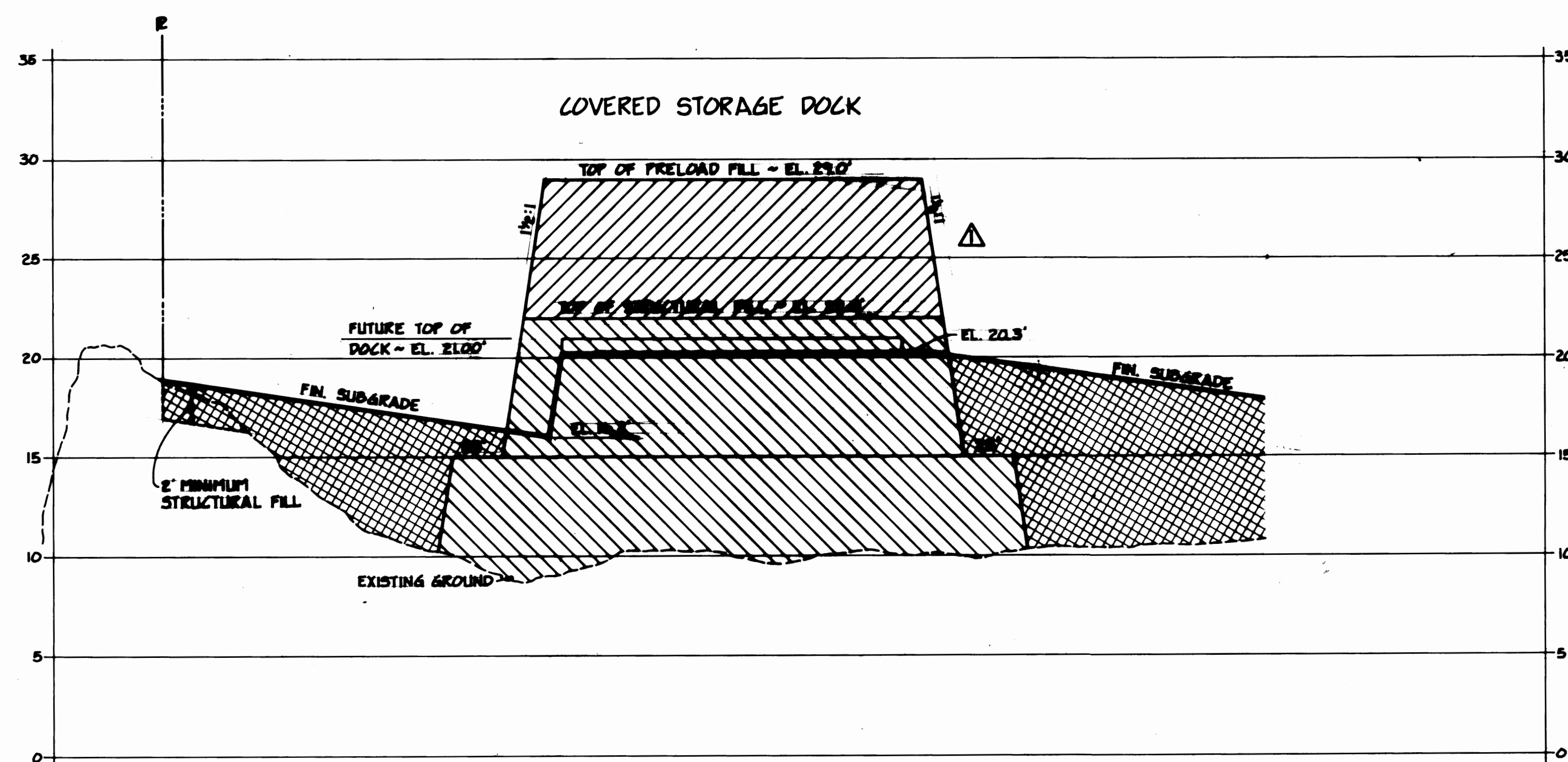
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APPROVED	J.T.P.	12/89/83
REVISION	J.T.P.	12/89/83
DRAWING NO.	EP-3865-23-C5	
SHEET	7	OF 9

NOTE:
 ACTUAL TOP OF PRELOAD ELEVATIONS
 SHALL BE ADJUSTED BASED UPON
 DENSITY OF PRELOAD MATERIAL AND
 SHALL FIRST BE APPROVED BY THE
 ENGINEER.



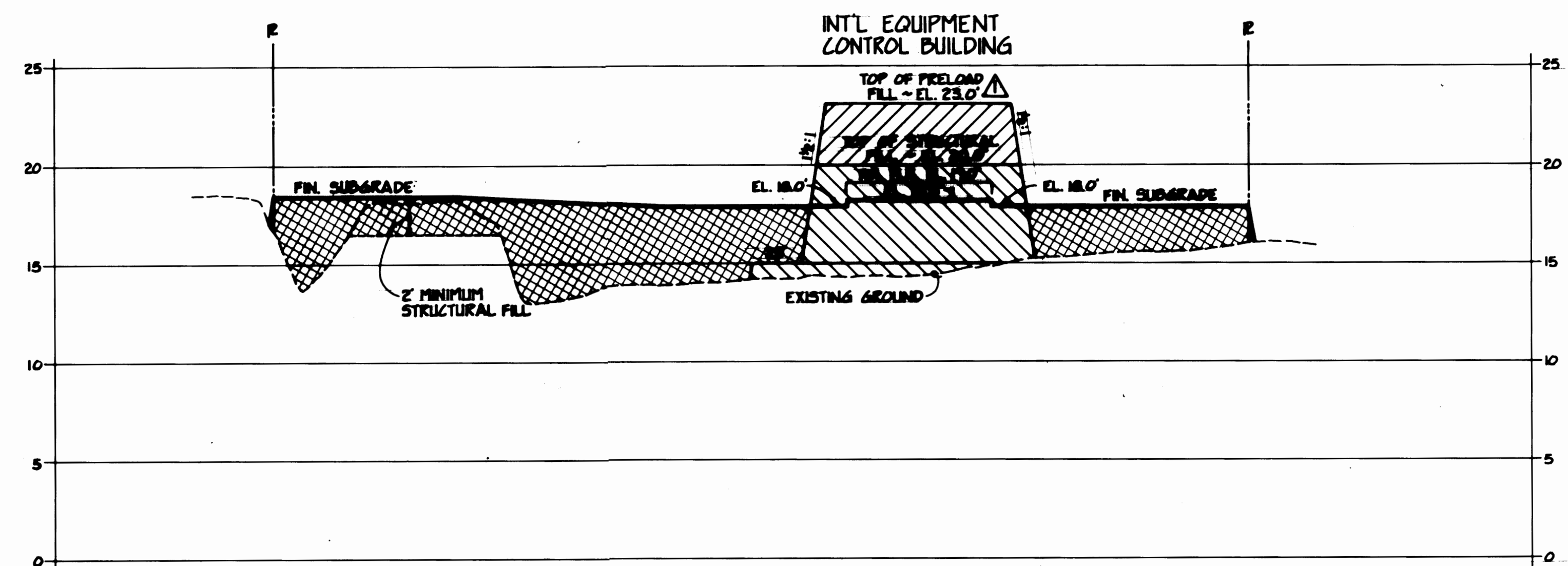
SECTION A-A

HORIZ. SCALE - 1" = 50'
 VERT. SCALE - 1" = 5'



SECTION B-B

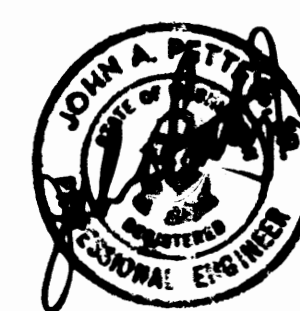
HORIZ. SCALE - 1" = 50'
 VERT. SCALE - 1" = 5'



SECTION C-C

HORIZ. SCALE - 1" = 50'
 VERT. SCALE - 1" = 5'

STRUCTURAL FILL
 PRELOAD FILL
 PRELOAD FILL RE-SPREAD AS STRUCTURAL FILL AND/OR ADDITIONAL IMPORTED STRUCTURAL FILL



Whitcomb Engineers, Inc.
 Consulting Engineering & Land Planning
 204 1st St. SE, P.O. Box 1000
 Tacoma, Washington 98402

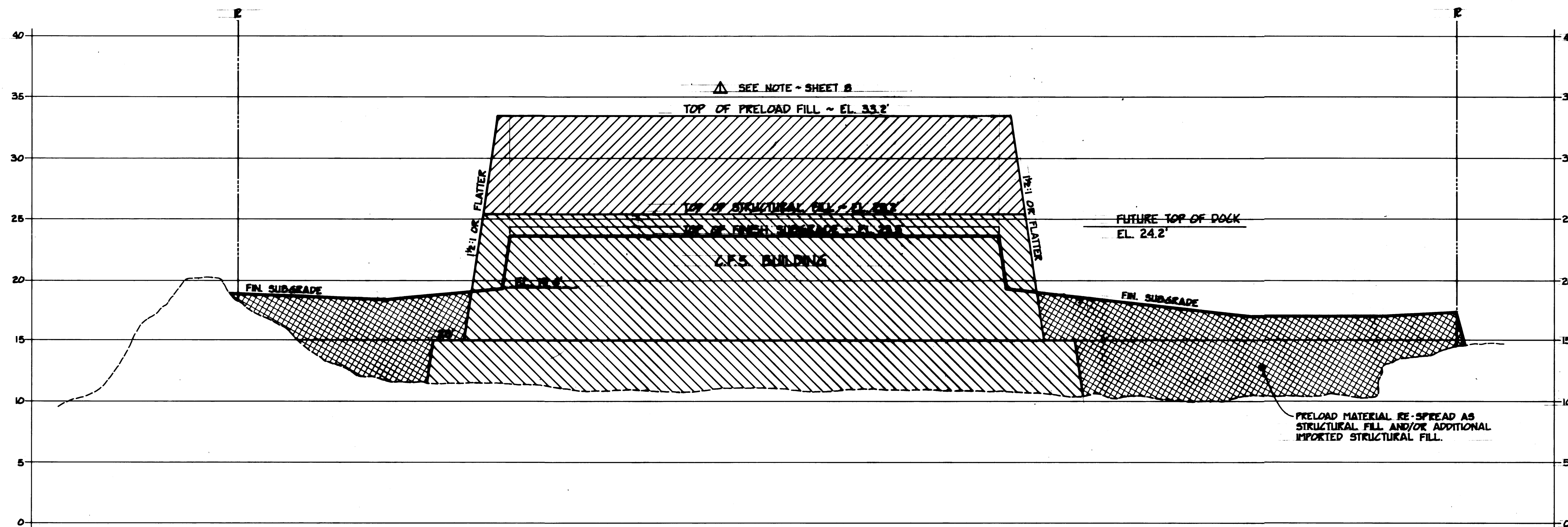
REVISION	DATE	BY	APP.
ISSUE FOR CONSTRUCTION	4/5/84	J.P.	J.P.
REVISED GRADES	4/5/84	J.P.	J.P.

DRAWN: RHT
 DATE: 12-27-83
 CHECKED: J.P.
 DATE: 12-27-83
 CHECKED: J.P.
 DATE: 12/27/83
 CONT. NO.: 550

PORT OF TACOMA
 TACOMA TERMINALS, INC.
 C.F.S. AREA EARTHWORK
 TYPICAL SECTIONS

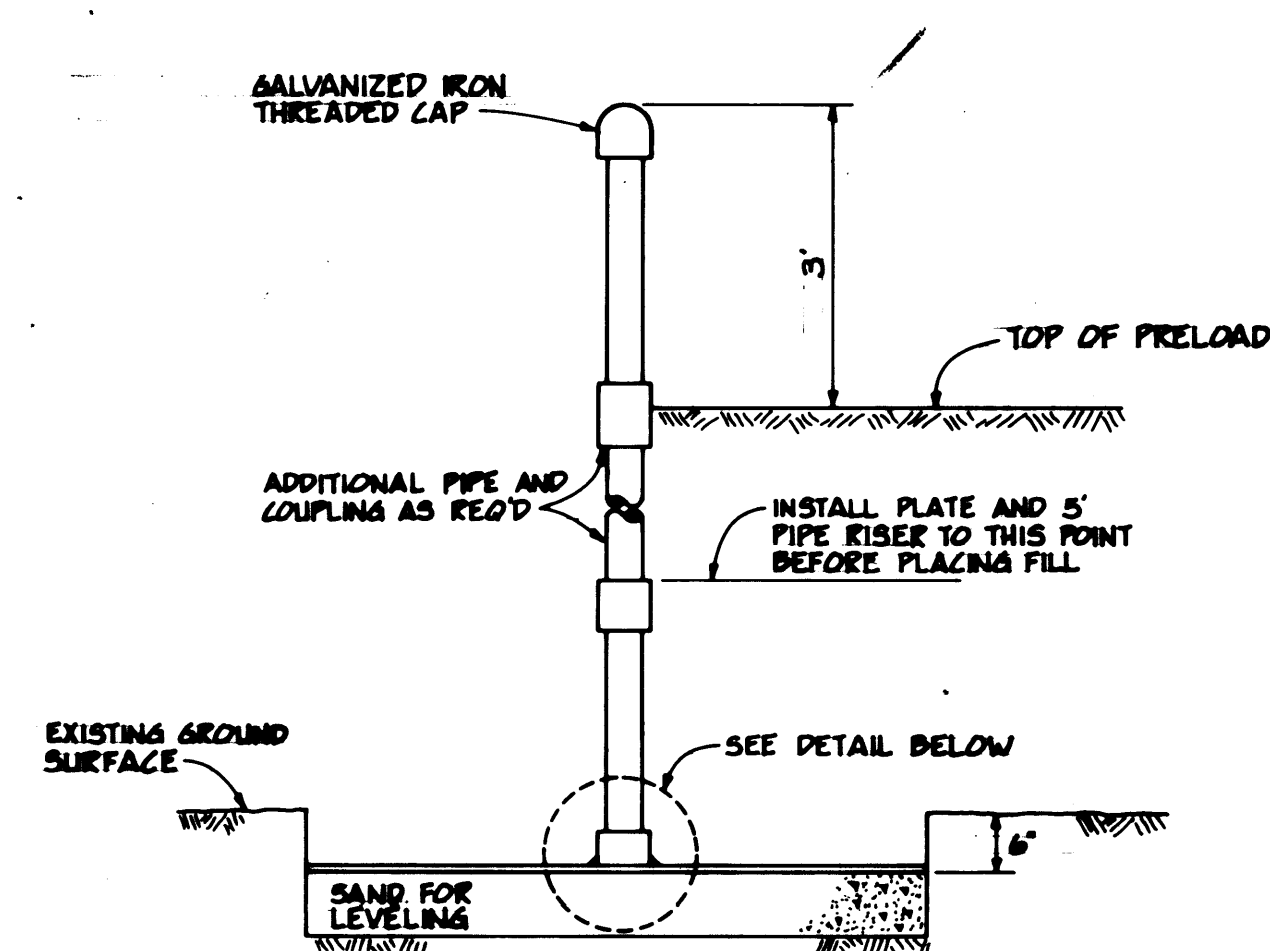
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APPROVED: [Signature] 12/27/83	12/27/83	EP-3865-23-46
DATE: 12/27/83	12/27/83	SHEET 8 OF 9

ISSUED FOR CONSTRUCTION 4/5/84

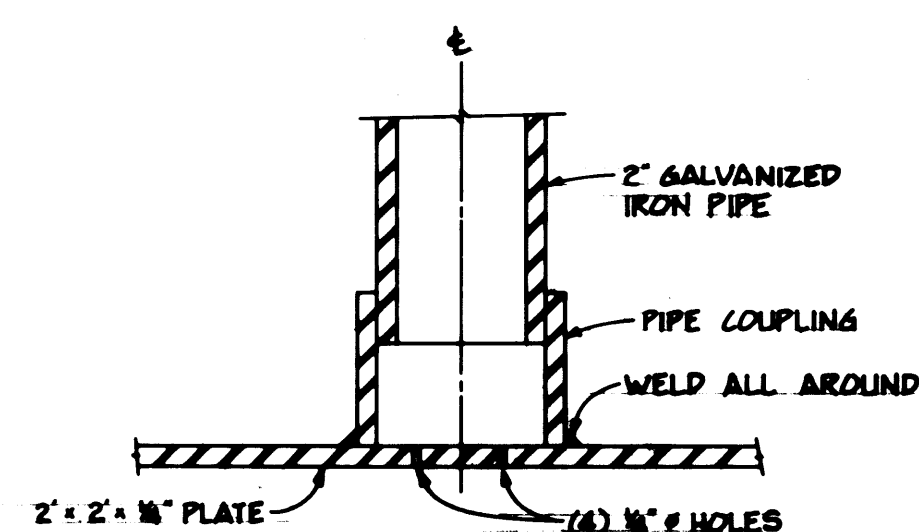


SECTION D-D

HORIZ. SCALE - 1" = 50'
VERT. SCALE - 1" = 5'

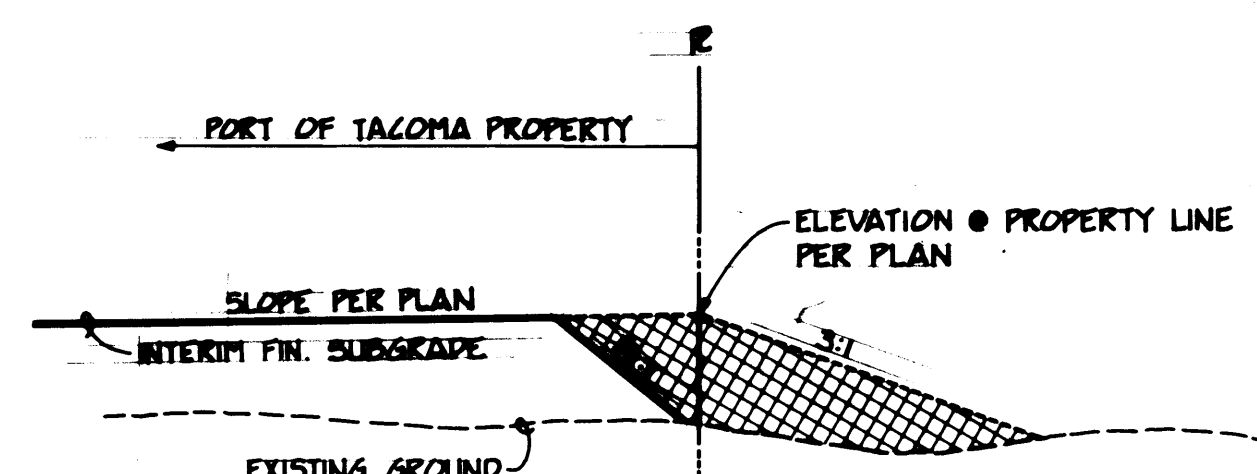


NOTE:
SETTLEMENT PLATES TO
BE PROVIDED BY CONTRACTOR.

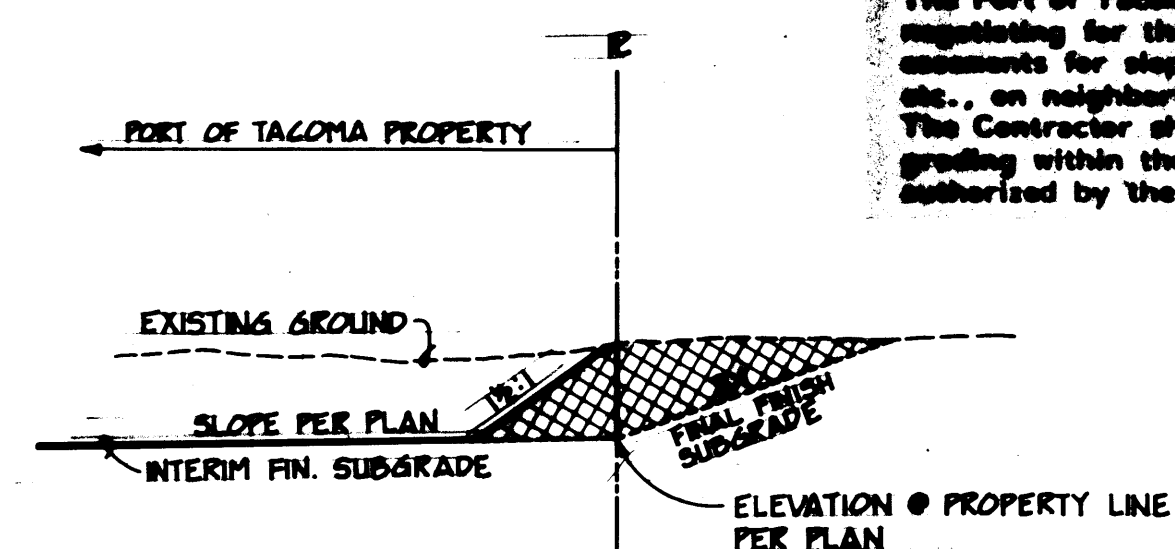


SETTLEMENT PLATE INSTALLATION

N.T.S.



FILL SECTION



CUT SECTION

DETAIL ~ INTERIM GRADING NEAR PROPERTY LINES

N.T.S.

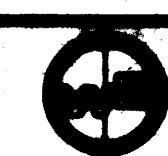
NOTE:
The Port of Tacoma is currently
negotiating for the appropriate
assessments for slopes, drainage,
etc., on neighboring properties.
The Contractor shall withhold
grading within these areas until
authorized by the Engineer.

This authorization will be
provided no later than (90+1)
days following the date of
award of this contract, or the
work shall be deleted from the
contract by modification (refer
to the Supplementary/Special
Conditions for a definition of
"(").



ISSUED FOR CONSTRUCTION 4/8/84

Whitcomb Engineers, Inc.
Consulting Engineering & Land Planning
224 6th St., Suite 200
Tacoma, Washington 98402



MARK	REVISION	BY	APP.	DATE
1	ISSUE FOR CONSTRUCTION	JTP		4-8-84
2	REVISED GRADES	JTP		4-8-84

DRAWN: RHT
DATE: 12-27-83
CHECKED: JTP
DATE: 12-27-83
CHECKED: JTP
DATE: 12/27/83
CONT. NO. 550

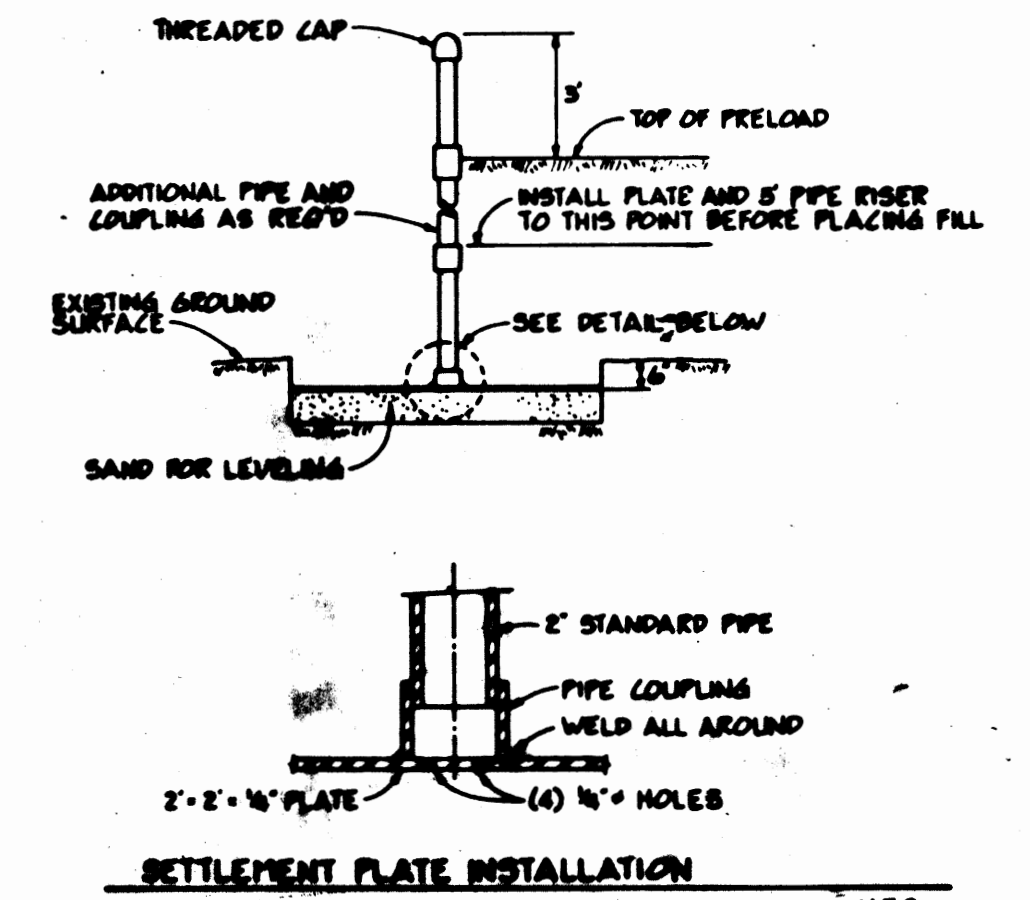
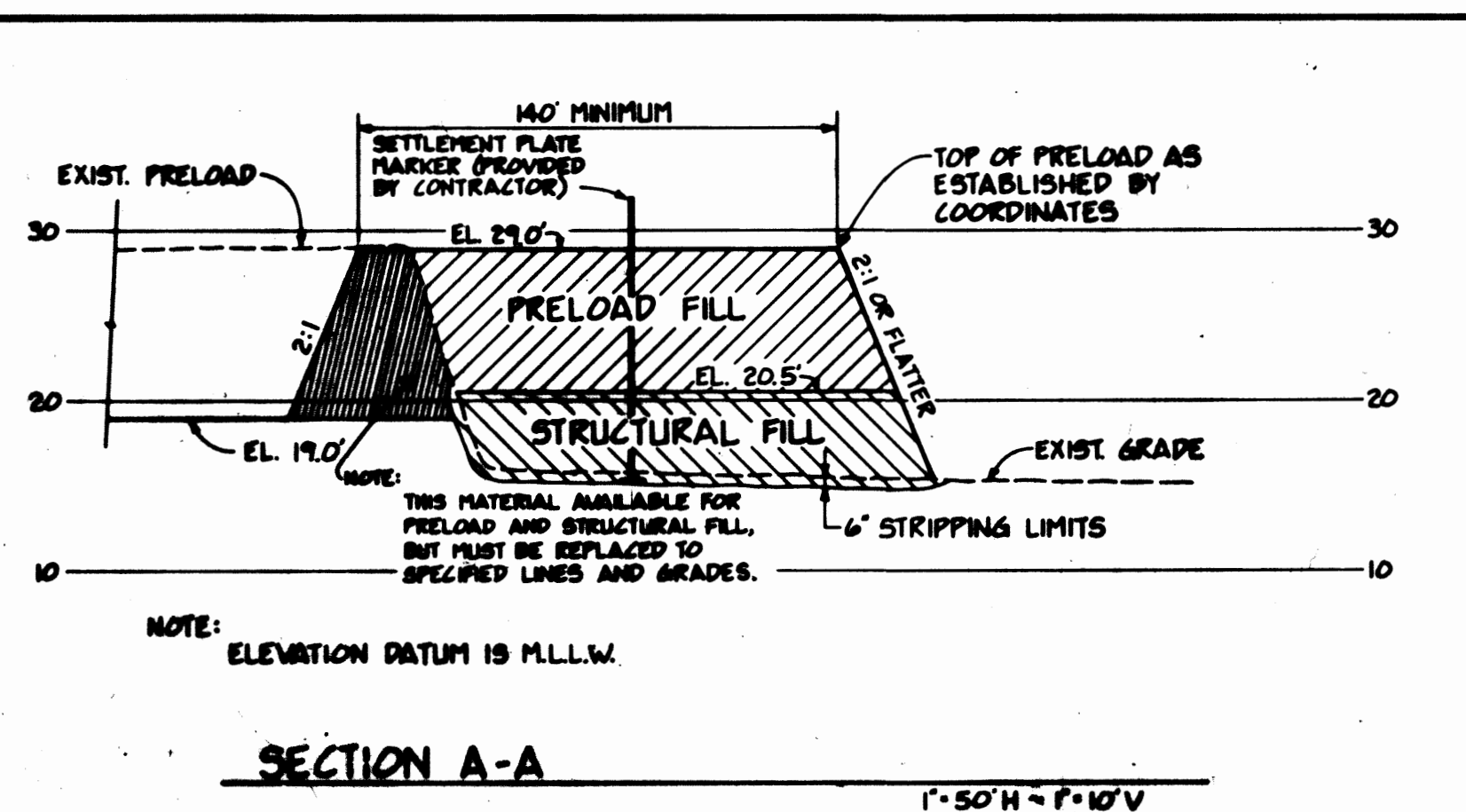
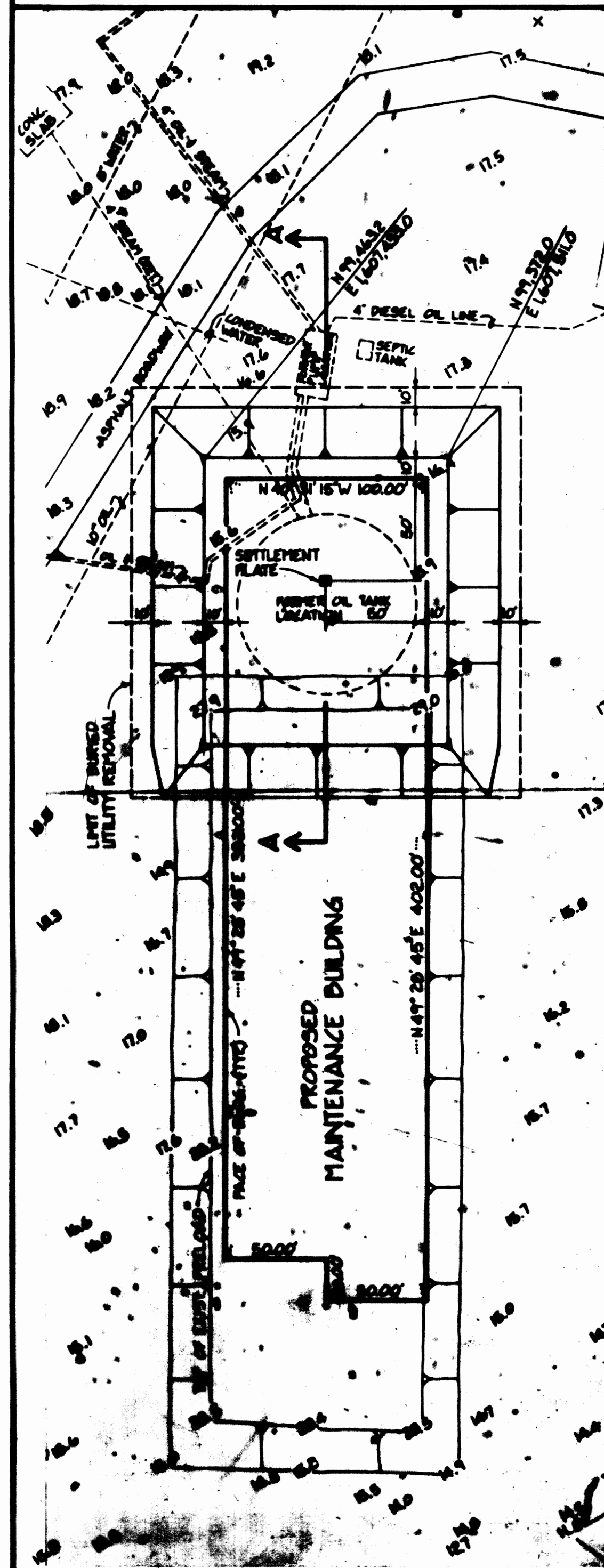
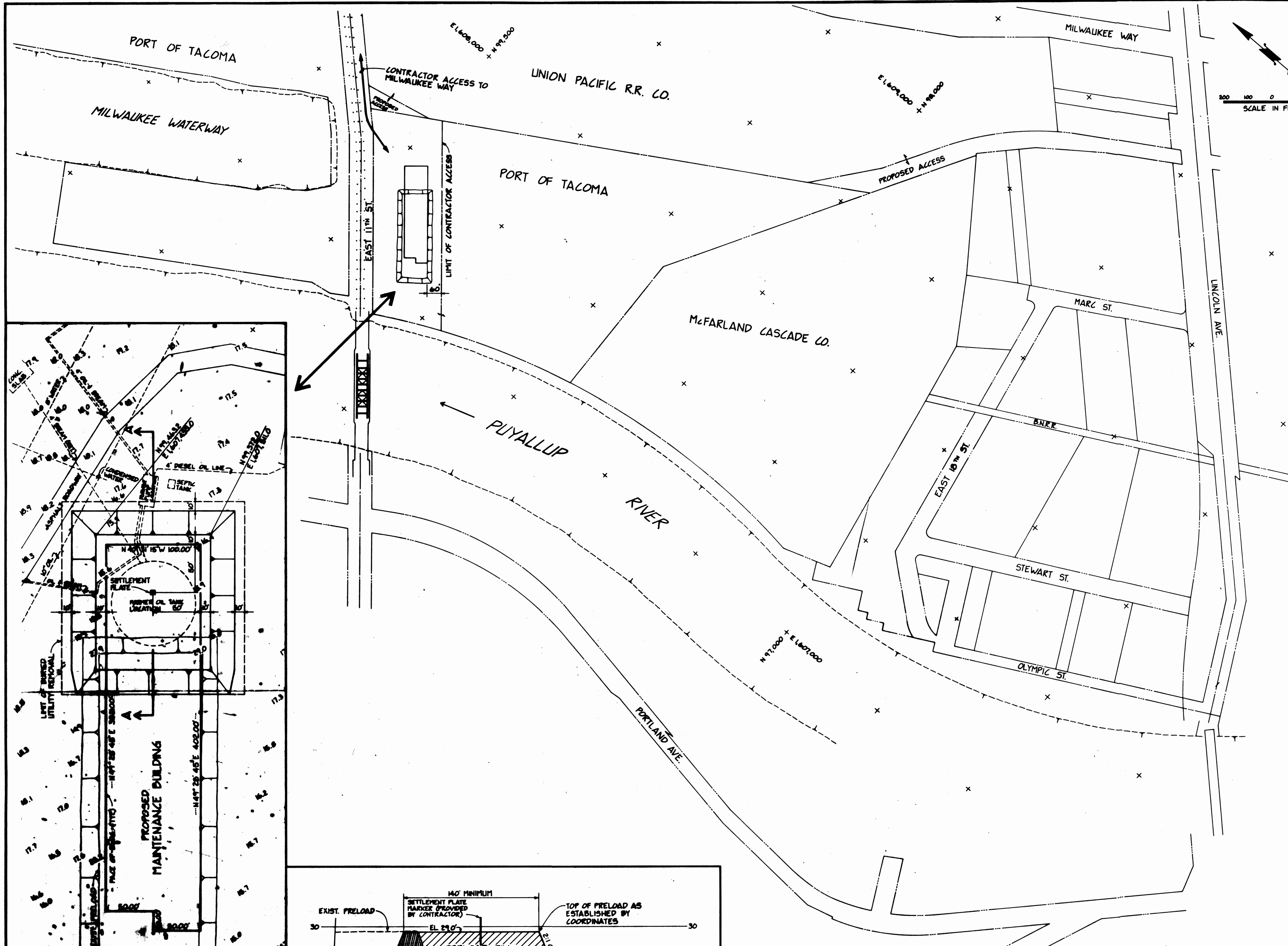
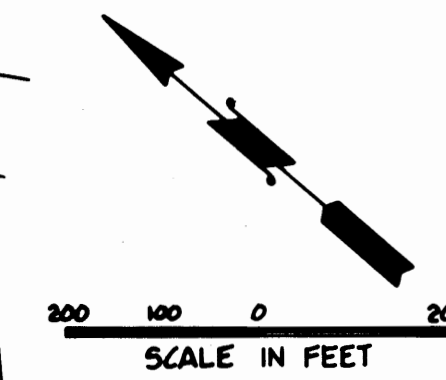
PORT OF TACOMA
TACOMA TERMINALS, INC.
L.F.S. AREA EARTHWORK
TYPICAL SECTIONS & DETAILS

FIELD BOOK (S)	SCALE	NOTED
APPROVED: [Signature]	SCALE: NOTED	DRAWING NO. EP-3865-23-C7
		SHEET 9 OF 9

GENERAL NOTES & SPECIFICATIONS

- All materials and methods for site work shall be as specified in the APWA Standard Specifications for Municipal Construction, 1981 edition.
- Material for structural fill and for preloaid shall consist of the existing preloaid material shown on the drawing.
- The locations of underground utilities shown on the drawing are approximate and were obtained from available records. The actual existence of these utilities is unknown. Depths are unknown. The construction sequence for buried utility removal is as follows:
 - Thoroughly probe the area within the limit of buried utility removal and notify the Port Engineer of any utilities found. If any utilities are found to be "live", the Port shall determine the required course of action.
 - Remove any buried pipe and appurtenances as directed by the Port. This material shall become the contractor's property and removed from Port of Tacoma land.
 - The remaining portions of any buried utilities shall be capped.

The contractor shall use extra care and caution on oil lines so as to prevent contamination of soil.
- Construction Sequence for Earthwork:
 - Perform any clearing and grubbing and strip surface area to receive preloaid of all vegetation and sod to a depth of 6 inches. All organic material shall be wasted off-site.
 - Any accumulations of organic-rich material or debris fill encountered on that portion of land to be preloaid shall be overexcavated to a minimum of 3 feet, removed, wasted off-site, and replaced with compacted structural fill.
 - Preloaid the exposed soils to a dense, non-yielding condition with a large, self-propelled vibratory roller or similar equipment.
 - Structural fill shall be placed in loose lifts not exceeding 10 inches in thickness and thoroughly compacted to at least 95% of the laboratory maximum density as determined by A.S.T.M. D-1557-70 to an elevation of 20.5 feet. (M.L.W.=0.00 datum). The structural fill shall be from that portion of the existing preloaid material that is visibly more granular in nature.
 - One settlement plate shall be installed beneath the preloaid fill as shown on the drawing so as to accurately allow monitoring of settlement.
 - Preloaid fill above elevation 20.5 feet shall be placed in loose layers not exceeding 12 inches and compacted to at least 90% of the laboratory maximum density as determined by A.S.T.M. D-1557-70 to an elevation of 29.0 feet.
 - The top of the preloaid fill shall extend beyond the perimeter of the building line a minimum of 10 feet as shown on the drawing. The top of the preloaid is to be essentially flat.
 - The side slopes of the fill should be no steeper than 2 horizontal to 1 vertical. The contractor shall leave all slopes straight and uniform.
- Construction staking, inspection, compaction testing, and monitoring of settlement shall be provided by the Port of Tacoma.
- The existing ground elevations shown were obtained from a survey prepared by the Port of Tacoma entitled "Milwaukee Property - Parcel 5", drawing no. TERM L-109, dated January 1982. The elevations shown on the existing preloaid material were obtained by Whitacre Engineers, Inc., on November 29, 1983.



**NOT IN CONTRACT
FOR REFERENCE ONLY**



Whitacre Engineers, Inc.
Consulting Engineering & Land Planning
200 S. 1st Street, P.O. Box 907
Tacoma, Washington 98402 (206) 252-2444



REVISION	BY	APP.	DATE

DRAWN: RPT		DATE: 12-7-83		PORT OF TACOMA TACOMA TERMINALS, INC. MAINTENANCE BUILDING PRELOID MODIFICATION	
CHECKED: J.P.		DATE: 12-7-83			
CHECKED: J.P.		DATE: 12/13/83			
CONT. NO. 294					
FIELD BOOK (S)		APPROVED: [Signature]		SCALE: NOTED	
		DATE: 12/29/83		DRAWING NO. EP 3063-23	
		DATE: 12/29/83		SHEET 1 OF 1	