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Reuse & Redevelopment Initiative

Brownfield Assessment

Preliminary Assessment and Cleanup Planning

ADOT&PF Glenn Highway Maintenance Station & ADF&G Glennallen Facility

Mile Post 185, Glennallen, Alaska

Submitted to:
Department of Environmental Conservation
Reuse and Redevelopment Program

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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LIST OF APPENDICES

PRELIMINARY ASSESSMENT AND CLEANUP PLANNING
ADOT&PF GLENN HIGHWAY MAINTENANCE STATION AND
ADF&G GLENNALLEN FACILITY, MILE POST 185
GLENNALLEN, ALASKA

1.0 INTRODUCTION

This report presents the results of Shannon & Wilson, Inc.'s (Shannon & Wilson) preliminary assessment and cleanup planning (PACP) activities conducted at the former Alaska Department of Transportation and Public Facilities (ADOT&PF) Glenn Highway Maintenance Station and the existing Alaska Department of Fish & Game (ADF&G) facility located on either side of the Glenn Highway near Mile Post 185 in Glennallen, Alaska (the Property).

1.1 Purpose and Objectives

The purpose of the project was to identify potential environmental concerns that could pose a threat to human health or the environment and limit the beneficial reuse of the Property. Project objectives included documenting potential and observed environmental concerns, developing recommendations for remedial action, and preparing a rough cost estimate for the recommended remedial actions.

1.2 Scope of Services

The work conducted for this project consisted of preparing a work plan, visually evaluating the Property for environmental concerns, collecting a limited number of soil and water samples, developing a conceptual site model, and preparing this PACP document. The work was performed for the Alaska Department of Environmental Conservation (DEC) Division of Spill Prevention and Response (SPAR) under Term Contract 18-9028-14. Authorization to proceed with the PACP efforts was provided by the DEC in the form of Notice to Proceed (NTP) 18-9028-14-101, dated July 22, 2009.

2.0 COMMUNITY OVERVIEW

2.1 Community General Information

Glennallen, Alaska, is an unincorporated community that serves as the administrative and commercial core of the Copper River region. The town is in an unorganized borough, and has no zoning or taxing authority. The town site was originally a camp near the Richardson Highway that was a base of operations for the construction of the Glenn Highway in the early 1940s. The importance of the town to travelers on the highways was further enhanced after the construction of the Tok Cut-Off Highway, 15 miles north of Glennallen, in the 1960s. In the 1970s, Glennallen was an important base for construction of the Trans-Alaska Pipeline, which passes through Glennallen. The 2008 population of Glennallen was estimated by the State of Alaska to be 454.

2.1.1 Location, Climate, Geological Setting

Glennallen is located on the Glenn Highway between about 0.5 and 2 miles west of the junction with the Richardson Highway and about 180 road miles east of Anchorage. The town is located in Sections 23 through 26, Township 4 North, Range 2 West, Copper River Meridian, Alaska. The project site is located at the west end of the town at 62.1094 degrees north latitude and 145.5520 degrees west longitude. Figure 1 provides an overview of the location of Glennallen and the Property.

The climate in Glennallen is classified as continental and is characterized by long, cold winters, moderate summer temperatures, and low precipitation. The average January temperature is -7 Fahrenheit (°F) and the average July temperature is 56 °F. Glennallen receives 9 inches of total precipitation yearly, including 39 inches of snow.

Glennallen is located about 5 miles northwest of the confluence of the Tazlina and Copper Rivers in the Copper River Lowland. The Copper River Lowland is bordered by the volcanic Wrangell Mountains to the east, the Alaska Range to the north, the Talkeetna Mountains from the north to the west, and the Chugach Mountains to the south. Based on information from the Bureau of Land Management (BLM) Lake Atna Research Project (2008), much of the lowland was covered by glacial sheets flowing from the surrounding mountain ranges during the height of the last ice age. As the ice age ended, the glaciers retreated. The ancient Lake Atna formed in the lowland during the glacial retreat because the Copper River's cut through the Chugach Mountains remained dammed by glaciers until about 10,000 years ago. According to the Best Interest Finding, Copper River Basin (Alaska Division of Oil and Gas 2000), the surficial deposits underlying the Glennallen area generally consists of glacial, lacustrine, and alluvial sediments, with occasional exposures of older continental deposits.

2.1.2 Community Infrastructure and Resources

Glennallen is the Copper River Valley base for the ADF&G, BLM, National Park Service, and the Alaska State Troopers. Many local businesses serve highway traffic with fuel, recreational vehicle parks, food, and other services.

Based on information in the State of Alaska Community and Regional Affairs database, homes and buildings in Glennallen have either private wells or are served by a private water truck business. About 52 homes and businesses in the downtown area have piped sewer service, operated by the Glennallen Improvement Corporation. The remaining dwellings use septic systems. Copper Valley Electric serves Glennallen with electricity purchased from the Solomon Gulch hydropower plant and diesel backup. Copper Basin Sanitation provides refuse collection service and operates the town's Class II landfill.

Glennallen is served by one elementary school and one high school. Prince William Sound Community College and the Alaska Bible College are also located in or near Glennallen. One local medical clinic provides health care services, including emergency care and helicopter air ambulance. The Copper Basin District, Inc. operates the 2,070 foot long turf airstrip at Brenwick's Airport north of Glennallen.

2.2 Community Involvement

2.2.1 Stakeholder Meeting Summary

A telephonic meeting was held on August 5, 2009, with DEC representatives John Carnahan and Deborah Williams; DNR representatives Jennifer Murrell and Robin Swinford; ADF&G representative Mark Somerville; and Shannon & Wilson representatives Matt Hemry and Randy Hessong. John Carnahan facilitated the meeting. Topics discussed included the regulatory perspective in context of the Re-use and Redevelopment (R&R) program, an overview of the 2009 project scope, R&R objectives for the site, on-site water wells and underground injection control wells, previous investigations and USTs at the ADF&G facility, community resources, and project schedule. The teleconference minutes are included in Appendix B.

2.2.2 Community Concerns, Proposed Reuse, and Funding

The former ADOT&PF facility is presently regulated as a Contaminated Site due to the presence of petroleum hydrocarbon concentrations greater than state cleanup standards. The DEC is taking a holistic approach to the site characterization and cleanup, instead of an issue-specific approach. The DEC wishes to address the entire State properties on which the former ADOT&PF buildings, the ADF&G facility, and other structures are located.

The DNR and ADF&G concurred that questionable structural integrity and the presence of hazardous building materials are the primary concerns of the current users of the former

ADOT&PF facility. The current users include the Glennallen Volunteer Fire Department (GVFD), the Copper River School District (CRSD), and the ADF&G. The DEC clarified that State Capitol Improvement Project (CIP) funds cannot be used for hazardous building material mitigation or solid waste management.

While no specific reuse or redevelopment plans were brought forward, community members expressed interest in developing a community center and/or hospital. The stakeholders felt that the most likely redevelopment scenario entails demolition of some or all on-site structures. Structure demolition or major renovation will likely introduce issues related to asbestos-containing materials (ACM) and lead-based paint.

2.2.3 Personal Interviews

Jennifer Murrell, a natural resource specialist with the DNR Division of Mining, Land, and Water Southcentral Region Land Office, was the property owner's representative for this project. Ms. Murrell participated in the stakeholders meeting and site visit, completed a site assessment questionnaire, and provided land ownership records and historic documents. Based on discussions with Ms. Murrell, the community of Glennallen does not have a strong organization for planning and development, and has not provided much input into potential re-use and redevelopment of the property. The CRSD use of and interest in the property has been declining. The GVFD is a small organization, and fire suppression efforts often receive support from better funded Federal fire crews. Finding resources to relocate or upgrade to fire station could be a challenge.

Mark Somerville has been the area management biologist for sport fisheries with the ADF&G for three years. Mr Somerville participated in the stakeholders meeting and site visit, completed a site assessment questionnaire, and provided the 1964 aerial photograph and combined facilities reconstruction plan. During the site visit, Mr. Somerville provided insight specific to the physical plant and use of the ADF&G facility, and discussed how use of the former warm storage building was no longer desirable due to building decay and the availability of the combined facilities building.

Tim Hand is the CRSD maintenance superintendant and Tim Davey is Mr. Hand's assistant. Mr. Hand and Mr. Davey provided a tour of the former garage, currently used as a bus barn, and provided insight into previous uses of the site by the CRSD.

3.0 SITE OVERVIEW

The project site is part of the former ADOT&PF Glenn Highway Maintenance Station and the existing ADF&G Facility located on either side of the Glenn Highway near Mile Post 185 in Glennallen, Alaska. Based on the US Geological Survey Gulkana A-4 Quadrangle map, the Property is located in the west ½ of the southwest ¼ of Section 23, Township 4 North, Range 3 West, Copper River Meridian, Alaska. The Property for this assessment falls within Alaska State Land Survey (ASLS) 790018, and includes Tracts 2B, 3, 4, 5, and a portion of Tract 6. Physically, the portion of the Property subject to this preliminary assessment is the developed area located north of Moose Creek, east of the old fence line approximated by the west boundary of Tract 2A, south of the State microwave communications tower and west of the Alaska Communications Systems property.

3.1 Historical Overview

Based on records provided by the DNR, 160 acres that includes the Property were withdrawn and reserved for use by the Alaska Road Commission (ARC) by President Roosevelt on January 21, 1942. Funding to begin construction of the Palmer-Richardson Highway (the current Glenn Highway) was appropriated in 1941, and 160 acres of undeveloped land was specifically reserved for use as a supply base and repair shop for the construction and maintenance of the Glenn Highway. The ARC moved their regional headquarters from Chitina to the new reserve, and some buildings were likely moved from Chitina to the Property. The presence of the ARC on the Property was likely a significant factor in the creation of the town of Glennallen.

3.2 Property Use

3.2.1 Historical Use

According to the *Alaska Road Commission Historical Narrative* (1983) prepared for the ADOT&PF, work began on the construction of the Glenn Highway in 1941 and a passable road was open for traffic in November of 1943. It is not clear if the ARC used the Property before it was formally set aside as a Federal reserve. A 1950 aerial photograph, provided as Figure B-1 in Appendix B, shows that the Property was well developed, with numerous buildings and material storage areas, and that the existing Garage was under construction. By 1950 the Property had become the base of operations for road work in the Copper River Basin. The December 10, 1952 *Glennallen Depot* drawing (Figure B-2) has “State of Alaska Department of Public Works” in the title block, despite the fact that Alaska became a state in 1959. The drawing also notes it was revised on June 15, 1962. Five of the buildings that exist today are shown on the 1952/1962 drawing, however numerous buildings visible along the Glenn Highway in the 1950 aerial photograph do not exist today, and are not shown on the drawing. It is apparent that active construction was occurring on the Property in the 1940s and 1950s. According to the DNR, the ADOT&PF allowed various state and local entities to occupy unused buildings and other portions of the reserve between 1959 and 1971. In 1971, the ADOT&PF moved its highway maintenance facility to the Klutina River site near Copper Center, and some structures were reportedly moved from Glennallen to Copper Center.

In 1960, 1.89 acres south of the Glenn Highway and north of Moose Creek were conveyed from the Federal Department of the Interior to the State of Alaska for use by the Bureau of Sport Fisheries and Wildlife, currently the ADF&G. The ADF&G office building is not mentioned in the land transfer, but a 1982 memorandum from the ADF&G Area Management biologist states that the building was built in 1958 with federal funds. The office building is present in the 1964 aerial photograph provided as Figure B-3. The State Combined Facilities Building and a heated garage were constructed on the Property between 1966 and 1967 south of the Glenn Highway and west of the ADF&G office building. The Combined Facilities building housed a small jail, court house, and clinic, and some reconstruction work was performed in 1968. Figure B-4 is an aerial photograph from 1972 that shows the combined facilities building, and the buildings remaining after the ADOT&PF moved.

3.2.2 Current Use

Currently four buildings are being used on the former ADOT&PF facility north of the Glenn Highway. The GVFD uses the former Service Station for emergency vehicle and equipment storage. The water well and a holding tank in the Boiler House are used to supply water for fire suppression. An open area to the east of the Garage is also available for fire training use by the GVFD. The former ADOT&PF Garage is used by the CRSD. In 1976/1977, the former garage was renovated as a vocational facility for mechanical and welding trades. The renovation included class rooms, restroom and shower facilities, and a new sewage system. Use as an educational facility was likely discontinued in the early 1990's. The CRSD now uses the facility for storage and light school bus maintenance, and the water and sewer systems are not maintained. The former Warm Storage building has been used by the ADF&G for cold storage, but use of the building has declined as the structure degrades. Figure B-5 is an aerial photograph from 2007, and is a good representation of the Property as observed in 2009.

South of the Glenn Highway, the ADF&G facility remains active as a regional center for the agency. One half of the office building is occupied by a clinic. The former Combined Facilities building is currently not occupied or heated, and is used for cold storage by the ADF&G. The heated garage south of the Combined Facilities building is heated and maintained by the ADF&G for light maintenance work. Other outbuildings are also utilized by the ADF&G.

3.3 Ownership Information

It is not clear when the State of Alaska began using and managing the Property, however ownership of the majority of the Property was officially transferred to the State on June 30, 1959 with a quitclaim deed under the Alaska Omnibus Act. Approximately 158 acres were transferred to the State, and became known as Other State Land (OSL) 131. The 1.89 acres of land south of the highway were apparently set aside sometime between 1942 and 1959 for the Department of Interior Fish and Wildlife Service. The 1.89 acres were conveyed to the State of Alaska on June 23, 1960, and the parcel is recorded as OSL 30. The Property is managed by the State of Alaska Department of Natural Resources (DNR). DNR started adjudicating authorizations for the Property in 1971. The DNR records for OSL 131 show twelve Alaska Division of Land transactions between 1962 and 1999 that include two public utility easements, three inter-agency land management transfers (ILMTs), two special land use permits, two inter-agency land management agreements (ILMAs), two public & charitable leases, and one sublease. Seven of these ADLs appear to fall within the assessment area of the Property, including those allowing use of the Service Station and open area to the east of the Garage by the Glennallen Volunteer Fire Department (GVFD), the use of the Garage by the Copper River School District (CRSD), and the use of the Warm Storage building by the ADF&G.

3.4 Records Review

The records reviewed to summarize property use and ownership history were provided by the DNR, and included:

Executive Order 9035 – summary from John T. Woolley and Gerhard Peters, The American Presidency Project [online]. Santa Barbara, CA: University of California (hosted), Gerhard Peters (data base). Available form World Wide Web: http://www.presidency.ucsb.edu/ws/?pid=60938.

Quitclaim Deed of June 30, 1959. For real properties conveyed to the State of Alaska by the US Department of Congress under the Alaska Omnibus Act (73 Stat. 141).

Deed, United States of America to State of Alaska, June 23, 1960. Conveys 1.89 acres, designated OSL 30 by Alaska, from the United States Department of Interior to the State of Alaska.

Naske, Claus-M., Alaska Road Commission Historical Narrative, June 1983. Prepared for ADOT&PF Division of Planning and Programming, Fairbanks, Alaska.

DNR Status Plat, 11/16/2006.

DNR, 2009, DEC brownfield assessment/cleanup request form, State of Alaska agency questionnaire for FY09-FY10 Questionnaire prepared by DNR Southcentral Region Land Office, Anchorage, Alaska, to Alaska Department of Environmental Conservation, Fairbanks, Alaska, 6 p.

4.0 FIELD ACTIVITIES

4.1 Overview

A site visit was conducted on September 22, and 23, 2009, by Shannon & Wilson field representative Randy Hessong. DNR natural resource specialist Jennifer Murrell accompanied Shannon & Wilson's representative during the site visit. The first day of the site visit was focused on meeting site representatives and visually examining the Property. The second day of the site visit focused on soil screening and soil and water sampling.

4.2 Field Observations

The site inspection was focused on observing materials and evidence of previous material handling that could potential release contaminants to the environment, and on evidence that contaminants had been released to the environment.

4.2.1 Former ADOT&PF Area

The study area north of the Glenn Highway shows evidence of multiple and changing uses, with declining use and maintenance over time. Little evidence remains of the pre-1950 construction camp shown lying close to the Glenn Highway alignment in the 1950 aerial photograph (Figure B-1). The 1952/1962 drawing (Figure B-2) suggests that the facility during that time period, including apartment buildings located to the west of the study area, were heated with steam from a central boiler house. Water apparently came from a well located in the boiler house, and sewage was collected from the structures through a piping system leading to a settling tank south of the Glenn Highway. The drawing suggests that fuel for the boiler house was stored to the west-northwest of the boiler house. The drawing also suggests that asphalt was stored in three 10,000 gallon tanks located at the east edge of the Property, and that the tanks were heated with steam from the boiler house. These asphalt tanks may be visible in the 1964 aerial photograph of Figure B-3. Electrical power lines and transformers are also shown in the drawing. It is not clear, but some of the electrical items shown on the old drawing suggest that electrical power was originally supplied from the boiler house, and the facility was later connected to a local electrical grid.

In the field, evidence of the fuel storage area remained in the form of concrete saddles located on either side of a dirt access road on the hill rising to the north of the main buildings. The concrete saddles, thought to form cradles for aboveground storage tanks (ASTs), are shown in Photos 1 and 2 of Figure A-1 in Appendix A, and on Figure 2. A steel pipe sticking out of the hill between the lower AST cradle and the boiler house may have been a fuel line. Two concrete vaults with manholes were opened and found to provide access to valves for the steam and water piping. A partially buried vault was not opened. The steam piping and, potentially, electrical conduit appear to remain in the ground in the central area of the site as seen in Photos 3 and 4. The boiler house, warm storage building, service station, garage, powder house and steel storage rack structures remain standing. The potential lumber shed, carpenter shop, ‘P&OL Whse.’, various other small warehouses, public water house, and the horizontal-cribbed asphalt tanks labeled on the 1952/1962 drawing were not observed during our site visit.

4.2.1.1 Boiler House

The boilers have been removed from the boiler house, but piping remains overhead and in below-grade vaults, as shown in Photo 5. The original fuel system for the boilers was not apparent. To keep the water supply area warm for use by the GVFD, an oil-fired forced-air furnace, shown in Photo 6, and an underground storage tank (UST) were retrofitted to the boiler house at some point in the past. The water well and adjacent tank rooms have been sealed off from the rest of the boiler house and asbestos abatement activities have occurred in the sealed-off sections (see Photo 7). The UST was removed by Shannon & Wilson in 2008 and the furnace was not in service at the time of our visit. Floor drains and a restroom in the boiler house suggest that the building was connected to the central sewer system. Disconnected older electrical lines and newer lines were visible on the outside of the boiler house. Electrical transformers 1931 and 1932 mounted on pole G186-7R2-L2 appeared to be of modern design. Transformers are shown in Photo 8. A former UST, reportedly removed from another CRSD property, was being stored on the ground at the northeast corner of the boiler house.

4.2.1.2 Warm Storage

The Warm Storage building appeared vacated, but contained a few items left in storage by the ADF&G, including a roughly 1/3 full, 55-gallon drum of antifreeze. Ceiling panels and insulation were degrading and falling on the floor, and the slab-on grade concrete floor was slanted and cracked in places. Forced-air heaters, visible in Photo 9, were located high on the walls inside the warm storage building, and were likely plumbed to the old central steam system. Plumbing for restroom facilities or sinks was not observed. Two floor drains were observed in the warm storage building. The debris in one floor drain sump, shown in Photo 10, consisted largely of soil, leaves and fiberglass insulation, and was pulled back to reveal an outlet pipe and a concrete bottom. The debris had a slightly oily texture and odor, and a headspace screening sample was collected from the debris.

4.2.1.3 Service Station

The service station appeared to be maintained by the GVFD, and was in good condition relative to the boiler and warm storage buildings. In 2008, two USTs and associated piping were removed from the ground near the northwest corner of the building by Shannon & Wilson. The original steam heating system was disconnected as shown in Photo 11, and the original restroom had been removed. Floor drains (Photo 12) and sewer piping suggest that the building had been connected to the central sewer system. Water storage tanks mounted high in the building and a pump system to fill them had been added to the structure for fire-fighting purposes. The building had been retrofitted with two oil-fired forced-air furnaces for heat. Fuel supply for the furnaces consisted of two approximately 500-gallon ASTs located outside the building. No staining was observed beneath the southern AST, which was sitting on a concrete slab as shown in Photo 13. The AST located on the east side of the building showed evidence of fuel weeping from a valve fitting, as seen in Photo 14. Field screening Sample HS05was collected from soil beneath the fuel fitting. Disconnected copper piping was present against the east wall of the building to the west of the existing AST. Three emergency vehicles, along with 5-gallon containers of fire-fighting foam, pump lubricant, and oil and gas dispersant were stored in the former service station. Fire-fighting equipment and clothing was stored in a loft, and some incidental paint and vehicle maintenance chemicals were stored in a work room.

4.2.1.4 Garage

Tim Hand and Tim Davey provided a tour of the former garage, commonly known as the Bus Barn by the CRSD. The slab-on grade concrete floor had a significant slope that is likely caused by differential thawing and settlement. The main garage bay had been divided with an insulated wall, and the smaller northern portion of the bay was being used for cold storage. An oil-fired forced-air furnace was observed connected to an approximately 500-gallon fuel tank along the west wall inside the southern main bay (see Photo 15). At the time of our visit, one active school bus and a small tractor were parked in the garage. A hydraulic vehicle lift, of the type with a sub-surface oil reservoir, was present in the main bay. Tools, lubricants, chemicals, and used oil typical of vehicle repair facilities were present in the main bay, as shown in Photo 16. Storage of a wide variety of school-related items, from paper records and school furniture to sporting goods and food service equipment, was observed throughout the building. Used engines and transmissions were stored in the northern portion of the building. Untidy storage, and stains on the floor suggest that oil, fuel, and other automotive chemicals may have been released to the floor. Photo 16 shows one of several floor drains observed in the structure. Electrical transformers numbered 1940, 1941, and 1942, visible in Photo 8, were mounted on pole G186-7R2-L3 and appeared to be of modern design.

Blue-print plans for the renovation of the garage into a vocational shop, dated 1976, were found in the garage. The plans showed a 45 by 12-foot fuel oil tank that was to be relocated from the northwest corner of the building to the east side. Evidence of a 45 by 12-foot fuel oil tank was not observed, but a smaller AST (approximately 5 by 15 feet) was observed within a soil berm to the east of the garage, as shown in Photo 17. The existing AST contained approximately 1.5 inches of fuel, as measured from the fill port. The fuel lines at the oil-fired recirculating hot water furnace were disconnected. The plans also show that the water supply for the building would be from the well in the boiler house. The plans included a new sewer system with a sewage treatment unit to be installed inside the building and a leach field to be constructed outside the building. The sewer treatment room had been converted to the storage of paper records, but some evidence of the piping remains. Restroom facilities were present, but out-of-service. A raised area to the southeast of the building was likely a leach field with multiple buried pipes based on the response of witching rods crossing the area. Based on the plans and the patched cuts in the old concrete, it did not appear that all the floor drains were connected to the new sewer system.

According to Mr. Hand, a modular administrative office building was present on the location of the apparent leach field until the early 1990s. An utility riser was present at that location. A temporary housing unit was reportedly located east of the southeast corner of the garage near the current location of a storage shed. Two 4-inch ABS pipes (see Photo 18) suggest that a septic system for the temporary housing had been installed.

4.2.1.5 Powder house

The powder house, located in the northeast corner of the study area still exists next to the State microwave communications site, as shown in Photo 19. The sheet-metal covered wooden structure was apparently used as part of the communications site, based on the large cables hanging from the north side and the air conditioning unit on the east side. Soil staining was not observed around the powder house. The communication site was not considered part of the study area.

4.2.1.6 Eastern Portion of ADOT&PF Area

The relatively flat area to the east of the garage and north of the Glenn Highway has a variety of debris, and containers, and shows evidence of past activities. The largest structures include a mobile home, a mobile electric power unit, a steel storage rack, and two ASTs containing petroleum. Fuel, water, or electrical connections to the mobile home were not found. Degrading wallboard stored outside the north end of the mobile home has the potential to contain asbestos (see Photo 20). The mobile electric power unit shown in Photo 21 was not connected to anything, appeared to have a self-contained fuel supply, and evidence of leakage was not observed. The rectangular AST located roughly 200 feet east-northeast of the garage building is approximately 10 feet square, and 6 feet high. A weathered oil stain, visible in Photo 22, was present around a port near the bottom northwest corner of the AST. A 4-inch diameter riser on top of the AST was open to the atmosphere, and was used as access to measure just over 3 feet of fluid in the tank (approximately 2,240 gal.). The fluid had an odor thought to be weathered gasoline, but the open riser suggests that a portion of the fluid was water. The vertically oriented cylindrical AST located near the eastern extent of the Property is approximately 8 feet tall and 8 feet in diameter (approximately 3,000 gallon). The tank, shown in Photo 23, was nearly full of black, viscous asphaltic material. The fact that the material would still flow at around 50°F suggests that asphalt had been thinned with a solvent.

Steel 55-gallon drums were observed at a number of locations, primarily in the eastern portion of the ADOT& PF area. Three drums were observed to contain fluid and have adjacent soil staining. A drum labeled “wheel…grease”, located on the south side of the steel storage rack, had a crease in the side and an oily stain in the soil below, as shown in Photo 24. An orange drum, visible in Photo 25 at the northeast corner of the rectangular AST, had an oily coating on the outside suggesting leakage, felt full, and a fuel odor was noted. A green drum, shown lying horizontally approximately 150 feet east-southeast of the rectangular AST in Photo 26, showed signs of slight leakage, and felt roughly 1/3 full.

Two partially full drums present on the north side of the Garage are shown in Photo 27. Three drums were lying horizontally near the rectangular AST (see Photo 26) felt empty, and the soil beneath the drums had an oily stain. One empty drum was present south of the rectangular

AST and west of the mobile home. To the northwest, a rusted, empty drum was present at the lower AST saddles, and two empty, rusted drums were observed between the AST saddles and the powderhouse.

4.2.1.7 Soil Stains

As noted above, oily stains were observed in soil beneath 55-gallon drums at three locations. Two small oil stains were observed south of the mobile home, one of which is visible in Photo 28. Broken automobile parts, marks on the ground, and altered vegetation growth suggest that vehicles had been parked at these stain locations. An irregularly shaped area roughly 12 feet by 5 feet (see Photo 29) had a thick layer of black asphaltic material at the surface, and an odor similar to used motor oil. On closer inspection, evidence of this material was found beneath leaves, soil, and vegetation extending west at least 30 feet from the visible 'pond' toward the burn area. A large area of soil that appeared to be impacted with asphalt was observed at the east end of the Property. This asphalt coated soil was located in the vicinity where asphalt tanks are shown on the 1952/1962 drawing (Figure B-2) and the existing vertically-oriented asphalt tank. The asphaltic material has settled into the soil and leaves, and moss and scattered vegetation cover the area, making the extent not immediately obvious, as shown in Photo 30. While measurements were not made in the field, the asphalt–impacted area was estimated to be approximately 95 feet by 60 feet, or over 5,000 square feet.

4.2.1.8 Other Areas of Potential Concern

The area east of the rectangular AST appears to have been used to burn about three mobile homes, potentially as practice for the GVFD. The ash and metal debris remaining can be seen in Photo 31. A second, smaller burn area with charred wood remains is present to the southeast of the garage. An old automobile is partially buried at the eastern edge of the Property north of the asphalt AST. The drive train appeared to have been removed, and soil staining was not observed adjacent to the car. A trench has been dug along the western edge of the rectangular AST. The trench leads into a basin created by pushing up a berm of soil. The area is largely overgrown, and it was not apparent what the basin was intended to capture (see Photo 32). Other miscellaneous debris in the eastern area of the Property include a roughly 1,000 gallon tank and steel rack, remnants of a large boiler, and a small motorized street sweeper. The type of fittings on the empty 1,000 gallon tank, and the lack of odor in the tank suggest that it was used for water. The boiler was likely from the boiler house, and had been stripped down to the main mass of steel. The street sweeper still had small amount of fuel remaining in the tank. A water well was observed to the west of the Property, near the location of the elementary school shown on the 1952/1962 drawing (Figure B-2), and was presumed to serve the Copper Valley Library.

4.2.2 ADF&G Facility

On the south side of the Glenn Highway, the site visit focused on the developed area being utilized by the ADF&G, as shown in Figure 3. Mark Somerville, ADF&G Area Management Biologist for Sport Fisheries, provided a tour of the facility.

4.2.2.1 ADF&G Office

Based on 1981 plans for a major renovation of the current office building, the wood-framed structure was built in 1958 as a residential duplex. The western half of the building houses the ADF&G offices and the eastern half is currently being used as a clinic. The building is supported by posts on a compacted gravel pad. The exterior siding of the building appears to be asbestos shingles. The structure is heated with heating oil supplied from an UST located on the south side of the building. The UST capacity was recorded as 1,000 gallons on an old drawing. The structure and UST piping are shown in Photo 33. Water is supplied from a holding tank housed in an electrically-heated shed located at the southwest corner of the building. A vendor delivers water to the holding tank. The water tank shed is not present in the 1964 or 1972 aerial photographs (Figures B-3 and B-4), and it is not clear how water was originally supplied to the building. Sewage is handled by a septic tank and leach field located on the south side of the building, east of the UST. The septic tank was replaced approximately 5 years ago, and the leach field was replaced in 2008. The older sewer system was located further south of the building by the fenced storage area.

4.2.2.2 Outbuildings

At the eastern edge of the developed area is a new-looking metal shed designed for storing hazardous materials. Gasoline, diesel, and propane containers were observed in the shed. A modern 500-gallon gasoline AST was located on the west side of the hazardous material storage, as shown in Photo 34. Surface staining was not observed on the gravel pad beneath these recently installed facilities. Travel trailers joined under a pole-supported roof make up the seasonal bunkhouse. The bunkhouse is heated with heating oil, and has electricity, but does not have running water or sewer. A roughly 200 gallon heating oil tank is located near the northwest corner of the bunkhouse (see Photo 35). There appeared to be fuel weeping from near the supply valve of the AST. A fenced area west of the bunkhouse and south of the office building is used to store boats and trailers. An old travel trailer in the fenced area had been used for hazmat storage before the specialty shed was installed. Staining was not visible beneath the trailer. A cold storage building with two 40-foot shipping containers incorporated into the structure is accessed from within the fenced area. The building contained snow machines, 4-wheelers, outboard motors, and a 55-gallon drum of aviation gasoline (avgas) on a pallet. No soil stains were observed on the gravel floor of the cold storage building. Along the north side of the fence, just north of the cold storage building, are three small outbuildings. The largest was an Atco trailer. Empty and partly full avgas drums were stored around the outside of the Atco unit, as shown in Photo 36. A stand, a drum, and disconnected piping suggest that the Atco unit was once heated, but did not have heat, water, or sewer at the time of our site visit. The other two outbuildings were small sheds for fish nets and animal carcasses. The net shed appears to be the structure removed from above the gasoline UST that was decommissioned by Dames & Moore in 1997. Three empty drums were located adjacent to the carcass shed.

4.2.2.3 Former Combined Facilities Building and Garage.

The former Combined Facilities building (see Photo 37) is a wood-framed structure supported by posts on a compacted gravel pad. Water had been supplied from the well shown in Photo 38 and located near the southwest corner of the shop building. A water conditioning system and holding tank are located in the shop building. The heat and water systems were deactivated, and ADF&G uses the structure for cold storage. Small engines and lead acid batteries are among the items stored in the building. The building had been heated by an oil-fired recirculating hot water furnace with fuel supplied from an UST located to the south of the building. The UST fill and vent piping is visible Photo 39. According to blue prints and field observations, the sewer plumbing for the Combined Facilities building was tied into the 1950’s era sewer line from the former ADOT& PF facility, and fed into the 1950’s settling tank located north of Moose Creek. Several restrooms and sinks were observed, as well as a floor drain in the boiler room, inside the building. The electricity was on and freezers were in use by the ADF&G at the time of our site visit.

The shop building is also a wood framed structure supported by posts on a compacted gravel pad. The shop floor is plywood. Heat is maintained in the shop by an oil-fired forced air furnace, as shown in Photo 40. There are not restroom facilities in the shop, but a floor drain, which was disconnected, originally drained to the sewer system. According to Mark Somerville, the water well is used occasionally, but not for drinking water. Typical mechanics tools, lubricants, lead acid batteries, and chemicals were present in the shop, and many of these items can been seen in Photo 40. Outboard motors and used oil containers were also observed in the shop. Outside the shop, a 55-gallon drum located near the southeast corner was reported to contain used oil. An oily stain, visible in Photo 41, was present on soil around the drum. A small soil stain in the center of the entrance ramp to the shop appeared to be from battery acid. No soil staining was observed around the vent and fill risers for the heating oil UST located east of the shop (Photo 39). The UST capacity was noted to be 1,500 gallons on the reconstruction plans.

4.2.2.4 Central Sewer System

Surficial evidence of a central sewer system, such as access manways, was not found on the north side of the Glenn Highway. On the south side of the Glenn Highway, two corrugated metal pipe (CMP) manways were observed, one, which appeared to contain the connection from the combined facilities building, is shown in Photo 42. The sewer line appears to be asbestos-cement pipe in a CMP utilidor. Three CMP manways were present on the top of the sewage settling tank, as shown on the 1952/1962 drawing (Figure B-2), and are visible in Photo 43. The insulation was removed from one of these manways to access the settling tank. The size of the tank was difficult to observe directly, but was estimated to be over 15 feet wide and 40 feet long. A roughly one-foot thick layer of ice was floating between 1 and 2 feet below the top of the tank, and human waste was present on the ice. Surficial evidence of water discharge from the settling tank was not found.

4.3 Site Sampling

Based on field observations, documents, and personal interviews, Shannon & Wilson's field representative selected areas of potential concern for near-surface screening and sampling. The scope of sampling for laboratory analysis was limited. Twenty soil screening samples were collected to assist in selecting six locations for recovering analytical soil samples. Three surface water samples were collected. Sample locations, screening results, and sample descriptions are listed in Table 1. The coordinates of sample locations were measured with a hand-held global positioning unit.

4.3.1 Sampling Methodology

A hand shovel was used to expose soil at depths of 0.3 to 1 feet below ground surface (bgs) at locations selected for soil sampling. New, disposable nitrile gloves were worn by the sampler, and the exposed soil was placed into containers using clean stainless steel spoons. Soil was screened for volatile organic compounds using a Thermo-Environmental OVM 580B photoionization detector (PID). Semi-quantitative headspace screening was performed by placing soil in a one-quart polyethylene bag, warming the soil, shaking the soil, and inserting the PID probe into the bag, following the DEC UST Procedures Manual protocol. Analytical samples were collected by exposing fresh soil with a stainless steel spoon, then filling laboratory-supplied containers. Sample containers for the analysis of volatile constituents were filled first and field extracted with methanol following Alaska Method (AK) 101 procedures. Surface water samples were collected by dipping a laboratory-supplied glass container into the water at the selected sampling location, then filling the provided sample containers from the dipping container, starting with containers for analysis of volatile constituents.

4.3.2 Laboratory Analysis

Analytical soil Samples SS01, SS06, and field duplicate SS11 were collected to evaluate potential fuel releases, and were analyzed for GRO by AK101, DRO by AK102, benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Solid Waste Method (SW) 8021B. Samples SS02 and SS03 were collected from soil with what appeared to be thick asphaltic oil, potentially mixed with unknown materials. Samples SS02 and SS03 were analyzed for DRO; RRO by AK103; volatile organic compounds (VOCs) by SW8260B; Semivolatile organic compounds (SVOCs) by SW8270D; polychlorinated biphenyls (PCBs) by SW8082A; and the eight Resource Conservation and Recovery Act (RCRA) metals arsenic, barium, cadmium, chromium, lead, selenium, and silver by SW6020, and mercury by SW7471B. Samples SS04 and SS05 were collected from locations possibly impacted with used lubricating oil, and were analyzed for GRO, DRO, RRO, VOCs, PCBs, and RCRA metals.

Surface water samples were analyzed for 16 SVOCs by EPA method 625M SIMS to facilitate calculating total aqueous hydrocarbons (TAqH), VOCs by SW8260B to facilitate calculation of total aromatic hydrocarbons (TAH) and assess the presence of solvents, and RCRA metals by SW6020 and SW7470A. Analytical methods are included on Tables 2 and 3, and on the laboratory reports provided in Appendix C.

4.3.3 Discussion of Results

The concentrations of analytes reported in laboratory samples are compared to the most stringent DEC cleanup levels, and in some cases the RCRA Maximum Concentration of Contaminants for the Toxicity Characteristic. Cleanup criteria are discussed in greater depth in Section 5.5. The soil analytical results are summarized in Table 2, and the water analytical results are summarized in Table 3. The most stringent DEC cleanup levels are included in the tables, and laboratory reports are provided in Appendix C.

4.3.3.1 Former ADOT&PF Area

Based on screening Samples HS01 through HS03, near-surface soil Sample SS01 and its field duplicate, designated Sample SS11, were collected from the west end of the lower (southern) AST saddles on the ADOT&PF facility. The 28,800 milligrams per kilogram (mg/kg) DRO concentration detected in Sample SS01 exceeds the 250 mg/kg cleanup standard. The laboratory analyst noted that the AK102 pattern was consistent with a weathered middle distillate. Sample SS02 was collected from the thick, oily surface stain east of the burn area, and contained DRO, RRO, arsenic, and chromium concentrations in excess of the DEC cleanup criteria. The laboratory analyst noted that the AK102/103 pattern was consistent with crude oil. Sample SS03 was collected from asphalt-saturated soil in the eastern portion of the former ADOT&PF facility. Concentrations of DRO, RRO, and 2-methylnaphthalene were above the DEC cleanup criteria in Sample SS03. The laboratory analyst noted that an “unknown hydrocarbon with several peaks is present” for the Sample SS03 AK103 analysis, and that the AK102 pattern was consistent with weathered gasoline. Benzene was not detected in Samples SS01, SS02, SS03, or SS11, but the practical quantitation limits (PQLs) for benzene were elevated above the 0.025 mg/kg cleanup level due to interference from the high hydrocarbon concentrations. Sample SS04 was collected from soil beneath an oily surface stain at the drums by the rectangular AST. Sample SS04 contained DRO, benzene, toluene, arsenic, and chromium in excess of the cleanup levels. The laboratory analyst noted that the AK102 pattern was consistent with a weathered middle distillate.

Based on Table 3 in “Element Concentrations In Surficial Materials Of Alaska,” (USGS Professional Paper 1458, 1988) and our experience, it is likely that the arsenic concentrations measured in Samples SS02, SS04, and SS05 are within the naturally occurring levels found in Alaska soils. The chromium concentrations measured in Samples SS02 and SS04 fall within the background range presented in USGS Professional Paper 1458, but the large deviation from the concentrations measured in Samples SS03 and SS05 suggest that the stains contained used lubricating oil from internal combustion engines.

4.3.3.2 ADF&G Facility

Two soil samples were submitted to the laboratory from the ADF&G facility. Sample SS05 was collected from soil beneath the surface stain around the used oil drum by the shop door. Arsenic was detected at 4.41 mg/kg in Sample SS05, exceeding the 3.7 mg/kg cleanup level, and DRO, RRO, and xylenes were detected, but at concentrations less than the DEC cleanup criteria. Based on visual observations of staining, hydrocarbon concentrations are likely higher at the ground surface. The laboratory analyst noted that the SS05 AK102/103 pattern was unknown, with several peaks present. The DRO concentration of 2,780 mg/kg measured in Sample SS06, collected from beneath the AST for the bunkhouse trailer, exceeds the DEC cleanup level. The laboratory analyst noted that the AK102 pattern was consistent with a weathered middle distillate.

Sample SS02 through SS05 were tested for the presence of halogenated compounds with VOC and PCB analyses to estimate whether the material may be hazardous for disposal purposes. Halogenated compounds were not detected in the four samples. These samples were also tested for the eight RCRA metals. The tests were performed for total metals, rather than by the toxicity leaching procedure (TCLP) which involves diluting the samples by 20 times with water. Dividing the total metal results by 20 provides a conservative estimate of leachable metals. The 195 mg/kg of lead measured in Sample SS02 suggests that the material sampled has the potential to be a hazardous waste under RCRA.

Surface water Sample SW01 was collected from the small pond located southeast of the sewer settling tank and shown in Photo 44. Surface water Samples SW02 and SW03 were collected from Moose Creek. Sample SW02 was collected from a location estimated to be downstream of the sewer settling tank (see Photo 45), and Sample SW03 was collected from a location estimated to be upstream of the tank. VOCs and SVOCs were not detected in the surface water samples. Barium was the only metal detected out of the eight tested. The barium concentrations ranged from 0.0217 to 0.00759 mg/L, well below the 2.0 mg/L criterion.

4.3.4 Quality Assurance Review

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable DEC and EPA data quality objectives (DQO). Internal laboratory quality controls for this project include surrogates, method blanks, laboratory control sample/laboratory control sample duplicates (LSC/LSCD), and matrix spike/matrix spike duplicates (MS/MSD). If a DQO for one of the controls is not met, the laboratory provides a brief explanation in the case narrative of their report. The soil and water results are reported in separate Level II data deliverable packages, following DEC Contaminated Sites requirements. Shannon & Wilson reviewed the SGS data deliverables for soil Work Order 1095269 and water

Work Order 1095270 and completed DEC Laboratory Data Review Checklists for each work order. The laboratory reports and review checklist are included in Appendix C. Non-conformities noted in the data packages include the following:

- The practical quantitation limits (PQLs) of benzene for soil Samples SS01, SS02, SS03, and SS11 were greater than the most stringent DEC cleanup criteria. It is possible that benzene was present in these samples, however the laboratory did not report benzene between the method detection limit and the PQL, and the method detection limits were less than one-half the cleanup criteria.
- Barium was detected in the method blank for soil samples, and the laboratory flagged the project sample results. The project sample results are greater than ten times the concentration measured in the method blank, and the results are considered usable.
- The LCS recoveries for four SVOC analytes were biased high. The SVOC analytes were not detected in the associated project soil samples. The case narrative notes that one 8260B LCS for ethylbenzene in soil is biased high. The data package shows ethylbenzene LCS/LCSD results that meet QC criteria and apply to the five project samples. The results are accepted.
- Soil Sample SS02 was spiked for the SVOC MS/MSD. Spike recoveries for the majority of analytes were zero, and the remaining recoveries were biased high. The MS/MSD results are relied upon primarily to calculate relative percent differences (RPDs) to assess precision, and RPDs cannot be calculated from results of zero. The RPD for the one SVOC detected in project samples met QC requirements.
- Surrogate recoveries for GRO, DRO, PCBs, and SVOCs were outside QC limits for a number of project soil samples due to hydrocarbon interference and/or dilution. Accuracy for the twelve analyses with failed surrogate recoveries were accepted based on LCS recoveries.
- For the soils analyses, internal initial and continuing calibration verification (ICV and CCV) recoveries for five VOC compounds were biased high. CCV recoveries for several SVOC analytes were biased high. These compounds were not detected in the associated samples, and the results are unaffected.
- For the water VOC analyses, LCS, CCV, MS, and MSD recoveries for several analytes were biased high. The VOC samples were reanalyzed outside of holding time to confirm the results. Because the results were confirmed (VOCs were not detected in the project samples), the original results were reported.
- One VOC surrogate recovery for water Sample SW03 was biased high. The associated analytes were not detected in the sample.

External quality controls include field records, two trip blanks, and one field duplicate sample. Field logs and records were checked for completeness and accuracy, and no discrepancies were identified that would impact the reliability of the data. The VOC analytes were not detected above the PQL in the trip blanks. A full set of field duplicates were not collected because the project objectives were not to verify cleanup, and the limited sampling budget could be best used collecting initial data. The field duplicate pair SS01/SS11 were analyzed for DRO, GRO, and BTEX. The DEC recommends a RPD of less than 50 percent for soil analysis, but comparability within a factor of five is acceptable for soil grab samples. The DRO RPD was 9 percent. The GRO and xylenes RPDs for duplicate Samples SS01 and SS11 were 81% and 77%, respectively, and are comparable within a factor of 2.5. Other BTEX constituents were not detected. The laboratory results fell within expected ranges and the data quality appears to be adequate for the purposes of this report.

5.0 ENVIRONMENTAL REVIEW

The DNR, DEC, ADOT&PF, and ADF&G were asked to review their files for previous environmental assessments and/or actions. The documents obtained are reviewed below. Searches of Federal data bases through the World Wide Web were performed. The Property and adjacent properties were not on the EPA’s National Priorities List, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database, or the RCRA handler list. Both the former ADOT&PF area and the ADF&G facility are listed in the DEC’s Contaminated Sites data base. The ADOT&PF area is listed as active due to hydrocarbons measured in soil samples from closure of the USTs as described in Shannon & Wilson’s 2008 report. The ADF&G facility is listed based on the 1997 UST closure assessment by Dames & Moore, and the status is “cleanup complete”.

5.1 Previous Investigations

5.1.1 Dames & Moore, 1997 and DEC, 2005

The Dames & Moore 1997 reports document the removal of one 2,000 gallon gasoline UST from the ADF&G facility south of the Glenn Highway. Approximately 34 cubic yards of soil were segregated as ‘suspected contaminated’ and hauled off site for treatment. Low levels of GRO, benzene, and xylenes were detected in confirmation samples from the final excavation. The 0.3 mg/kg benzene concentrations detected in two excavations samples are less than the 0.5 mg/kg cleanup level applied at the time of excavation, but exceed the current DEC Method 2 migration to groundwater standard of 0.025 mg/kg. One composite sample from the ‘suspected contaminated’ stockpile was analyzed, and 52.5 mg/kg GRO and 9.57 mg/kg xylenes were detected in the sample. Although groundwater was anticipated to be within 15 feet of the ground surface, groundwater was not reported at the 12-13 foot maximum sample depth. Analytical samples were not collected from the soil segregated as ‘suspected clean’, and the soil was used to partially backfill the excavation. An AST in southeast corner of site, near the location of current gasoline AST, is shown on 1997 site plan. In 2005, the DEC reviewed the Dames & Moore 1997 reports, and issued a letter of no further action for the UST site (LUST ID 1310).

5.1.2 WEC, 1997

White Environmental Consultants, Inc. (1997) identified ACM in three samples collected from a structure identified as “a vacant DOT building located behind the Glennallen Volunteer Fire Department”. The work was likely related to the asbestos abatement actions observed in the boiler house. The document reviewed is only a summary, and additional details may be contained in the full report.

5.1.3 Shannon & Wilson, 2008

The Shannon & Wilson 2008 report includes findings from five investigatory soil test pits and closure assessments for one unregulated and two regulated USTs performed in September 2008. Two approximately 10,000-gallon capacity USTs, one gasoline and one diesel, were removed from a single excavation off the northwest corner of the former service station. Associated piping and one remaining fuel dispenser were also removed. One approximately 500-gallon unregulated heating oil UST was removed from just north of the boiler building. Soil samples collected from select test pits, the tank excavations, dispenser island, and soil stockpiles were submitted for laboratory analyses to evaluate the presence and magnitude of contamination at the site. Shannon & Wilson’s 2008 study noted additional areas of potential concern, including numerous 55-gallon drums, several burn and refuse piles, and two ASTs in the northeast portion of the Property.

The five test pits were advanced at potential former fuel storage areas based on aerial photographs and at areas of visible stained soil. Based on field screening, laboratory samples were not collected from Test Pits 1 and 2. Test Pit 3 was excavated at the northwest corner of the boiler building. One project sample and one duplicate sample were submitted for analysis from Test Pit 3, and DRO, GRO, and two VOCs exceeded cleanup criteria in each sample. DRO was detected at less than the cleanup level in the single laboratory samples from Test Pits 4 and 5. The sample from 4 feet bgs in Test Pit 4 had a 150 parts per million (ppm) headspace screening result and a hydrocarbon odor was noted. Groundwater was encountered between 6 and 7 feet bgs in Test Pits 1, 3, and 4, and frozen ground was encountered at depths of 11.5 and 7.2 feet bgs in Test Pits 2 and 5, respectively. Low permeability silty soil was reported at depths greater than 9 feet bgs.

Up to 1,990 mg/kg of GRO and 3,390 mg/kg of DRO were reported in soil samples collected from the southern portion of the service station UST excavation. Ethylbenzene also exceeded the DEC cleanup criterion. These samples were collected from within the apparent groundwater smear zone between 7.5 and 8 feet below ground surface. An oily sheen was noted on the water in the UST excavation. DRO concentrations in the samples from beneath the dispenser island exceeded the cleanup criterion. DRO and BTEX results from the excavated soil were below cleanup criteria and the soil was returned to the service station UST excavation. The excavated soil was not tested for GRO. Two analytical samples from the heating oil UST excavation and one collected from the associated soil stockpile contained DRO concentrations in excess of the cleanup criterion. Considering the higher laboratory results and the higher screening results from 2 to 7 feet bgs in nearby Test Pit 3, the concentrations measured in the heating oil UST excavation maybe related to a former AST thought to be at the northwest corner of the boiler house. The excavated soil was returned to the heating oil UST excavation.

5.2 Identified and Potential Source Areas

Based on previous environmental work and our 2009 field activities, there are areas where laboratory results indicate that soil on the Property has been contaminated, areas where there is potential for contaminants to have been released to the environment, and areas that have the potential to release contaminants to the environment.

5.2.1 Former ADOT&PF Area

Areas of identified soil contamination in the study area north of the Glenn Highway include:

- The lower of the two former AST cradle locations;
- The former service station gasoline and diesel UST excavation;
- The north side of the boiler house from Test Pit 3 to the former heating oil UST;
- The drums at the northeast corner of the rectangular AST;
- The oily surface stain/puddle east of the large burn area and rectangular AST; and
- The area of asphalt coated soil near the southeastern corner of the facility.

Areas where contamination could potentially have been released to the environment include:

- The piping presumed to run between the AST cradles and the boiler house;
- Floor drains in the warm storage, service station, boiler, and garage buildings and the associated drainage systems;

- The area north of the former garage, where a 12 by 45 foot AST may have been, two drums were present, and an area of soil staining was investigated with Test Pit 4 in 2008;
- The fuel piping between the existing 1970's heating oil AST and the former garage;
- Other releases from the former garage that may have entered the subsurface through the floor, hydraulic lift, or leach field;
- Former vehicle storage areas, including two small soil stains observed south of the mobile home;
- Current and historic 55-gallon drum storage areas, including the wheel bearing grease drum and the horizontal drum to the east where staining was observed; and
- Burn areas that may be sources of petroleum hydrocarbons used to ignite the fires, metals from materials burned, and products of incomplete combustion.

Areas where materials were present that could potentially be released to the environment include:

- Two active ASTs at the former service station/GVFD building;
- The rectangular AST;
- The asphalt AST;
- Heating oil, hydraulic lift oil, and other products stored in the former garage/CRSD bus barn;
- Five scattered 55-gallon drums that were observed to contain fluid;
- Five electrical transformers that appeared to be active; and
- Wallboard outside the old mobile home that could potentially contain asbestos which may be released to the atmosphere.

5.2.2 ADF&G Facility

Soil contamination in excess of the DEC cleanup criteria was measured in one location in the study area south of the Glenn Highway:

- Soil beneath the bunkhouse AST.

Areas where contamination could potentially have been released to the environment include:

- Two heating oil USTs currently in service, and potentially over 40 years old;
- The former gasoline UST (placed in the potential category because benzene may remain at concentrations in excess of the current migration to groundwater cleanup criteria, and some of soil returned to the excavation was not characterized);

- Current and former 55-gallon drum storage areas, including the used oil drum where staining was observed, but a sample from 0.8 to 0.9 feet bgs did not exceed cleanup criteria for petroleum hydrocarbons;
- The office building Septic system; and
- The sewer system to which the former combined facilities and shop buildings were connected.

Areas where materials have the potential to release contaminants to the environment include:

- One active gasoline AST;
- Heating oil storage mentioned above in two USTs and one AST;
- Drums of aviation fuel;
- The hazardous materials storage shed;
- Various small engines and small engine-powered vehicles;

Based on field observations, the various drums, small engines, and related automotive chemicals are actively used. Large unreported releases are not likely.

5.3 Data Gaps

5.3.1 ADOT&PF Area

Laboratory results have confirmed the presence of petroleum hydrocarbon contamination at the six locations outlined above on the former ADOT&PF site. At each of these locations, the horizontal and vertical extent of the contamination has not been fully characterized. Based on the presence of groundwater in the bottom of the service station UST excavation, groundwater has likely been impacted in at least one location. The degree and extent of groundwater impacts have not been characterized. Chemical analyses of soil from beneath two burn areas have not been collected. The fate of potential contaminants entering the floor drains of four buildings has not been verified. Several potential source areas, such as likely fuel lines, former AST locations, and a hydraulic lift have not been investigated or characterized. Fluids in abandoned containers have not been characterized for recycling or disposal.

5.3.2 ADF&G Facility

One analytical sample supports the observation that a release has occurred from the bunkhouse heating oil AST. Visual observations suggest that the release was small, but the extent has not been characterized with laboratory data. Near-surface soil screening samples were collected from the fill riser areas of the two active USTs and one vent riser on the ADF&G facility. The screening results did not suggest the presence of petroleum hydrocarbons. Considering the age of the fuel systems, additional subsurface sampling is recommended to investigate potential releases. Evidence of a limited fuel release was found during the 1997 gasoline UST decommissioning, but potential impacts to groundwater were not investigated. Characterization of groundwater potentially impacted from USTs, ASTs, sewer systems, and miscellaneous smaller potential sources has not been performed.

5.4 Conceptual Site Model

A conceptual site model (CSM) was prepared to identify known and potential exposure pathways associated with identified and potential contaminants at the project site. The CSM was developed using the DEC's 2005 Policy Guidance on Developing Conceptual Site Models, and the results are presented in the CSM Graphic and the Scoping Form included in Appendix D. Discussions of the potential exposure pathways for each impacted medium are provided below. The narrative includes descriptions of site-specific considerations that increase or decrease the viability of each pathway at this site.

Soil

Incidental ingestion of impacted soil is a potentially complete exposure pathway for on-site commercial workers and trespassers and for future residents and construction workers. Concentrations of DRO and RRO have been measured in near-surface soil on the former ADOT&PF facility that exceed the DEC ingestion criteria. Dermal absorption of contaminants from soil is also a potentially completed pathway because concentrations of total chromium and lead that are within a factor of 10 of the DEC direct contact criteria have been measured in near-surface soil.

Groundwater

Groundwater ingestion and inhalation of volatiles in tap water are considered potentially complete exposure pathways because soil samples collected within the observed zone of water table fluctuation at the service station UST location contained concentrations of GRO, DRO, and ethylbenzene that exceed the DEC migration to groundwater criteria. Other potential sources of groundwater contamination exist on the Property. While it is unlikely that the shallow groundwater aquifer will be used for drinking water due to seasonal freezing, a groundwater use determination has not been conducted in accordance with 18 AAC 75.350. A connection between the shallow aquifer and deeper aquifers has not been disproven, and water wells are present in the vicinity. The water well located on the ADF&G facility is not currently being used for drinking water, but is used occasionally for other purposes which may contact the workers. Because the groundwater is shallow in places, dermal exposure to groundwater is possible for construction workers.

Air

Inhalation of outdoor and indoor air are considered potentially completed exposure pathways because GRO, benzene, and ethylbenzene have been measured at concentrations that are within a factor of 10 of the DEC outdoor inhalation cleanup levels for soil. The GRO and ethylbenzene concentrations were measured within 100 feet of the slab-on-grade structure used by the GVFD. Future construction could result in the placement of a building on contaminated soil and exposure to construction workers and building occupants. Inhalation of fugitive dust is considered a potentially completed exposure pathway because of concentrations of DRO, RRO, and total chromium in near-surface soils on the former ADOT&PF facility.

Surface Water

Surface water ingestion is considered a potentially complete exposure pathway because near-surface soil samples collected from stained areas contained concentrations that exceed DEC migration to groundwater standards and precipitation runoff could enter water bodies. Also, there is potential for shallow groundwater to discharge to Moose creek, and the sewer settling tank has the potential to impact Moose Creek. Moose Creek is not know to be a domestic water supply, but evidence of recreational use of the waterway was observed. Samples collected from Moose Creek and a pond met water quality standards, suggesting that this pathway was not complete at the time of sampling. Dermal contact with surface water is considered a potentially complete exposure pathway primarily because of the potential for contact with precipitation runoff from stained areas.

Other

Evidence of direct releases of sediment to Moose Creek or the ADF&G pond was not observed. If contaminants are seeping into the surface water bodies from groundwater, contact with contaminated sediment could be an exposure pathway for recreational and subsistence users. Plants observed growing through soil stains with confirmed contamination suggest that biota is a potentially complete exposure pathway. Trespassers could harvest the plants, or wild game could consume the plants, and subsequently be harvested. With the exception of lead, and potentially arsenic, the contaminants detected are not listed as bioaccumulative in the DEC guidance.

5.5 Cleanup Criteria

In Section 4.3.3 above, the results of field sampling were compared to the most stringent DEC cleanup criteria. The concentrations of petroleum hydrocarbons reported in analytical soil samples were compared to the cleanup levels listed in the Oil and Other Hazardous Substances Pollution Control Regulations (18 AAC 75, Section 341) that were revised in October 2008. The soil criteria are based on the most stringent exposure pathway (typically migration to groundwater) listed in Tables B1 and B2 for the "under 40-inch (precipitation) zone". In Section 4.3.3 soil results were also compared to the Maximum Concentration of Contaminants for the Toxicity Characteristic, Table 1 in 40 CFR 261.24 to estimate if the material may be a hazardous waste for disposal under RCRA. During preparation of the conceptual site model, soil analytical results were compared to the direct contact, inhalation, and ingestion cleanup levels in 18 AAC 75 Tables B1 and B2 along with the migration to groundwater standards.

Alternative soil cleanup levels could potentially be calculated and proposed based on site-specific soil properties or a site-specific risk assessment. Alternative cleanup levels may include institutional controls and restrictions to potential land use. Pursuit of alternative cleanup levels would require collection of additional site specific data.

Surface water analytical results were compared to the most stringent criteria in DEC's Water Quality Standards (18 AAC 70.020). The analytical results and most stringent DEC cleanup levels are summarized in Table 2.

The applicable cleanup criteria for groundwater are listed in Table C of the Oil and Other Hazardous Substances Pollution Control Regulations (18 AAC 75.345). Alternative groundwater cleanup levels could potentially be established based on a site-specific risk assessment, or if it can be shown that the shallow ground water is not a source of drinking water, would not reasonably be a potential future source, and the groundwater is not closely connected enough to surface water to cause the surface water to exceed the standards in 18 AAC 70.

5.6 Summary of Findings

Releases of petroleum products have impacted soil at a number of locations across the Property. Laboratory testing indicates that impacted soil concentrations exceed regulated cleanup levels. Based on relatively low concentrations of volatile constituents, the releases are not recent and do not pose an immediate danger to life or health. The extents of areas with confirmed impacts have not been well delineated. Multiple exposure pathways could be completed from the impacted soil. Field observations and historic documents suggest that potential contamination at several locations has not been characterized by laboratory testing. The potential for impacts to shallow groundwater is high, but has not been confirmed. Materials remaining in multiple containers are potential sources of additional contamination.

6.0 RECOMMENDED ACTIONS/OPINION

6.1 General Environmental Actions and Remedial Requirements

The site cleanup rules of 18 AAC 75.325 apply to the site based on concentrations in soil samples collected to date. Under 18 AAC 75.325, a responsible party is required to investigate, contain, and perform cleanup of a release of a hazardous substance. Because there is evidence of a release at the regulated USTs removed from the former service station, a release investigation (18 AAC 78.235) and corrective action (18 AAC 78.240) are required. Initial or emergency spill response actions are not recommended because the confirmed releases to the environment appear to have happened sometime in the past, are not likely to be spreading rapidly, and do not appear to pose an immediate danger to life or health. Removal of potential contaminants that are stored in an uncontrolled manner is the first recommended action in order to avoid additional releases. Funding for testing and removal of stored materials may have to come from a different source than funding for cleanup of releases. Because the extents of confirmed releases are not well delineated, and there are potential source areas that have not been investigated, we are recommending a mix of remedial action (RA), release investigation (RI), and additional site characterization for the Property. Combining remedial actions to eliminate or control exposure pathways with investigation and characterization activities will reduce the costs of mobilizing equipment and personnel to the site.

A number of potential source areas are related to the buildings on the former ADOT&PF facility. If building demolition is selected as part of the R&R plan, RA, RI, and characterization work should be coordinated with the demolition work. Contaminants from both identified and potential sources may extend under the structures, and floor drain plumbing could be traced more easily during removal of floor slabs.

6.2 Remedial Actions by Identified and Potential Source Areas:

The remedial actions presented below include rough estimates of quantities based on limited field observations, field screening, laboratory results, and experience with similar releases.

6.2.1 Former ADOT&PF Area

Recommended actions at areas of identified soil contamination are outlined below.

- The lower of the two former AST cradle locations:
  - Clear vegetation, create an access ramp, and remove concrete saddles.
  - Excavate impacted soil based on field screening and test pits. Silty soil near surface suggests vertical migration may be limited, but natural attenuation may be limited also.
  - If depth appears to exceed 10 feet bgs, remove the top 5 feet of impacted soil up to a volume of 200 cubic yards (CY), and characterize depth and groundwater impacts with three soil borings / monitoring wells.
  - Analyze up to 5 samples for DRO and BTEX.
  - It may be possible to re-grade the hillside rather than importing backfill (one access road may be lost).

- The former gasoline and diesel USTs at the former service station:
  - If building is to be demolished, remove concrete slab and investigate floor drains.
  - Investigate extent of petroleum contamination with test pits, and, potentially, three soil borings if the building is to remain.
  - Remove overburden soil based on field screening and the polyethylene sheet placed in the original UST excavation.
  - Excavate up to 250 CY of impacted soil to the groundwater contact or up to 1 foot into the grey silty soil based on field screening.
  - Blend a chemical oxidant and an oxygen-supplying compound into wet, petroleum-impacted soil remaining within the zone of water table fluctuation.
  - Import non-frost susceptible granular soil for backfill.
  - Characterize groundwater impacts with three groundwater monitoring wells.
  - Analyze up to 9 soil samples for GRO, DRO, and BTEX. Include lead in analyses of 3 groundwater samples.

- The north side of the boiler house from Test Pit 3 to the former heating oil UST:
  - If building is to be demolished, remove concrete slab and investigate floor drains and piping vaults.
  - Excavate up to 250 CY of impacted soil to the groundwater contact or up to 1 foot into the grey silty soil based on field screening.

  - Incorporate investigation of potential fuel pipeline from AST cradles with excavation.
  - Characterize groundwater impacts by installing three groundwater monitoring wells, and by sampling the water well located in the boiler house.
  - Analyze up to 8 soil samples and 3 groundwater samples for DRO and BTEX. Analyze the water well sample for DRO, VOCs and RCRA metals.
  - Import non-frost susceptible granular soil for backfill.

- The drums at the northeast corner of the rectangular AST:
  - Characterize and dispose of fluid in drums (See "Five 55-gallon drums" below).
  - Excavate stained soil based on visual observation and field screening, up to 10 CY. Bulk soil with other soil from small stains.
  - Characterize soil remaining in place with 2 samples for GRO, DRO, RRO, BTEX, arsenic, barium, chromium, lead, nickel, and vanadium analysis, based on Sample SS04.
  - Backfill with on-site or imported fill.

- The oily surface stain/puddle east of the burn area and rectangular AST:
  - Collect a sample from material near the center of stain and analyze for TCLP lead.
  - Excavate visibly stained soil, and soil with elevated field screening readings up to 30 CY, and place in lined soil bags.
  - Characterize soil remaining in place with 2 samples for GRO, DRO, RRO, VOCs, arsenic, barium, chromium, lead, nickel, and vanadium analysis, based on Sample SS02.
  - Backfill with on-site or imported fill.

- The area of asphalt coated soil near the southeastern corner of the facility:
  - See "asphalt AST" below.
  - If leaving the material in place with institutional controls is an option, characterize the extent with 8 to 10 shallow test pits, and migration to groundwater with 4 soil borings / monitoring wells. Analyze up to 10 soil and 4 groundwater samples for the analytes listed below.
  - If migration to groundwater is occurring, or long-term institutional controls are not an option, excavate up to 2,000 CY of impacted soil based on visual observations and field screening.
  - Characterize groundwater impacts with three monitoring wells.

  - o After excavation, analyze up to 24 soil samples and 3 groundwater samples for DRO, RRO, VOCs, and polynuclear aromatic hydrocarbons (PAHs).
  - o Import backfill.

Recommended actions where contamination could potentially have been released to the environment are outlined below.

- The piping presumed to run between the AST cradles and the boiler house:
  - o Investigate potential piping as part of boiler house excavation.
  - o If present, drain and decommission piping.
  - o Screen piping trench every 10 feet (approximately 22 screening samples).
  - o Excavate impacted soil based on field screening up to 50 CY.
  - o Analyze up to 5 samples of soil remaining in place for DRO and BTEX.
  - o Backfill with on-site or imported fill.
- Floor drains in the warm storage, service station, boiler, and garage buildings and the associated drainage systems:
  - o If buildings are demolished, excavate piping to determine discharge points.
  - o Screen soil beneath drain and piping joints for volatile constituents.
  - o Characterize soil beneath each basin, and, based on observations and screening, beneath potential release points.
  - o Analyze up to 20 soil samples for GRO, DRO, RRO, VOCs, PAHs, PCBs, and RCRA metals.
- The area north of the former garage, where a 12 by 45 foot AST may have been, two drums were present, and an area of soil staining was investigated with Test Pit 4 in 2008;
  - o Perform additional characterization with a minimum of 3 test pits.
  - o Select a minimum of 3 soil samples based on field screening for analysis of GRO, DRO, RRO, VOCs, PAHs, PCBs, and RCRA metals.
- The fuel piping between the existing 1970's heating oil AST and the former garage:
  - o Decommission AST and piping, dispose hydraulic oil.
  - o Collect residual fuel for energy recovery.
  - o Screen soil beneath piping runs every 10 feet.
  - o Select 2 to 4 soil samples for DRO and BTEX analysis based on field screening.
- Other releases from the former garage that may have entered the subsurface through the floor, hydraulic lift, or leach field:

  - Decommission hydraulic lift and collect soil sample beneath sump for DRO/RRO analysis.
  - If building is to remain in place, advance soil borings at 2 locations along the south side of building, one along the east and west sides of the building, and one to the south of the leach field. Complete borings as monitoring wells.
  - If building is demolished, advance test pits at potential release locations based on field observations.
  - Analyze 5 soil and 5 water samples or up to 10 soil samples for GRO, DRO, RRO, VOCs, PAHs, PCBs, and RCRA metals.

- Former vehicle storage areas, including two small soil stains observed south of the mobile home:
  - Excavate stained soil based on visual observation and field screening, up to 2 CY at each location. Bulk soil with other soil from small stains.
  - Characterize soil remaining in place with one sample from each location for GRO, DRO, RRO, BTEX, PAH, arsenic, barium, chromium, lead, nickel, and vanadium analysis.
  - Backfill with on-site or imported fill.

- Current and historic 55-gallon drum storage areas, including the wheel bearing grease drum and the horizontal drum to the east where staining was observed:
  - Excavate stained soil based on visual observation and field screening, up to 3 CY at each location. Bulk soil with other soil from small stains.
  - Characterize soil remaining in place with one sample at each location.
  - Analyze for GRO, DRO, RRO, VOC, PAH, PCB, arsenic, barium, chromium, lead, nickel, and vanadium.
  - Backfill with on-site or imported fill

- Burn areas:
  - Characterize ashes with 3 samples (one composite from largest area) for asbestos and TCLP RCRA metals analyses.
  - Separate metal from ashes for recycling.
  - Collect up to 6 soil characterization samples from beneath ashes for laboratory analysis of DRO, SVOCs, RCRA metals.

Recommended actions for areas with materials that could potentially release to the environment are presented below.

- Two active ASTs at the former service station/GVFD building:
  - If the building is to remain in service, assist the GVFD with developing a maintenance and inspection program.
  - If the building is taken out of service or demolished, sample under ASTs after they are emptied and removed.
  - Analyze two soil samples for DRO and BTEX, based on the results of up to six screening samples.
- The rectangular AST:
  - Characterize contents with one sample for Burning Oil Specification parameters.
  - Dispose the estimated 2,240 gallons of fluids, plus sludge, properly.
  - Clean and recycle vessel.
  - Screen soil beneath AST for selection of one analytic soil sample tested for GRO, DRO, BTEX, and lead (add additional parameters if indicated by product characterization).
- The asphalt AST;
  - Characterize contents with one sample for Burning Oil Specification parameters.
  - Empty and dispose of contents properly.
  - Clean and recycle vessel.
  - Characterize soil remaining beneath AST as part of the asphalt area remedial action described above.
- Heating oil, hydraulic lift oil, and other products stored in the former garage/CRSD bus barn:
  - See “other releases from the former garage” above.
- Five scattered 55-gallon drums that were observed to contain fluid:
  - Work with the CRSD to characterize and dispose the two drums on north side of the garage building.
  - Characterize contents of the grease drum, the drums at the rectangular AST and the horizontal drum with three samples for Burning Oil Specification parameters.
  - Dispose the drums properly.
  - See remedial actions described above.

- Five electrical transformers that appeared to be active:
  - Transformers appeared in good condition, and are likely the property of the Copper Valley Electric Association.
- Wallboard outside the old mobile home that could potentially contain and release asbestos to the atmosphere:
  - Collect two samples for asbestos analysis.
  - Dispose the material as solid waste or ACM.

6.2.2 ADF&G Facility

Recommended actions for the area of identified soil contamination are outlined below.

- Soil beneath the bunkhouse AST:
  - Roll back fence and move AST to gain access.
  - Excavate up to 10 CY of impacted soil based on field screening.
  - Analyze 2 samples for DRO and BTEX.
  - Import classified soil for backfill.
  - Return fence and AST to service.

Recommended actions for areas where contamination could potentially have been released to the environment are presented below.

- Two heating oil USTs currently in service:
  - Advance 2 soil borings to groundwater near each AST.
  - Complete one boring at each AST as a monitoring well if screening suggests the presence of contamination near the water table.
  - Analyze up to 3 soil samples from each AST for GRO, DRO, and BTEX.
  - Analyze one groundwater sample from each well for GRO, DRO, and BTEX.
  - Sample the water well west of the shop for GRO, DRO, VOC, and RCRA metals analyses.
- The former gasoline UST:
  - Advance one soil boring near the southern extent of the UST excavation and complete as a groundwater monitoring well.
  - Analyze one soil and one groundwater sample for GRO, DRO, and BTEX.
- Used oil drum by shop:
  - Work with the ADF&G to characterize and dispose of the drum contents.

  - Excavate stained soil based on visual observation and field screening, up to 3 CY. Bulk soil with other soil from small stains.
  - Characterize soil remaining in place with one sample analyzed for DRO, RRO, arsenic, barium, chromium, lead, nickel, and vanadium based on Sample SS05.
  - Import classified soil for backfill.

- The sewer system to which the former combined facilities, shop, and ADOT&PF buildings were connected:
  - Clear vegetation to facilitate access with a tracked drill rig.
  - Advance 3 soil borings and complete as groundwater monitoring wells.
  - Collect two soil samples and one groundwater sample from each boring location.
  - Analyze samples for GRO, DRO, RRO, VOC, PAH, PCB, and RCRA metals.

Areas where remedial actions or investigations are not recommended at this time include:

- One active gasoline AST;
- Drums of aviation fuel;
- The hazardous materials storage shed;
- Various small engines and small engine-powered vehicles; and
- The office building septic system.

6.3 Remediation Strategies or Alternatives

The remedial actions discussed above include excavation of impacted soil in order to reduce the contaminant mass in the environment and potentially remove some exposure pathways in a relatively short time period. Reduction of contaminant concentrations to below the applicable DEC cleanup levels may not be achieved at one or more locations. A less aggressive approach could be taken, depending on redevelopment plans. For example, the impacted areas at the former AST cradles and the asphalt coated soil are outside where buildings exist in the central ADOT&PF area. These may be locations were the soil could be left in place, access could be restricted, and a long-term monitoring program could be implemented with institutional controls. Institutional controls are a non-engineered, limited-action remedial alternative implemented to prevent or limit exposure to the contaminants remaining in soil and groundwater. Institutional controls may consist of easements, restrictive covenants (e.g. land-use restrictions), deed notices, access control, zoning ordinances, and/or monitoring programs. DEC requires that Institutional Controls be applied to a site where current or potential future exposure to contaminated soil or groundwater does not allow for unrestricted land and groundwater use.

6.3.1 Soil Management Strategies

Soil may be remediated in-situ with natural attenuation, in-situ with active remediation, or by removal and treatment. Natural attenuation is a slow process, and may require institutional controls and long-term monitoring for periods in excess of 30 years. Active in-situ remediation has been performed in a variety of ways, and remediation rates and costs are highly variable depending on the selected technology, the soil, and the contaminants.

Soil removal and treatment is relatively expensive initially, but highly effective. Removed soil will require treatment or disposal in an approved landfill, and there are several alternative treatment methods. Soil impacted with gasoline and diesel fuel/heating oil may be effectively treated with natural attenuation/biodegradation techniques such as landfarming or biopiles. These treatment options can take from one to several seasons. Landfarming is relatively inexpensive, and consists of spreading the soil on a petroleum resistant liner to a depth of one to two feet, and turning the soil periodically. Natural degradation processes reduce contaminant concentrations over time. Biological degradation is enhanced with biopiles by blending nutrient amendments in to the soil and placing it in a treatment cell that includes a leachate collection and a blower-operated aeration system. These techniques are not likely to be effective with soils containing metals and longer-chain petroleum hydrocarbons such as used oil and asphalt, or with cohesive and fine-grained soils. Soil from heating oil, diesel, and gasoline releases could potentially be treated with landfarming on one portion of the Property as redevelopment activities occur in another portion.

Petroleum-impacted soil may be treated with thermal desorption, either on site or off site. Thermal desorption is performed by screening out large particles, breaking up large agglomerations of soil, and feeding the soil into a heated rotary kiln. The emitted gasses are passed through an afterburner to oxidize unburned hydrocarbons. This treatment option is rapid, but is not applicable to soils contaminated with metals. High concentrations of long-chain hydrocarbons such as asphalt can be difficult to remediate when using thermal desorption. Typically, setting up an on-site thermal desorption unit on the road system in Alaska is not cost effective for less than roughly 10,000 tons of soil. A potential treatment option for the asphalt-impacted soil is incorporation into asphalt-cement pavement. A fair amount of research and testing would be required, and the pavement mix would not likely meet the performance specifications for high-traffic areas. The blended hot-mix asphalt could potentially be used for parking lots and driveways as part of site redevelopment.

We recommend a mix of in-situ natural attenuation with institutional controls for soil that cannot be easily excavated, off-site thermal desorption of excavated soil impacted with petroleum hydrocarbons, and off-site disposal of soil impacted with metals or PCBs. On site landfarming is a lower cost option for some soil, but requires a reliable party to regularly monitor the condition of the cell and till the soil. If a contractor is on site for two or more seasons as part of redevelopment, landfarming would be a viable option.

6.3.2 Water Management Strategies

Based on observations during the removal of the gasoline and diesel ASTs, petroleum contamination in shallow groundwater is likely. Two water wells were identified on site, but are not currently being used for drinking water. Based on observations made in the 2008 test pits, and UST excavations, there is low-permeability silty soil and potential permafrost beneath the shallow groundwater. Drinking water wells are not likely to function year-round in the shallow water table aquifer. Monitoring wells in the shallow aquifer are likely to frost-jack and be a maintenance issue.

Groundwater may be remediated in-situ with natural attenuation and Institutional Controls, enhanced natural attenuation, or active treatment. We recommend initially characterizing the extent of groundwater impacts vertically and horizontally, removing soil with high concentrations of petroleum that may act as a source for groundwater contamination, and monitoring natural attenuation. In excavations where petroleum hydrocarbons are present in the soil within the zone of water table fluctuation, we recommend enhancing natural attenuation by blending soil remaining below the water table with a chemical oxidant and an oxygen-supplier.

If contaminated soil is left in place near the ground surface, exposure pathways from surface water runoff and infiltration will need to be controlled. A vegetated cap of low permeability soil, sloped for gentle drainage, could be place over contaminated soil left near the surface.

6.3.3 Available Resources

6.3.3.1 Equipment

There are excavation contractors in the Copper River basin suggesting that some equipment may be available for hire by qualified operators. The presence and availability of equipment operators with the qualifications required for work on contaminated sites has not been determined.

6.3.3.2 Labor

The presence and availability of laborers with the qualifications required for work on contaminated sites has not been determined, but the population of the region is large enough that a small labor pool may be available for a qualified contractor to hire.

6.4 Rough Order of Magnitude Cost Estimate

The rough order of magnitude cost estimate presented in Appendix E was developed for the remedial actions outlined in Section 6.2 based on estimates and assumptions made from limited sampling and observation data. We have assumed that a contractor with contaminated sites experience will mobilize three HAZWOPER certified workers and equipment to the site for approximately one month, and that one qualified environmental consultant will be on site for the entire period. We have assumed off-site transportation, treatment, and disposal of soil, and that soil from the large oil stain and small uncharacterized stains will be impacted with metals and require shipment out of Alaska. While we have assumed that the off-site thermal desorption facility can effectively treat the asphalt-coated soil, some testing that was not included in the costs will need to be performed to confirm the assumption. We have also assumed that a qualified drilling contractor and one environmental consultant will perform subsurface investigation work over a roughly one-week period. A waste disposal contractor will empty and clean ASTs and transport fluids to Anchorage for recycling, treatment or disposal while the contractor and consultant are on site. We have assumed that ashes from burn areas are not hazardous, and that building demolition or material abatement, disposal of solid wastes, and salvage of scrap metal are not included in this effort.

7.0 CONCLUSIONS

Based on laboratory testing and visual observations, releases of petroleum have impacted soil at a number of locations across the Property. Metals in excess of cleanup criteria are also present. The extents of areas with confirmed impacts have not been well delineated. Multiple exposure pathways could be completed from the impacted soil. Field observations and historic documents suggest that there is potential for contamination at several locations that have not been characterized by laboratory testing. The potential for impacts to shallow groundwater is high, but has not been confirmed. Materials remaining in multiple containers are potential sources of additional contamination.

Potential and confirmed source areas are outlined in section 5.2, and recommended actions are outlined in Section 6.2. In general, we have recommended removal actions combined with release investigations at locations with confirmed releases, and additional characterization at locations where the potential for a release of hazardous substances was observed. We have included a rough order of magnitude cost estimate in Appendix E. The costs include off-site treatment of impacted soil for timeliness and effectiveness, but less expensive options exist for some of the impacted soil. The total estimated cost of 1.5 million dollars for performing the recommended actions presented above is based on a number of estimations and assumptions. Because of the unknown extents of contamination, this estimate should be considered rough-order-of-magnitude. Significant increases or reductions in cost could be realized. A reuse plan could be established before or concurrently with performing remedial actions. Only portions of the recommended actions may be necessary to initiate safe reuse of the Property. We recommend prioritizing the remedial actions and developing a phased approach based on the planned reuse.

8.0 CLOSURE/LIMITATIONS

This report was prepared for the exclusive use of our clients and their representatives in the study of this site. The findings we have presented within this report are based on the limited research, sampling, and analyses that we conducted. They should not be construed as definite conclusions regarding the site's soil or groundwater. It is possible that our subsurface tests missed higher levels of petroleum hydrocarbon constituents, although our intention was to sample areas likely to be impacted. As a result, the sampling and analysis performed can only provide you with our professional judgment as to the environmental characteristics of this site, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. The data presented in this report should be considered representative of the time of our site assessment. Changes in site conditions can occur with time, due to natural forces or human activity. In addition, changes in government codes, regulations, or laws may occur. Because of such changes beyond our control, our observations and interpretations may need to be revised. Shannon & Wilson has prepared the attachments in Appendix F, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

You are advised that various state and federal agencies (DEC, EPA, etc.) may require the reporting of this information. Shannon & Wilson does not assume the responsibility for reporting these findings and therefore, has not, and will not, disclose the results of this study, except with your permission or as required by law.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

We appreciate this opportunity to perform these services. Please call the undersigned or Mr. Matt Hemry at (907) 561-2120 with questions or comments concerning the contents of this report.

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TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location	Sample Depth (feet~)	Headspace ^ (ppm)	Sample Classification**
SOIL SAMPLES					
Field Screening Samples					
HS01	9/22/2009	5 ft. east of lower AST saddles	0.8	81	Gray, slightly sandy SILT; moist; diesel odor
HS02	9/22/2009	West end of lower AST saddles	0.8	110	Gray, slightly sandy SILT; moist; diesel odor
HS03	9/22/2009	20 ft. east of lower AST saddles under presumed pipe cribbing	0.9	6.1	Gray, slightly sandy SILT; moist
HS04	9/22/2009	West end of upper AST saddles	0.8	2.7	Brownish gray, slightly sandy SILT; with cobbles; moist
HS05	9/22/2009	Beneath weeping fitting of AST on east side of former service station building	0.5-0.7	2.2	Brown, sandy GRAVEL; with cobbles; moist
HS06	9/22/2009	East wall of former service station, beneath copper fuel lines and rocks with dark staining (possibly from trees)	0.6-0.8	1.1	Brown, sandy GRAVEL; moist
HS07	9/22/2009	Former warm storage building floor drain, at level of outlet pipe	1.8	4.8	Dark brown, sandy SILT; with organics and debris; moist; mild oily odor
HS08	9/22/2009	North end of AST east of former garage, beneath fill pipe	0.3-0.4	1.5	Light brown, sandy GRAVEL; dry to moist
HS09	9/22/2009	South end of AST east of garage, beneath burried supply/return fittings	0.5-0.6	0.7	Brown, sandy GRAVEL; moist
HS10	9/22/2009	Asphalt-coated soil area in eastern portion of ADOT&PF area, south of asphalt AST	0.3-0.4	260	Black and brown, gravelly SAND; moist; asphalt stained
HS11	9/22/2009	16 feet east of Sample SS02 location, beyond visibly stained area	0.7-0.8	5.4	Brown, slightly silty, sandy GRAVEL; moist
HS12	9/22/2009	Southeast (stained) end of horizontal drum in eastern portion of ADOT&PF area	0.4-0.6	10	Light brown, gravelly SILT; moist
HS13	9/22/2009	Near center of large burn area east of rectangular AST	0.7-0.8	6.4	Brown, slightly silty, sandy GRAVEL; moist
HS14	9/22/2009	Near center of basin south of rectangular AST and west of mobile home	0.5-0.7	6.9	Brown, silty, gravelly SAND; moist; slight organics
HS15	9/22/2009	Stained soil off northeast corner of rectangular AST, among four drums	0.4-0.5	92	Brownish gray, silty, sandy GRAVEL; moist; petroleum odor
HS16	9/22/2009	Alongside UST fill riser, west of shop in ADF&G area	1.0	4.7	Grayish brown, slightly silty, gravelly SAND; dry to moist; no odor noted

KEY	DESCRIPTION
~	Approximate feet below ground surface
^	Field screening instrument was a TEI OVM 580B photoionization detector
**	Sample classification applies to the analytical sample collection depth
ppm	Parts per million

TABLE 1 - SAMPLE LOCATIONS AND DESCRIPTIONS

Sample Number	Date	Sample Location	Sample Depth (feet~)	Headspace ^ (ppm)	Sample Classification**
Field Screening Samples (Continued)					
HS17	9/22/2009	Beneath lower elbow of UST vent riser at western wall of ADF&G shop	0.7-0.8	4.7	Brown, slightly silty, gravelly SAND; moist; no odor noted
HS18	9/22/2009	Beneath stain at used oil drum, southeast corner of ADF&G Shop	0.8-0.9	2.2	Brown, gravelly SAND; moist
HS19	9/22/2009	Beneath supply valve of AST on west side of ADF&G bunkhouse	0.7-0.9	100	Grayish brown, slightly silty, gravelly SAND; moist; diesel odor
HS20	9/22/2009	Adjacent to UST fill riser on south side of ADF&G office	0.9-1.0	4.8	Gray, sandy SILT; moist; beneath topsoil with organics
Laboratory Samples					
SS01	9/22/2009	Sample HS02 location, west end of lower AST saddles	0.8-0.9	110	Gray, slightly sandy SILT; moist, diesel odor
SS02	9/22/2009	South edge of black, oily surface stain/ puddle, eastern ADOT&PF area, under power lines	0.3	43	Black, silty, sandy GRAVEL; viscous oil-coated; used oil odor
SS03	9/22/2009	At Sample HS10 location, in area with asphalt in soil	0.3-0.5	260	Black and brown, gravelly SAND; moist; asphalt stained
SS04	9/22/2009	Sample HS15 location at rectangular AST drums	0.5-0.7	92	Brownish, slightly silty, sandy GRAVEL; moist
SS05	9/22/2009	Sample HS18 location at southeast corner ADF&G Shop	0.8-0.9	2.2	Brown, gravelly SAND; moist
SS06	9/22/2009	Sample HS19 location at ADF&G bunkhouse AST	0.7-0.9	100	Grayish brown, slightly silty, gravelly SAND; moist; diesel odor
SS11	9/22/2009	Field duplicate of Sample SS01	0.8-0.9	110	Gray, slightly sandy SILT; moist, diesel odor
WATER SAMPLES					
SW01	9/22/2009	Small pond located 40 to 50 feet southeast of original sewer system septic tank	-	-	Still surface water with some tannin coloration
SW02	9/22/2009	Moose Creek, down stream of old septic tank	-	-	Clear, flowing surface water
SW03	9/22/2009	Moose Creek, up stream of old septic tank	-	-	Clear, flowing surface water
QUALITY CONTROL SAMPLES					
TBS1	9/22/2009	Soil Trip Blank	-	-	Laboratory-supplied silica sand in methanol
TBW1	9/22/2009	Water Trip Blank	-	-	Organic-free water blank prepared in the laboratory

KEY	DESCRIPTION
-	Not applicable
~	Approximate feet below ground surface
^	Field screening instrument was a TEI OVM 580B photoionization detector
**	Sample classification applies to the analytical sample collection depth
ppm	Parts per million

TABLE 2 - SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level†	ID Number^ and Collection Depth in Feet (See Table 1, Figures 2 and 3, and Appendix C)			
			SS01 0.8-0.9	**SS11~** 0.8-0.9	**SS02** 0.3	**SS03** 0.3-0.5
PID Headspace Reading - ppm	580B PID	-	110	-	43	260
Total Solids - %	SM20 2540G	-	79.0	77.8	95.0	97.1
Gasoline Range Organics (GRO) - mg/kg	AK101	300	36.8	86.8	-	-
Diesel Range Organics (DRO) - mg/kg	AK102	250	**28,800**	**26,300**	**37,700**	**15,000**
Residual Range Organics (RRO) - mg/kg	AK103	10,000	-	-	**39,100**	**34,400**
Aromatic Volatile Organics (BTEX)						
Benzene - mg/kg	SW8021B	0.025	**<0.0273**	**<0.0285**	-	-
Toluene - mg/kg	SW8021B	6.5	<0.109	<0.114	-	-
Ethylbenzene - mg/kg	SW8021B	6.9	0.136	<0.114	-	-
Xylenes - mg/kg	SW8021B	63	1.25	2.80	-	-
Volatile Organic Compounds (VOCs)						
Benzene - mg/kg	SW8260B	0.025	-	-	**<0.0263**	**<0.0359**
Toluene - mg/kg	SW8260B	6.5	-	-	<0.0876	0.401
Ethylbenzene - mg/kg	SW8260B	6.9	-	-	0.0885	0.431
Xylenes - mg/kg	SW8260B	63	-	-	4.28	28.2
n-Butylbenzene - mg/kg	SW8260B	15	-	-	0.352	1.26
sec-Butylbenzene - mg/kg	SW8260B	12	-	-	<0.0438	2.16
Isopropylbenzene (Cumene) - mg/kg	SW8260B	51	-	-	<0.0438	0.713
4-Isopropyltoluene - mg/kg	SW8260B	-	-	-	0.164	5.08
Naphthalene - mg/kg	SW8260B	20	-	-	1.07	6.62
n-Propylbenzene - mg/kg	SW8260B	15	-	-	0.0539	0.946
1,2,4-Trimethylbenzene - mg/kg	SW8260B	23	-	-	4.73	4.06
1,3,5-Trimethylbenzene - mg/kg	SW8260B	23	-	-	4.14	16.8
Other VOCs	SW8260B	Various	-	-	ND	ND
Semivolatile Organic Compounds (SVOCs)						
2-Methylnaphthalene - mg/kg	SW8270D	6.1	-	-	<23.3	**15.4**
Other SVOCs	SW8270D	Various	-	-	ND	ND
Polychlorinated Biphenyls (PCBs)	SW8082A	1.0	-	-	<0.835	<0.819
RCRA Metals						
Arsenic - mg/kg	SW6020	3.7	-	-	**5.63**	2.17
Barium - mg/kg	SW6020	1,100	-	-	110 B	31.9 B
Cadmium - mg/kg	SW6020	5	-	-	0.760	<0.190
Chromium - mg/kg	SW6020	25	-	-	**43.8**	12.7
Lead - mg/kg	SW7471B	400	-	-	195	8.51
Mercury - mg/kg	SW6020	1.4	-	-	<0.0409	<0.0374
Selenium - mg/kg	SW6020	3.4	-	-	<0.514	<0.475
Silver - mg/kg	SW6020	11.2	-	-	<0.103	<0.0949

KEY	DESCRIPTION
^	Sample ID No. preceded by "17322-" on the chain of custody form
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
†	Cleanup level based on most stringent criteria in 18 AAC 75 (October 9, 2008) for the "under 40-inch (precipitation) zone"
~	Duplicate of Sample SS01
mg/kg	Milligrams per kilogram
28,800	Reported concentration exceeds the regulated cleanup level
<0.0273	Laboratory reporting limit for analyte exceeds the regulated cleanup level
<0.109	Analyte not detected at or above the laboratory reporting limit of 0.109
-	Not applicable or not analyzed
ND	Individual analytes not detected
B	Analyte was found in a blank associated with the sample

TABLE 2 - SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

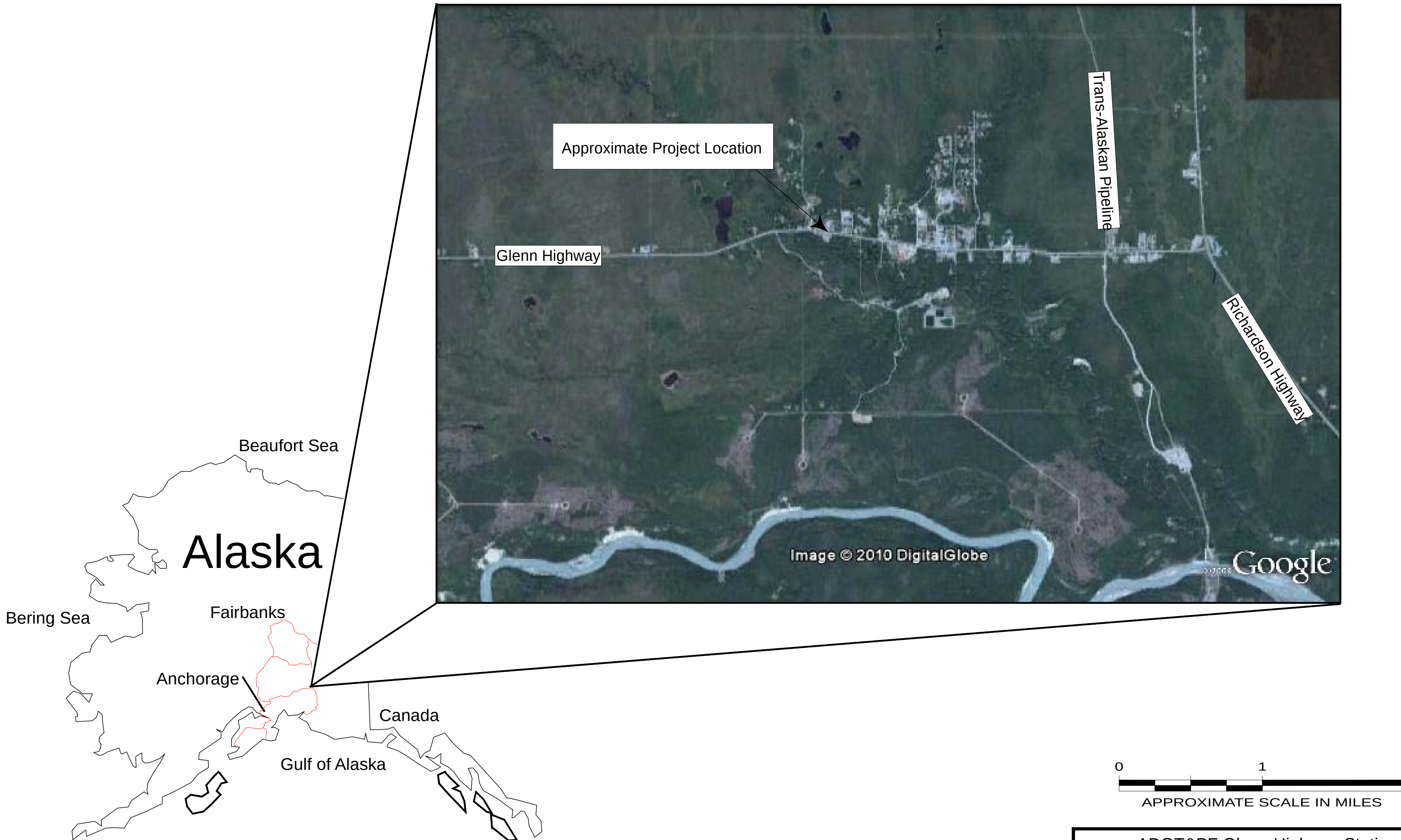
Parameter Tested	Method*	Cleanup Level†	ID Number^ and Collection Depth in Feet (See Table 1, Figures 2 and 3, and Appendix C)			
			SS04 0.5-0.7	SS05 0.8-0.9	SS06 0.7-0.9	TBS1 -
PID Headspace Reading - ppm	580B PID	-	92	2.2	100	-
Total Solids - %	SM20 2540G	-	82.0	93.6	92.6	100
Gasoline Range Organics (GRO) - mg/kg	AK101	300	218	<3.78	47.5	-
Diesel Range Organics (DRO) - mg/kg	AK102	250	**4,640**	140	**2,780**	-
Residual Range Organics (RRO) - mg/kg	AK103	10,000	851	897	-	-
Aromatic Volatile Organics (BTEX)						
Benzene - mg/kg	SW8021B	0.025	-	-	<0.0163	-
Toluene - mg/kg	SW8021B	6.5	-	-	<0.0654	-
Ethylbenzene - mg/kg	SW8021B	6.9	-	-	0.102	-
Xylenes - mg/kg	SW8021B	63	-	-	0.889	-
Volatile Organic Compounds (VOCs)						
Benzene - mg/kg	SW8260B	0.025	**2.31**	<0.0227	-	<0.0151
Toluene - mg/kg	SW8260B	6.5	**11**	<0.0756	-	<0.0502
Ethylbenzene - mg/kg	SW8260B	6.9	0.642	<0.0378	-	<0.0251
Xylenes - mg/kg	SW8260B	63	46.2	0.209	-	<0.100
n-Butylbenzene - mg/kg	SW8260B	15	<0.0660	<0.0378	-	<0.0251
sec-Butylbenzene - mg/kg	SW8260B	12	<0.0660	<0.0378	-	<0.0251
Isopropylbenzene - mg/kg	SW8260B	51	<0.0660	<0.0378	-	<0.0251
4-Isopropyltoluene - mg/kg	SW8260B	-	0.0884	<0.0378	-	<0.0251
Naphthalene - mg/kg	SW8260B	20	1.63	<0.0756	-	<0.0502
n-Propylbenzene - mg/kg	SW8260B	15	0.0838	<0.0378	-	<0.0251
1,2,4-Trimethylbenzene - mg/kg	SW8260B	23	4.22	<0.0378	-	<0.0251
1,3,5-Trimethylbenzene - mg/kg	SW8260B	23	9.18	0.0438	-	<0.0251
Other VOCs	SW8260B	Various	ND	ND	-	ND
Semivolatile Organic Compounds (SVOCs)						
2-Methylnaphthalene - mg/kg	SW8270D	6.1	-	-	-	-
Other SVOCs	SW8270D	Various	-	-	-	-
Polychlorinated Biphenyls (PCBs)	SW8082A	1.0	<0.0608	<0.0525	-	-
RCRA Metals						
Arsenic - mg/kg	SW6020	3.7	**6.77**	**4.41**	-	-
Barium - mg/kg	SW6020	1,100	130 B	56.9 B	-	-
Cadmium - mg/kg	SW6020	5	<0.225	<0.195	-	-
Chromium - mg/kg	SW6020	25	**34.4**	21.2	-	-
Lead - mg/kg	SW6020	400	9.91	6.21	-	-
Mercury - mg/kg	SW7471B	1.4	<0.0453	<0.0420	-	-
Selenium - mg/kg	SW6020	3.4	<0.562	<0.487	-	-
Silver - mg/kg	SW6020	11.2	0.112	<0.0974	-	-

KEY	DESCRIPTION
^	Sample ID No. preceded by "17322-" on the chain of custody form
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
†	Cleanup level based on most stringent criteria in 18 AAC 75 (October 9, 2008) for the "under 40-inch (precipitation) zone"
TBS1	Soil trip blank
mg/kg	Milligrams per kilogram
4,640	Reported concentration exceeds the regulated cleanup level
<3.78	Analyte not detected at or above the laboratory reporting limit of 3.78
-	Not applicable or not analyzed
ND	Individual analytes not detected
B	Analyte was found in a blank associated with the sample

TABLE 3 - SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS

Parameter Tested	**Method***	**Cleanup Level †**	**Sample ID Number^ (See Table 1, Figure 3, and Appendix C)**			
			Surface Water Samples			**QC**
			SW1	**SW2**	**SW3**	**TBW1**
Volatile Organic Compounds (VOC) - mg/L	SW8260B	-	ND	ND	ND	ND
Semivolatile Organic Compounds (SVOC) - mg/L	EPA 625M SIMS	-	ND	ND	ND	-
Total Aromatic Hydrocarbons (TAH)	SW8260M	0.010	ND	ND	ND	-
Total Aqueous Hydrocarbons (TAqH)	EPA 625M SIMS	0.015	ND	ND	ND	-
RCRA Metals						
Barium - mg/L	SW6020	2.0	0.0217	0.00858	0.00759	-
Other RCRA Metals	SW6000/7000	-	ND	ND	ND	-

KEY	**DESCRIPTION**
^	Sample ID No. preceded by "17322-" on the chain of custody form
*	See Appendix C for compounds tested, methods, and laboratory reporting limits
†	Cleanup level based on most stringent criteria in 18 AAC 70.020 (September 19, 2009)
QC	Quality control
mg/L	Milligrams per liter
-	Not applicable or not tested for this parameter
ND	Individual analytes not detected. Detection limits less than cleanup values
TAH	Sum of benzene, toluene, ethylbenzene, xylene, and four chlorobenzene constituents
TAqH	Sum of TAH and 625M SIMS constituents



Map adapted from aerial imagery provided by Google Earth Pro,
reproduced with permission granted by Google Earth(tm) Mapping Service

ADOT&PF Glenn Highway Station
and ADF&G Facility
Glennallen, Alaska

VICINITY MAP

April 2010 | 32-1-17322

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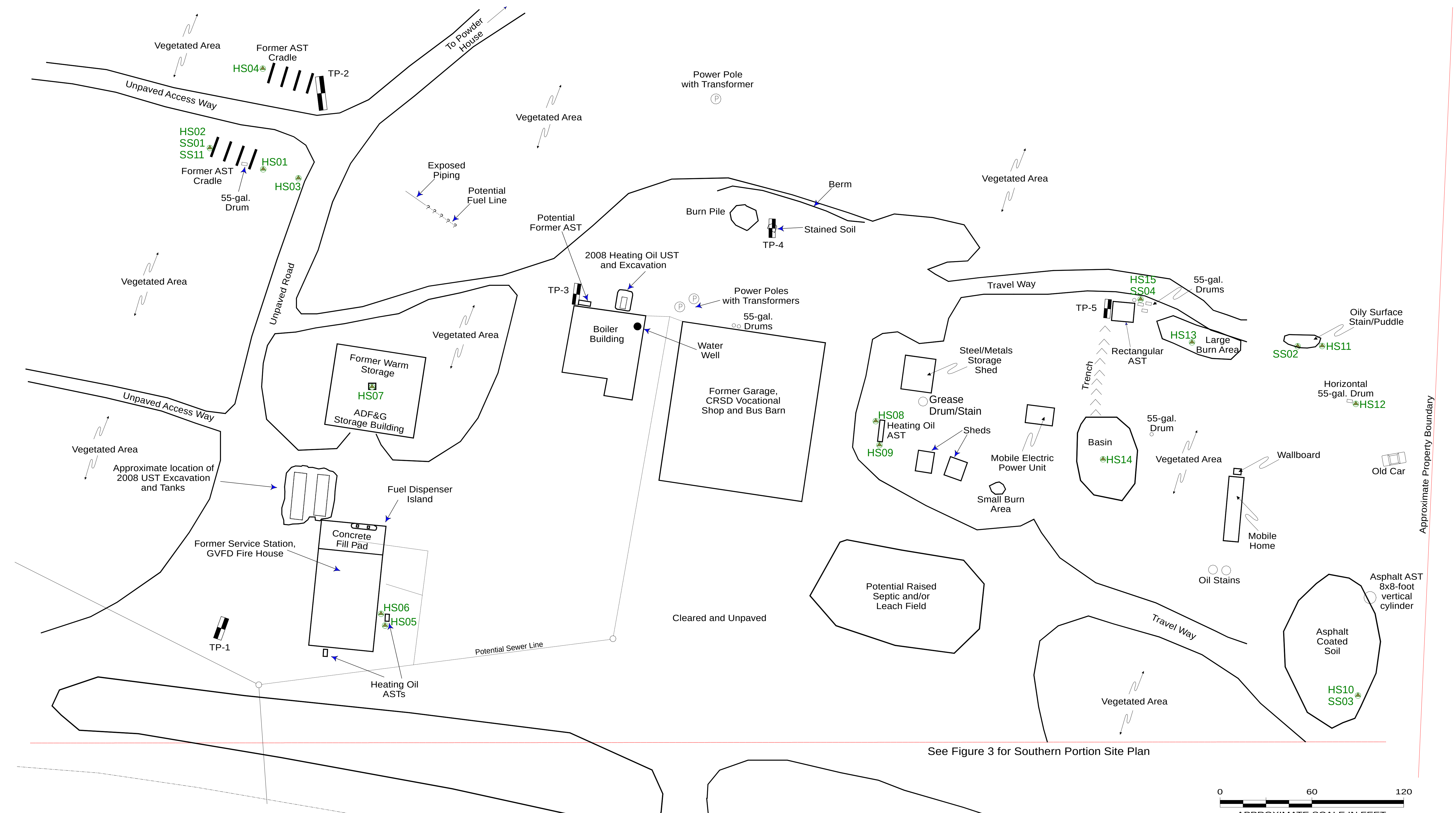
Geotechnical & Environmental Consultants

Fig. 1



LEGEND

TP-1	Approximate location of Test Pit TP1, advanced by Shannon & Wilson, Inc. September, 2008
HS02	Approximate location of headspace screening sample, collected by Shannon & Wilson, Inc., September, 2009
SS02	Approximate location of analytical sample, collected by Shannon & Wilson, Inc., September, 2009
P	Approximate location of Power Pole
	Approximate location of main sewer lines shown on 1952/1962 Drawing (See Figure B-2)
	Approximate location of secondary sewer lines shown on 1952/1962 Drawing (See Figure B-2)

N

ADOT&PF Glenn Highway Station and ADF&G Facility

Glennallen, Alaska

NORTHERN PORTION SITE PLAN

April 2010 32-1-17322

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Fig. 2

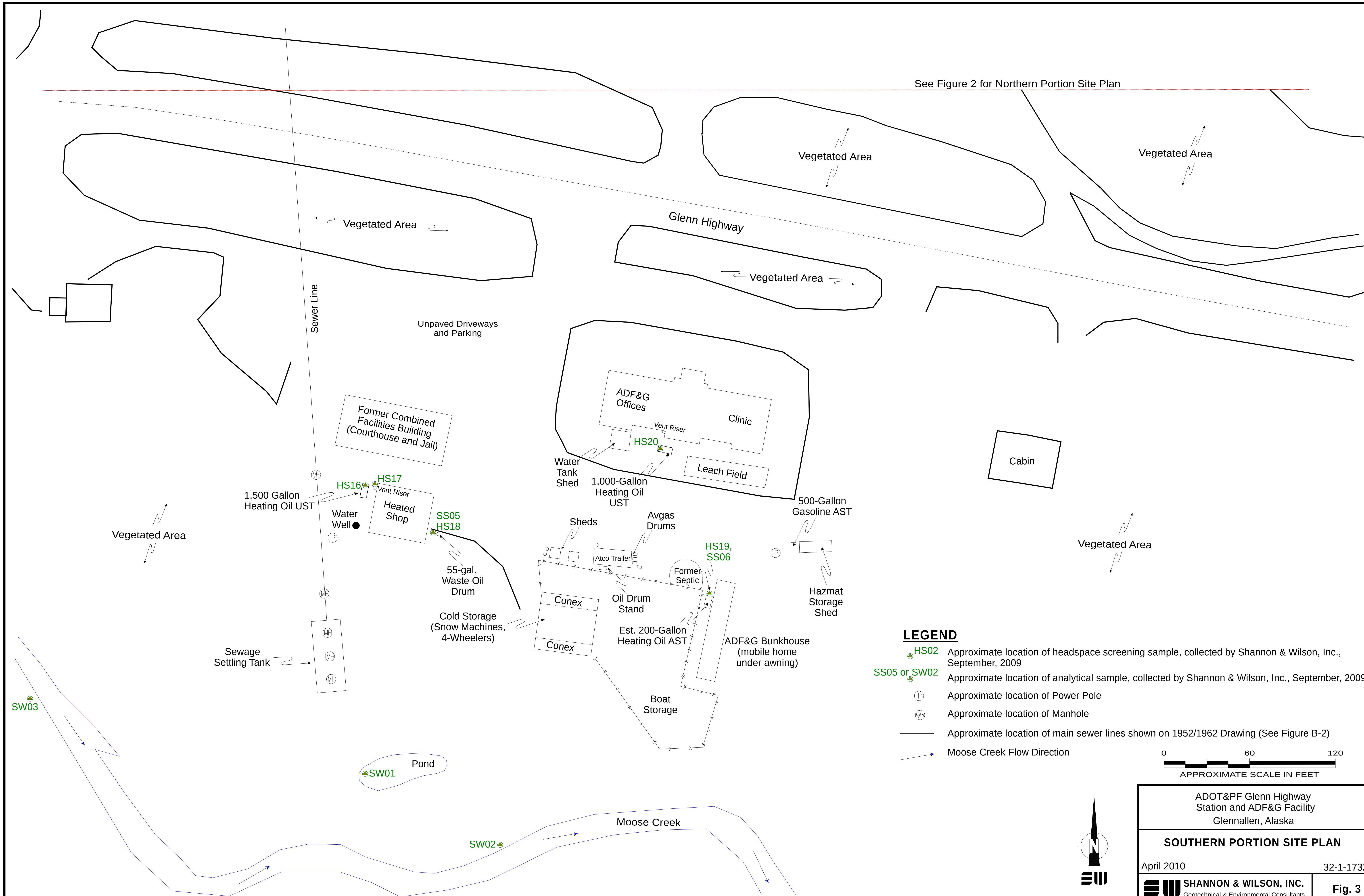
See Figure 2 for Northern Portion Site Plan
Glenn Highway
Vegetated Area
Vegetated Area
Vegetated Area
Vegetated Area
Vegetated Area
Vegetated Area
Vegetated Area
Sewer Line
Unpaved Driveways and Parking
ADF&G Offices
Clinic
Vent Riser
HS20
Leach Field
Water Tank Shed
1,000-Gallon Heating Oil UST
Cabin
Former Combined Facilities Building (Courthouse and Jail)
HS16
HS17
Vent Riser
Heated Shop
1,500 Gallon Heating Oil UST
Water Well
SS05
HS18
55-gal. Waste Oil Drum
Sheds
Avgas Drums
Atco Trailer
HS19, SS06
Former Septic
500-Gallon Gasoline AST
Hazmat Storage Shed
Oil Drum Stand
Conex
Conex
Cold Storage (Snow Machines, 4-Wheelers)
Est. 200-Gallon Heating Oil AST
ADF&G Bunkhouse (mobile home under awning)
Boat Storage
Sewage Settling Tank
SW03
Pond
SW01
SW02
Moose Creek
LEGEND
HS02 Approximate location of headspace screening sample, collected by Shannon & Wilson, Inc., September, 2009
SS05 or SW02 Approximate location of analytical sample, collected by Shannon & Wilson, Inc., September, 2009
Approximate location of Power Pole
Approximate location of Manhole
Approximate location of main sewer lines shown on 1952/1962 Drawing (See Figure B-2)
Moose Creek Flow Direction
0
60
120
APPROXIMATE SCALE IN FEET
N
ADOT&PF Glenn Highway Station and ADF&G Facility
Glennallen, Alaska
SOUTHERN PORTION SITE PLAN
April 2010
32-1-17322
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Fig. 3

APPENDIX A

SITE PHOTOGRAPHS