REPORT

TIER 1 EVALUATION / SITE HISTORY REPORT FOR DREDGING

Seward Freight Dock Expansion Project

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ACRONYMS AND ABBREVIATIONS

DEC	Alaska Department of Environmental Conservation
APDES	Alaska Pollution Discharge Elimination System
ARRC	Alaska Railroad Corporation
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CS	Contaminated Sites
COC	Chemical of Concern
CWA	Clean Water Act
CY	Cubic Yard
DMEF	Dredge Material Evaluation Framework
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
HPAH	High-molecular-weight PAH
LPAH	Low-molecular-weight PAH
LCRA	Lower Columbia River Management Area
ML	Maximum Level
MLLW	Mean Lower Low Water
MPR	Management Plan Report
MSGP	Multi-Sector General Permit
NPDES	National Pollution Discharge Elimination System
PAH	Polynuclear Aromatic Hydrocarbon
QA/QC	Quality Assurance/Quality Control
SAP	Sampling and Analysis Plan
SLF	Seward Loading Facility
SL	Screening Level
TBT	Tributyltin
EPA	United States Environmental Protection Agency
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Carbon

EXECUTIVE SUMMARY

The Seward Freight Dock Expansion Project includes removing approximately 22,000 cubic yards (CY) of bottom substrate (i.e., dredge material) from the east side of the Freight Dock area shown in Figure 3. ARRC plans to discharge this dredged material to a nearby deep-water disposal area in Resurrection Bay (Figure 3).

According to USACE 2014, Section 4.3, the Section 404 of the Clean Water Act (CWA) includes provisions for exclusion from Tier 2 Chemical Testing based on Tier 1 evaluations. However, all testing exclusions are project–specific and may be subject to other regulatory authorities and guidelines. USACE's Dredge Material Evaluation and Disposal Procedures, User Manual (USACE 2014b), exclusions from Tier 2 Chemical Testing is possible if the proposed dredge material is not considered to be a "carrier of contaminants" when it is:

1. Composed primarily of sand, gravel and/or inert materials
2. Dredged from locations "far removed" from modern sources of contaminants/pollution
3. Deposited in preindustrial times at the depths to be excavated
4. Discharged at a site that is adjacent to the excavation site and subject to the same sources of contaminants, and materials at the two sites are substantially similar

Tier 1 Evaluation Criteria	Rationale Supporting Exclusion from Tier 2 Chemical Testing
Composed primarily of sand, gravel and/or inert materials	The material to be excavated is comprised of inert materials consisting of silt, sand, and gravel sediments deposited by the Resurrection River and reworked by wind and wave action from Resurrection Bay.
Dredged from locations "far removed" from modern sources of contaminants/pollution	There is no evidence to suggest that the reported spills have impacted the proposed project area on the east side of the Freight Dock.
Deposited in preindustrial times at the depths to be excavated	The material deposited in the proposed project area originated from the unimpaired glacial fed Resurrection River.
Discharged at a site that is adjacent to the excavation site and subject to the same sources of contaminants, and materials at the two sites are substantially similar	Previous chemical testing results for sediment samples collected in the ARRC dock area showed the sediments met the open water disposal criteria.

The contaminated sites search results indicate that the spills were generally small, located a relatively great distance from the ARRC dock area, or located west of the Freight Dock with limited, if any, potential to impact the ARRC dock area because of existing break walls and currents from the Resurrection River. Previous chemical testing results indicate that the current ARRC dock area was not impacted by oil

contamination from the 1964 earthquake, and the dredged material from the earlier approved projects was discharged in the open water disposal area south of the ARRC dock area. As a result, the disposal area and excavation site are subject to the same sources of contaminants, and materials at the two sites should be substantially similar.

With the Tier 1 exclusion criteria met, per USACE's Dredge Material Evaluation and Disposal Procedures, User Manual, ARRC is excluded from Tier 2 Chemical Testing for this proposed project.

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1.0 INTRODUCTION

On behalf of the Alaska Railroad Corporation (ARRC), Golder Associates Inc. (Golder) prepared this Tier 1 Evaluation/Site History (Evaluation) for the Seward Freight Dock Expansion Project located in Seward, Alaska (Figure 1). This Tier 1 Evaluation was conducted per our proposal P1523305 dated February 25, 2015, Task Order No. 1, and our Professional Services Contract between ARRC and Golder (Contract No. 96752, executed on September 17, 2014).

1.1 Purpose and Objectives

The purpose of our services is to assist ARRC with assessing whether or not the material to be dredged at the Freight Dock (Figure 2) is suitable for deep-water disposal in Resurrection Bay. Our objectives are to characterize the proposed dredge material based on a desk top study, and identify the Chemicals of Concern (COC) if a Tier 2 Chemical Testing program is recommended or required by the U.S. Army Corps of Engineers (USACE).

1.2 Scope of Services

The Tier 1 Evaluation tasks performed are listed below:

- Reviewed the conceptual dredge plan and associated documentation concerning the planned dredging locations
- Reviewed historical site and adjacent site ownership and use
- Reviewed historical and ongoing sources of contamination (spill events), land use, previously obtained chemical data, and the site specific historical seismic activity, and site characteristics that may affect movement of contaminated sediments
- Reviewed regulatory agency web-based databases and as applicable, interviewed state regulatory agency personnel, and owner's representatives
- Prepared a Tier 1 report that summarizes site history, site characterization, and if applicable a COC list with rational for including the specific chemical parameters, and sources of information reviewed

2.0 BACKGROUND

2.1 Project Description

The Seward Freight Dock Expansion Project includes removing approximately 22,000 cubic yards (CY) of bottom substrate (i.e., dredge material) from the east side of the Freight Dock area shown in Figure 3. ARRC plans to discharge this dredged material to a nearby deep-water disposal area in Resurrection Bay (Figure 3) which has a bottom elevation ranging from approximately minus 215 feet to minus 453 feet (USACE 2014a). The minimum disposal depth is minus 180 feet mean lower low water (MLLW) tide per previous USACE permits (e.g., USACE 2009, and USACE 2013) issued to perform maintenance dredging and a more recent Public Notice (USACE 2014a). A portion of the dredge material may be placed within the dock structure. ARRC completed sampling and analysis of bottom substrate from nearby areas west of the Freight Dock between 1998 and 2009 (USACE 2014a, ARRC 2006, Hart Crowser 2007, Shaw 2008, Shaw 2010). The approximate locations for these samples are presented in Figure 4, and additional details for the proposed project are shown on the figures in Appendix A which originated from the USACE Public Notice of Application for Permit.

USACE's Dredge Material Evaluation and Disposal Procedures, User Manual (USACE 2014b) requires each project to review historical and ongoing sources of potential contamination, land use, and any previously collected data. This information is presented in a Tier 1 Evaluation and identifies potential COCs. If Tier 2 Chemical Testing is required, the analytical results would be compared to screening levels applicable for open deep-water disposal. If terrestrial disposal of the dredge material is considered the analytical results would be compared to applicable state cleanup levels.

2.2 Current Land Use - General

The Seward Terminal Reserve (property) extends from the shoreline north and west to the Seward Highway, south into Resurrection Bay, and east to the Airport and the Resurrection River Delta (Figure 2). The infrastructure along the water is industrial which includes the Passenger Dock, Freight Dock, the Seward Loading Facility (SLF) and support areas associated with intermodal operations. Railroad land not used to support railroad operations, or not set aside for future capital and expansion opportunities, is made available for lease or permitted use. A brief description of this infrastructure is presented below:

- The Passenger Dock includes a terminal building. This dock serves a variety of vessels. From May to September the dock primarily hosts cruise ships, and is only used occasionally for light freight and logistics.
- The Freight Dock handles a variety of commodities. This dock is supported with rail operations, and with upland areas for staging commodities, and to provide parking. The approximately 1,100 foot long sediment groin extending south of the current Freight Dock (east dock) was installed to protect the dredged basins to the west from further siltation.

- The SLF on the west edge of the marine water front was constructed for transport of bulk materials and consists of an upland storage area and conveyor system to load material into bulk ships.
- Support areas were developed as necessary to service intermodal operations and customer needs.

The Small Boat Harbor, the public boat launch, fish processing facility, and small businesses are west of the ARRC waterfront property. The developed coastline between the Freight Dock and the Small Boat Harbor is protected by large rip-rap and dock structures. The Seward airport is to the north with the Resurrection River channels following the east side of the airport property before discharging into Resurrection Bay, east of the Freight Dock.

The coastline east of the Freight Dock is the Resurrection River delta. The sediment groin extending from the Freight Dock (Figure 2) is comprised of large diameter rip-rap, and was constructed before completion of this dock to protect the dredged basins to the west from the sediment load coming from the Resurrection River. The proposed deep-water or open-water disposal area is shown in Figure 3.

3.0 GENERAL SITE SETTING

3.1 Climate

The local climate is maritime which is influenced by the nearby mountains. The average annual rainfall is 66 inches with approximately 80 inches of snowfall. At elevations near sea level the annual temperatures average about 40 degrees Fahrenheit (F), average maximum July temperatures reach 59 degrees F, and average minimum January temperatures drop to 20 degrees F (USDA 2010).

3.2 Resurrection River

The Resurrection River discharges into marine waters through a broad deltaic fan east of the Freight Dock (Figure 2). Summer flow rates in the Resurrection River vary from approximately 2,650 cubic feet per second (cfs) to 17,650 cfs, the average being approximately 3,885 cfs. Winter flow rates drop to below 1,766 cfs and may be as low as 350 cfs between January and March (USFWS 1998). Extreme instantaneous peak flows have reached 19,000 cfs (USDA 2010, Curran et al 2003).

The Resurrection River water quality is reported as unimpaired, although there is a significant sediment load during glacial melt with moderate to very high turbidities that increase throughout the summer as the rate of glacial melting increases (USADA 2010). There are no streams in the Resurrection River Watershed that are listed on the 303(d) list of impaired water bodies, and sources of pollutants are limited, although there is some potential from anthropogenic activities in the lower portion of the water shed (USDA 2010). Sources of human-caused sedimentation have very little effect on water quality because of the naturally high levels of sediment in Resurrection River (USADA 2010). U.S. Geological Survey data from 1959 to 1995 showed suspended sediment loads of 5 to 1120 mg/L or 2 to 23,600 tons per day (USADA 2010).

3.3 Resurrection Bay - Marine Waters

The marine waters of Resurrection Bay cover the southern portion of the ARRC property. This glacial fjord quickly reaches depths of 300 to 700 feet. Within the ARRC property, elevations range from approximately 25 feet above sea level to nearly 80 feet below sea level. Portions of the sea floor near the ARRC docks are periodically dredged to maintain sufficient draft for ships using the terminal (HDR 2013a). The mean diurnal tidal range is 8.3 feet. Extreme high and low tides occur in January and July that range from -3.0 feet to +14.8 feet (USACE 1998).

3.4 Soils and Sediment

The project area is situated at the edge of the Resurrection River floodplain, which is a wide, braided, low-banked stream that occupies a deep U-shaped valley (Golder 1998). The floodplain has been subject to recent alternate accretion and erosion with the channel migrating laterally across the floodplain. The subsurface is characterized by pro-grading glacial-fluvial sand and gravel, which overlies marine deposits

consisting of mainly silt with silty sand interbeds. The fluvial sands and gravels are often inter-mixed with and/or blanketed by finer marine sediments. A lower unit of sand and gravel underlies the marine sediments at depths ranging from 75 to 100 feet. These sediments contain interbeds of glacial till (Golder 1998 & S&W 1964). Land areas have been reclaimed by historic construction of dikes/groins and filling efforts, in part using materials dredged from Resurrection Bay (HLA 1976). The sediment groin east of the Freight Dock reduces the amount of sedimentation into the dredged basins to the west that originates from the Resurrection River; however, some sediment overtops and migrates around the sediment groin at sufficiently high tides and / or through wave, wake, and tidal action (ARRC 2006).

The Environmental Characterization Memo (HDR 2013a) divides the ARRC property in to three habitats based on soil type: (1) uplands, (2) wetlands, and (3) intertidal and subtidal. Soil characteristics of each of these habitats are generally described by Gracz and Van Patten (2007) and HDR (2013a) as follows.

- The uplands are underlain by soils that were deposited over time by alluvial fans, floodplains, and fan deltas. They are generally comprised of coarse sands and gravels with little to no organic layer at the ground surface.
- The wetlands are described as poorly drained with a shallow organic layer at the ground surface that is underlain by mineral layers of varying thickness that appear to have originated from widespread alluvial fans, floodplains, or through tidal processes.
- The intertidal and subtidal areas are comprised of a mix of sand, gravel, and mudflats (HDR 2013a).

A number of samples have been collected between 1994 and 2009 from within the dock area as a pre-cursor to and support of dredging activities. Details of these sampling events are described further in Section 5 of this report. In general, the samples collected from the upper materials along harbor-bottom / seafloor were generally described as “fine sediments” (ARRC 2006), and are made up of predominantly silt with minor amounts of sand. Some samples were grey in color with no organic odor or matter, while others were dark brown or black and contained organic matter. Below this top layer of fine sediment, a range of soil materials found include: silt, sand, silty sand, sand with silt and gravel, and silt, sand, and gravel mix with potential for occasional cobbles.

The Freight Dock Expansion Project proposes removing approximately 22,000 CYs of bottom substrate (i.e., dredge material) that is situated under the intertidal and subtidal habitat located on the east side of the Freight Dock in the approximate area shown in Figure 3.

4.0 SITE HISTORY AND USE

4.1 Site Current and Previous Property Owners

The property that was developed into the existing ARRC facilities was mostly undeveloped up to at least 1950 and probably as late as 1966 when the current Passenger Dock was developed in approximately 1966. A road servicing the old airport strip (known as Airport Bay Road) extends through the support area, as shown in the 1950 aerial photograph (Figure B1, Appendix B). The Louisiana-Pacific Sawmill, located at the end of Airport Bay Road, was in operation during the 1960s and consisted of a logging area and sawmill. The tidelands would likely have been property owned by the State of Alaska, but this was not confirmed since they were not developed prior to the ARRC developments.

4.2 Development Chronology

ARRC has had facilities in Seward since the early 1920's (Figures B1 and B2). The historical railroad marine docks built prior to the 1964 earthquake were located generally between the south ends of Second and Fourth Avenues near the current location of the Sea Life Center (see aerial photographs (Lemke 1967)). These photographs show that the current ARRC dock area appears undeveloped prior to the 1964 earthquake (Figure B1 and B2).

A chronology of the development of the current dock area is presented below based on information provided in the Dock Facilities Master Plan (ARRC 2014), historical aerial photography for the years 1950, 1964, 1973, 1985, 1996, 1998, 2000, 2001, 2002, 2004, 2005, 2008, 2011, and 2012 (Figures B1 through B14, Appendix B), and historical topographic maps for the years 1975, 1983, 1990, and 1997 (Figures C1 through C 4, Appendix C):

- The Passenger Dock was constructed in 1966 (ARRC 2014) after the historical dock located on the south end of Seward was destroyed in the 1964 earthquake. The 1973 aerial photograph (Figure B3) shows the Passenger Dock prior to the construction of the Freight Dock or SLF.
- The approximately 1,100 foot long sediment groin extending south of the current Freight Dock (east dock) was installed sometime prior to 1996 (see Figure B5) to protect the dredged basins to the west from sedimentation from the Resurrection River. This structure becomes submerged during higher tides and the turbid water from the Resurrection River hides the feature (See Figures B3 through B14).
- The SLF was constructed in 1984 and is visible in the 1985 aerial photo (Figure B4). This facility was acquired by ARRC in 2003.
- The Freight Dock was constructed in 2000 and 2001 (see Figures B6 and B7) to handle a variety of commodities. A portion of the east side was widened in 2007 which is visible in the 2008 photograph (Figure B12).

The development of support areas has been transient in nature and consists of infrastructure, cargo storage, and commodities. The development history of the support areas based on the historical aerial photographs and other sources as cited are summarized below:

- Support areas are used for parking and staging of equipment, cargo, and commodities that although outside, are protected from exposure precipitation by the nature of the packaging and/or cargo containers.
- Bulk fuel oil tanks have been present on support areas. Underground storage tanks (USTs) and above ground storage tanks (ASTs) were present in an area north of the Passenger Dock and south of Port Avenue. Two relatively large ASTs were installed in this area between 1973 and 1985 (Figure B4), but the aerial photographs suggest they may have been taken out of service by 1996 (Figure B5 through B9). There is no visible evidence of the ASTs by the year 2005 (Figure B10).
- Three USTs have been removed from the support area in 1992 according to information provided in the Department of Environmental Conservation (DEC) CS database (File Nos. 2332.26.003 and 2332.26.023). These USTs were located near the ASTs noted above. USTs T-3 and T-5 stored gasoline and had capacities of 500 and 2,000 gallons, respectively. UST T-2 stored diesel fuel and had a capacity of 1,000 gallons. All three UST sites are listed as closed contaminated sites with institutional controls, which are discussed in more detail in Section 5.0.
- The area north of the ARRC Henderlong Building previously consisted of a logging area and sawmill in operation in the 1960s by Louisiana-Pacific Sawmill (HDR, 2013b).
- The ARRC Henderlong Building area or site, located directly north of the Freight Dock (Figure 3), has been occupied since 1953 as warehouse, offices, and outside storage according to a list of lease holders (personal communication, ARRC 2015a). A structure at this location is present in a 1963 aerial photograph. It is unknown if this structure was destroyed during the 1964 earthquake. A structure (building) is visible in the 1973 aerial photo (Figure B3) and this structure has been added to with possibly another building nearby as show in the 1985 photograph (Figure B4). By 1996 only one building appears to remain and the area does not appear to have had permanent structures of significant size added to the area (Figures B5 through B14). The site use has remained the same (i.e., warehouse, office, and outside storage) with various tenants since 1965. Currently the site is leased by Carlile Transportation System Inc. for offices and light truck maintenance.

In 2014, ARRC received a grant to develop a master plan which will cover conceptual and preliminary design of the port and support areas. Known as the Seward Marine Terminal Expansion Project, this Master Plan will allow ARRC to prioritize infrastructure improvements to better serve regional, state, and national partners and customers.

4.3 Industrial Processes / Activity at or near the Site

The ARRC provided a list of permit holders with a brief description of the permitted activity on ARRC property and dock facilities. A review of the information provided for these 120 permit holders shows that the industrial processes or activities are mostly associated with the transportation and/or temporary storage of containerized materials (cargo) and transportation of passengers. Many of the permits are

entry permits to ARRC property to perform these routine activities that do not involve processing, handling or transporting hazardous materials.

Industrial processes that appear to have a potential to generate hazardous materials are mostly associated with the handling of fuels and servicing vessels. Of the 120 permits, 8 were identified that list an allowable activity as Vessel Servicing meaning "*all acts related to providing miscellaneous services to vessels, e.g., repairs, maintenance, fueling, watering, garbage removal, and related Stevedore Services and/or Longshore Services."* These services generally include the tie-up of vessels and the handling of freight, cargo, supplies to or from vessels moored at ARRC docks. This permit type limits vessel servicing to those activities that are inside the vessel and that are contained by the hull or routine on deck maintenance activities that do not include handling or generating hazardous waste (personal communication ARRC 2015a).

There are two permits issued to fuel providers to service vessels at the ARRC docks. Under Permit 9922, Delta Western Inc. (DW) refuels vessels by trucks or tanks owned by DW (doing business as Inlet Petroleum Company); stores equipment; and, parks vehicles on ARRC docks. Permit 8892, is an identical type of permit for fuel transloading, equipment storage, and vehicle parking for Shoreside Petroleum. Prior to 2013, vessels on the west side of the Freight Dock were refueled from trucks. Vessels were never refueled or even moored on the east side of the Freight Dock. Shoreside Petroleum extended their fuel pipeline from the Passenger Dock to the Freight Dock in 2013. The main function of the pipeline at the Freight Dock is to offload fuel from tankers vessels direct to their bulk storage facility.

4.4 Hazardous Substances used or Generated on Site

The U.S. Environmental Protection Agency (EPA) Resource Conservation Recovery Act System Envirofacts web-based database (EPA 2015) was searched to identify hazardous waste generators in the general area. The generators found are small quantity generators as shown in Table 1. They are located north and/or west of the proposed project area with limited to no potential to affect the dredge area with proper management of the small quantity wastes generated.

The hazardous substances used at the ARRC facility would mostly include petroleum fuels that are stored or used in the support areas and in water craft. Materials typical to maintain boats, docks, and loading and off-loading equipment are also used in small quantities for activities described.

4.5 Outfall Information (NPDES/APDES Data Search)

The EPA and DEC web-based databases were searched to identify stormwater and wastewater discharge permits. The DEC issues permits in Alaska for stormwater and wastewater discharges to State waters; except at some federal facilities and facilities located in Indian Country; facilities operating outside state waters (three miles offshore); and facilities issued Clean Water Act Section 301(h) waivers from

secondary treatment standards. EPA transferred National Pollution Discharge Elimination System (NDPES) authority to Alaska and permits are issued under the Alaska Pollution Discharge Elimination System (APDES).

The APDES permit database was searched to identify permits associated with stormwater and wastewater discharges and outfalls. APDES permits for stormwater management for construction projects were ignored because of the temporary nature of this activity; these activities typically are focused on controlling sediment runoff rather than COCs, and are usually not associated with a point discharge such as an outfall. The APDES database search identified three permit types that have some potential to discharge COCs in Resurrections Bay. These permits included Multi-Sector General Permits (MSGP) for stormwater, and General and Individual permits for wastewater.

The search identified one MSGPs issued for stormwater for the ARRC marine facilities in Seward as shown in Table 2. This permit (AKR06AC94) was issued in 2009 and renewed in 2015. The associated stormwater outfalls under this permit are located in several locations within the SLF with limited to no potential to impact sediments on the east of the Freight Dock. Outfalls shown on Figure 3.

A review of the APDES wastewater permits (i.e., General and Individual Permits) indicates these treated wastewaters are discharged either west or south of the ARRC facilities, or significantly upstream in the Resurrection River, or in deep marine waters with limited to no potential to affect the proposed project area.

4.6 Pertinent Marine Facility Permitting

Pertinent permitting of the project site is as follows:

- Maintenance Dredging:
  - March 8, 2013: Permit modification POA-1965-34-M18 authorized ARRC to dispose of material dredged under authorization POA-1965-34-M13 at a previously used deep-water disposal site, approximately 2,000 feet south of the docks, or discharged on the east side of the Freight Dock to facilitate dock widening.
  - October 28, 2005: Permit POA-1965-34-M13 (Z-650034) Resurrection Bay 26, authorized dredging of 250,000 CY within the footprints of the previously dredged basins at the passenger and Freight Docks to their previously authorized depths of -36 feet MLLW and -59 feet MLLW, respectively. The disposal site was at a previously used deep-water site located about 2,000 feet south of the existing dock. All maintenance dredging and disposal shall be conducted between October 1 and March 31, unless otherwise requested and authorized on a case-by-case basis.
- Widening of Freight Dock:
  - June 6, 2007: Permit modification POA-1965-34-M14 authorized ARRC to expand the width of an existing Freight Dock to 320 feet, install a mooring dolphin to aid in berthing barges, and trench an electrical line from the dock to the mooring dolphin. The discharge of approximately 115,000 CY of fill, with about 92,000 CY below the

high tide line (86,000 CY of gravel fill and 6,000 CY of riprap), to expand the footprint of the existing dock by approximately 5.3 acres was authorized.

- Construction of Freight Dock:
  - January 13, 2000: Permit POA-1965-34-M9 (U-650034), Resurrection Bay 26, was issued to authorize the construction of a new 200 foot x 620 foot Freight Dock and upgrades to the existing ARRC Passenger Dock. The Freight Dock construction included 143,700 CY of fill material, installation of a catwalk and dolphin at the end of the dock, and dredging 9.5 acres (220,000 CY) to -33 feet MLLW. The disposal site was at a previously used deep-water site located about 2,000 feet south of the existing dock.
  - January 28, 1966: Permit POA-1965-34 and modifications 1 (M-650034) through 8 (T- 650034), were issued to authorize the construction of the cruise ship passenger dock, maintenance of that dock, and dredging activities, including marine in-water disposal. Disposal of the dredged material was authorized in marine waters of -180 feet MLLW depth or greater and extending seaward to the ARRC property line.

5.0 CONTAMINATED SITES AND SPILL DATABASE SEARCH

5.1 Contaminated Site Database

The State of Alaska web-based mapping search feature was used to identify sites listed in the Contaminated Sites (CS) database (ADEC 2015) that are located in an area east of the Seward highway, south of the airport's northern boundary, and at the Small Boat Harbor. The search identified 14 CS with five of these identified as ARRC sites that are numbered 1 through 5 in Table 3 and listed below:

1. ARRC Henderlong Building Seward
2. ARRC Seward Rail Yard
3. ARRC Seward Rail Yard Tank 5
4. ARRC Seward Rail Yard Tanks 3 & 4
5. ARRC Seward Bulk Fuel Farm

Sites 1 through 4 are located in the support areas of the current ARRC dock facilities. The cleanup status for these four sites is either complete or complete with institutional controls as noted in Table 3 and the State of Alaska Department of Environmental Conservation (DEC) Project Summaries for each site (see Appendix D). To evaluate the potential for impacting the proposed project area, Golder reviewed the readily available DEC information and contacted DEC project manager (Grant Linden, Environmental Program Specialist). The conclusion based on the database search results and the DEC interview was that most sites are too far away from the water front and/or the release was too small to reach the proposed project area or even the City of Seward water front area in general.

Site 5, the Seward Bulk Fuel Farm, is a CS file established for informational purposes and there is no cleanup proposed. The file references ARRC as a possible responsible party for ARRC bulk fuel tanks damaged during the 1964 earthquake. The Seward Bulk Fuel Farm was located at points south of the present day Seward Small Boat Harbor. The tsunami triggered by the 1964 earthquake damaged the tanks and may be a possible source of petroleum hydrocarbons present in sediments and groundwater westerly of the Small Boat Harbor. Based on previous chemical testing of sediments in the ARRC Passenger Dock basin, it appears that the 1964 earthquake did not impact the ARRC dock basins between the SLF and Freight Dock, as noted in Section 6.0 of this report.

5.2 Spill Database

Table 4, Page 2 of 6, and Page 4 of 6 lists spills generally consisting of relatively small quantities of petroleum hydrocarbon products. The larger quantity spills (e.g., Unique Spill ID 23318 M/V Bruin Bay, Table 4) appear too far away to impact the proposed project area. Many seemed to have occurred in the Small Boat Harbor. Mr. Don Fritz (DEC Central Alaska Response Team) noted in an email transmitting

the database that at the Freight Dock "…the dredge materials that might be encountered on the east side of the Freight Dock probably have not been impacted to a significant extent by many if any of the enclosed spills."

Table 5 summarizes the spill reports that may have potential for impacting the proposed project area. There are eleven spill reports from the year 2002 to 2015 which were associated with petroleum hydrocarbon products.

6.0 PREVIOUS SEDIMENT SAMPLING RESULTS SUMMARY

6.1 Sediment Type

A number of samples have been collected between 1994 and 2009 at various locations in the ARRC dock area as a pre-cursor to and support of dredging activities. The sample locations were south and west of the Freight Dock and sediment groin as shown in Figure 4. In general, the samples collected from the upper materials along harbor-bottom / seafloor were generally described as fine sediments (ARRC 2006), and are comprised of predominantly silt with minor sand constituency. Some samples were grey in color with no organic odor or matter, while others were dark brown or black having strong organic odor and containing high organic matter (including fish waste, presumed from the nearby processing plant) and shell fragments. Within the reach of dredging, a range of soil materials have been found to include: silt, sand, silty sand, sand with silt and gravel, and silt, sand, and gravel mix with potential for occasional cobbles (Shaw 2009). The sediment type east of the Freight Dock could show variation from what was encountered to the west because of the influence of the encroaching Resurrection River delta deposits.

6.2 Historical Chemical Testing Results

Chemical testing of sediment has been performed for previous ARRC dredge projects located west of the Freight Dock and sediment groin, but not east of these features where the Resurrection River deposits it bed load. In general, the previous chemical testing results supported open water disposal in that the concentrations for the parameters tested were below the Dredge Material Evaluation Framework (DMEF) Lower Columbia River Management Area (LCRA) Tier IIB testing parameters.

The earliest sampling results are summarized in ARRC 2006 letter which presents the chemical testing results for sediment samples collected in the years 1994, 1996, and 2005 (ARRC 2006). These results were summarized by Shaw 2007 by stating,

> *"Prior surficial sediment sampling of the ARRC dock dredge area was conducted in 1994 and 1996 and 2005. With the one exception of tributyl tin (TBT), the 1996 sampling effort included analysis for all other of the DMEF LCRA Tier IIB testing parameters. All of the tested parameters from the 1996 sampling were found to be within approved open-water disposal limits. Dredging of the ARRC dock area was last conducted in 1997 with open water disposal."*

Additional testing in 2009 showed that the concentrations of TBT in the sediments near the Passenger Dock area are below screening levels and that the earlier results were possibly a result of the sampling method as discussed (Shaw 2010, Attachment I). Total zinc was also found to exceed LCRA screening levels in one of the earlier sampling efforts; however, later sampling events indicated that the samples

were cross-contaminated by the sampling equipment and that actual concentrations were below the screening levels (Shaw 2010, Attachment G).

In March 2007, sediment samples were collected adjacent to the Passenger Dock with no detections above the laboratory detection limit except some metals and polycyclic aromatic hydrocarbons (PAH) detected at relatively low concentrations (Hart Crowser 2007).

Concentrations of hydrocarbons in the groundwater south of the Henderlong building, which was sampled in 2008, were either non-detect or below cleanup levels. Therefore there is no potential for soil or groundwater contamination to the dredging area from this site (Hart Crowser 2008).

In August 2009, additional sediments samples were collected and the analytical results are summarized in Sampling & Analysis Final Report (Shaw 2010b). Samples were collected from the material to be dredged near ARRC's Passenger Dock and the west side of the Freight Dock. The concentrations of the parameters tested, including TBT and zinc, were below LCRA screening levels. In addition statistical analysis of the PAH results from sediment samples collected during two sampling rounds indicated that with a 95 percent upper confidence interval the PAH compounds are below LCRA screening levels, including LPAH and HPAH (Shaw 2010, Attachment H). Based on the data collected during several sampling rounds, the material that was scheduled for dredging was suitable for open-water placement (Shaw 2010).

7.0 EXCLUSION FOR TIER 2 CHEMICAL TESTING DISCUSSION

According to USACE 2014, Section 4.3, Section 404 of the Clean Water Act (CWA) includes provisions for exclusion from Tier 2 Chemical Testing based on Tier 1 evaluations. However, all testing exclusions are project–specific and may be subject to other regulatory authorities and guidelines. Per general criteria noted in USACE 2014b, exclusions from Tier 2 Chemical Testing is possible if the proposed dredge material is not considered to be a "carrier of contaminants" when it is:

1. Composed primarily of sand, gravel and/or inert materials
2. Dredged from locations "far removed" from modern sources of contaminants/pollution
3. Deposited in preindustrial times at the depths to be excavated
4. Discharged at a site that is adjacent to the excavation site and subject to the same sources of contaminants, and materials at the two sites are substantially similar

Tier 1 Evaluation Criteria	Rationale Supporting Exclusion from Tier 2 Chemical Testing
Composed primarily of sand, gravel and/or inert materials	The material to be excavated is comprised of inert materials consisting of silt, sand, and gravel sediments deposited by the Resurrection River and reworked by wind and wave action from Resurrection Bay.
Dredged from locations "far removed" from modern sources of contaminants/pollution	There is no evidence to suggest that the reported spills have impacted the proposed project area on the east side of the Freight Dock.
Deposited in preindustrial times at the depths to be excavated	The material deposited in the proposed project area originated from the unimpaired glacial fed Resurrection River.
Discharged at a site that is adjacent to the excavation site and subject to the same sources of contaminants, and materials at the two sites are substantially similar	Previous chemical testing results for sediment samples collected in the ARRC dock area showed the sediments met the open water disposal criteria.

The contaminated sites search results indicate that the spills were generally small, located a relatively great distance from the ARRC dock area, or located west of the Freight Dock with no potential to impact the ARRC dock area because of existing break walls and currents from the Resurrection River. Previous chemical testing results indicate that the current ARRC dock area was not impacted by oil contamination from the 1964 earthquake, and the dredged material from the earlier projects was discharged in the open water disposal area south of the ARRC dock area. As a result, the disposal area and excavation site are subject to the same sources of contaminants, and materials at the two sites should be substantially similar.

With all criteria met, per USACE's Dredge Material Evaluation and Disposal Procedures, User Manual (USACE 2014b), this Tier 1 Report excludes ARRC from Tier 2 Sampling and Analysis for this proposed project.

8.0 CLOSING

Based on the information available for this Tier 1 Evaluation, the conditions for Tier 2 Chemical Testing exclusion appear to have been met for the Seward Freight Dock Expansion Project as proposed. Thank you for the opportunity to submit this Tier 1 Evaluation Report for this project. Please call Jan Deick (907-865-2514) or Tom Krzewinski (907-865-2510) if you have any questions or require clarification of any aspect of this report.

GOLDER ASSOCIATES INC.

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JFD/TGK/

9.0 REFERENCES

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TABLES

Table 1: EPA Hazardous Waste Generator Search Results Summary

Handler Name	Type	Handler ID	Street	Latitude	Longitude
CITY BOAT HARBOR	CE-SQG	AKR000004481	SMALL BOAT HARBOR		
MEEHAN BY PRODUCTS	CE-SQG	AKD983075854	PORT AVE	60.12181	-149.43451
RAINBOW FIBERGLASS AND BOAT REPAIR LLC	CE-SQG	AKR000205526	ALAMEDA ST		
SEWARD FISHERIES SEWARD PLANT	CE-SQG	AKD012271649	PORT AVE	60.12121	-149.435965
SHORESIDE PETROLEUM-SPI SEWARD	CE-SQG	AKD000834952	PORT AVE	60.12181	-149.43454
USDOT CG CUTTER MUSTANG WPB 1310	CE-SQG	AK6690300185	4TH AVE & SMALL BOAT HARBOR		
CROWLEY BARGE 160-4 IMO 525850	SQG	AKR000202259	PORT ROAD	60.12145	-149.437655
N L PETROLEUM SVCS INC SEWARD	Unspecified Universal	AKD991280983	ADJACENT CITY & R R DOCKS		
TESORO SEWARD	Unspecified Universal	AKD000641621	MI 1.5 SEWARD HWY	60.12463	-149.43743
USDOT CG SEWARD BOAT HARBOR DRUMS	Unspecified Universal	AK1690300222	4TH AVE X FLOAT	60.11681	-149.44017

Notes:

CE-SQG = Conditionally Exempt Small Quantity Generators (CESQG) generate 100 kilograms or less per month of hazardous waste, or 1 kilogram or less per month of acutely hazardous waste.

SQG = Small Quantity Generators (SQG) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.

Unspecfied Universal = federally designated "universal wastes," (e.g., batteries, pesticides, mercury-containing equipment, and bulbs).

Table 2: APDES Permit Search Results Summary

Permit	Site / Facility	City	Owner / Operator	Date Issued
Multi-Sector General Permits (MSGP) for Stormwater				
AKR06AA17	Seward Marine Industrial Center	Seward	City of Seward	4/19/2015
AKR06A94	Seward Loading Facility	Seward	Aurora Energy Services LLC	8/13/2015
AKR05CD51	Seward Section ARRC	Seward	Alaska Railroad Corporation	5/27/2009
AKR06AA85	Seward Quarry	Seward	Kenia Peninsula Borough	6/23/2015
AKR06AA02	Vigor Alaska Seward	Seward	Vigor Alaska LLC	11/5/2014
AKR06AA04	Shoreside Petroleum Inc. Seward Bulk Fuel Facility	Seward	Shoreside Petroleum Inc.	1/30/2015
AKR06AA08	Raibow Fiberglass at Seward Marine Industrial Center	Seward	Raibow Fiberglass and Boat Repair	2/2/2015
AKR06AA11	Alaska Logistics @ Seward Marine Industrial Complex	Seward	Alaska Logistics, LLC	4/1/2015
General Permits for Waste Water Discharge				
AKG520488	Icicle Seafoods Seward Plant	Seward	Icicle Seafoods Inc.	7/27/2001
AKG520474	Polar Seafoods Seward Plant	Seward	Cook Inlet Proc- Seward Polar Equip	7/27/2001
AKG520355	Resurrection Bay Seafoods Seward Plant	Seward	Pacific Seafood Group	7/27/2001
AKG370A83	Sanders Canyon Creek Mine Site	Seward	Golden Nugget Mining	6/14/2013
Individual Permts For Waste Water				
AK0052566	Alaska Sealife Center	Seward	Alaska Sealife Center	6/18/2014
AK0021890	Seward Wastewater Treatment Facility	Seward	City of Seward	6/24/2011

Notes: APDES - Alaska Pollution Discharge Elimination System

Table 3: Contaminated Sites Search Results Summary

No.	Site Name	Address	Status	File ID	Site Type	Latitude	Longitude
1	ARRC Henderlong Building Seward	Seward Lease 7379 Port Avenue	Cleanup Complete	2332.38.033	Commercial/Retail/Office	60.123961	-149.4228
2	ARRC Seward Rail Yard	Seward Hwy.	Cleanup Complete - Institutional Controls	2332.38.002	Railroad Operation	60.130204	-149.4272
3	ARRC Seward Rail Yard Tank 5	ARRC Seward Rail Yard	Cleanup Complete -	2332.26.023	Railroad Operation	60.120382	-149.42818
4	ARRC Seward Rail Yard Tanks 3 & 4	Seward Hwy.	Cleanup Complete - Institutional Controls	2332.26.003	Railroad Operation	60.120121	-149.42802
5	ARRC Seward Boat Harbor	1412 Fourth Avenue	Cleanup Complete	2332.38.001	Unknown	60.130204	-149.4272
6	Seward Bulk Fuel Tank Farm - 1964 Earthquake (Responsible Party identified as ARRC)	In the Vicinity of the Small Boat Harbor	Informational	2332.38.012	Non-Crude Terminal	60.115527	-149.43935
7	Benny Benson Lagoon	Government Road	Open	2332.38.031	Cannery/Seafood Processing	60.116794	-149.44293
8	Gateway Texaco- Seward	1400 Seward Highway	Cleanup Complete	2332.26.005	Unknown	60.121498	-149.44048
9	Harbor Air Service	2210 Airport Road	Cleanup Complete	2332.38.005	Unknown	60.1325	-149.4225

Table 3: Contaminated Sites Search Results Summary

No.	Site Name	Address	Status	File ID	Site Type	Latitude	Longitude
10	No Sweatt Auto Service	1000 Third Avenue	Open	2332.26.024	Gas Station	60.1126	-149.4417
11	Seward Military Resort	2305 Dimond Blvd.	Open	2102.26.069	Park/Recreation Area	60.133273	-149.43303
12	Seward Ship Chandlery-2	1714 Leirer Road	Cleanup Complete	2332.38.010	Unknown	60.123889	-149.43611
13	Shoreside Petroleum	700 Port Avenue	Cleanup Complete - Institutional Controls	2332.38.014	Other	60.1225	-149.43444
14	Shoreside Petroleum-Seward Small Boat Harbor	SW Corner of Seward Small	Cleanup Complete	2332.26.020	Unknown	60.1154	-149.4386
15	USCG Seward Mustang Mooring Bldg	1401 4th Avenue	Open	2332.38.050	Military Installation - Base/Post/Other	60.118572	-149.43969

Table 4: Spill Site Search Results Summary

Unique Spill ID	Spill Name	Spill Number	Spill Date	Case Closed Date	"Maximum" level of ADEC response	FacilityType	FacilitySubType	SourceType	Site/Facility Latitude	Site/Facility Longitude
	Carlile Transportation Seward	15239912801	5/9/2015	7/23/2015	Field Visit/s	Maintenance Yard/Shop				
699	SHORESIDE PETROLEUM	239911801	4/27/2000	4/29/2000	Took Report	Gas Station			60.108333	-149.441667
715	SEWARD SHIPS CHANDLERY	239912404	5/3/2000	11/5/2001	Took Report	Vessel	Other, under 400 GT		60.108333	-149.441667
1025	F/V ADVANTAGE	239925401	9/10/2000	9/10/2000	Took Report	Vessel	Fishing, under 400 GT		60.108333	-149.441667
1036	STAN SMITH FUEL TO WATER	239925901	9/15/2000	9/15/2000	Took Report	Vessel	Fishing, under 400 GT		60.108333	-149.441667
1068	M/V DAVIDSON	239928001	10/6/2000	10/6/2000	Took Report	Vessel	Other, under 400 GT		60.108333	-149.441667
1113	SEWARD HARBOR TO WATER	239930001	10/26/2000	10/30/2000	Took Report	Gas Station			60.108333	-149.441667
3160	F/V CAROLINA BOY	1239923003	8/18/2001	8/20/2001	Phone Follow-up	Vessel	Fishing, under 400 GT		60.108333	-149.441667
16286	Northstar Terminal Hydraulic	2239907601	3/17/2002	3/27/2002	Took Report	Harbor/Port/Marina		Heavy Equipment		
17172	F/V Alaska Spirit Diesel	2239917802	6/27/2002	7/8/2002	Took Report	Vessel	Fishing, under 400 GT	Other		
19778	Seward Marine Industrial Center Contamination	3239919602	7/15/2003	12/10/2007	Field Visit/s	Vessel	Other, under 400 GT	Bilge		
19997	Tustamina Hydraulic	3239924001	8/28/2003	9/2/2003	Took Report	Unknown		Hydraulic System		
22179	Ryndam Hydraulic	4239915601	6/4/2004	6/4/2004	Phone Follow-up	Vessel	Passenger, under 400 G	Hydraulic System	60.108333	-149.441667
23318	M/V Bruin Bay	5239900402	1/4/2005	3/11/2005	Phone Follow-up	Vessel	Barge	Tank, Other		
23332	F/V Isle Royale	5239900801	1/8/2005	12/10/2007	Phone Follow-up	Vessel	Fishing, under 400 GT	Other		
23914	Seward SBH Diesel	5239908901	3/30/2005	5/24/2005	Took Report	Vessel	Other, under 400 GT	Tank, Other	60.108333	-149.441667
24127	CGC Maple - Hydraulic	5239912201	5/2/2005	5/2/2005	Phone Follow-up	Vessel	Other, over 400 GT	Hydraulic System		
24756	Seward Ship Drydock Waste Oil	5239923101	8/19/2005	8/22/2005	Phone Follow-up	Vessel	Fishing, under 400 GT	Other		
26753	Vessel US Fishing Hydraulic	6239916901	6/18/2006	6/19/2006	Took Report	Vessel	Fishing, under 400 GT	Heavy Equipment		
30912	Bering Explorer	8239906702	3/7/2008	3/12/2008	Took Report	Harbor/Port/Marina		Drum(s)	60.108333	-149.441667
30925	Swalling Construction	8239907101	3/11/2008	3/12/2008	Took Report	Harbor/Port/Marina		Heavy Equipment	60.108333	-149.441667
32018	M/V Mt. Mitchell	8239923302	8/20/2008	8/21/2008	Took Report	Vessel	Other, over 400 GT	Unknown	60.108333	-149.441667
32593	Seward coal dock diesel	8239933901	12/4/2008	12/6/2008	Phone Follow-up	Harbor/Port/Marina		Heavy Equipment		
32654	F/V Blue Star	8239935201	12/17/2008	12/19/2008	Took Report	Vessel	Fishing, under 400 GT	Unknown	60.108333	-149.441667
35418	F/V Equinox	10239909601	4/6/2010	4/8/2010	Took Report	Vessel	Fishing, under 400 GT	Bilge	60.108333	-149.441667
35585	F/V Twi Lite	10239912004	4/30/2010	5/21/2010	Took Report	Vessel	Cargo, under 400 GT	Heavy Equipment	60.108333	-149.441667
35723	Seward unknown	10239916801	6/17/2010	6/21/2010	Took Report	Vessel	Fishing, under 400 GT		60.108333	-149.441667

Table 4: Spill Site Search Results Sur

Unique Spill ID	Spill Name	Facility Name	Spilled Substance	Quantity Released (gallons)	Cause	General Cause Category	Affiliate (person or organization associated with spill)
	Carlile Transportation Seward	Carlile Transportation Systems	Asphalt	100			
699	SHORESIDE PETROLEUM	SEWARD SHORESIDE PETROLEUM BULK PLANT	Diesel	12	Human Error	Human Factors	SHORESIDE PETROLEUM - NO ENTRY, NO ENTRY
715	SEWARD SHIPS CHANDLERY	SEWARD SHIP'S CHANDLERY	Diesel	10	Other	Other	USAF - NO ENTRY, NO ENTRY
1025	F/V ADVANTAGE	SEWARD HARBOR	Diesel	5	Sinking	Human Factors	STORM CHASERS SALVAGE CO - NO ENTRY, NO ENTRY
1036	STAN SMITH FUEL TO WATER	SEWARD HARBOR FUEL DOCK	Diesel	10	Other	Other	SMITH STAN - SMITH, STAN
1068	M/V DAVIDSON	SEWARD FUEL DOCK	Diesel	15	Overfill	Human Factors	PELGOS RACAL - PELGOS, RACAL
1113	SEWARD HARBOR TO WATER	SEWARD HARBOR SHORESIDE PETROLEUM	Diesel	2	Overfill	Human Factors	LISKA SCOTT - LISKA, SCOTT
3160	F/V CAROLINA BOY	SEWARD T DOCK	Diesel	10	Overfill	Human Factors	F/V CAROLINA BOY - NO ENTRY, NO ENTRY
16286	Northstar Terminal Hydraulic	NORTHSTAR TERMINAL	Hydraulic Oil	20	Other	Other	Unknown - Unknown
17172	F/V Alaska Spirit Diesel	RAILROAD DOCK	Diesel	12	Overfill	Human Factors	Unknown - Unknown
19778	Seward Marine Industrial Center Contamination	SEWARD MARINE INDUSTRIAL CENTER	Bilge Oil	55	Leak	Structural/Mechanical	CITY OF SEWARD - NO ENTRY, NO ENTRY
19997	Tustamina Hydraulic	FREIGHT DOCK	Hydraulic Oil	1	Leak	Structural/Mechanical	STATE OF ALASKA - NO ENTRY, NO ENTRY
22179	Ryndam Hydraulic	SEWARD HARBOR	Hydraulic Oil	1	Leak	Structural/Mechanical	HOLLAND AMERICA CRUISE LINES - NO ENTRY, NO ENTRY
23318	M/V Bruin Bay	SEWARD MARINE INDUSTRIAL CENTER	Diesel	800	Crack	Structural/Mechanical	n/a - Brandau, Lincoln & Shawna
23332	F/V Isle Royale	SEWARD MARINE INDUSTRIAL CENTER	Diesel	20	Equipment Failure	Structural/Mechanical	F/V Isle Royale - Barber, Lloyd
23914	Seward SBH Diesel	SEWARD HARBOR SHORESIDE PETROLEUM	Diesel	20	Unknown	Unknown	CROWLEY MARINE SERVICES - NO ENTRY, NO ENTRY
24127	CGC Maple - Hydraulic	Near Seward Ship's Drydock	Hydraulic Oil	5	Equipment Failure	Structural/Mechanical	USCG - NO ENTRY, NO ENTRY
24756	Seward Ship Drydock Waste Oil	Seward Ship Drydock	Used Oil (all types)	1	Leak	Structural/Mechanical	SEWARD SHIP DRYDOCK - Madden, Jim
26753	Vessel US Fishing Hydraulic	FREIGHT DOCK	Hydraulic Oil	2	Line Failure	Structural/Mechanical	US Fishing - Moore, Erin
30912	Bering Explorer	SEWARD HARBOR ON WATER	Unknown	10	Cargo Not Secured	Human Factors	Bering Explorer - Domingus, Henry
30925	Swalling Construction	SEWARD HARBOR ON WATER	Hydraulic Oil	5	Line Failure	Structural/Mechanical	Swalling Construction - Koenig, jerry
32018	M/V Mt. Mitchell	SEWARD RESSURECTION BAY	Diesel	0.25	Unknown	Unknown	Globle Sea LLC - ,
32593	Seward coal dock diesel	Seward coal dock loading facility	Diesel	3	Equipment Failure	Structural/Mechanical	AURORA ENERGY - NO ENTRY, NO ENTRY
32654	F/V Blue Star	SEWARD HARBOR ON WATER	Bilge Oil	2	Human Error	Human Factors	Blue Ace LLC - Watson, Robert
35418	F/V Equinox	SEWARD HARBOR	Bilge Oil	5	Bilge Discharge	Human Factors	F/V Equinox - Ostrander, Derek
35585	F/V Twi Lite	SEWARD HARBOR ON WATER	Hydraulic Oil	0.125	Line Failure	Structural/Mechanical	Delta Western - Niemann , Bev
35723	Seward unknown	KENAI SEWARD RESURRECTION BAY	Diesel	0.5	Unknown	Unknown	Unknown - ,

Table 4: Spill Site Search Results Summary

Unique Spill ID	Spill Name	Spill Number	Spill Date	Case Closed Date	"Maximum" level of ADEC response	FacilityType	FacilitySubType	SourceType	Site/Facility Latitude	Site/Facility Longitude
39136	FV Kupreanof	11239903701	2/6/2011	2/6/2012	Phone Follow-up	Vessel	Fishing, under 400 GT	Other	60.108333	-149.441667
37225	Seward Stevedores Transformers	11239904801	2/17/2011	5/27/2011	Phone Follow-up	Harbor/Port/Marina		Transformer	60.120217	-149.426133
38261	Alaska Railroad Dock-Seward-Millennium Spill	11239923102	8/19/2011	8/26/2011	Phone Follow-up	Harbor/Port/Marina			60.117703	-149.42313
38265	Seward- Cruise Ship Dock Southeast Stevedoring	11239923103	8/19/2011	8/26/2011	Phone Follow-up	Harbor/Port/Marina		Unknown	60.117703	-149.42313
38401	Resurrection Rentals	11239926201	9/19/2011	9/22/2011	Phone Follow-up	Harbor/Port/Marina		Heavy Equipment	60.117703	-149.589797
39087	M/V Susan K Chainsaw Oil Release	12239902701	1/27/2012	2/6/2012	Phone Follow-up	Harbor/Port/Marina		Other	60.108333	-149.441667
39209	M/V Pamela Lee sinking	12239904401	2/13/2012	2/24/2012	Phone Follow-up	Vessel	Passenger, under 400 G	Other	60.108333	-149.441667
39261	Resurrection Bay unknown sheen	12239906201	3/2/2012	3/2/2012	Took Report	Unknown		Unknown	60.108333	-149.441667
39517	FV Ocean Gem	12239910701	4/16/2012	4/16/2012	Phone Follow-up	Vessel	Fishing, under 400 GT		60.108333	-149.441667
39990	Seward Harbor unknown sheen	12239918001	6/28/2012	6/28/2012	Took Report	Unknown		Unknown	60.108333	-149.441667
39991	Seward harbor unknown sheen	12239918201	6/30/2012	7/2/2012	Took Report	Unknown		Unknown	60.108333	-149.441667
40400	Seward harbor	12239923601	8/23/2012	9/5/2012	Took Report	Unknown		Unknown	60.108333	-149.441667
40866	Resurrection Bay Mystery Sheen 09-27-2012	12239927101	9/27/2012	11/20/2012	Phone Follow-up	Vessel	Other, under 400 GT	Unknown	60.108333	-149.441667
40850	Seward small boat harbor sheen 11-07-2012	12239931201	11/7/2012	11/7/2012	Phone Follow-up	Harbor/Port/Marina		Other	60.108333	-149.441667
41084	Crowley Tug Warrior Lube Oil Release	12239935601	12/21/2012	12/24/2012	Phone Follow-up	Vessel	Other, under 400 GT	Other		
41202	M/V Noble Discoverer	13239901801	1/18/2013	1/18/2013	Phone Follow-up	Vessel	Other, over 400 GT	Heavy Equipment		
41578	F/V Provider	13239910501	4/15/2013	4/15/2013	Phone Follow-up	Vessel	Fishing, under 400 GT	Tank, Other	60.108333	-149.441667
41619	FV Nunivak	13239910901	4/19/2013	11/7/2013	Phone Follow-up	Vessel	Fishing, under 400 GT			
41789	M/V Kathy J Diesel Spill 5/22/2013	13239914202	5/22/2013	5/24/2013	Phone Follow-up	Vessel	Other, under 400 GT	Tank, Other	60.108333	-149.441667
42286	Shoreside Petro - Alaska Railroad Dock	13239922501	8/13/2013	8/14/2013	Phone Follow-up	Non-Crude Terminal		Pipe or Line	60.117703	-149.42313
42444	RoyalCarribbean Radiance of the Seas Hydraulic Oil	13239924201	8/30/2013	9/3/2013	Took Report	Vessel	Passenger, under 400 G	Hydraulic System	60.117703	-149.42313
42447	Radiance of the Seas	13239924202	8/30/2013	9/4/2013	Took Report	Vessel	Passenger, under 400 G	Other		
42716	Resurrection Bay Sheen Incident- 10-11-2013	13239928401	10/11/2013	10/14/2013	Field Visit/s	Unknown		Unknown	60.099317	-149.440367

Table 4: Spill Site Search Results Sur

Unique Spill ID	Spill Name	Facility Name	Spilled Substance	Quantity Released (gallons)	Cause	General Cause Category	Affiliate (person or organization associated with spill)
39136	FV Kupreanof	SEWARD HARBOR	Bilge Oil	0.1	Other	Other	FV Kupreanof - Barclay, Tim
37225	Seward Stevedores Transformers	NORTHSTAR TERMINAL	Transformer Oil	105	Human Error	Human Factors	NORTH STAR STEVADORE COMPANY - NO ENTRY, NO ENTRY
38261	Alaska Railroad Dock-Seward-Millennium Spill	Seward- Alaska Railroad Cruise Ship Dock	Engine Lube Oil	0.125	Vehicle Leak, All	Structural/Mechanical	Alaska Railroad Corporation - Terry, Christy
38265	Seward- Cruise Ship Dock Southeast Stevedoring	Seward- Alaska Railroad Cruise Ship Dock	Engine Lube Oil	0.25	Vehicle Leak, All	Structural/Mechanical	SOUTHEAST STEVEDORING - NO ENTRY, NO ENTRY
38401	Resurrection Rentals	Seward- Alaska Rairorad Cruise Ship Dock	Transmission Oil	0.004	Leak	Structural/Mechanical	Resurrection Rentals - , Allen
39087	M/V Susan K Chainsaw Oil Release	KENAI SEWARD RESURRECTION BAY	Other	0.25	Human Error	Human Factors	M/V Susan K - ,
39209	M/V Pamela Lee sinking	SEWARD HARBOR	Gasoline	0.004	Sinking	Human Factors	M/V Pamela Lee - Traini, Dick
39261	Resurrection Bay unknown sheen	SEWARD HARBOR ON WATER	Unknown	0.1	Unknown	Unknown	Unknown - ,
39517	FV Ocean Gem	SEWARD HARBOR	Gasoline	0	Equipment Failure	Structural/Mechanical	FV Ocean Gem - McKee, Kaitlin
39990	Seward Harbor unknown sheen	SEWARD HARBOR	allast Water (containing o	0.5	Unknown	Unknown	Unknown - , Unknown
39991	Seward harbor unknown sheen	SEWARD HARBOR	allast Water (containing o	0.1	Unknown	Unknown	Unknown - , Unknown
40400	Seward harbor	SEWARD HARBOR ON WATER	Gasoline	0.5	Unknown	Unknown	Unknown - ,
40866	Resurrection Bay Mystery Sheen 09-27-2012	SEWARD HARBOR ON WATER	Diesel	4	Unknown	Unknown	Unknown - ,
40850	Seward small boat harbor sheen 11-07-2012	SEWARD HARBOR	Diesel	0.1	Other	Other	Unknown - ,
41084	Crowley Tug Warrior Lube Oil Release	Resurrection Bay	Engine Lube Oil	0.1	Seal Failure	Structural/Mechanical	Crowley Tug Warrior - File, Tom
41202	M/V Noble Discoverer	Resurrection Bay- AK Railroad Dock	Diesel	0.1	Leak	Structural/Mechanical	Noble Drilling US - Molone, Captain John
41578	F/V Provider	SEWARD HARBOR FUEL DOCK	Diesel	3	Overfill	Human Factors	F/V Provider - Reutov, Alexander
41619	FV Nunivak	SEWARD MARINE INDUSTRIAL CENTER	Diesel	2	Corrosion	Structural/Mechanical	Chesapeake Inc - Shupe, Mike
41789	M/V Kathy J Diesel Spill 5/22/2013	SEWARD HARBOR	Diesel	3	Overfill	Human Factors	M/V Kathy J - Janssen, George
42286	Shoreside Petro - Alaska Railroad Dock	Seward- Alaska Railroad Cruise Ship Dock	Diesel	20	Human Error	Human Factors	Shoreside Petroleum - Lechner, Doug
42444	RoyalCarribbean Radiance of the Seas Hydraulic Oil	Seward- Alaska Railroad Cruise Ship Dock	Hydraulic Oil	0.1	Human Error	Human Factors	Royal Carribean - Hagavei, Vedar
42447	Radiance of the Seas	Radiance of the Seas cruise ship	Used Oil (all types)	0.001	Human Error	Human Factors	Radiance of the Seas - Anderson, Claus
42716	Resurrection Bay Sheen Incident- 10-11-2013	Resurrection Bay Sheen Incident- 10-11-2013	Diesel	100	Unknown	Unknown	- , Unknown

Table 4: Spill Site Search Results Summary

Unique Spill ID	Spill Name	Spill Number	Spill Date	Case Closed Date	"Maximum" level of ADEC response	FacilityType	FacilitySubType	SourceType	Site/Facility Latitude	Site/Facility Longitude
43044	Ocean Eagle Diesel Spill 12-22-2013	13239935601	12/22/2013	12/26/2013	Phone Follow-up	Vessel	Cargo, under 400 GT	Tank, Other		
44193	Alaska Railroad Dock-Seward-7-11-2014	14239919201	7/11/2014	7/14/2014	Phone Follow-up	Harbor/Port/Marina		Hydraulic System	60.117703	-149.42313
45236	Resurrection Bay Mystery Sheen 2-2-2015	15239903301	2/2/2015	2/2/2015	Took Report	Vessel	Fishing, under 400 GT	Bilge	59.83	-149.480278
6318	F/V SEA RIDER	96239916501	6/13/1996	7/15/1996	Took Report	Vessel	Fishing, under 400 GT		60.108333	-149.441667
6595		96239930402	10/30/1996	10/30/1996	Took Report	Vessel	Fishing, under 400 GT		60.108333	-149.441667
8358	DRAGNET DRUMS - SEWARD	97239903701	2/6/1997	3/15/1997	Phone Follow-up	Other		Drum(s)	60.108333	-149.441667
8560		97239915001	5/30/1997	6/2/1997	Took Report	Unknown			60.108333	-149.441667
8600	F/V KITTY ANNE / SEWARD	97239916901	6/18/1997	6/19/1997	Phone Follow-up	Vessel	Fishing, under 400 GT		60.108333	-149.441667
11280	SEWARD MYSTERY SPILL	98239925302	9/10/1998	9/12/1998	Took Report	Unknown			60.108333	-149.441667
13497	TUG C VIXEN	99239901901	1/19/1999	1/19/1999	Phone Follow-up	Vessel	Other, under 400 GT		60.108333	-149.441667
13966		99239923002	8/18/1999	8/23/1999	Took Report	Unknown			60.108333	-149.441667
13975	SEWARD MYSTERY SHEEN	99239923204	8/20/1999	8/20/1999	Took Report	Unknown			60.108333	-149.441667

Table 4: Spill Site Search Results Sur

Unique Spill ID	Spill Name	Facility Name	Spilled Substance	Quantity Released (gallons)	Cause	General Cause Category	Affiliate (person or organization associated with spill)
43044	Ocean Eagle Diesel Spill 12-22-2013	Ocean Eagle- Seward Cargo Dock	Diesel	2	Overfill	Human Factors	Brusco Tug and Barge - Pickerd, Robert
44193	Alaska Railroad Dock-Seward-7-11-2014	Seward- Alaska Railroad Cruise Ship Dock	Hydraulic Oil	0.01	Leak	Structural/Mechanical	Alaska Railroad Corporation - Terry, Christy
45236	Resurrection Bay Mystery Sheen 2-2-2015	KENAI SEWARD RESURRECTION BAY SHEEN	Bilge Oil	1	Bilge Discharge	Human Factors	- , Unknown
6318	F/V SEA RIDER	KENAI SEWARD FISH DOCK PIER ON WATER	Diesel	5	Sinking	Human Factors	F/V SEA RIDER - NO ENTRY, NO ENTRY
6595		KENAI SEWARD TRAVEL LIFT DOCK ON WATER	Engine Lube Oil	1	Cargo Not Secured	Human Factors	CITY OF SEWARD - NO ENTRY, NO ENTRY
8358	DRAGNET DRUMS - SEWARD	KENAI SEWARD DRAGNET FISHERIES	Used Oil (all types)	10	Leak	Structural/Mechanical	DRAGNET FISHERIES - NO ENTRY, NO ENTRY
8560		KENAI SEWARD HARBOR ENTRANCE TO HARBOR ALONG BREAK	Unknown	1	Unknown	Unknown	UNKNOWN - NO ENTRY, NO ENTRY
8600	F/V KITTY ANNE / SEWARD	KENAI SEWARD DRAGNET FISHERIES DOCK ON WATER	Diesel	20	Overfill	Human Factors	EGEMO ROD - EGEMO, ROD
11280	SEWARD MYSTERY SPILL	SEWARD HARBOR ON WATER	Other	2	Unknown	Unknown	UNKNOWN - NO ENTRY, NO ENTRY
13497	TUG C VIXEN	SEWARD SHIP YARD ON WATER	Diesel	25	Overfill	Human Factors	CROWLEY MARINE - NO ENTRY, NO ENTRY
13966		KENAI SEWARD RESURRECTION BAY	Other	5	Unknown	Unknown	UNKNOWN - NO ENTRY, NO ENTRY
13975	SEWARD MYSTERY SHEEN	SEWARD RESSURECTION BAY	Other	5	Unknown	Unknown	UNKNOWN - NO ENTRY, NO ENTRY

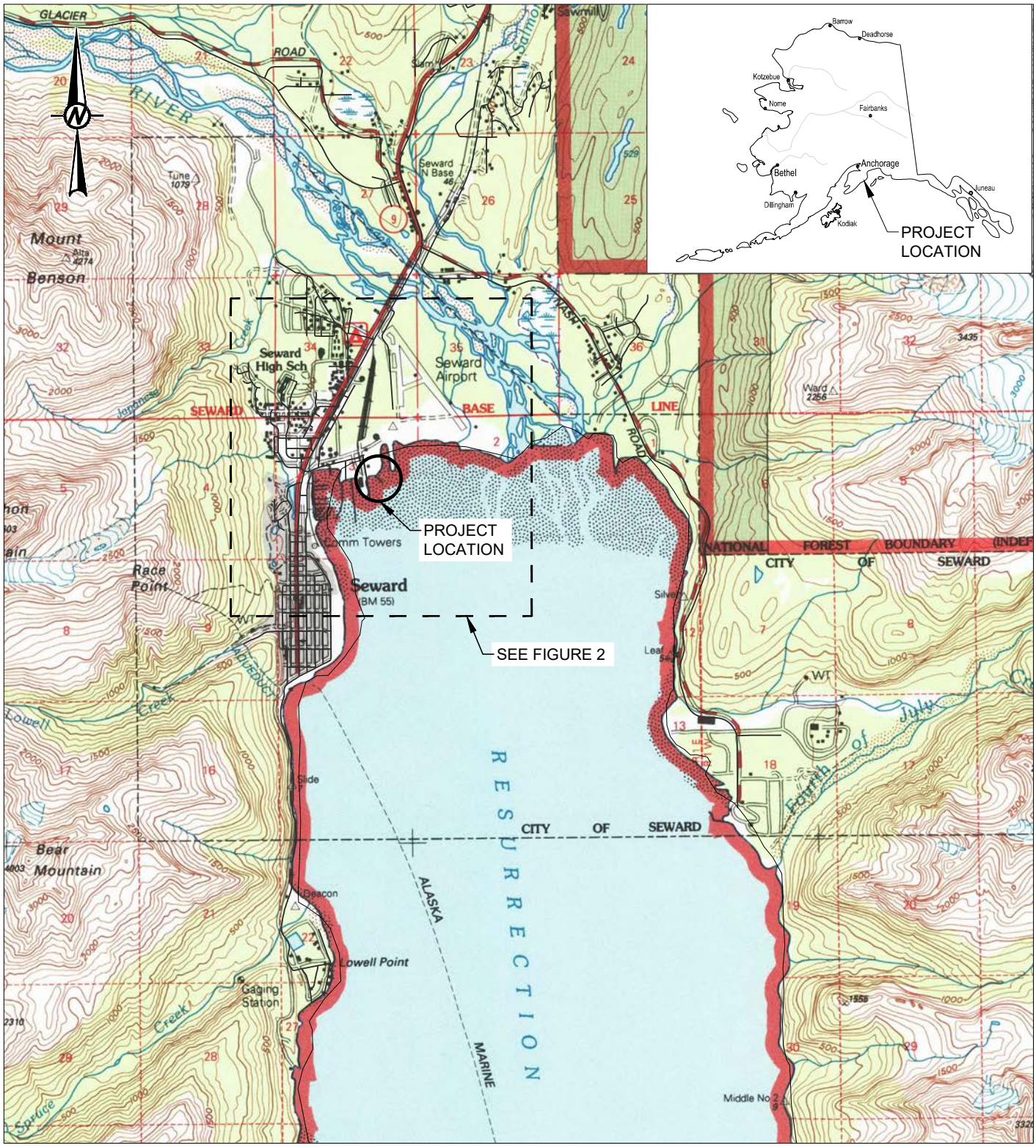
Table 5: ARRC Dock Facility Spill Search Results Summary

Unique Spill ID	Facility Name	Spill Name	Spill Number	Spill Date	Case Closed Date	Spilled Substance	Quantity Released (gallons)	Cause	General Cause Category
17172	RAILROAD DOCK	F/V Alaska Spirit Diesel	2239917802	6/27/2002	7/8/2002	Diesel	12	Overfill	Human Factors
19997	FREIGHT DOCK	Tustamina Hydraulic	3239924001	8/28/2003	9/2/2003	Hydraulic Oil	1	Leak	Structural/Mechanical
26753	FREIGHT DOCK	Vessel US Fishing Hydraulic	6239916901	6/18/2006	6/19/2006	Hydraulic Oil	2	Line Failure	Structural/Mechanical
32593	Seward coal dock loading facility	Seward coal dock diesel	8239933901	12/4/2008	12/6/2008	Diesel	3	Equipment Failure	Structural/Mechanical
38261	Seward-Alaska Railroad Cruise Ship Dock	Alaska Railroad Dock-Seward-Millennium Spill	11239923102	8/19/2011	8/26/2011	Engine Lube Oil	0.125	Vehicle Leak, All	Structural/Mechanical
38265	Seward-Alaska Railroad Cruise Ship Dock	Seward-Cruise Ship Dock Southeast Stevedoring	11239923103	8/19/2011	8/26/2011	Engine Lube Oil	0.25	Vehicle Leak, All	Structural/Mechanical
38401	Seward-Alaska Rairorad Cruise Ship Dock	Resurrection Rentals	11239926201	9/19/2011	9/22/2011	Transmissio n Oil	0.004	Leak	Structural/Mechanical
41202	Resurrection Bay- AK Railroad Dock	M/V Noble Discoverer	13239901801	1/18/2013	1/18/2013	Diesel	0.1	Leak	Structural/Mechanical
42286	Seward-Alaska Railroad Cruise Ship Dock	Shoreside Petro - Alaska Railroad Dock	13239922501	8/13/2013	8/14/2013	Diesel	20	Human Error	Human Factors

Table 5: ARRC Dock Facility Spill Search Results Summary

Unique Spill ID	Facility Name	Spill Name	Spill Number	Spill Date	Case Closed Date	Spilled Substance	Quantity Released (gallons)	Cause	General Cause Category
42444	Seward-Alaska Railroad Cruise Ship Dock	RoyalCarribbean Radiance of the Seas Hydraulic Oil	13239924201	8/30/2013	9/3/2013	Hydraulic Oil	0.1	Human Error	Human Factors
44193	Seward-Alaska Railroad Cruise Ship Dock	Alaska Railroad Dock-Seward-7-11-2014	14239919201	7/11/2014	7/14/2014	Hydraulic Oil	0.01	Leak	Structural/Mechanical

FIGURES



REFERENCE

1:63,360 SCALE TOPOGRAPHIC MAP CREATED AND DISTRIBUTED BY USGS. QUADRANGLE USED IS SEWARD A-7, AK (1997).

SCALE 0 1/2 1 MILES

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
VICINITY MAP

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	1

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.005.dwg

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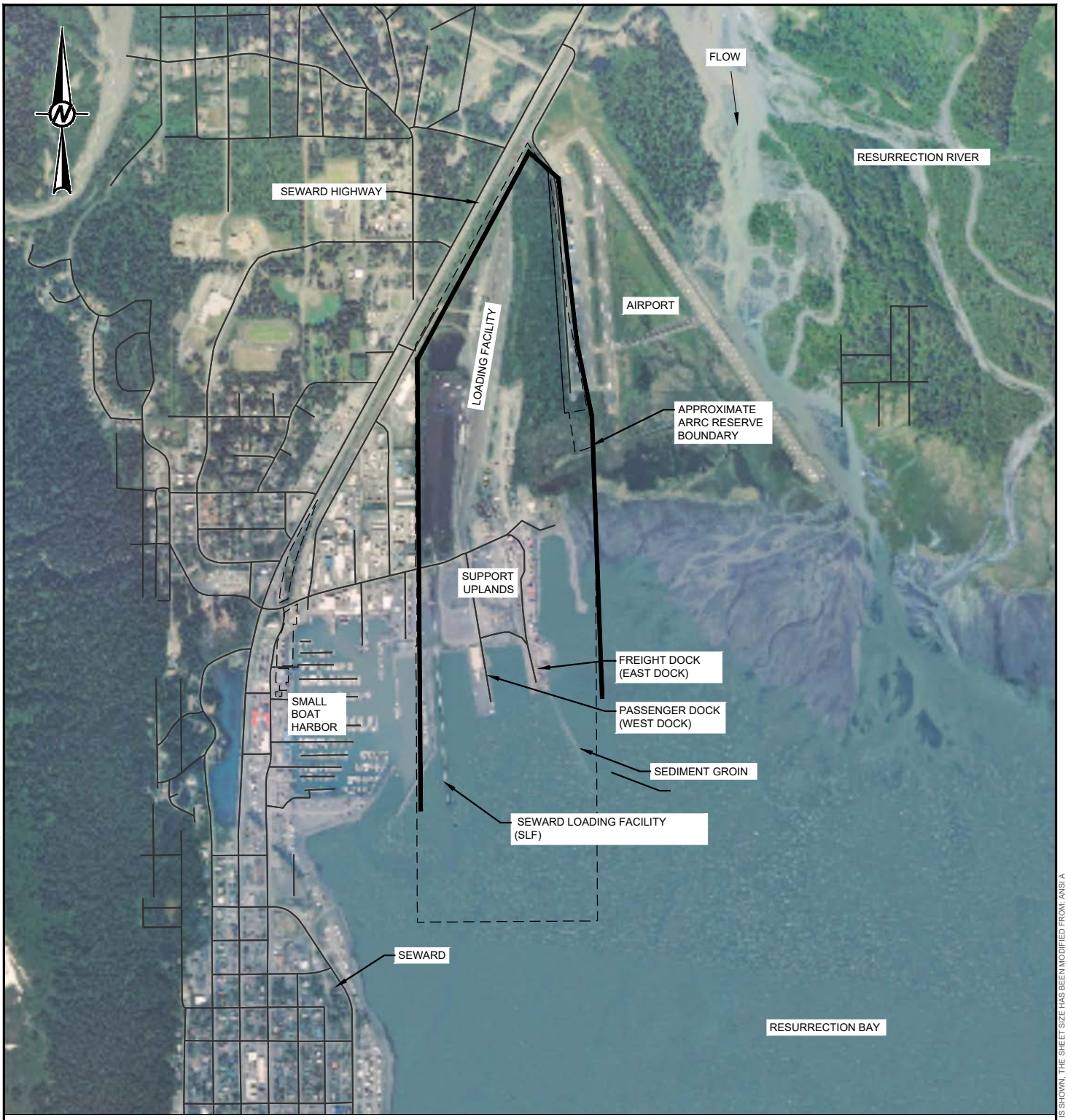
0 1 in



LEGEND

— — — — LAND PARCELS OWNED BY ALASKA RAILROAD CORPORATION

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2012-10-12 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. LAND PARCEL INFORMATION ACQUIRED IN APRIL 2015 WAS PRODUCED AND DISTRIBUTED BY KENAI PENINSULA BOROUGH (KPB).

0 750 1500
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT
Golder Associates

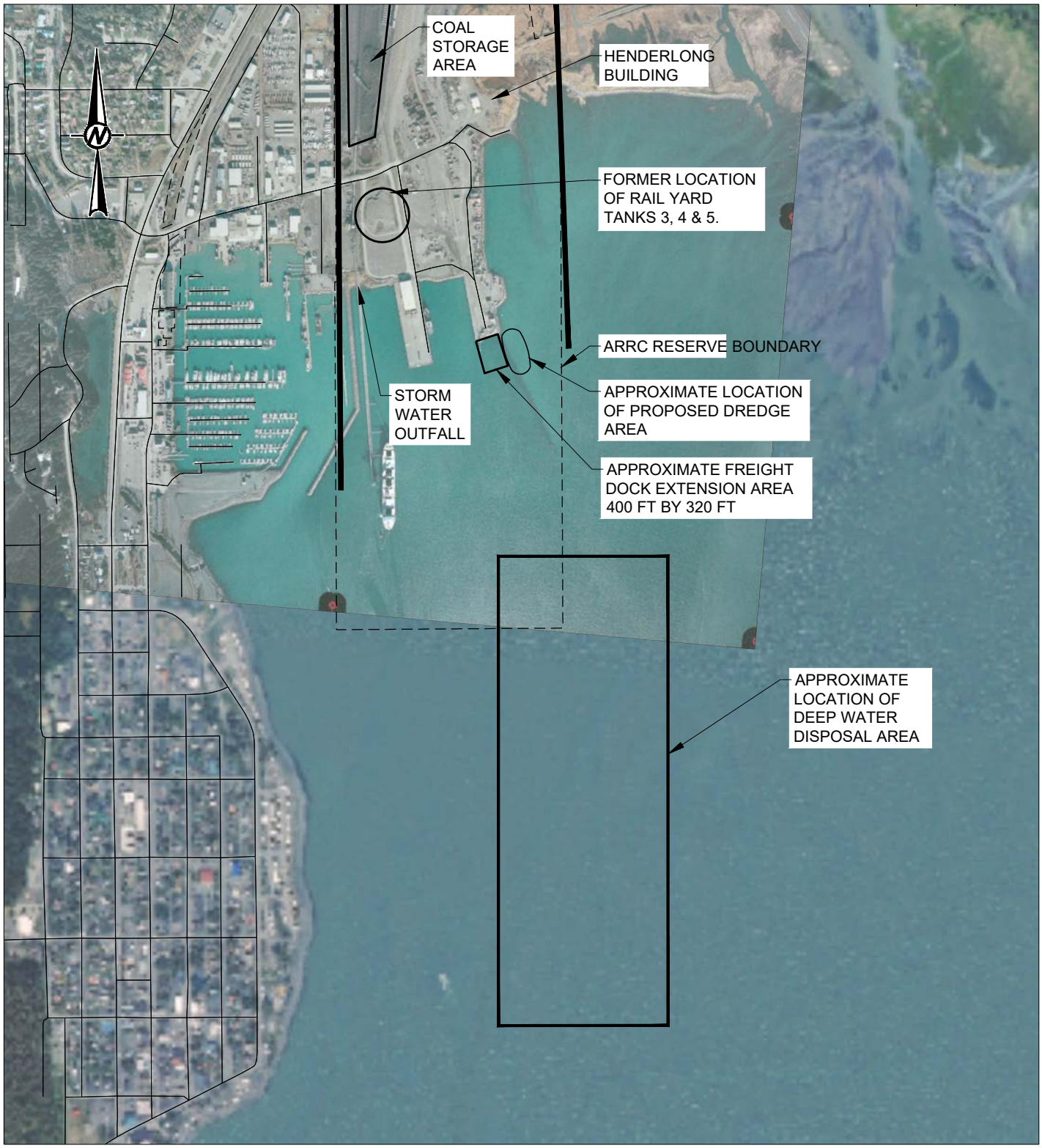
YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE
PROJECT AREA GENERAL FEATURES

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	2

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.004.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in



LEGEND

— — — — LAND PARCELS OWNED BY ALASKA RAILROAD CORPORATION

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2012-10-12 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. LAND PARCEL INFORMATION ACQUIRED IN APRIL 2015 WAS PRODUCED AND DISTRIBUTED BY KENAI PENINSULA BOROUGH (KPB).

0 600 1200
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
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TITLE
PROJECT LOCATION MAP

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	3

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.004.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in

LEGEND

- 1994 SAMPLE LOCATION
- 1996 SAMPLE LOCATION
- 1999 SAMPLE LOCATION
- 2003 SAMPLE LOCATION
- 2007 SAMPLE LOCATION
- 2008 SAMPLE LOCATION
- 2009 SAMPLE LOCATION

REFERENCES

1. SAMPLE LOCATIONS TAKEN FROM FIGURE "SEWARD SAMPLE LOCATIONS, 1994-2009", BY ARRC, DATED 2014-09-04.
2. AERIAL PHOTOGRAPH TAKEN ON 2012-10-12 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.

0 150 300
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
SEWARD SAMPLE LOCATIONS 1994-2009

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	4

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.006.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in

APPENDIX A
PUBLIC NOTICE OF APPLICATION FOR PERMIT
(REF. NO. POA-1965-34-M20)

ARR 1964 ARR

Golder 1997 APXXX

U:\ACAD\eng-projects\Seward\Dredging\Seward 1994 - 2009 Sample Locations

HLA 1976 # HLA

AP186

#HLA-1

ARR-34

AP188

AP190

HLA6

#HLA-2

AP187

AP191

ARR-35

AP189

#HLA-4

AP192

ARR-41

HLA-5

proposed dredge area

N

LEGEND:

1994 -

1996 -

1999 -

2003 -

2007 -

2008 -

2009 -

FIGURE 1.
POA-1965-34-M20
Resurrection Bay

ALASKA RAILROAD CORPORATION
ENGINEERING SERVICES
P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT :

SEWARD SAMPLE LOCATIONS
1994 - 2009

TITLE:

DESIGNED BY: R.G.	SCALE : 1" = 250'	AFE NO.:	
DRAWN BY: mdg		ACAD FILE:	
CHECKED BY:	DATE : 09/04/2014	DWG NO. 1 OF 1	
APPROVED BY:			

1" = 200'

APPENDIX B
HISTORICAL AERIAL PHOTOGRAPHS

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 1950 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

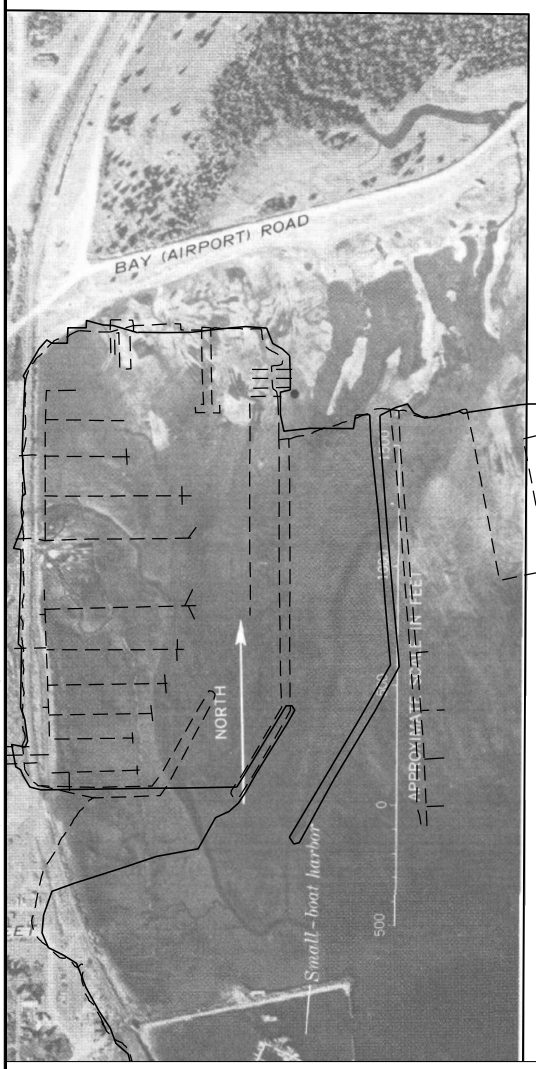
1950 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.001.dwg



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN PRIOR TO THE 1964 EARTHQUAKE (PHOTOGRAPH DATE AUGUST 16, 1959). PHOTO DATE PROVIDED BY STEVE SPARKS, QUANTUM GEOSPATIAL. CORP OF ENGINEERS AND PUBLISHED BY LEMKE, R.W., 1967, EFFECTS OF THE EARTHQUAKE OF MARCH 27, 1964, AT SEWARD, ALASKA: U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 542-E, P.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
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DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1964 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B2

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWGs | File Name: 1523305.001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 1973 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA AND DISTRIBUTED BY KENAI PENINSULA BOROUGH .
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

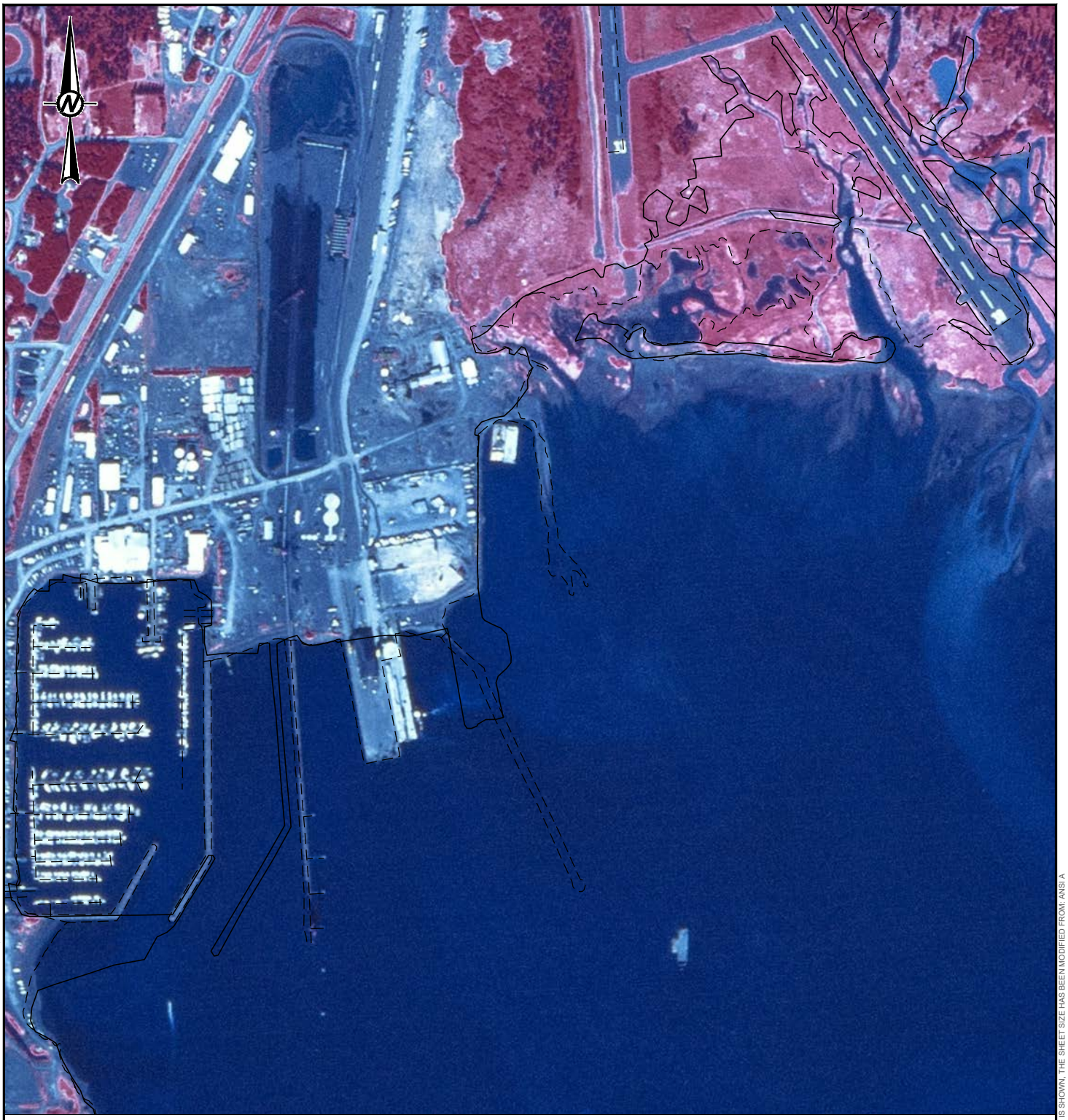
1973 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.001.dwg



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON OCTOBER 17, 1985 ACQUIRED AND DISTRIBUTED BY USGS.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1985 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B4

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
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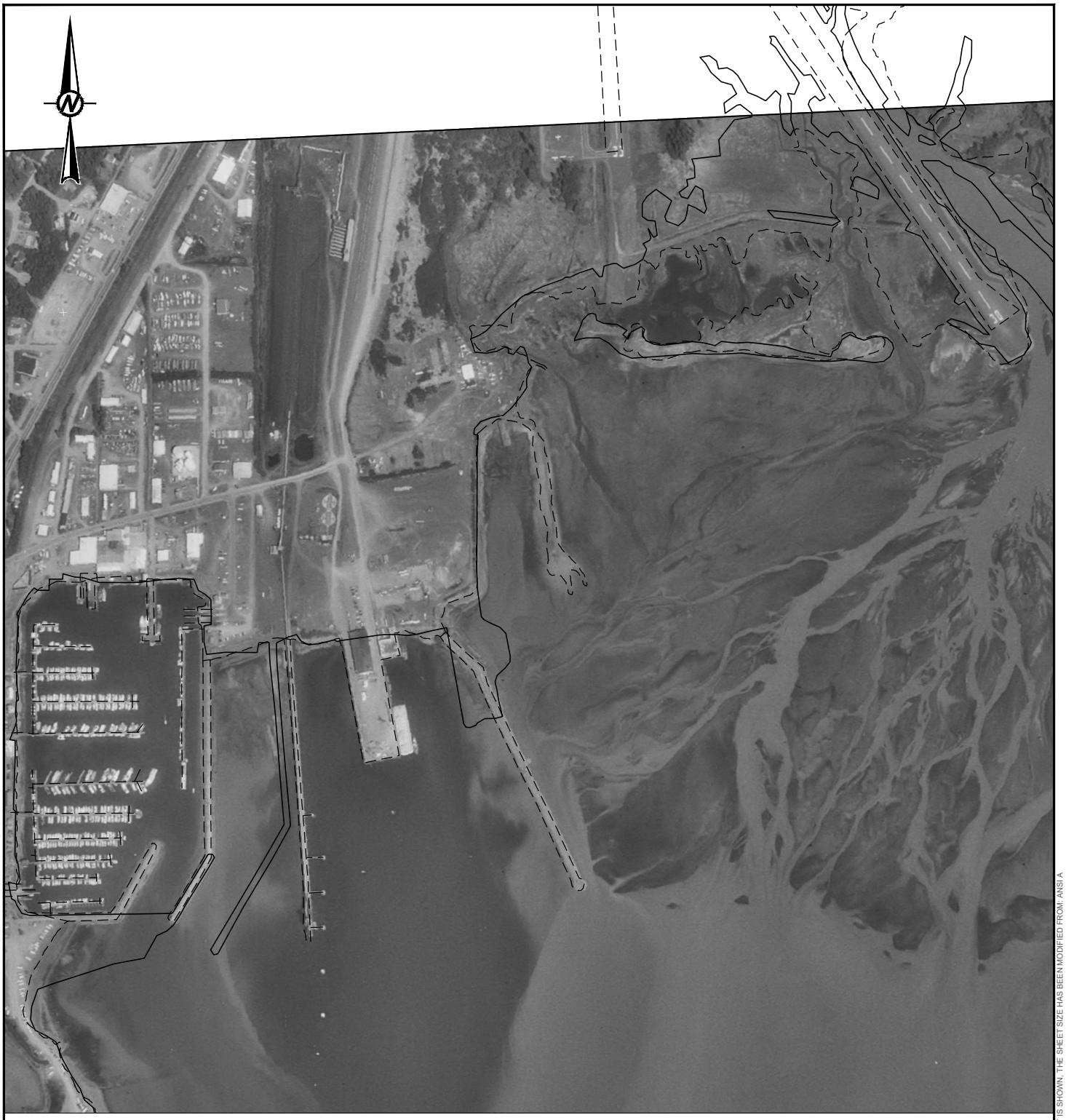


LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH (DIGITAL ORTHOQUAD (DOQ))TAKEN ON 1996 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA FOR THE NRCS AND DISTRIBUTED BY USGS .
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

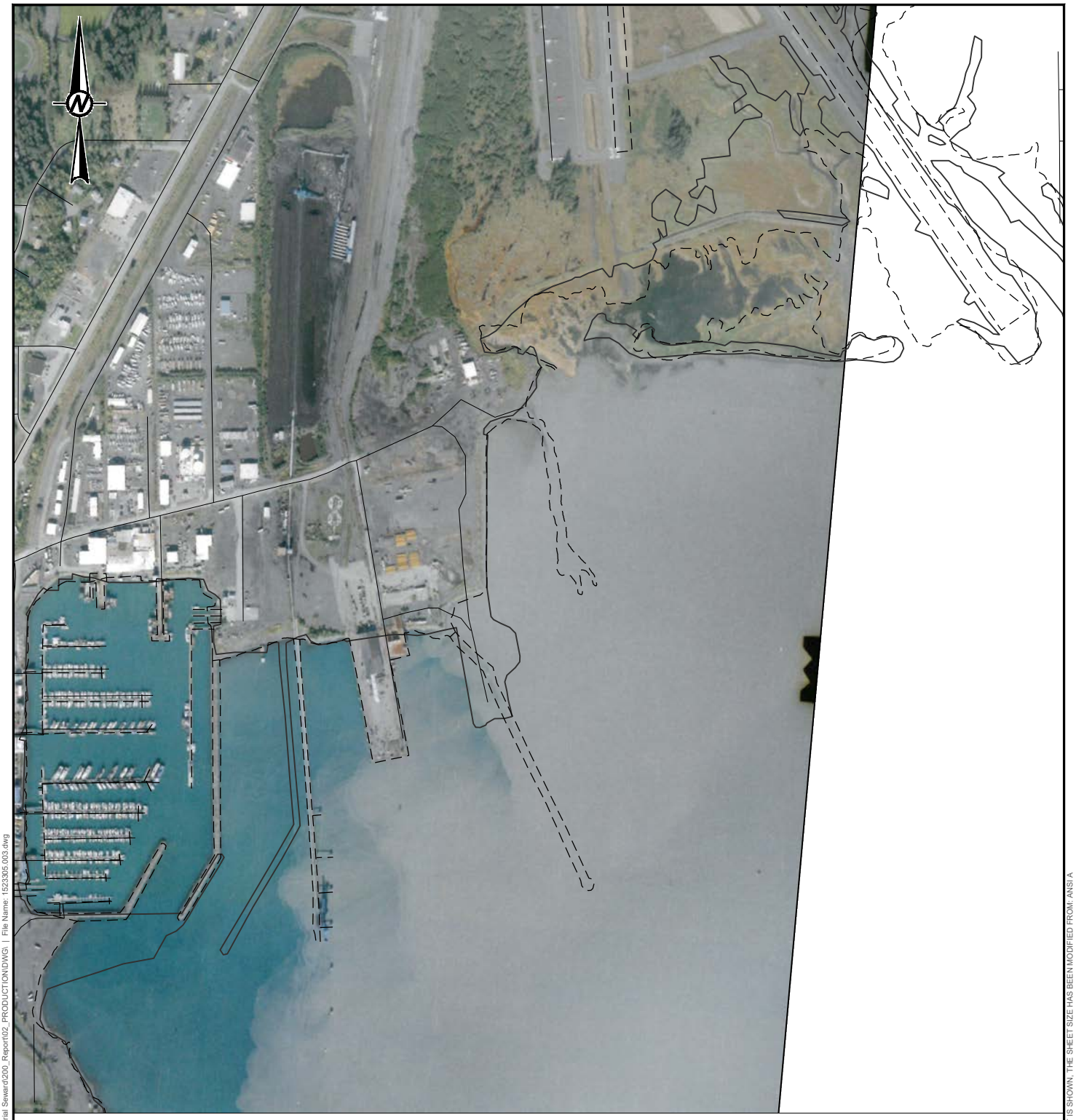
1996 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B5

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWGs | File Name: 1523305.001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 1998-09-24 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

1998 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B6

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. PHOTOGRAPH TAKEN IN 2000 BY SPACE IMAGING/DIGITALGLOBE AND DISTRIBUTED BY KPB.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

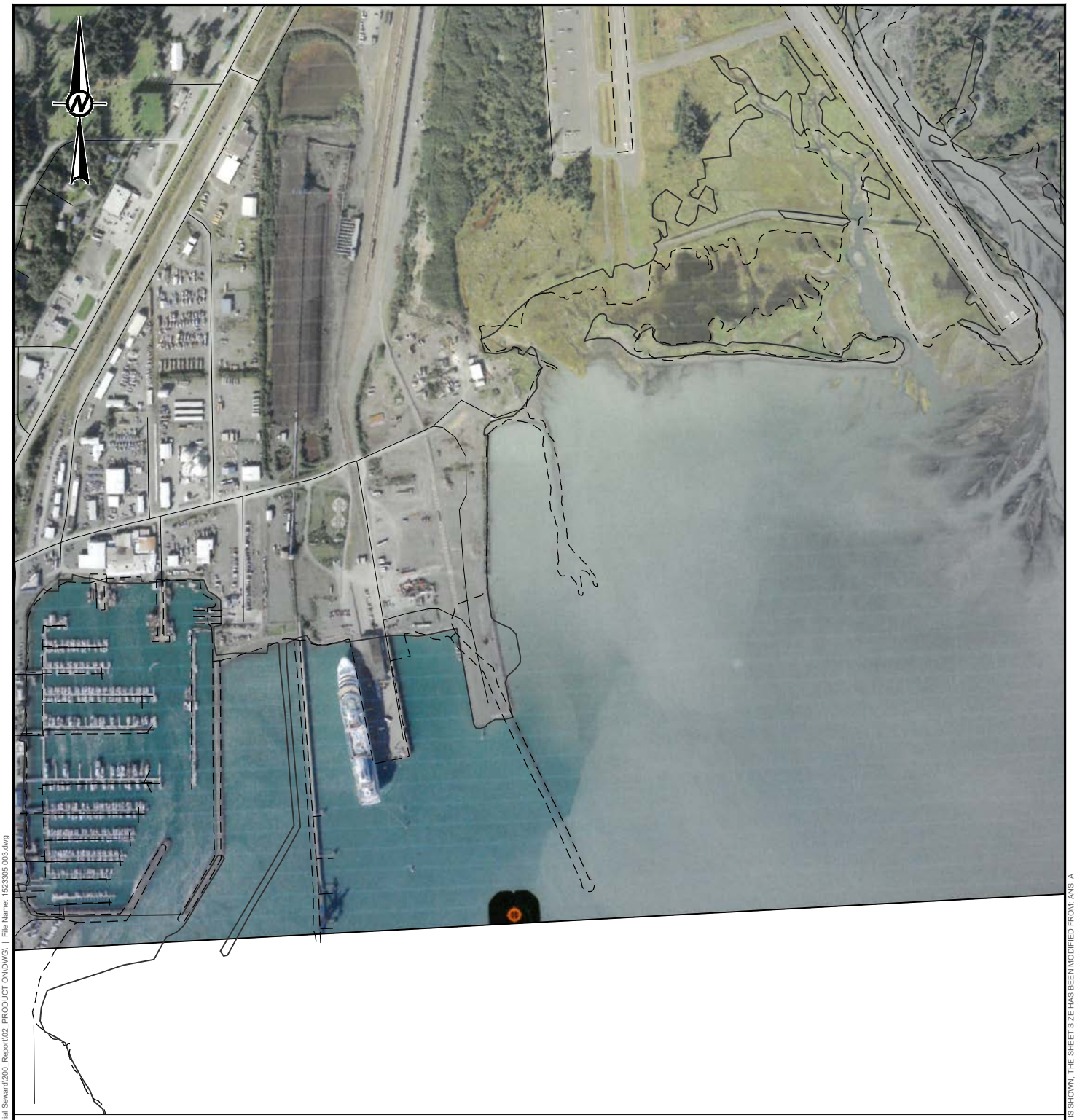
PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE

2000 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B7



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2001-09-08 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE

2001 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B8

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2002-08-02 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

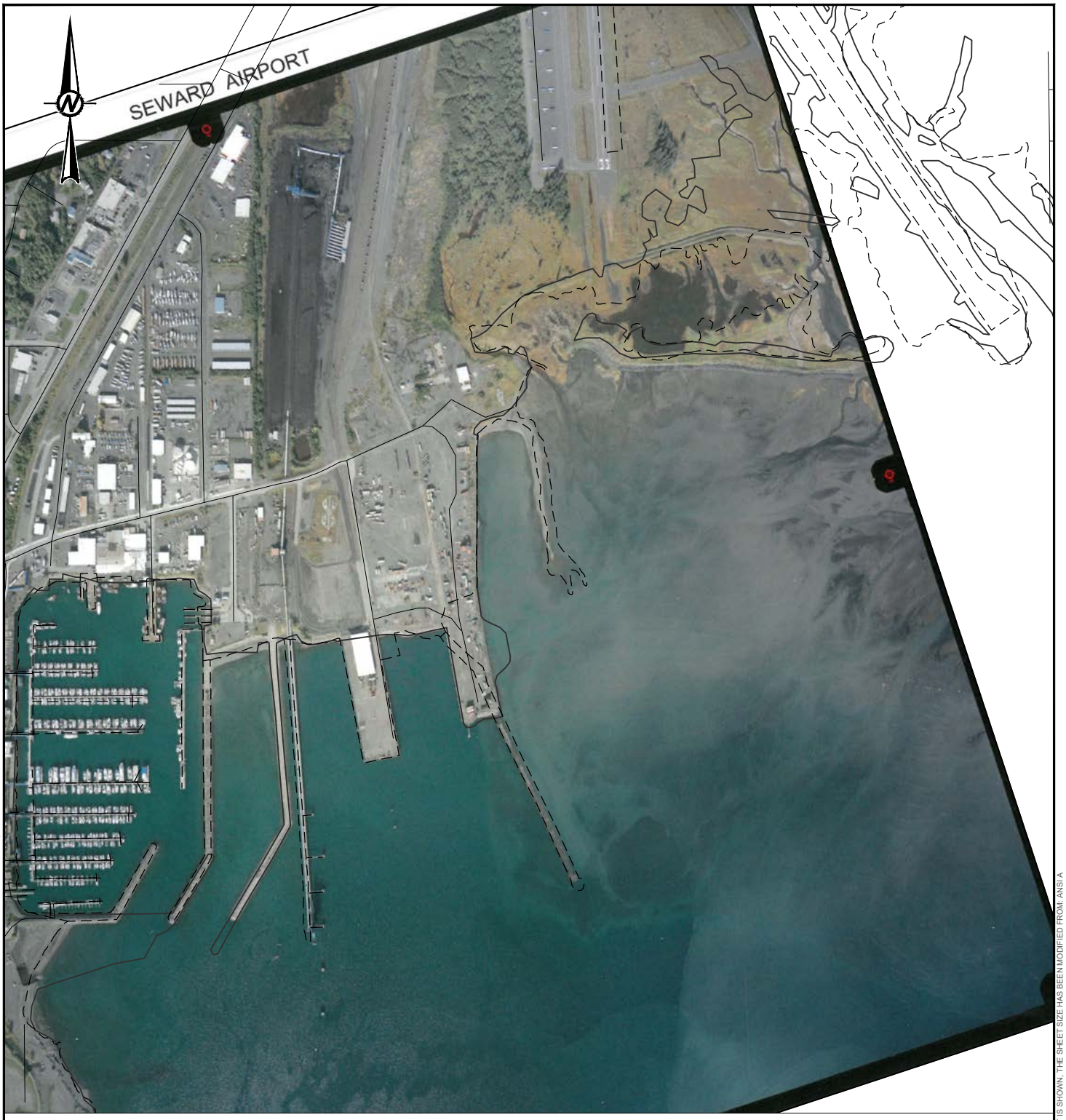
2002 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B9

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\09_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2004-09-21 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
2004 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B10

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 60 CM QUICKBIRD SATELLITE IMAGE TAKEN IN 2005 AND COPYRIGHTED BY DIGITAL GLOBE AND DISTRIBUTED BY KENAI PENINSULA BOROUGH.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

2005 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B11

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.001.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2008-06-09 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

2008 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B12

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2011-08-29 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

2011 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B13

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. AERIAL PHOTOGRAPH TAKEN ON 2012-10-12 BY AEROMETRIC INC. OF ANCHORAGE, ALASKA.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800

SCALE FEET

CLIENT

ALASKA RAILROAD CORPORATION

PROJECT

TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE

2012 AERIAL PHOTOGRAPH

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	B14

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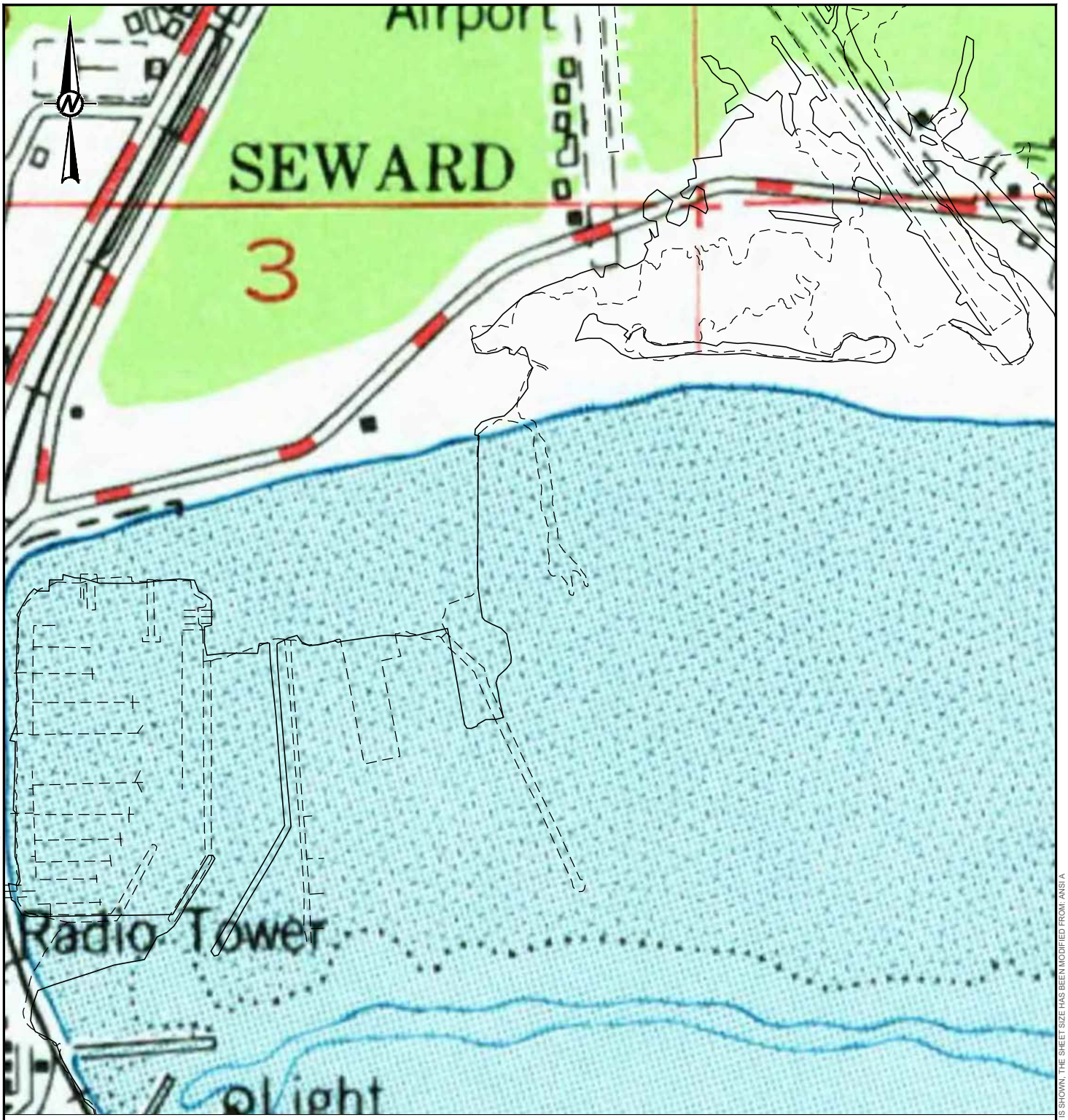
APPENDIX C
HISTORICAL TOPOGRAPHIC MAPS



LEGEND

——— NOAA HIGH RESOLUTION SHORELINE (2009-2012)

– – – – NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 1:63,360 SCALE TOPOGRAPHIC MAP PRODUCED AND DISTRIBUTED BY USGS. QUADRANGLE USED WAS SEWARD (A-7), ALASKA, 1951.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1951 TOPOGRAPHIC MAP - 1:63,360 SCALE

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	C1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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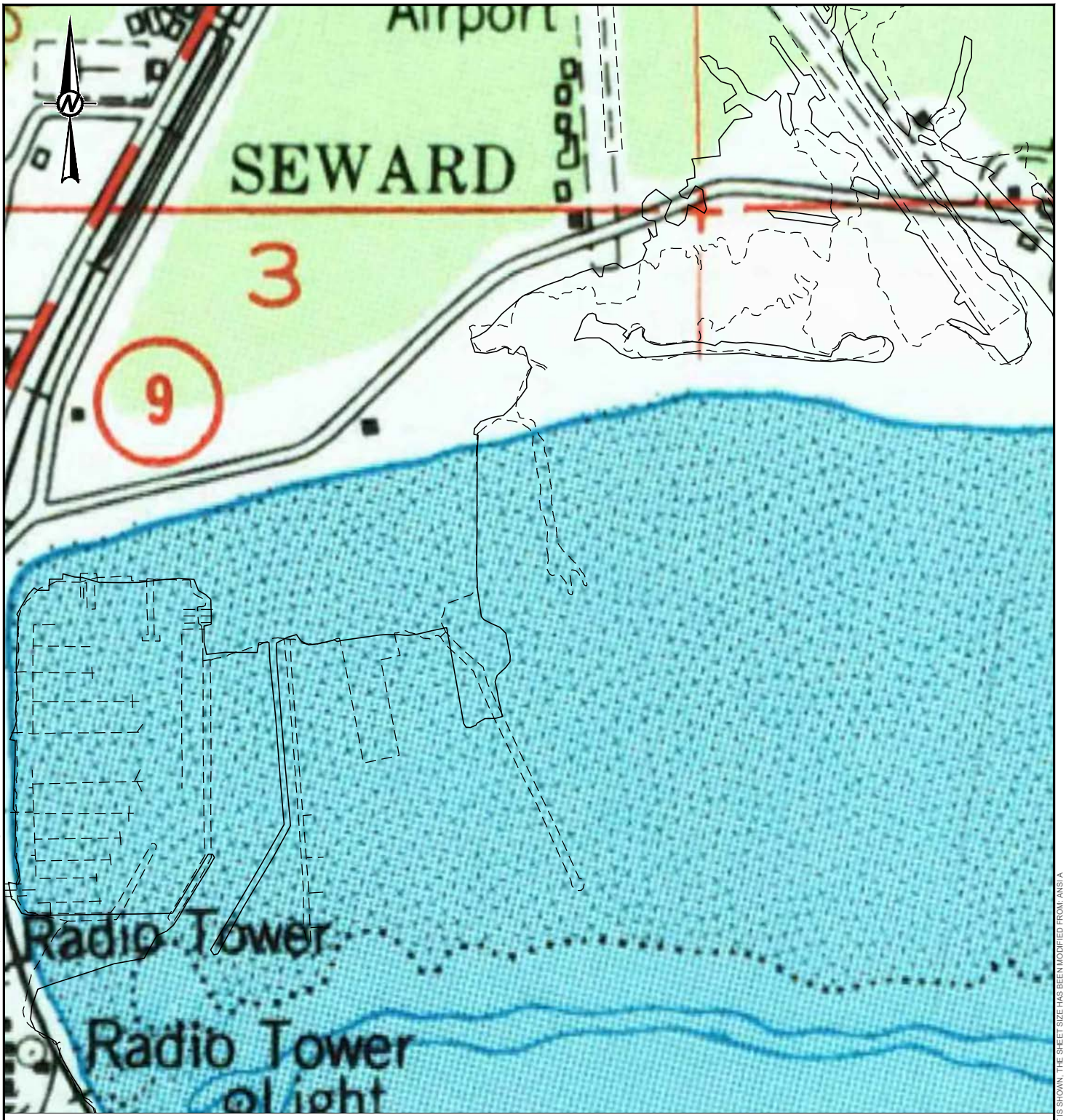
Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.002.dwg



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 1:63,360 SCALE TOPOGRAPHIC MAP PRODUCED AND DISTRIBUTED BY USGS. QUADRANGLE USED WAS SEWARD (A-7), ALASKA, 1950 WITH MINOR REVISIONS IN 1975.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1975 TOPOGRAPHIC MAP 1:63,360 SCALE

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	C2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

0 1 in

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.002.dwg

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 1:25,000 SCALE TOPOGRAPHIC MAP PRODUCED AND DISTRIBUTED BY USGS. QUADRANGLE USED WAS SEWARD (A-7), SE ALASKA, 1983.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

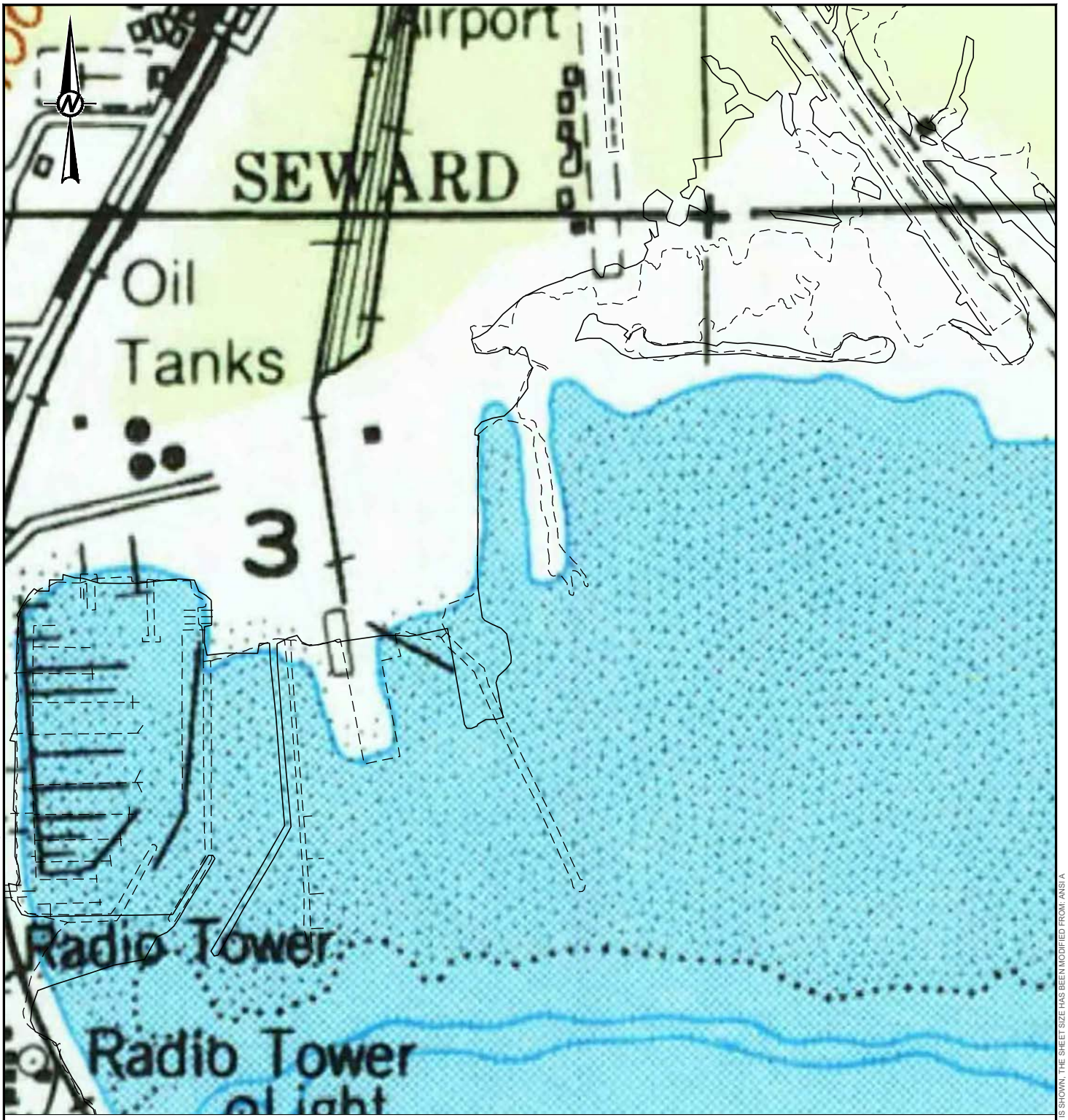
PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1983 TOPOGRAPHIC MAP 1:25,000 SCALE

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	C3

Path: \\Anchorage\Public\Geomatics\ARRC\Seward\99_PROJECTS\1523305 ARRC Dredge Material Seward\200_Report\02_PRODUCTION\DWG\ | File Name: 1523305.002.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
0 1 in



LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 1:63,360 SCALE TOPOGRAPHIC MAP PRODUCED AND DISTRIBUTED BY USGS. QUADRANGLE USED WAS SEWARD (A-7), ALASKA, 1950 WITH MINOR REVISIONS 1975 AND MODIFICATIONS AS PRIMARY BASE SERIES 1990.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

TITLE
1990 TOPOGRAPHIC MAP 1:63,360 SCALE

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	C4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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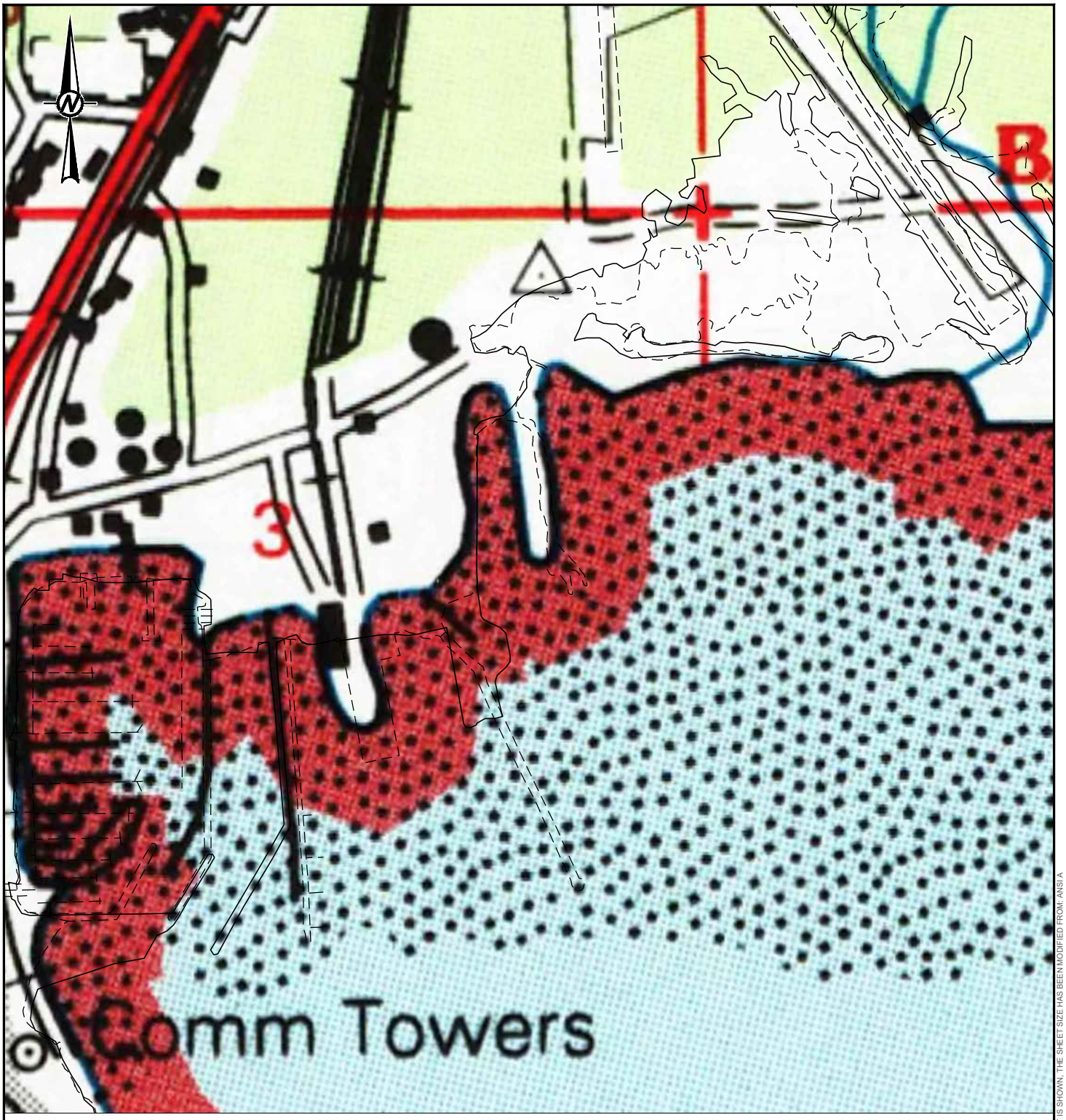

LEGEND

NOAA HIGH RESOLUTION SHORELINE (2009-2012)

NOAA HIGH RESOLUTION SHORELINE (1990)

REFERENCES

1. 1:63,360 SCALE TOPOGRAPHIC MAP PRODUCED AND DISTRIBUTED BY USGS. QUADRANGLE USED WAS SEWARD (A-7), ALASKA, 1997.
2. HIGH RESOLUTION SHORELINE DISTRIBUTED BY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA). SHORELINE DATA BASED ON OFFICE INTERPRETATION OF IMAGERY AT THE TIME OF SURVEY 2009-04 TO 2012-05. SHORELINE MAPPING PROGRAM OF SEWARD, AK, AK1012E, 2014.

0 400 800
SCALE FEET

CLIENT
ALASKA RAILROAD CORPORATION

PROJECT
TIER 1 EVALUATION SEWARD FREIGHT DOCK EXPANSION PROJECT
SEWARD, ALASKA

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-08-14
PREPARED	APG
DESIGN	-
REVIEW	JFD
APPROVED	TGK

TITLE
1997 TOPOGRAPHIC MAP 1:63,360 SCALE

PROJECT No.	CONTROL	Rev.	FIGURE
1523305		A	C5

APPENDIX D
CONTAMINATED SITE SUMMARIES

STATE OF ALASKA LETTER
RECORD OF DECISION ARRC HENDERLONG BUILDING SEWARD CLEANUP COMPLETE DETERMINATION
JANUARY 23, 2009

STATE OF ALASKA

SARAH PALIN, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

555 Cordova Street
Anchorage, AK 99501
PHONE: (907) 269-8685
FAX: (907) 269-7649
www.dec.state.ak.us

File: 2332.38.033
Return Receipt Requested
No: 7007 0710 0004 3852 9038

January 23, 2009

Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

Re: Record of Decision (ROD) ARRC Henderlong Building Seward
Cleanup Complete Determination

Dear Ms. Schrader:

The Alaska Department of Environmental Conservation (ADEC), Contaminated Sites Program, has completed review of the environmental records associated with ARRC Henderlong Building, Seward. Based on the information provided to date, the ADEC has determined that the contaminant concentrations remaining on site do not pose an unacceptable risk to human health or the environment, and this site will be closed.

This decision is based on the administrative record for ARRC Henderlong Building Seward, which is located in the offices of the ADEC in Anchorage, Alaska. This letter summarizes the decision process used to determine the environmental status of this site and provides a summary of the regulatory issues considered in the Cleanup Complete Determination.

Introduction

Site Name and Location:
ARRC Henderlong Building Seward
Seward Lease 7379 Port Avenue
Seward, Alaska 99664

Name and Mailing Address of Contact Party:
Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

Database Record Key and File Number:
ADEC Reckey: 2006230127601
File: 2332.38.033
Hazard ID: 4416

Regulatory authority under which the site is being cleaned up:
18 AAC 75

Background
Petroleum impacted soils were encountered during a floor drain excavation at the Henderlong Building in 2006.

Contaminants of Concern
During the various investigations at this site, groundwater and soil samples were analyzed for diesel range organics (DRO); gasoline range organics (GRO); volatile organic compounds (VOC); semi-volatile compounds (SVOC); polychlorinated biphenyls; metals; and benzene, toluene, ethylbenzene, and xylene (BTEX). Based on these analyses and knowledge of the contaminant source, the following Contaminants of Concern were identified:

- Benzene
- Toluene

Cleanup Levels
The soil cleanup levels for this site are established in 18 AAC 75.341, Method Two, Table B2 Under 40 inch Zone, Migration to Groundwater.

Contaminant	Site Cleanup Level (mg/kg)
Benzene	0.025
Toluene	6.5

The groundwater cleanup levels for this site are established in 18 AAC 75.345 Table C Groundwater Cleanup Levels.

Contaminant	Site Cleanup Level (mg/L)
Benzene	0.005
Toluene	1.0

Site Characterization and Cleanup Actions
Evaluation of the onsite water well and soil underneath the concrete floor drain area was performed in the fall of 2006. Approximately 4 cubic yards of soil were excavated from the top 6 inches below the former floor drain and placed in two 55-gallon drums. Soil samples collected from the drums and the excavation contained benzene up to 1.15 mg/kg and toluene up to 15.7 mg/kg. Contaminants were not detected in the ground water sample from the onsite water well.

Further excavation and evaluation of soil and groundwater was performed in 2007. Soil was excavated from the location of the former floor drain and stockpiled in two separate piles inside the Henderlong Building. Soil samples collected from the stockpiles contained benzene up to 0.0256 mg/kg. Four soil samples collected from the excavation bottom contained benzene up to 0.385 mg/kg. A water quality sample collected from the onsite water well indicated the groundwater is influenced by salt water intrusion from nearby Resurrection Bay.

In 2008, additional characterization of the groundwater was conducted and the stockpiles were transported to Alaska Soil Recycling for treatment. Groundwater samples collected from two temporary monitoring wells between the building and Resurrection Bay did not contain contaminates above ADEC cleanup levels.

Pathway Evaluation
The exposure pathways for human health that were evaluated include the following: ingestion of soil and groundwater, indoor and outdoor inhalation of vapors, and dermal contact with soil. These pathways may be complete, but the remaining contaminant concentrations do not exceed inhalation, ingestion, or direct contact cleanup levels.

The migration to groundwater pathway may be complete, but drinking water is supplied by the city of Seward. Groundwater samples from the onsite non-potable well did not contain detectable concentrations of contaminants. Furthermore, due to the salt water influence from Resurrection Bay, the onsite well is not suitable for use as a drinking water source.

The exposure pathway analysis above was supported by the most recent ADEC Exposure Tracking Model (ETM) ranking. The ETM results showed all pathways to be either De Minimus or Incomplete.

ADEC Decision
The cleanup actions to date have served to excavate and adequately remove contaminated soil from the site. Based on the information available, ADEC has determined no further assessment or cleanup action is required. There is no longer a risk to human health or the environment, and this site will be designated as Cleanup Complete on the Department's database.

Although a Cleanup Complete determination has been granted, ADEC approval is required for off-site soil disposal in accordance with 18 AAC 75.325(i). It should be noted that movement or use of potentially contaminated soil in a manner that results in a violation of 18 AAC 70 water quality standards is unlawful.

This determination is in accordance with 18 AAC 75.380(d) and does not preclude ADEC from requiring additional assessment and/or cleanup action if future information indicates that this site may pose an unacceptable risk to human health or the environment.

Appeal
Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 -18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 15 days after receiving the department's decision reviewable under this section. Adjudicatory hearing

requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 30 days after the date of issuance of this letter, or within 30 days after the department issues a final decision under 18 AAC 15.185. If a hearing is not requested within 30 days, the right to appeal is waived.

If you have questions about this closure decision, please contact Grant Lidren at (907) 269-8685.

Sincerely,

Linda Nuechterlein
Environmental Manager

STATE OF ALASKA
INSTITUTIONAL CONTROLS VERIFICATION FOR ARRC SEWARD RAIL YARD TANK 5
APRIL 9, 2014

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION & RESPONSE
Contaminated Sites Program

410 Willoughby Ave Suite 303
PO Box 111800
Juneau, Alaska 99811-1800
Main: 907-465-5210
Fax: 907-465-5218

File No: 2332.26.023

April 9, 2014

Certified Mail Return Receipt Requested
Article No. 7013 1090 0000 7617 5759

Alaska Railroad Corporation
PO Box 107500
Anchorage, AK 99510-7500

Re: Institutional Controls verification for ARRC Seward Rail Yard Tank 5

The Contaminated Sites Program conducts periodic verification of closed sites where institutional controls (land use restrictions) are required under 18 AAC 75.375. We have identified ARRC Seward Rail Yard Tank 5 as a site with institutional controls.

In order to prevent people from being exposed to any remaining contamination on the property, this letter is being sent as a reminder of the conditions placed on the property as part of the 2009 Record of Decision granted by the Alaska Department of Environmental Conservation (ADEC). At the time of closure, soil and groundwater contamination was documented as remaining on the property. The contamination is from petroleum impacted soils encountered during the excavation of a regulated 2,000-gallon underground storage tank (Tank 5) in 1992.

The 2009 determination is subject to the following site-specific conditions and/or controls:

1. Any future change in land use may impact the exposure assumptions cited in the Record of Decision document. If land use and/or ownership changes, current institutional controls may not be protective and ADEC may require additional remediation and/or institutional controls. Therefore, ARRC will report to ADEC every five years to document land use, or as soon as ARRC becomes aware of any change in land ownership and/or use. The report can be sent to the local ADEC office or electronically at DEC.ICUnit@alaska.gov.
2. Any proposal to transport soil or groundwater off site requires ADEC approval in accordance with 18 AAC 75.325(i). A "site" [as defined by 18 AAC 75.990 (115)] means an area that is

contaminated, including areas contaminated by the migration of hazardous substances from a source area, regardless of property ownership.

3. Movement or use of potentially contaminated soil in a manner that results in a violation of 18 AAC 70 water quality standards is unlawful.
4. The soil contamination located under the asphalt at the Tank 5 location is currently inaccessible. When the soil becomes accessible, the soil must be evaluated and contamination addressed in accordance with an ADEC approved work plan.
5. Groundwater wells may not be installed on site without ADEC approval.

In addition to the conditions above, you are required to notify the ADEC if there are any changes in land use or ownership. Failure to maintain these requirements may result in re-opening the site by the Contaminated Sites Program, in which case, further remediation could be mandatory.

In accordance with 18 AAC 75.380(d)(2), ADEC may require additional site assessment, monitoring, remediation, and/or necessary actions at this facility should new information become available that indicates contamination at this site may pose a threat to human health or the environment.

If you seek to have the institutional controls removed from this site, you can choose at any time to voluntarily conduct additional assessment, monitoring or further cleanup to demonstrate that contamination at the site now meets the applicable cleanup levels under 18 AAC 75.

This site information is a matter of public record and is available at ADEC's online database record at: http://dec.alaska.gov/Applications/SPAR/CCReports/Site_Report.aspx?Hazard_ID=25411

If you have any questions regarding this site, please contact me at (907) 465-5229 or evonne.reese@alaska.gov and I will be glad to assist you.

Sincerely,

Kristin K. Brown

for Evonne Reese
Environmental Program Specialist
Institutional Control Unit

Encl: 2009 Record of Decision

STATE OF ALASKA
RECORD OF DECISION: ARRC SEWARD RAIL YARD CLEANUP COMPLETE DETERMINATION – INSTITUTIONAL CONTROLS
APRIL 17, 2009

STATE OF ALASKA

SARAH PALIN, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

555 Cordova Street
Anchorage, AK 99501
PHONE: (907) 269-8685
FAX: (907) 269-7649
www.dec.state.ak.us

File: 2332.38.002
Return Receipt Requested
Article No: 70073020000019488933

April 17, 2009

Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

Re: Record of Decision: ARRC Seward Rail Yard
Cleanup Complete Determination- Institutional Controls

Dear Ms. Schrader:

The Alaska Department of Environmental Conservation (ADEC), Contaminated Sites Program, has completed a review of the environmental records associated with the ARRC Seward Rail Yard. Based on the information provided to date, the ADEC has determined that the contaminant concentrations remaining on site do not pose an unacceptable risk to human health or the environment, and no further remedial action will be required as long as the site is in compliance with established institutional controls.

This decision is based on the administrative record for the ARRC Seward Rail Yard, which is located in the offices of the ADEC in Anchorage, Alaska. This letter summarizes the decision process used to determine the environmental status of this site and provides a summary of the regulatory issues considered in the Cleanup Complete with Institutional Controls Determination.

Introduction

Site Name and Location:
ARRC Seward Rail Yard
Seward, Alaska 99664

Name and Mailing Address of Contact Party:
Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

Database Record Key and File Number:
ADEC Reckey: 1992230132504
File: 2332.38.002
Hazard ID: 1529

STATE OF ALASKA
RECORD OF DECISION: ARRC SEWARD RAIL YARD TANK 5, CORRECTIVE ACTION
COMPLETE DETERMINATION – INSTITUTIONAL CONTROLS
MAY 4, 2009

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

SARAH PALIN, GOVERNOR

555 Cordova Street
Anchorage, AK 99501
PHONE: (907) 269-8685
FAX: (907) 269-7649
www.dec.state.ak.us

File: 2332.26.023
Certified Return Receipt
Article No: 7007 3020 0000 1948 7714

May 4, 2009

Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

Re: Record of Decision: ARRC Seward Rail Yard Tank 5
Corrective Action Complete Determination- Institutional Controls

Dear Ms. Schrader:

The Alaska Department of Environmental Conservation (ADEC), Contaminated Sites Program, has completed review of the environmental records associated with the ARRC Seward Rail Yard Tank 5. Based on the information provided to date, the ADEC has determined that the contaminant concentrations remaining on site do not pose an unacceptable risk to human health or the environment, and no further remedial action will be required as long as the site is in compliance with established institutional controls.

This decision is based on the administrative record for the ARRC Seward Rail Yard Tank 5, which is located in the offices of the ADEC in Anchorage, Alaska. This letter summarizes the decision process used to determine the environmental status of this site and provides a summary of the regulatory issues considered in the Corrective Action Complete with Institutional Controls Determination.

Introduction

Site Name and Location:
ARRC Seward Rail Yard Tank 5
Seward, Alaska 99664

Name and Mailing Address of Contact Party:
Susan Schrader
Alaska Railroad Corporation
P.O. Box 107500
Anchorage, Alaska 99510-7500

ADEC Site Identifiers:
File #: 2332.26.023
Hazard ID: 25411

Regulatory authority under which the site is being cleaned up:
18 AAC 75 & 18 AAC 78

Background
Petroleum impacted soils were encountered in 1992 during the excavation of Tank 5 (T5) which was a regulated 2,000-gallon underground storage tank (UST) that stored gasoline. T5 was located north of the former old dock building in the Alaska Railroad Corporation (ARRC) rail yard in Seward. The Seward rail yard has been operating since 1903. Historical activities include the following: the building of the railroad, port activities, and rail transportation of people and cargo.

Contaminants of Concern
During the investigation at this site, soil samples were analyzed for diesel range organics (DRO), gasoline range organics (GRO), and volatile organic compounds (VOCs) including benzene, toluene, ethylbenzene, and xylene (BTEX). Based on these analyses and knowledge of the source area, the following Contaminant of Concern was identified:

- Benzene

Cleanup Levels
The default soil cleanup levels for this site are established in 18 AAC 75.341, Method Two, Tables B1 and B2, under 40 inch Zone, Migration to Groundwater.

Contaminant	Site Cleanup Level (mg/kg)
Benzene	0.025

Site Characterization and Cleanup Actions
Approximately 45 cubic yards of soil were removed during the excavation of tank T5 in 1992 and later transported to Anchorage for thermal remediation. The excavation measured 17.5 feet by 12.5 feet by 9.0 feet in depth. Confirmation samples collected at the base of the excavation contained benzene up to 0.17 mg/kg. Clean fill was used to backfill the excavation. No groundwater was encountered.

Pathway Evaluation
The exposure pathways for human health that were evaluated include the following: Outdoor Inhalation of vapors; direct contact with soil; ingestion of groundwater and migration to groundwater pathways. The inhalation pathway may be complete, but the remaining contaminant concentrations do not exceed Outdoor Inhalation health-based soil cleanup levels for benzene established in the Method Two, Table B1. Contaminated soil remains on site, but is located in the subsurface, making the direct contact exposure pathway incomplete.

The ingestion of groundwater pathway may be complete, but drinking water is supplied by the City of Seward and no drinking water wells exist in the vicinity of the site. Furthermore, any potentially remaining contamination in the subsurface soil is de minimis in nature and is unlikely to migrate to the groundwater in the future.

The exposure pathway analysis above was supported by the most recent ADEC Exposure Tracking Model (ETM) ranking. The ETM results showed all pathways to be De Minimus Exposure or Pathway Incomplete.

ADEC Decision

There is contamination remaining above established cleanup levels at the ARRC Seward Rail Yard Tank 5, but ADEC has determined there is no unacceptable risk to human health or the environment, and this site will be granted a Corrective Action Complete- Institutional Controls Determination subject to the following:

1. Any future change in land use may impact the exposure assumptions cited in this document. If land use and/or ownership changes, current institutional controls may not be protective and ADEC may require additional remediation and/or institutional controls. Therefore, ARRC will report to ADEC every five years to document land use, or as soon as ARRC becomes aware of any change in land ownership and/or use. **The report can be sent to the local ADEC office or electronically to DEC.ICUnit@alaska.gov**

2. A Notice of Residual Contamination will be recorded on the ADEC database to document that there is residual contamination remaining on site above the most stringent ADEC cleanup levels.

3. Any proposal to transport soil or groundwater off site requires ADEC approval in accordance with 18 AAC 75.325(i). A "site" [as defined by 18 AAC 75.990 (115)] means an area that is contaminated, including areas contaminated by the migration of hazardous substances from a source area, regardless of property ownership. (See attached site figure.)

4. Movement or use of potentially contaminated soil in a manner that results in a violation of 18 AAC 70 water quality standards is unlawful.

5. The soil contamination located under the asphalt at the T5 location is currently inaccessible (see attachment B). When the soil becomes accessible, the soil must be evaluated and contamination addressed in accordance with an ADEC approved work plan.

6. Groundwater wells may not be installed on site without ADEC approval.

This determination is in accordance with 18 AAC 78.276 (f) and does not preclude ADEC from requiring additional assessment and/or cleanup action if future information indicates that this site may pose an unacceptable risk to human health or the environment.

Appeal

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 -18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 15 days after receiving the department's decision reviewable under this section. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 30 days after the date of issuance of this letter, or within 30 days after the department issues a final decision under 18 AAC 15.185. If a hearing is not requested within 30 days, the right to appeal is waived.

If you have questions about this closure decision, please contact the ADEC Project Manager, Grant Lidren at (907) 269-8685.

Approved By,

Linda Nuechterlein
Environmental Manager

Recommended By,

Grant Lidren
Environmental Specialist

Attachment A: Cleanup Complete-ICs Agreement Signature Page
Attachment B: Site Figure

*Attachment A: Cleanup Complete-ICs Agreement and Signature Page**

Alaska Railroad Corporation agrees to the terms of this Corrective Action Complete with Institutional Controls determination as stated in this Record of Decision (ROD) document dated **May 4, 2009** for the ARRC Seward Rail Yard Tank 5, Hazard ID: 25411. Failure to comply with the terms of this agreement may result in ADEC reopening this site and requiring further remedial action in accordance with 18 AAC 78.276(f).

Env. Engr 5/5/09

Signature of Authorized Representative, Title
Alaska Railroad Corporation

Susan M. Schrader Env. Engr.

Printed Name of Authorized Representative, Title
Alaska Railroad Corporation

RECEIVED
MAY 0 8 2009
DEPT. OF ENVIRONMENTAL CONSERVATION

Note to Responsible Person (RP):
After making a copy for your records, please return a signed copy of this form to the ADEC project manager, Grant Lidren at the address on this correspondence within 30 days of receipt of this letter.

Attachment B: Site Figure

Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

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Golder Associates

Engineering Earth's Development, Preserving Earth's Integrity