Geotechnical Engineering Report
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

March 2007

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Project Number: 32-1-0153-003

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POINT MACKENZIE, ALASKA

1.0 INTRODUCTION

This report presents the results of a geotechnical study conducted for a road corridor accessing the west side of Knik Arm Crossing north of Anchorage, Alaska. The project involved investigating the proposed access route from the intersection of South Burma Road and Point MacKenzie Road to the proposed west abutment approach of the Knik Arm crossing. The general alignment of the access route is approximately 13 miles long and traverses both developed and undeveloped land. To characterize general subsurface conditions along the alignment and support preliminary engineering recommendations, Shannon & Wilson advanced ninety-three borings along the proposed new alignment of Point MacKenzie Road. Explorations were also conducted to evaluate the potential of a localized gravel borrow source at several proposed quarry locations along or near the project alignment.

Authorization to proceed with this work was received from Mr. Doug Kenley, of PND Engineering, Inc. via email. This work was conducted in accordance with our February 2006 proposal.

2.0 SITE AND PROJECT DESCRIPTION

The Knik Arm Crossing Project is intended to provide a connection between the west and east shore of the Knik Arm. The proposed Mat-Su access route (Point MacKenzie Alignment) extending through the Matanuska-Susitna Borough to the crossing, generally follows the developed corridor of the existing Point MacKenzie Road with approximately 3.5 miles of new roadway. The general corridor of the proposed Point MacKenzie Alignment is shown in Figure 1.

2.1 Site Description

Point MacKenzie, located in Southcentral Alaska, is approximately 3 miles northwest of Anchorage across the Knik Arm of Upper Cook Inlet. Knik Arm is an approximately 34 mile long narrow water body that is orientated approximately northeast by southwest. It is 1.6- to 5-miles wide and is characterized by strong currents, deep water, and large tide swings, as well as strong winds, winter storms, and sea ice.

The proposed Point MacKenzie Alignment connecting to the Knik Arm Crossing largely entails an upgrade of the existing Point MacKenzie Road as well as approximately 3.5 miles of new roadway through previously undeveloped land. The project begins at the southern most extent of pavement on Point MacKenzie Road, near the intersection of Point MacKenzie Road and South Burma Road (see Figure 1). The northern portion of the gravel road (South Burma Road) leads to Big Lake while the southern portion is Point MacKenzie Road leading to Port MacKenzie approximately 20 miles from the intersection.

2.2 Project Description

The Knik Arm Crossing, Mat-Su Access Route is part of a project to update and extend the existing Point MacKenzie Road system to connect to the proposed bridge crossing Knik Arm approximately 4 miles north of Point MacKenzie, Alaska. The goal of this project is to provide an improved infrastructure linking Anchorage, Alaska with the Matanuska-Susitna valley.

Much of the existing infrastructure in Point MacKenzie consists of a gravel road with multiple trailheads accessing occasional farms and the Mat-Su Borough’s Port MacKenzie Dock. While the roadway adequately met the needs of the private residence and recreational users to date, it will need to be improved to meet Alaska Department of Transportation & Public Facilities (DOT&PF) standards as well as the increased traffic expected when the bridge is built.

The Point MacKenzie Alignment project focuses on the approximately 10 miles of roadway south from the intersection of South Burma Road to the north and Point MacKenzie Road. Additionally, an approximately 3.5 mile stretch of new roadway is proposed though undeveloped land. The most significant improvements planned for the undeveloped area are large cut/fill zones (approximately 20 to 30 feet) as well as increasing/decreasing road grades along centerline in a few areas. Improving the existing Point MacKenzie Road subgrade, in areas where the existing road will make deep cuts or where deep (approximately 10 to 20 feet thick) surface organics are present, is also a major part in this project.

The new alignment of Point MacKenzie Road is proposed to cross marshy areas (i.e. Stations 290+00 to 296+00 and Stations 415+00 to 442+00) where organic material may be present to depths of approximately 20 feet. A number of large hills are present along the alignment (i.e. Stations 163+00 to 182+00 and Stations 555+00 to 575+00), which would require cuts deeper than 30 feet. In addition to the deep (greater than 20 feet) cuts, numerous less pronounced hills are present and will require cuts. At the time of explorations, it was not observed that the alignment crosses well defined flowing streams, however due to snow cover and frozen ground, less defined streams may be present along the alignment.

3.0 GEOLOGICAL SETTING

This project lies within the northern reaches of the Cook Inlet Basin, which is a low-lying structural trough overlying Tertiary rock formations and surrounded by Quaternary deposits of varying densities. These rocks consist of interbedded shale and sandstones with coal beds and are exposed closest to the study area along Eagle River, west of the Border Ranges fault, and more extensively in the Matanuska Valley and on the Kenai Peninsula (Magoon et al. 1976; Winkler 1992). Geophysical surveys across Knik Arm and oil exploration wells drilled in the area indicate that bedrock is likely deeper than 600 to 1,000 feet in the project vicinity (HLA 1983; Golder 2003; Shannon & Wilson 2004).

The topography of the area surrounding the project is the result of past glacial activity. Knik Arm has experienced at least five glacial events in the last 2 to 3 million years (Karlstrom 1964). The most recent events include the Knik Glaciation and the Naptowne Glaciation, both of which occurred within the past 75,000 years. During the Knik Glaciation (30,000 to 75,000 years ago), thick sequences of sediment, known as the Knik Ground Moraine, were deposited as glaciers retreated. Within the study area, these deposits extend from Eagle River valley to Point MacKenzie and Point Woronzof, and lie mostly below sea level. The deposits generally consist of poorly sorted till sediment deposited by glacial ice (Karlstrom, 1964; Mat-Su Borough, 1995).

The Naptowne Glaciation (11,000 to 30,000 years ago) is responsible for the majority of glacial deposits currently encountered in the Knik Arm and Point MacKenzie. At its maximum, the Naptowne Glaciation extended across the Anchorage Bowl area from the north and terminated at Point Woronzof and Point Campbell (Reger and Pinney, 1997). The Bootlegger Cove Formation was formed during this time in ice-free areas of the Susitna River valley, lower Knik Arm, and Upper Cook Inlet (Reger et al., 1995). Bootlegger Cove sediments generally consist of estuarine, marine, and lacustrine clays and silts with lesser amounts of sand and scattered pebbles and cobbles (Schmoll et al. 1984; Updike and Carpenter, 1986).

Overlying the Bootlegger Cove Formation clays are sand and gravel glacial deposits, including the Naptowne Outwash and the Elmendorf Moraine. Approximately 14,000 years ago, the Elmendorf Moraine was formed at the terminus of the Knik-Matanuska glacial lobe and is now a prominent topographic feature on both sides of the Knik Arm. The Elmendorf Moraine consists of a wide variety of poorly sorted sediments and stretches across Elmendorf Air Force Base from about Cairn Point northeast to the town of Eagle River. On the west side of Knik Arm, the Elmendorf Moraine arcs north from Point MacKenzie towards Wasilla and Big Lake. The retreat of ice, following deposition of Elmendorf Moraine, left behind ground moraine, kame fields, kame terraces, and abandoned channels on both sides of Knik Arm (Karlstrom 1964; Reger et al. 1995). As described above, a portion of the moraine has been eroded by the tidal influxes of the Knik Arm, which formed in response to a worldwide rise in sea level because of retreating glaciers.

The Naptowne Outwash is a flat sprawling apron of glaciofluvial sediment that overlies much of the Bootlegger Cove Formation on both the east and west sides of the Knik Arm. This material was deposited by large braided stream channels that contained sand and gravel and flowed from the Knik-Matanuska glacier. These sediments were subject to constant reworking by the glacial runoff and consist of a variety of sorted sediment that has been deposited in front of the Elmendorf Moraine.

Surface soils along the northern part of the Point MacKenzie alignment are typically well-drained and consist of silt over gravelly sand. Soils along the southern part of the Point MacKenzie alignment consist of a mixture of well drained and poorly drained soils, all of which were derived from glaciofluvial and glaciolacustrine plains, hills, and depressions left behind by the Naptowne Glaciation. These soils are typically composed of sandy silts over stratified sandy, silty clays, gravelly silty clays, sand and gravelly sand, or gravelly sandy to cobbly silts.

Ash fall within Southcentral Alaska has not been recorded as occurring in thick units. During the 1989-1990 eruption of Mount Redoubt, approximately 3 inches of ash fell over the Anchorage area (AVO). In 1992, Mount Spurr erupted with a subsequent ash fall of approximately 3 millimeters (USGS 2002).

4.0 TECTONICS AND SEISMIC HAZARDS

The Upper Cook Inlet region is one of the most seismically active areas in the United States and historically subjected to large (greater than 6.0 Magnitude) earthquakes. Alaska experiences approximately 24,000 earthquakes of any given magnitude per year, which accounts for 52 percent of all the earthquakes in the United States (AEIC).

The tectonics and seismicity of southern Alaska are the result of ongoing relative motion between two lithospheric plates; the Pacific Plate moves about 5 to 6 centimeters per year (cm/yr) northwestward relative to the North American Plate. The margin of convergence between the plates is the subduction zone and is marked on the surface by the Aleutian trench, southeast of Anchorage. Active seismicity in southcentral Alaska occurs as both deep earthquakes associated with the subduction zone, as well as shallow earthquakes associated with long linear transform faults and smaller fault-cored fold structures (Figure 2).

5.0 SUBSURFACE EXPLORATIONS

Shannon & Wilson conducted geotechnical explorations to evaluate the subsurface conditions that would likely be encountered during construction of the road improvement project. In total, 93 borings were completed. In general, one boring was advanced approximately every 1,000 feet along the existing Point MacKenzie Road and the undeveloped portion of the alignment except in areas where deep cuts were to be made or where peat deposits were expected. The approximate locations of the borings are presented on the plan and profile sheets in Appendix A.

In addition to the road improvement subsurface investigation, a gravel burrow source investigation was also conducted. Seven borings were advanced in areas that could be potentially developed as gravel sources to estimate the suitability of soils in these areas for use in the construction of this project. The locations of these gravel source areas are shown in Appendix A, Figure A-97 and on the Plan and Profile Sheets (where possible) presented as Figure A-3. The boring logs for these explorations are also included in Appendix A as Figures A-98 through A-104.

6.0 LABORATORY TESTING

Laboratory tests were performed on select soil samples from the borings to estimate the physical characteristics and engineering properties of soils encountered. The laboratory testing program on the soils was formulated with special emphasis on the characterization of native and existing soils for road construction. Additionally, index tests namely moisture contents, gradation and Atterberg limits were conducted to better establish the behavior characteristics of these soils. The parameters from these tests, combined with visual examination of sample consistency during drilling, the penetration resistance values from the Standard Penetration tests, and other field measurements provide the information needed for our preliminary engineering analysis of the soils.

Results of the soil tests performed on samples from each boring as well as results of laboratory analysis of the gravel source investigations are presented in Appendix B, along with a brief description of each test. The results of these tests have been used to estimate the physical characteristics of the major soil units discussed in Section 7.

7.0 SUBSURFACE CONDITIONS

Subsurface conditions at each boring site are presented graphically in the boring logs presented in Appendix A (Figures A-4 through A-96) and as stick logs on the Plan and Profile Sheets (Figure A-3). Our borings encountered a range of soil types from existing fill material to native soils and organics (peat).

Existing Fills

The majority of the borings advanced along the existing road encountered slightly silty to silty, sandy gravel fill material in the upper 5 feet within the existing road prism. According to laboratory testing, the fines content of this type of fill generally ranged from 10 and 14 percent. Periodically, our borings encountered slightly silty to silty, gravelly sand fill soils within the existing road prism with fines content generally ranging from 8 and 31 percent. Occasionally, significantly silty fills were encountered with fines as high as 40 percent. Moisture contents for the encountered fill materials ranged from 0.5 to 21.1 percent with an average of approximately 3 percent. The existing fill was frozen at the time of our explorations and is assumed to have a relative density of medium dense to dense.

Granular Native Soils

Explorations along the existing road encountered native slightly silty to silty, sandy gravel and slightly silty to silty, gravelly sand. Fines content ranged from 6 to 9 percent for the gravel and 4 to 20 percent for the sand. Occasionally, sandy silty gravels with approximately 40 percent fines were encountered as well as gravelly, silty sands containing approximately 31 to 48 percent fines.

During the explorations along the undeveloped portion of the proposed alignment, slightly silty to silty sandy gravels and slightly silty to silty gravelly sands were generally encountered below the surface organics. Fine contents were approximately 25 percent in the gravels and ranged from 11 to 27 percent in the sands. Occasionally, slightly gravelly, silty sand was encountered with fines of 29 to 44 percent.

Moisture contents for the sandy material ranged from 2.7 to 30.9 percent with an average of approximately 9 percent. The gravel soils moisture content ranged from 1.2 to 12.8 percent with an average of approximately 5 percent. Relative densities for the coarse-grained material encountered ranged from loose to very dense and was most commonly dense.

Fine Grained Native Soils

Silts and clays were encountered throughout the project area and at varying depths. Along the existing road, silt and clay layers were encountered anywhere from 0 to 30 feet below the ground surface (bgs) with varying thicknesses. Most of these soils also contained sands and gravels. Occasionally, organic material was found intermixed with the silts and/or clays. Moisture contents for the fine-grained soils encountered ranged from 8.2 to 54.8 percent with an average of approximately 20 percent. The consistency of the fine-grained soils encountered ranged from soft to hard and were most commonly medium stiff.

The plasticity of the encountered fine-grained soils varies widely across the project area. Based on laboratory tests, the clay soils encountered contained plasticity indexes of approximately 10. The plasticity indices of the silt soils encountered was typically about 4. Non-plastic clays and silts were also encountered.

Peat/Organic Rich Soils

Organics (peat) were encountered in borings advanced through marshy areas as well as a number of borings along the existing road. Peat was identified below the road prism in Borings B-020, B-028, B-034, B-045, B-047, B-049, and B-051. This organic layer was encountered at depths ranging from 4 to 16 feet bgs below the road with thicknesses from 1 to 8 feet.

The swamp located between Stations 415+00 and 438+00 contained three borings (B-046, B-048, and B-050) located off the existing road. These borings encountered peat at ground surface to between 3 and 8 feet bgs. Boring B-048 encountered peat from 11.4 to 20.1 feet bgs. Borings B-068, B-071, B-073, B-079, B-081, B-085, B-086, and B-087 were advanced along the undeveloped alignment and encountered peat from the surface to approximately 2 feet bgs.

Borings B-048 and B-091 encountered a unique layer of soft organic silt\clay at approximately 20 and 26 feet bgs, respectively. The silt\clay was approximately 3 to 5 feet thick and contained scattered crustacean shells. Moisture contents for the layers encountered were between 166 and 195 percent. Atterberg limits on the silt\clay estimated plastic indexes of approximately 126 and 103, respectively. The silt\clay was not encountered in adjacent borings, however it may exist between sample intervals.

Gravel Source

Borings X-1 through X-4 encountered gravelly sand with fines content ranging from 16 to 32 percent. The gravel content in the gravelly sand portion of Borings X-1 through X-4 ranged from 26 to 47 percent. In addition to the gravelly sand, gravelly silts were also encountered. Gravel content in the silts from Borings X-1 through X-4 ranged from 12 to 15 percent. Boring X-4 also encountered silty sand with a fines content of 16 percent.

Borings X-6 through X-8 encountered silty sands, sandy silts, and sandy clays. The fine content of the sands was estimated at between 40 and 50 percent. Minor gravel was encountered in these borings.

Groundwater

Groundwater was found in a number of borings along the proposed alignment and at varying depths. The depth groundwater was encountered is noted on the appropriate boring log (presented in Appendix A) along with the date of drilling.

8.0 ENGINEERING RECOMMENDATIONS

The focus of the project is to realign and widen the Port MacKenzie access route. Based on the results of our field explorations, the corridor traverses a wide variety of terrain and soil conditions. This report presents generalized recommendations on a preliminary basis and it is our opinion that the information contained herein should be used for planning purposes only. We recommend additional explorations be conducted along the corridor and at the quarry sites prior to final design to provide subsurface coverage consistent with the ADOT&PF October 2003, *Engineering Geology & Geotechnical Exploration Procedures Manual*.

Preliminary recommendations provided in this report address major aspects of the project such as subgrade preparation, embankment development, and pavement section construction. We also provide general discussion of issues related to settlement, drainage, seismic considerations, and structural fill characteristics and usage. The goal of the recommendations is to assist you in developing a preliminary design that can be used to plan logistics, costs, and schedules for construction of the new roadway.

8.1 Site Preparation

Before construction of the road improvements occur, several steps will need to be taken in order to prepare the existing features. The recommendations outlined below should take place before fill placement in embankments and for pavement section development. Site preparation activities generally include clearing and grubbing or stripping, excavating for cuts or sub-cutting organic surface soils, and preparing the existing roadway or other fill surfaces for fill cover.

8.1.1 Ground Clearing/Stripping

Vegetation and surface organics will need to be removed from portions of the corridor that are not currently developed for the existing Port MacKenzie Road. Surfaces that will eventually receive fill should be stripped of vegetation (grass, shrubs, trees, etc.), the upper layer of organics (peat, organic silt, etc.), and soft or compressible soil if present. According to our borings along the alignment, the surface organics are largely comprised of dark brown, organic silt and peat soil containing roots and decayed plant matter and generally varies from 1 to 2 feet thick in areas that have not been developed. This soil is frost susceptible and/or compressible and is generally unsuitable, in our opinion, within the active frost zone beneath an arterial pavement. Therefore, we recommend that this layer be removed and disposed. The exposed surface should be smoothed with scraping equipment and tracked to ensure a smooth, consistent base for new fill. Due to the silt content in much of the soil encountered in our borings, we believe silty, native soils will be sensitive to water and disturbance caused by construction traffic. Therefore, advanced drainage considerations should be made in topographically low areas to limit the collection of surface water. In areas where the roadway will not be constructed over thick peat deposits and subgrade soils contain more than approximately 30 percent silt, we recommend installing a non-woven separation geofabric to create a barrier preventing siltation of fills placed on top of these exposed native soils. Specifications and considerations for geotextile use are presented later in Section 8.8.

Note that we did encounter areas where surface deposits of peat and/or ash were greater than 20 feet thick. Depending on the peat thickness and the desired performance of the roadway, thick sections of peat may be excavated prior to road fill placement. Construction over a peat subgrade is discussed in further detail in Section 8.1.3. In sub-cutting to remove peat and ash soils, the excavation should be extended laterally from the roadway centerline far enough to allow development of fill slopes at slopes not steeper than 1.5 horizontal (H) to 1 vertical (V) below the existing ground surface. The material should be removed so that firm, native, mineral soils are exposed over the entire excavation bottom. We believe the exposed soils at the bottom of the excavation will likely be moisture sensitive and flat-nosed excavator buckets should be used. Additionally, equipment should not be operated on the exposed subgrade prior to fill placement. Woven separation geofabric should be placed on the excavation bottom and an initial, 2-foot lift of Select Material Type A fill should be pushed into place over the geofabric and tracked or rolled with a static drum for compaction. Above the geofabric and initial lift of fill, embankment development may commence as described in Section 8.3.

8.1.2 Existing Roadway Preparation

Much of the alignment is located on or adjacent to the existing Port MacKenzie Road and some preparation of the existing grade will be required before filling. First, the upper 6 inches of exposed fill material should also be removed in areas where the existing road prism materials are to remain in place. Other areas will require cutting deeper into the existing fills or potentially removing them completely in areas where the road was developed over organic soils. In cases where the road material is left in place, the exposed grade after removing the upper 6 inches of fill should be graded and compacted with a static drum roller or tracked equipment. We also recommend these areas be inspected by an experienced geotechnical engineer to detect loose or soft zones. These areas should be excavated and replaced with compacted, Select Material Type A (see gradation requirements in Figure 3). They may also be “healed” with geogrid reinforcement. Ultimately, the exposed surfaces of existing road grade to receive additional fills should be smooth and relatively compact prior to embankment or structural section development.

8.1.3 Organic Subgrade Preparation

In areas where peat was encountered in thick, saturated layers, it may not be practical to excavate all of the peat from beneath the new embankment. We recommend excavating and rebuilding existing embankments that would be included within the new roadway alignment and that have been constructed over peat subgrade. It is important to note that similar, more isolated areas may also exist at many other locations along the alignment that were not encountered by our borings. In developing embankments in these areas, the existing grade should be prepared by disturbing the organic surface as little as possible. Trees and shrubs should be cut approximately 6 inches above the ground surface, leaving the surface mat largely intact. Woven geofabric should then be spread over the footprint of the new embankment in preparation for the new fill.

While the exact details of the embankment configuration should be determined in final design, we recommend that at least the bottom 5 feet of embankment constructed over an organic subgrade consist of Select Material Type A and a double layer of biaxial geogrid. An initial 2-

foot lift of Select Material A should be placed and compacted as recommended in Section 8.7, followed by a layer of geogrid, an additional 1-foot thick layer of Select Material Type A, another layer of geogrid and then 2 additional feet of Select Material Type A. Fill material placed above the initial 2-foot lift may be placed and compacted using conventional vibratory equipment. Recommended Geogrid specifications are provided in Section 8.8. The goal of the double geogrid layer and higher quality fill near the bottom of the embankment is to reinforce and bridge over softer areas to achieve more uniform settlement over the entire embankment over these sections. Depending on the consistency of the subgrade and height of the embankment, settlement can be expected to be on the order of 10 to 20 percent of the organic layer thickness over the life of the roadway. Embankments can then be developed up to the bottom of the road prism described in Section 8.6. We recommend that where this embankment section is used, it be extended at least 100 feet longitudinally to provide a smoother transition between soft subgrade and surrounding, firm subgrade.

8.2 Excavation Considerations

The plan and profile sheets indicate that cuts associated with this project will generally be less than 40 feet in depth. We believe conventional earthmoving equipment will likely be used in conducting cut excavations for this project. Because of the depositional environment of the area, the contractor should plan on encountering large boulders occasionally in excavations along the alignment.

When excavating existing embankment materials and native soils, the disturbance will likely cause the soils to swell, effectively decreasing the bulk density of the excavated material when compared to in-place density. Blow count values may be used to estimate in-place densities, however, it is clearly a gross estimation as the soil types are variable and blow count values are controlled by more than soil density (i.e. the presence of larger gravel, etc.). Additionally, blow count values collected from the prism materials represent frozen conditions and do not reflect the condition of existing fill materials in their thawed state. Since no in-place or disturbed density tests were performed on any of the soils, swell factors can only be estimated using the limited density estimations provided by the blow count data and professional judgment.

Primarily silty soils ranged from soft to stiff and the more granular native soils found generally ranged from medium dense to very dense. In our opinion, there was no indication from the borings that the native soils were overconsolidated. The following table presents the estimated ranges of swelling factors due to excavation for the three major soil type encountered by the ADOT&PF explorations.

Soil Type	Potential Swell Factors
Native Silts and Clays	1.1 – 1.7
Native Silts and Clays with Sand and Gravel	1.2 – 1.6
Native Sand and Gravel	1.2 – 1.5
In-Place Granular Fills	1.3 – 1.5

In our opinion, excavated existing fills that will be reused as structural fill will likely recompact to a density comparable to its present condition, with proper moisture control. Therefore, we believe the overall shrink/swell factor for in-place structural fill materials is negligible.

8.3 Embankment Construction

Prior to embankment fill development, some subgrade preparation will be required as outlined in Section 8.1. Structural fills (Select Material Type C or better) may then be placed on the smooth, unyielding surface as outlined in Section 8.7. We recommend that fill placed in embankments for this project should be well blended to provide a relatively consistent material. Fill placed in embankments should be compacted as outlined in Section 8.7. If Select Material Type C is used for this project, isolated areas of embankment fill may prove difficult to compact due to excess moisture and high silt content. If encountered, these areas may be "healed" by excavating and replacing with free draining material or with geogrid reinforcement. Embankment fills should be developed to top of subgrade elevation, where the recommended road structural section should be constructed.

8.4 Widening Existing Embankments

Widening existing embankments will likely be required where the new road alignment is near or on the centerline of the existing roadway. Adding fill to the side of an existing embankment will create sliver fills that are typically difficult to compact. It should be noted that subgrade preparation described above should be used in developing these new embankments as well. Also, if the existing roadway is construction over peat subsoils, it is likely that the existing embankment will need to be removed along with the peat and an entire new embankment will then be constructed.

Sliver fills are roughly defined as narrow fills that essentially widen an existing embankment fill. In cross section, these fills are in the shape of narrow wedges on one or both sides of an existing fill or create a road or trail on an existing slope. When designing and constructing these types of fills, it is important to address the stability and quality of the new embankment and its conformity to the fills that already exist.

Frequently, sliver fills are constructed by simply side casting and bulking new material over the edge of an existing embankment. While the embankment is widened, this technique does not allow for adequate compaction of new soils. It also causes an unconformity at the new/old embankment interface, which is often a plane of weakness that can spawn future slope failure and differential settlement under loading. We recommend that new "sliver" fills be keyed into the existing embankment slopes using 3 to 4-foot high benches to allow for a stable joining of new and old fills, and to encourage good compaction of the new embankment materials. Keying in the new fills will create a stair-stepped interface between new and old fills in cross section as shown in Figure 4.

8.5 Permanent Cut and Fill Slopes

Soil slopes created by embankment fills and cut sections along the alignment should be constructed to a maximum 2H to 1V. From a constructability standpoint, the contractor should be prepared to deal with spring water released while excavating cut slopes and also protection of silt exposures in cut slopes from sheet erosion or rilling. To accomplish this, we recommend constructing spring head drains in areas of persistent seepage to intercept the groundwater with a horizontal trench drain on the slope face and a downslope trench drain to carry the water to the drainage ditch adjacent to the new road. Trench drains should consist of 2 to 4 foot wide trenches filled with crushed aggregate ¾ to 2 inches in diameter. Lastly, the slopes should be seeded to establish vegetation before the end of the construction season. We do not recommend spreading topsoil on embankment or cut slopes as this allows the build-up of hydrostatic pressure and increases the chances for surface "pop-outs" or slumping during spring melt periods.

8.6 Pavement Design

Design of new pavements should consider the bearing support capabilities of the underlying soils at the subgrade level as well as the subgrade moisture content and frost susceptibility. These factors affect pavement section performance including expected settlements and potential seasonal heaving. In general, existing fills found along the corridor are frost susceptible ranging from F2 to F3. Granular native soils encountered in our borings varied significantly from non-frost susceptible sands and gravels to frost susceptible silty sand and silty gravel.

8.6.1 Road Pavement Sections

Assuming the pavement section was to be built directly on the frost susceptible (F3) native soils, existing fill soils, or new Select Material Type C fill, we recommend that the pavement section be made 40 inches thick and consist of the materials and layering shown in the below table.

Layer Thickness (inches)	Material Type
2	Asphalt Concrete
4	Asphalt Treated Base
16	Select Material, Type A
18	Select Material, Type B

It should be noted that some areas of the alignment will be constructed over relatively competent, non-frost susceptible (NFS or F1) soils. In these areas (typically those with native soils containing less than 6 percent fines) the bottom layer of Select Material Type B may be removed from the recommended section. Further explorations are needed to better define the extents of non-frost susceptible soils along the project corridor. Structural fill materials placed and compacted for this project should be done so as described in Section 8.7. Select Material, Type A placed in the upper 16 inches of the new road prism should have a maximum grain size of 3 inches to accommodate requirements of the asphalt treated base layer.

8.6.2 Frost Penetration Considerations

A frost penetration estimation has been conducted on the above 40 inch recommended pavement section. Given the general climatic conditions of the area and assuming that the 40 inch pavement section is constructed directly on the silty native soils, we believe that frost will penetrate approximately 2.5 feet into the subgrade during winter months. It is our opinion that said frost penetration will cause heaving at the road surface, however, it is likely that it will be relatively uniform given the general uniformity of the local native soils. Since a certain amount of heave is expected, we also believe that the subgrade will be weakened for a certain amount of time in the spring when the subgrade thaws, making reduced axle load limits on the road necessary.

If reducing axle load limits on the roadway is not desirable, we recommend increasing the above 40 inch section to 64 inches by increasing the Type A subbase layer to 40 inches over zones of frost susceptible soils (F3 and F4). This will decrease the amount of frost penetration into the subgrade significantly. In our opinion, this section will provide enough protection such that reduced axle loads should not be necessary to protect the driving surface during the spring months. Note that additional explorations should be conducted to better define the limits of frost susceptible subgrade soils along the project corridor.

8.7 Structural Fills and Compaction

We recommend that unclassified material placed during the construction of this project (i.e., non-structural fill placed outside of the pavement structural section) consist of soils that generally have less than 20 percent fines (particle size less than the Number 200 Standard Sieve) based on the minus ¾ inch portion. It should also have a moisture content close to optimum where it can be placed in loose lifts not to exceed 8-inches thick and compacted to at least 95 percent of the maximum density as determined by the Modified Proctor compaction procedure (ASTM D-1557).

Base and subbase course materials should consist of free-draining, relatively clean sandy gravel. Select Material, Type B is specified in the deeper portions of the pavement structural sections. Because of the depth at which this material is placed in the structural section, it may contain slightly higher amounts of fine grained material. This layer combined with the Select Material Type A will provide most of the support needed for the anticipated traffic on the proposed roadway. Select Materials Type A and B are specified in Sections 703-2.09 and 703-2.09, respectively, in the Alaska DOT&PF Standard Specifications for Highway Construction. Figure 3 summarizes the gradation requirements for the materials described above.

Structural fills placed during construction of this project, should be placed in loose lifts not to exceed 12 inches and compacted (with moisture control) to 95 percent of the maximum density as determined by the Modified Proctor compaction procedure (ASTM D-1557). In addition, care should be taken during fill placement to ensure that they are not “contaminated” with deleterious mater such as organics, silt, ice, etc. It is our opinion that proper compaction may be achieved in the granular fill material using conventional vibratory equipment.

8.8 Geosynthetics

Recommendations presented earlier in this report include the use of geofabrics and geogrids. These materials are used for separation of embankment fill from native soils and reinforcement of embankments constructed over soft subgrades. Generalized guidelines for construction and recommended material types are listed below. It should be noted that the recommended applications of these materials previously and below in this report are to be used as guidelines in the final design. The manufacturer of the product selected can provide additional use and design guidelines for the specific product and application.

8.8.1 Geofabric

After the area to be treated with geofabric has been prepared as described in Section 8.1, woven or non-woven geofabric should be placed over the exposed grade. While this geofabric layer will not significantly increase the stability or strength of the embankment itself, it will prevent intermixing of peat and native silts or clays with structural fill. We recommend the following minimum material properties (also known as minimum average roll values or MARV) when selecting a geofabric for this application in the project:

Woven geotextile

- Puncture by ASTM D4833: 100 lb
- Mullen Burst by ASTM D3786: 450 psi
- Trapezoidal Tear by ASTM D4533: 75 lb
- Grab Tensile by ASTM D4632: 200 lb
- Grab Tensile Elongation by ASTM D4632: 15 percent

Non-woven geotextile

- Puncture by ASTM D4833: 100 lb
- Mullen Burst by ASTM D3786: 330 psi
- Trapezoidal Tear by ASTM D4533: 75 lb
- Grab Tensile by ASTM D4632: 180 lb
- Grab Tensile Elongation by ASTM D4632: 50 percent

To minimize the impact of horizontal unconformities due to seams, at least 1 foot of overlap should be maintained on roll side and end seams. End seams should also be staggered by a distance equal to the roll width. Also, after the fabrics are unrolled on the embankment footprint, fills should be pushed onto the fabric from the center of the embankment in an outward direction to discourage the formation of a mudwave as the embankment advances over soft soils.

8.8.2 Geogrid

The geogrid recommended for the bottom of the new embankment sections should increase the strength and stability of the embankment. By increasing the tensile strength of the lower embankment soils, differential settlement should be decreased both longitudinally along the alignment and laterally from the center to the edges of the embankment. We recommend the following minimum material properties (also known as minimum average roll values or MARV) when selecting a geogrid for this application in the project:

- Aperture Dimension: 1 in.
- Minimum Rib Thickness: 0.05 in.
- True Initial Modulus in Use: 27,420 lb/ft
- True Tensile Strength @ 2% Strain: 410 lb/ft
- True Tensile Strength @ 5% Strain: 810 lb/ft
- Junction Efficiency: 93 percent
- Flexural Stiffness: 4.2 lb-in
- Aperture Stability: 6.5 degrees

Sections of geogrid should be unrolled smoothly on the grade surface so that it covers the entire exposed grade evenly. There should also be at least 1 foot of overlap between grid sheets. Fill lifts on top of geogrid should be placed and compacted as described in Section 8.7. Traffic on top of the initial lift over the grid should travel in straight lines to prevent damaging the geogrid. In order for geogrid to improve the strength of the embankment soils, it should be placed between compacted granular fill layers. The effectiveness of the geogrid will be greatly reduced if the grid is placed directly on soft or compressible subgrade. Additionally, the double layer of geogrid is recommended such that at least 1 foot, but not more than 3 feet, of fill is placed between the geogrid sheets.

8.9 Drainage

To extend the life of the paved road and pathway and minimize seasonal heaving, attention to drainage details should be emphasized. All paved surfaces should be sloped or crowned at a minimum 2 percent grade to encourage drainage of surface water off the driving surface. Where natural drainage away from the pavement is not possible, such as cut slopes or low lying areas, surface ditches in shoulder areas are recommended to direct surface runoff away from the pavement prism. Keeping the water contents in the subgrade and subbase soils low with good site drainage, will limit seasonal heaving of road pavements.

When placing culverts, it will be important to provide a firm base of compacted fill. We recommend that at least 2 feet of compacted Select Material, Type A be placed beneath each culvert and that the same material also be used around and over the buried pipe so that there is at least 2 feet (or ½ the culvert diameter, whichever is greater) of compacted Select Material Type A atop the pipe. When placing this fill around and on top of this pipe, hand operated compaction equipment should be used.

9.0 CLOSURE AND LIMITATIONS

The analyses and subsurface interpretations contained in this report are based on site conditions as they presently exist. It is assumed that the existing data is representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the existing data.

Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely coring pavements or taking soil samples. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs. Shannon & Wilson has prepared the attachments in Appendix C "Important Information About Your Geotechnical/Environmental Report" to assist you and others in understanding the use and limitations of the reports.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:

Kyle Brennan
Senior Geotechnical Engineer

Kyle Brennan
CE - 11122

Reviewed by:

William S. Burgess, P.E.
Senior Associate

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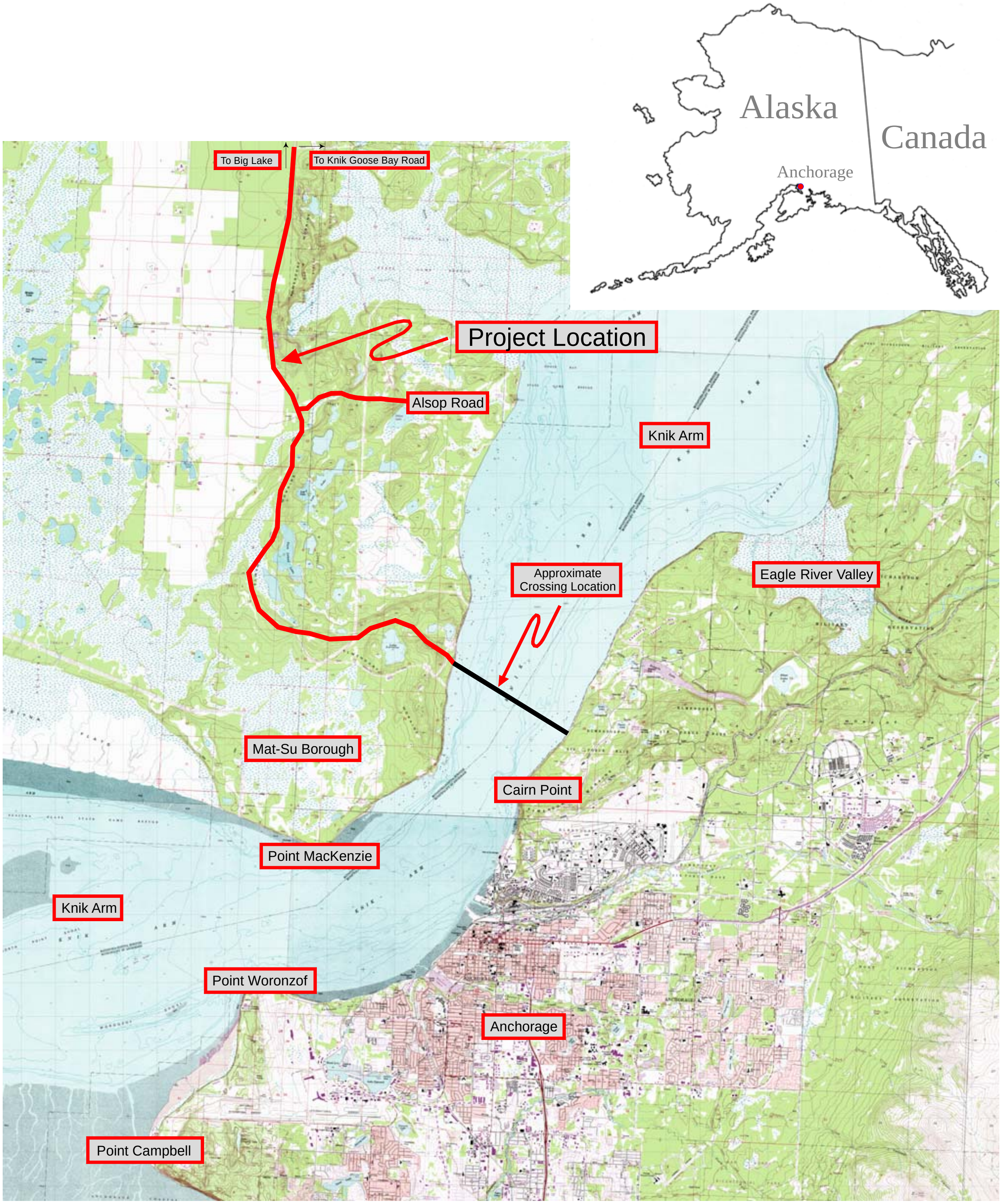

1927 North American Datum; Topography in Meters
Map compliled from USGS Quads: AK Tyonek A-1 NE, AK Tyonek B-1 NE, AK Tyonek B-1 SE, AK Anchorage A-8 NW, AK Anchorage A-8 NE, AK Anchorage B-8 NW, AK Anchorage B-8 SE, AK Anchorage B-8 SW, AK Anchorage B-8 NE

MAP NOT TO SCALE

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

VICINITY MAP

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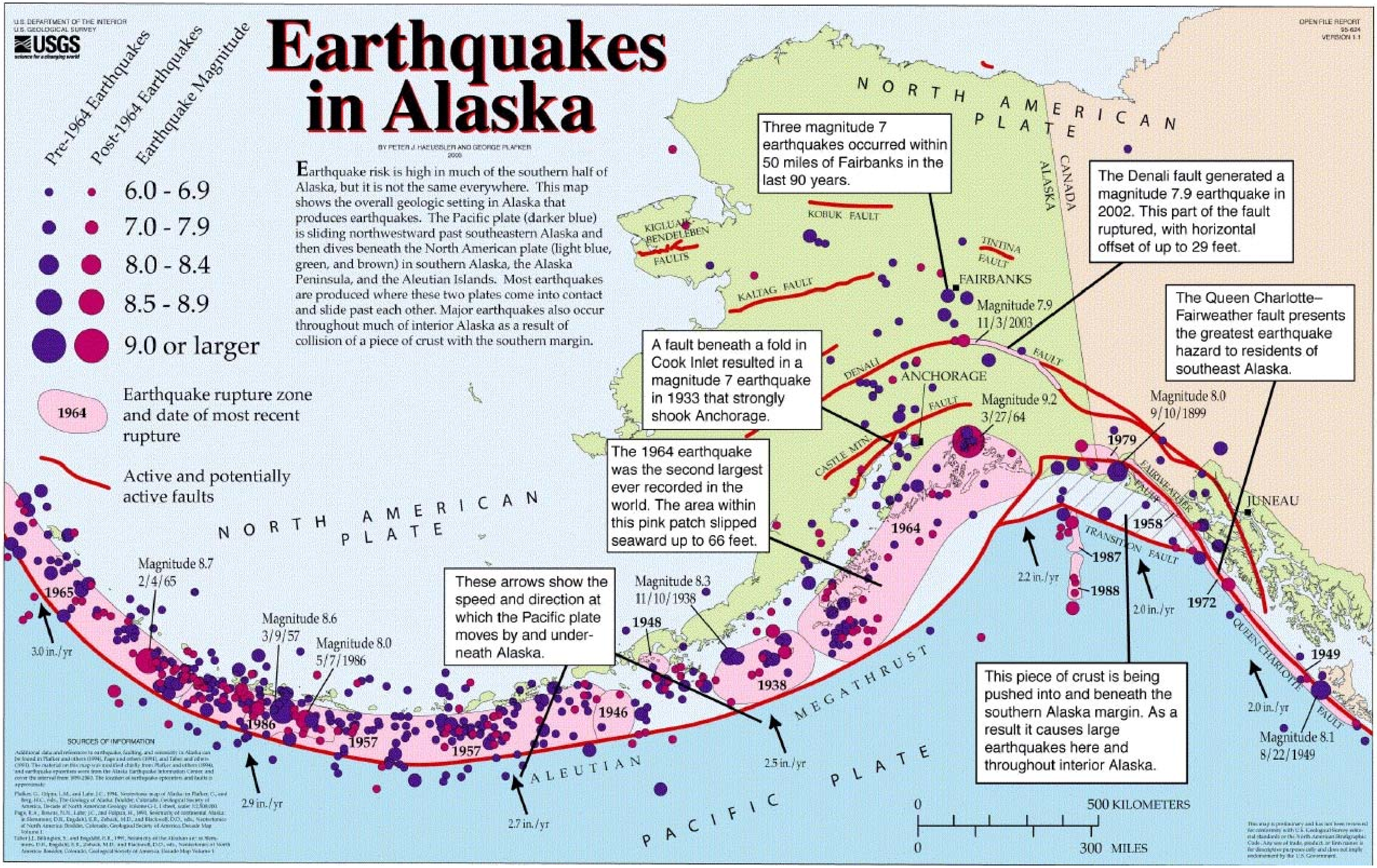
Fig. 1



Earthquakes in Alaska

BY PETER J. HAEUSSLER AND GEORGE PLAFKER
2003

Earthquake risk is high in much of the southern half of Alaska, but it is not the same everywhere. This map shows the overall geologic setting in Alaska that produces earthquakes. The Pacific plate (darker blue) is sliding northwestward past southeastern Alaska and then dives beneath the North American plate (light blue, green, and brown) in southern Alaska, the Alaska Peninsula, and the Aleutian Islands. Most earthquakes are produced where these two plates come into contact and slide past each other. Major earthquakes also occur throughout much of interior Alaska as a result of collision of a piece of crust with the southern margin.

Three magnitude 7 earthquakes occurred within 50 miles of Fairbanks in the last 90 years.

The Denali fault generated a magnitude 7.9 earthquake in 2002. This part of the fault ruptured, with horizontal offset of up to 29 feet.

The Queen Charlotte–Fairweather fault presents the greatest earthquake hazard to residents of southeast Alaska.

A fault beneath a fold in Cook Inlet resulted in a magnitude 7 earthquake in 1933 that strongly shook Anchorage.

The 1964 earthquake was the second largest ever recorded in the world. The area within this pink patch slipped seaward up to 66 feet.

These arrows show the speed and direction at which the Pacific plate moves by and underneath Alaska.

This piece of crust is being pushed into and beneath the southern Alaska margin. As a result it causes large earthquakes here and throughout interior Alaska.

Source: http://www.aeic.alaska.edu/

Knik Arm Crossing
Point MacKenzie, Alaska

TECTONICS

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Fig. 2

GRADATION AND DURABILITY REQUIREMENTS

After: Alaska Department of Transportation
Standard Specifications for Highway Construction

D1

U.S. STANDARD SIEVE SIZE		PERCENT PASSING BY WEIGHT
English	Metric	
1 in.	25 mm	100
3/4 in.	19 mm	70 - 100
3/8 in.	9.5 mm	50 - 80
No. 4	4.75 mm	35 - 65
No. 8	2.36 mm	20 - 50
No. 50	0.300 mm	8 - 30
No. 200	0.075 mm	0 - 6

Select Material Type A

U.S. STANDARD SIEVE SIZE		PERCENT PASSING BY WEIGHT
English	Metric	
No. 4	4.75 mm	20 - 55
No. 200	0.075 mm	6 Max. on minus 3-in. portion

Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by WAQTC FOP for AASHTO T 89/T 90. Meet the gradation as tested by WAQTC FOP for AASHTO T 27/T 11.

Select Material Type B

U.S. STANDARD SIEVE SIZE		PERCENT PASSING BY WEIGHT
English	Metric	
No. 200	0.075 mm	10 Max. on minus 3-in. portion

Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by WAQTC FOP for AASHTO T 89/T 90. Meet the gradation as tested by WAQTC FOP for AASHTO T 27/T 11.

Select Material Type C

U.S. STANDARD SIEVE SIZE		PERCENT PASSING BY WEIGHT
English	Metric	
No. 200	0.075 mm	30 Max. on minus 3-in. portion

Aggregate containing no muck, frozen material, roots, sod or other deleterious matter and with a plasticity index not greater than 6 as tested by WAQTC FOP for AASHTO T 89/T 90. Meet the gradation as tested by WAQTC FOP for AASHTO T 27/T 11.

Coarse Aggregate Durability

Retained on #4 Sieve

Test Type	Percent Loss
L.A. Abrasion	45 - 50 max. *
Sulfate Soundness	9 max.

* Asphalt and Surface Course = 45% max
Base Course = 50% max

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

GRADATION AND DURABILITY REQUIREMENTS

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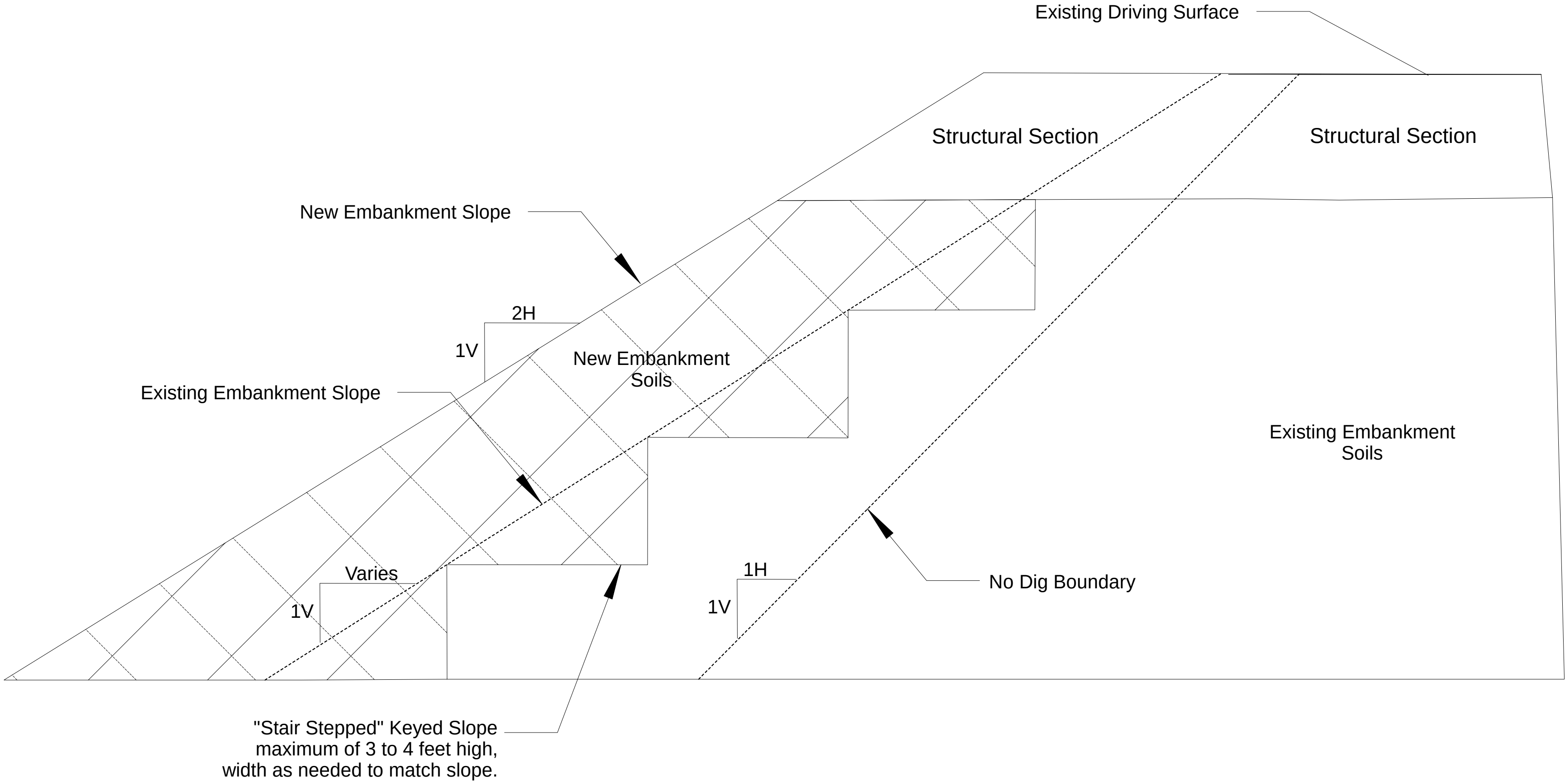
Fig. 3



Notes:

New embankment, road base and subbase materials should be placed and compacted as outlined in Section 8.7 of the report.

The new structural section should be developed as described in the report, The upper levels of the existing embankment may not match the recommended structural section.

Drawing not to scale.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

SLIVER FILL DETAIL

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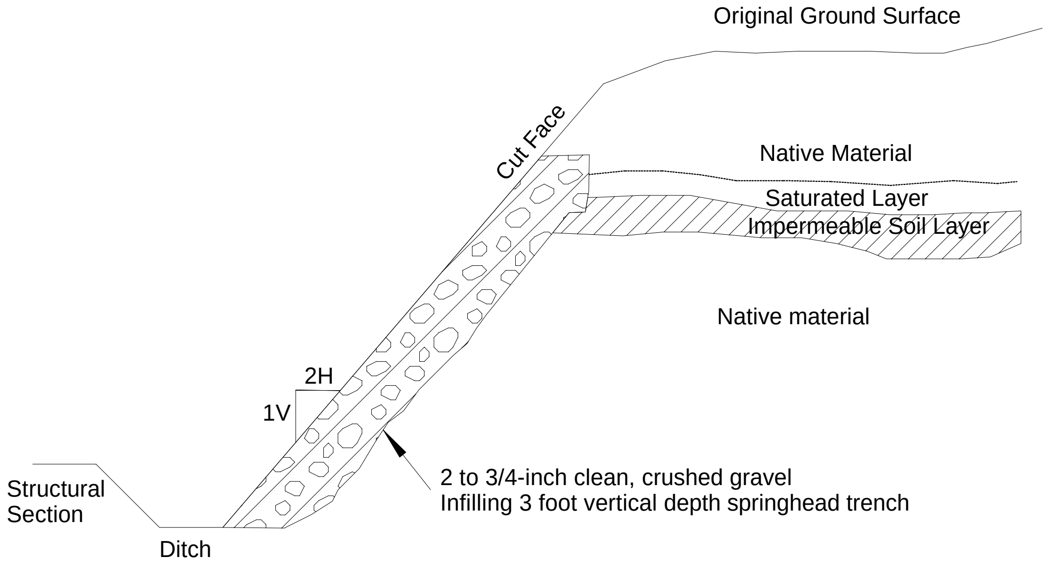
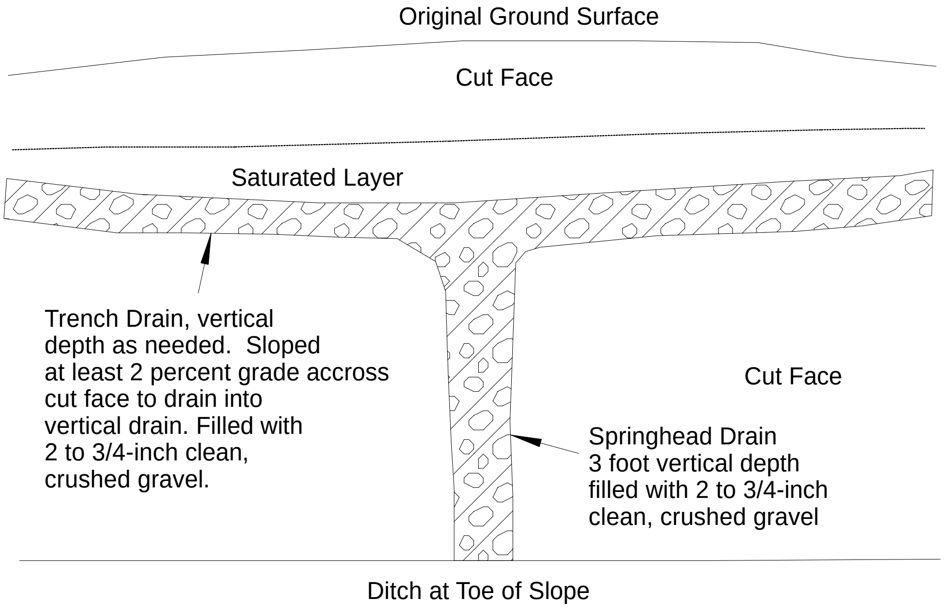
Fig. 4



Cross Section



Profile

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

SPRINGHEAD DRAIN DETAILS

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Fig. 5

APPENDIX A

PLAN AND PROFILE SHEETS / BORING LOGS

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APPENDIX A
PLAN AND PROFILE SHEETS / BORING LOGS

The Point MacKenzie Alignment is located along approximately 10 miles of existing Point MacKenzie Road and 3.5 miles of undeveloped land. The purpose of the explorations described below is to provide subsurface information that can be used to facilitate the design of the new road. The information included herein should be considered a starting point as adjustments from the currently proposed alignment later in the project life or other data needs may require additional explorations along the project alignment.

A.1 Subsurface Investigations

Ninety-three borings, designated B-001 through B-093, were conducted along the corridor of the proposed Point MacKenzie Alignment. Additionally, seven borings, designated Boring X-1 through X-4 and X-6 through X-8, were advanced in areas of potential gravel sources. The purpose of the explorations was to gather subsurface information to be used in the development of general geotechnical recommendations for the proposed new roadway. Drilling services for this project were provided by Discovery Drilling, of Anchorage, Alaska. The borings were advanced with $3^1/_4$-inch inner diameter (ID), continuous flight, hollow-stem augers. An experienced geologist from our firm was present during drilling to locate the borings, observe drill action, collect samples, log subsurface conditions, and monitor groundwater if appropriate. Fifty-three of the borings were drilled from a truck mounted CME-75 drill rig within the existing Point MacKenzie road prism. The remaining forty borings, as well as the quarry investigation borings, were advanced using a Nodwell (track) mounted CME-55 drill rig off the existing Point MacKenzie Road.

A.1.1 Geotechnical Borings

Conducted during February and March 2006, borings were generally advanced to depths of between 15 and 40 feet below ground surface (bgs). The deeper (30 to 40 feet bgs) borings were advanced in order to characterize cut soils along the proposed alignment. As shown on Figure A-3, most of the borings were not drilled along the proposed centerline of the proposed alignment. Borings along the existing Point MacKenzie Road were shifted left or right of centerline to avoid existing utilities or accommodate road traffic. Borings along the proposed realignment were drilled near centerline within Global Positioning System (GPS) accuracy (± 20 feet).

Prior to field work, Shannon & Wilson, Inc. selected boring locations in order to characterize the subsurface conditions along the proposed alignment in areas of deep cuts, fills and organic zones (marshes). Generally, these borings were placed at a spacing of approximately 1,000 feet with increased boring frequency in areas of cuts deeper than 20 feet or in areas of possible organics. PND Engineering converted those locations to GPS coordinates so that locations could be established in the field with a handheld GPS with an accuracy of approximately 20 feet.

An experienced geologist from Shannon & Wilson was present continuously during the field work to locate the borings, observe drilling operations, recover soil samples, and log the subsurface conditions encountered in each boring. At their completion, borings were backfilled using the cuttings removed during the drilling activity and then staked with a pin flag or survey lath. Boring locations along the existing road were surveyed by PND Engineering, Inc. after completion and are plotted in their surveyed locations on the plan and profile sheets presented as in Appendix A, Figure A-3. Locations for borings advanced along the undeveloped portion of the proposed alignment were not surveyed and are plotted on the plan and profile sheets (Figure A-3) in their original locations selected prior to drilling. These locations should be considered approximate. Elevations of the boring locations were established from the plan and profile sheets provided by PND Engineering, Inc. after our explorations and should therefore be considered approximate.

Our field program with a boring location spacing of approximately 1,000 feet does not meet Alaska Department of Transportation & Public Facilities (DOT & PF) standards. Further work is needed to characterize soils between boring locations to conform to ADOT & PF standards.

A.1.2 Soil Sampling

In general, bulk samples were collected from drill cuttings starting at the ground surface to a depth of 2 feet bgs at borings located along the existing Point MacKenzie Road. As the borings in both on and off-road areas were advanced, samples were recovered with a 2-inch outside diameter (OD) split spoon sampler using Standard Penetration Test (SPT) procedures. These samples were recovered by driving the sampler into the bottom of the advancing hole with blows of a 140-lb hammer free falling 30 inches onto the drilling rod. The number of blows required to advance the sampler the final 12 inches of an 18-inch penetration is termed the Penetration Resistance, which was recorded for each sample. Penetration resistance values that were collected in the field are shown graphically on the boring logs adjacent to the sample depth and give a measure of the relative density (compactness) or consistency (stiffness) of cohesionless or cohesive soils, respectively. In the event that the blows for a six-inch penetration exceeded 50 blows, the penetration resistance is recorded as “sampler refusal”. Sampler refusal was as recorded when after 20 blows the sampler had not moved. Sampler refusal is noted on the boring logs in place of penetration resistance.

Pocket Penetrometer (PP) and Torvane (TV) tests were performed on the fine-grained soils encountered in our borings. The pocket penetrometer is a hand-held spring-calibrated ¼-inch cylindrical probe, which is slowly pushed into the cohesive soil specimen until ¼-inch penetration is achieved. The maximum reading is then taken and provides an estimate of the unconfined compressive strength. The upper limit of this test is 4.5 tons per square foot thus when the limit was exceeded in the test the results are reported as > 4.5 tsf. The results are presented on the boring logs as PP in tons per square foot (tsf).

The Torvane is a hand-held, spring calibrated torsional device with six small steel vanes on the end. In this test the vanes are pushed into the specimen and then torqued until failure by shearing results. The highest reading is then recorded as an estimate of the materials undrained shear strength. The results of this testing are included on the boring logs as TVH (horizontal orientation) or TVV (vertical orientation) in tsf.

Unified Soil Classification System

GROUP NAME **Criteria for Assigning Group Names and Group Symbols**				**Soil Classification Group Symbol with Generalized Group Descriptions**	
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	Clean GRAVELS Less than 5% fines	▨	GW	Well-graded Gravels
			▨	GP	Poorly-graded Gravels
		GRAVELS with fines More than 12% fines	▨	GM	Gravel & Silt Mixtures
			▨	GC	Gravel & Clay Mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	Clean SANDS Less than 5% fines	▨	SW	Well-graded Sands
			▨	SP	Poorly-graded Sands
		SANDS with fines More than 12% fines	▨	SM	Sand & Silt Mixtures
			▨	SC	Sand & Clay Mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit 50% or less	INORGANIC	▨	ML	Non-plastic & Low-plasticity Silts
			▨	CL	Low-plasticity Clays
		ORGANIC	▨	OL	Non-plastic and Low-plasticity Organic Clays Non-plastic and Low-plasticity Organic Silts
	SILTS AND CLAYS Liquid limit greater than 50%	INORGANIC	▨	CH	High-plasticity Clays
			▨	MH	High-plasticity Silts
		ORGANIC	▨	OH	High-plasticity Organic Clays High-plasticity Organic Silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		▨	PT	Peat

Organic Content

Adjective	Percent by Volume
Occasional	0-1
Scattered	1-10
Numerous	10-30
Organic	30-50, minor constituent
Peat	50-100, MAJOR constituent

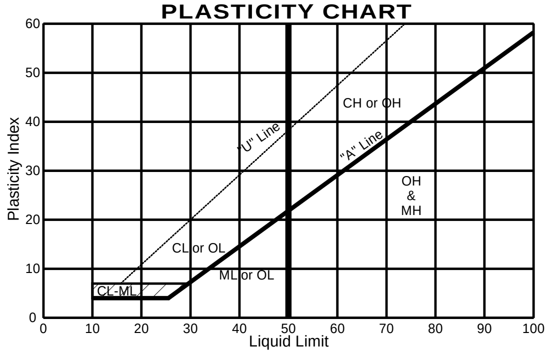
Descriptive Terminology Denoting Component Proportions

Description	Range of Proportion
Add the adjective "slightly"	5 - 12%
Add soil adjective[(a)]	12 - 50%
Major proportion in upper case, (e.g., SAND)	>50%

(a) Use gravelly, sandy, or silty as appropriate

NOTE: The soil descriptions used in the boring logs lists constituents from smallest percentage to largest percentage.

PLASTICITY CHART



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SOIL CLASSIFICATION LEGEND

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Fig. A-1

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FROST CLASSIFICATION

(after Municipality of Anchorage)

GROUP		P-200	USC SYSTEM
NFS	Sandy Soils	0 to 3	SW, SP
	Gravelly Soils	0 to 6	GW, GP, GW-GM, GP-GM
F1	Sandy Soils	3 to 6	SW, SP, SW-SM, SP-SM
	Gravelly Soils	6 to 13	GM, GW-GM, GP-GM
F2	Sandy Soils	6 to 19	SP-SM, SW-SM, SM
	Gravelly Soils	13 to 25	GM
F3	Sands, except very fine silty sands*	Over 19	SM, SC
	Gravelly Soils	Over 25	GM, GC
	Clays, PI>12		CL, CH
F4	All Silts		ML, MH
	Very fine silty sands*	Over 19	SM, SC
	Clays, PI<12		CL, CL-ML
	Varved clays and other fined grained, banded sediments		CL and ML CL, ML, and SM; SL, SH, and ML; CL, CH, ML, and SM

P-200 = Percent passing the number 200 sieve

* Very fine sand : greater than 50% of sand fraction passing the number 100 sieve

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

FROST CLASSIFICATION LEGEND

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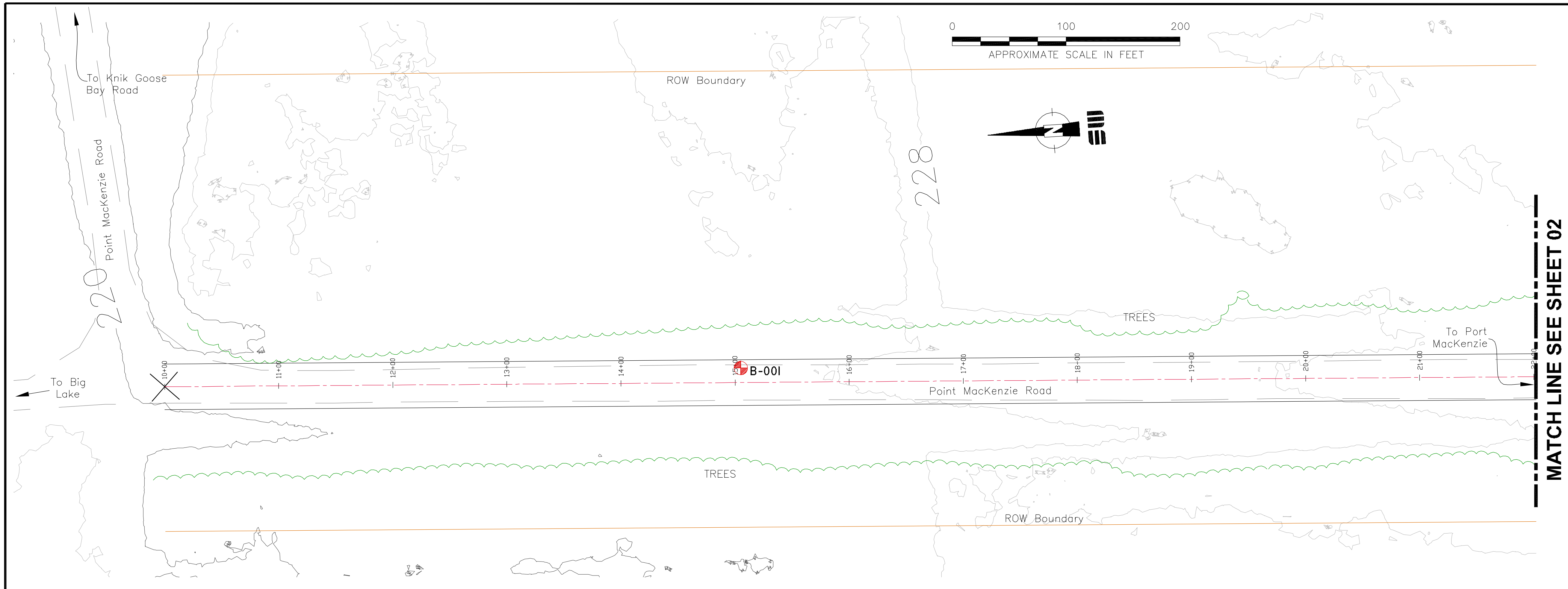
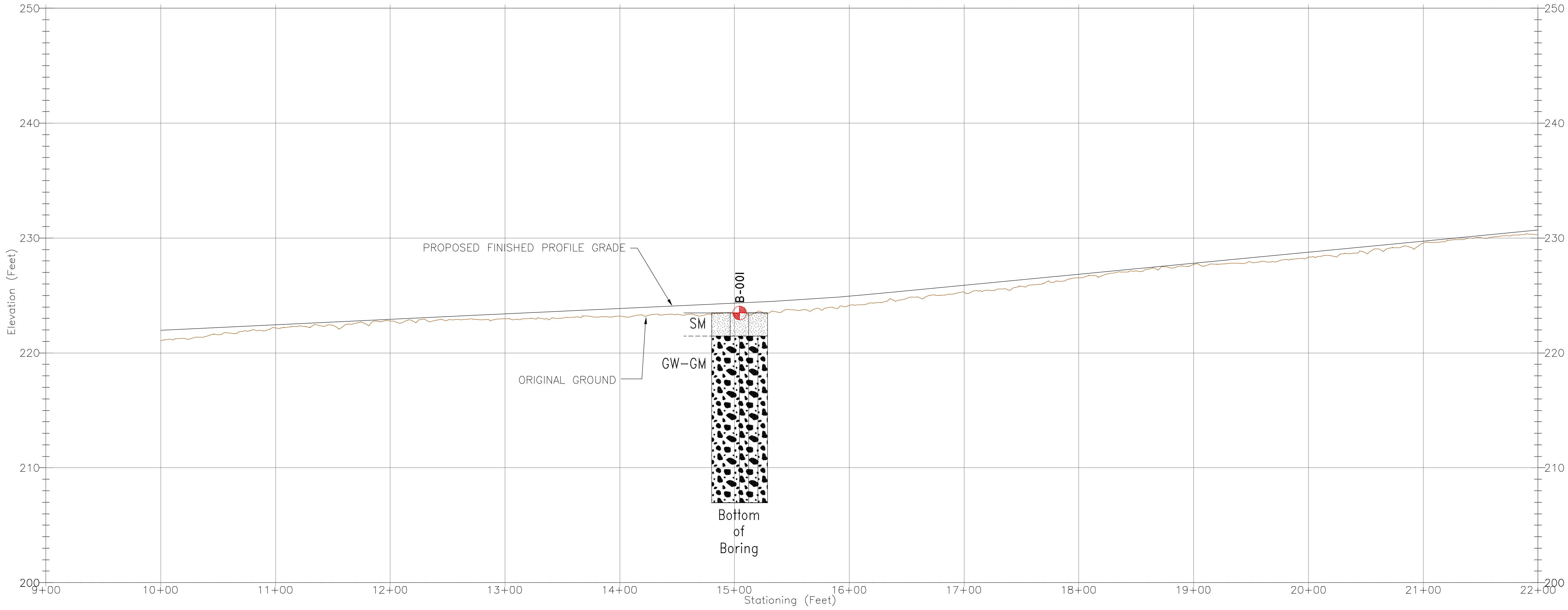
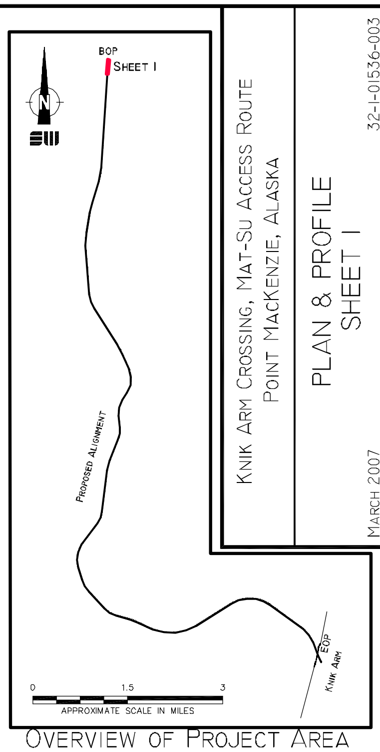
Fig. A-2







OVERVIEW OF PROJECT AREA

NOTES

1. Drawing adapted from PND Engineers, Inc. provided Plan & Profile sheets.
2. Boring logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

⊕ B-001	Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)
— — —	Approximate location of exisiting Point MacKenzie Road
———	Approximate location of proposed Point MacKenzie Road upgrade
— · —	Approximate location of proposed centerline
———	Approximate location of proposed right-of-way (ROW) boundary
	Approximate location of marshy areas
	Approximate location of treeline
	Contours in 4-foot intervals
	Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

PLAN & PROFILE
SHEET 1

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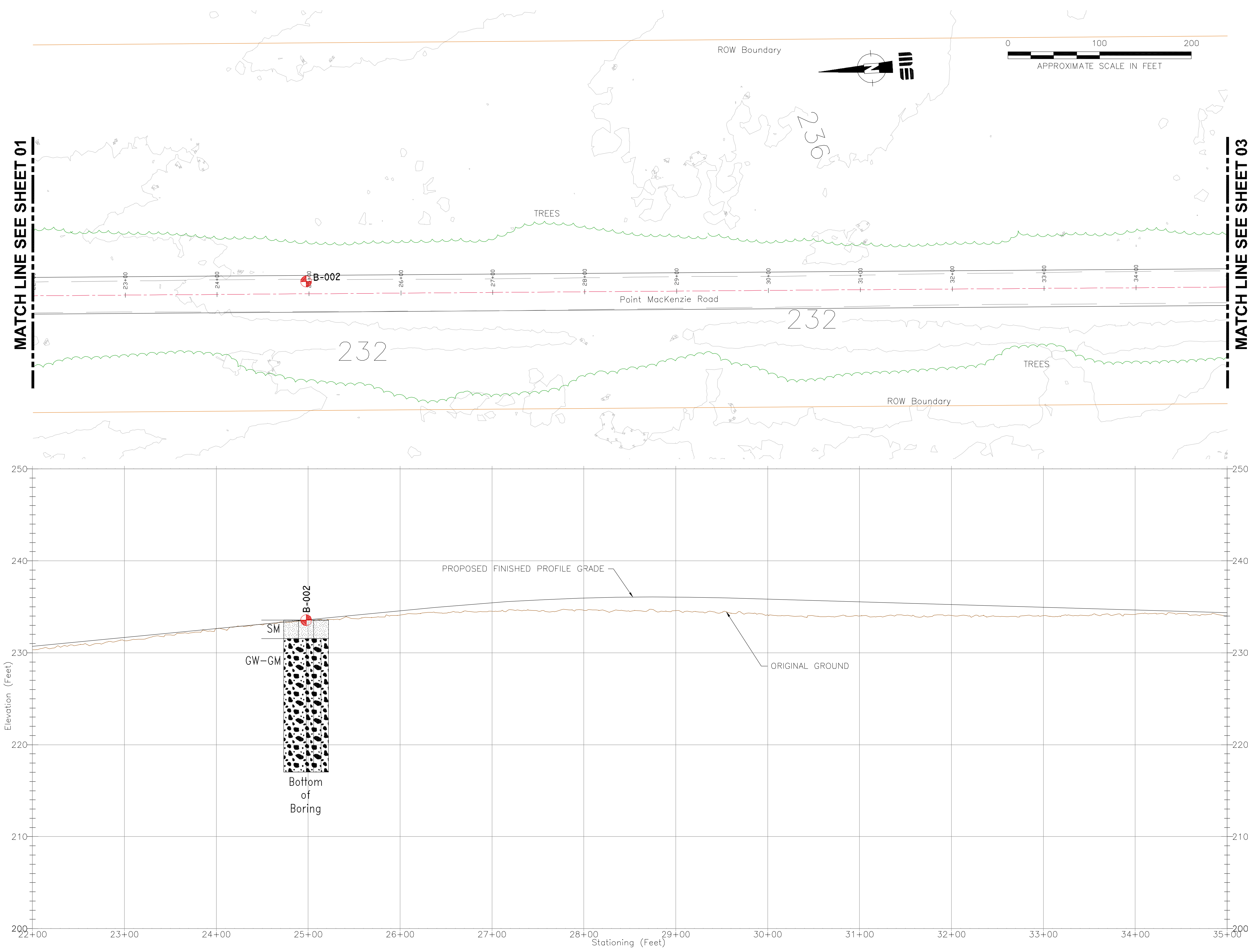
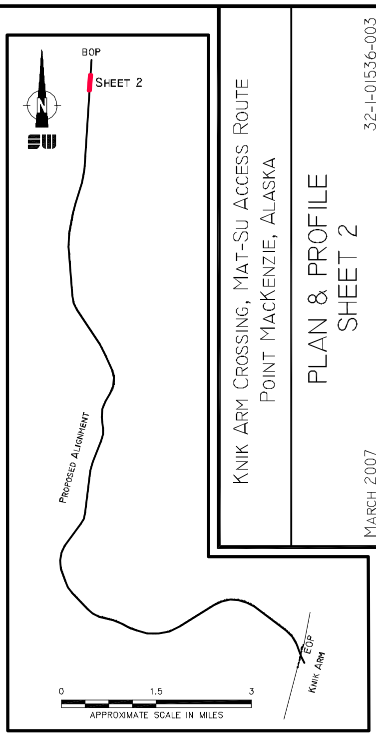
Fig. A-3
Sheet 1 of 34





Overview of Project Area

NOTES

1. Drawing Adapted from PND Engineers, Inc. provided Plan & Profile Sheets.
2. Boring Logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

⊕ B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
– – –	Approximate Location of Exisiting Point MacKenzie Road
—	Approximate Location of Proposed Point MacKenzie Road Upgrade
–·–	Approximate Location of Proposed Centerline
—	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
☁	Approximate Location of Treeline
≋	Contours in 4-foot intervals
◌	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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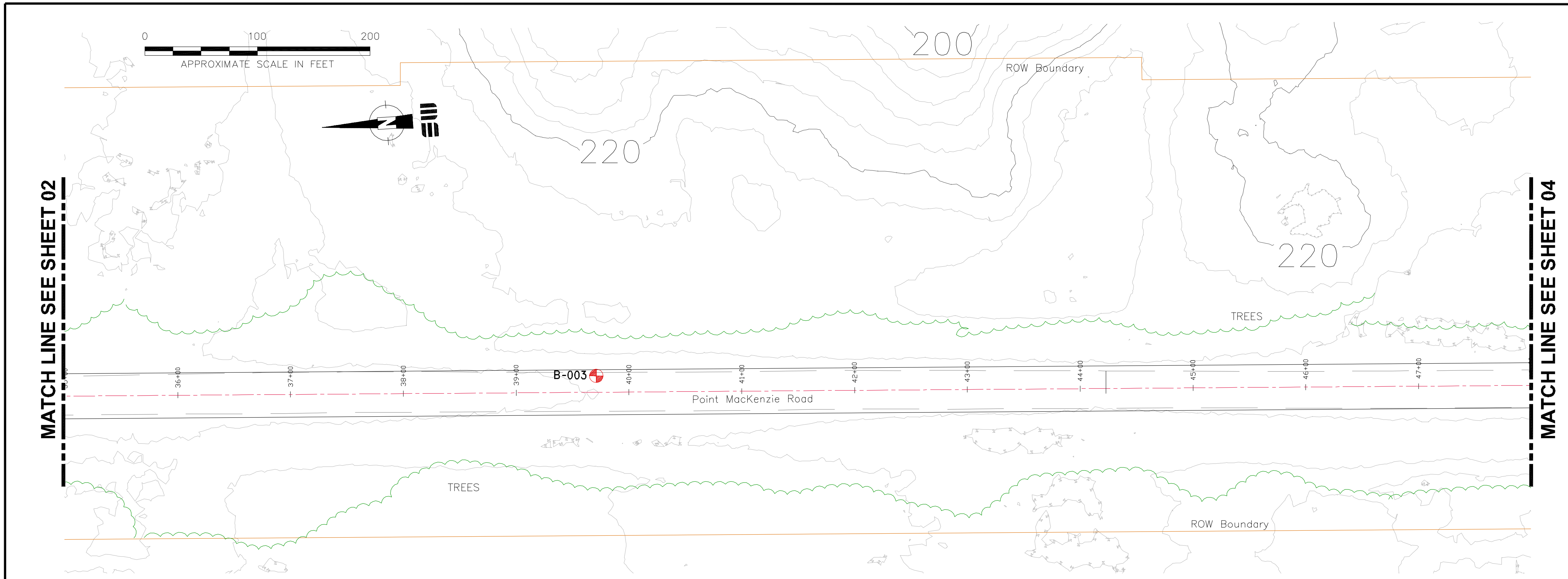

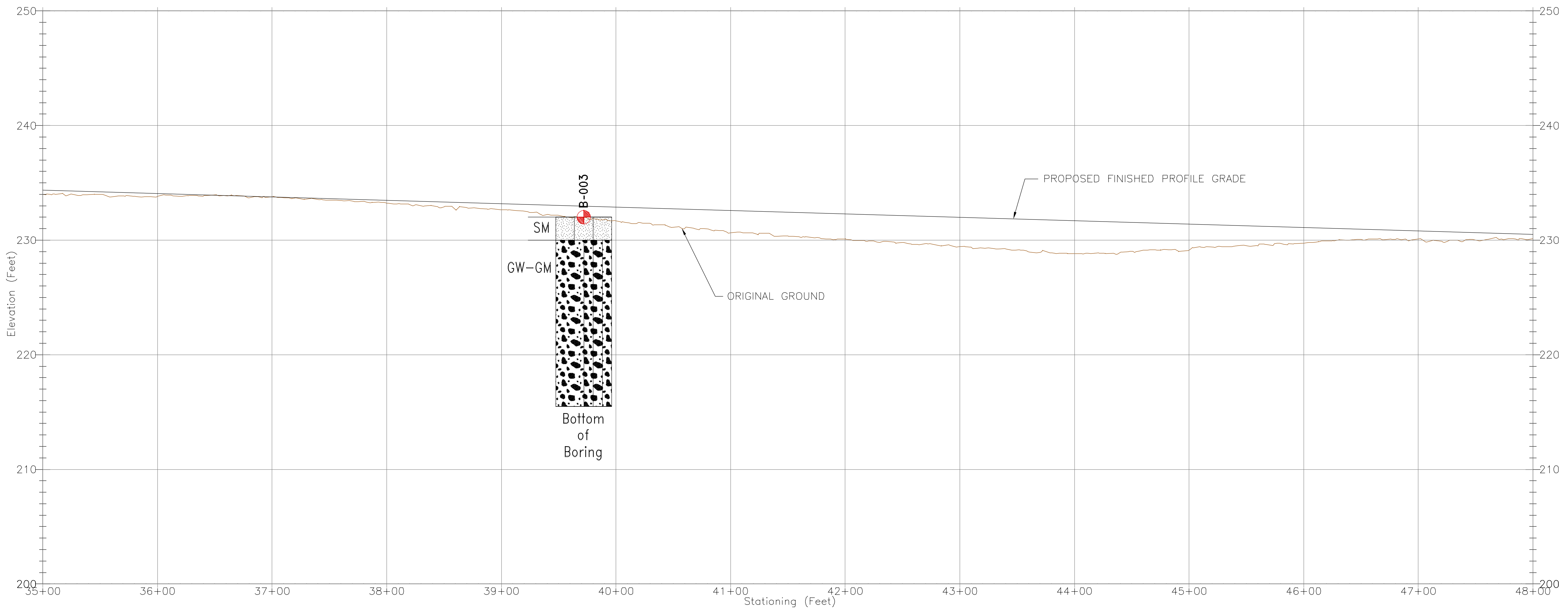

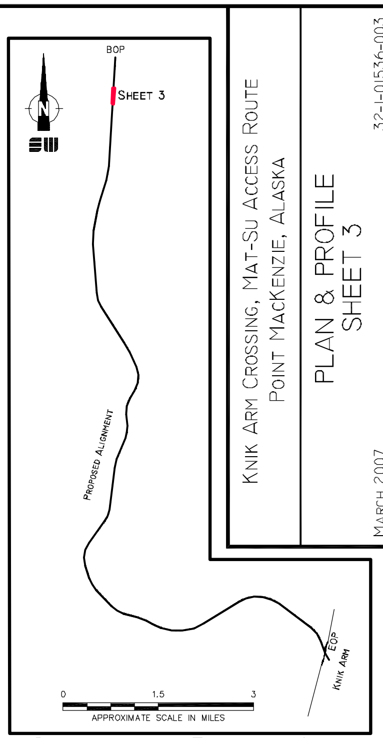

Overview of Project Area

NOTES

1. Drawing adapted from PND Engineers, Inc. provided Plan & Profile sheets.
2. Boring logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001	Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)
— — —	Approximate location of exisiting Point MacKenzie Road
——	Approximate location of proposed Point MacKenzie Road upgrade
—·—·—	Approximate location of proposed centerline
——	Approximate location of proposed Right-of-Way (ROW) boundary
	Approximate location of marshy areas
	Approximate location of treeline
	Contours in 4-foot intervals
	Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

PLAN & PROFILE
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Fig. A-3
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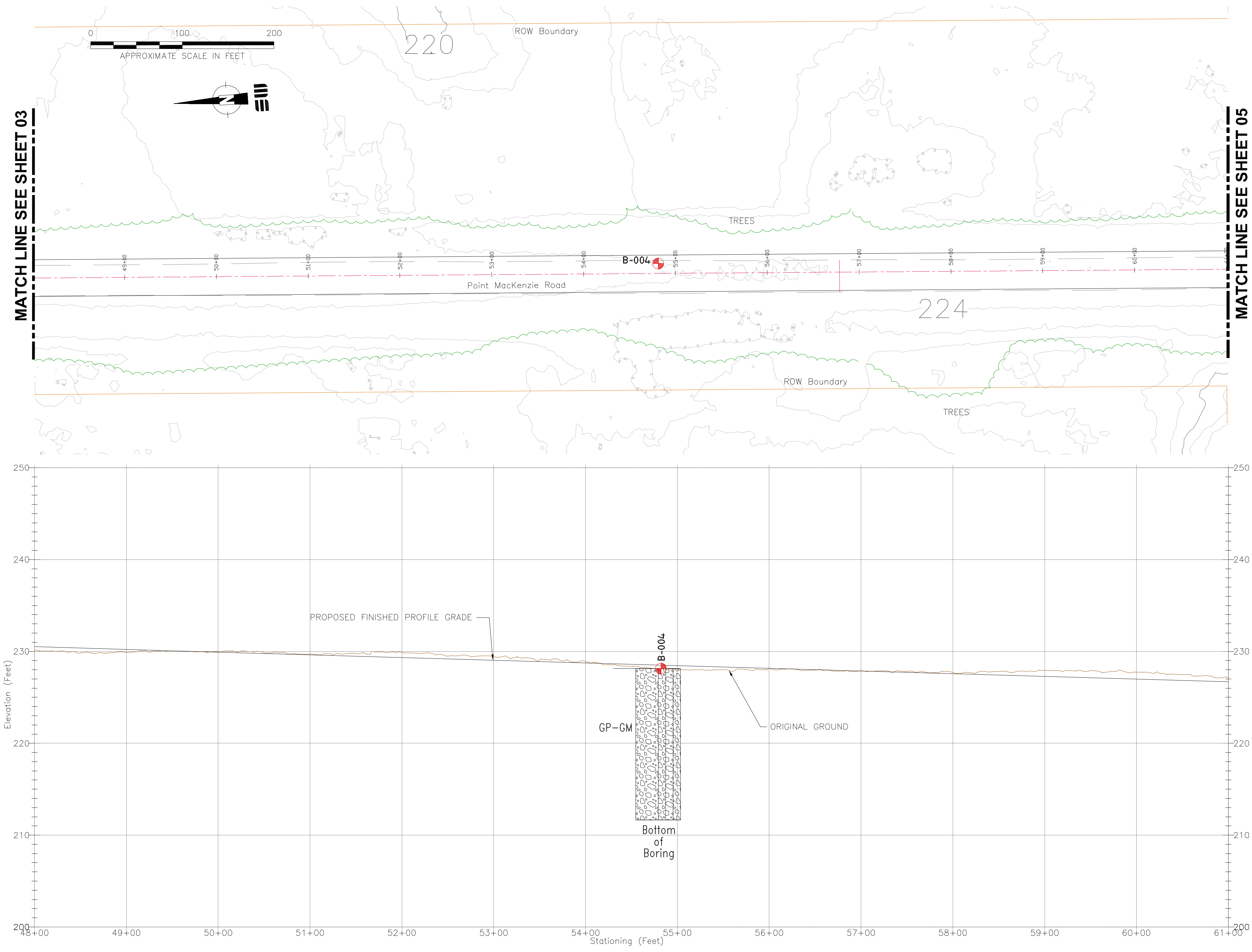

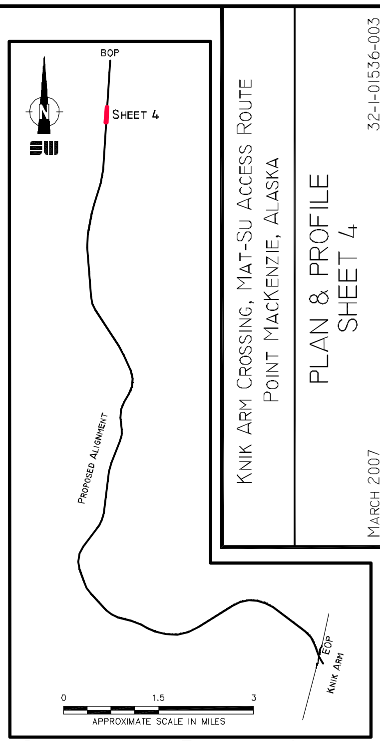

OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
⬠	APPROXIMATE LOCATION OF MARSHY AREAS
✿	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
⬯	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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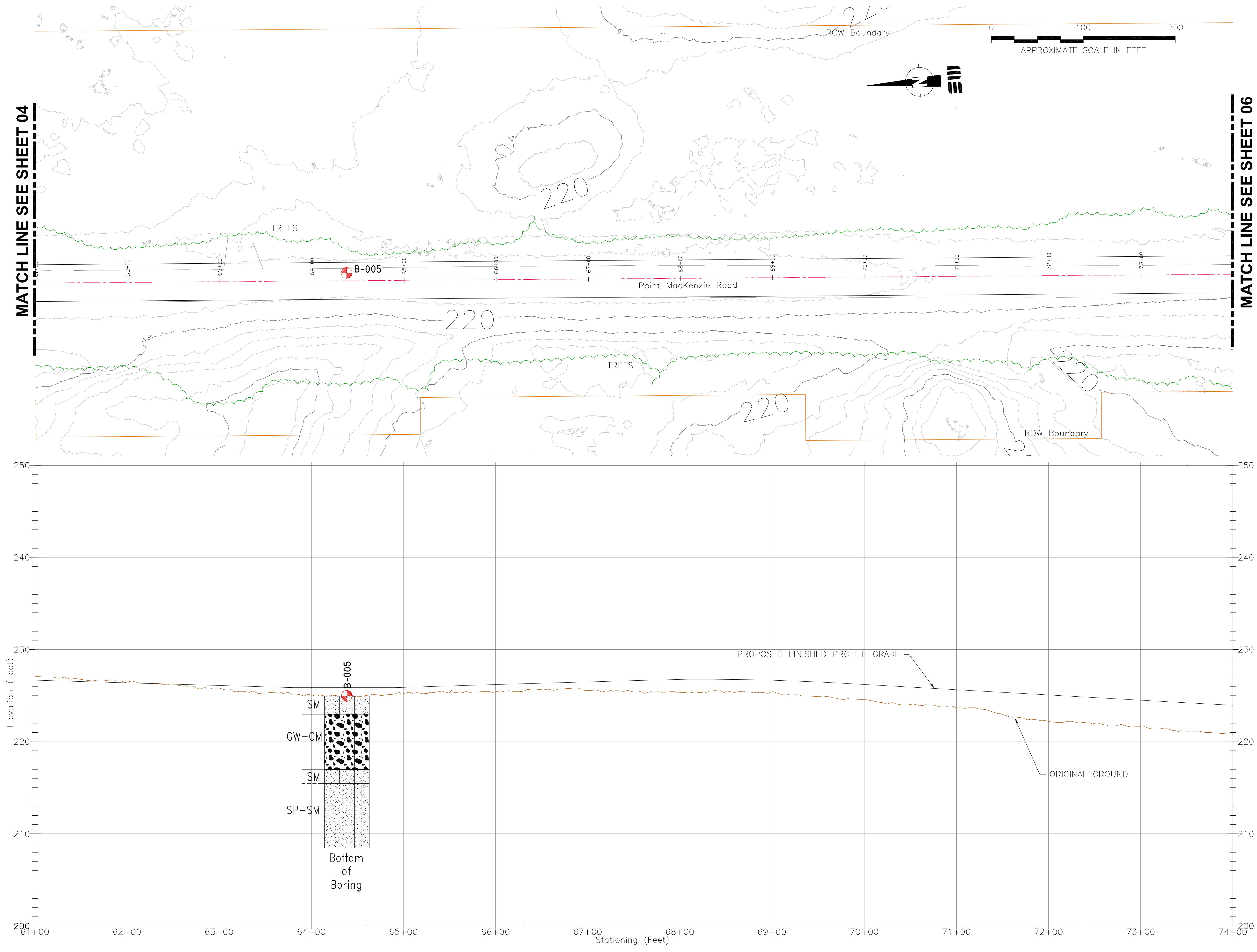

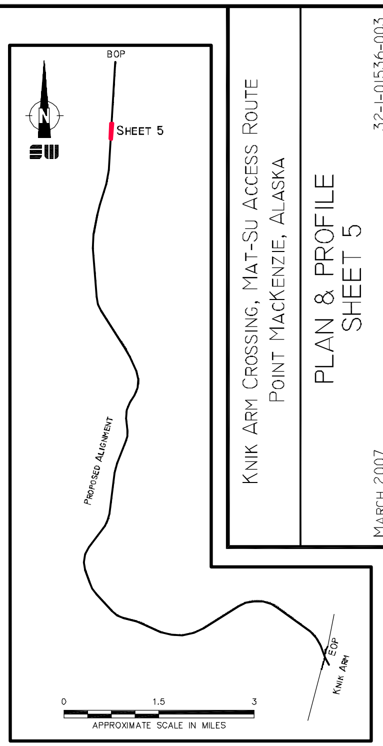

OVERVIEW OF PROJECT AREA

NOTES

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2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

PLAN & PROFILE
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FIG. A-3
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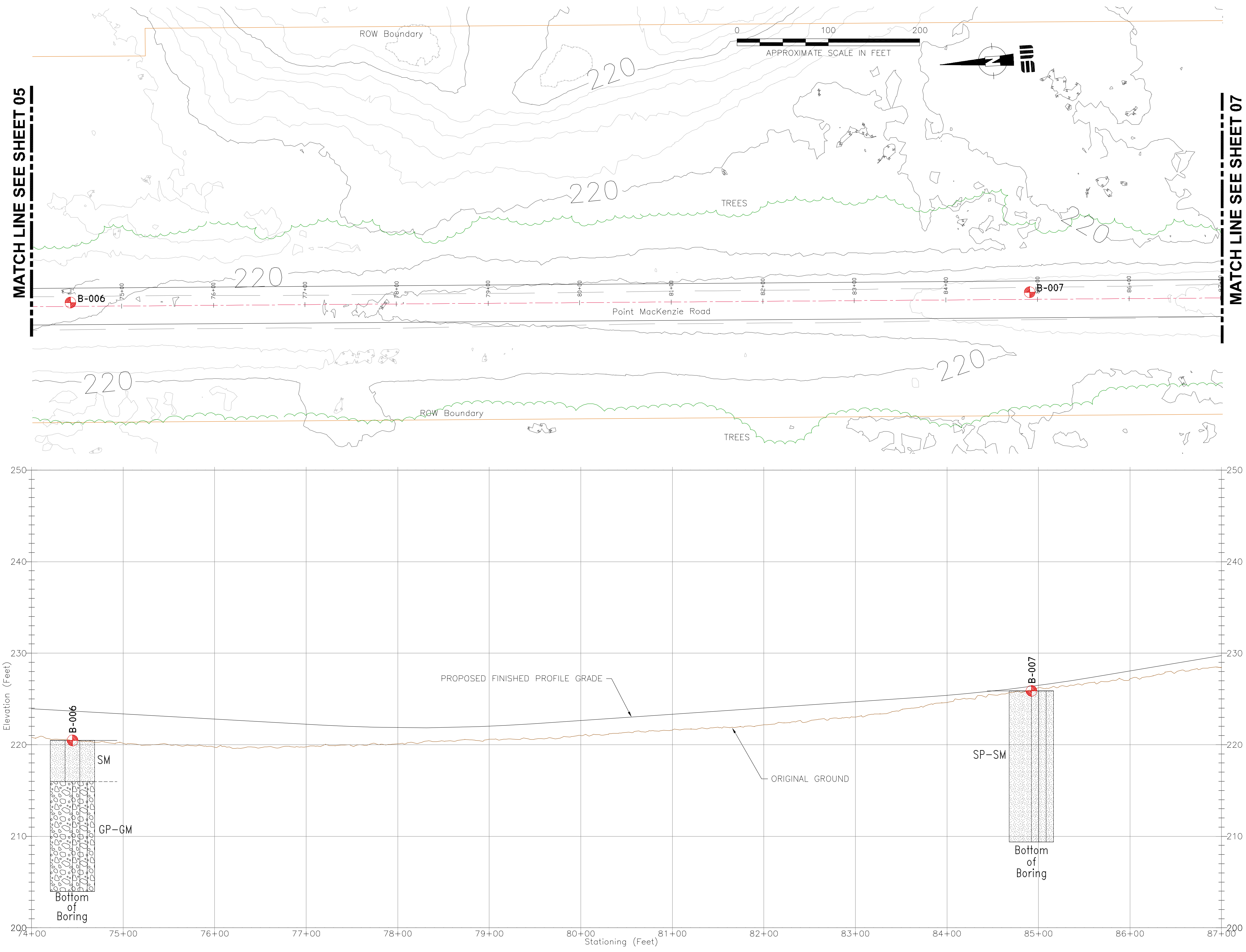

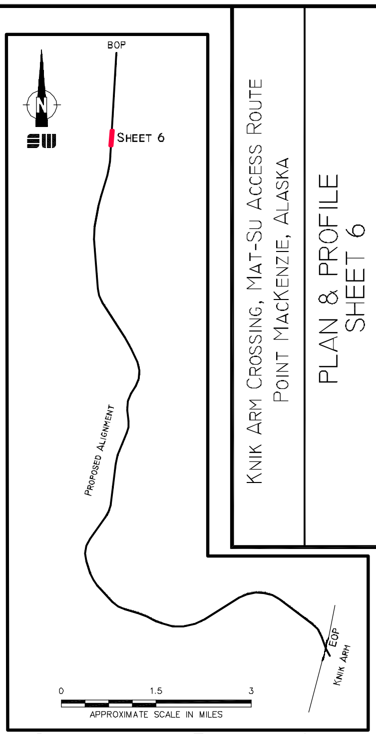

OVERVIEW OF PROJECT AREA

NOTES

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2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE I.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-I.
5. VERTICAL SCALE EXAGGERATED I0 TIMES HORIZONTAL SCALE

LEGEND

⊕ **B-00I**	APPROXIMATE LOCATION OF BORING B-00I, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
–·–	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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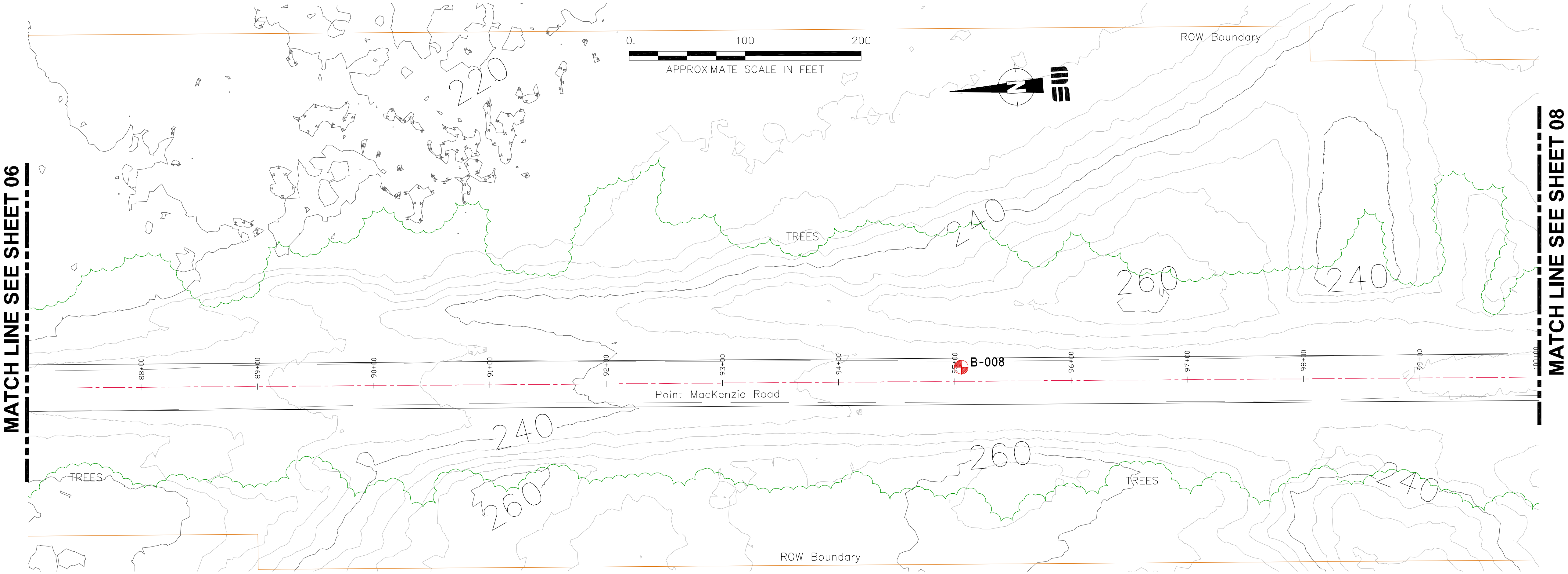

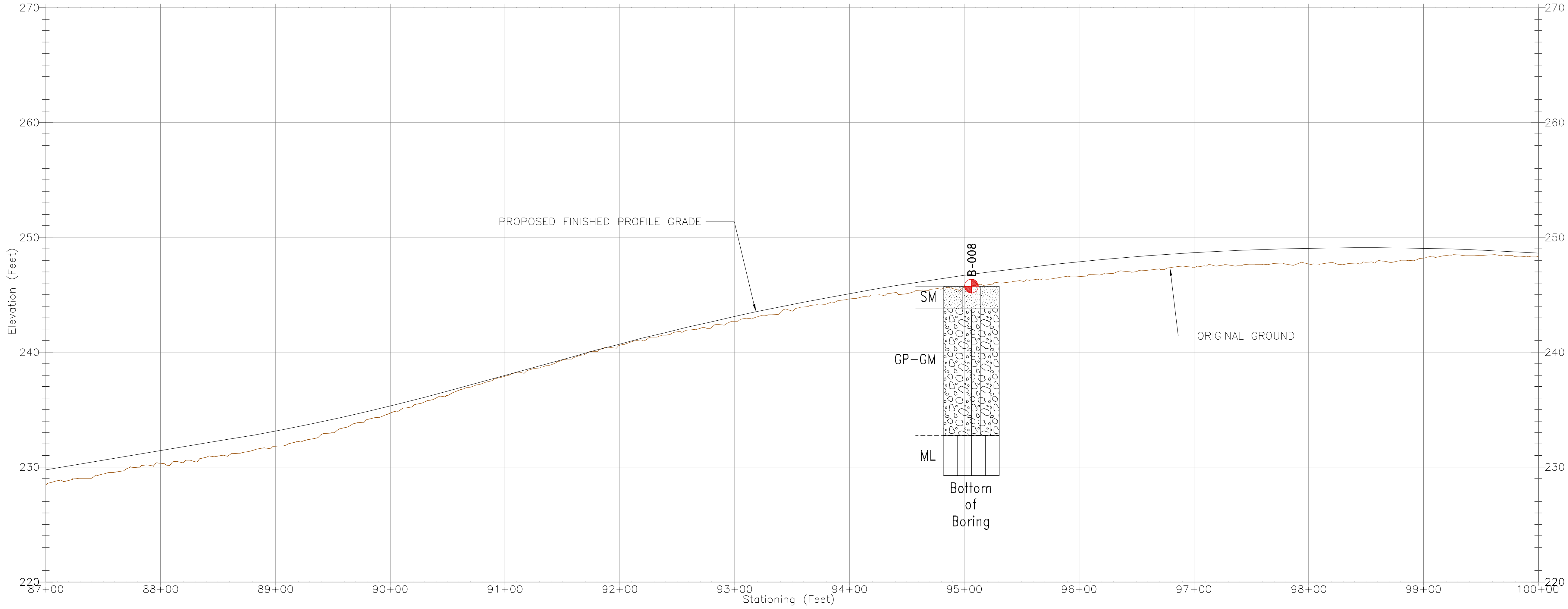

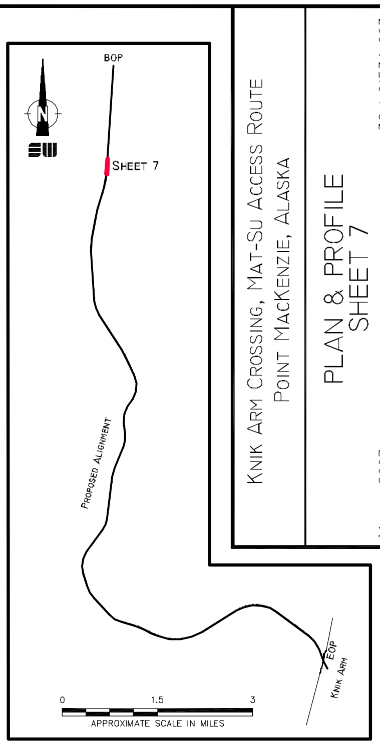

OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
——	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
— · —	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
——	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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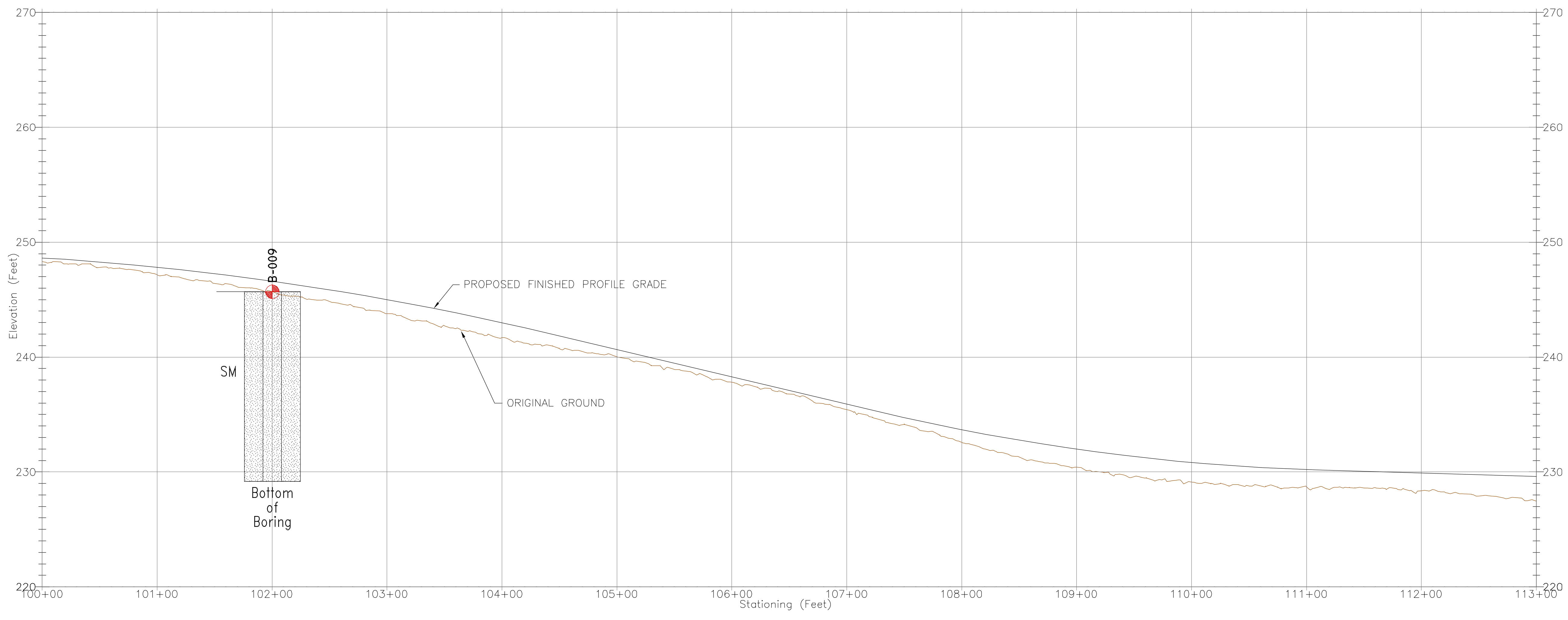

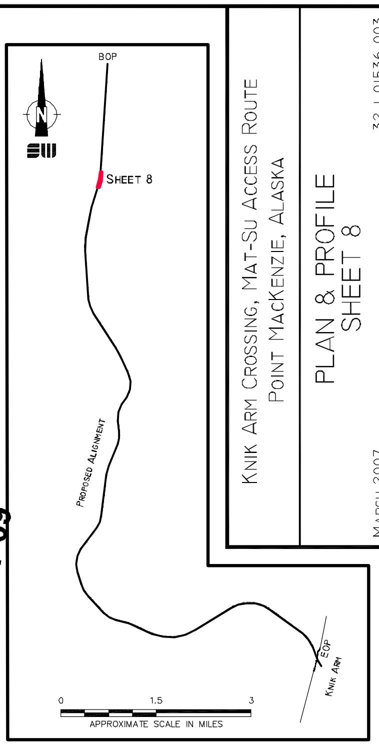

Overview of Project Area

NOTES

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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
——	Approximate Location of Proposed Point MacKenzie Road Upgrade
—·—	Approximate Location of Proposed Centerline
——	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
○	Approximate Location of Treeline
≈	Contours in 4-Foot Intervals
○	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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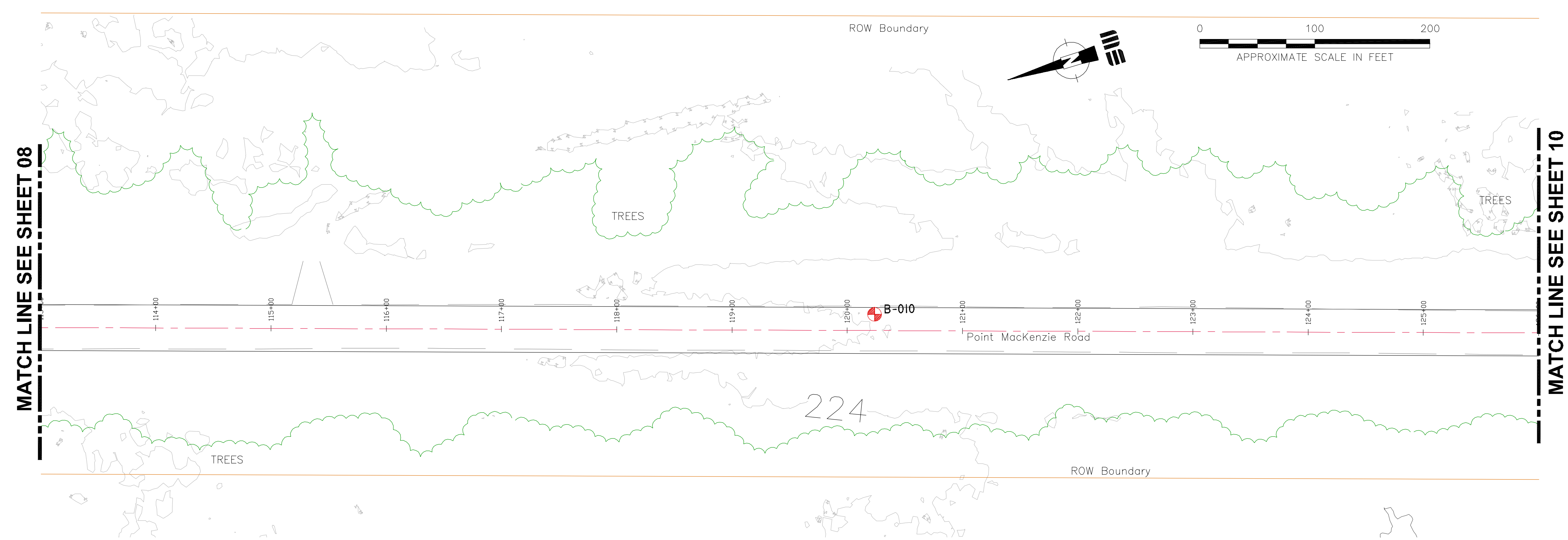

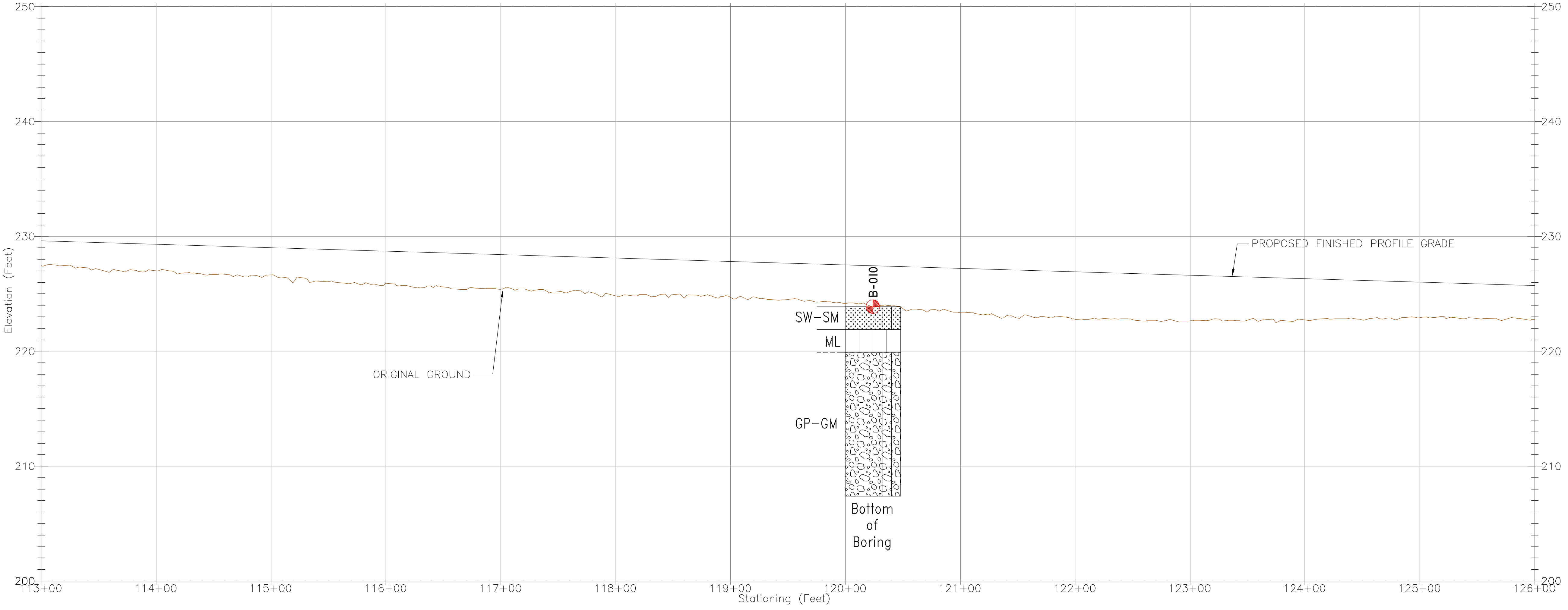

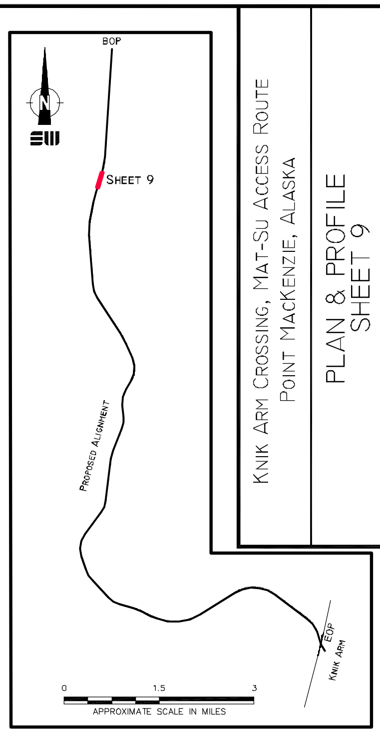

Overview of Project Area

NOTES

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3. Overview of Project Area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
——	Approximate Location of Proposed Point MacKenzie Road Upgrade
—·—·	Approximate Location of Proposed Centerline
——	Approximate Location of Proposed Right-of-Way (ROW) Boundary
	Approximate Location of Marshy Areas
	Approximate Location of Treeline
	Contours in 4-Foot Intervals
	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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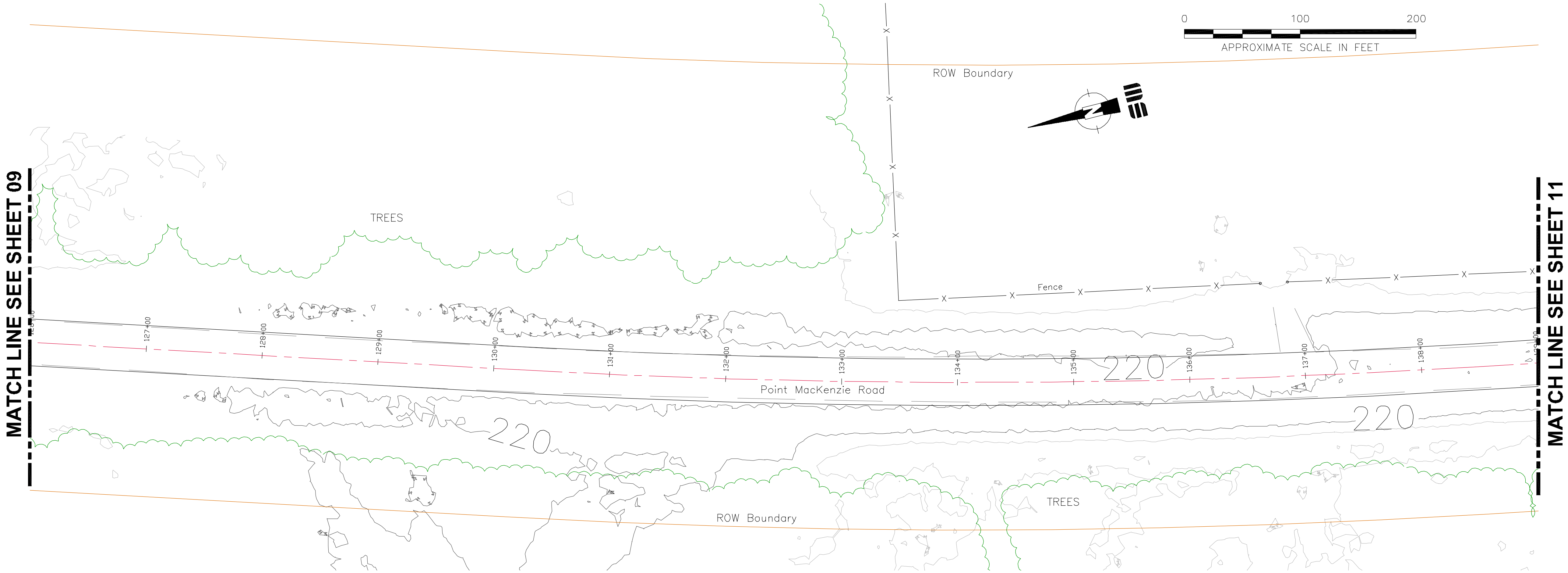

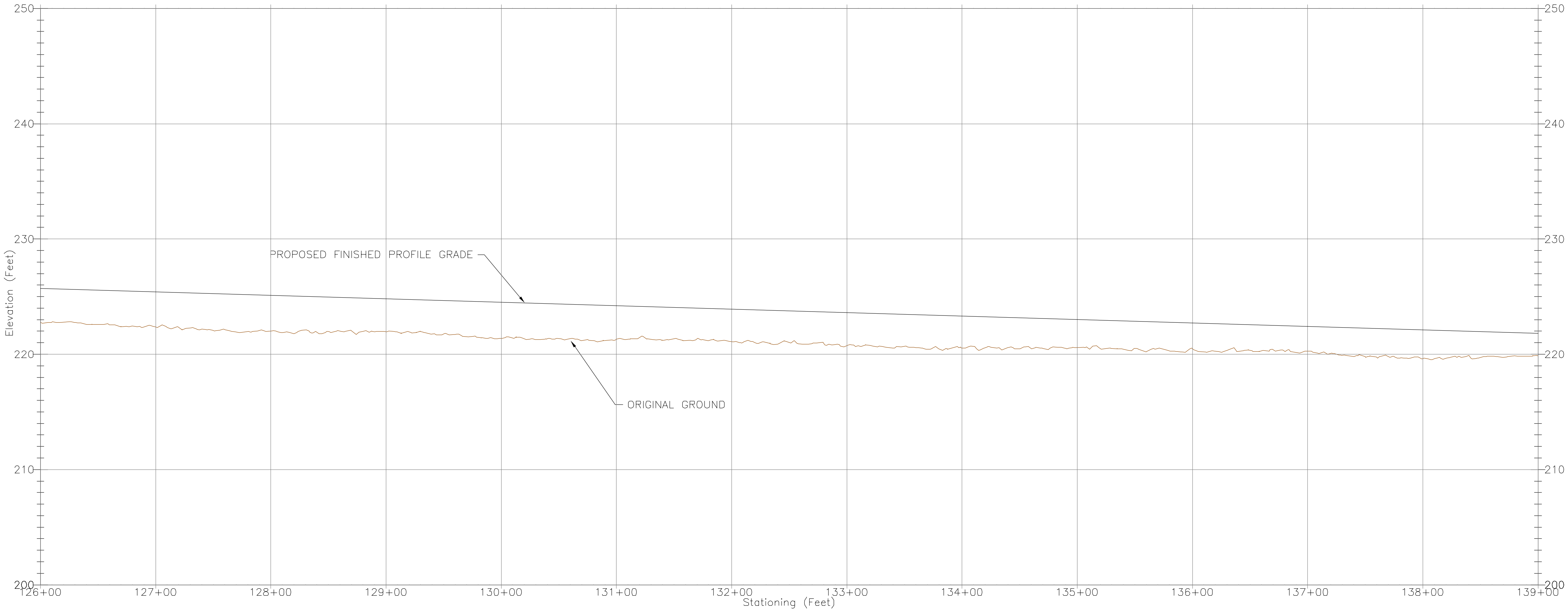

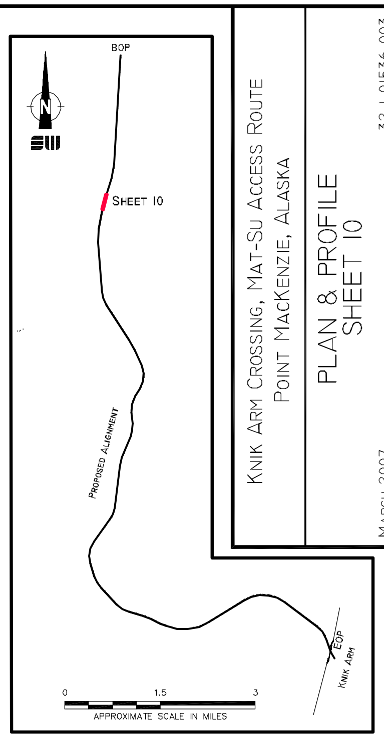

OVERVIEW OF PROJECT AREA

NOTES

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3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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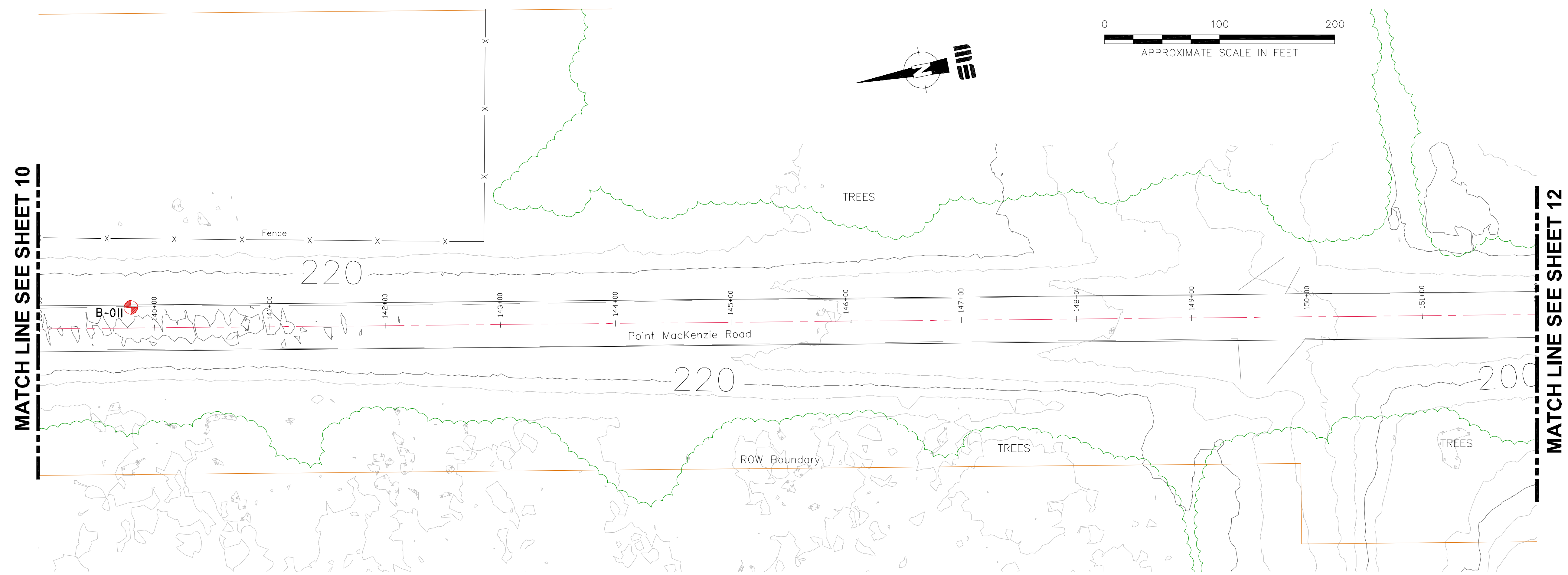

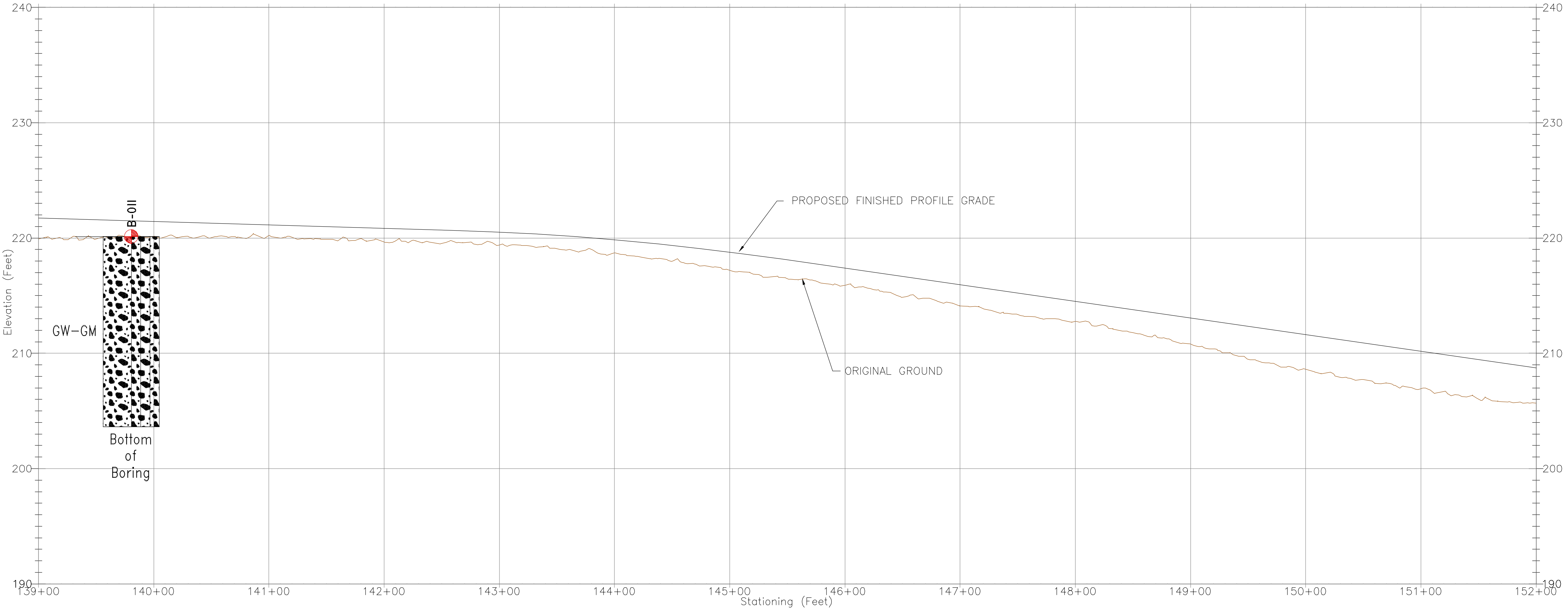

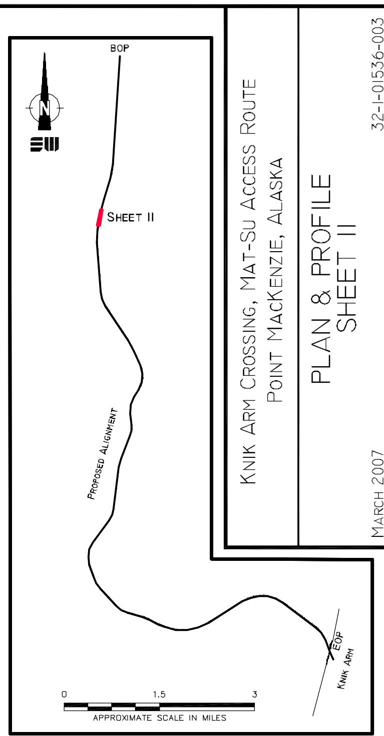

OVERVIEW OF PROJECT AREA

NOTES

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2. Boring logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
———	Approximate Location of Proposed Point MacKenzie Road Upgrade
— · —	Approximate Location of Proposed Centerline
———	Approximate Location of Proposed Right-of-Way (ROW) Boundary
	Approximate Location of Marshy Areas
	Approximate Location of Treeline
	Contours in 4-foot intervals
	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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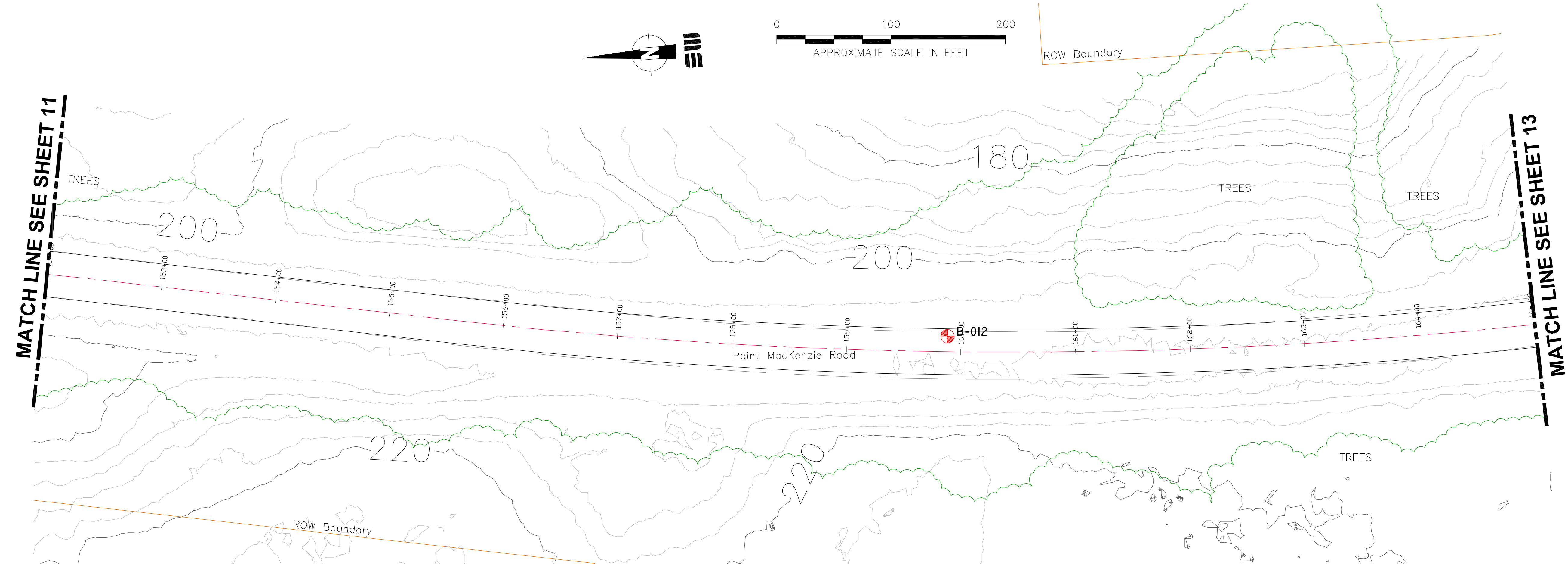

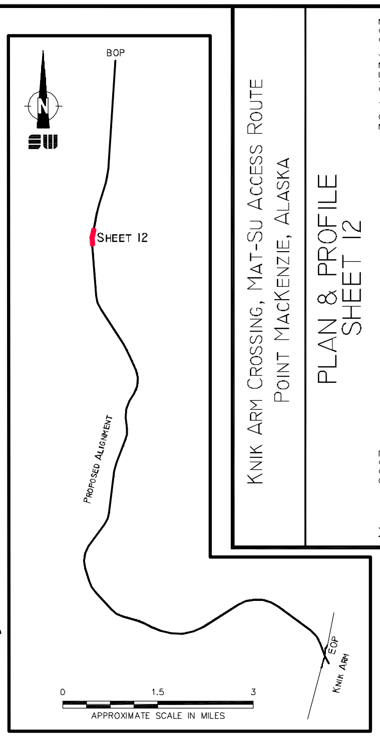

OVERVIEW OF PROJECT AREA

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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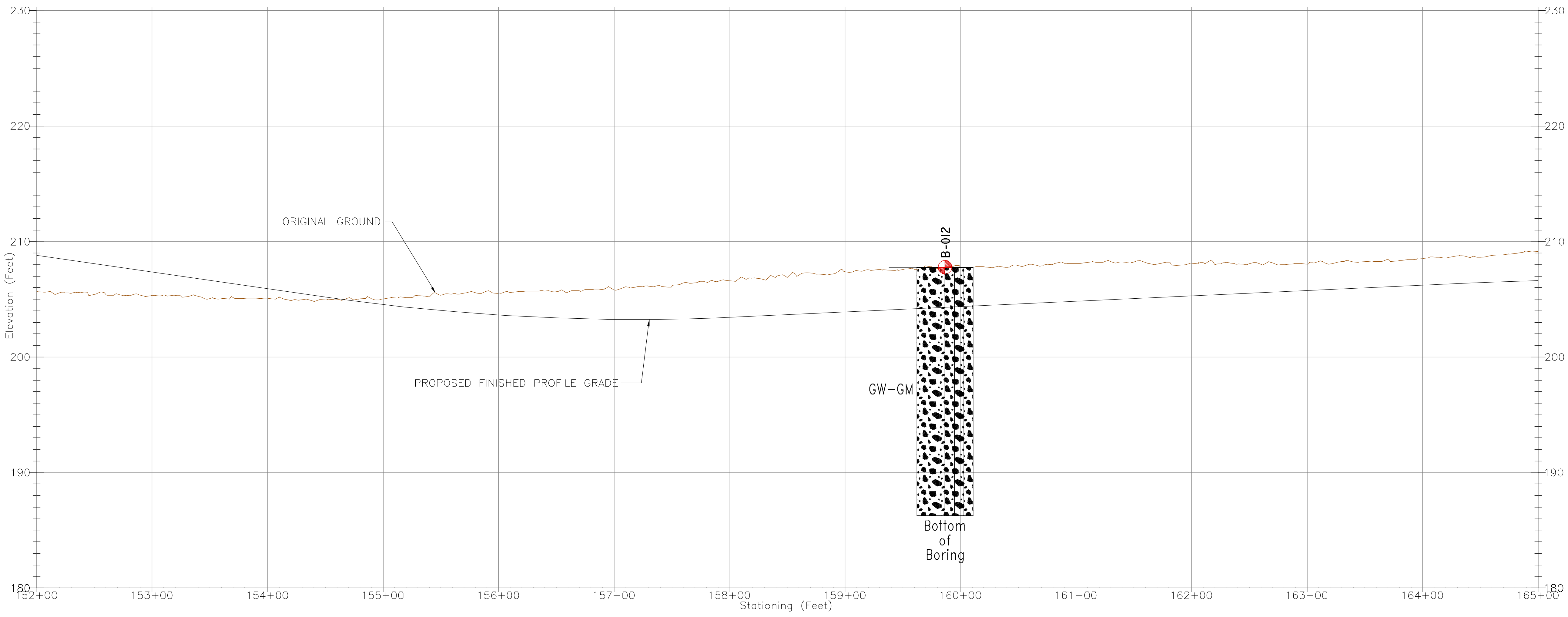
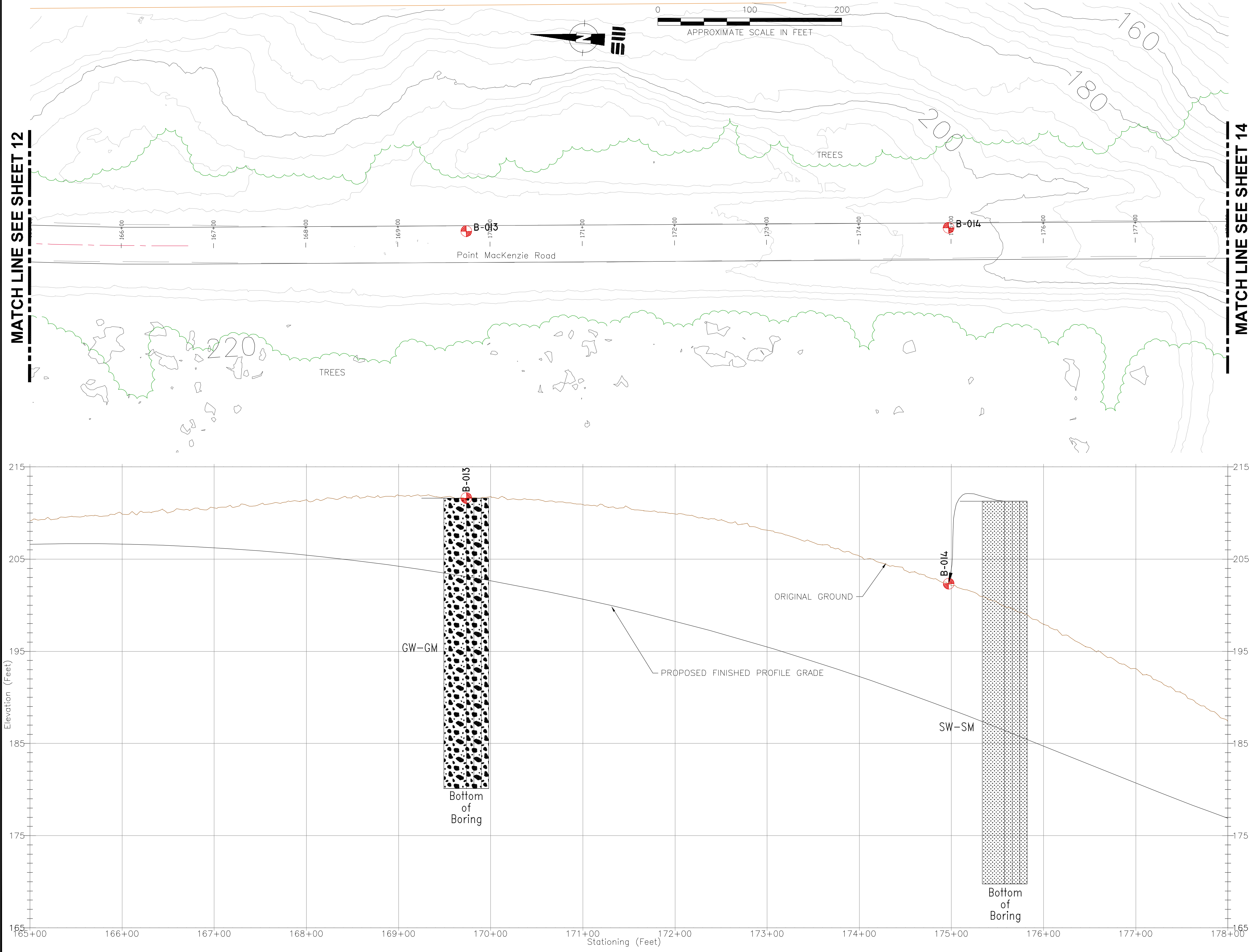
NOTES

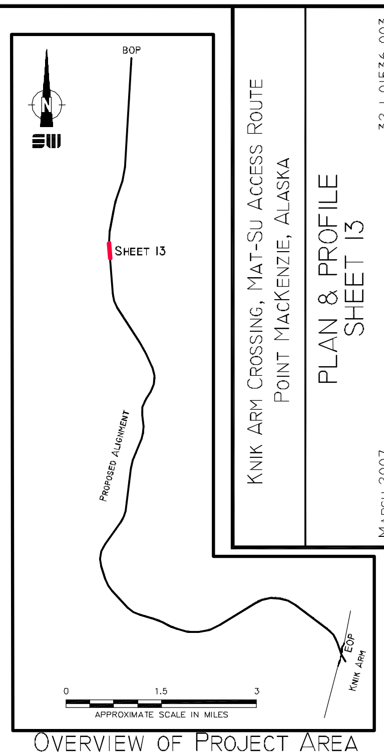
1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE I.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-I.
5. VERTICAL SCALE EXAGGERATED I0 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-00I	APPROXIMATE LOCATION OF BORING B-00I, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR







OVERVIEW OF PROJECT AREA

NOTES

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3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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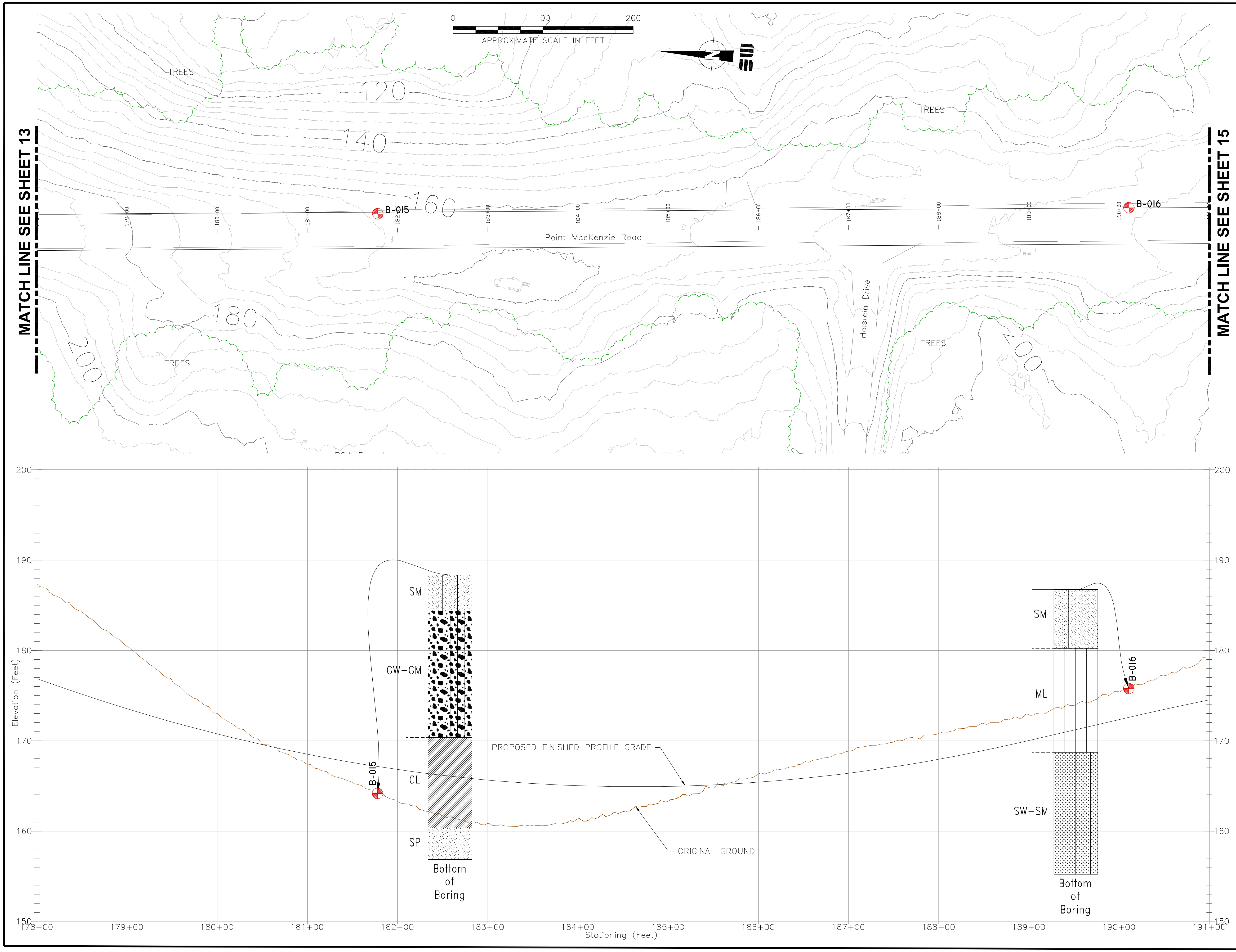

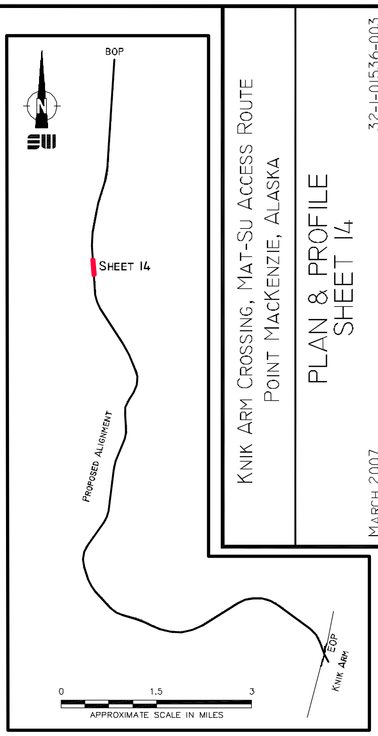

NOTES

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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001 Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)

Approximate location of exisiting Point MacKenzie Road

Approximate location of proposed Point MacKenzie Road upgrade

Approximate location of proposed centerline

Approximate location of proposed right-of-way (ROW) boundary

Approximate location of marshy areas

Approximate location of treeline

Contours in 4-foot intervals

Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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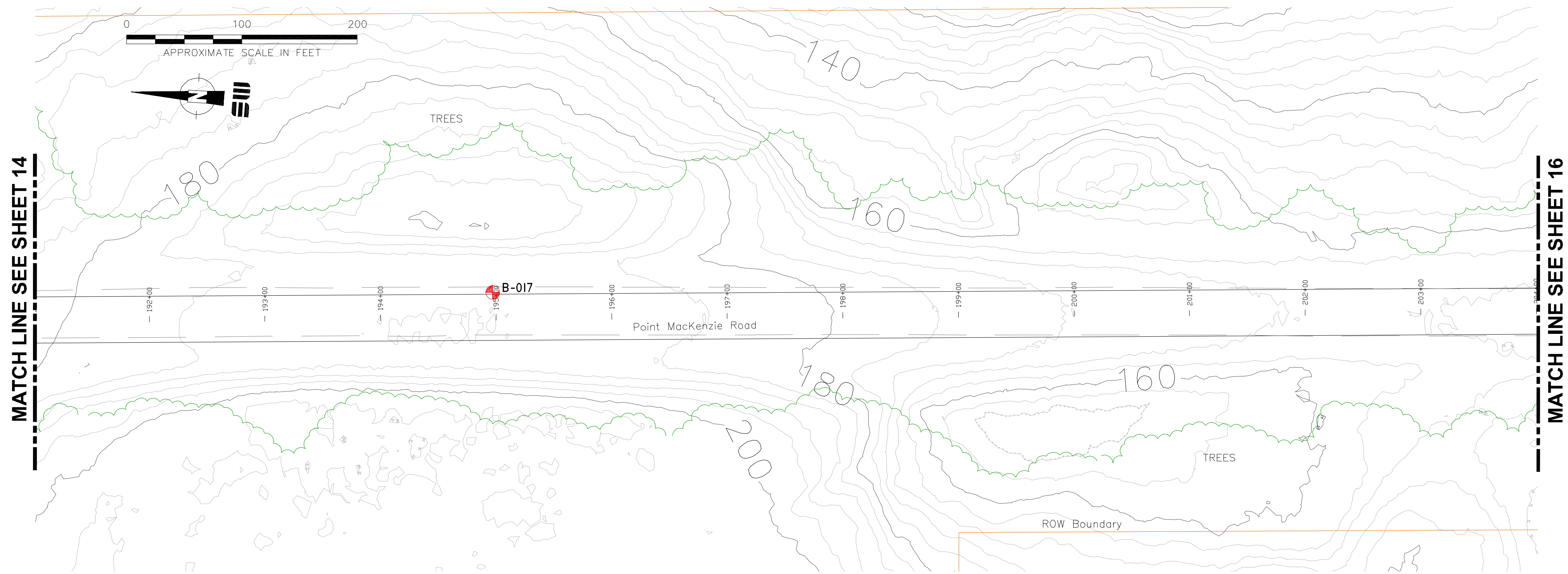

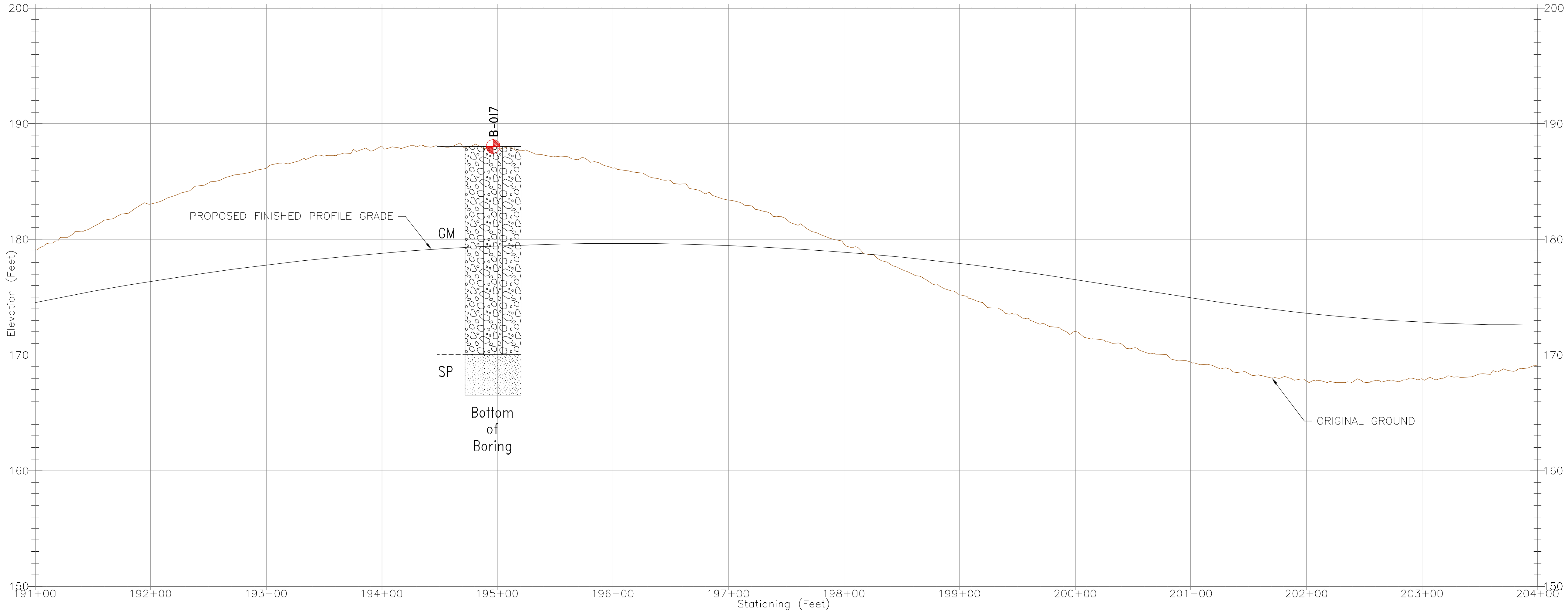

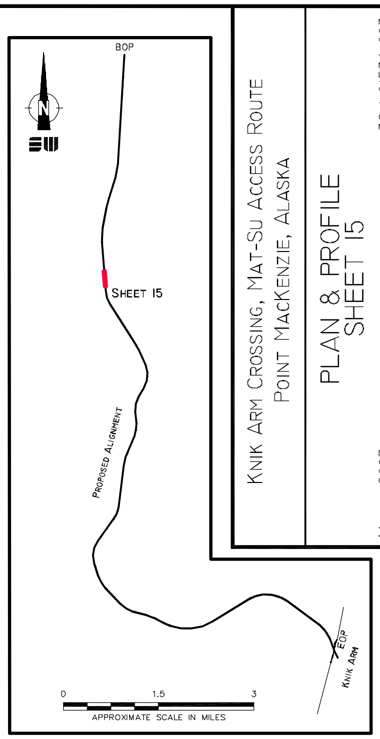

OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
———	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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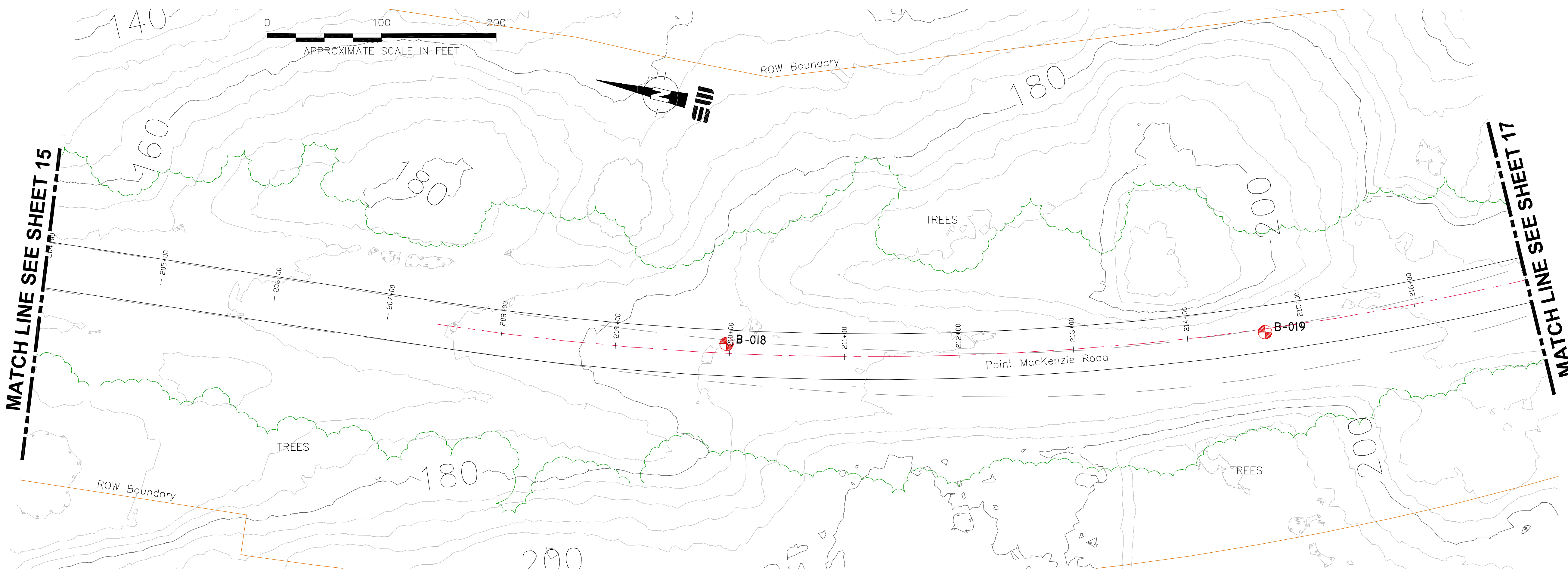
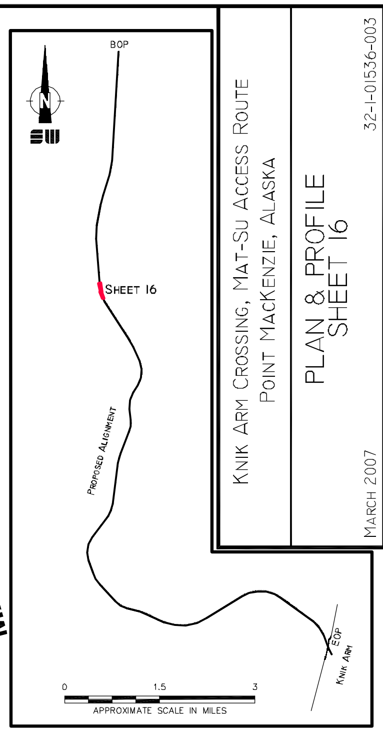
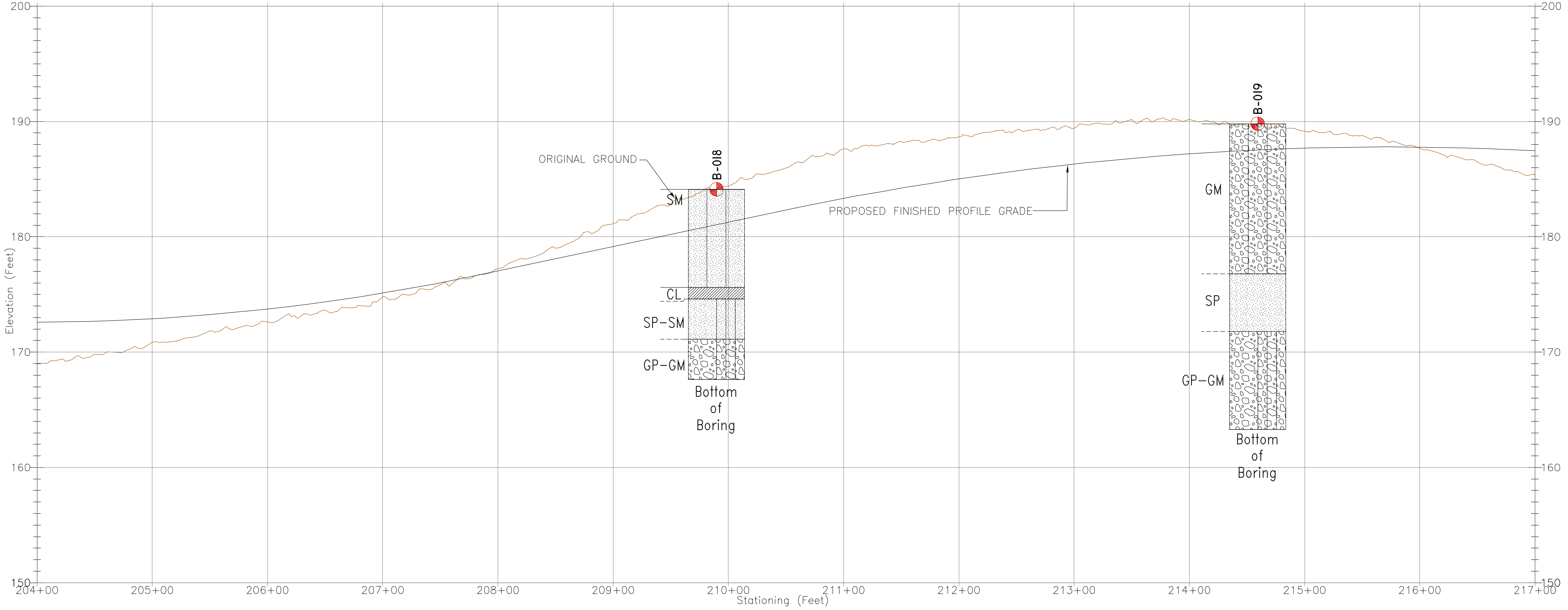




OVERVIEW OF PROJECT AREA



NOTES

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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001 Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)

Approximate Location of Exisiting Point MacKenzie Road

Approximate Location of Proposed Point MacKenzie Road Upgrade

Approximate Location of Proposed Centerline

Approximate Location of Proposed Right-of-Way (ROW) Boundary

Approximate Location of Marshy Areas

Approximate Location of Treeline

Contours in 4-foot intervals

Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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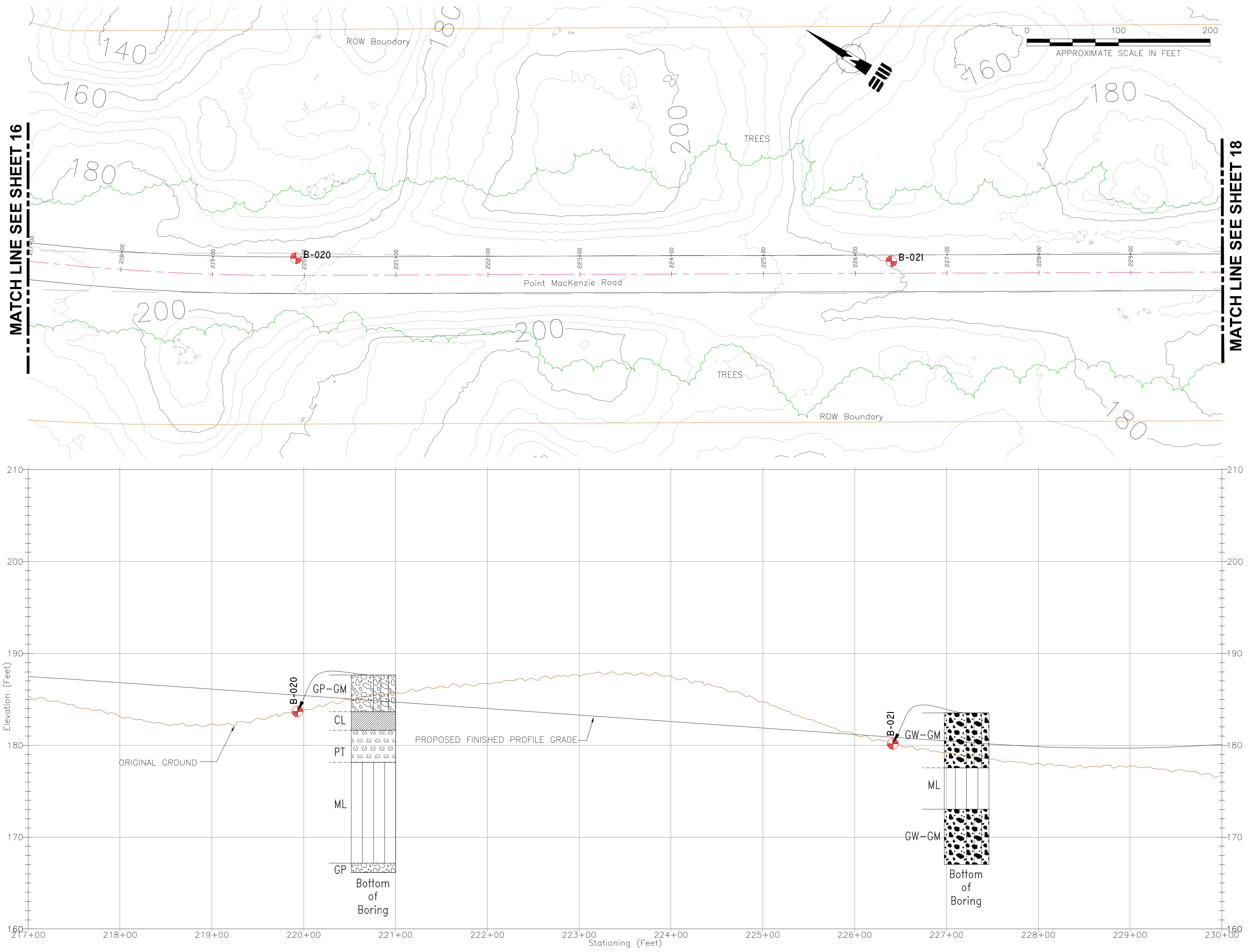

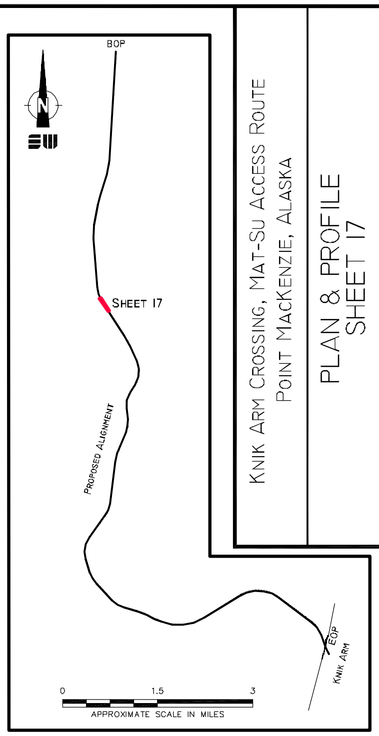

OVERVIEW OF PROJECT AREA

NOTES

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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001	Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)
— — —	Approximate location of existing Point MacKenzie Road
———	Approximate location of proposed Point MacKenzie Road upgrade
—·—·—	Approximate location of proposed centerline
———	Approximate location of proposed right-of-way (ROW) boundary
	Approximate location of marshy areas
	Approximate location of treeline
	Contours in 4-foot intervals
	Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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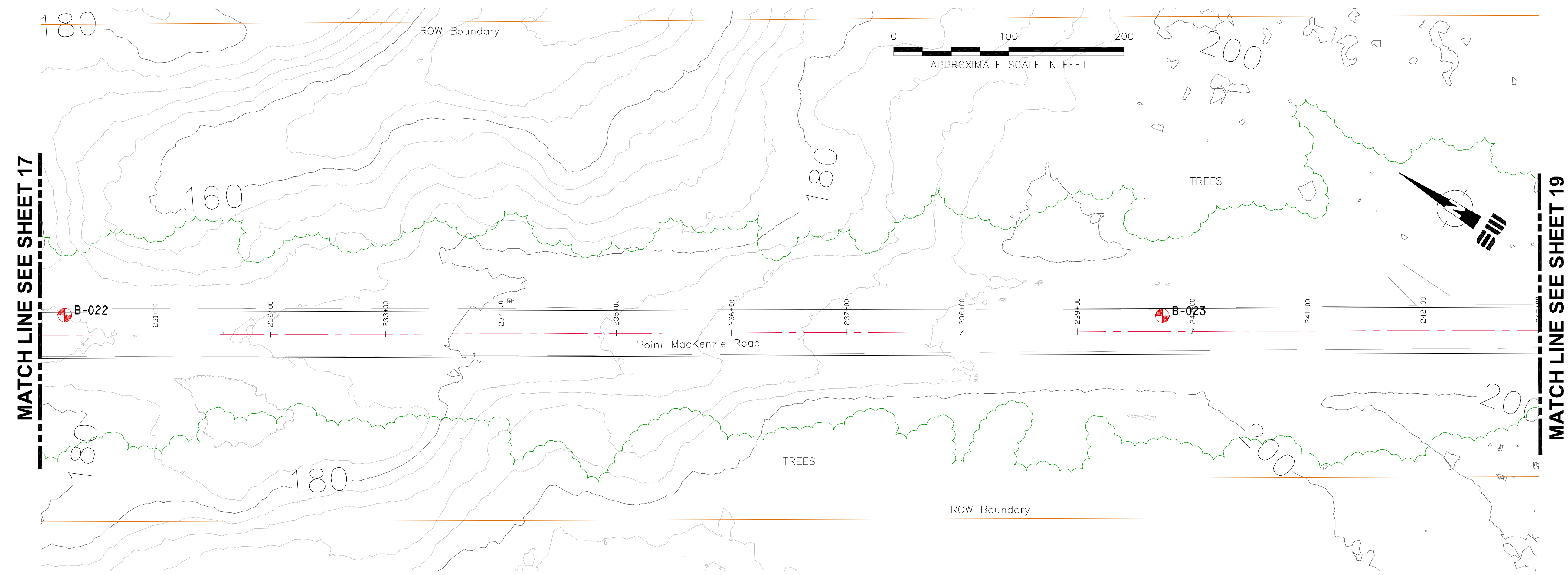

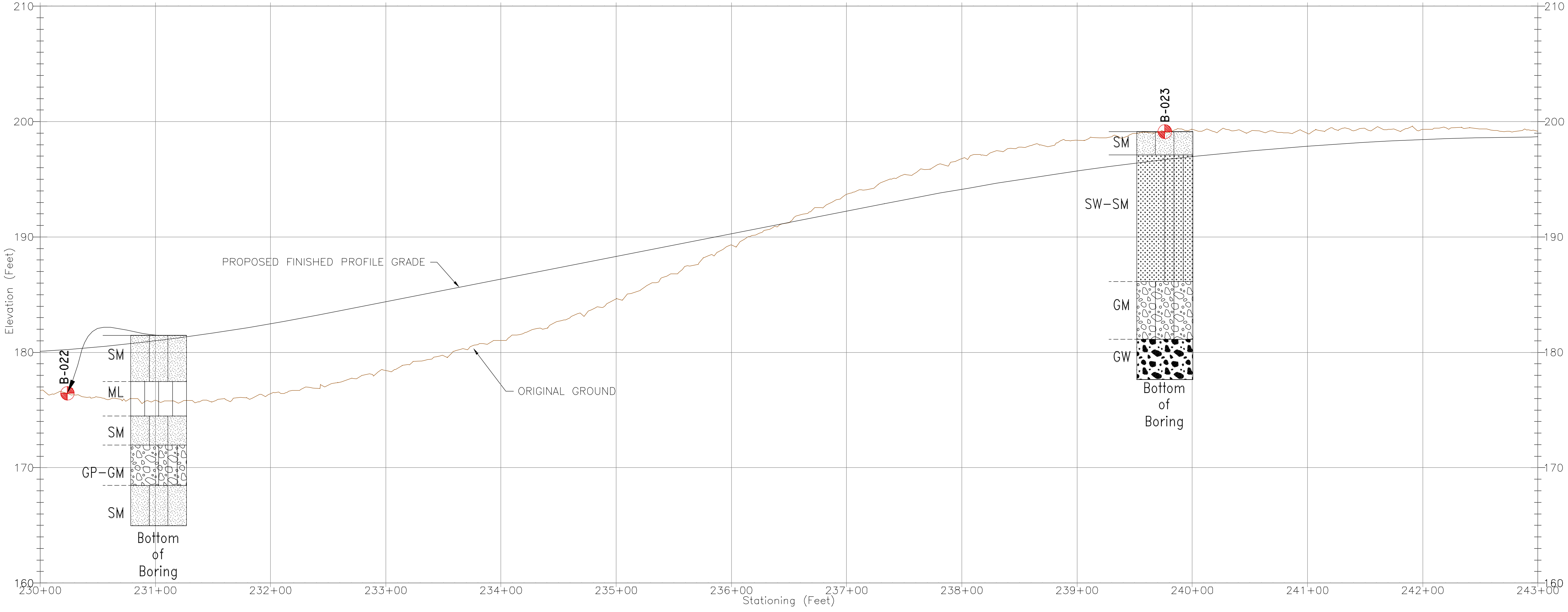

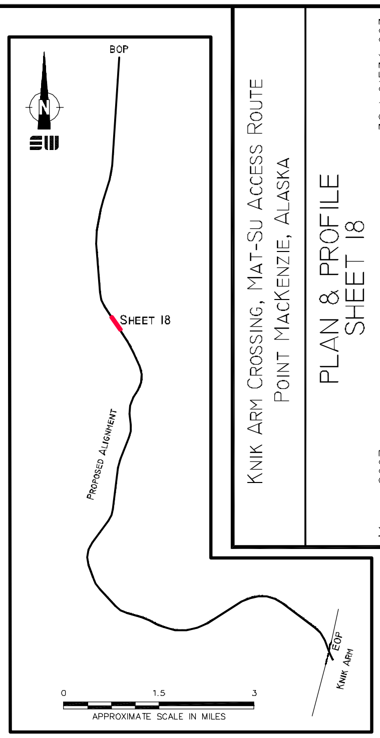

OVERVIEW OF PROJECT AREA

NOTES

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3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE I.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-I.
5. VERTICAL SCALE EXAGGERATED I0 TIMES HORIZONTAL SCALE

LEGEND

B-00I	APPROXIMATE LOCATION OF BORING B-00I, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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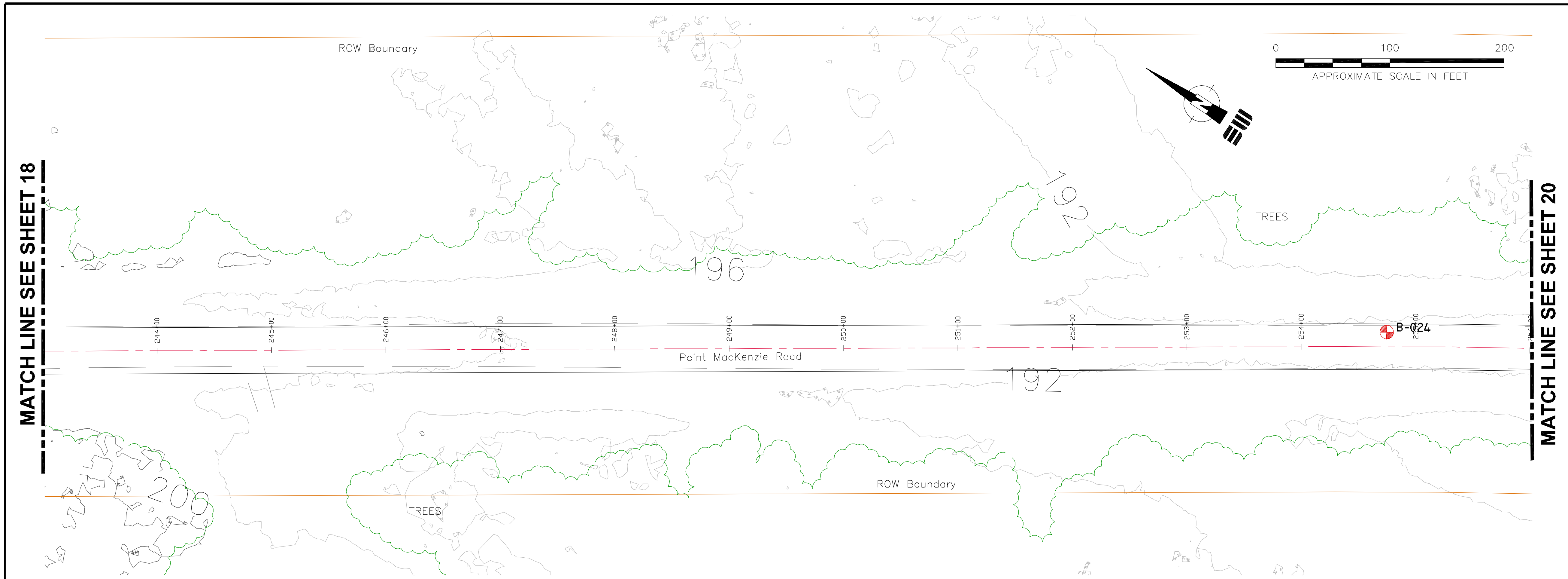

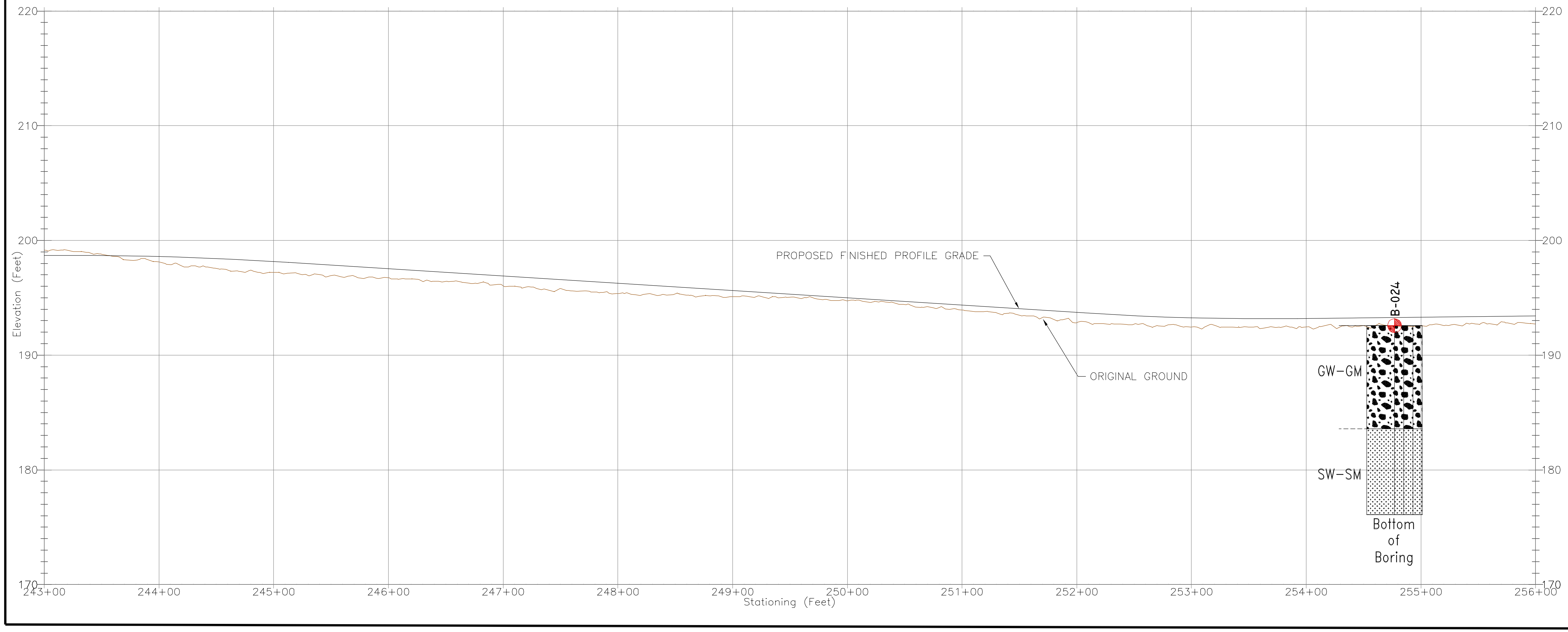

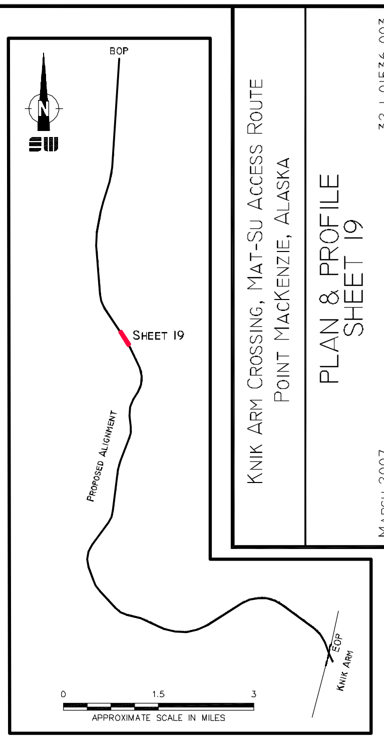

OVERVIEW OF PROJECT AREA

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
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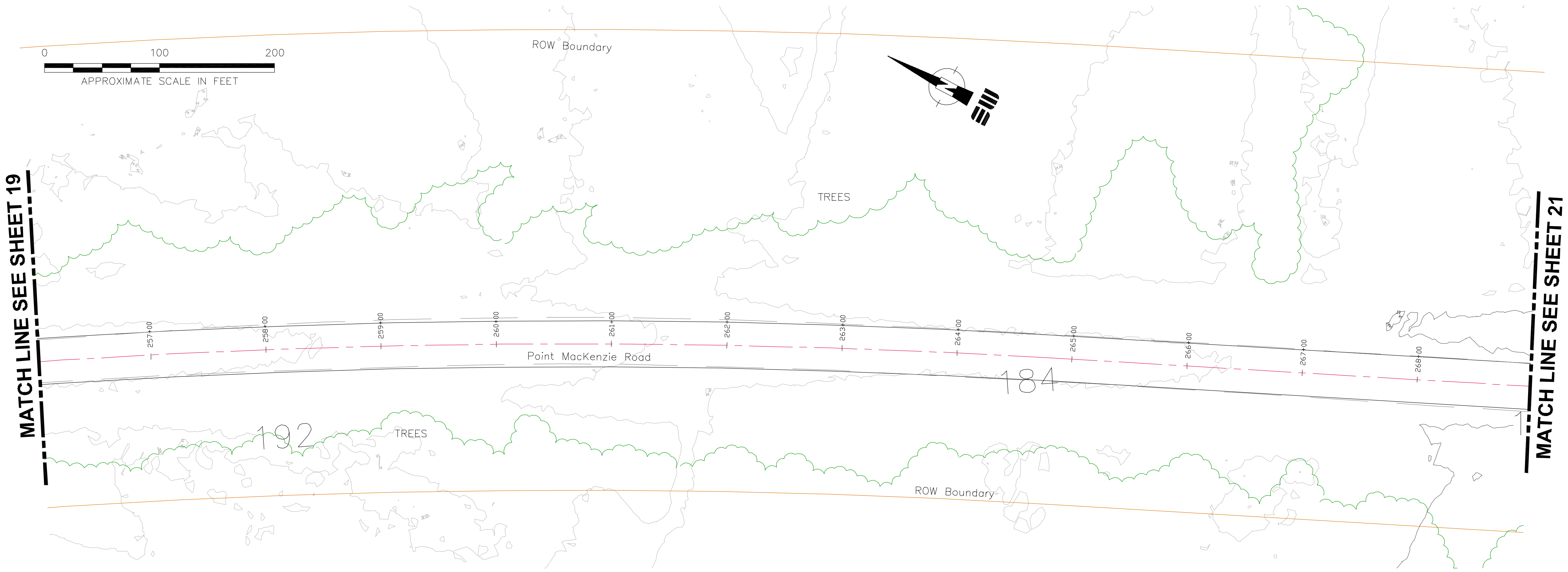
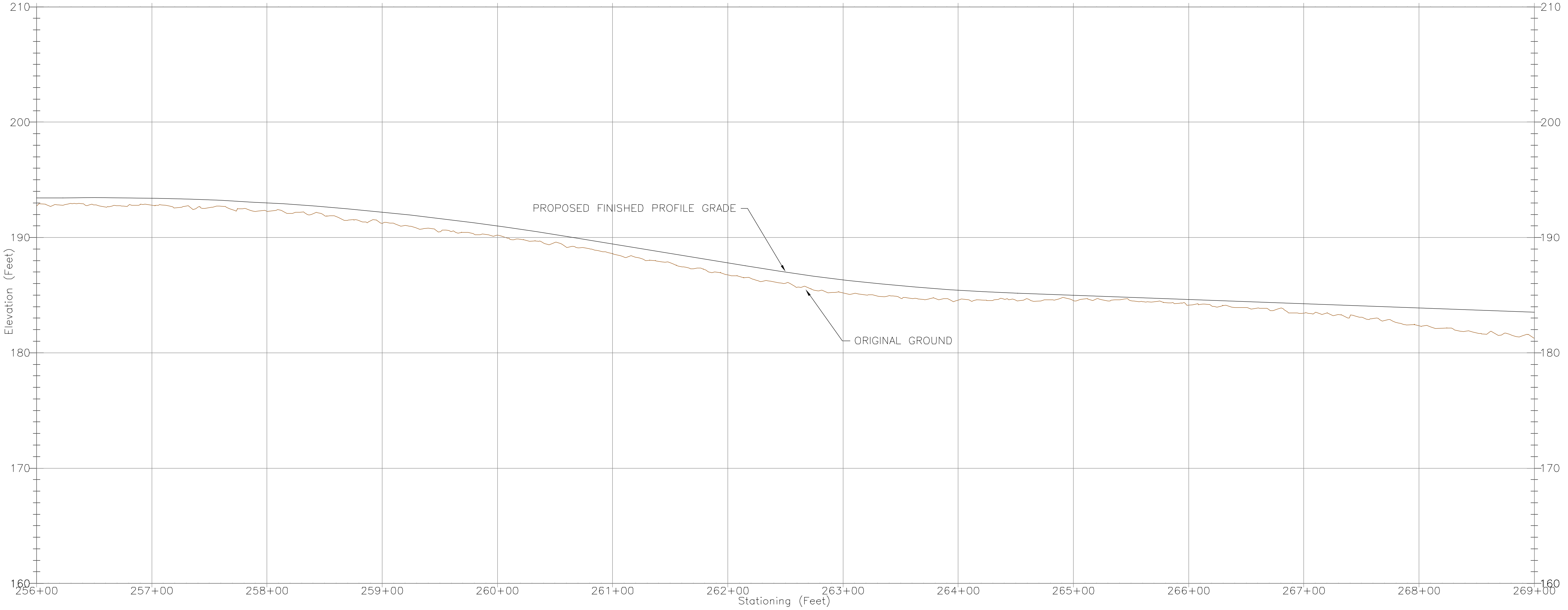
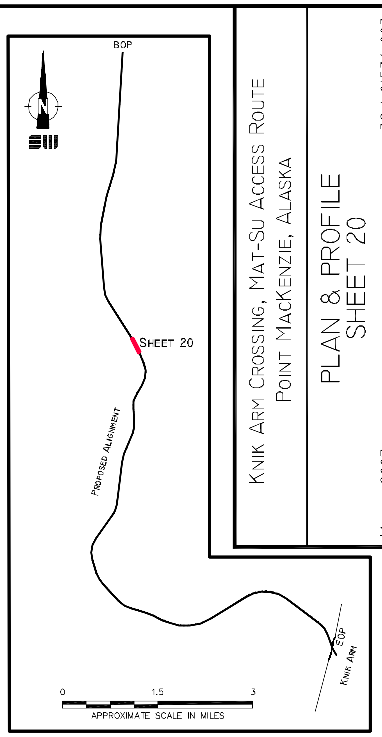
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═══	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR







OVERVIEW OF PROJECT AREA

NOTES

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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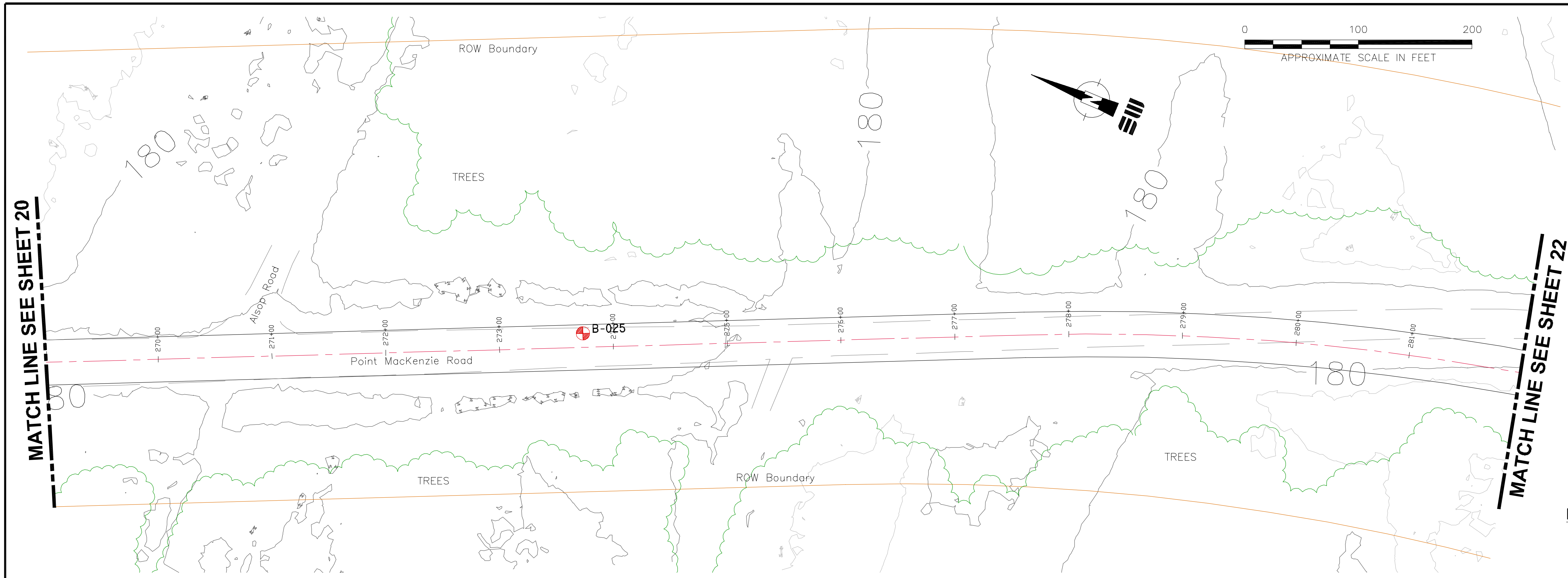

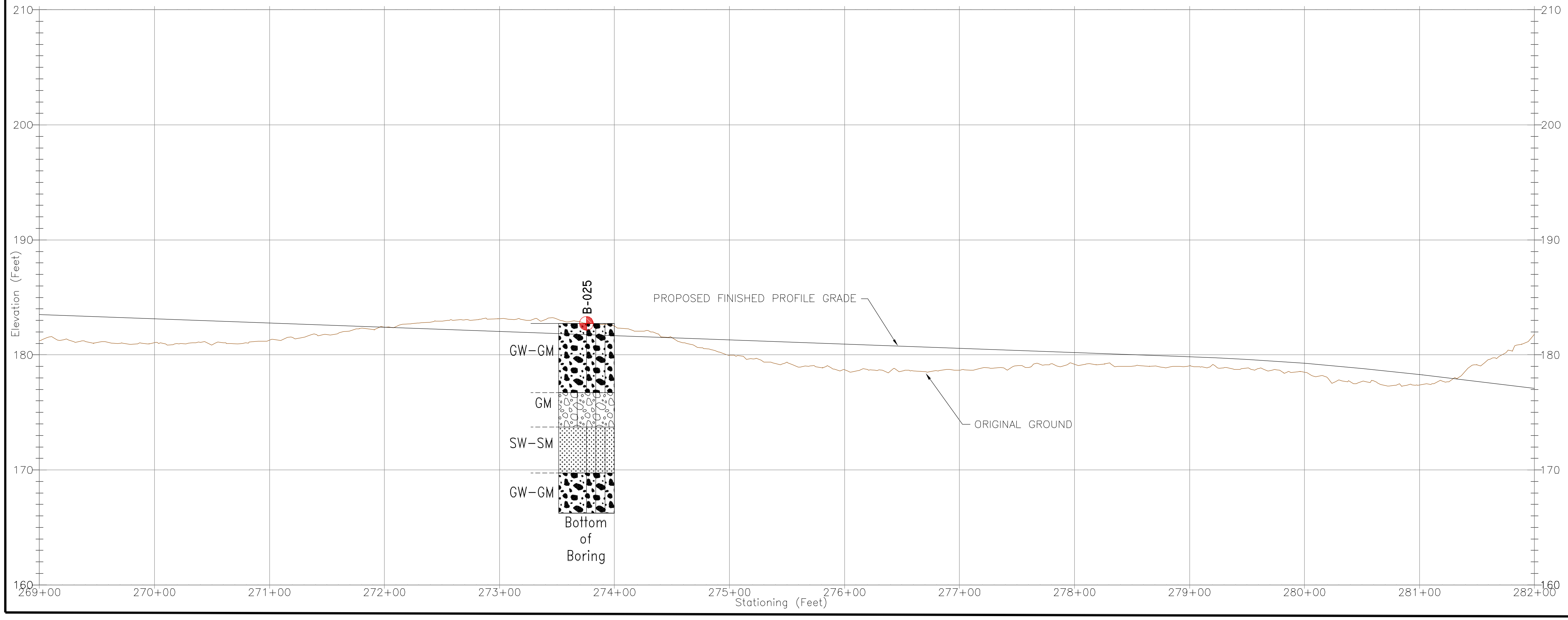

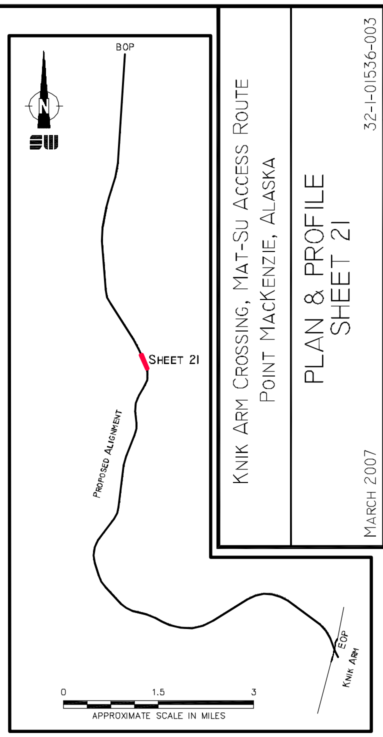

Overview of Project Area

NOTES

1. Drawing Adapted from PND Engineers, Inc. provided Plan & Profile Sheets.
2. Boring Logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
———	Approximate Location of Proposed Point MacKenzie Road Upgrade
—·—·—	Approximate Location of Proposed Centerline
———	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
○	Approximate Location of Treeline
≋	Contours in 4-foot intervals
○	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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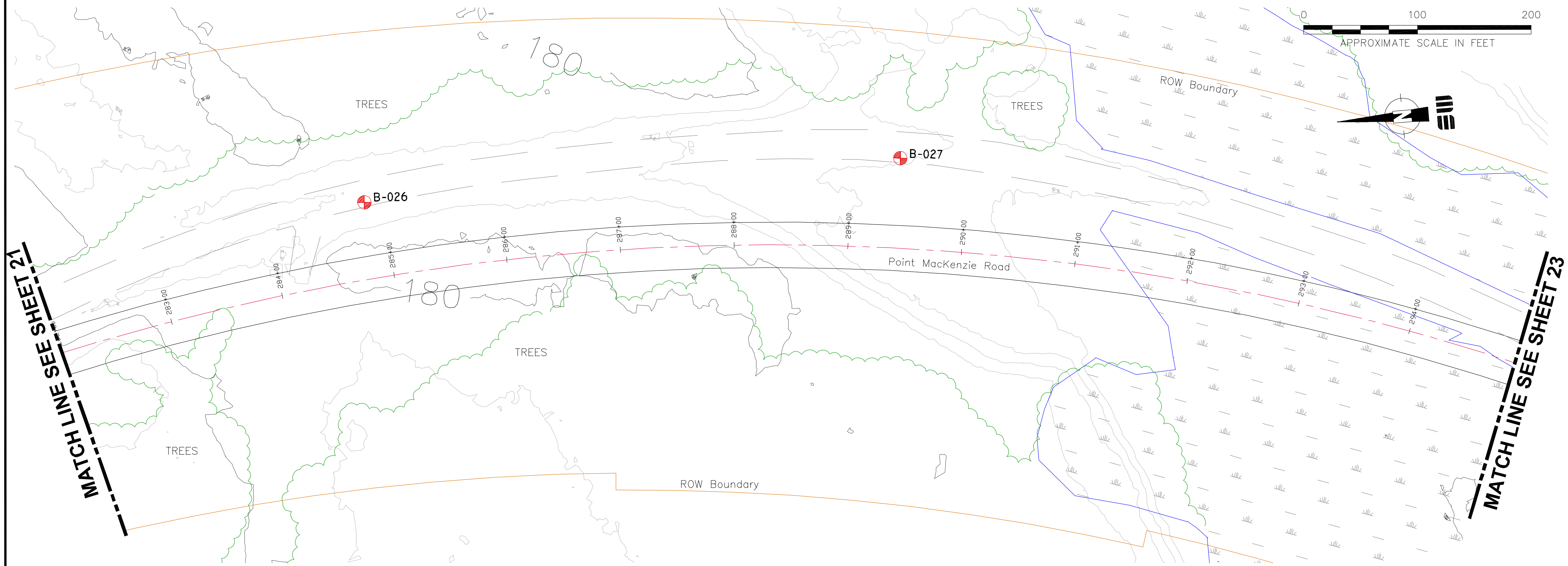

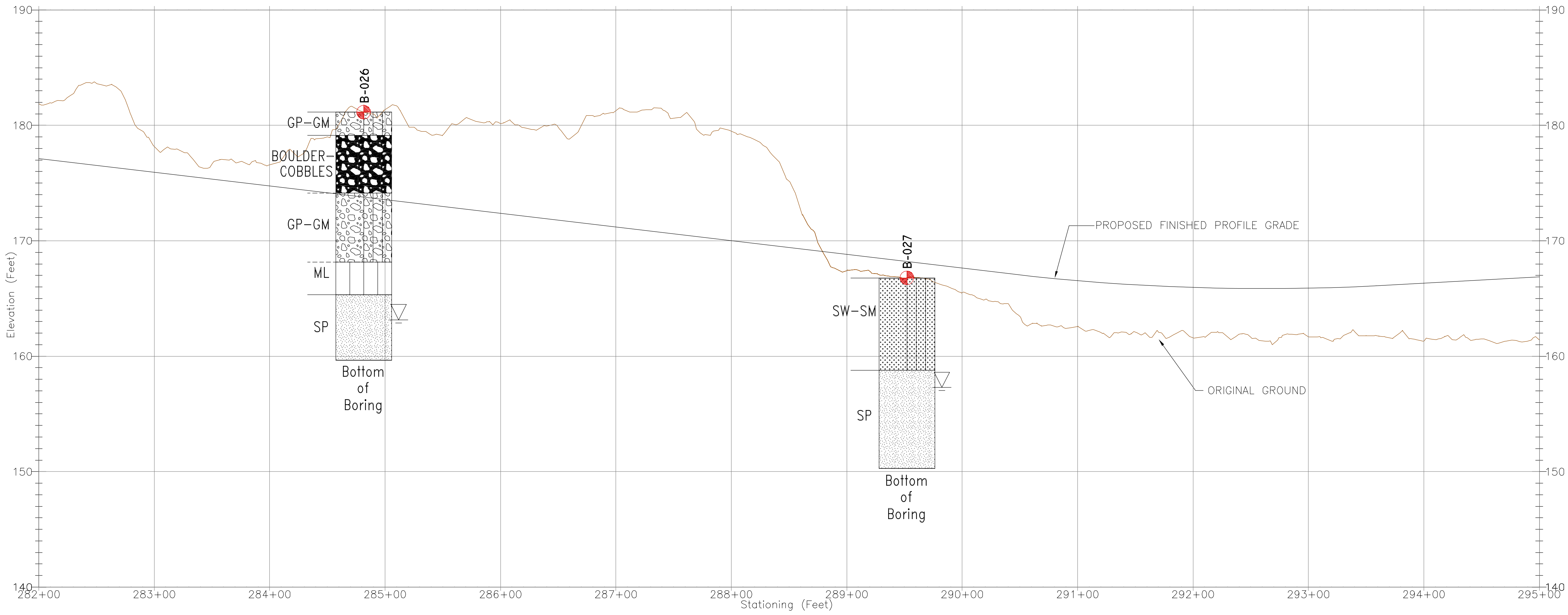

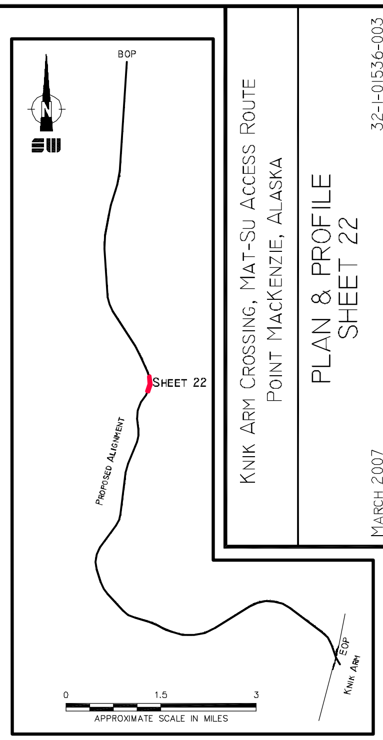

Overview of Project Area

NOTES

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3. Overview of project area is presented as Figure I.
4. Unified Soil Classification System (USCS) legend presented as Figure A-I.
5. Vertical Scale Exaggerated I0 Times Horizontal Scale

LEGEND

⊕ B-00I	Approximate Location of Boring B-00I, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
═	Approximate Location of Proposed Point MacKenzie Road Upgrade
—·—·—	Approximate Location of Proposed Centerline
—	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
○	Approximate Location of Treeline
220 200	Contours in 4-foot intervals
○	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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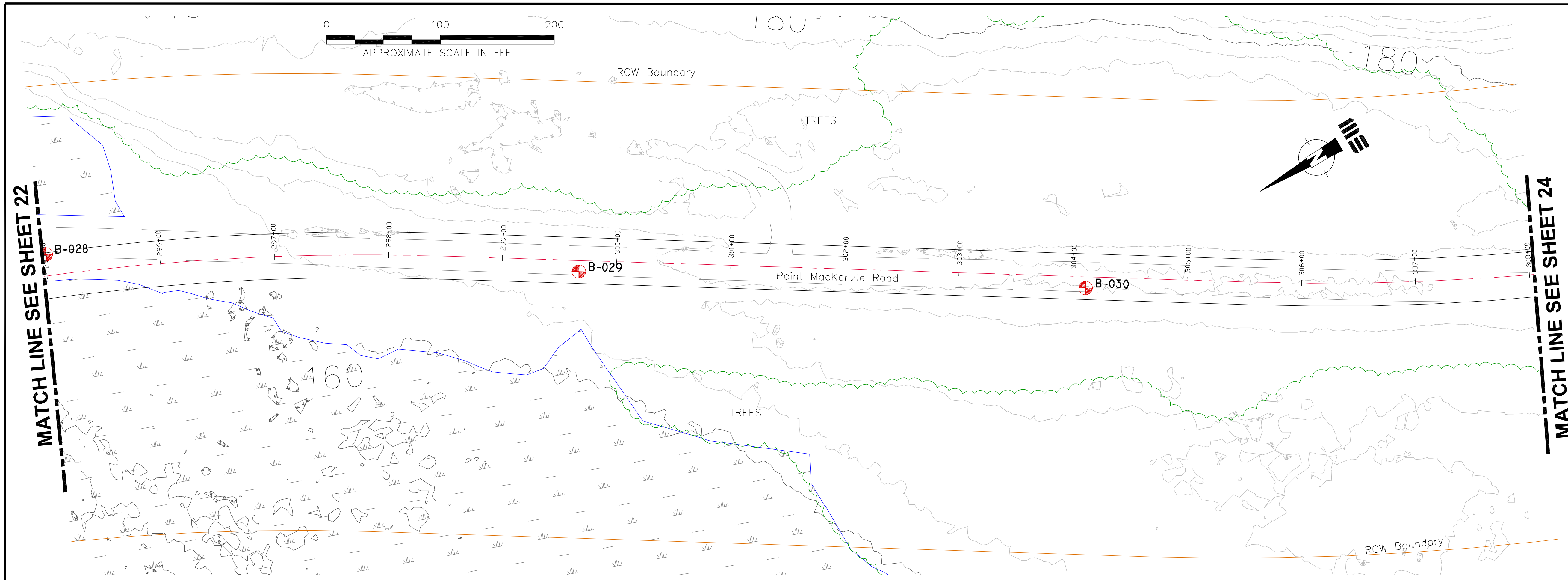
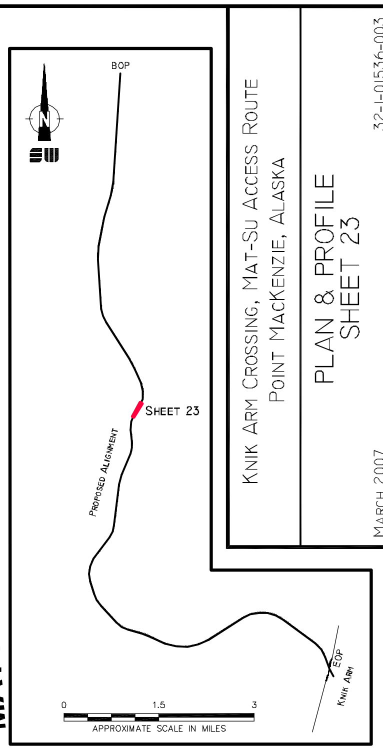
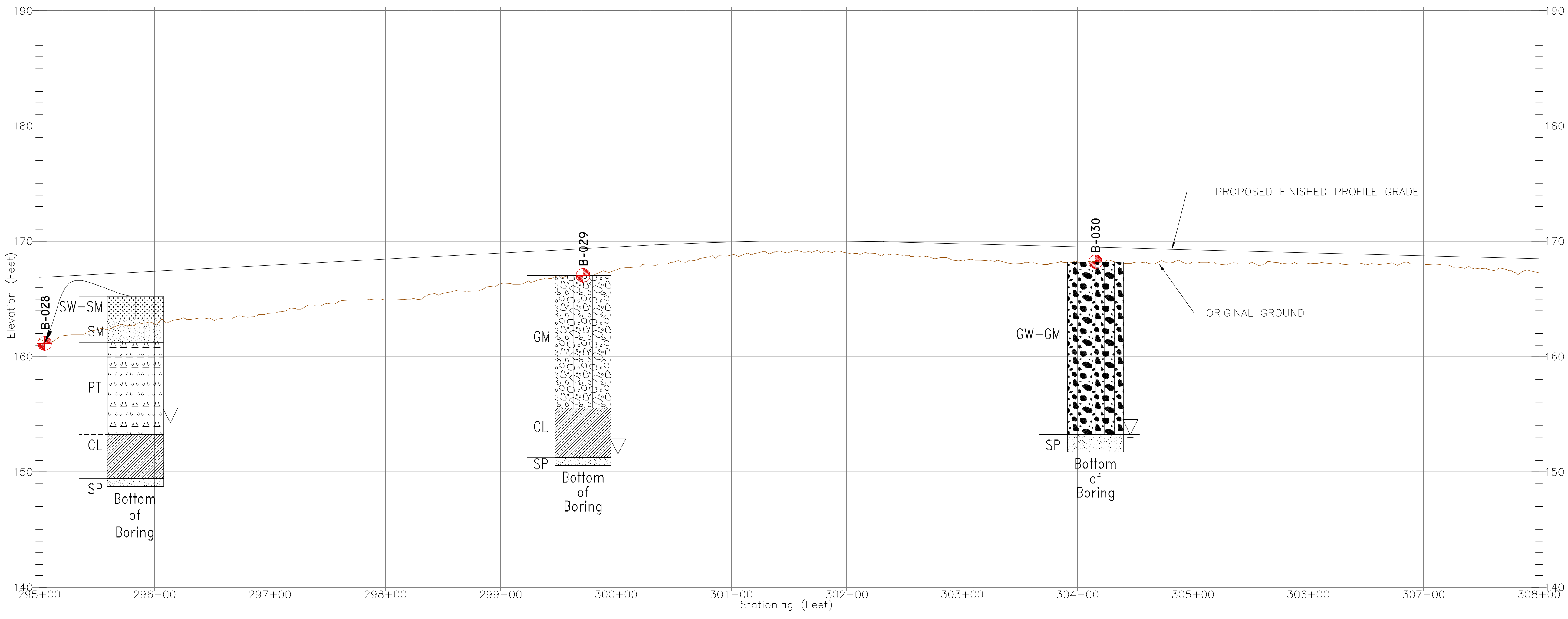




OVERVIEW OF PROJECT AREA



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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

⊕ B-001	Approximate Location of Boring B-001, advanced by Shannon & Wilson, Inc., 2006 (Location surveyed after completion)
— — —	Approximate Location of Exisiting Point MacKenzie Road
═══	Approximate Location of Proposed Point MacKenzie Road Upgrade
— · —	Approximate Location of Proposed Centerline
———	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
◯	Approximate Location of Treeline
≋	Contours in 4-Foot Intervals
◯	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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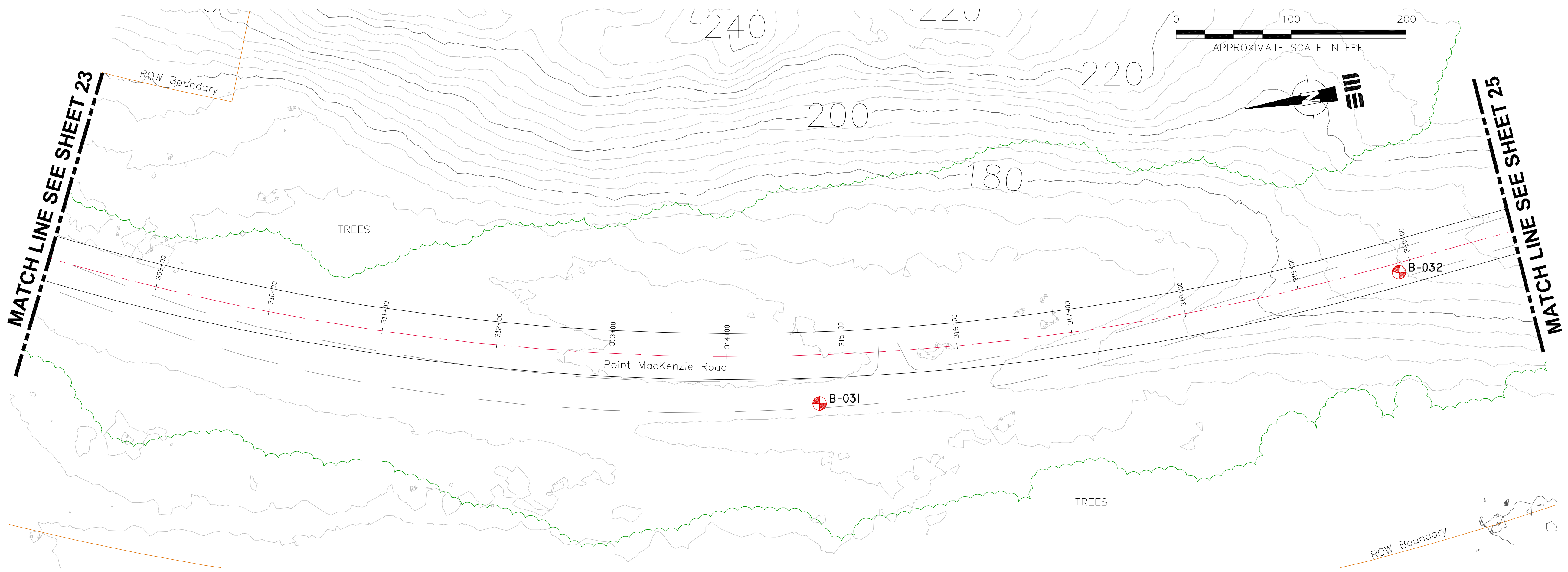

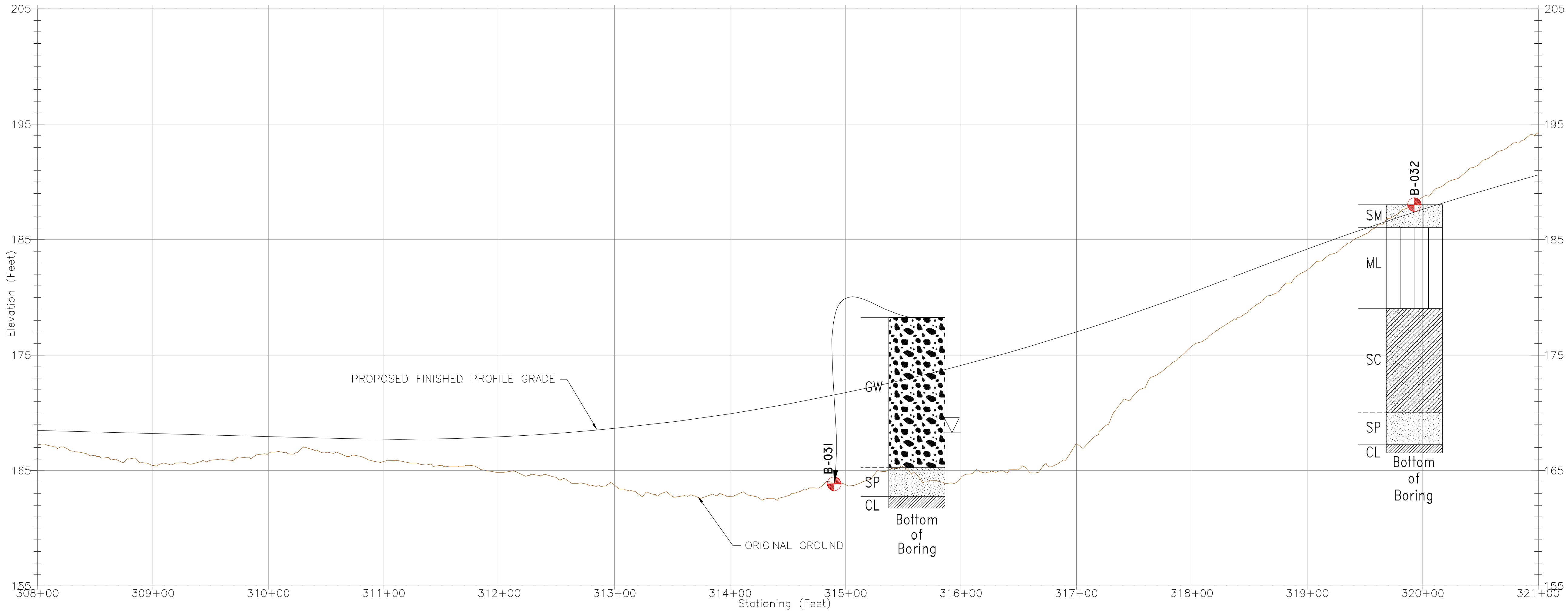

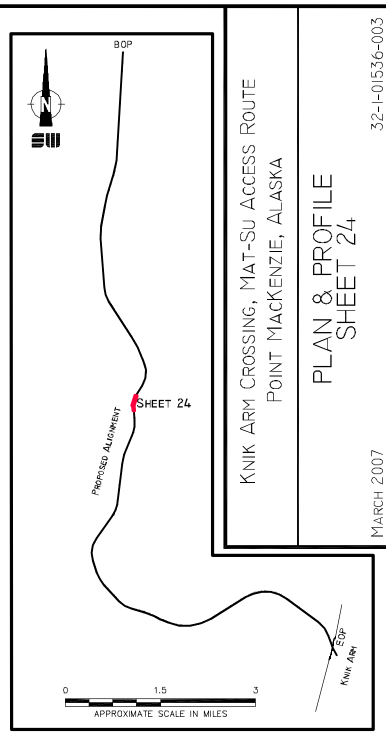

OVERVIEW OF PROJECT AREA

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5. VERTICAL SCALE EXAGGERATED I0 TIMES HORIZONTAL SCALE

LEGEND

B-00I APPROXIMATE LOCATION OF BORING B-00I, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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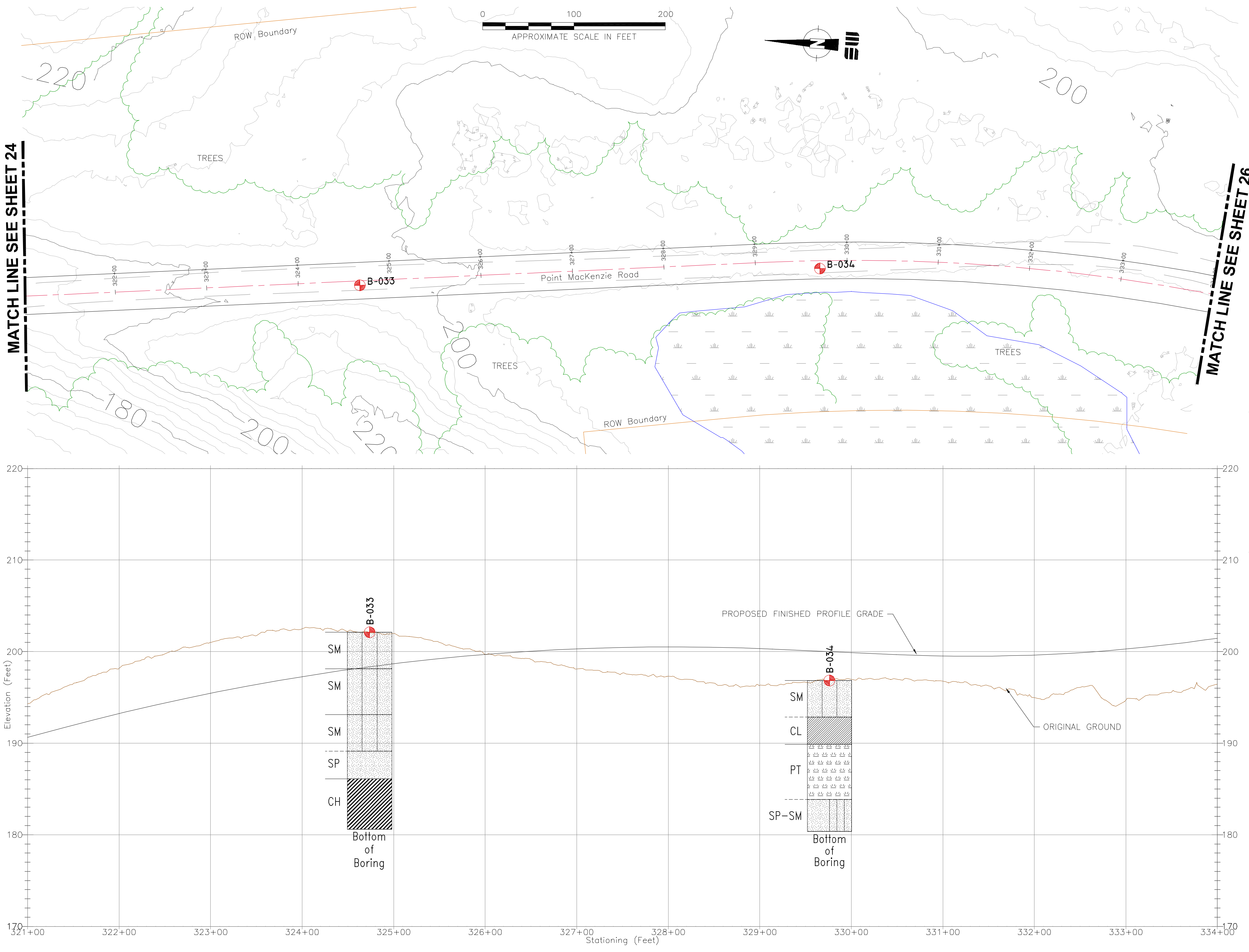

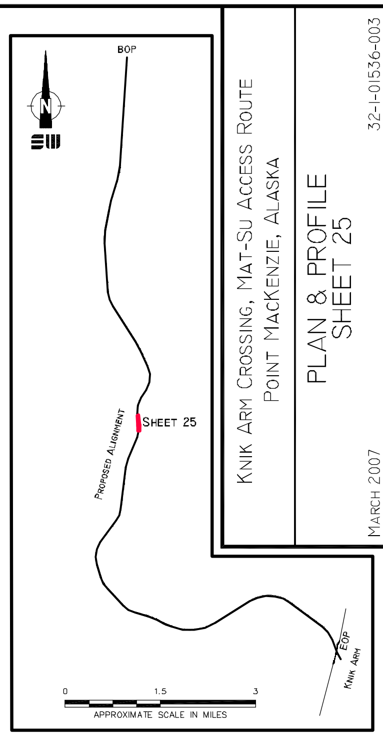

OVERVIEW OF PROJECT AREA

NOTES

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3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-001 Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)

Approximate location of exisiting Point MacKenzie Road

Approximate location of proposed Point MacKenzie Road upgrade

Approximate location of proposed centerline

Approximate location of proposed right-of-way (ROW) boundary

Approximate location of marshy areas

Approximate location of treeline

Contours in 4-foot intervals

Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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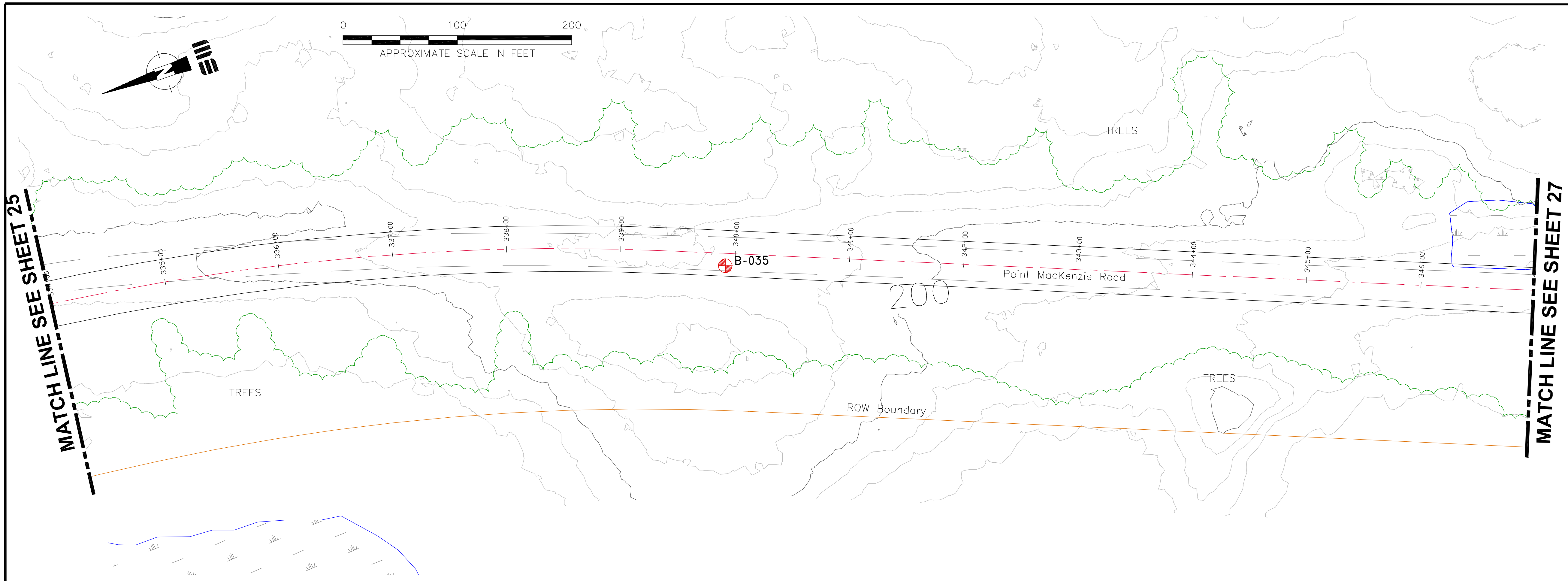

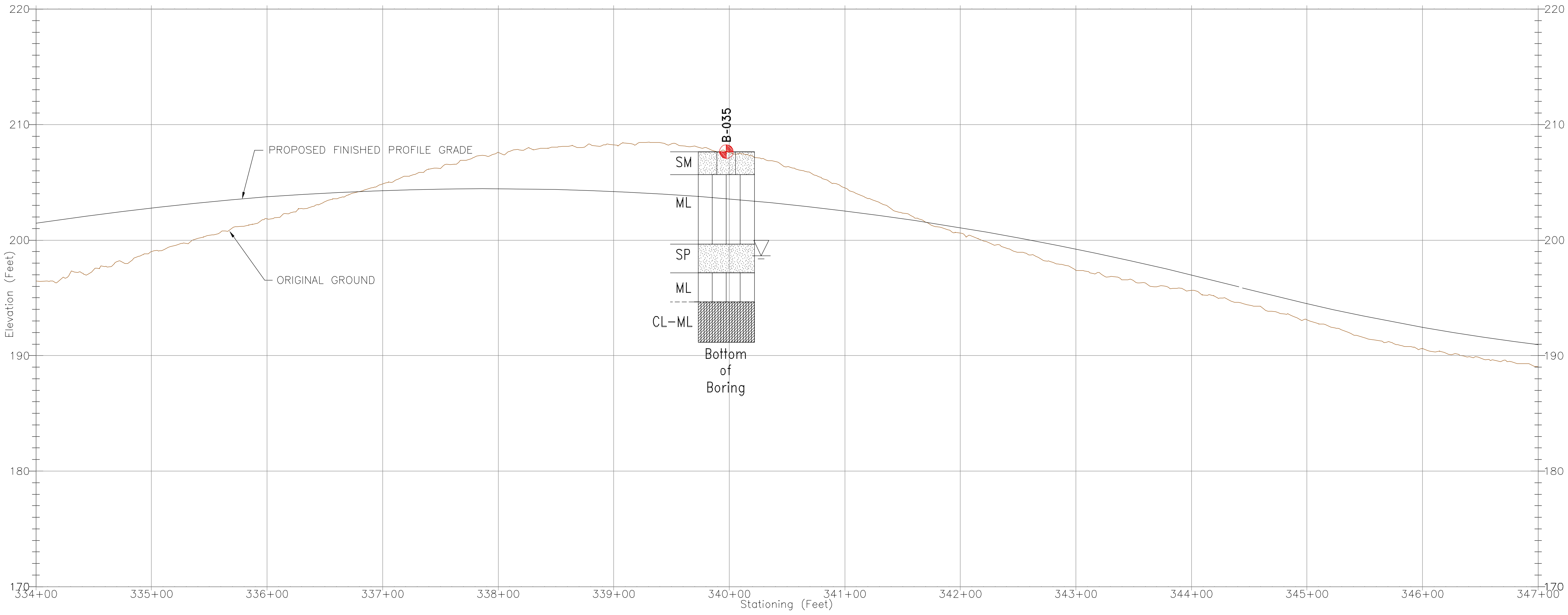

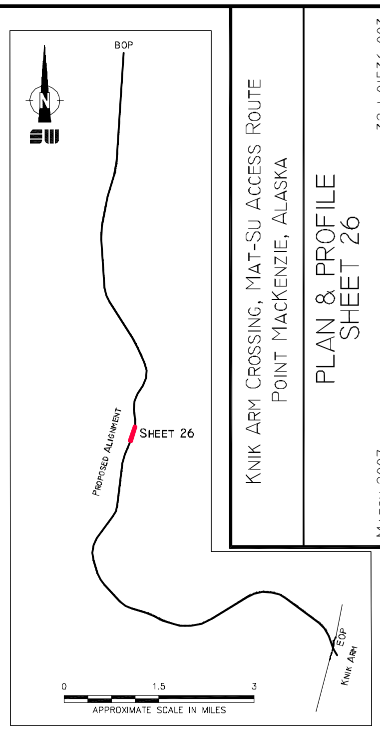

OVERVIEW OF PROJECT AREA

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

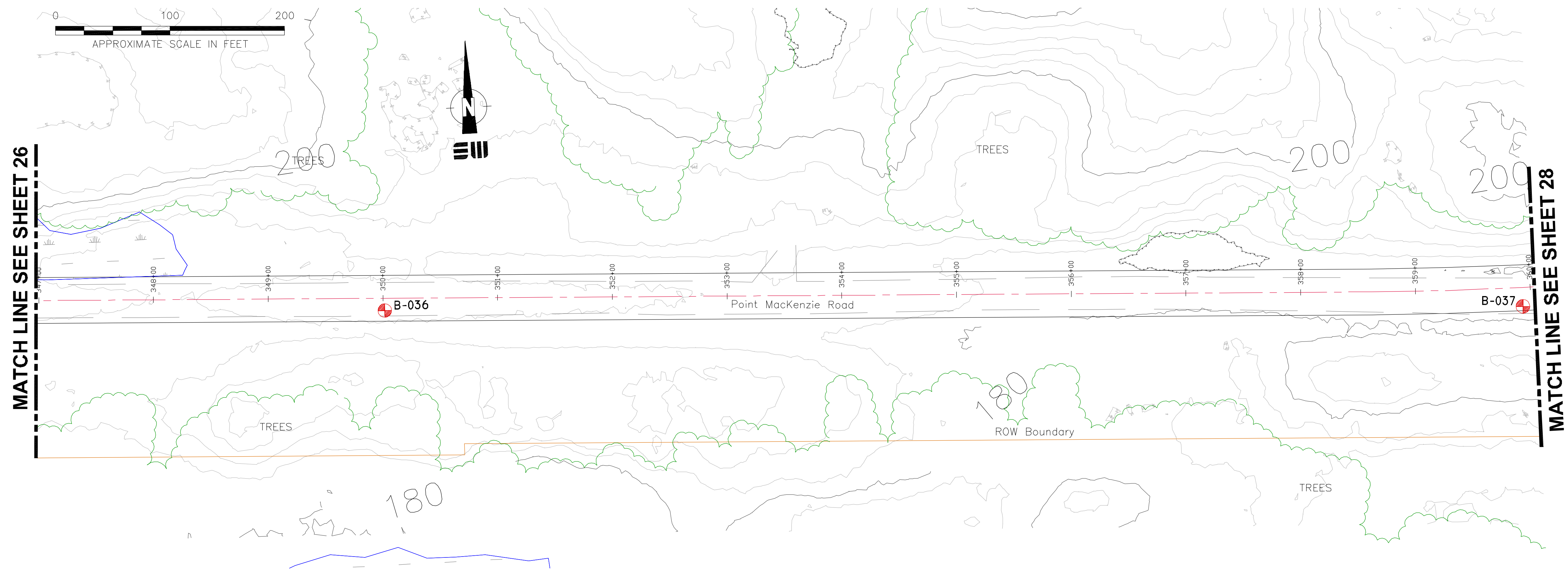
APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

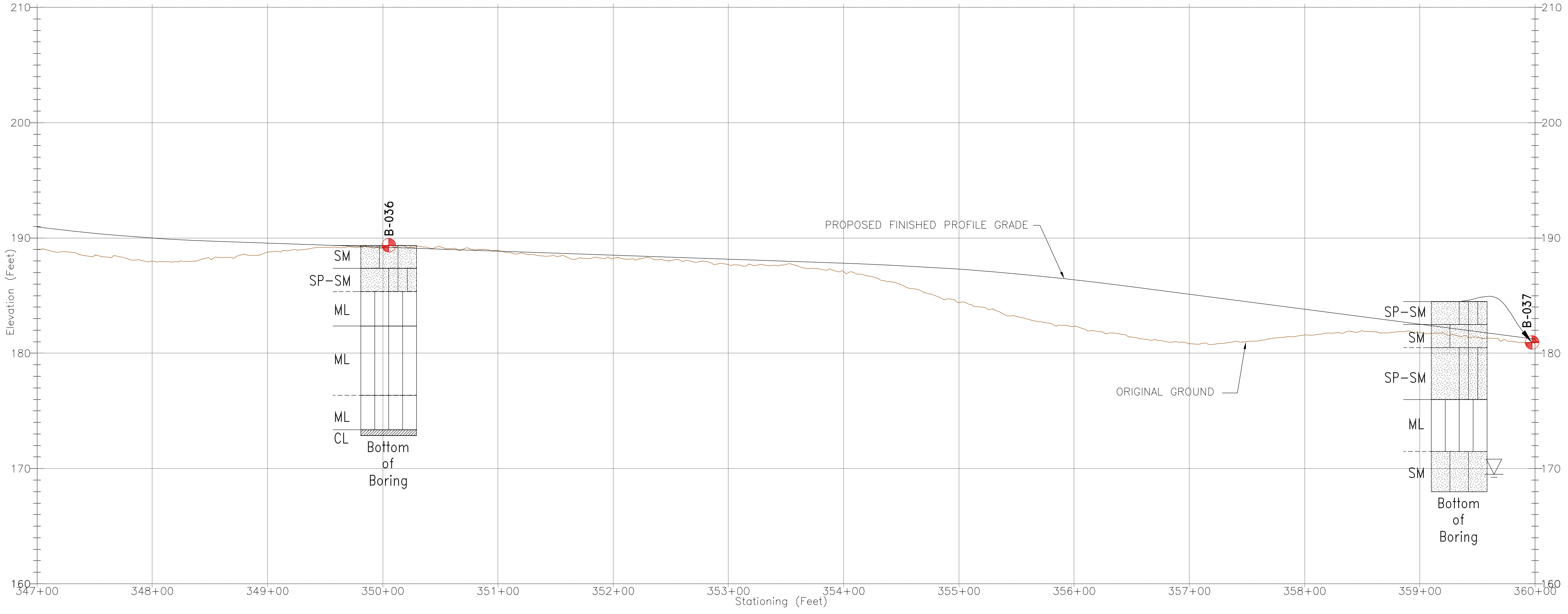
APPROXIMATE LOCATION OF MARSHY AREAS

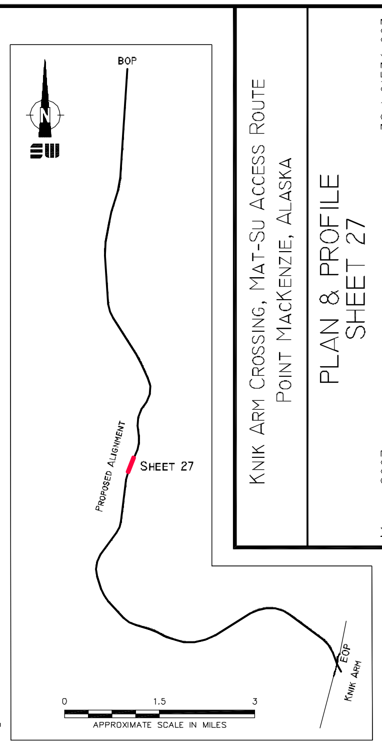
APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR







OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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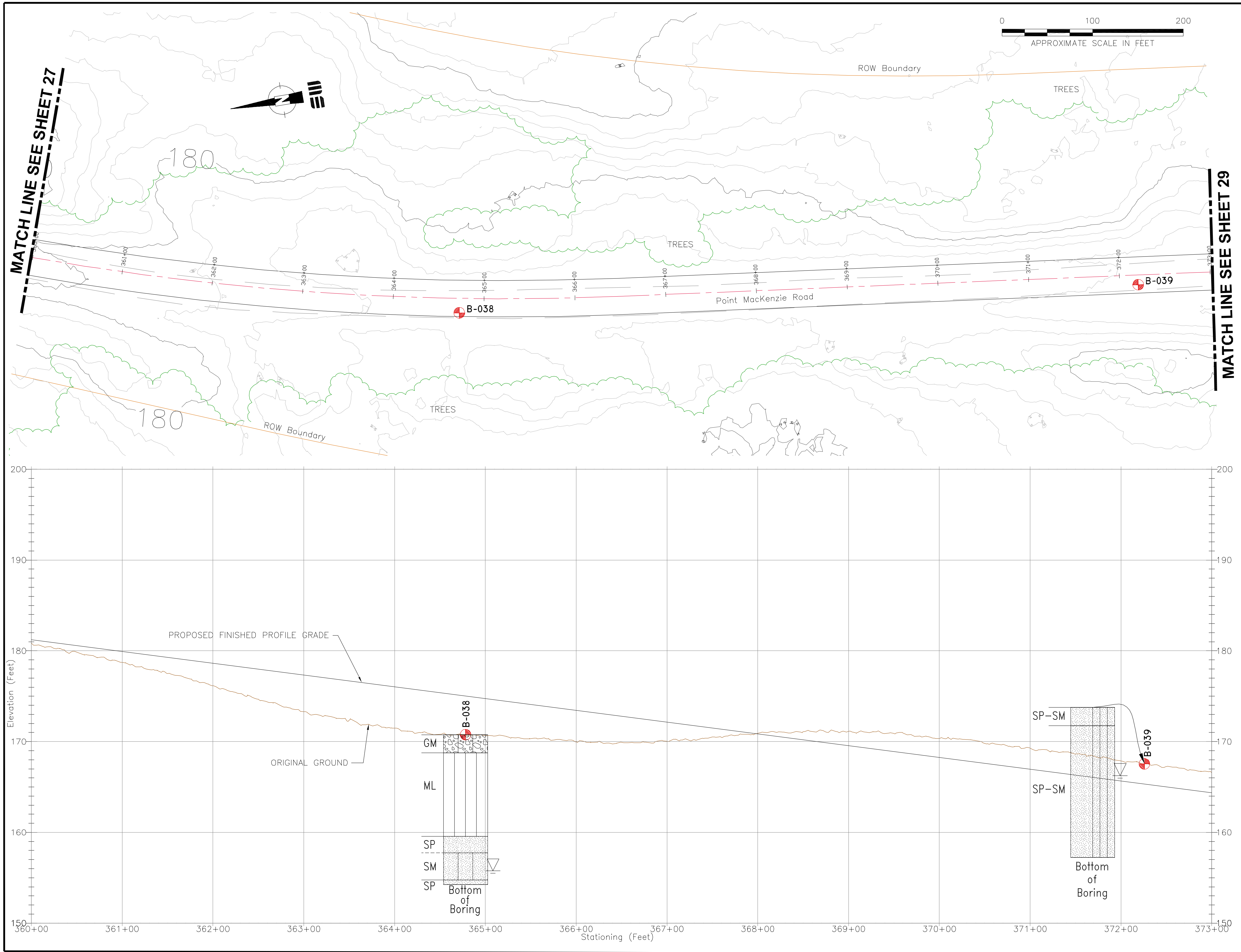

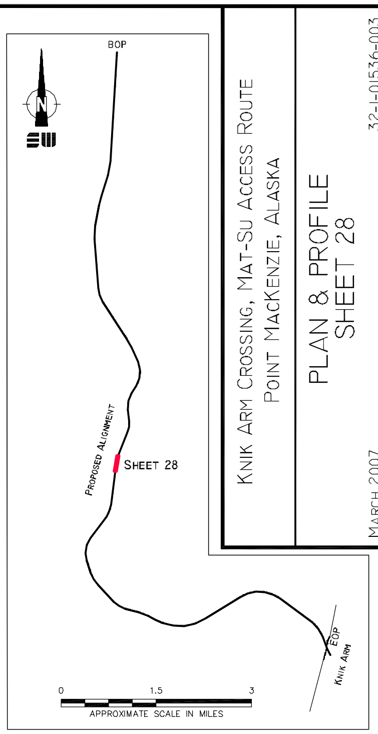

Overview of Project Area

NOTES

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2. Boring Logs are Included in Appendix A
3. Overview of Project Area is Presented as Figure 1.
4. Unified Soil Classification System (USCS) Legend Presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

⊕ B-001 Approximate Location of Boring B-001, Advanced by Shannon & Wilson, Inc., 2006 (Location Surveyed after Completion)

— — — Approximate Location of Exisiting Point MacKenzie Road

—— Approximate Location of Proposed Point MacKenzie Road Upgrade

-·-·- Approximate Location of Proposed Centerline

—— Approximate Location of Proposed Right-of-Way (ROW) Boundary

▨ Approximate Location of Marshy Areas

Approximate Location of Treeline

Contours in 4-Foot Intervals

Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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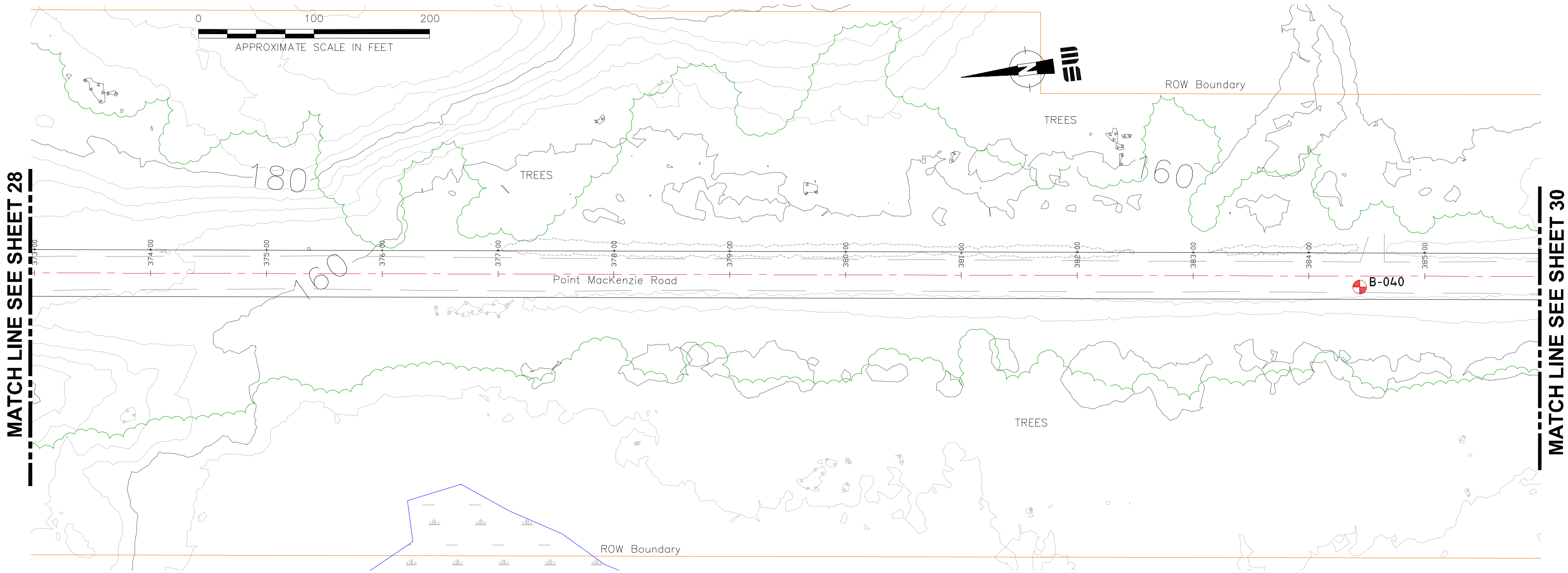

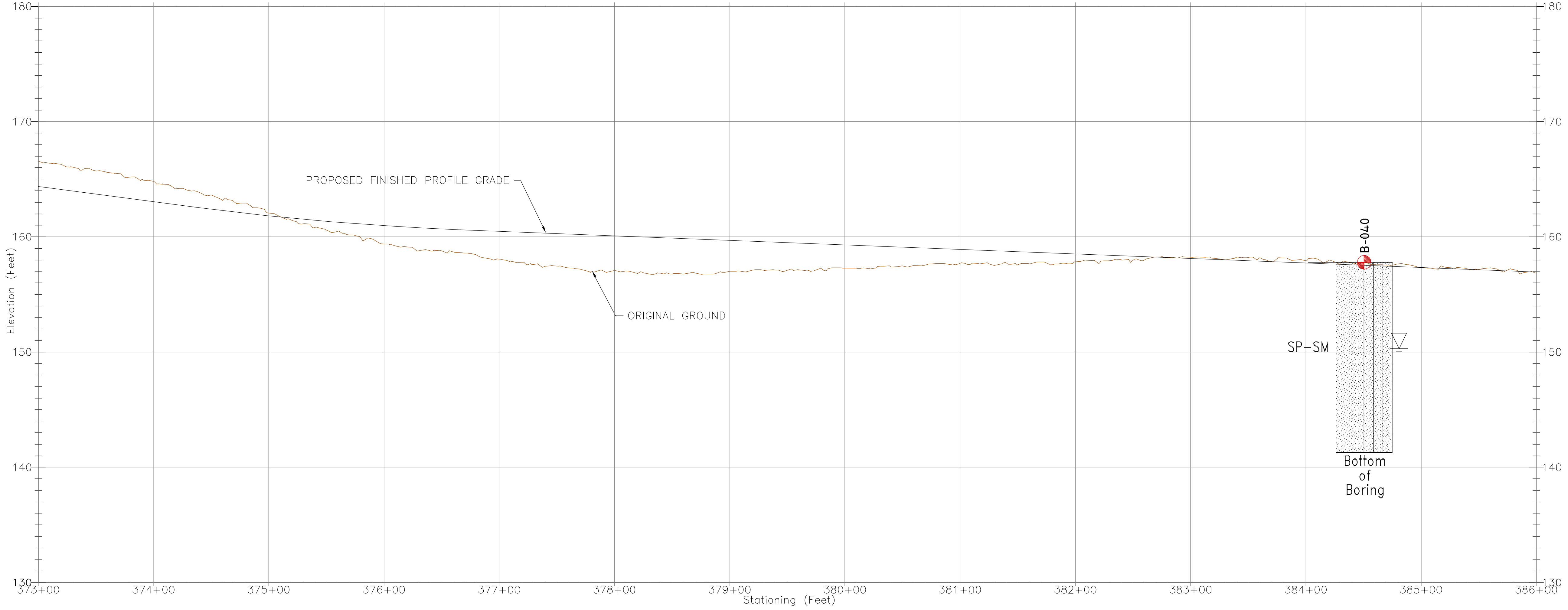

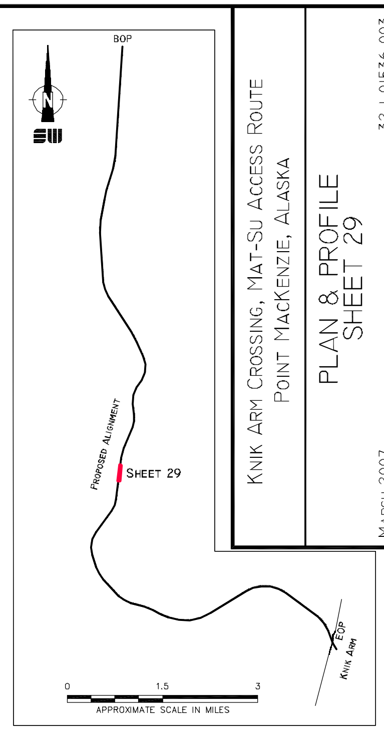

OVERVIEW OF PROJECT AREA

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5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

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APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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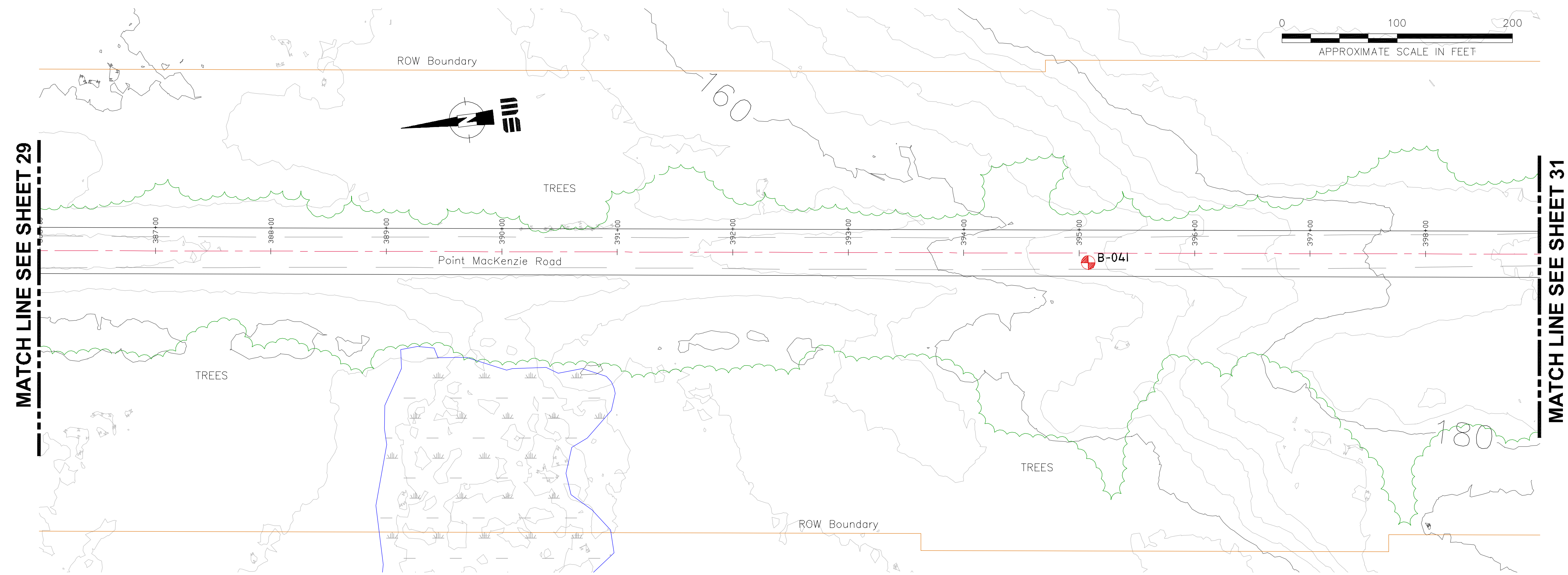

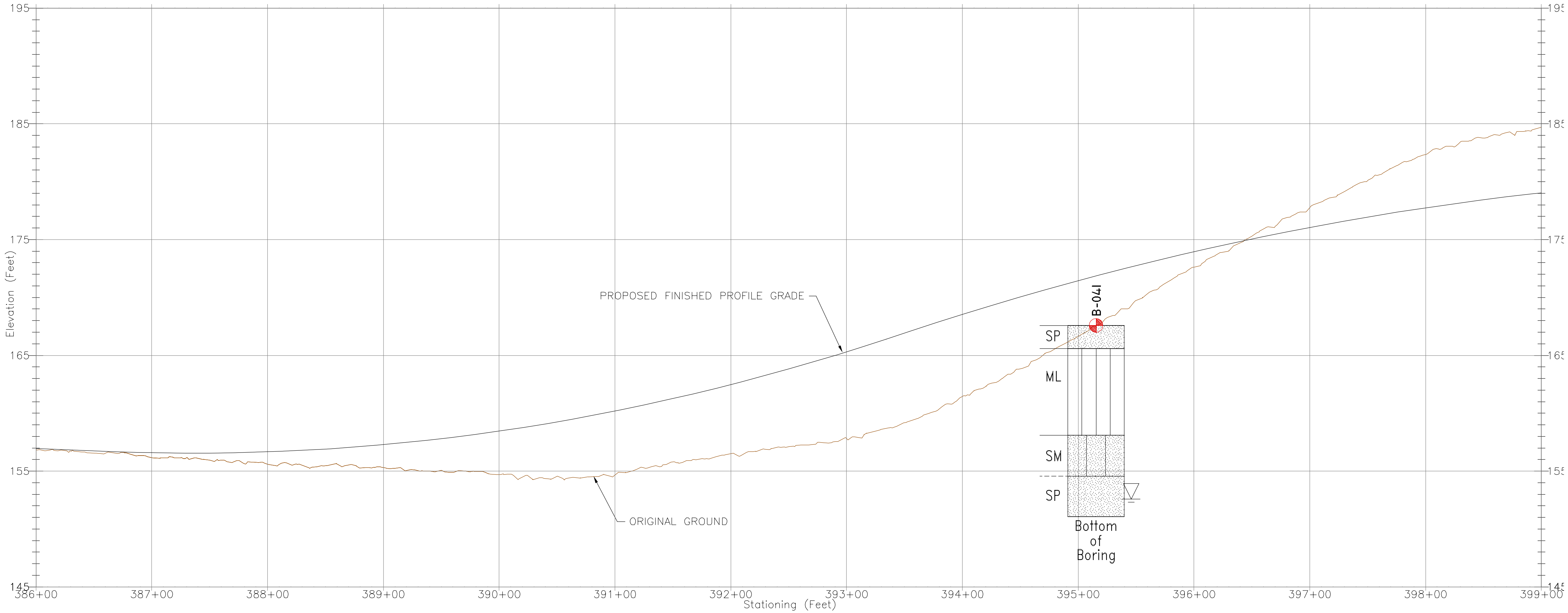

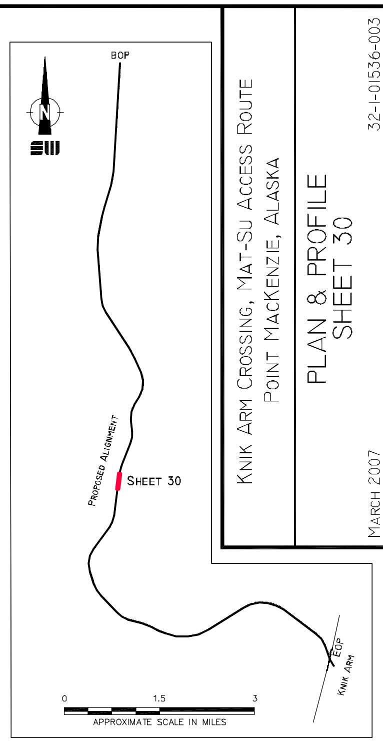

Overview of Project Area

NOTES

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4. Unified Soil Classification System (USCS) Legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

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— — —	Approximate Location of Exisiting Point MacKenzie Road
═	Approximate Location of Proposed Point MacKenzie Road Upgrade
—·—	Approximate Location of Proposed Centerline
—	Approximate Location of Proposed Right-of-Way (ROW) Boundary
▨	Approximate Location of Marshy Areas
○	Approximate Location of Treeline
≋	Contours in 4-foot Intervals
○	Depression in Contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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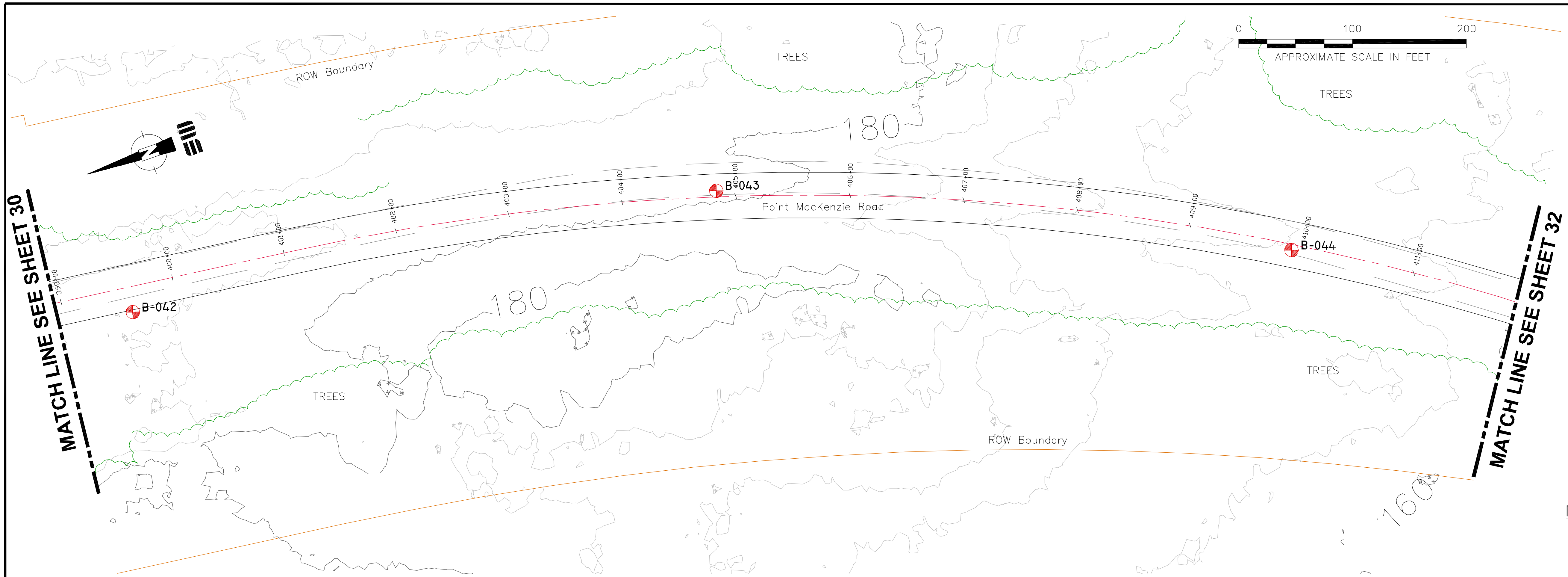

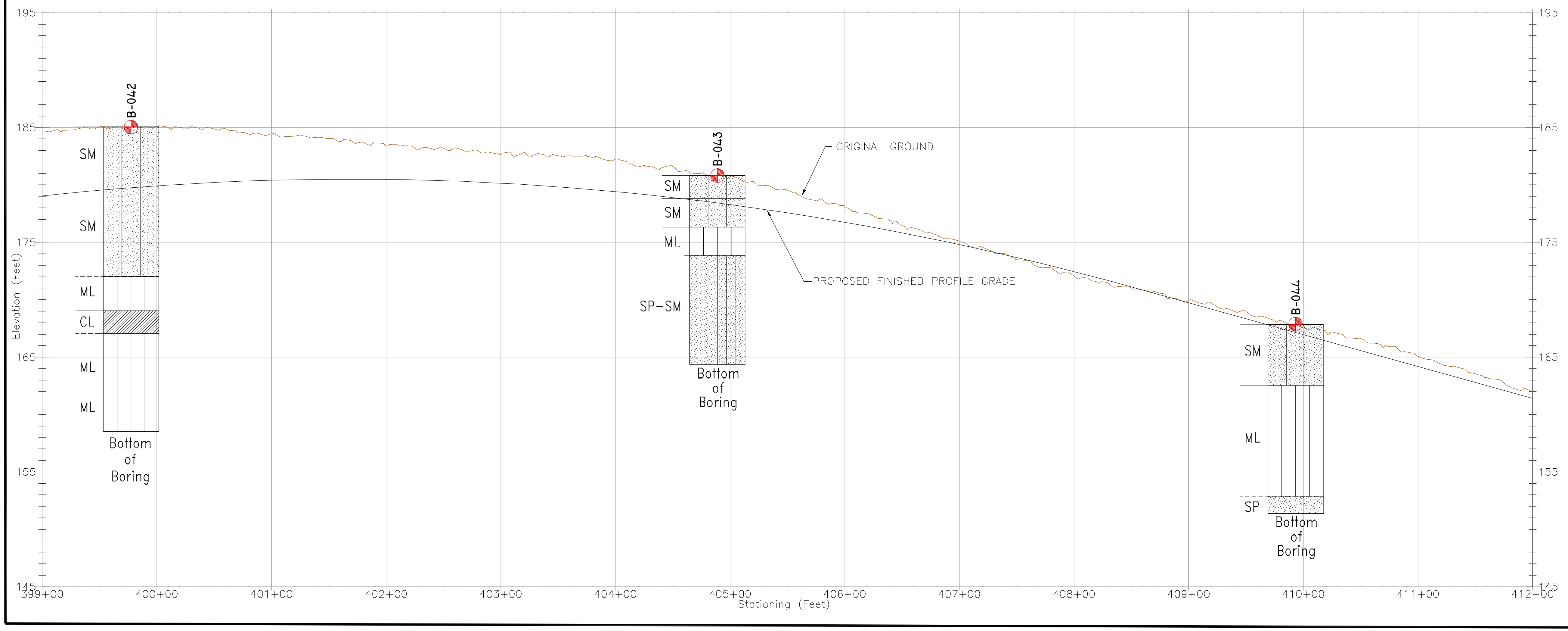

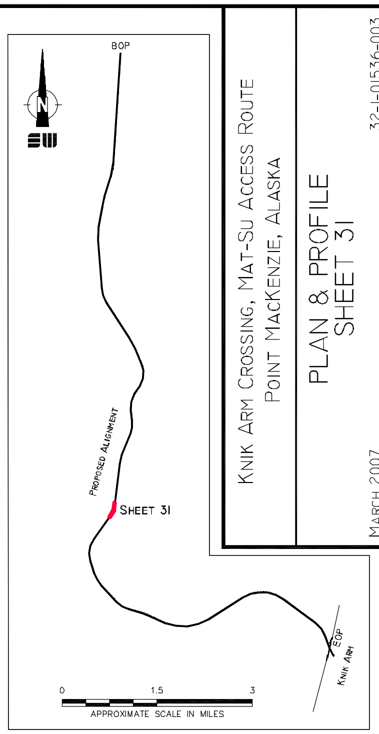

OVERVIEW OF PROJECT AREA

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LEGEND

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— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
———	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
⬠	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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A-3
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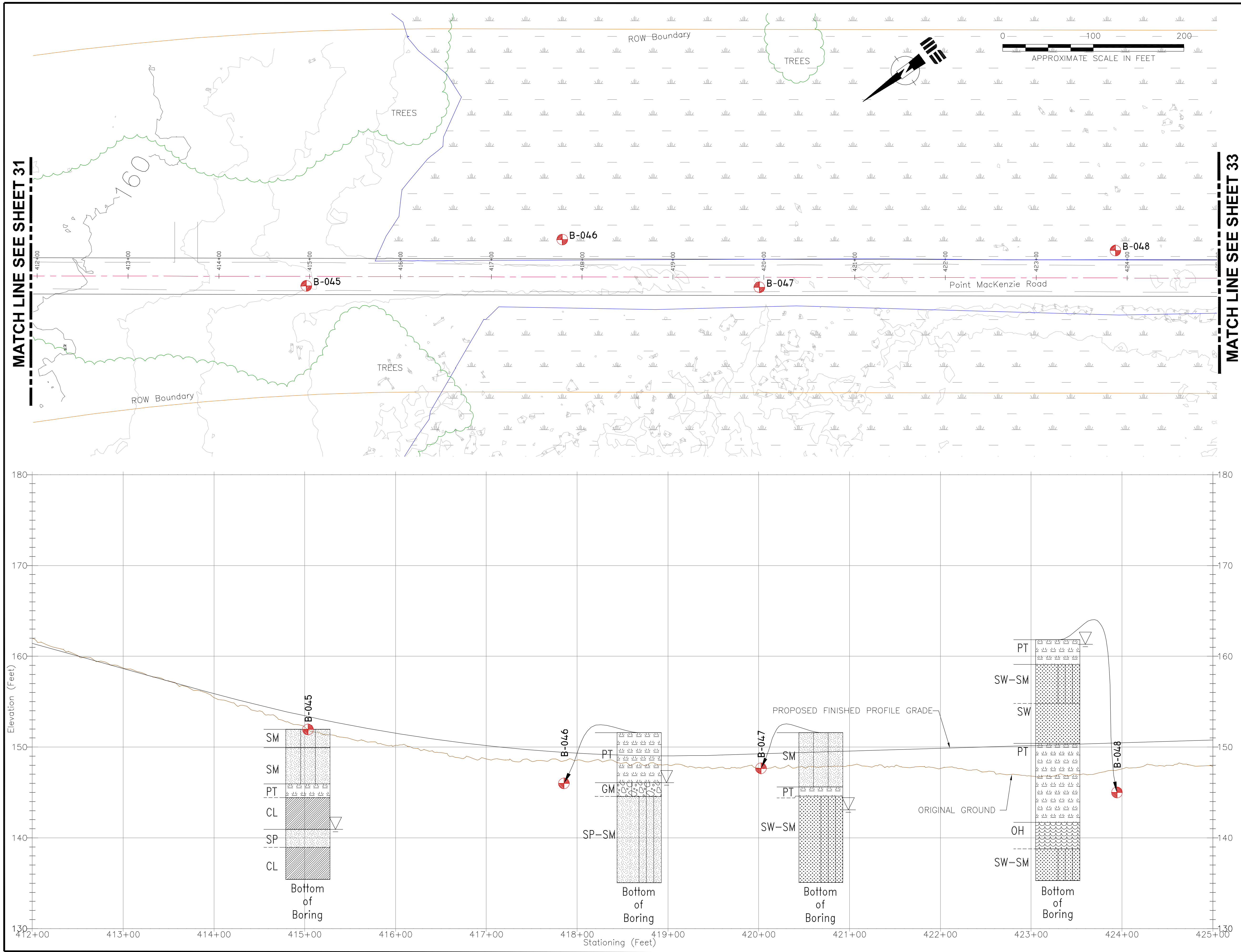

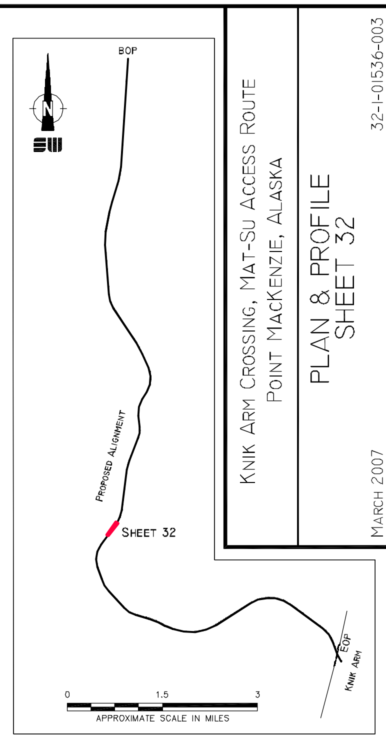

OVERVIEW OF PROJECT AREA

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——	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
——	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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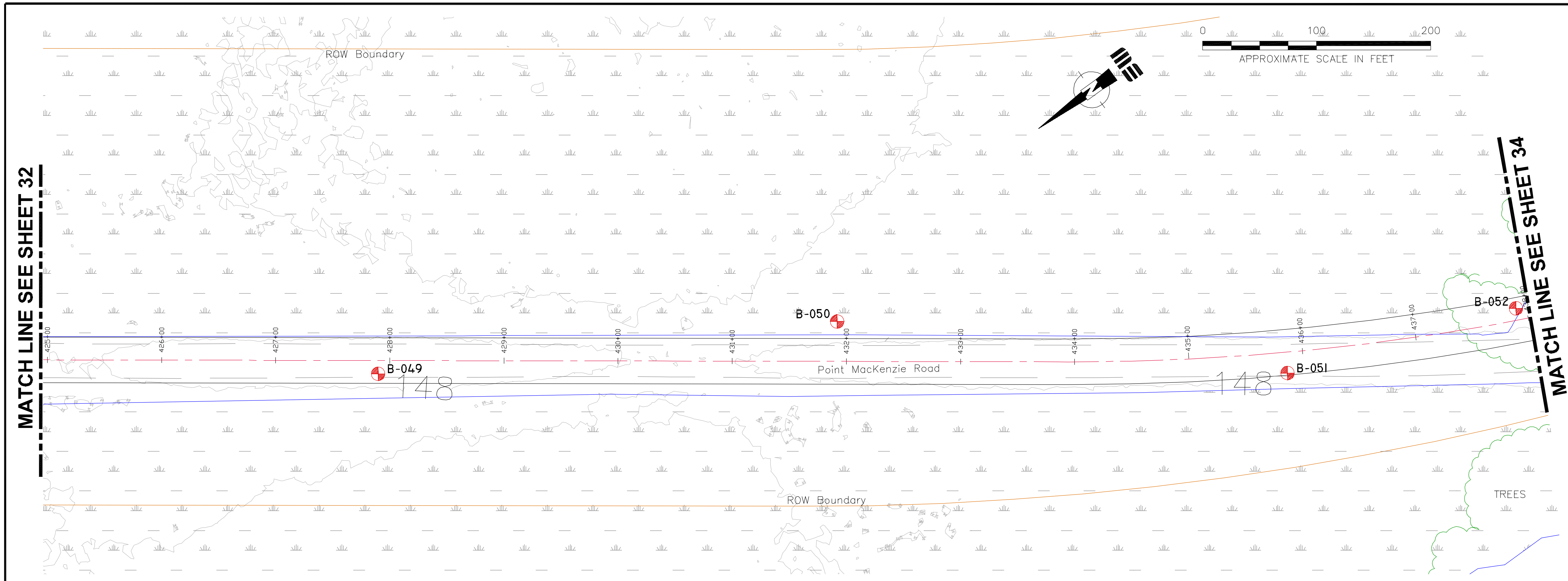

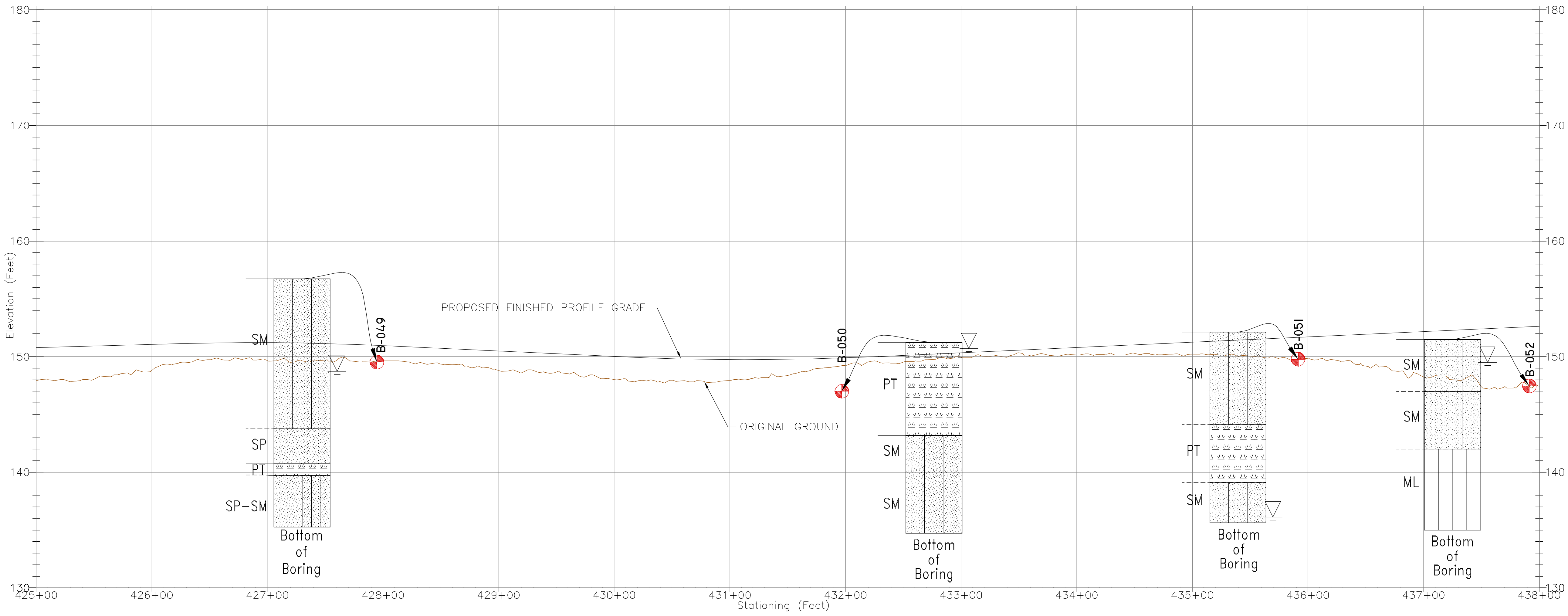

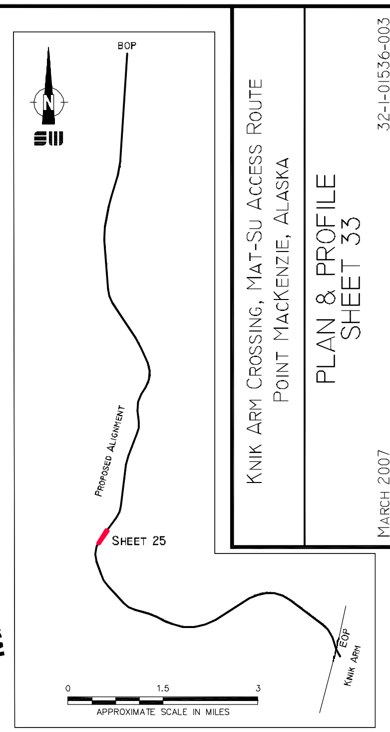

OVERVIEW OF PROJECT AREA

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—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
☁	APPROXIMATE LOCATION OF TREELINE
〰	CONTOURS IN 4-FOOT INTERVALS
⬠	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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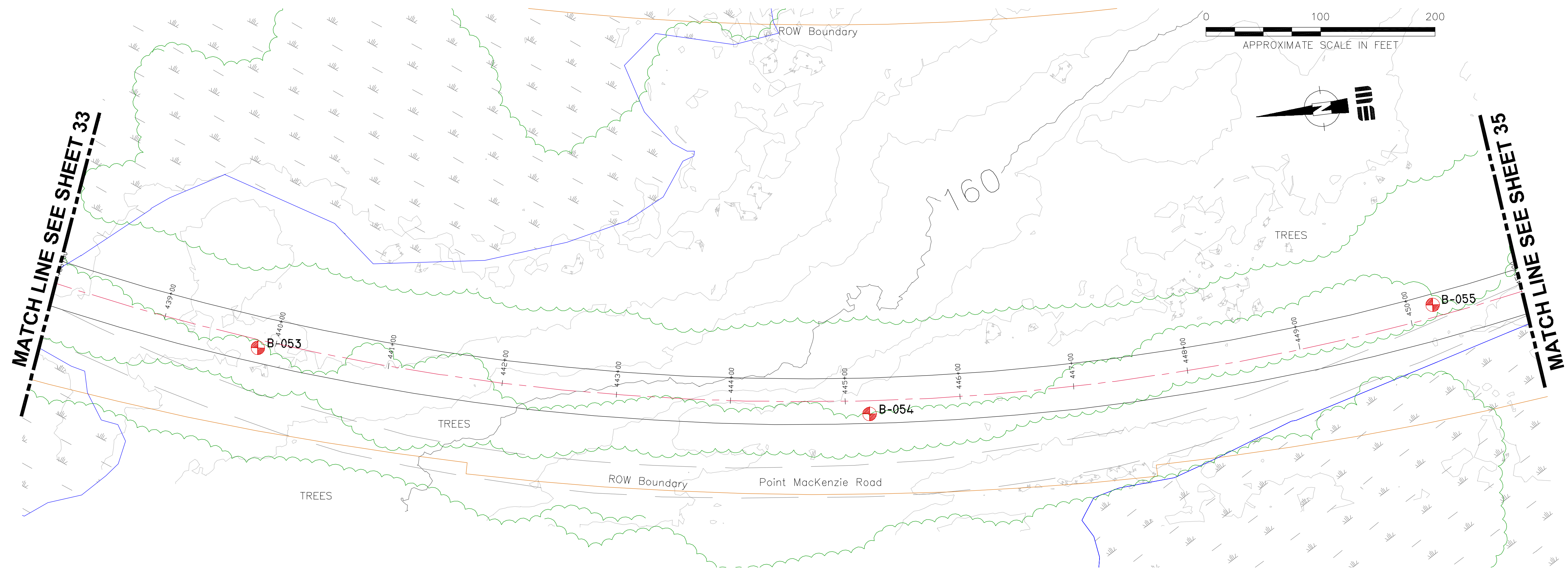

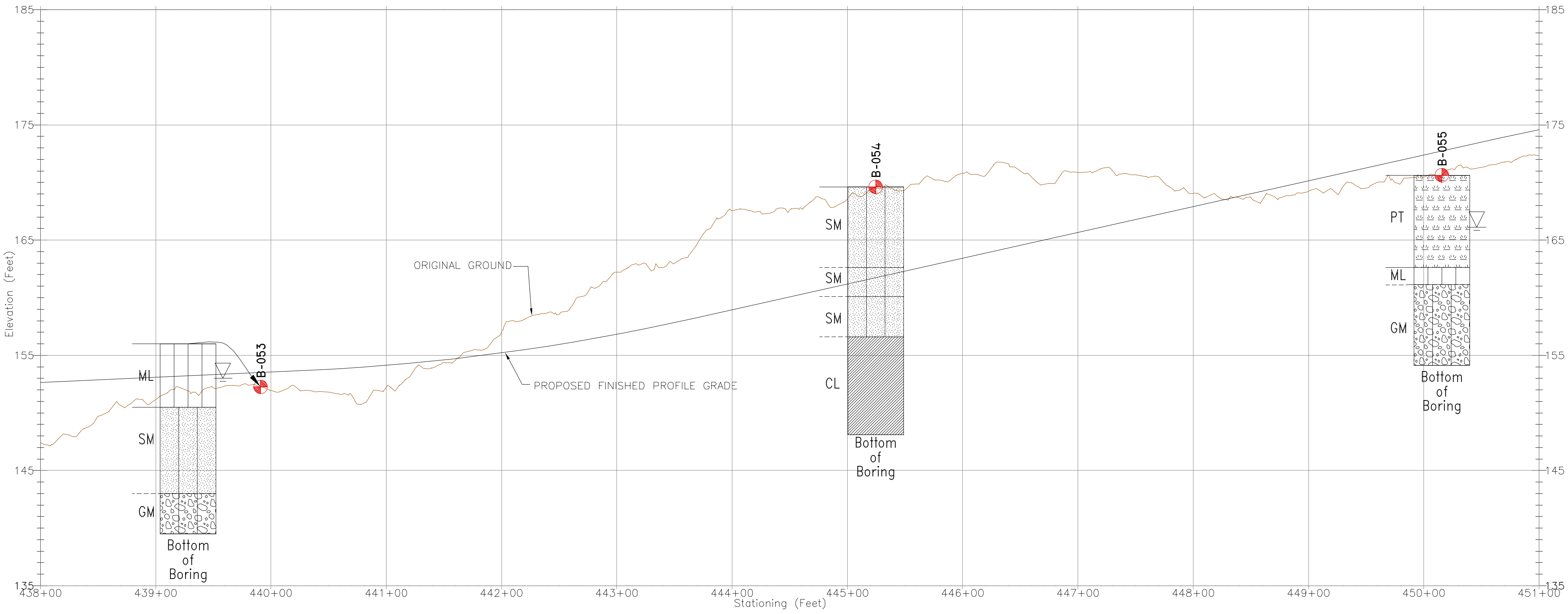

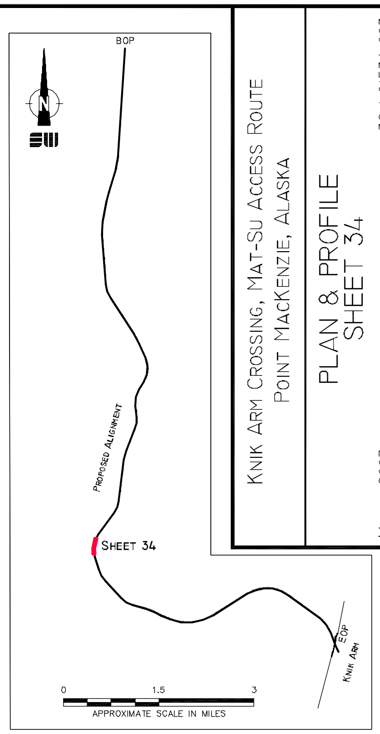

Overview of Project Area

NOTES

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5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

- B-001 Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)
- Approximate location of Exisiting Point MacKenzie Road
- Approximate location of proposed Point MacKenzie Road upgrade
- Approximate location of proposed centerline
- Approximate location of proposed right-of-way (ROW) boundary
- Approximate location of marshy areas
- Approximate location of treeline
- Contours in 4-foot intervals
- Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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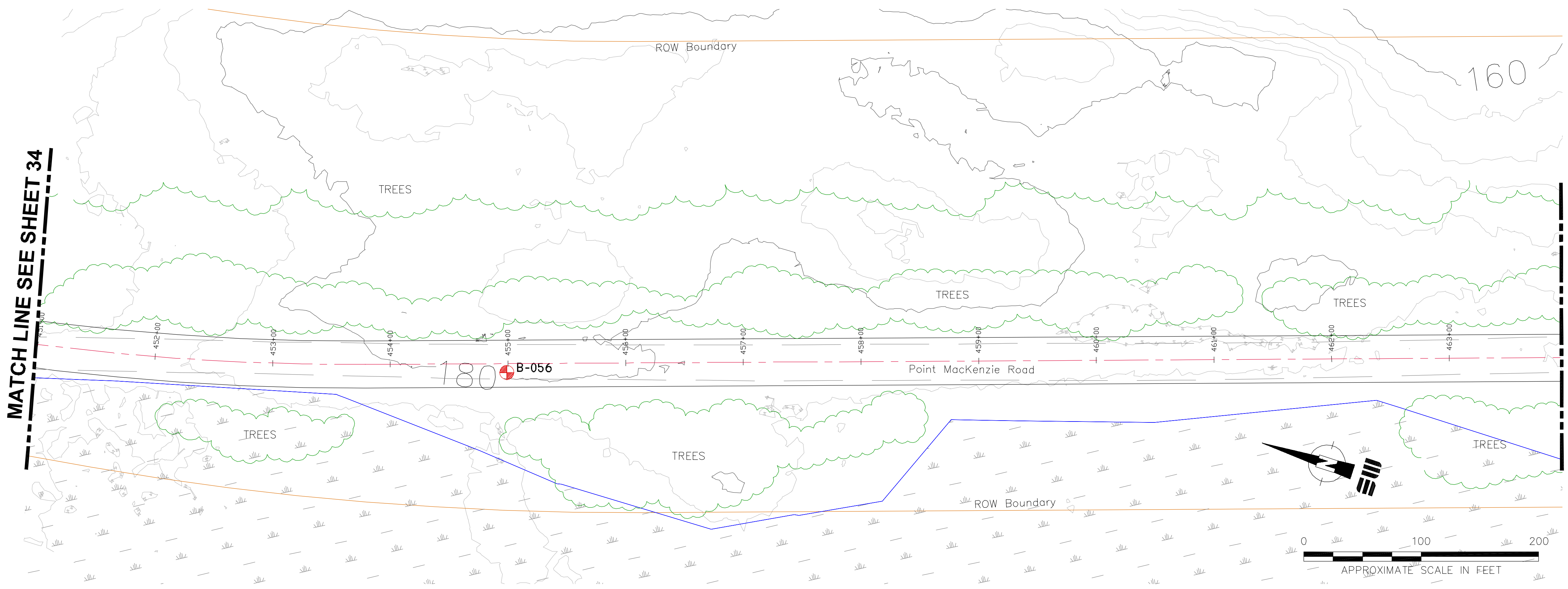

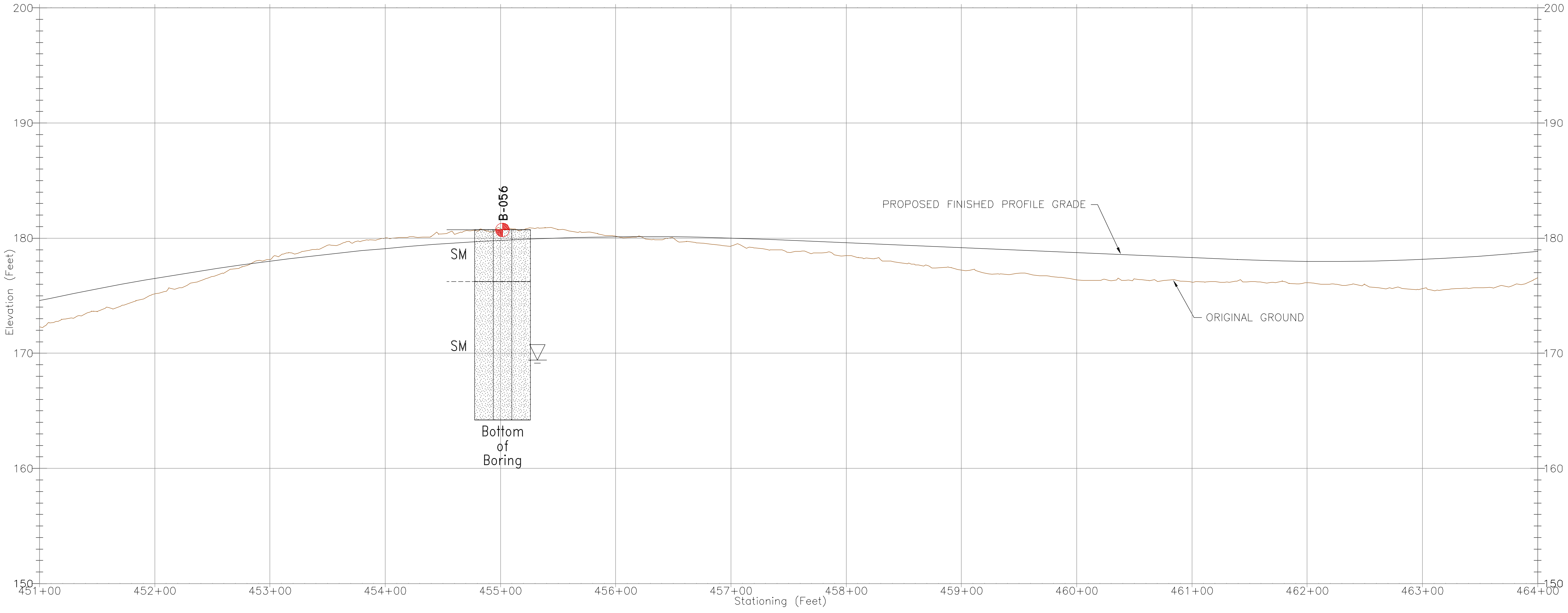

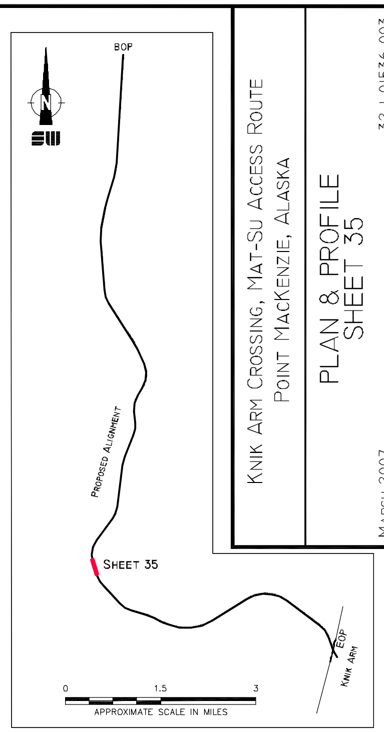

OVERVIEW OF PROJECT AREA

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LEGEND

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———	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
◯	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
◯	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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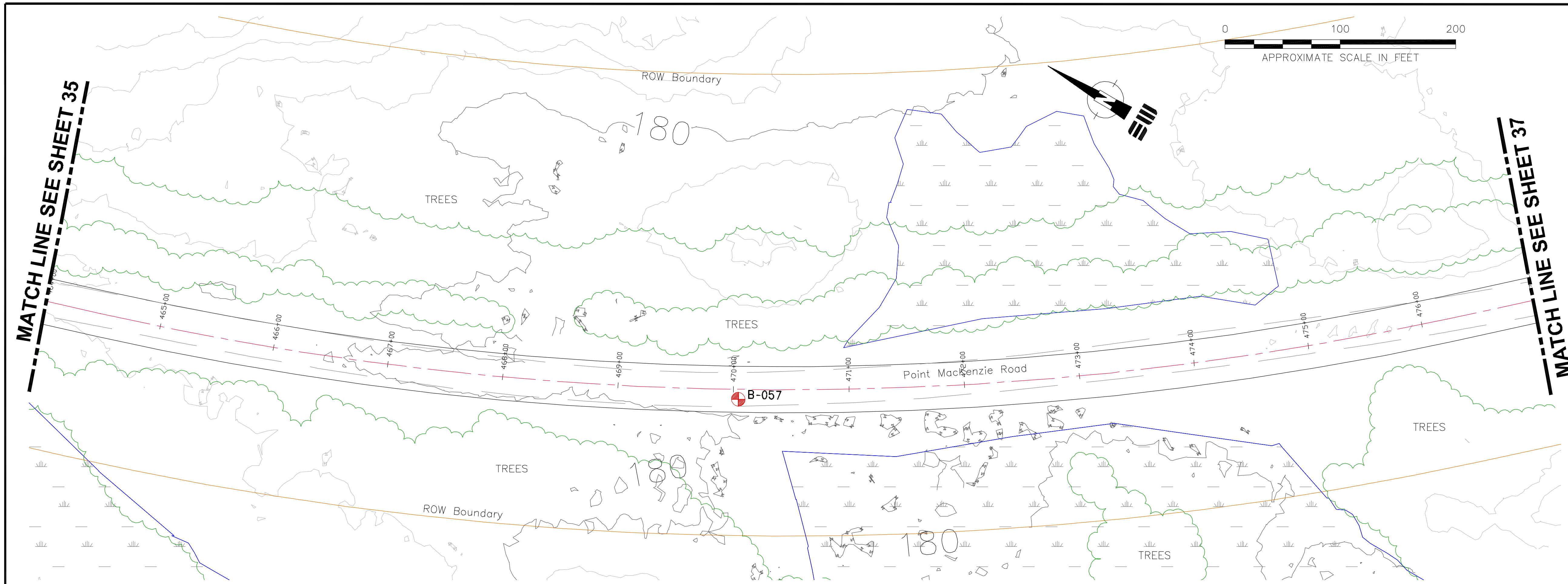

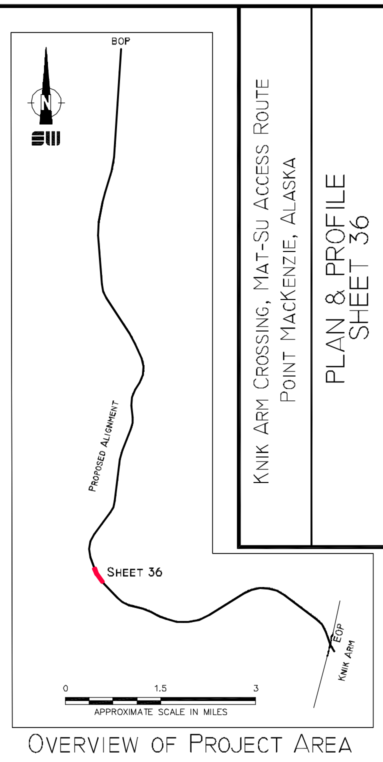

Overview of Project Area

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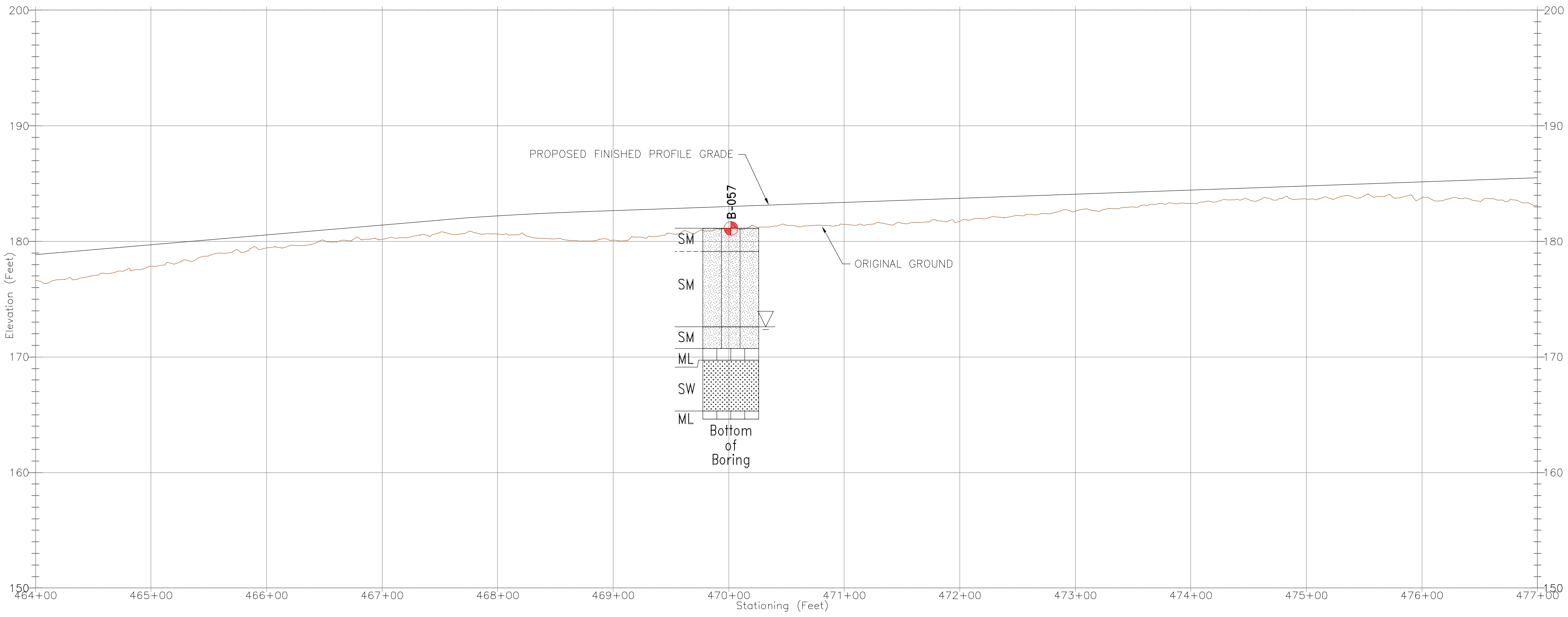

LEGEND

B-001 Approximate location of boring B-001, advanced by Shannon & Wilson, Inc., 2006 (location surveyed after completion)

Approximate location of exisiting Point MacKenzie Road

Approximate location of proposed Point MacKenzie Road upgrade

Approximate location of proposed centerline

Approximate location of proposed right-of-way (ROW) boundary

Approximate location of marshy areas

Approximate location of treeline

Contours in 4-foot intervals

Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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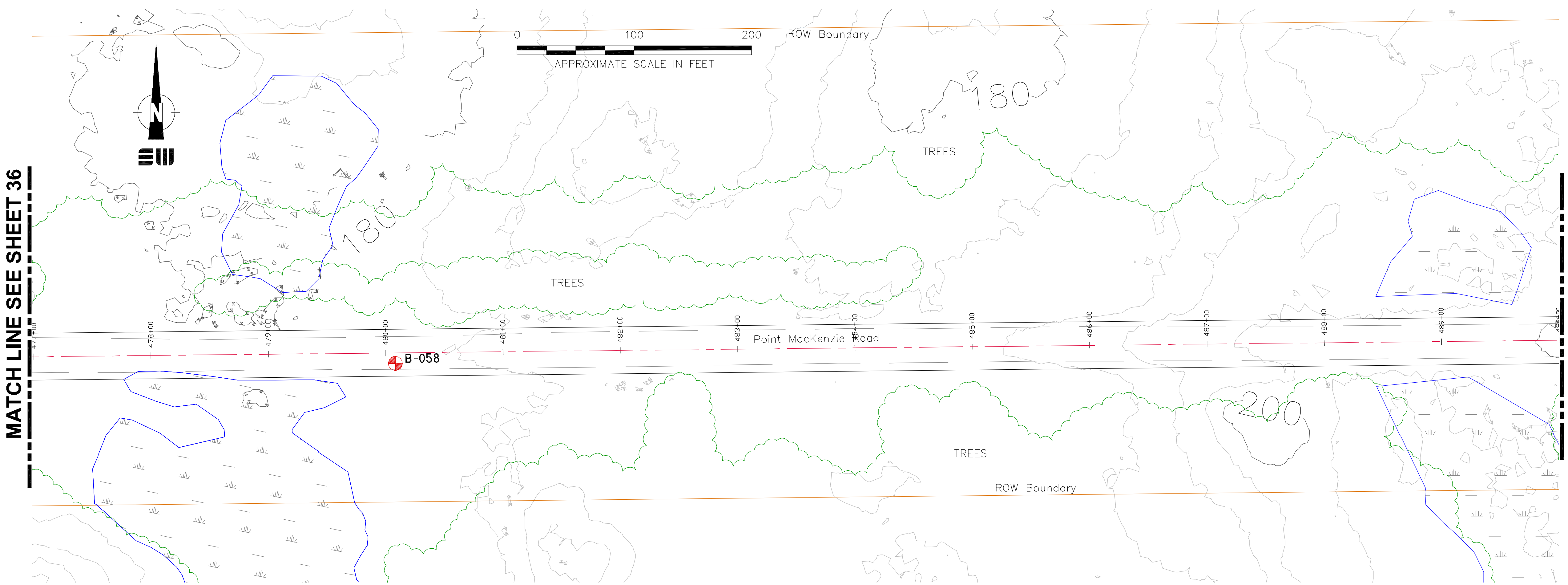

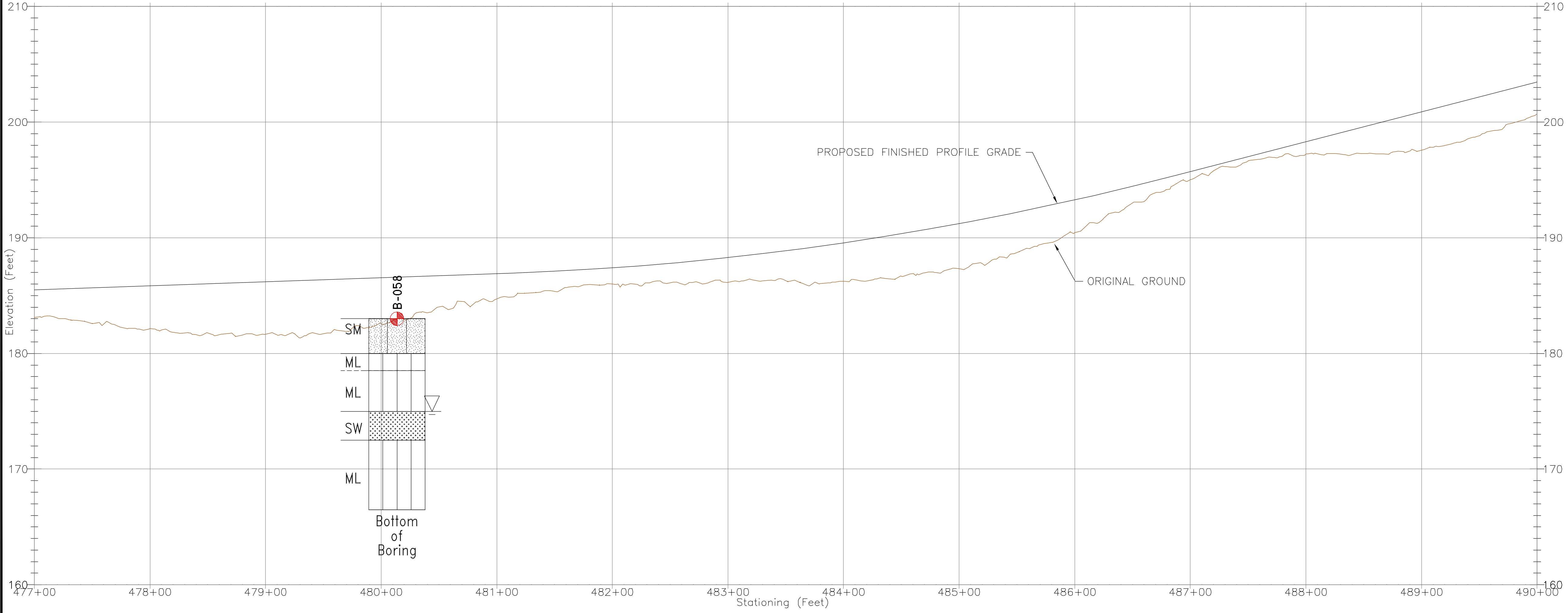

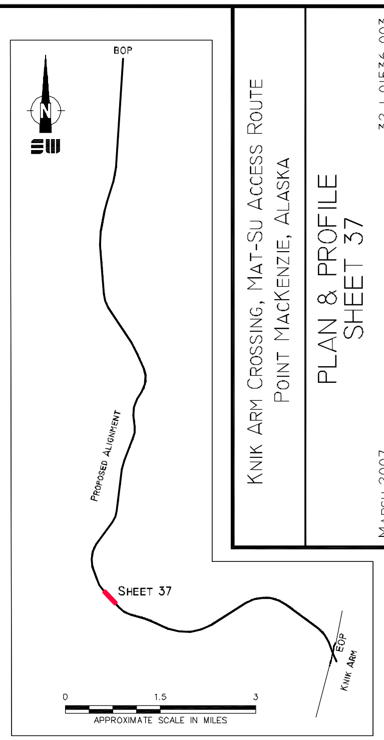

OVERVIEW OF PROJECT AREA

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LEGEND

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—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
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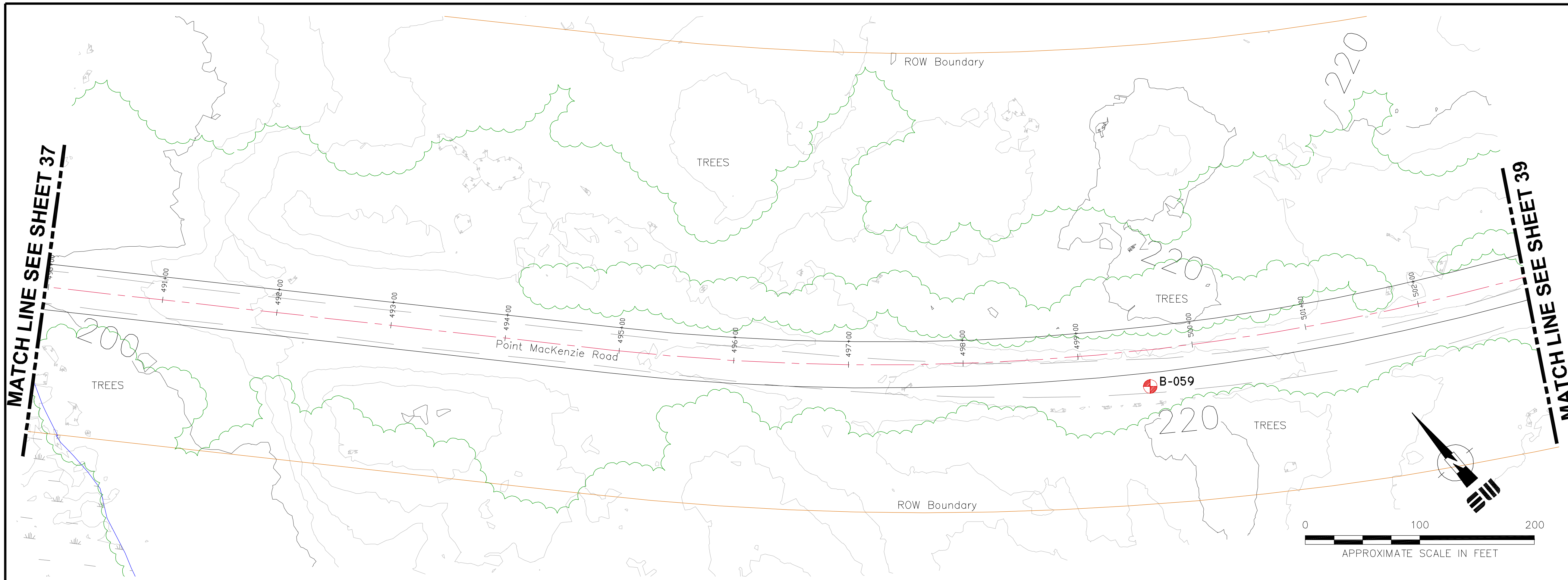

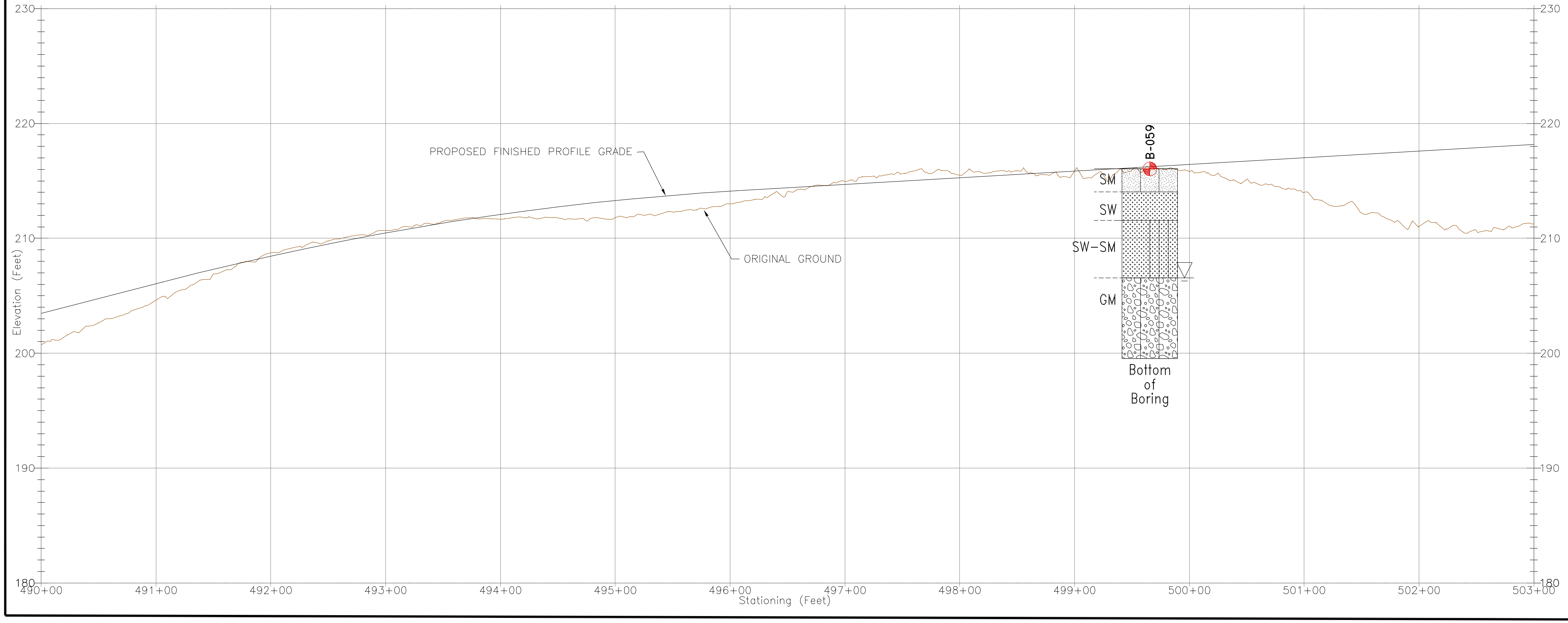

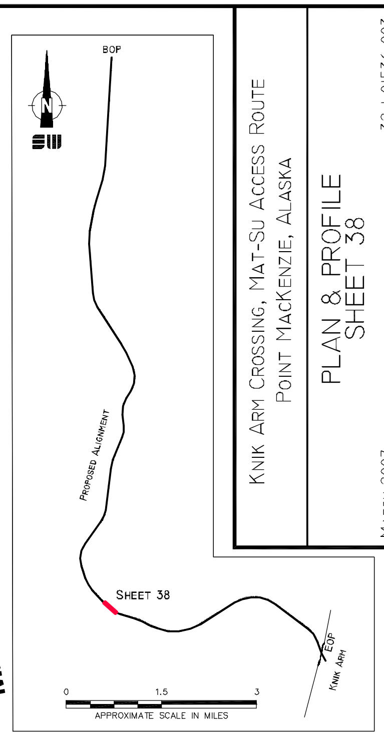

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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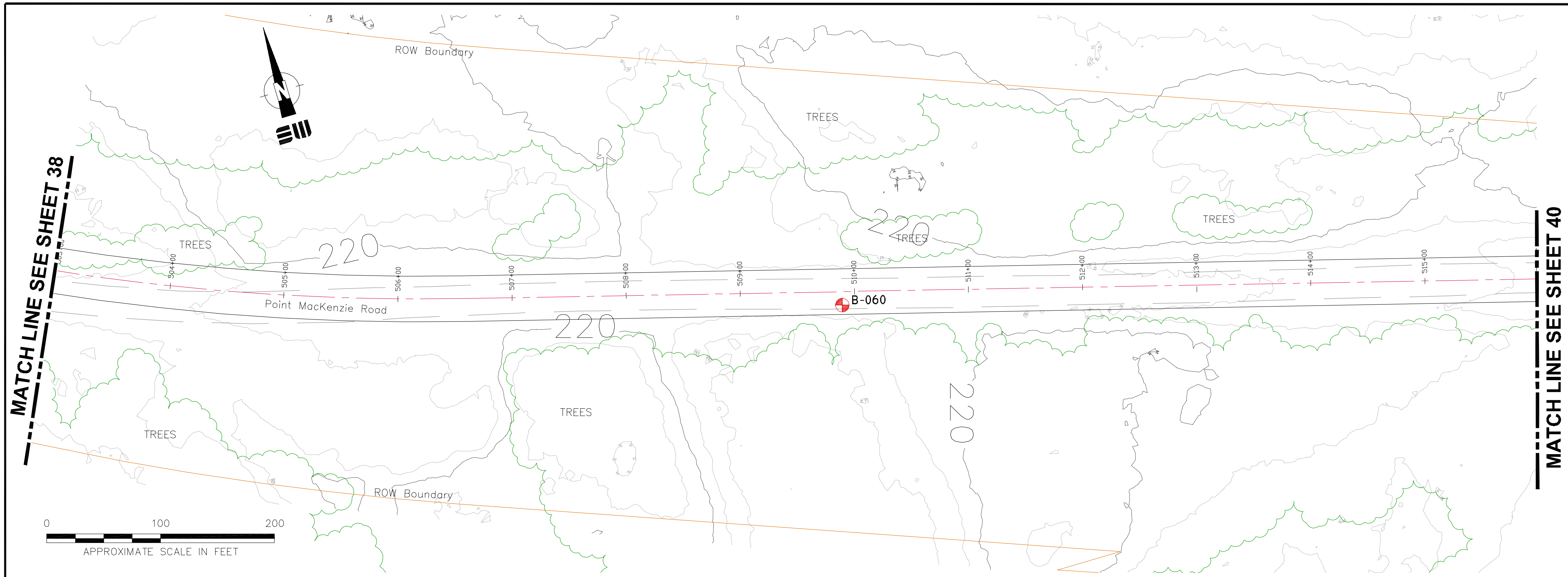

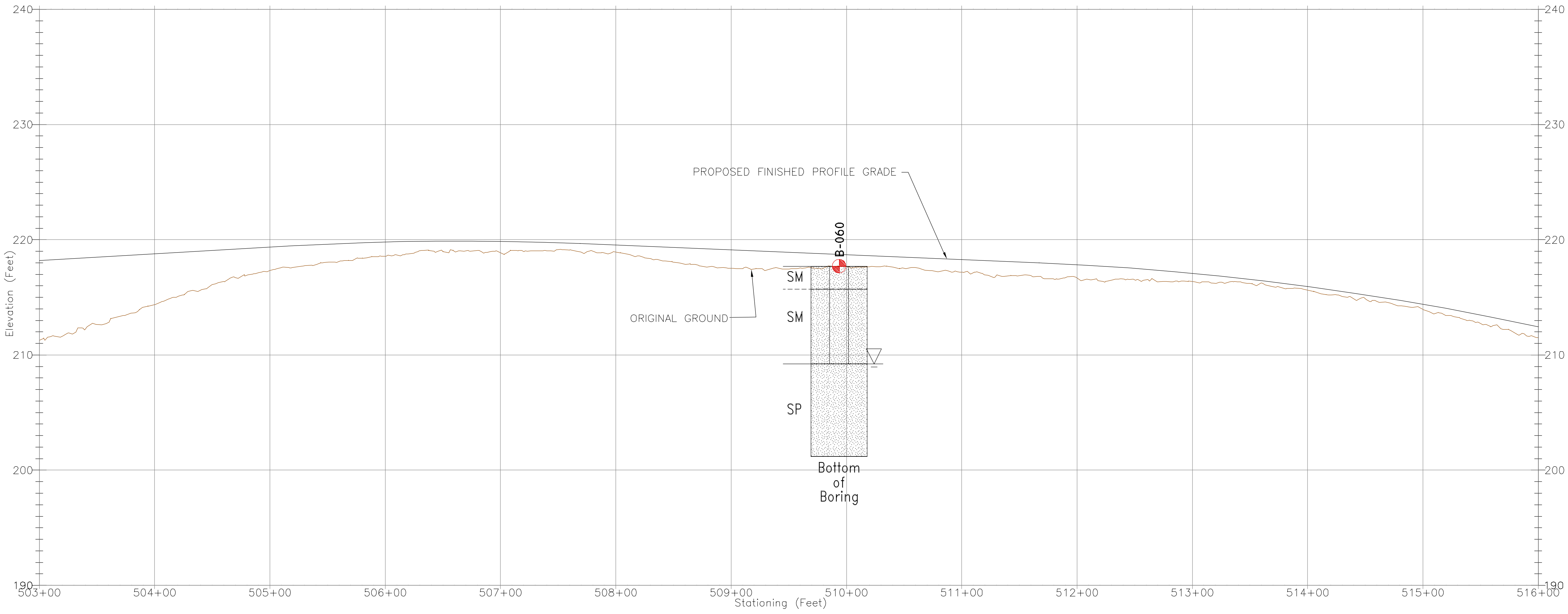

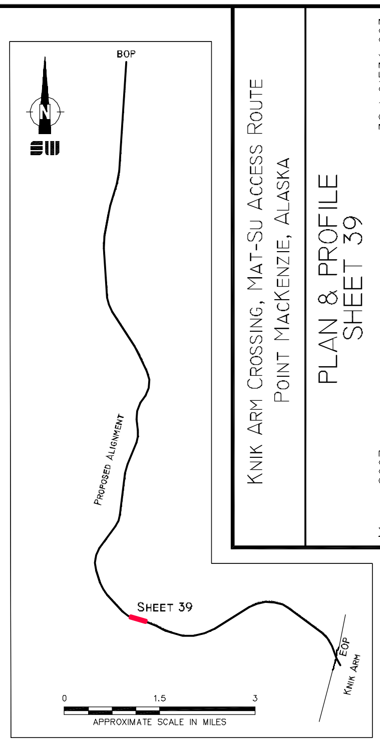

OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-001 APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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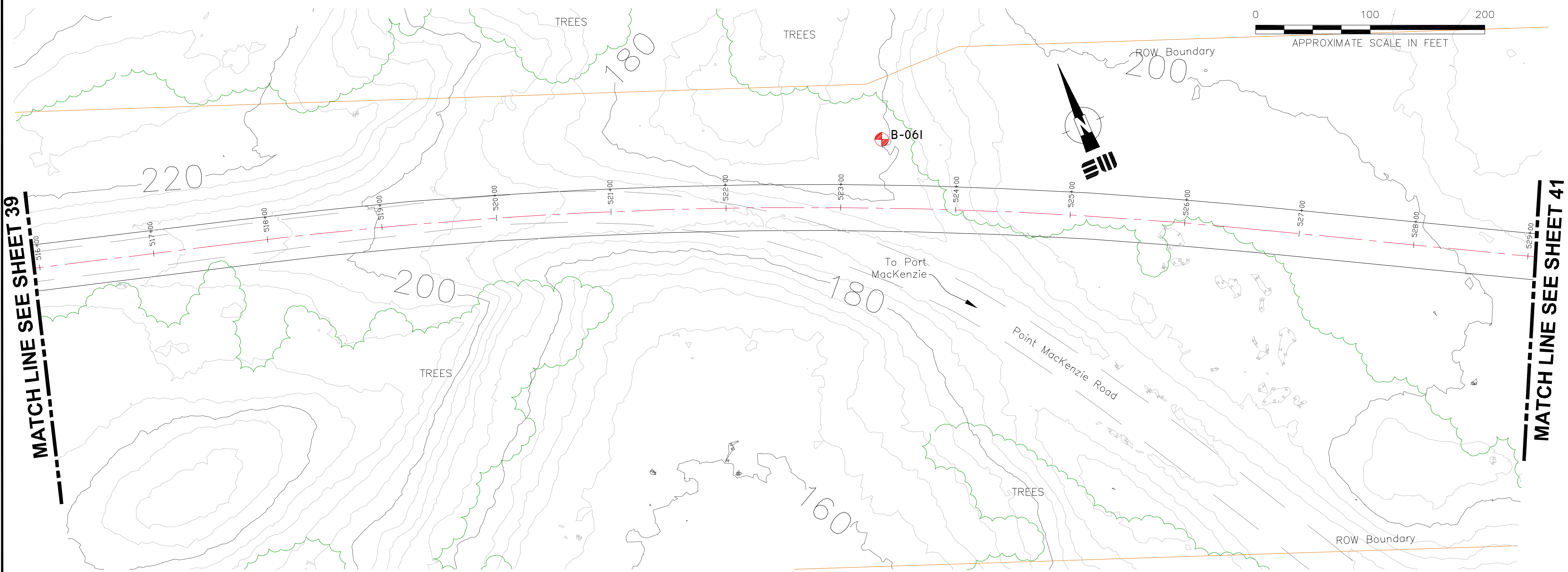

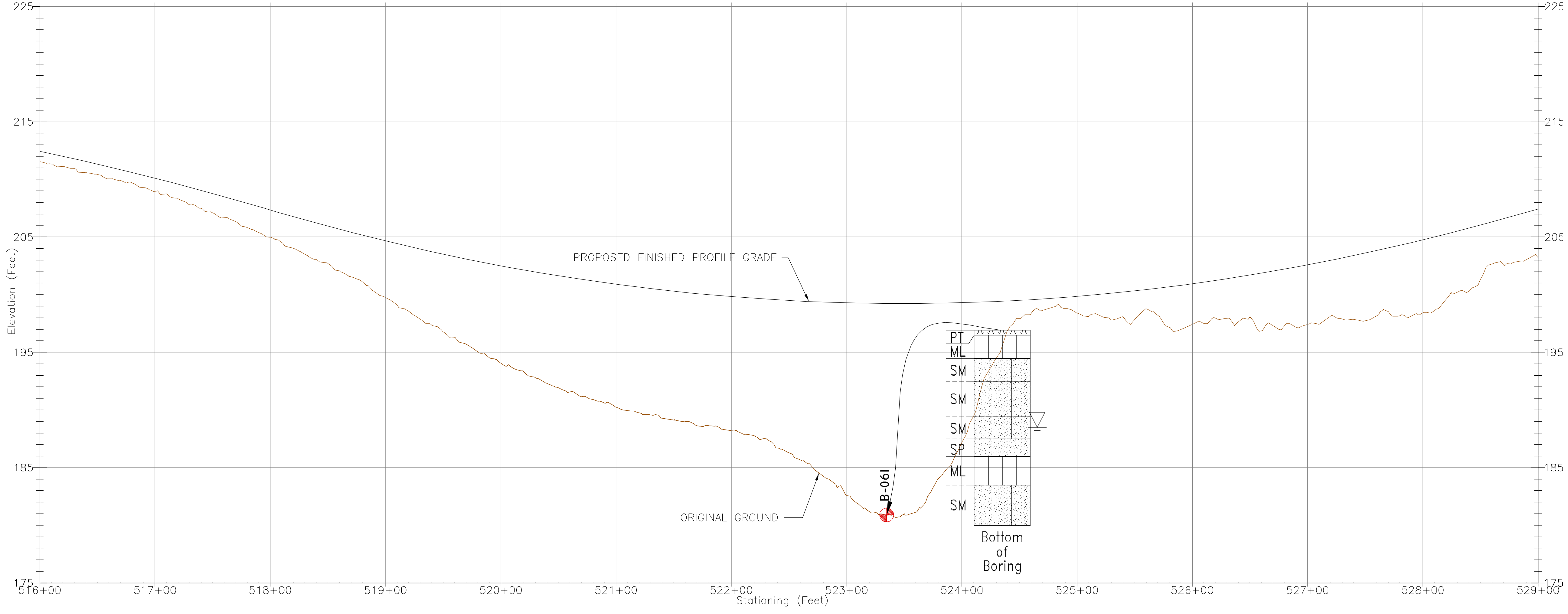

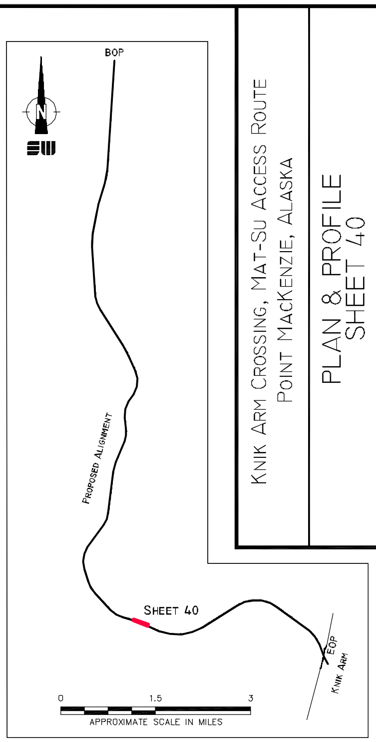

OVERVIEW OF PROJECT AREA

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-001	APPROXIMATE LOCATION OF BORING B-001, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
— · —	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
⁘	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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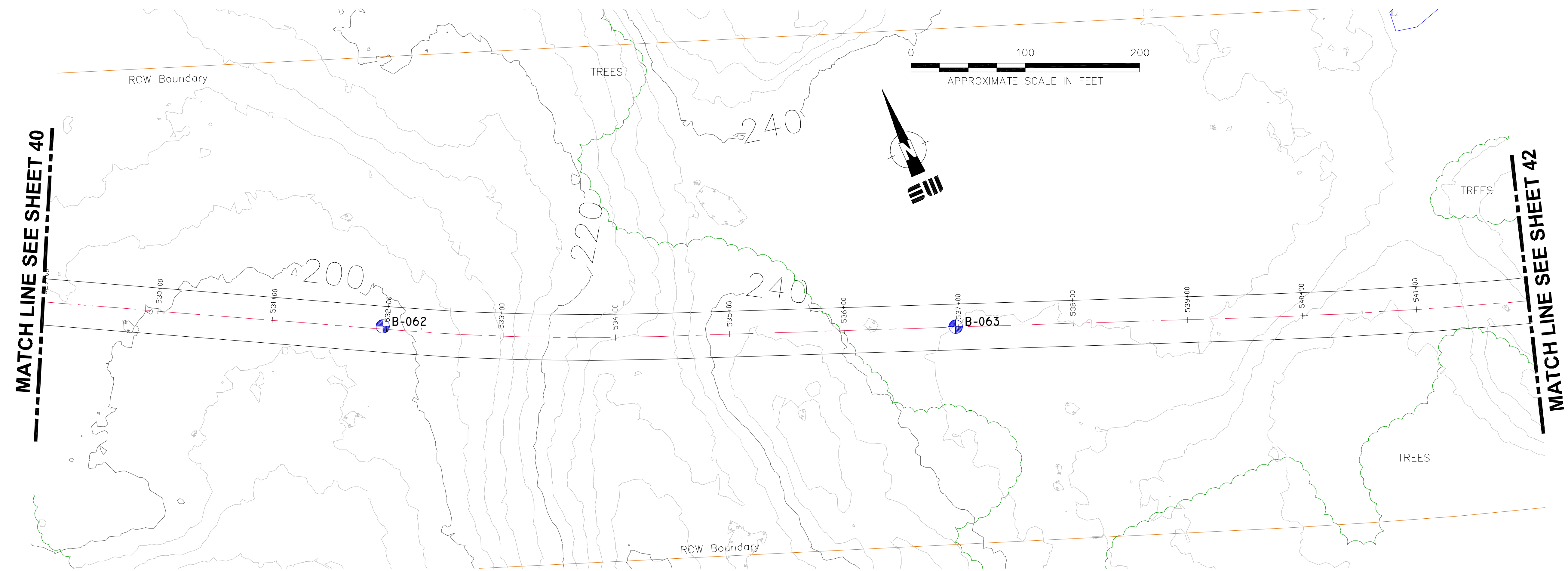
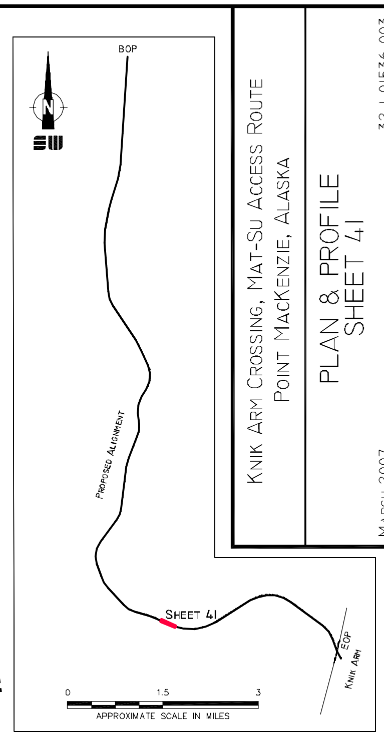
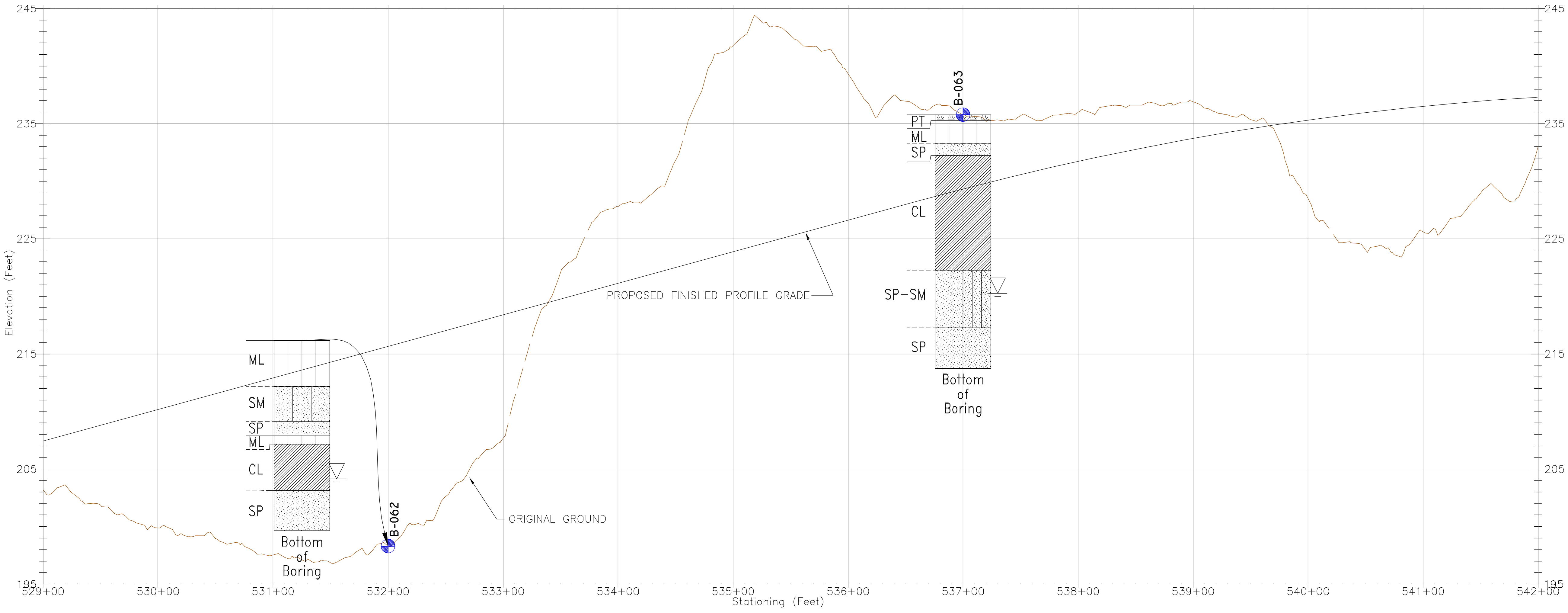




Overview of Project Area



NOTES

1. Drawing adapted from PND Engineers, Inc. provided Plan & Profile Sheets.
2. Boring logs are included in Appendix A
3. Overview of project area is presented as Figure I.
4. Unified Soil Classification System (USCS) legend presented as Figure A-I.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

B-062	Approximate location of boring B-062, advanced by Shannon & Wilson, Inc., 2006 (location not surveyed after completion)
— — —	Approximate location of exisiting Point MacKenzie Road
═	Approximate location of proposed Point MacKenzie Road upgrade
— · —	Approximate location of proposed centerline
—	Approximate location of proposed right-of-way (ROW) boundary
⁘	Approximate location of marshy areas
○	Approximate location of treeline
≋	Contours in 4-foot intervals
◌	Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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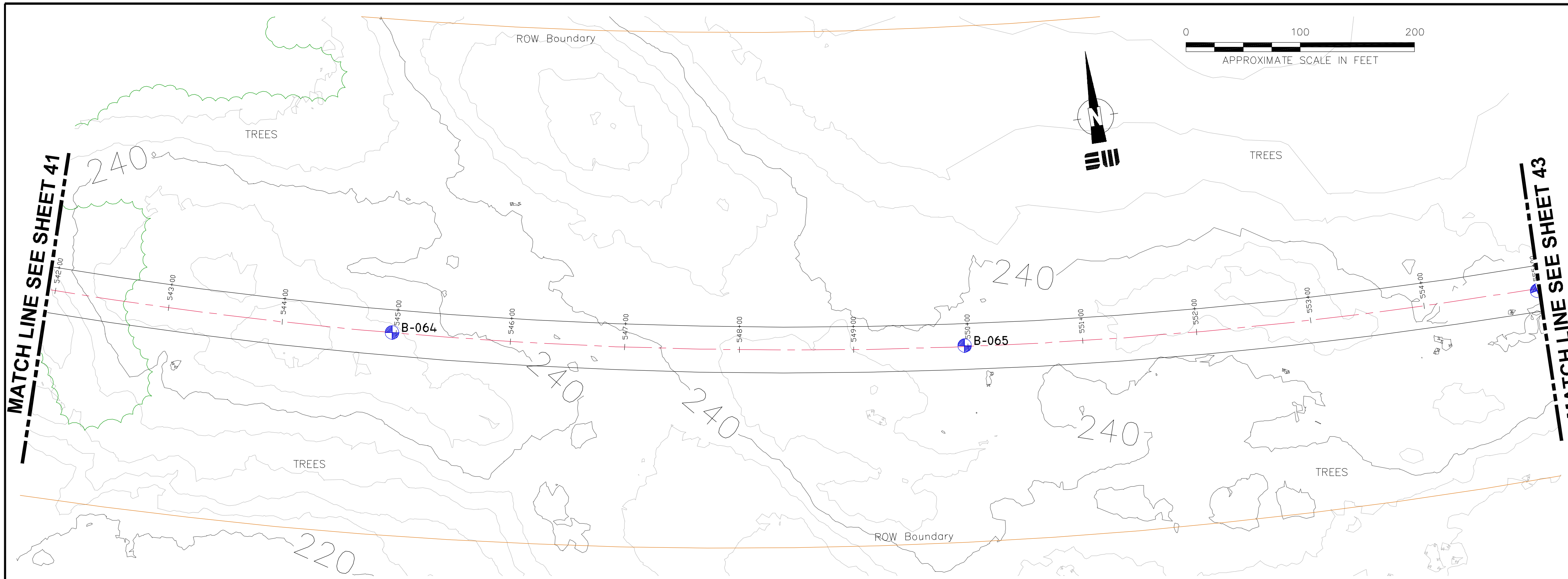

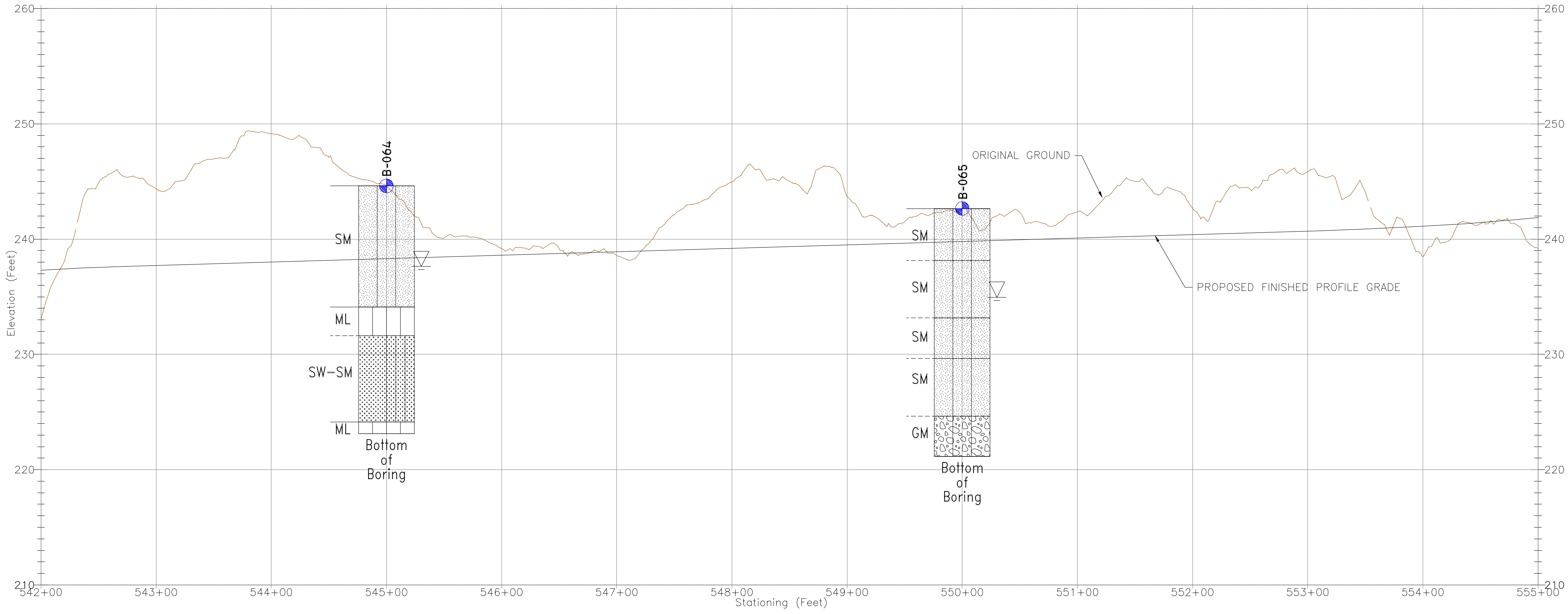

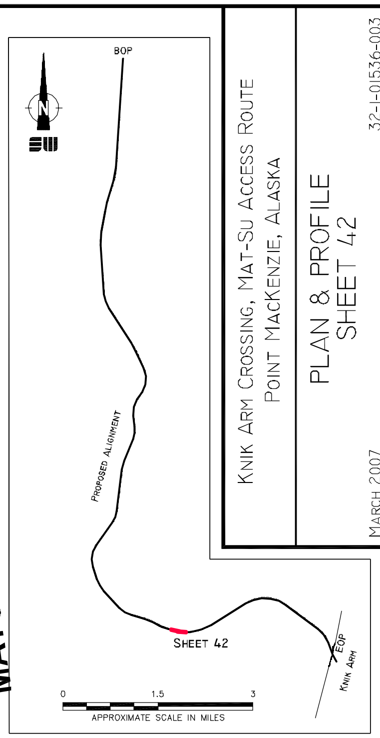

OVERVIEW OF PROJECT AREA

NOTES

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-062 APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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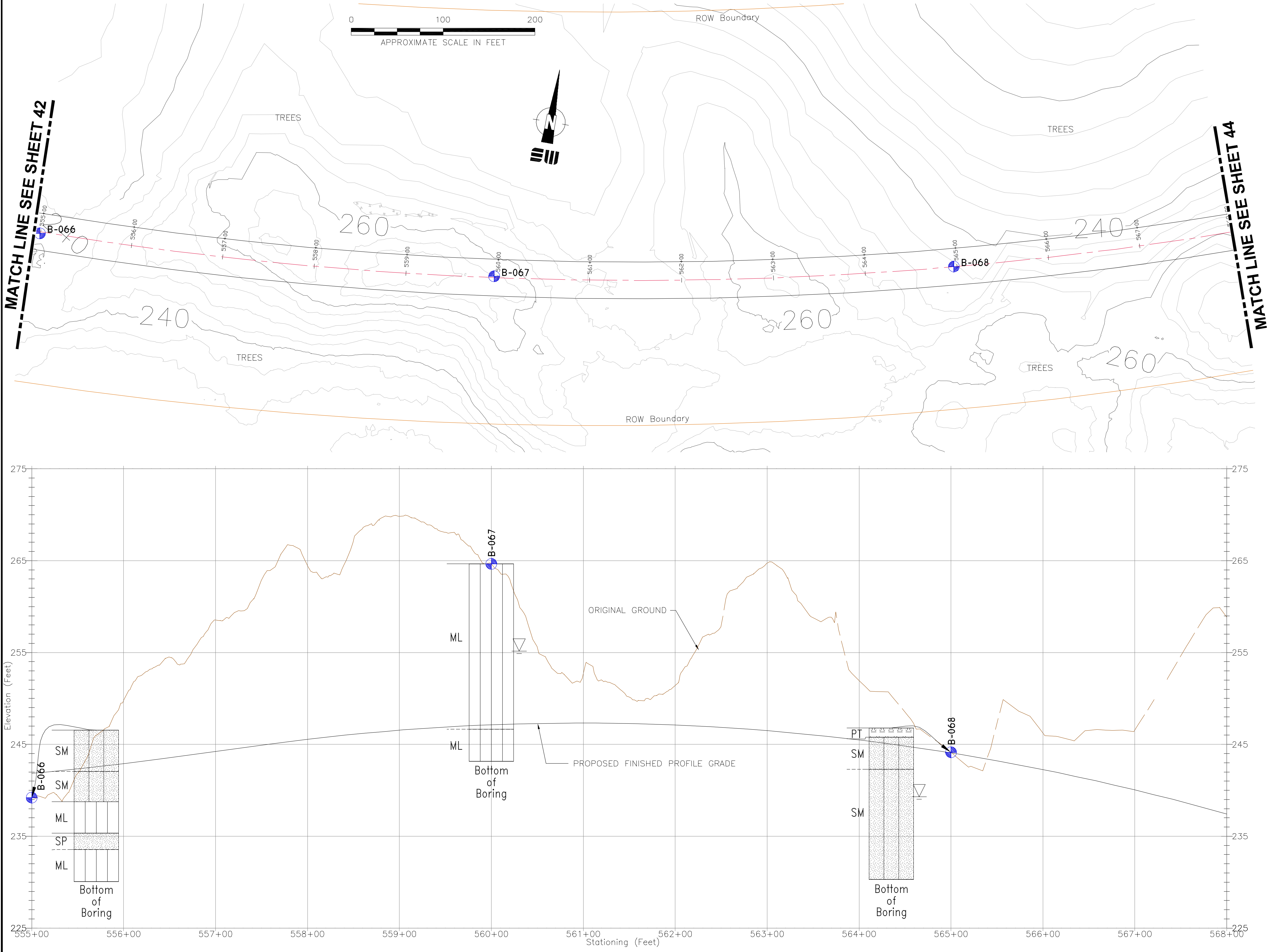

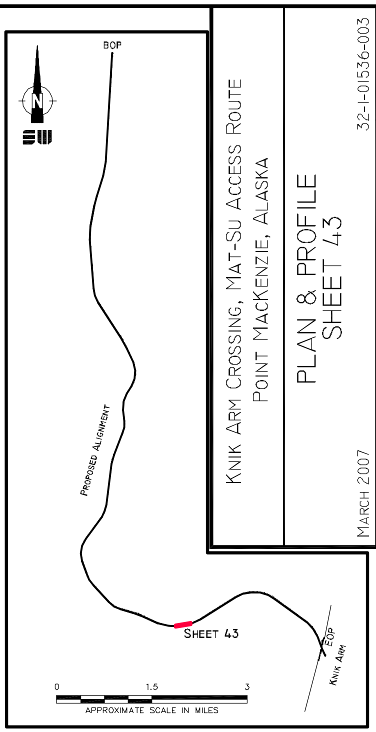

OVERVIEW OF PROJECT AREA

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LEGEND

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APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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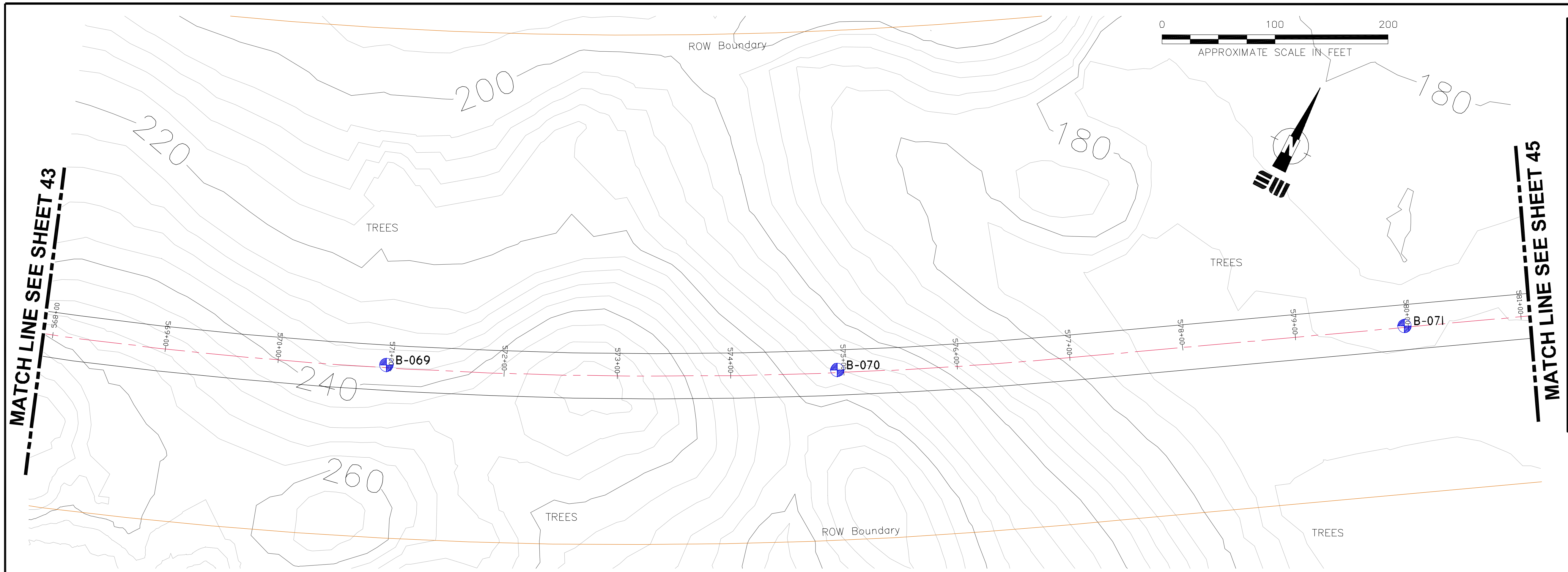
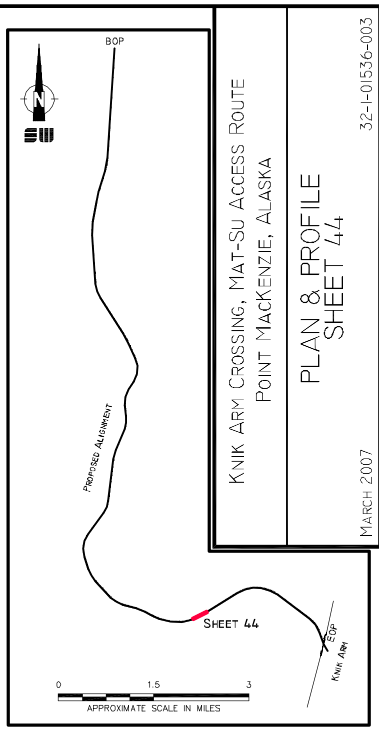
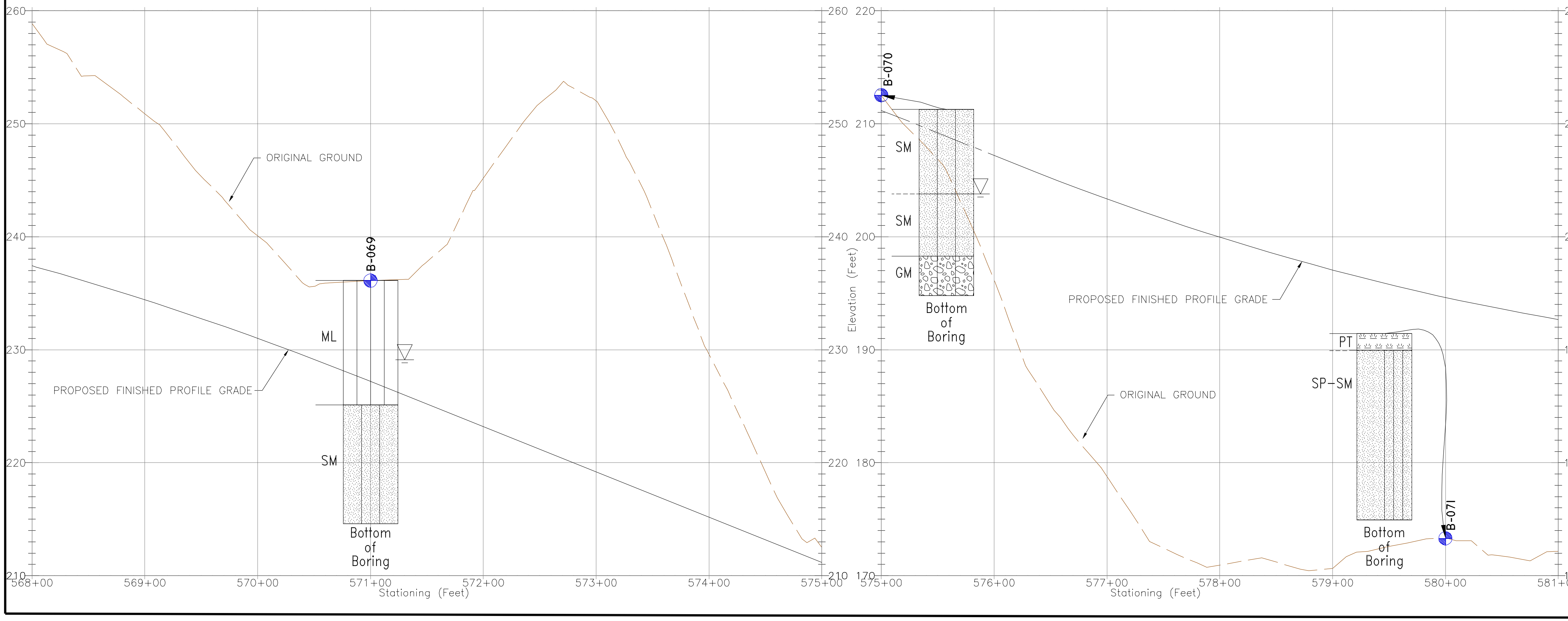




OVERVIEW OF PROJECT AREA



NOTES

1. Drawing adapted from PND Engineers, Inc. provided Plan & Profile sheets.
2. Boring logs are included in Appendix A
3. Overview of project area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical scale exaggerated 10 times horizontal scale

LEGEND

- B-062 Approximate location of boring B-062, advanced by Shannon & Wilson, Inc., 2006 (Location not surveyed after completion)
- Approximate location of exisiting Point MacKenzie Road
- Approximate location of proposed Point MacKenzie Road upgrade
- Approximate location of proposed centerline
- Approximate location of proposed right-of-way (ROW) boundary
- Approximate location of marshy areas
- Approximate location of treeline
- Contours in 4-foot intervals
- Depression in contour

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

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Fig. A-3
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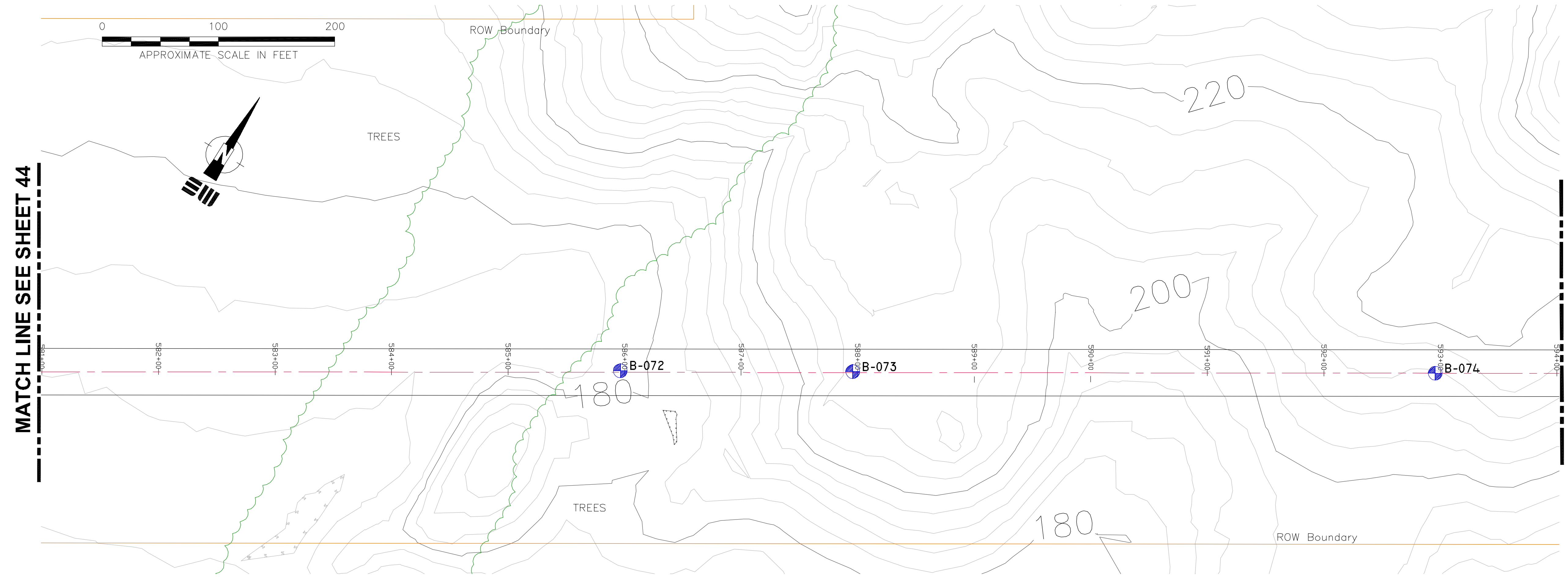

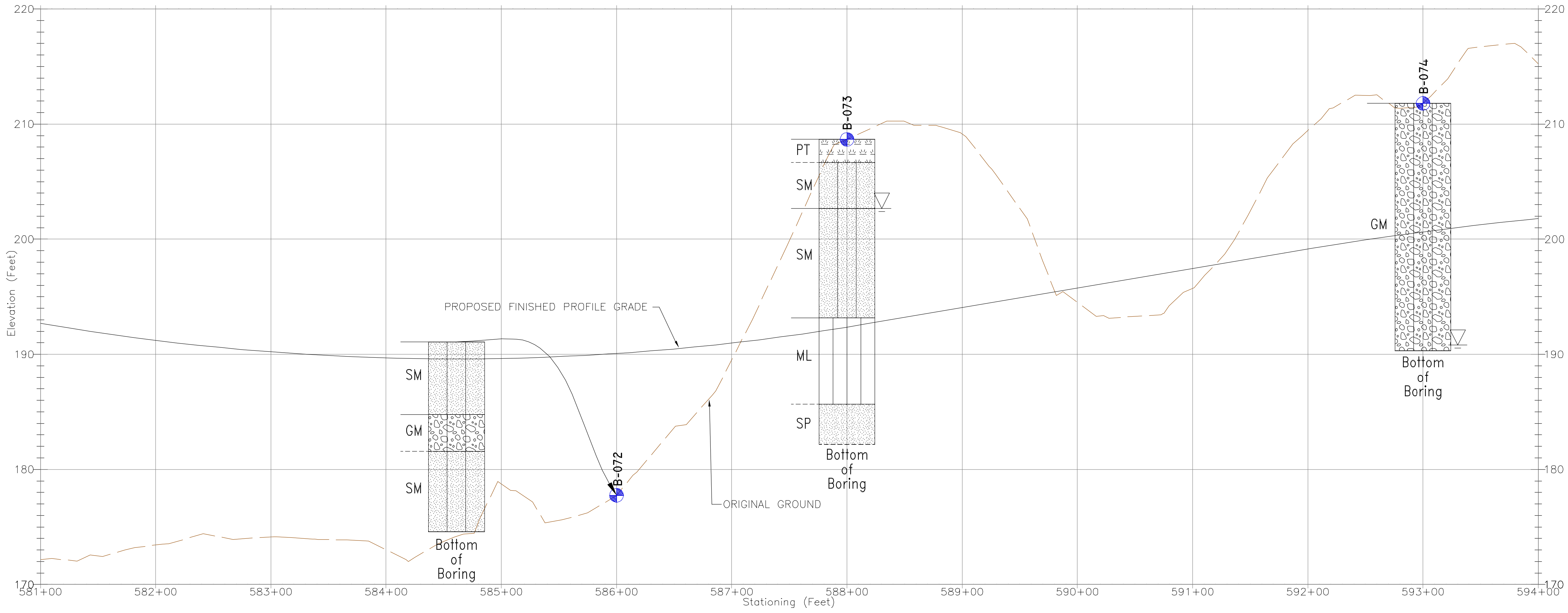

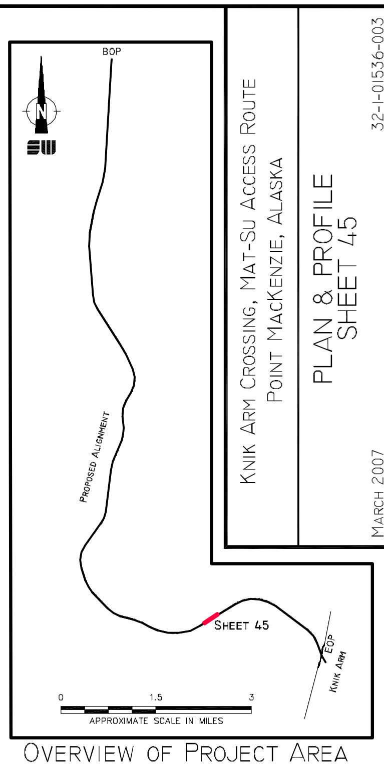

OVERVIEW OF PROJECT AREA

NOTES

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2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE I.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-I.
5. VERTICAL SCALE EXAGGERATED IO TIMES HORIZONTAL SCALE

LEGEND

B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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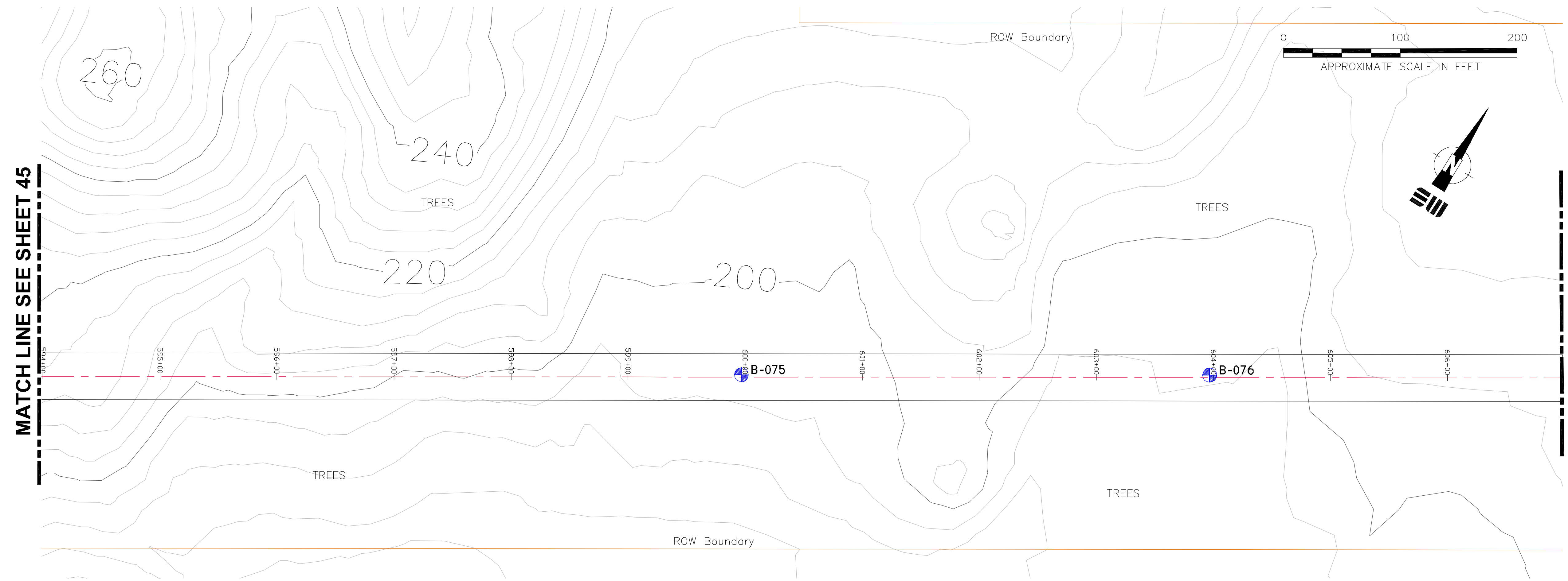

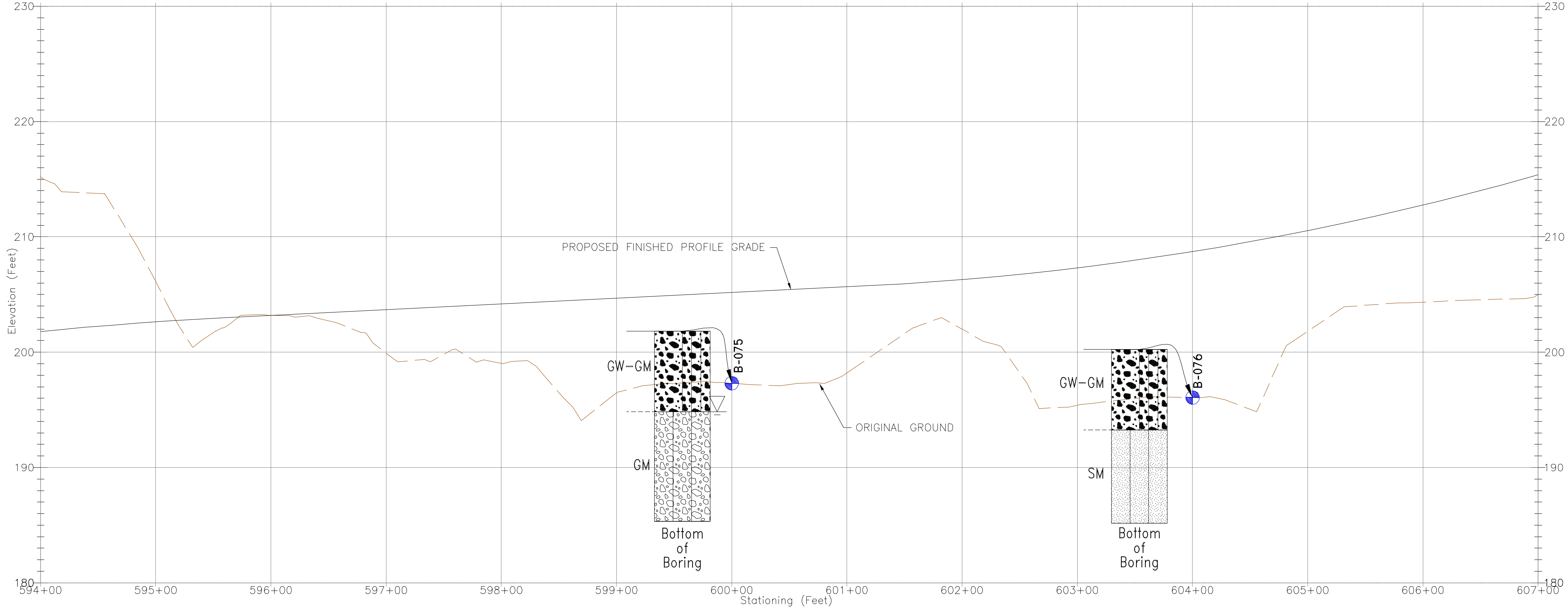

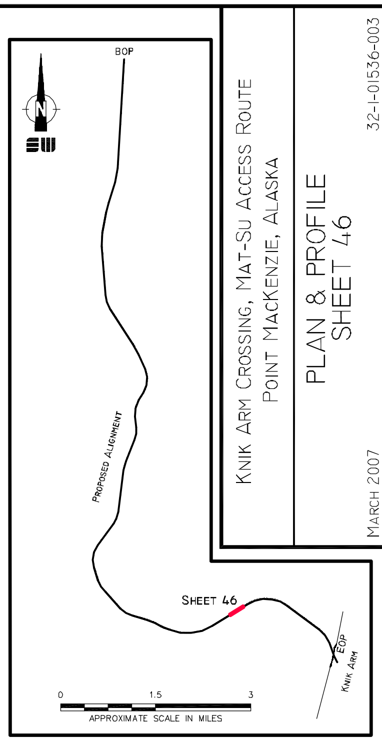

OVERVIEW OF PROJECT AREA

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-I.
5. VERTICAL SCALE EXAGGERATED I0 TIMES HORIZONTAL SCALE

LEGEND

● B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
———	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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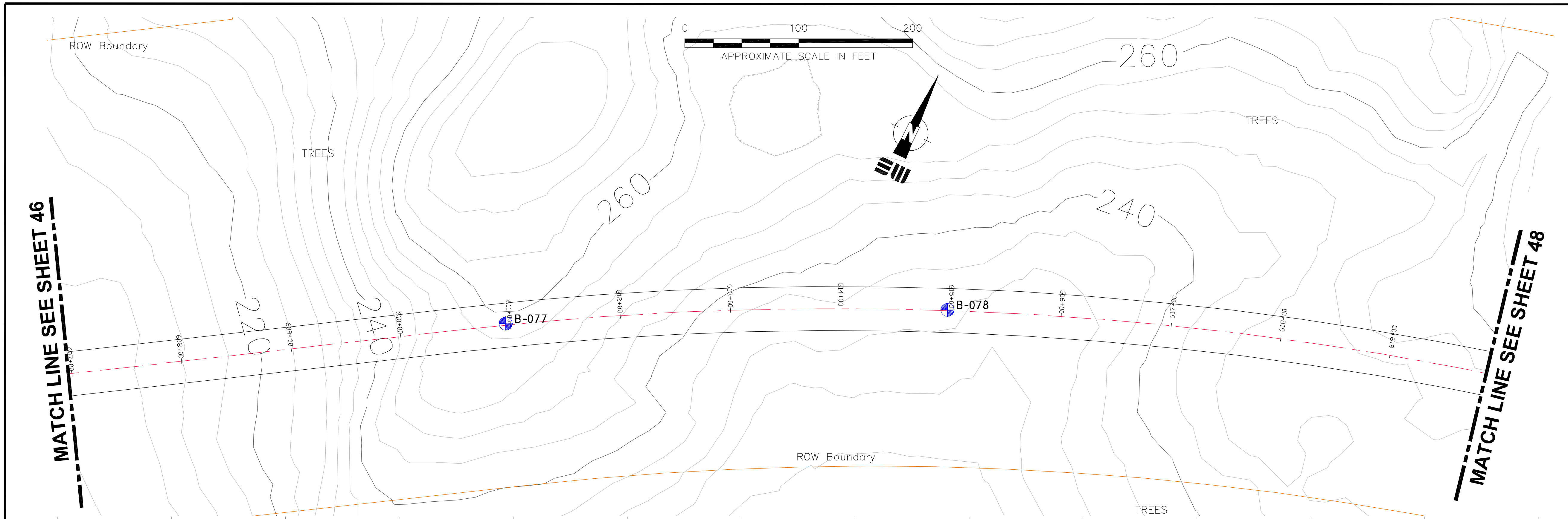

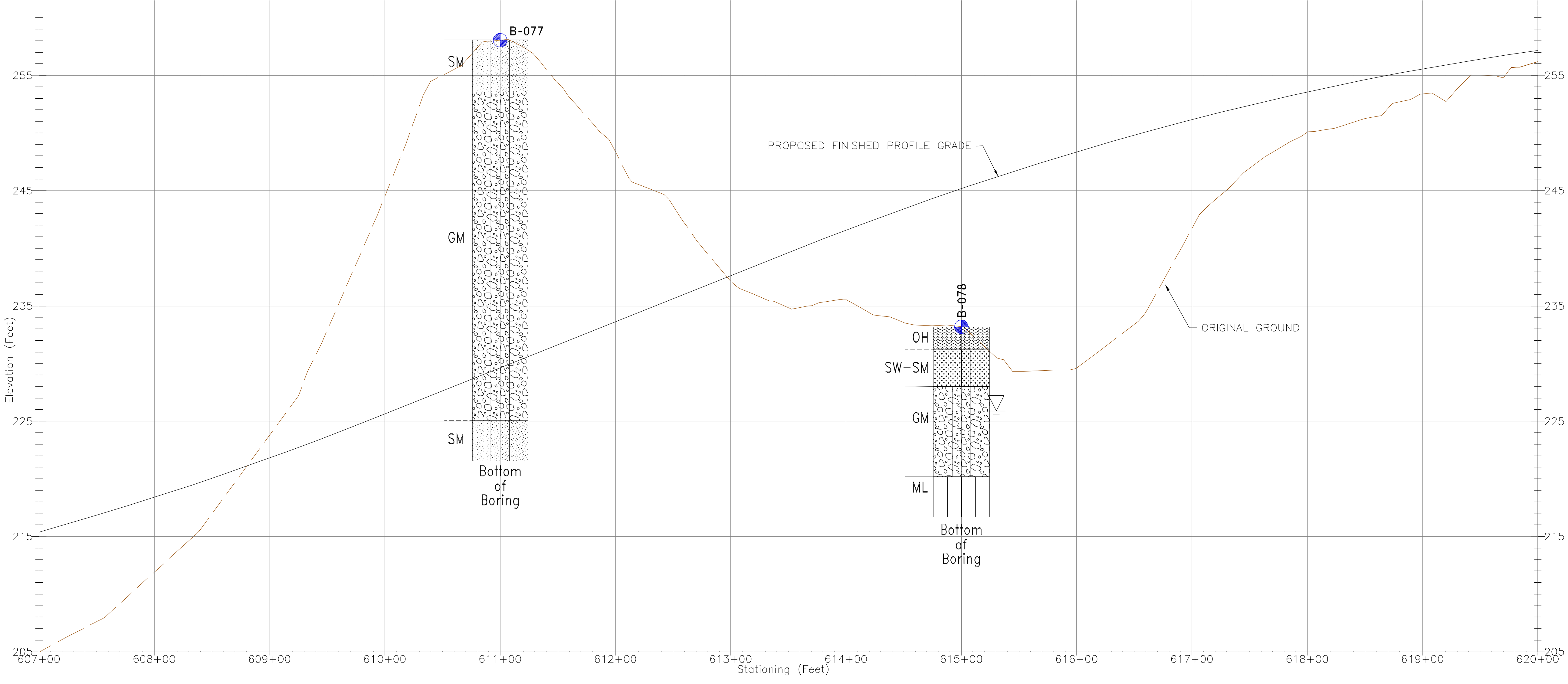

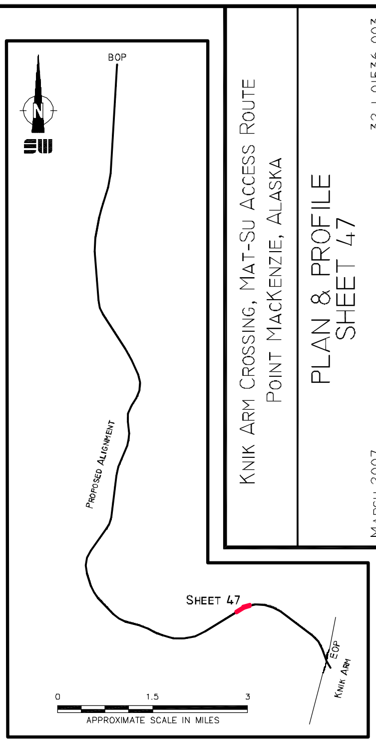

OVERVIEW OF PROJECT AREA

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4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═══	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
⬠	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
220 200	CONTOURS IN 4-FOOT INTERVALS
◯	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

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FIG. A-3
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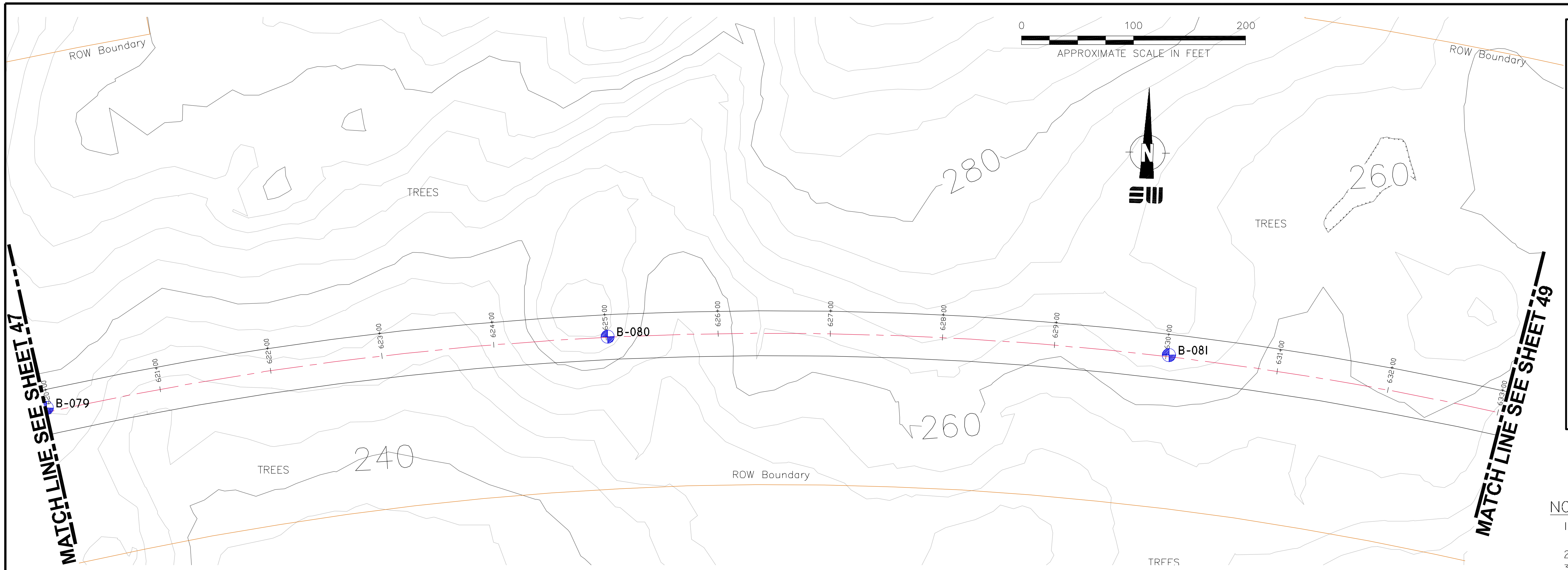

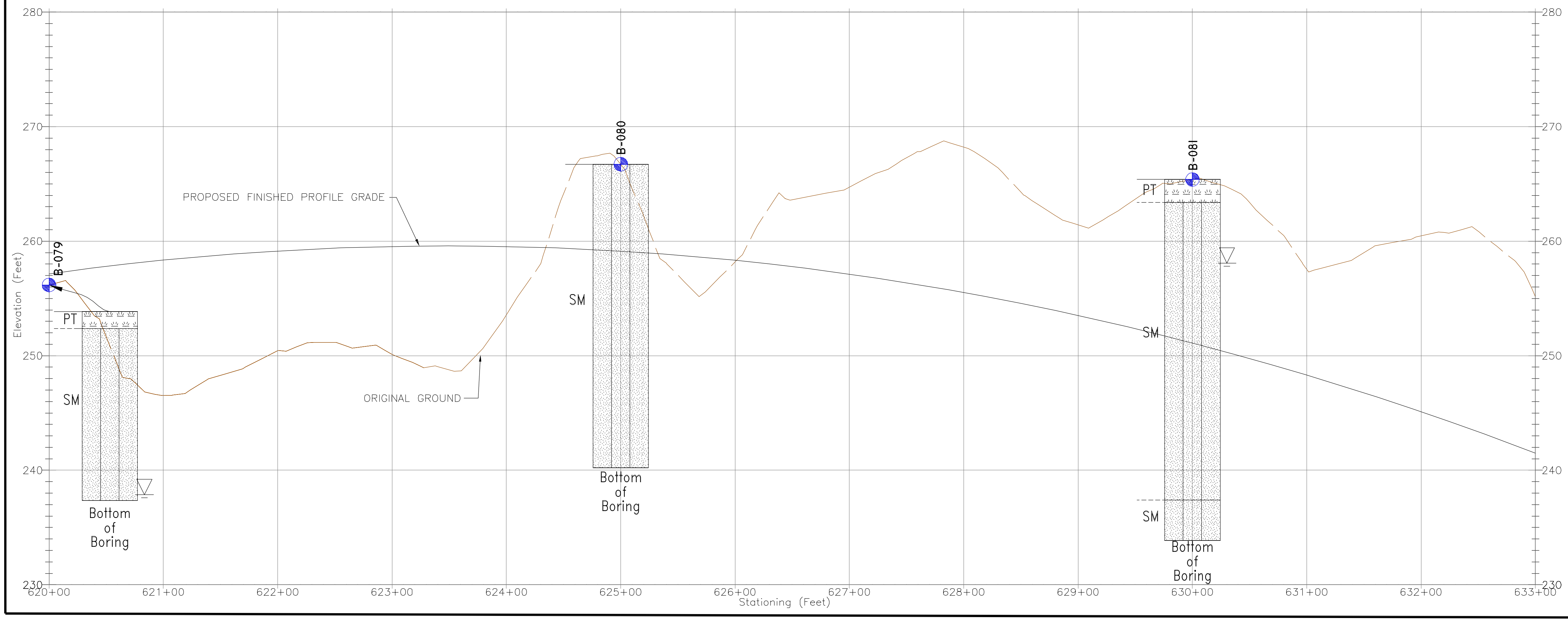

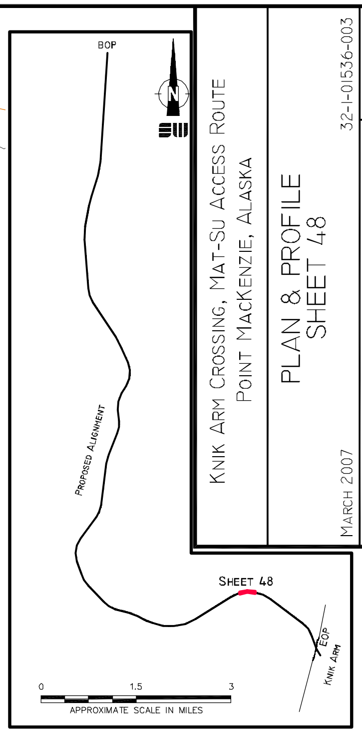

OVERVIEW OF PROJECT AREA

NOTES

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5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
- - -	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
-·-·-	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

PLAN & PROFILE
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FIG. A-3
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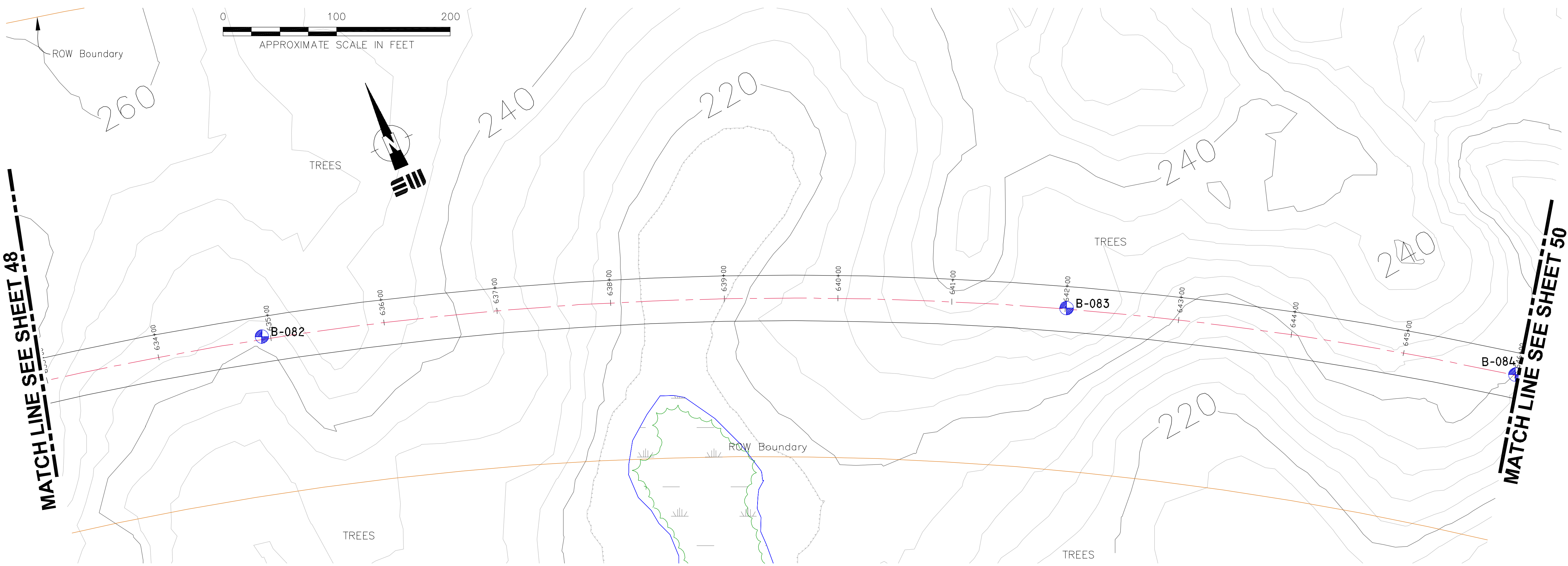

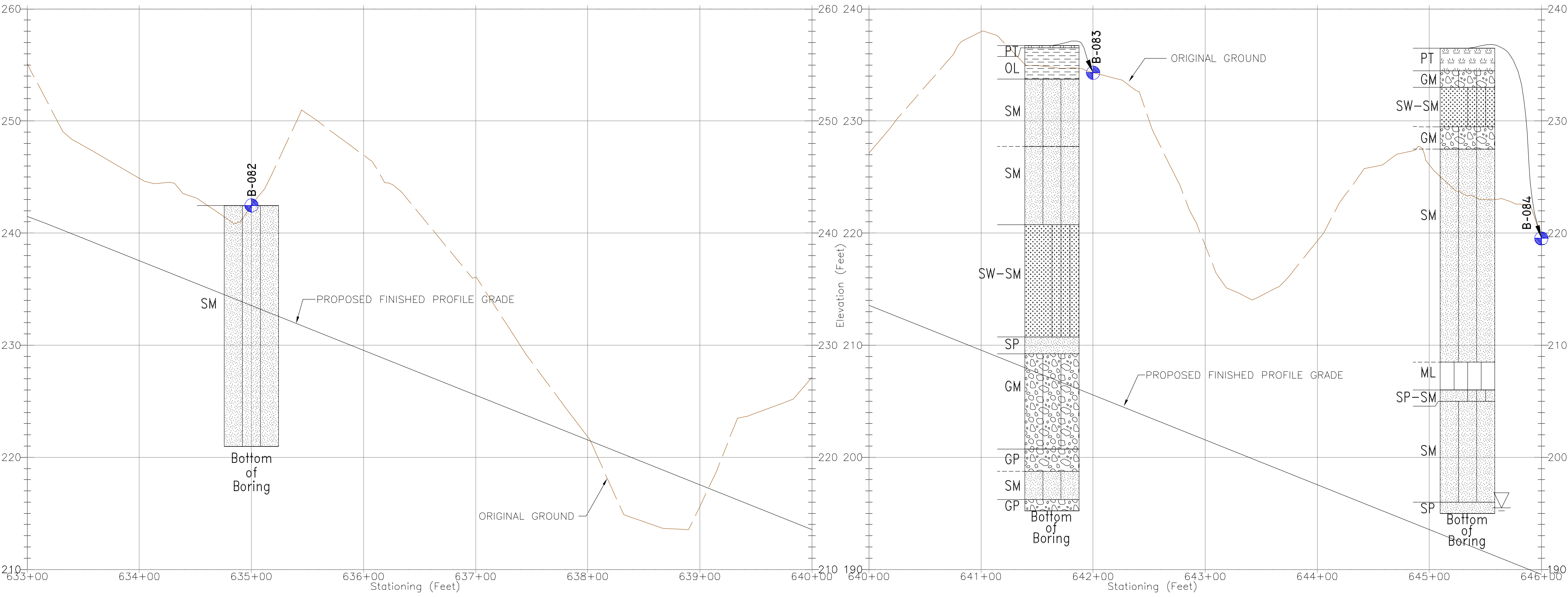

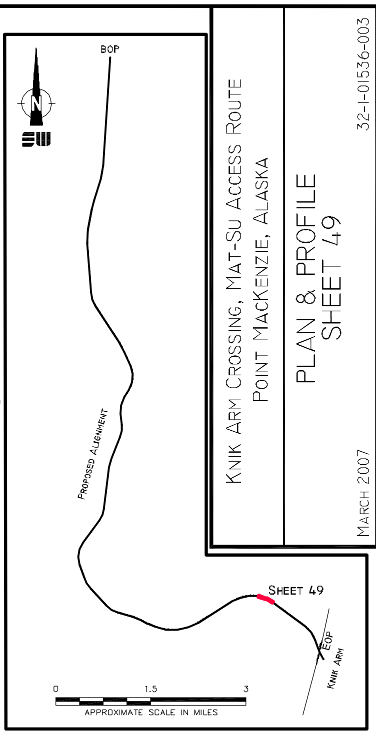

OVERVIEW OF PROJECT AREA

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LEGEND

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— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
220 200	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

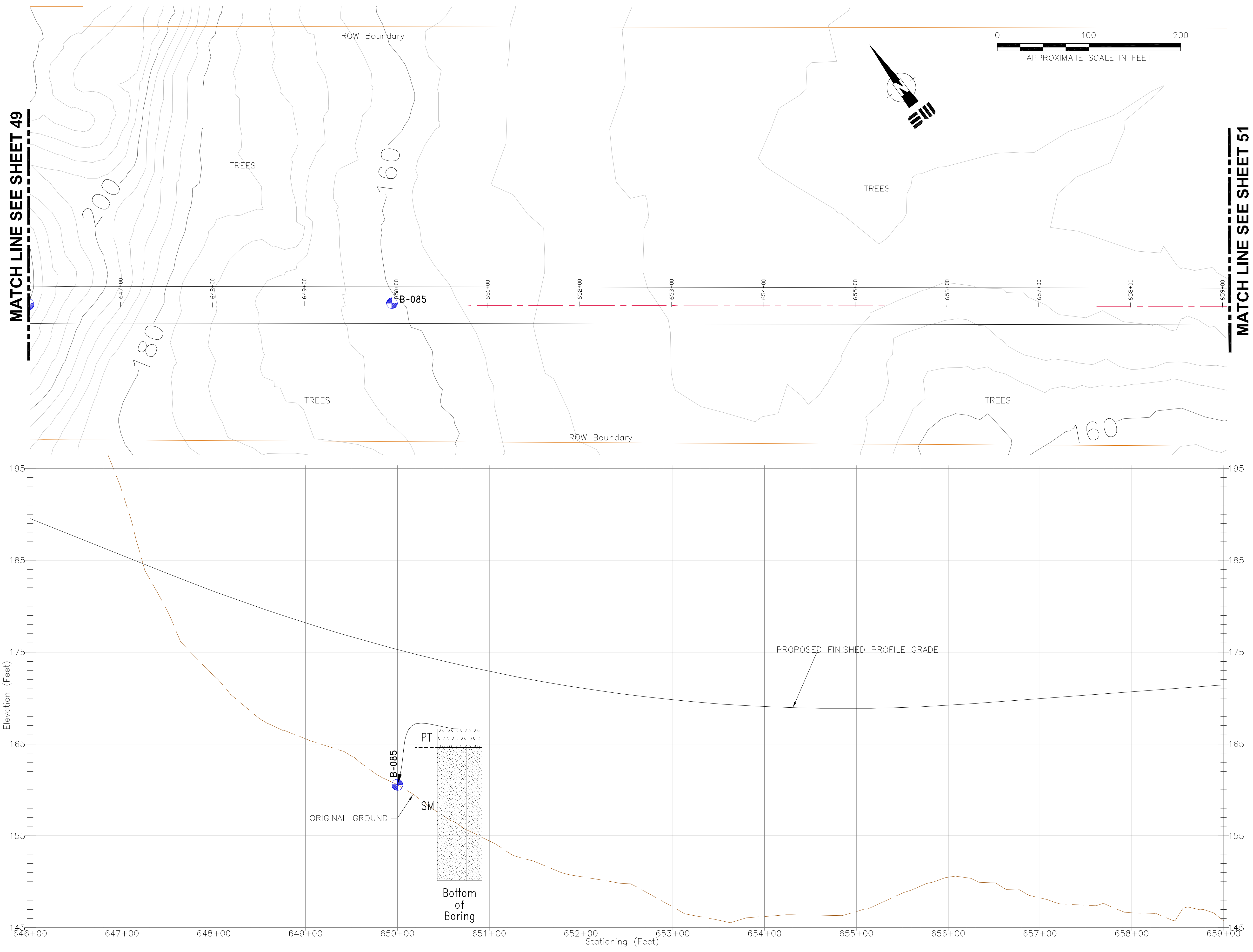
KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

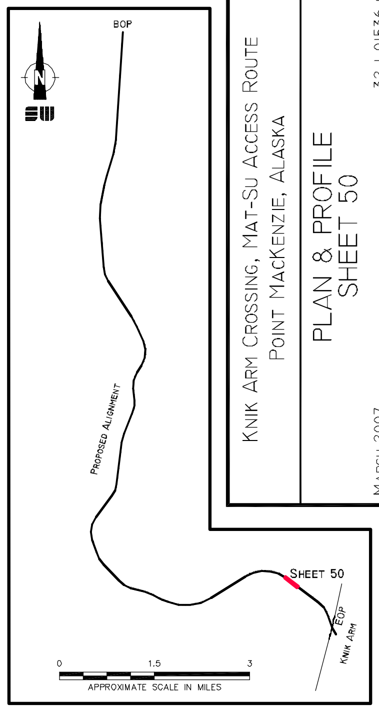
PLAN & PROFILE
SHEET 49

MARCH 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
SHEET 49 OF 54





OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
———	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
———	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≈	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

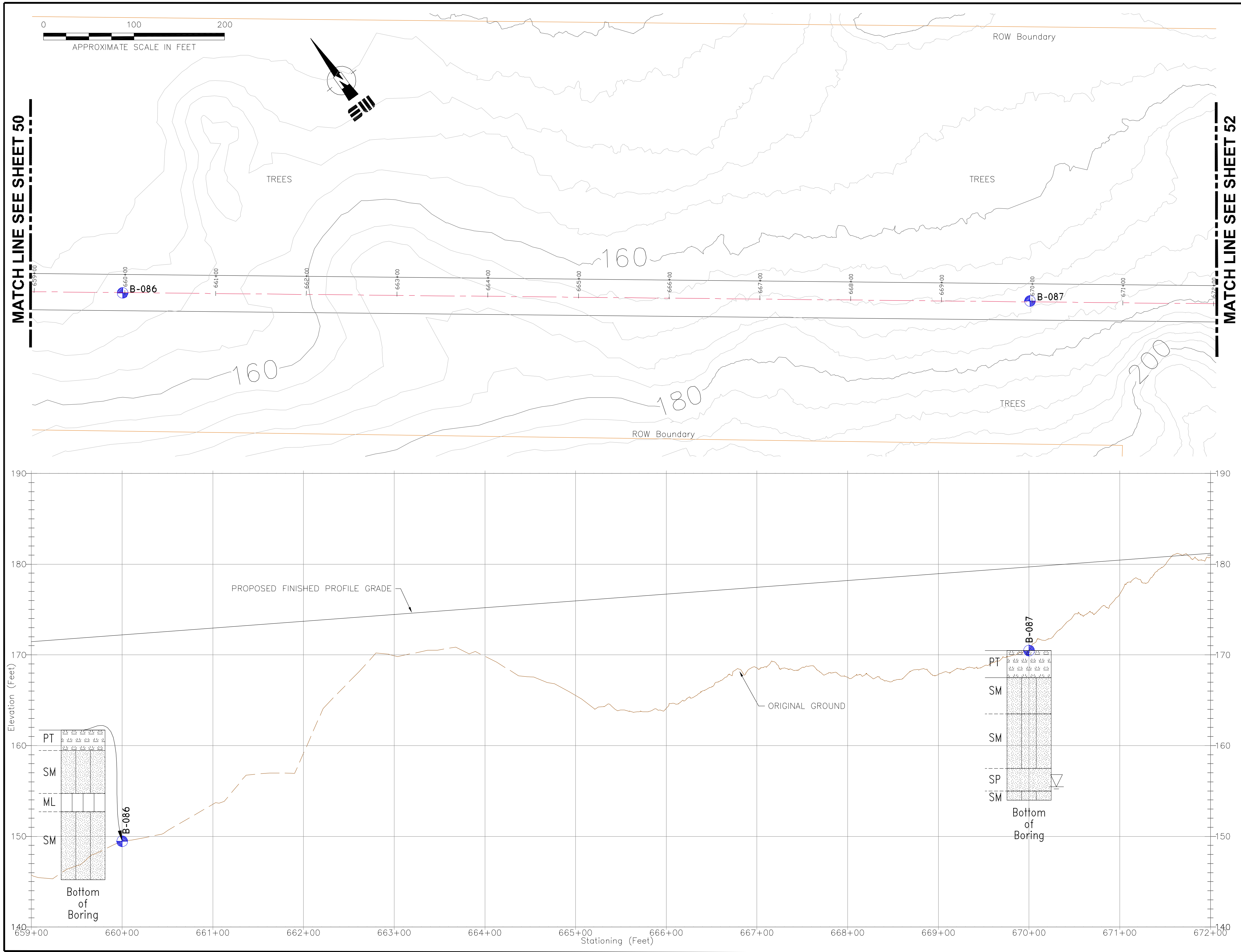
KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

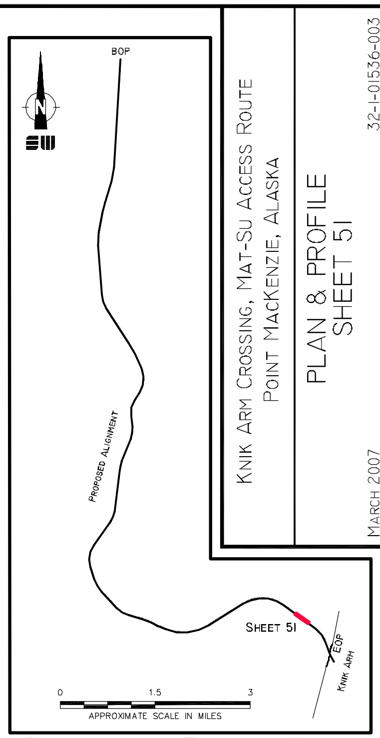
PLAN & PROFILE
SHEET 50

MARCH 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
SHEET 50 OF 54





OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
	APPROXIMATE LOCATION OF MARSHY AREAS
	APPROXIMATE LOCATION OF TREELINE
	CONTOURS IN 4-FOOT INTERVALS
	DEPRESSION IN CONTOUR

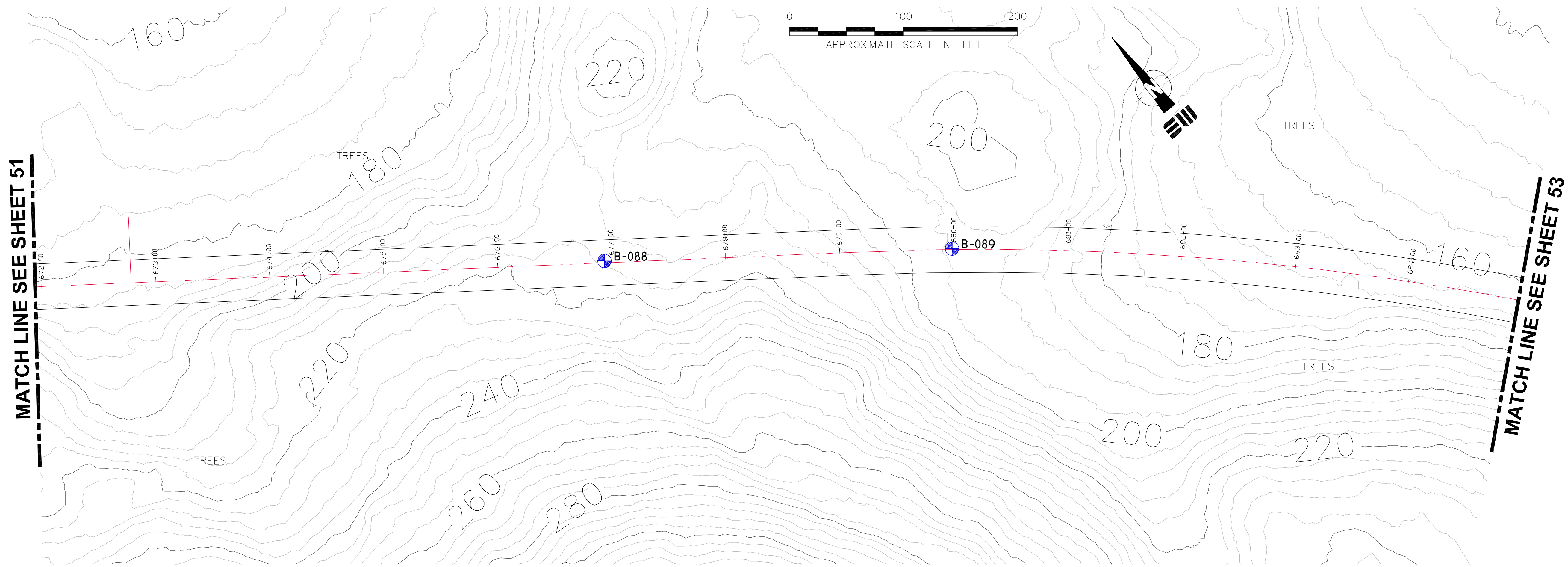
KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

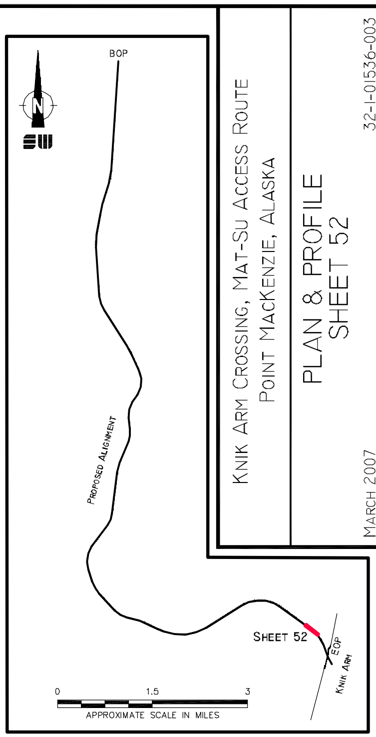
PLAN & PROFILE
SHEET 51

MARCH 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
SHEET 51 OF 54





OVERVIEW OF PROJECT AREA

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

PLAN & PROFILE
SHEET 52

March 2007

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SHANNON & WILSON, INC.
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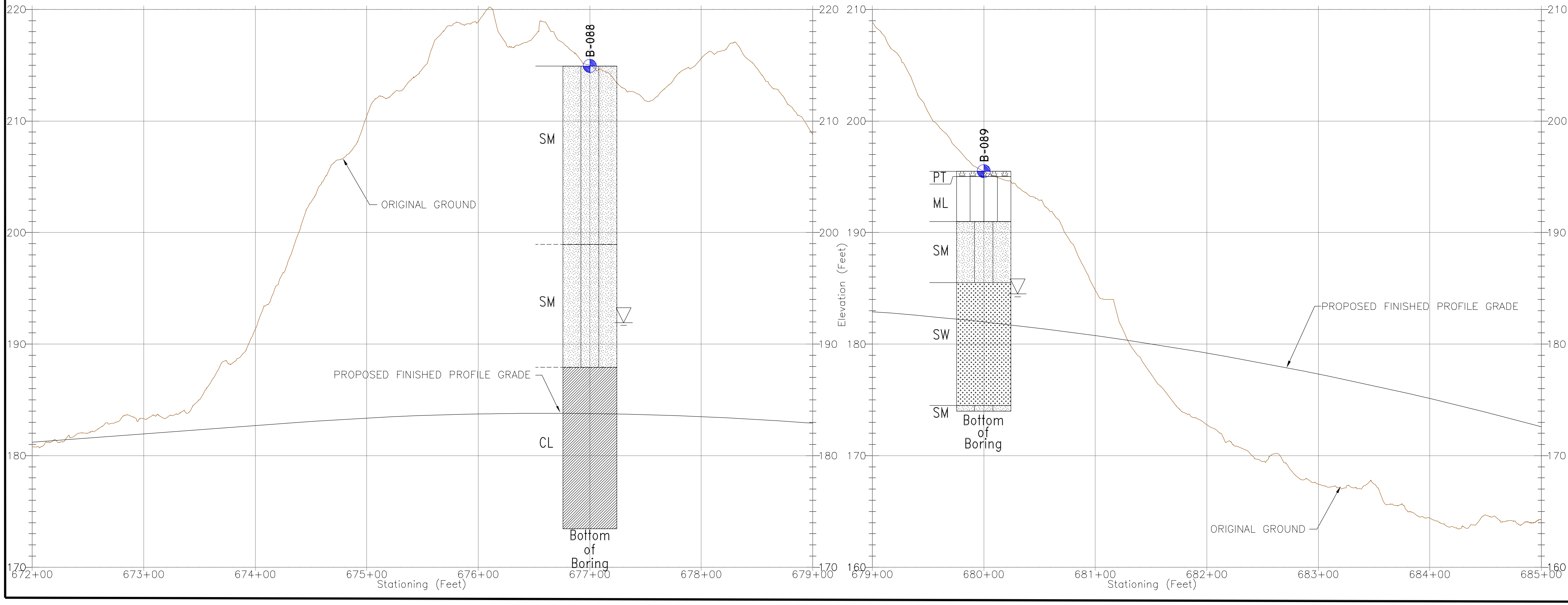
Fig. A-3
Sheet 52 of 34



NOTES

1. Drawing Adapted from PND Engineers, Inc. provided Plan & Profile Sheets.
2. Boring Logs are included in Appendix A
3. Overview of Project Area is presented as Figure 1.
4. Unified Soil Classification System (USCS) legend presented as Figure A-1.
5. Vertical Scale Exaggerated 10 Times Horizontal Scale

LEGEND

B-062 Approximate Location of Boring B-062, Advanced by Shannon & Wilson, Inc., 2006 (Location not surveyed after completion)

Approximate Location of Exisiting Point MacKenzie Road

Approximate Location of Proposed Point MacKenzie Road Upgrade

Approximate Location of Proposed Centerline

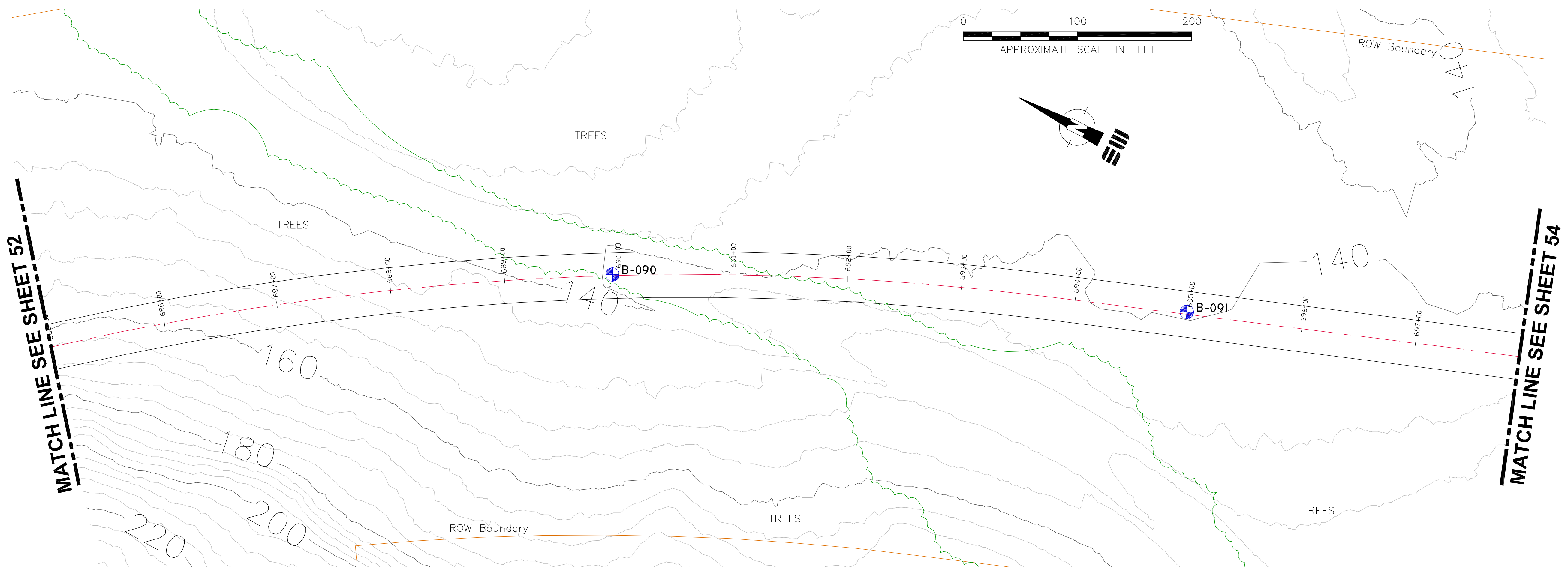
Approximate Location of Proposed Right-of-Way (ROW) Boundary

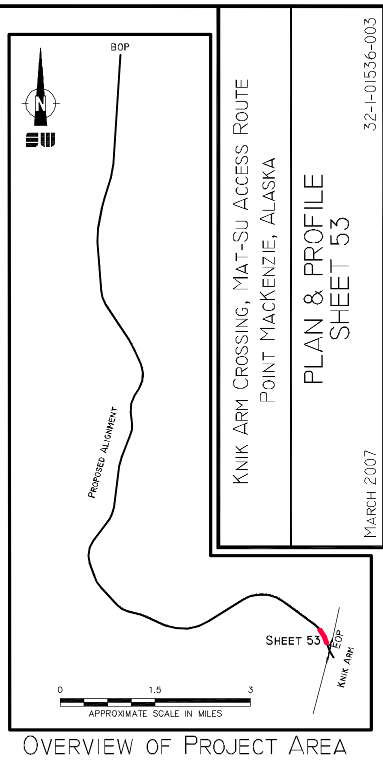
Approximate Location of Marshy Areas

Approximate Location of Treeline

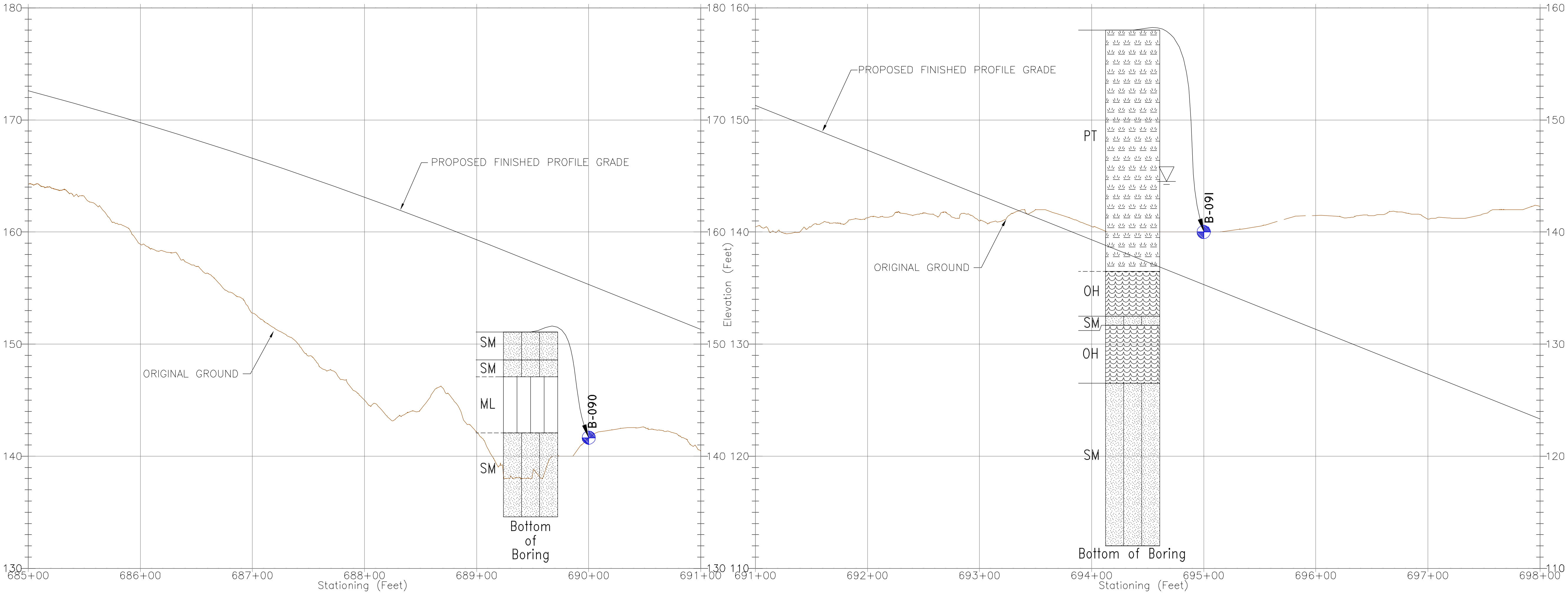
Contours in 4-foot Intervals

Depression in Contour





OVERVIEW OF PROJECT AREA



NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

B-062 APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)

APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD

APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE

APPROXIMATE LOCATION OF PROPOSED CENTERLINE

APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY

APPROXIMATE LOCATION OF MARSHY AREAS

APPROXIMATE LOCATION OF TREELINE

CONTOURS IN 4-FOOT INTERVALS

DEPRESSION IN CONTOUR

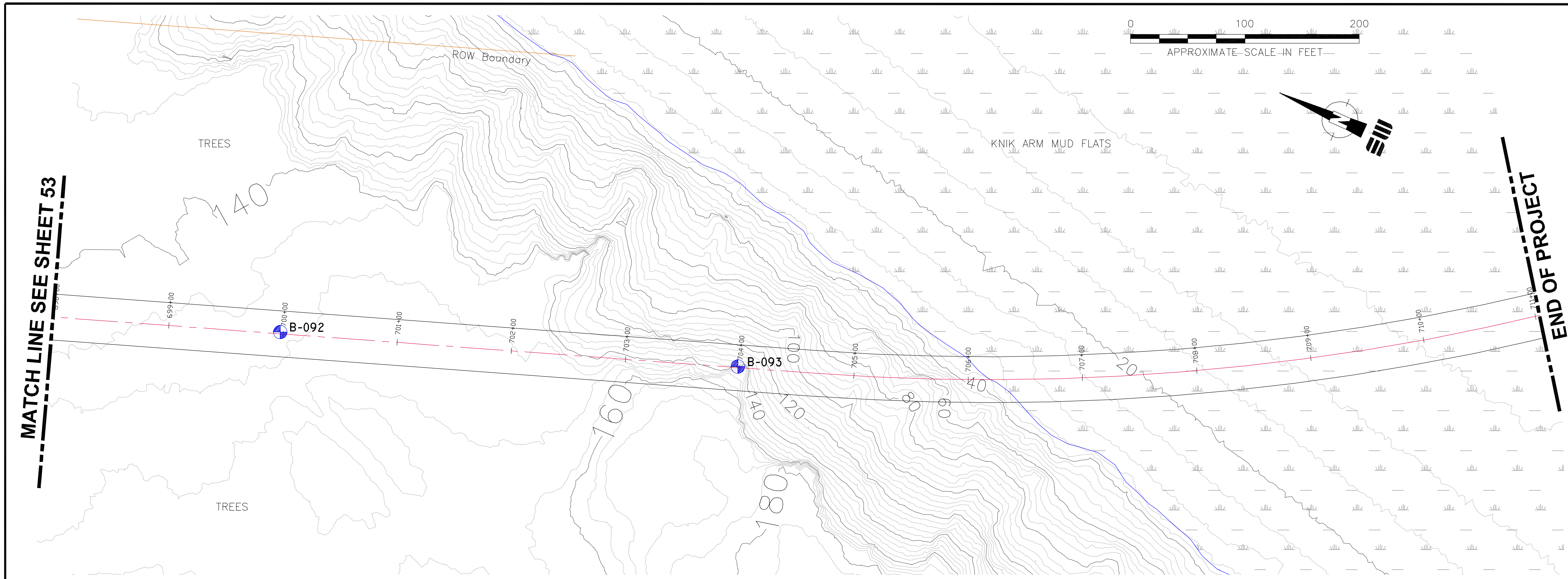
KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

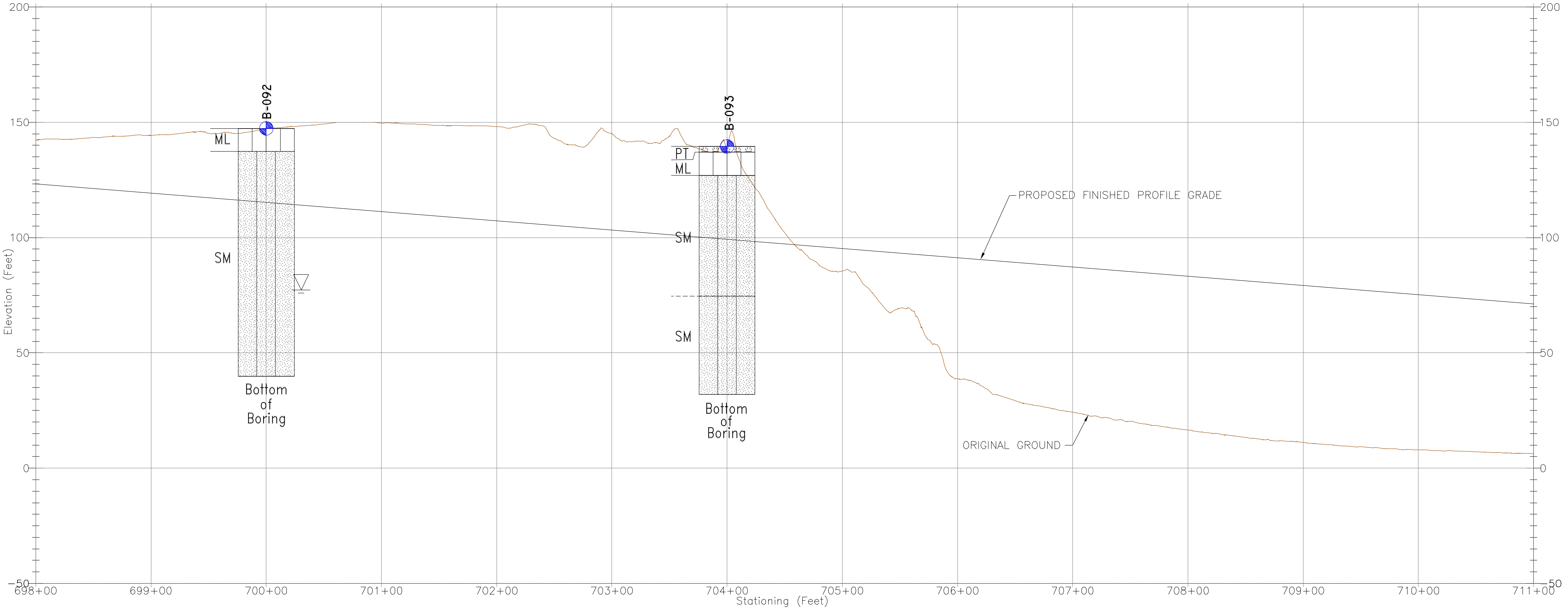
PLAN & PROFILE
SHEET 53

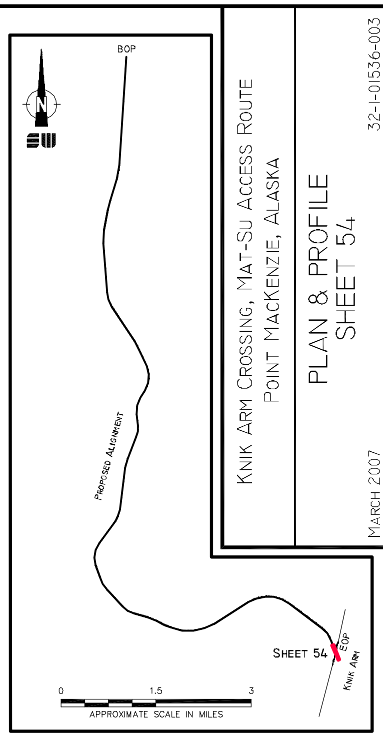
MARCH 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
SHEET 53 OF 54







OVERVIEW OF PROJECT AREA

NOTES

1. DRAWING ADAPTED FROM PND ENGINEERS, INC. PROVIDED PLAN & PROFILE SHEETS.
2. BORING LOGS ARE INCLUDED IN APPENDIX A
3. OVERVIEW OF PROJECT AREA IS PRESENTED AS FIGURE 1.
4. UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) LEGEND PRESENTED AS FIGURE A-1.
5. VERTICAL SCALE EXAGGERATED 10 TIMES HORIZONTAL SCALE

LEGEND

⊕ B-062	APPROXIMATE LOCATION OF BORING B-062, ADVANCED BY SHANNON & WILSON, INC., 2006 (LOCATION NOT SURVEYED AFTER COMPLETION)
— — —	APPROXIMATE LOCATION OF EXISITING POINT MACKENZIE ROAD
═	APPROXIMATE LOCATION OF PROPOSED POINT MACKENZIE ROAD UPGRADE
—·—·—	APPROXIMATE LOCATION OF PROPOSED CENTERLINE
—	APPROXIMATE LOCATION OF PROPOSED RIGHT-OF-WAY (ROW) BOUNDARY
▨	APPROXIMATE LOCATION OF MARSHY AREAS
○	APPROXIMATE LOCATION OF TREELINE
≋	CONTOURS IN 4-FOOT INTERVALS
○	DEPRESSION IN CONTOUR

KNIK ARM CROSSING, MAT-SU ACCESS ROUTE
POINT MACKENZIE, ALASKA

PLAN & PROFILE
SHEET 54

MARCH 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

FIG. A-3
SHEET 54 OF 54

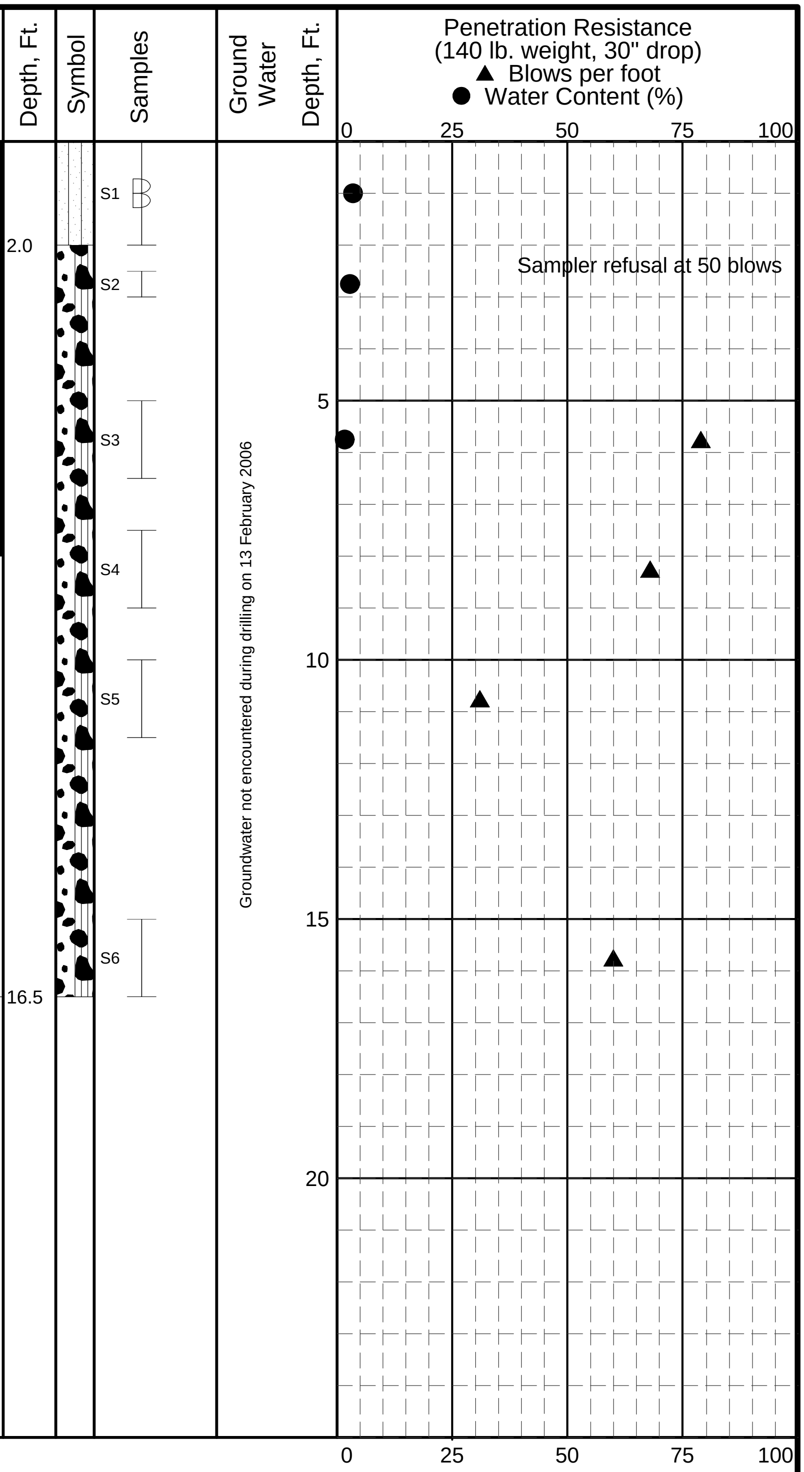
MATERIAL DESCRIPTION

Approx. Elevation: 223 Ft.

Frozen, brown, silty, gravelly SAND; moist
[FILL]
S1: 42% Gravel, 45% Sand, 14% Fines (F2)

Frozen to dense to very dense, brown, slightly silty, sandy GRAVEL; moist

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-001
Station 15+04

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-4

MATERIAL DESCRIPTION

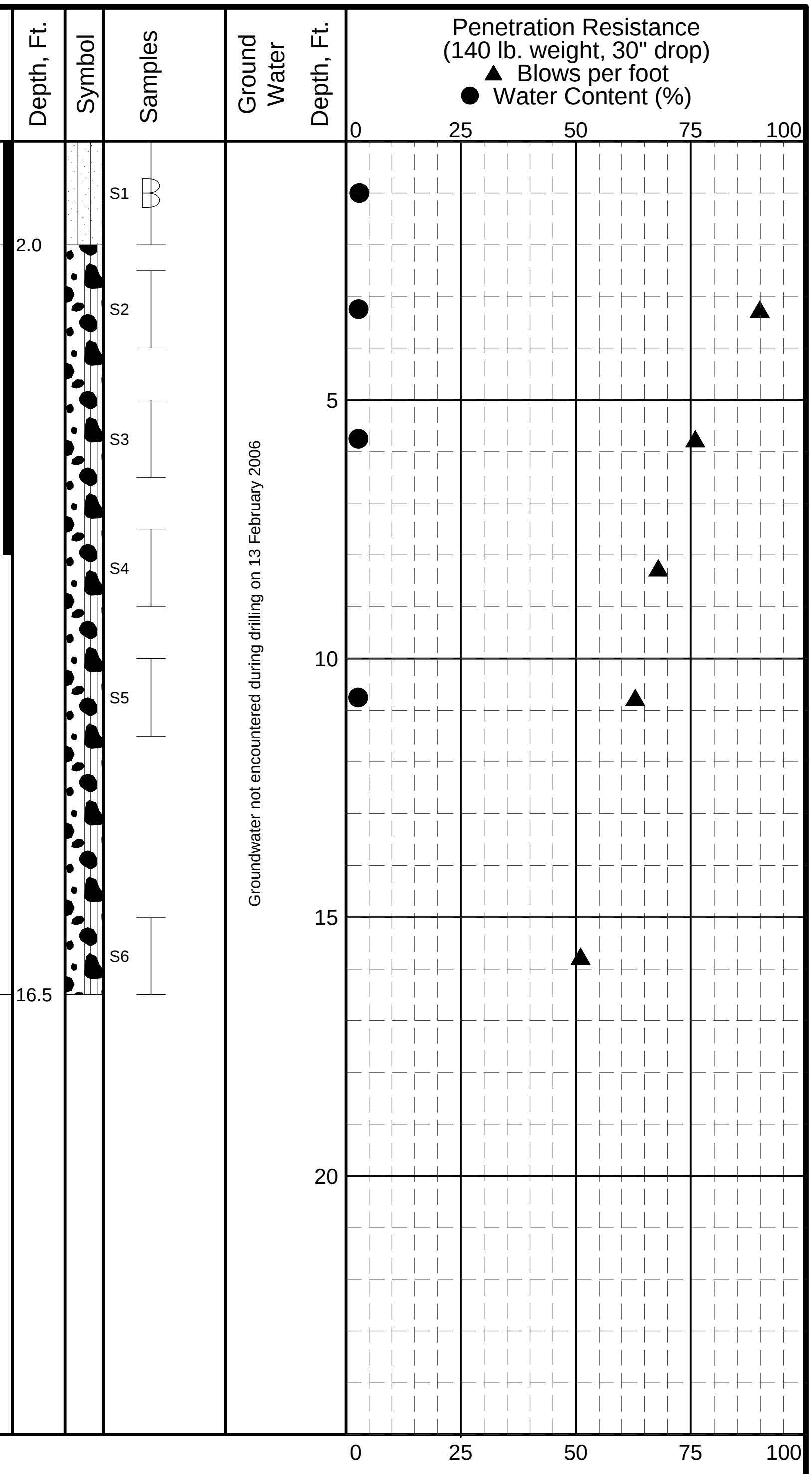
Approx. Elevation: 233 Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]

Frozen to very dense, brown, slightly silty, sandy GRAVEL; moist

S5: 52% Gravel, 39% Sand, 9% Fines (F1)

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

*	Sample Not Recovered	∇	Ground Water Level At Time Of Drilling
⌶	2" O.D. Split Spoon Sample		
Ⅲ	3" O.D. Split Spoon Sample		
B	Bulk Sample		
▮	Frozen		

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-002
Station 24+98

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-5

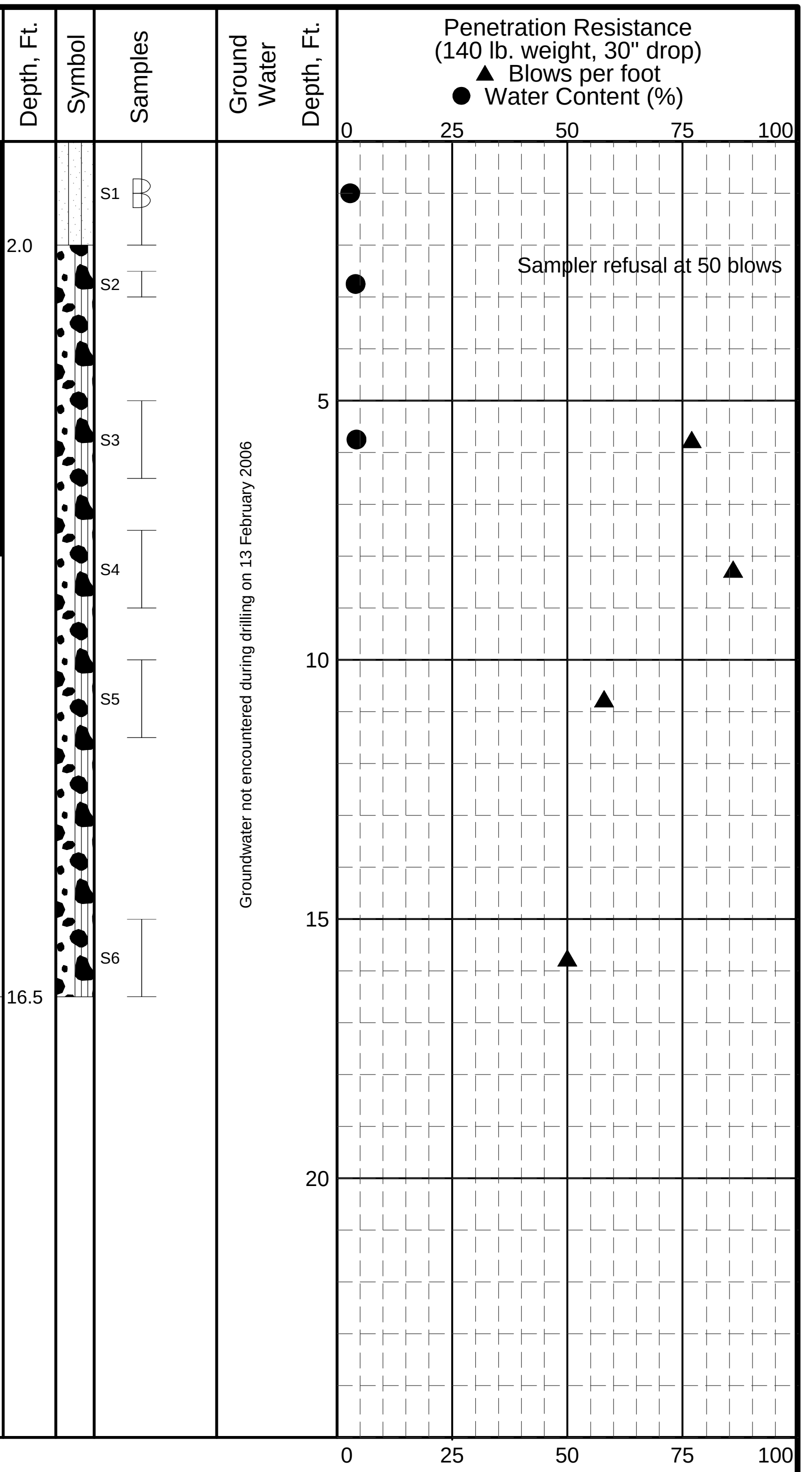
MATERIAL DESCRIPTION

Approx. Elevation: 232 Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]

Frozen to very dense, brown, slightly silty, sandy GRAVEL; moist

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-003
Station 39+72

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-6

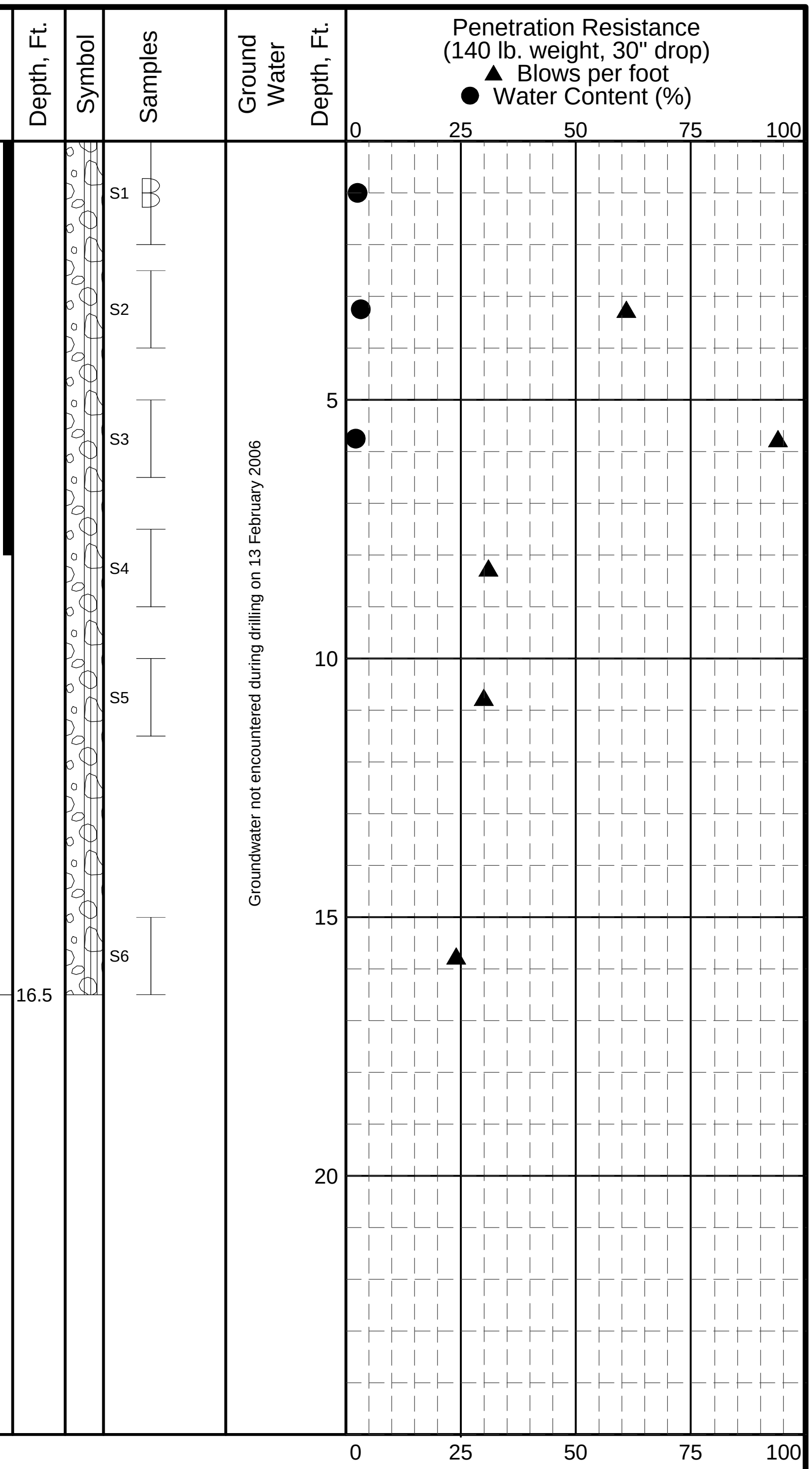
MATERIAL DESCRIPTION

Approx. Elevation: 228 Ft.

Frozen to medium dense brown, slightly silty, sandy GRAVEL; moist [FILL]
S1: 46% Gravel, 43% Sand, 11% Fines (F1)

S3: 47% Gravel, 45% Sand, 8% Fines (F1)

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
⌶B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-004
Station 54+82

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

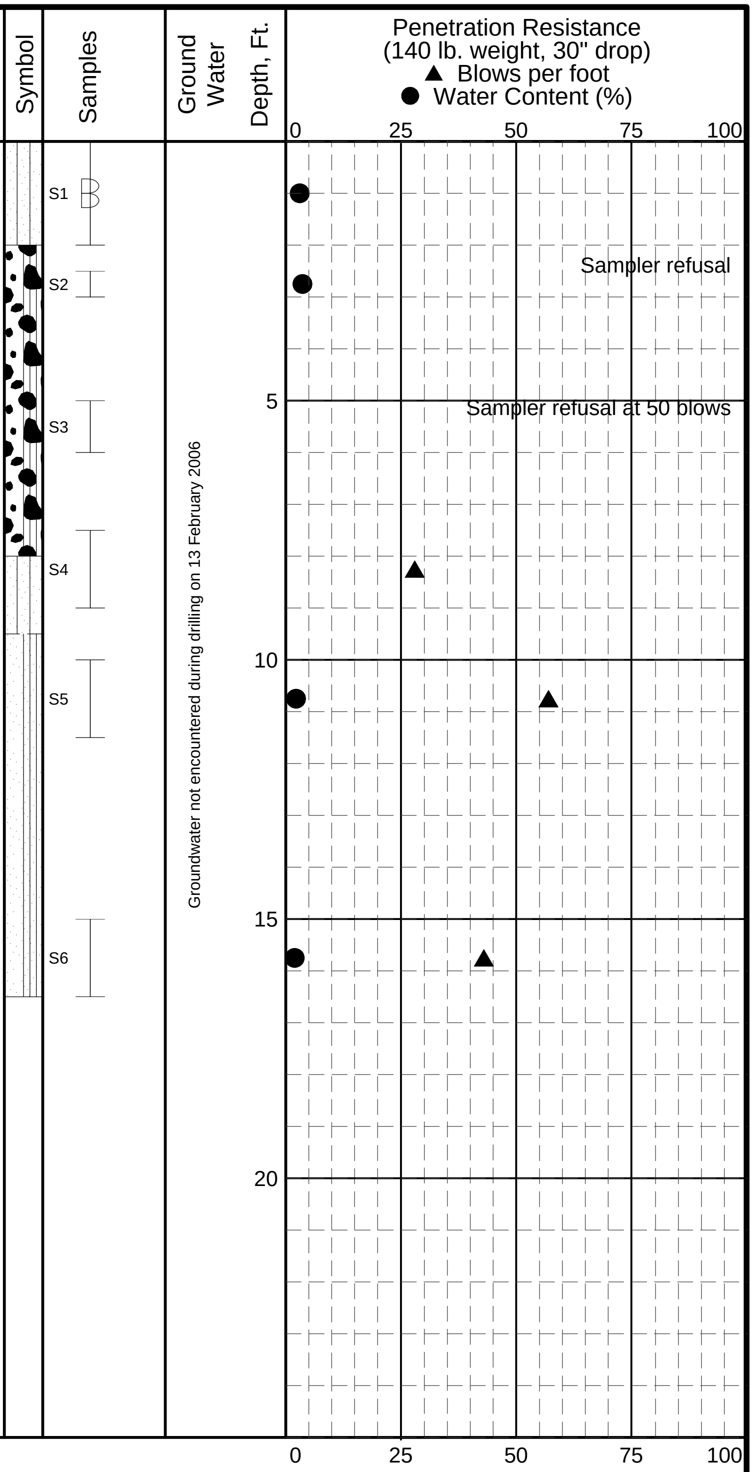
Fig. A-7

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

Approx. Elevation: 225 Ft.

MATERIAL DESCRIPTION	Depth, Ft.
Frozen, brown, silty, gravelly SAND; moist [FILL]	2.0
Frozen to very dense, brown, slightly silty, sandy GRAVEL; moist [FILL]	8.0
Medium dense, brown, gravelly, silty SAND; moist	9.5
Dense to very dense, brown, slightly silty, gravelly SAND; moist S5: 47% Gravel, 48% Sand, 5% Fines (F1)	16.5

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-005
Station 64+38

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-8

MATERIAL DESCRIPTION

Approx. Elevation: 220 Ft.

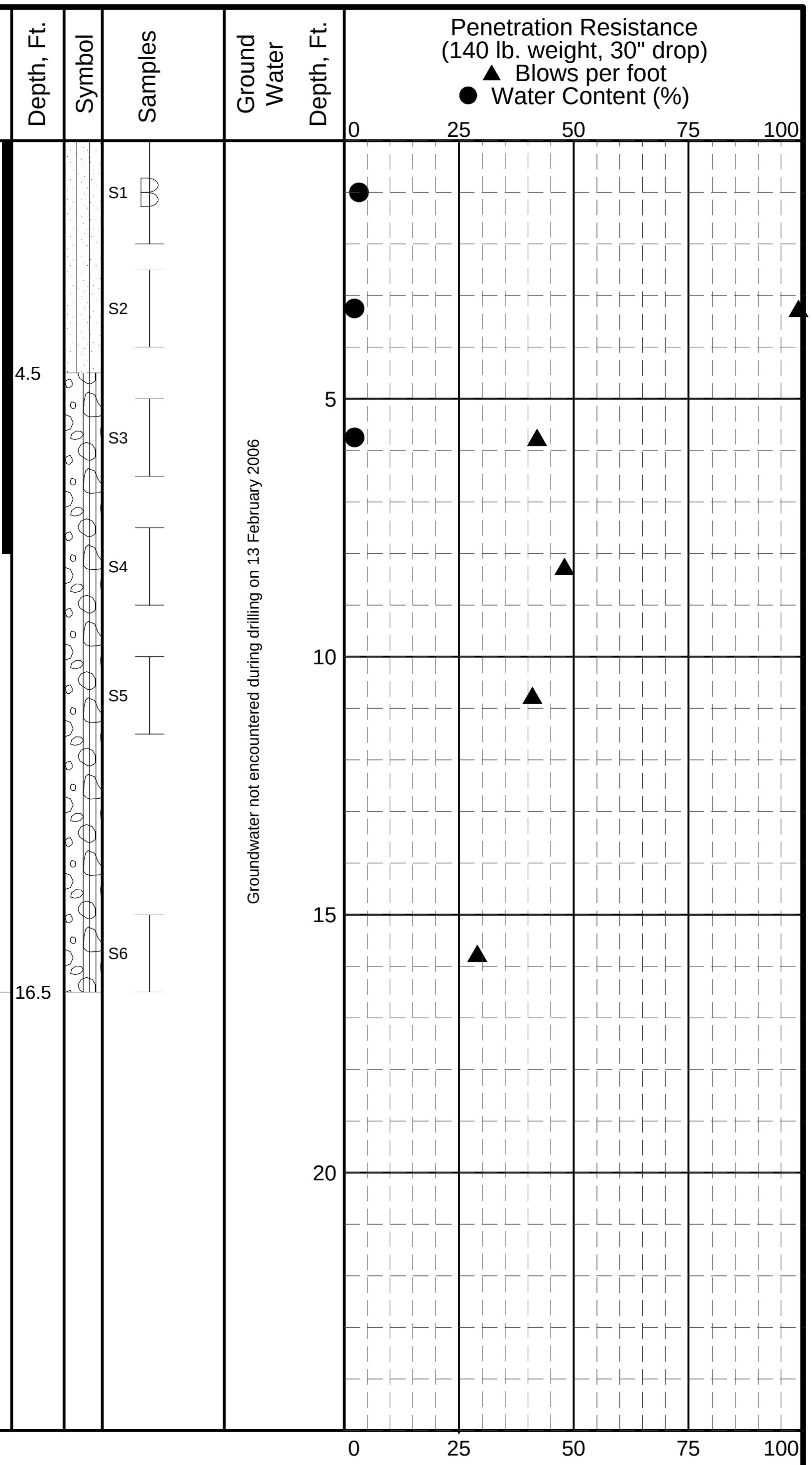
Frozen, brown, silty, gravelly SAND; moist [FILL]

4.5

Frozen to medium dense to dense, brown, slightly silty, sandy GRAVEL; moist [FILL]

16.5

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-006
Station 74+45

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-9

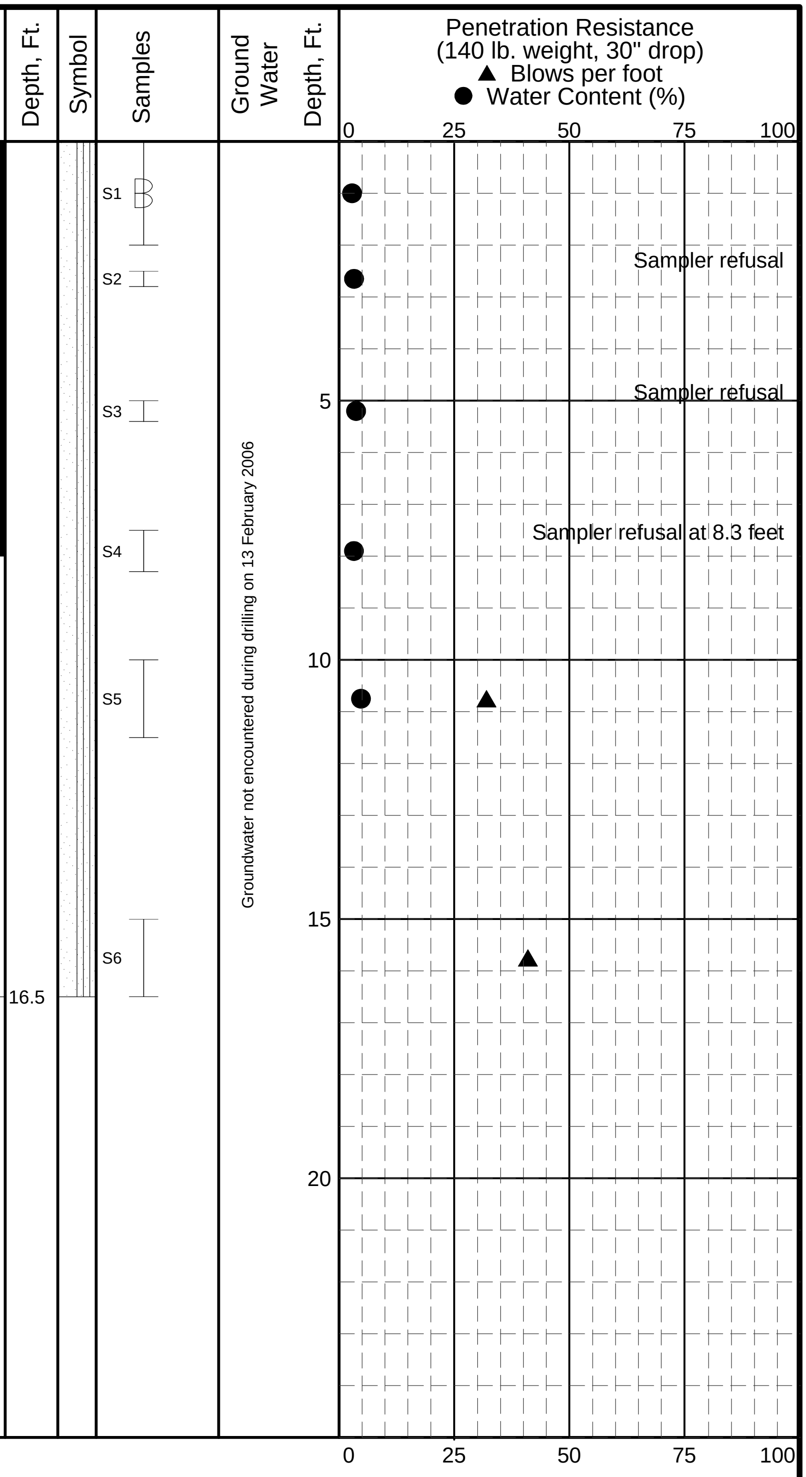
MATERIAL DESCRIPTION

Approx. Elevation: 226 Ft.

Frozen to dense, brown, slightly silty, gravelly SAND; moist [FILL]

S5: 34% Gravel, 55% Sand, 10% Fines (F2)

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-007
Station 84+92

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-10

MATERIAL DESCRIPTION

Approx. Elevation: 245 Ft.

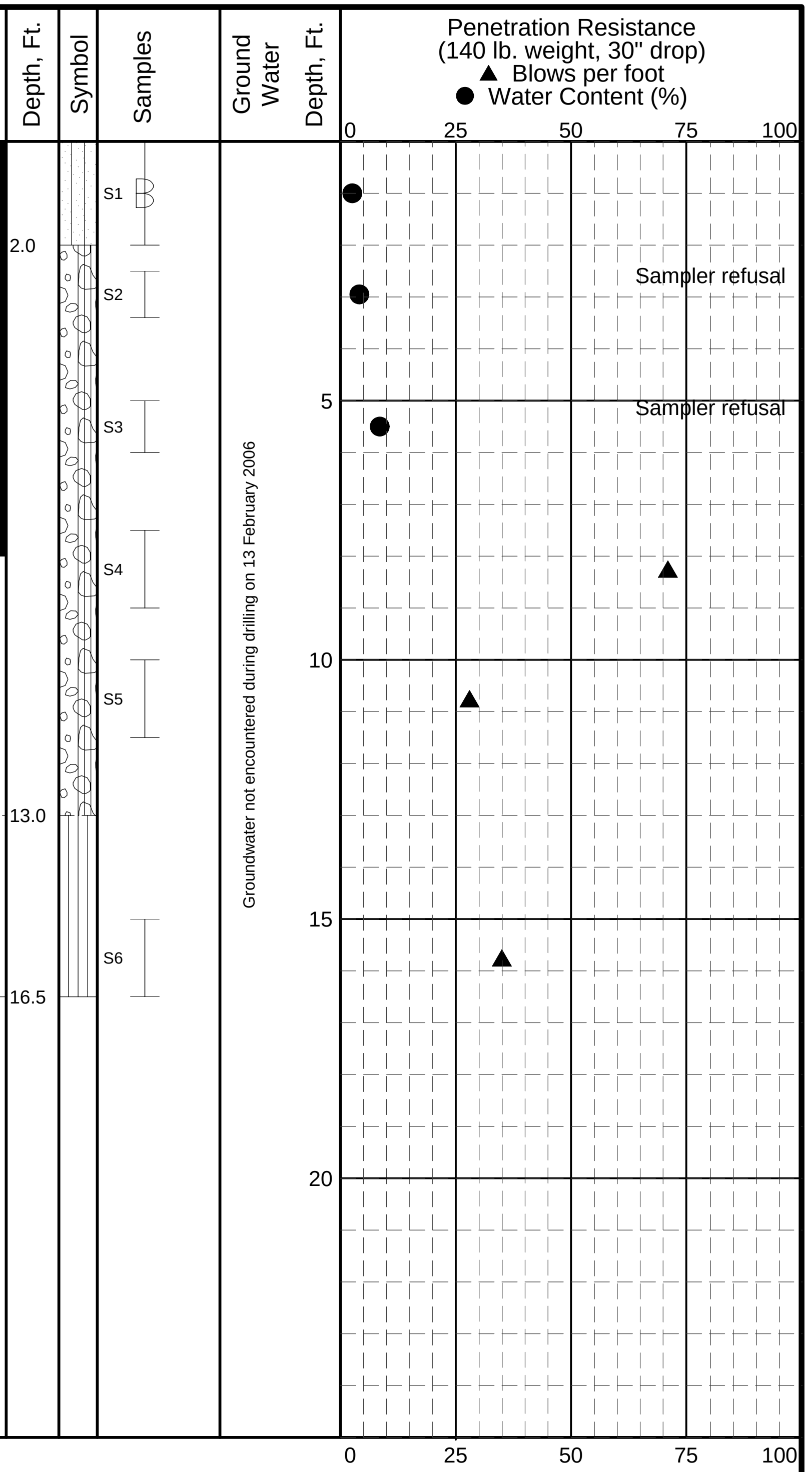
Frozen, brown, silty, gravelly SAND; moist
[FILL]

Frozen to medium dense to very dense, brown, slightly silty, sandy GRAVEL; moist
[FILL]

Drilling action indicates boulder or cobble at 6.5 feet bgs

Hard, brown, sandy SILT; moist

Bottom of Boring
Boring Completed 13 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-008
Station 95+06

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-11

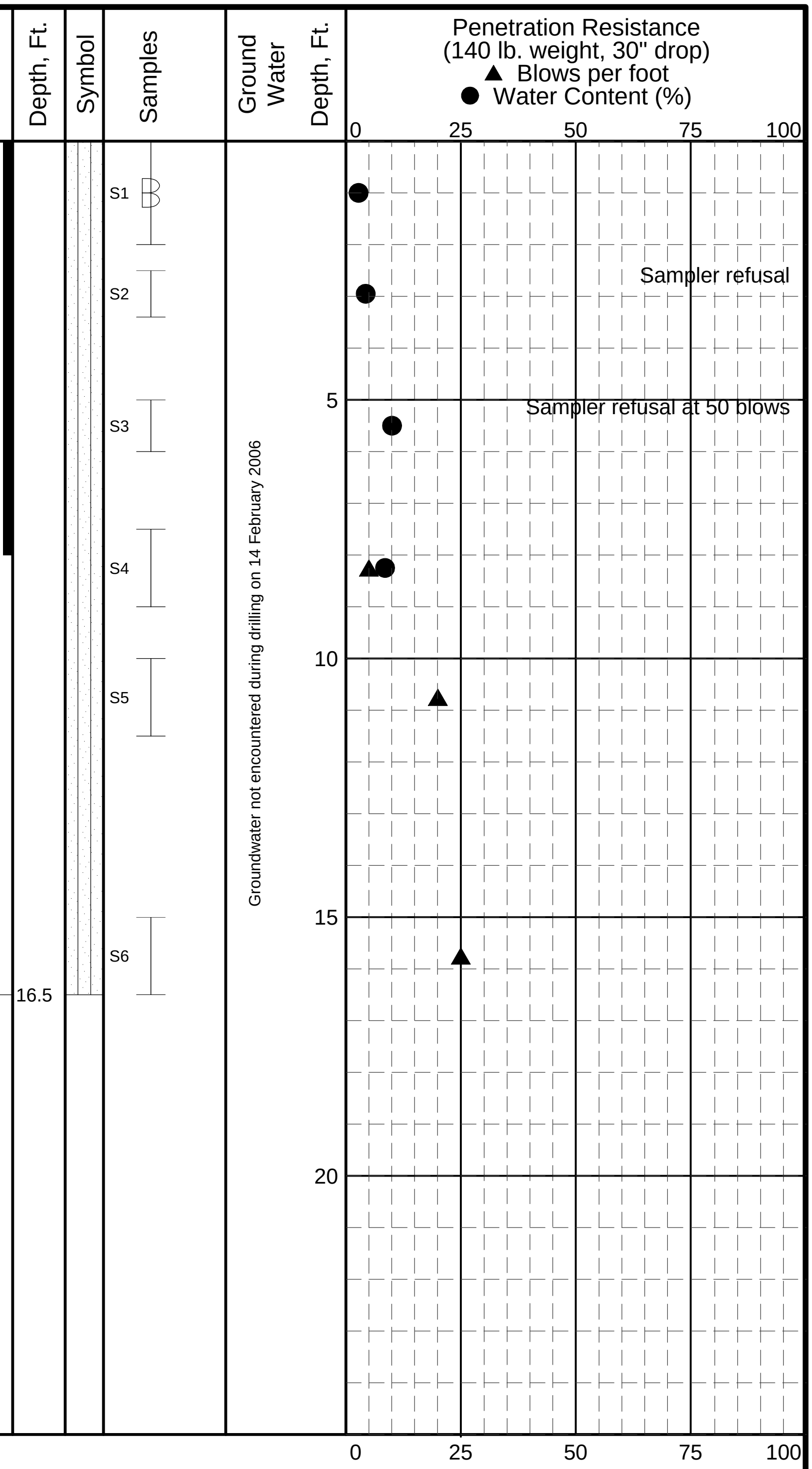
MATERIAL DESCRIPTION

Approx. Elevation: 245 Ft.

Frozen to loose to medium dense, brown, gravelly, silty SAND; moist [FILL]

S3: 26% Gravel, 43% Sand, 31% Fines (F3)

Bottom of Boring
Boring Completed 14 February 2006



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

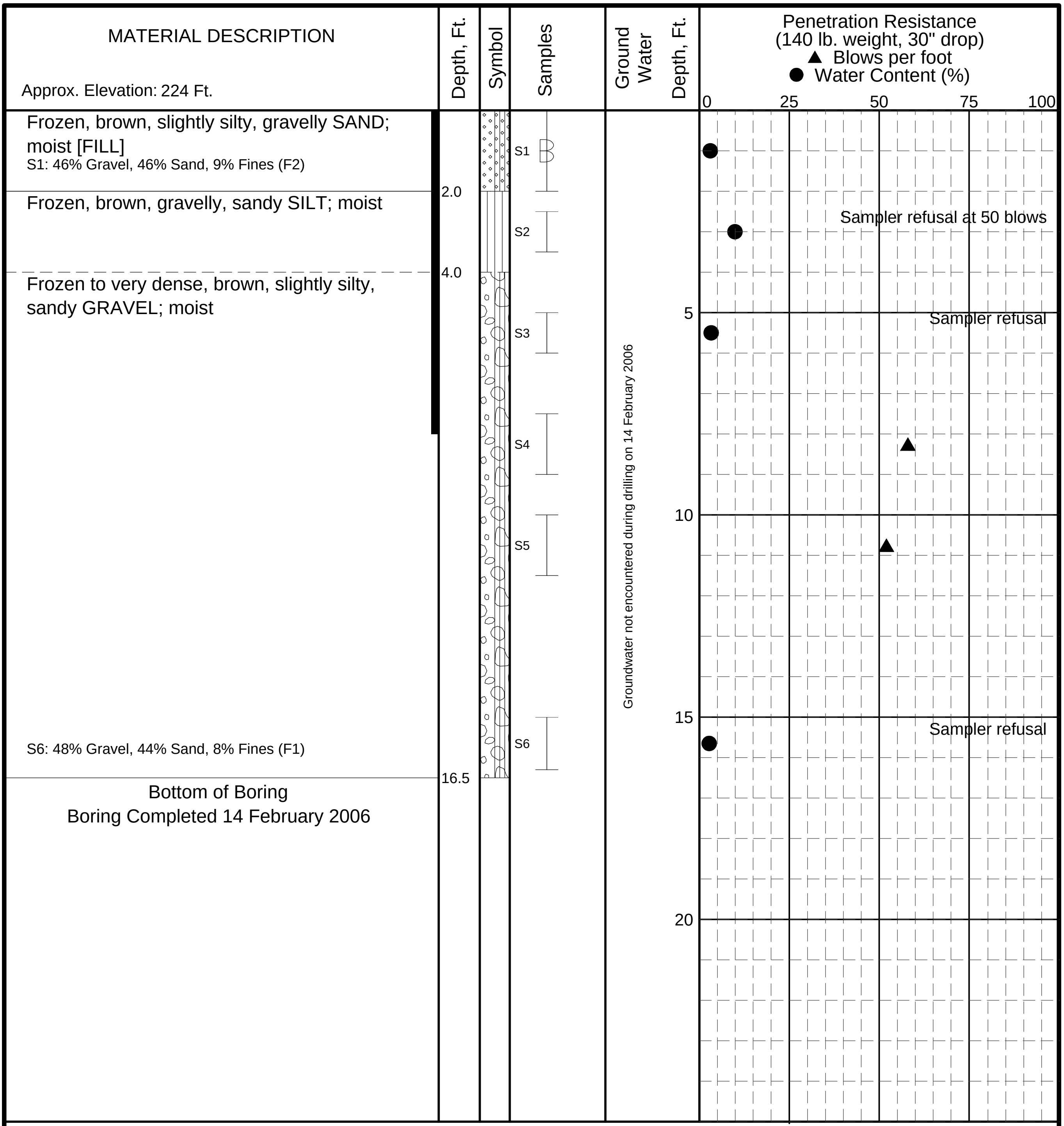
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-009
Station 102+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-12



MATERIAL DESCRIPTION

Approx. Elevation: 224 Ft.

Frozen, brown, slightly silty, gravelly SAND; moist [FILL]
S1: 46% Gravel, 46% Sand, 9% Fines (F2)

Frozen, brown, gravelly, sandy SILT; moist

Frozen to very dense, brown, slightly silty, sandy GRAVEL; moist

S6: 48% Gravel, 44% Sand, 8% Fines (F1)

Bottom of Boring
Boring Completed 14 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-010
Station 120+24

March 2007
32-1-01536-003

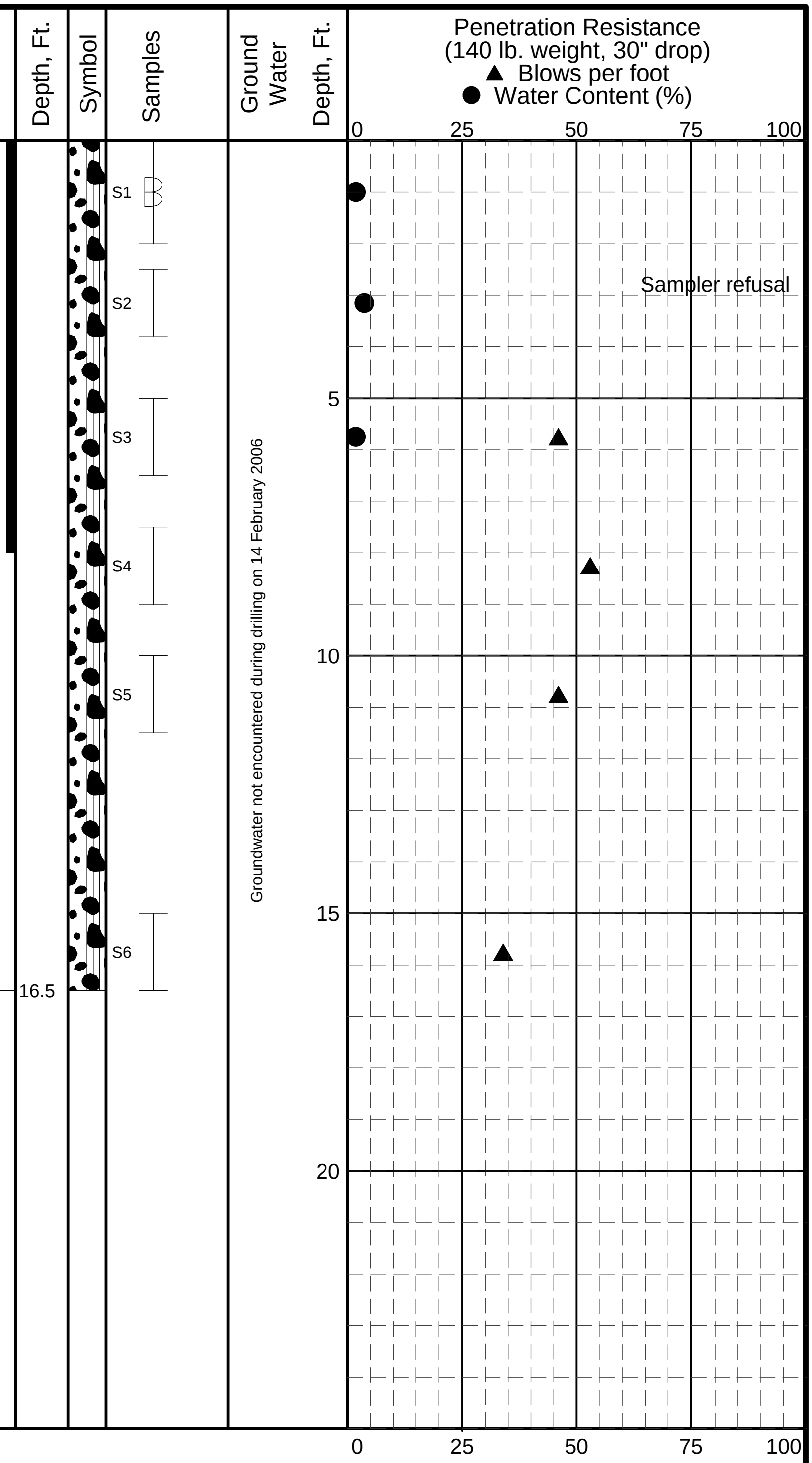
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-13

MATERIAL DESCRIPTION

Approx. Elevation: 220 Ft.

Frozen to dense to very dense, brown, slightly silty, sandy GRAVEL; moist [FILL]



Bottom of Boring
Boring Completed 14 February 2006

LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-011
Station 139+80

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-14

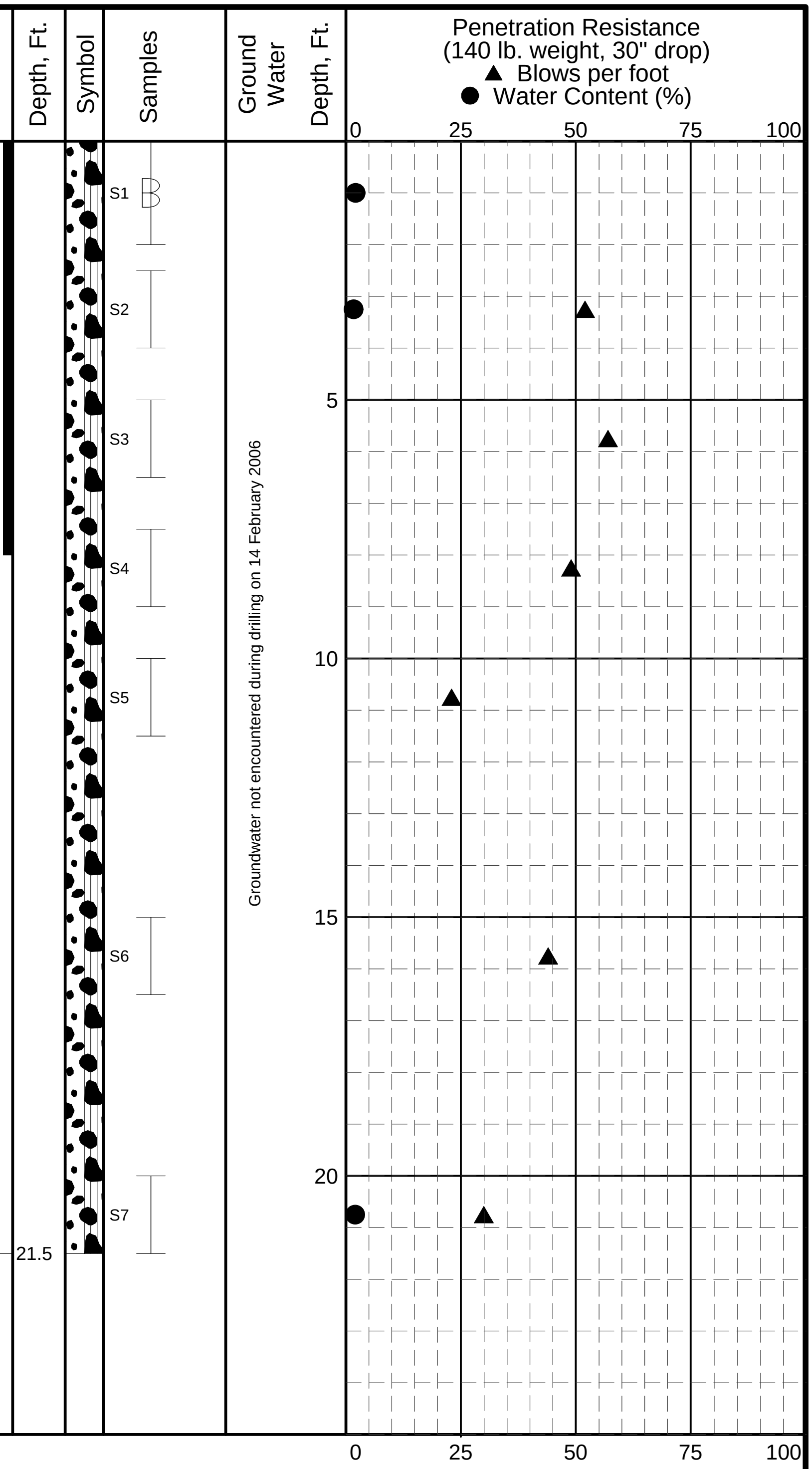
MATERIAL DESCRIPTION

Approx. Elevation: 208 Ft.

Frozen to medium dense to dense, brown, slightly silty, sandy GRAVEL; moist [FILL]

S7: 49% Gravel, 45% Sand, 6% Fines (NFS)

Bottom of Boring
Boring Completed 14 February 2006



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-012
Station 159+86

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-15

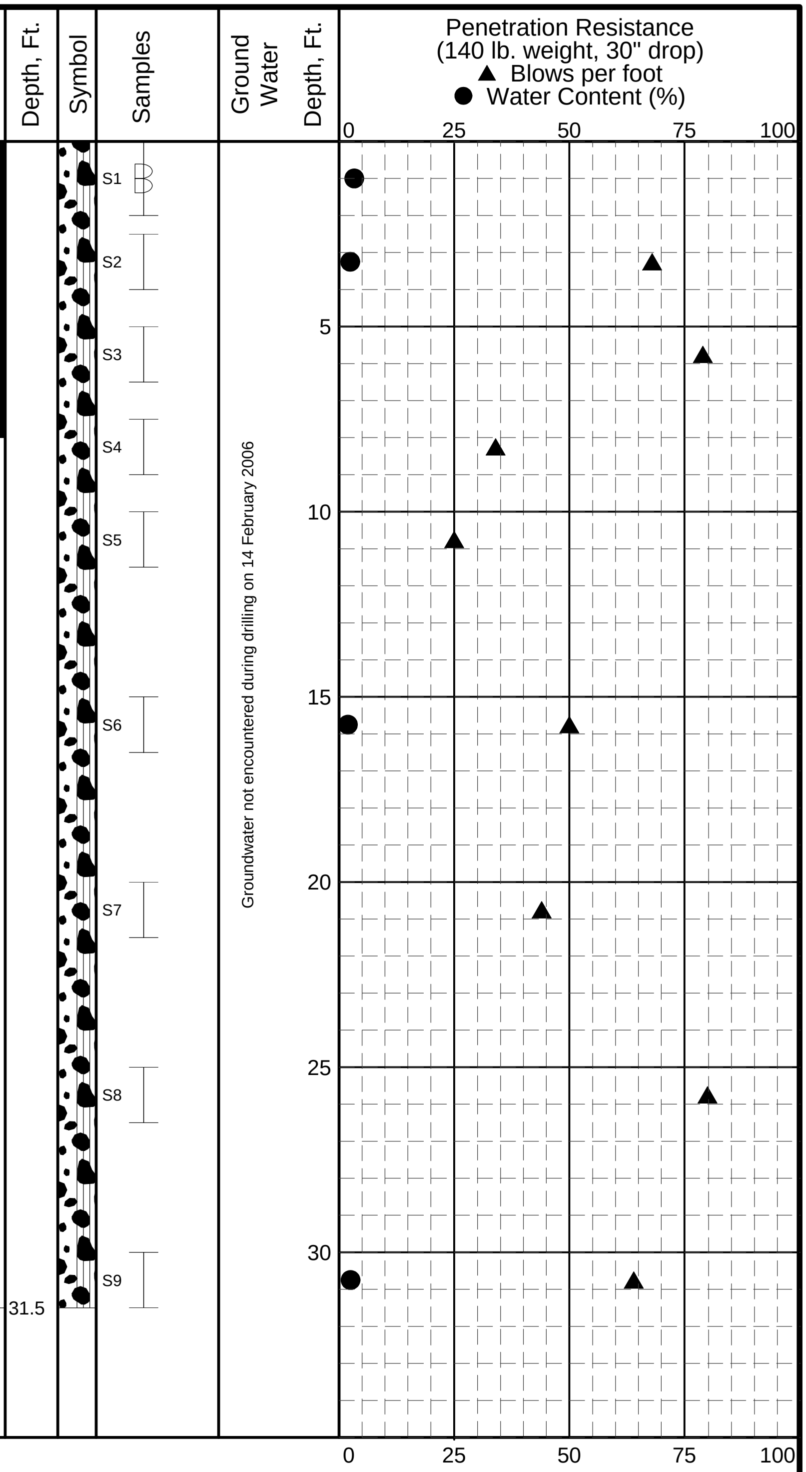
MATERIAL DESCRIPTION

Approx. Elevation: 211 Ft.

Frozen to medium dense to very dense, brown, slightly silty, sandy GRAVEL; moist [FILL]

S9: 48% Gravel, 45% Sand, 7% Fines (F1)

Bottom of Boring
Boring Completed 14 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

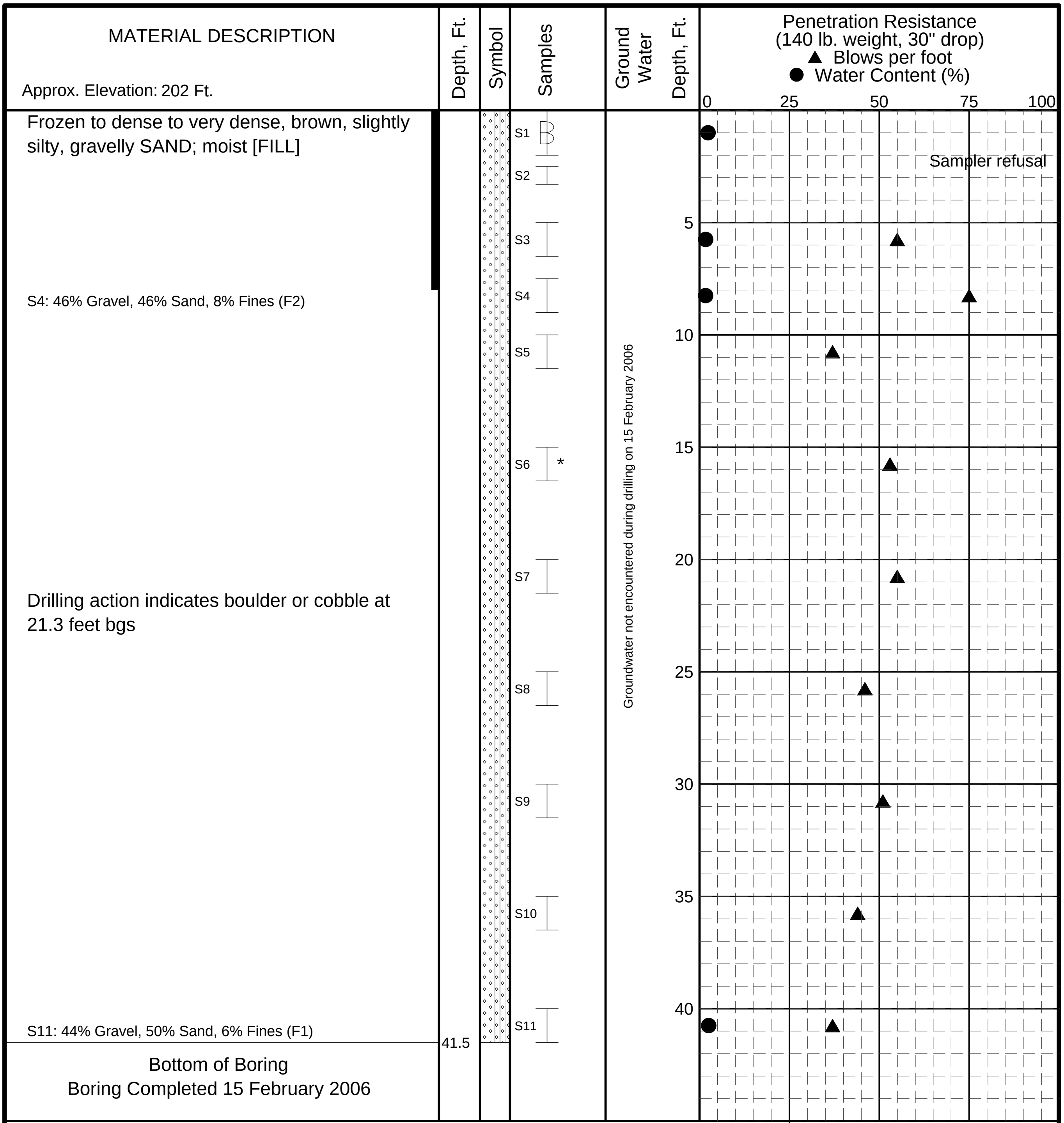
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-013
Station 169+74

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-16



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |——●——| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-014
Station 174+97

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-17

MATERIAL DESCRIPTION

Approx. Elevation: 173 Ft.

Depth, Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]

4.0

Frozen to medium dense to dense, brown, slightly silty, sandy GRAVEL; moist [FILL]

S6: 49% Gravel, 44% Sand, 7% Fines (F1)

18.0

Soft to medium stiff, brown CLAY; moist

S7: PP = 0.4; TV = 0.1H 0.1V

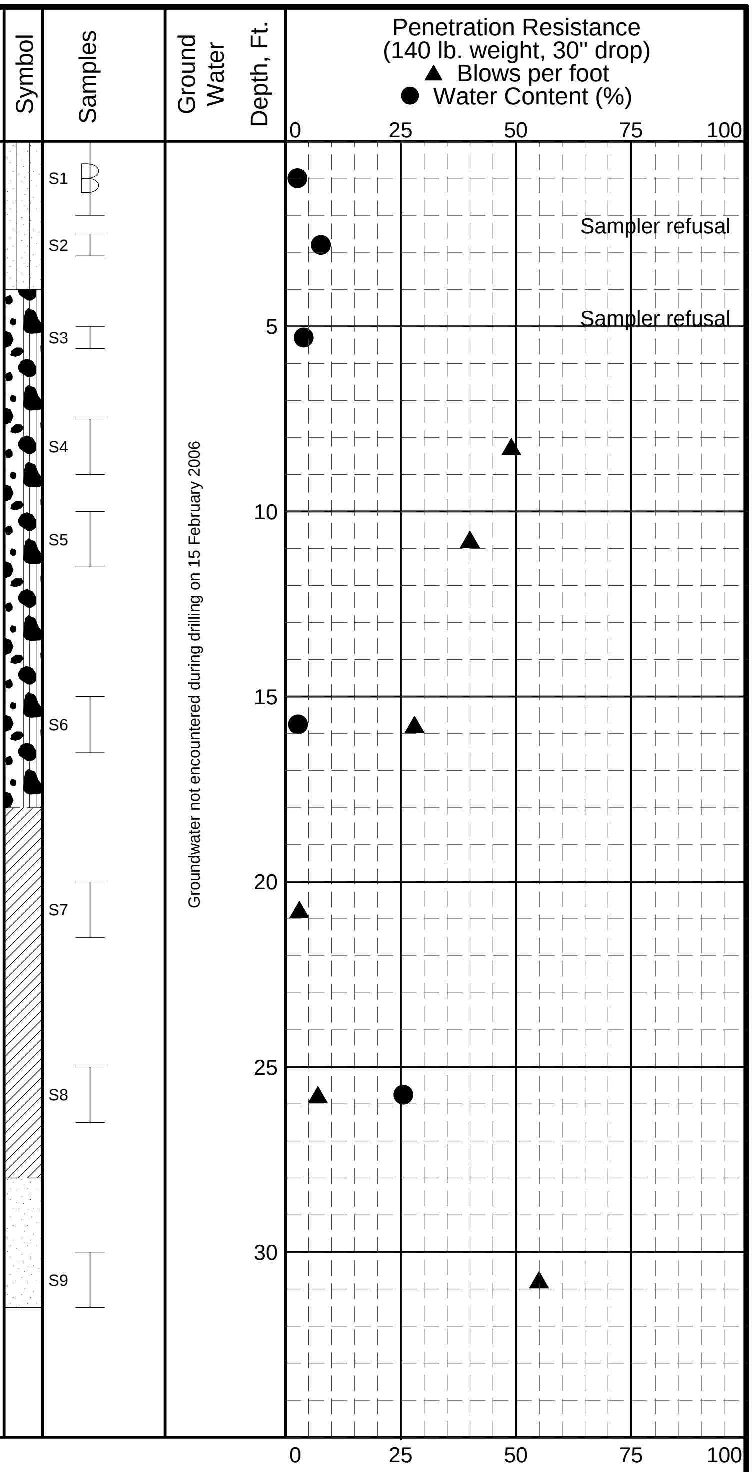
S8: Non-Plastic
PP = 0.25; TV = 0.05H 0.05V

28.0

Very dense, brown, gravelly SAND; moist

31.5

Bottom of Boring
Boring Completed 15 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
Ƀ Bulk Sample
▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-015
Station 181+78

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-18

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION

Approx. Elevation: 176 Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]

6.5

Frozen to stiff to very stiff, brown, sandy SILT; moist

S5: Non-Plastic
PP = n/a

S6: PP = 0.4

18.0

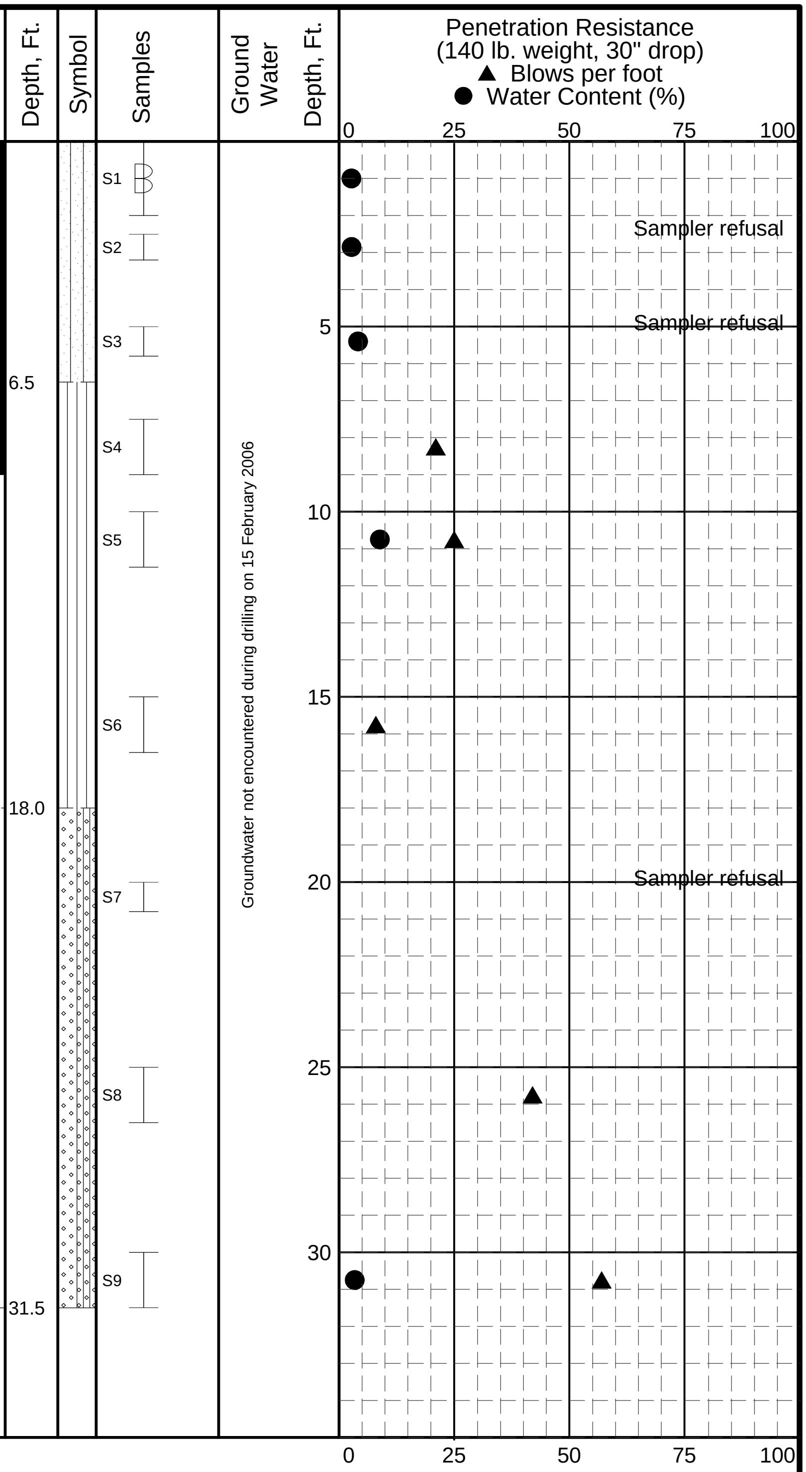
Dense to very dense, brown, slightly silty, gravelly SAND; moist

Drilling action and sampler refusal suggests boulder or cobble at 20.8 feet bgs

S9: 45% Gravel, 49% Sand, 6% Fines (F2)

31.5

Bottom of Boring
Boring Completed 15 February 2006



Groundwater not encountered during drilling on 15 February 2006

LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

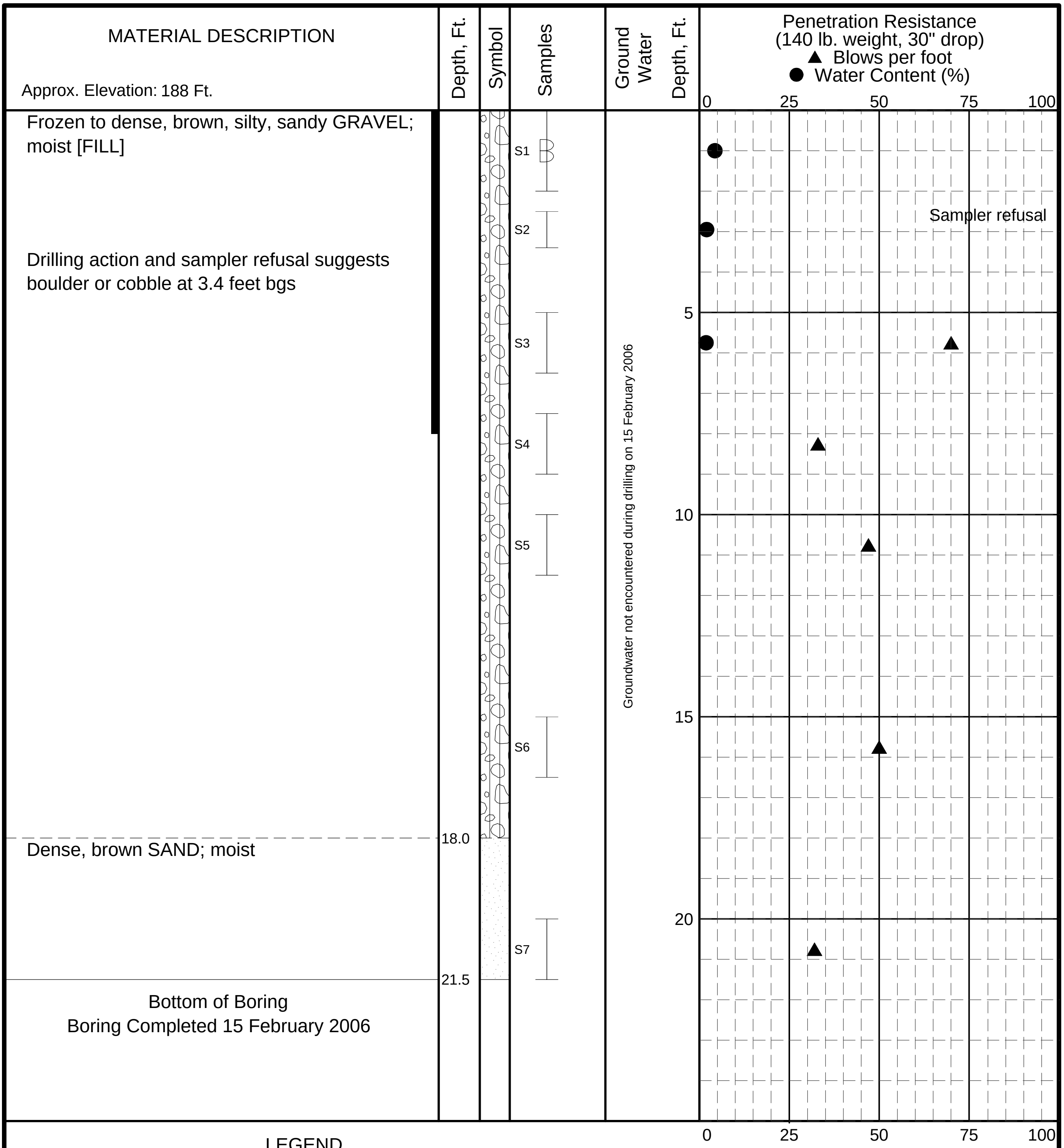
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-016
Station 190+11

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-19



Frozen to dense, brown, silty, sandy GRAVEL; moist [FILL]

Drilling action and sampler refusal suggests boulder or cobble at 3.4 feet bgs

Dense, brown SAND; moist

Bottom of Boring
Boring Completed 15 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-017
Station 194+96

March 2007 32-1-01536-003

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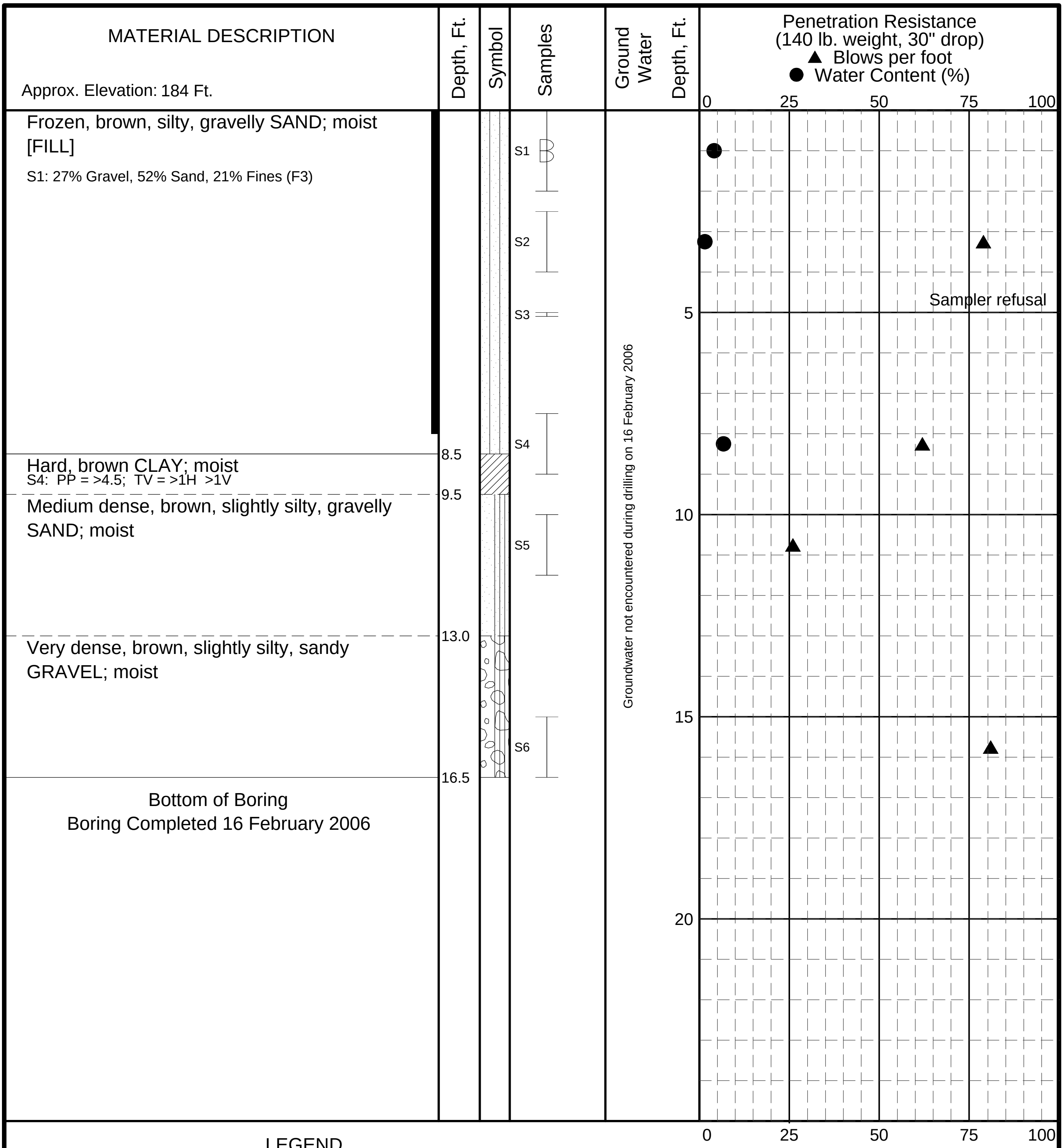
Geotechnical and Environmental Consultants

Fig. A-20



Approx. Elevation: 184 Ft.

Frozen, brown, silty, gravelly SAND; moist
[FILL]

S1: 27% Gravel, 52% Sand, 21% Fines (F3)

Hard, brown CLAY; moist
S4: PP = >4.5; TV = >1H >1V

Medium dense, brown, slightly silty, gravelly SAND; moist

Very dense, brown, slightly silty, sandy GRAVEL; moist

Bottom of Boring
Boring Completed 16 February 2006

LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-018
Station 209+90

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-21

MATERIAL DESCRIPTION

Approx. Elevation: 189 Ft.

Frozen, brown, silty, sandy GRAVEL; moist [FILL]

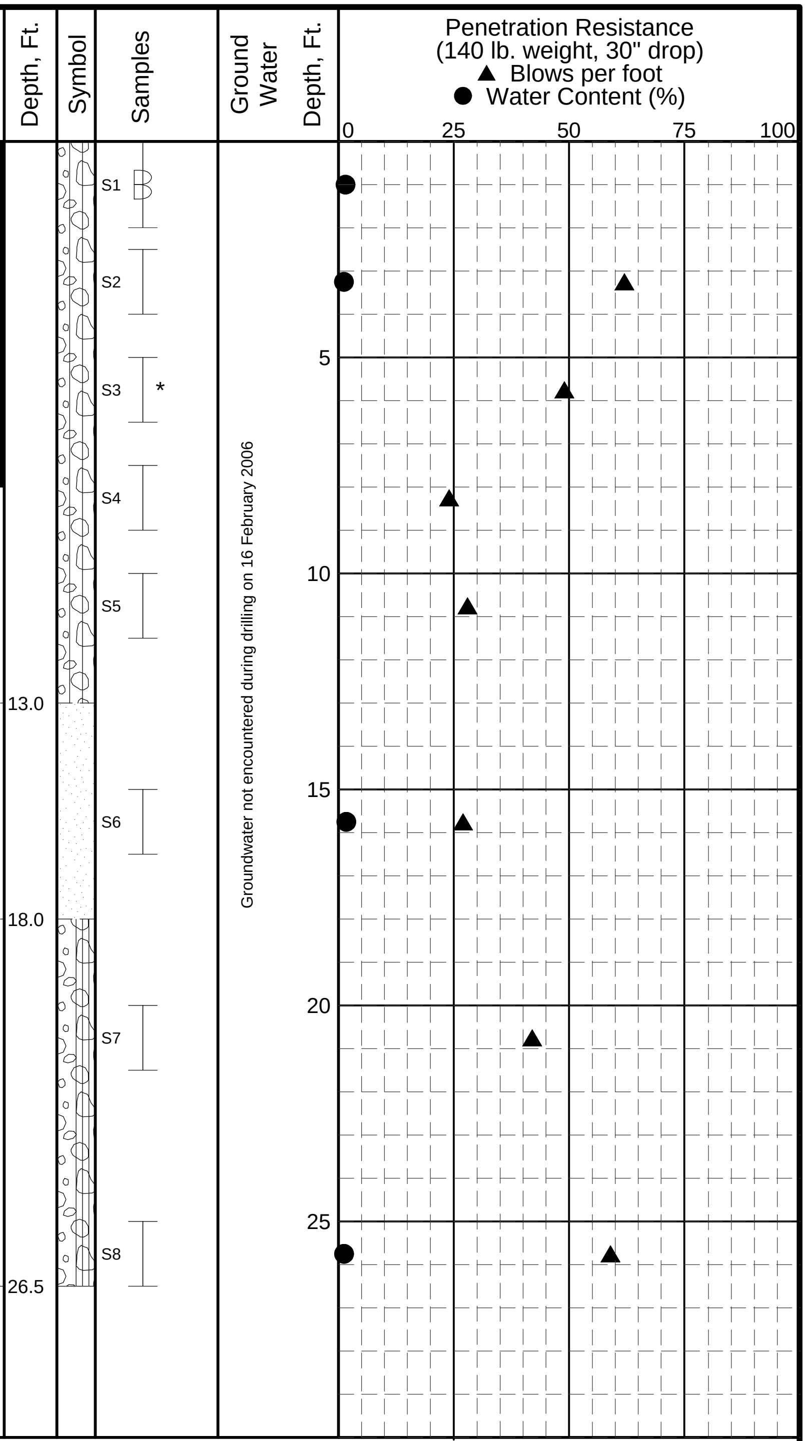
Medium dense, brown, gravelly SAND; moist

S6: 46% Gravel, 49% Sand, 4% Fines (F1)

Dense to very dense, brown, slightly silty, sandy GRAVEL; moist

S8: 55% Gravel, 38% Sand, 7% Fines (F1)

Bottom of Boring
Boring Completed 16 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
ᗸ Bulk Sample
▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

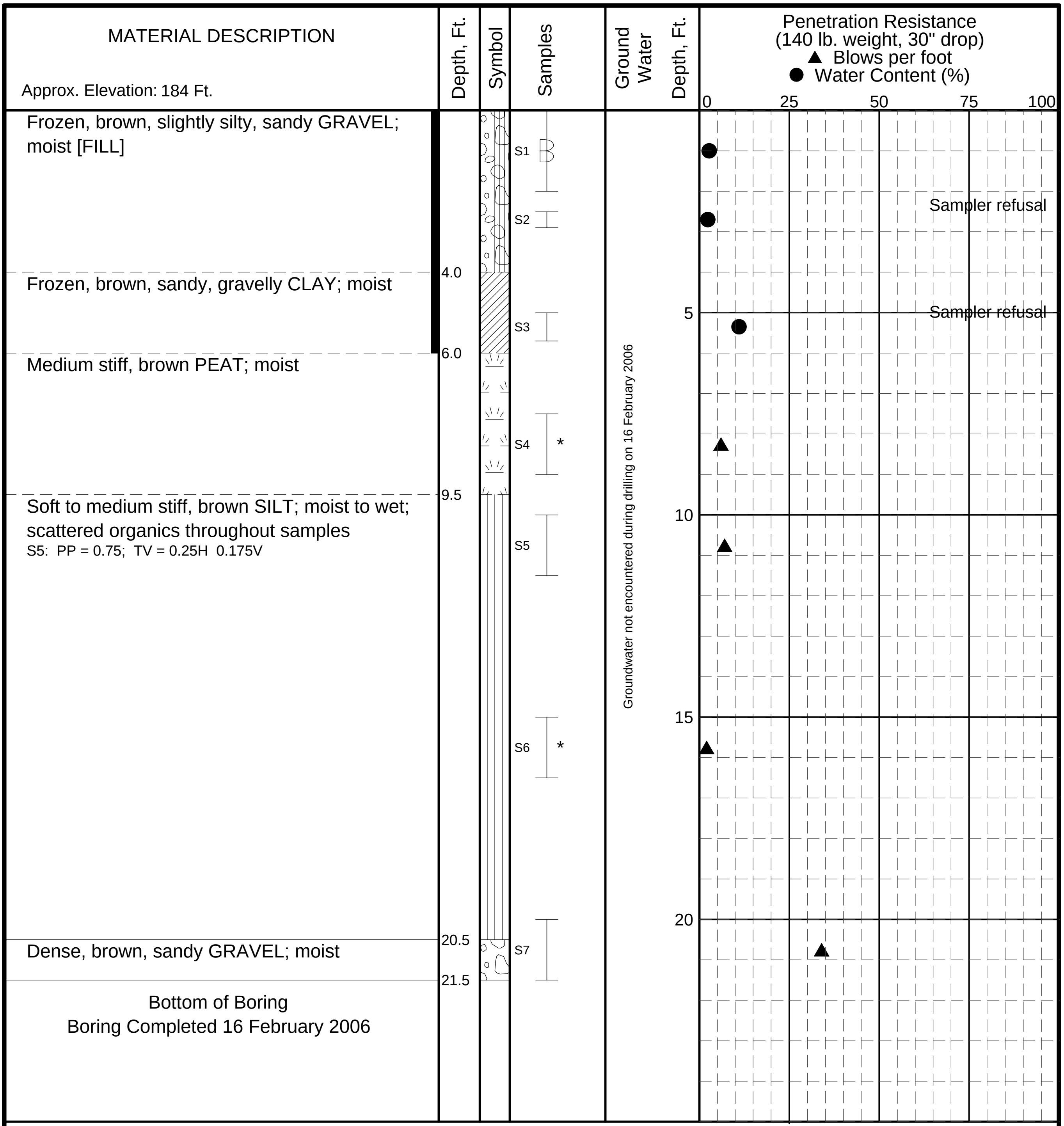
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-019
Station 214+59

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-22



MATERIAL DESCRIPTION

Approx. Elevation: 184 Ft.

Frozen, brown, slightly silty, sandy GRAVEL; moist [FILL]

4.0 Frozen, brown, sandy, gravelly CLAY; moist

6.0 Medium stiff, brown PEAT; moist

9.5 Soft to medium stiff, brown SILT; moist to wet; scattered organics throughout samples
S5: PP = 0.75; TV = 0.25H 0.175V

20.5 Dense, brown, sandy GRAVEL; moist

21.5

Bottom of Boring
Boring Completed 16 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- ⌶ 3" O.D. Split Spoon Sample
- ⌶ Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

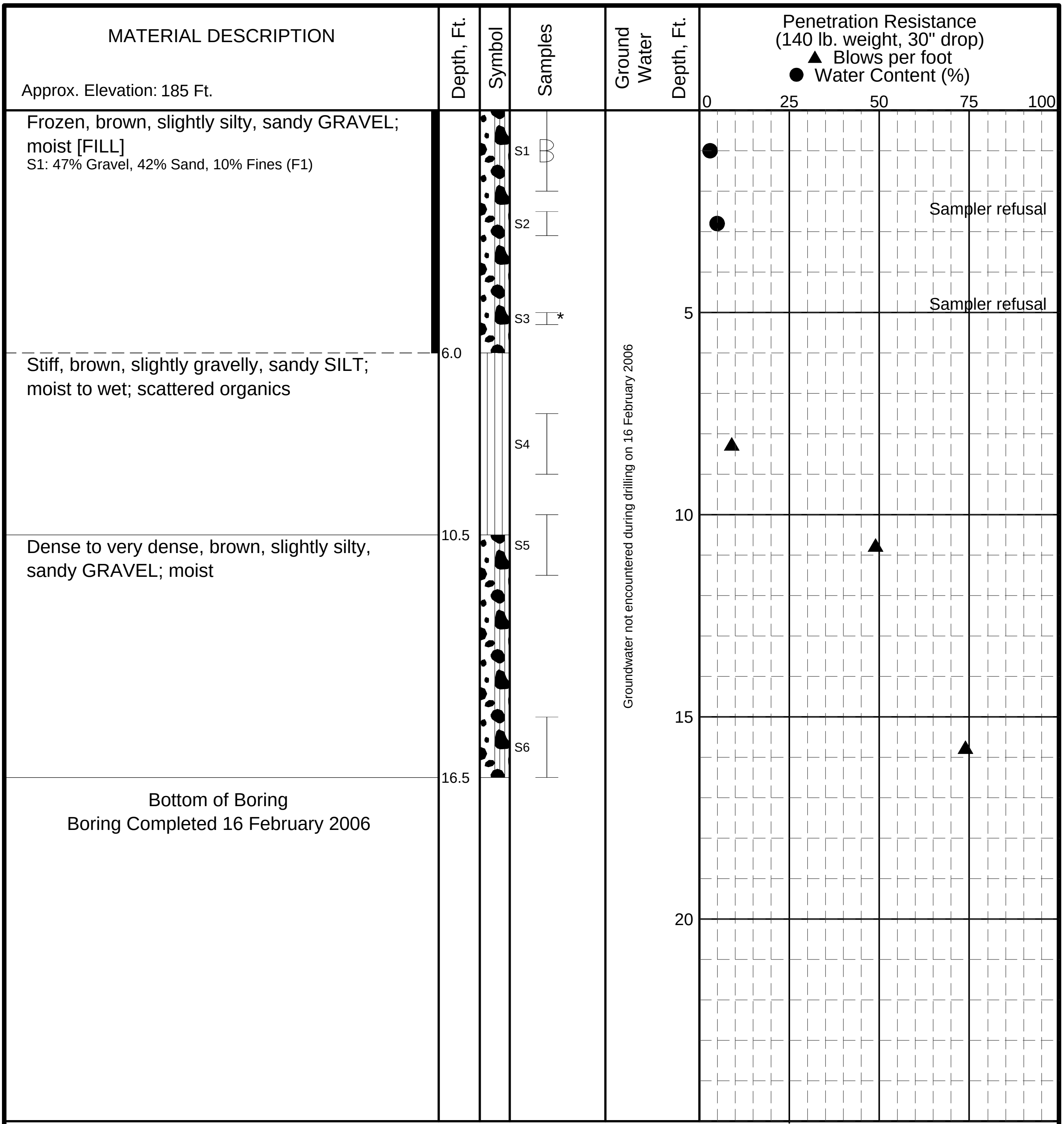
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-020
Station 219+93

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-23



Approx. Elevation: 185 Ft.

Frozen, brown, slightly silty, sandy GRAVEL; moist [FILL]
S1: 47% Gravel, 42% Sand, 10% Fines (F1)

Stiff, brown, slightly gravelly, sandy SILT; moist to wet; scattered organics

Dense to very dense, brown, slightly silty, sandy GRAVEL; moist

Bottom of Boring
Boring Completed 16 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

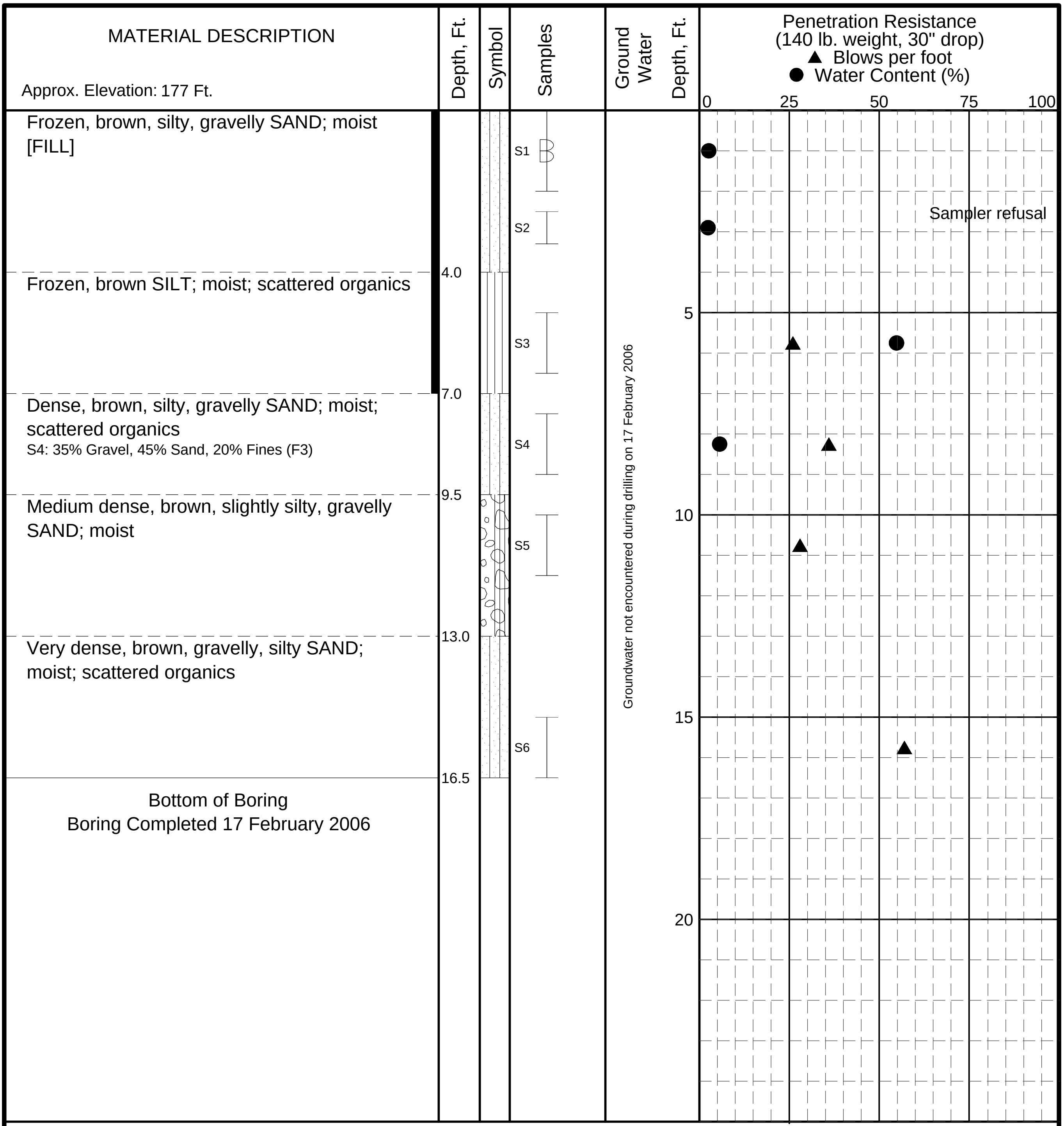
LOG OF BORING B-021
Station 226+42

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-24

MATERIAL DESCRIPTION Approx. Elevation: 177 Ft.	Depth, Ft.
Frozen, brown, silty, gravelly SAND; moist [FILL]	
Frozen, brown SILT; moist; scattered organics	4.0
Dense, brown, silty, gravelly SAND; moist; scattered organics S4: 35% Gravel, 45% Sand, 20% Fines (F3)	7.0
Medium dense, brown, slightly silty, gravelly SAND; moist	9.5
Very dense, brown, gravelly, silty SAND; moist; scattered organics	13.0
Bottom of Boring Boring Completed 17 February 2006	16.5



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

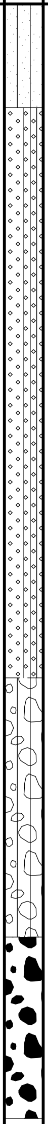
LOG OF BORING B-022
Station 230+24

March 2007
32-1-01536-003

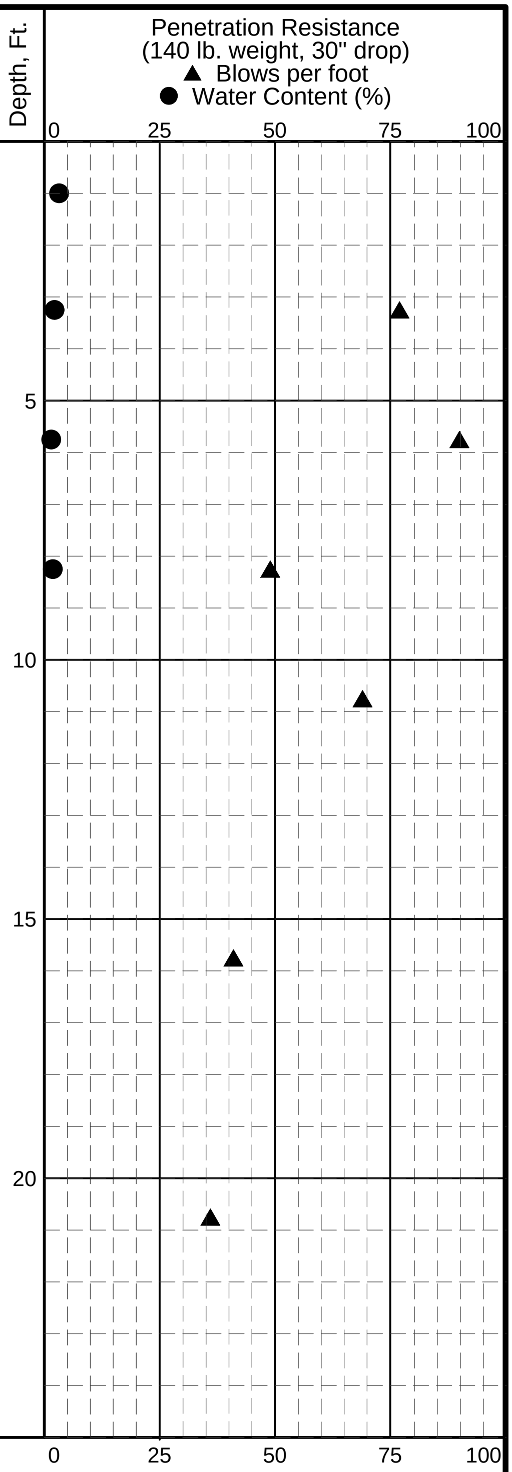
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-25

MATERIAL DESCRIPTION Approx. Elevation: 199 Ft.	Depth, Ft.	Samples
Frozen, brown, silty, gravelly SAND; moist [FILL]		S1
Frozen to dense to very dense, brown, slightly silty, gravelly SAND; moist S4: 41% Gravel, 47% Sand, 12% Fines (F2)	2.0	S2 S3 S4 S5
Dense, brown, sandy, silty GRAVEL; moist	13.0	S6
Dense, brown, sandy GRAVEL; moist	18.0	S7
Bottom of Boring Boring Completed 17 February 2006	21.5	



Ground Water: Groundwater not encountered during drilling on 17 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-023
Station 239+76

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-26

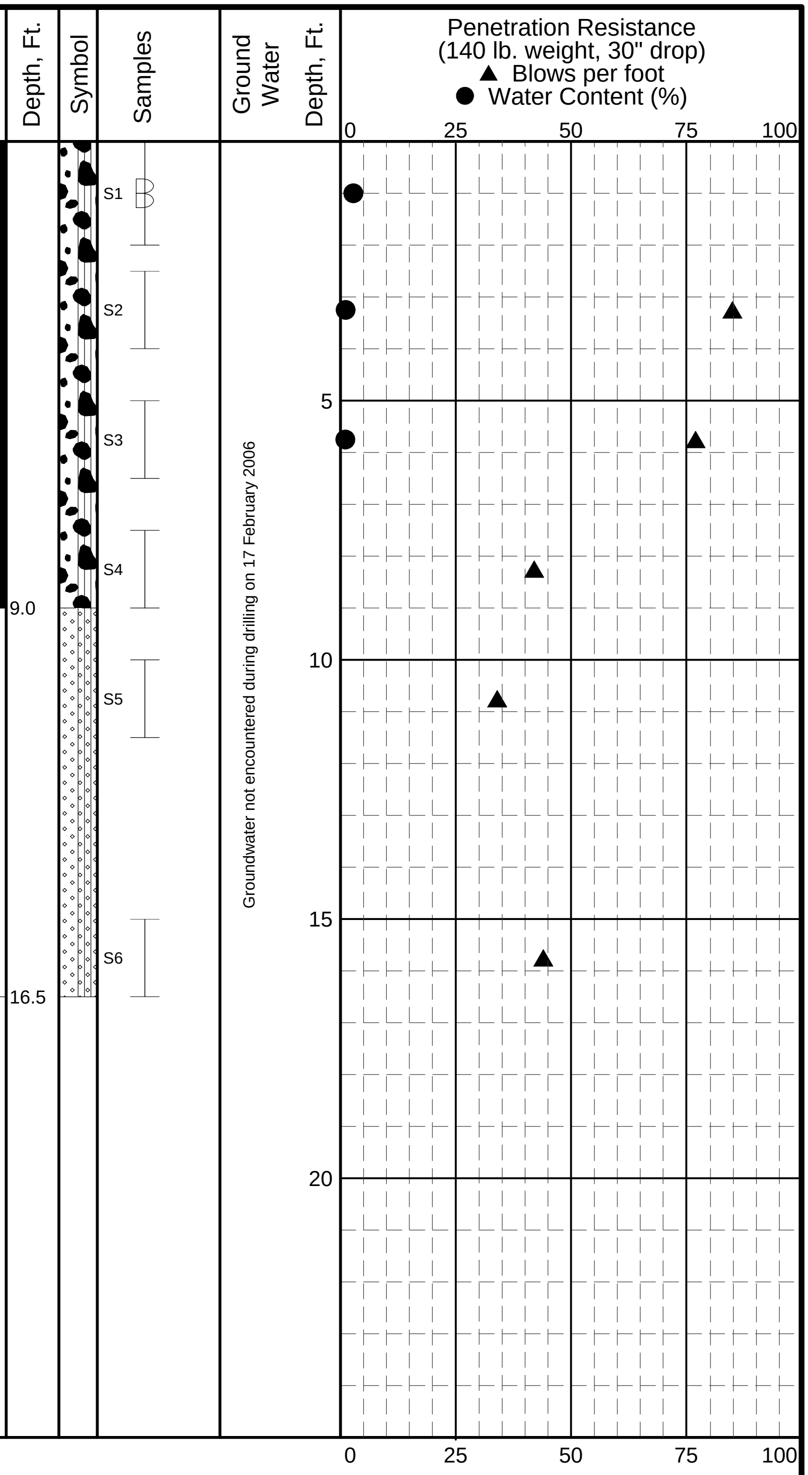
MATERIAL DESCRIPTION

Approx. Elevation: 193 Ft.

Frozen, brown, slightly silty, sandy GRAVEL; moist [FILL]

Dense, brown, slightly silty, gravelly SAND; moist

Bottom of Boring
Boring Completed 17 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-024
Station 254+77

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-27

MATERIAL DESCRIPTION

Approx. Elevation: 182 Ft.

Frozen, brown, slightly silty, sandy GRAVEL; moist [FILL]

S3: 52% Gravel, 38% Sand, 10% Fines (F1)

6.0

Very dense, brown, silty, sandy GRAVEL; moist

9.0

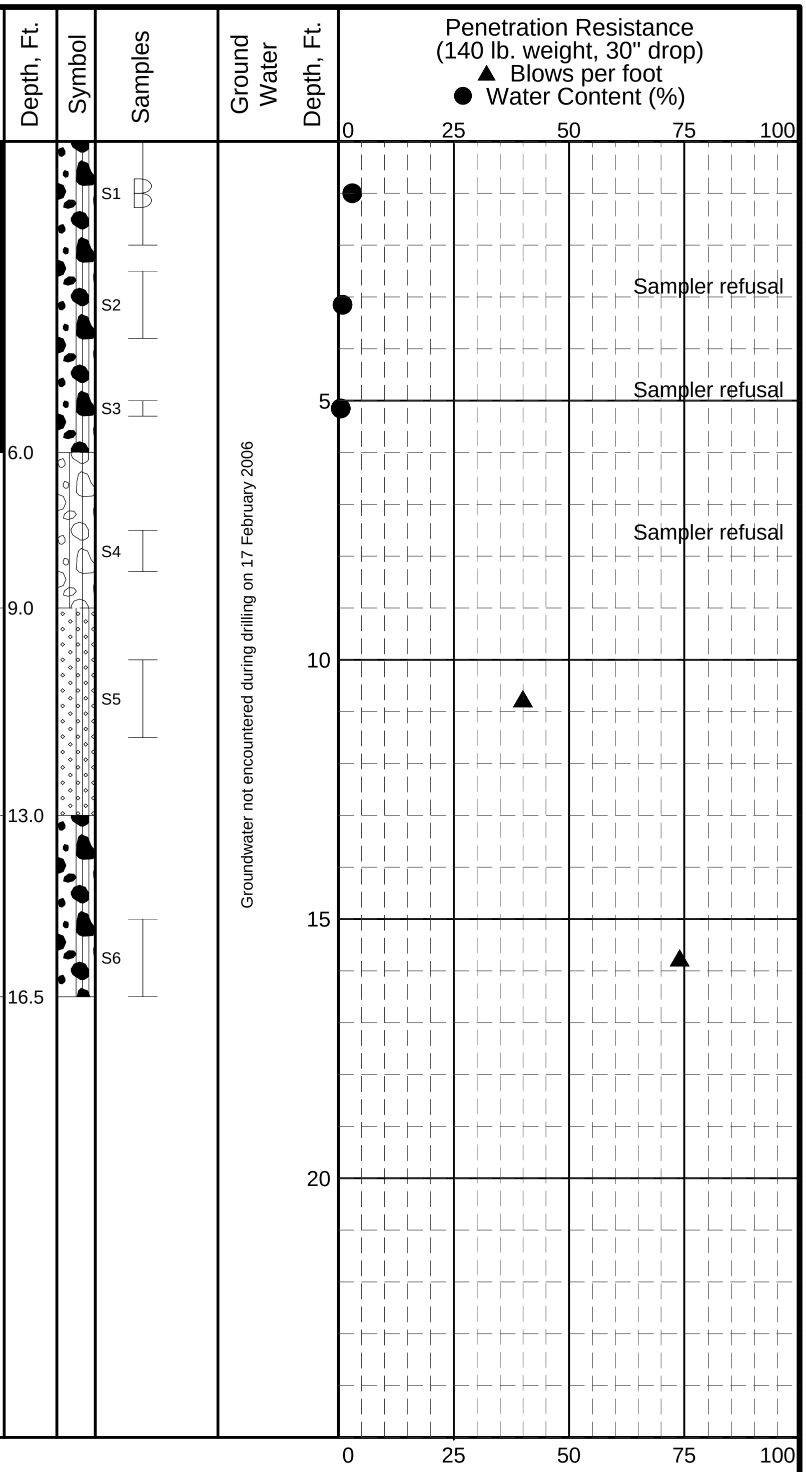
Dense, brown, slightly silty, gravelly SAND; moist

13.0

Very dense, brown, slightly silty, sandy GRAVEL; moist

16.5

Bottom of Boring
Boring Completed 17 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

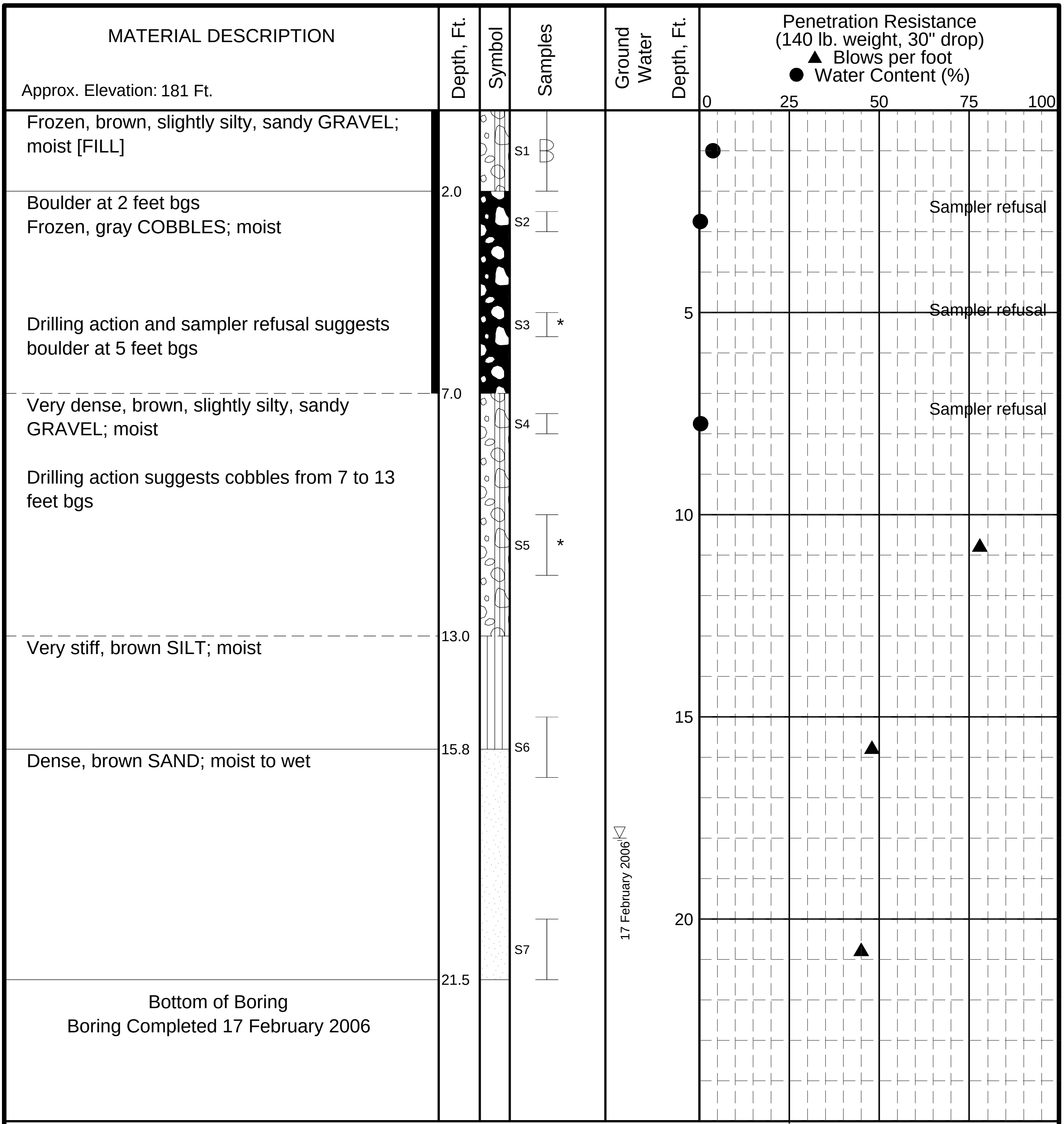
LOG OF BORING B-025
Station 273+76

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-28

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07



Frozen, brown, slightly silty, sandy GRAVEL; moist [FILL]

Boulder at 2 feet bgs
Frozen, gray COBBLES; moist

Drilling action and sampler refusal suggests boulder at 5 feet bgs

Very dense, brown, slightly silty, sandy GRAVEL; moist

Drilling action suggests cobbles from 7 to 13 feet bgs

Very stiff, brown SILT; moist

Dense, brown SAND; moist to wet

Bottom of Boring
Boring Completed 17 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- ⌶ Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

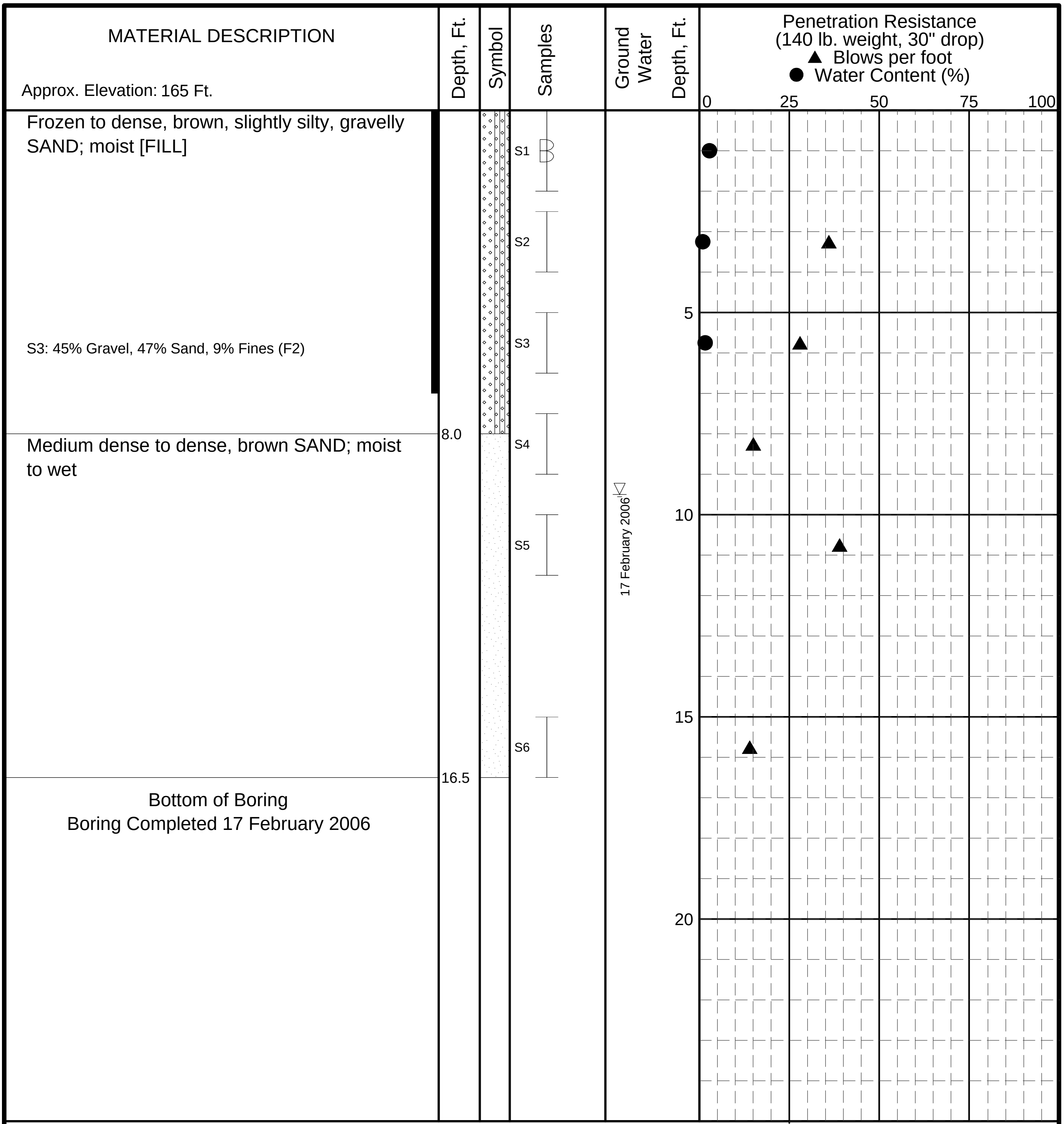
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-026
Station 284+81

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-29



Frozen to dense, brown, slightly silty, gravelly SAND; moist [FILL]

S3: 45% Gravel, 47% Sand, 9% Fines (F2)

Medium dense to dense, brown SAND; moist to wet

Bottom of Boring
Boring Completed 17 February 2006

LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
∇	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-027
Station 289+52

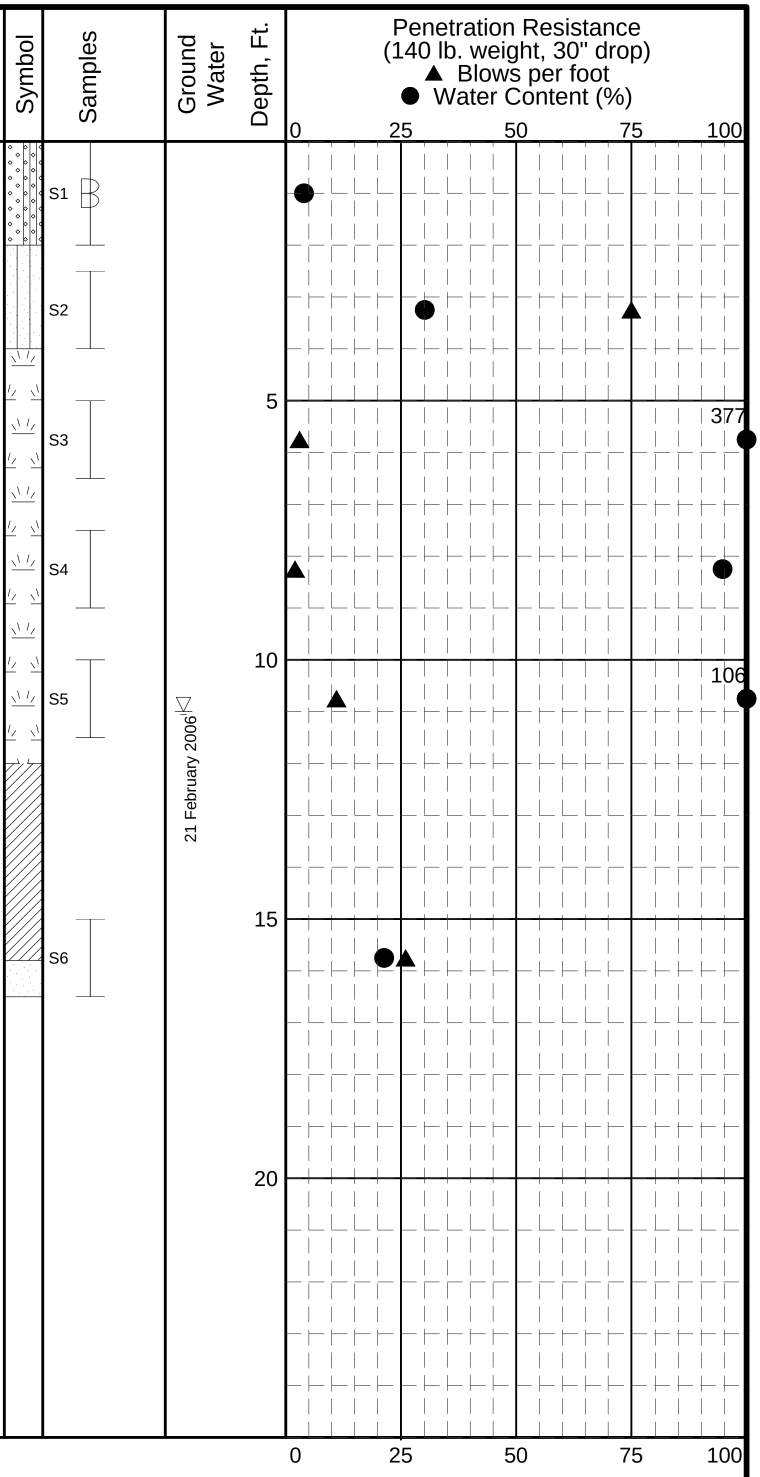
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-30

Approx. Elevation: 162 Ft.

MATERIAL DESCRIPTION	Depth, Ft.
Frozen, brown, slightly silty, gravelly SAND; moist [FILL]	
Frozen, brown, gravelly, silty SAND; moist; numerous organics	2.0
Frozen to stiff, brown, PEAT; moist to wet	4.0
Very stiff, gray CLAY; moist to wet S6: PP = 2.5; TV = 0.8H 0.75V	12.0
Medium dense, gray SAND; wet	15.8
Bottom of Boring Boring Completed 21 February 2006	16.5



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
■ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-028
Station 295+05

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-31

MATERIAL DESCRIPTION

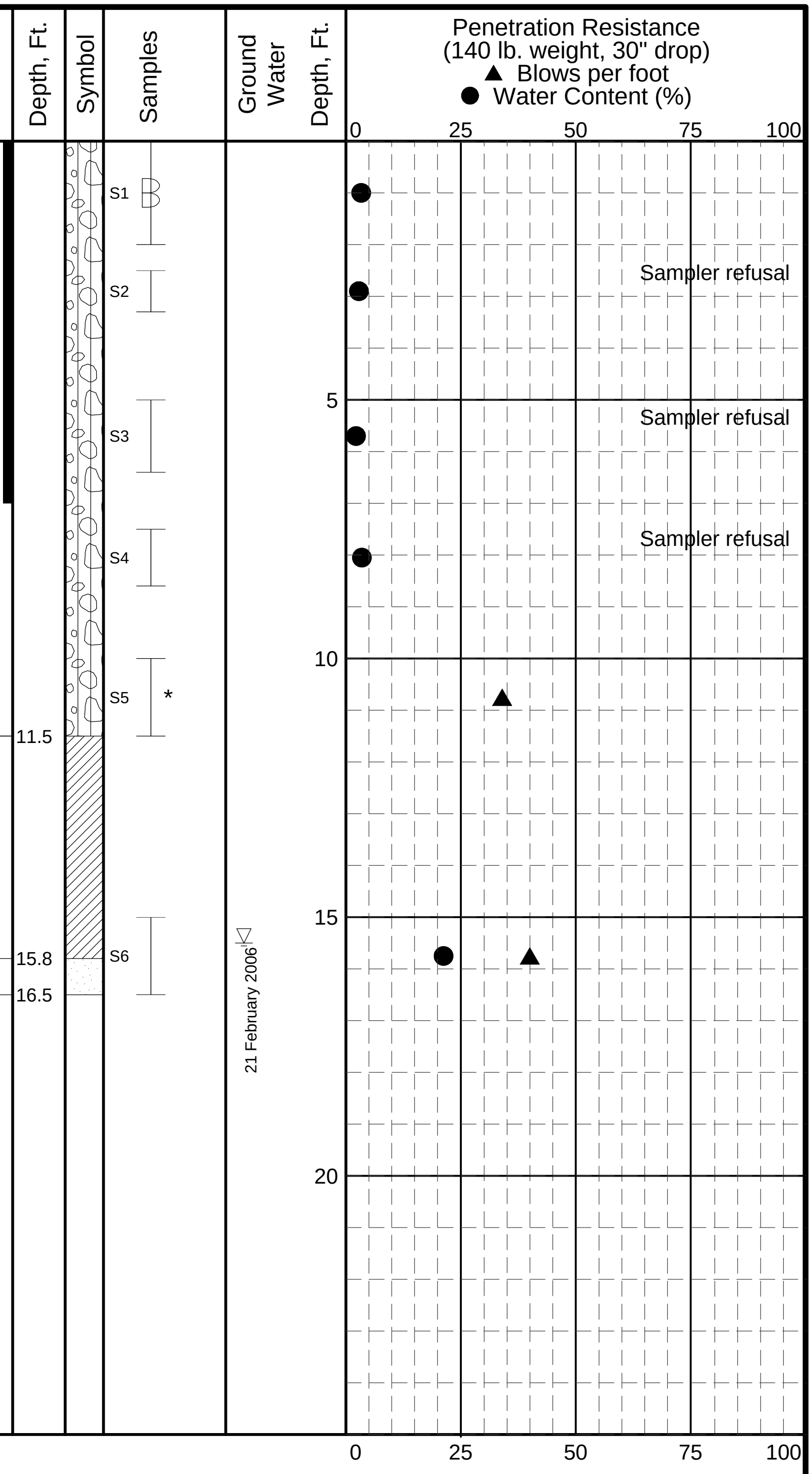
Approx. Elevation: 167 Ft.

Frozen to dense to very dense, brown, silty, sandy GRAVEL; moist [FILL]
S1: 43% Gravel, 43% Sand, 14% Fines (F2)

Hard, gray, slighty sandy CLAY; moist to wet

Dense, gray SAND; wet

Bottom of Boring
Boring Completed 21 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-029
Station 299+72

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-32

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION

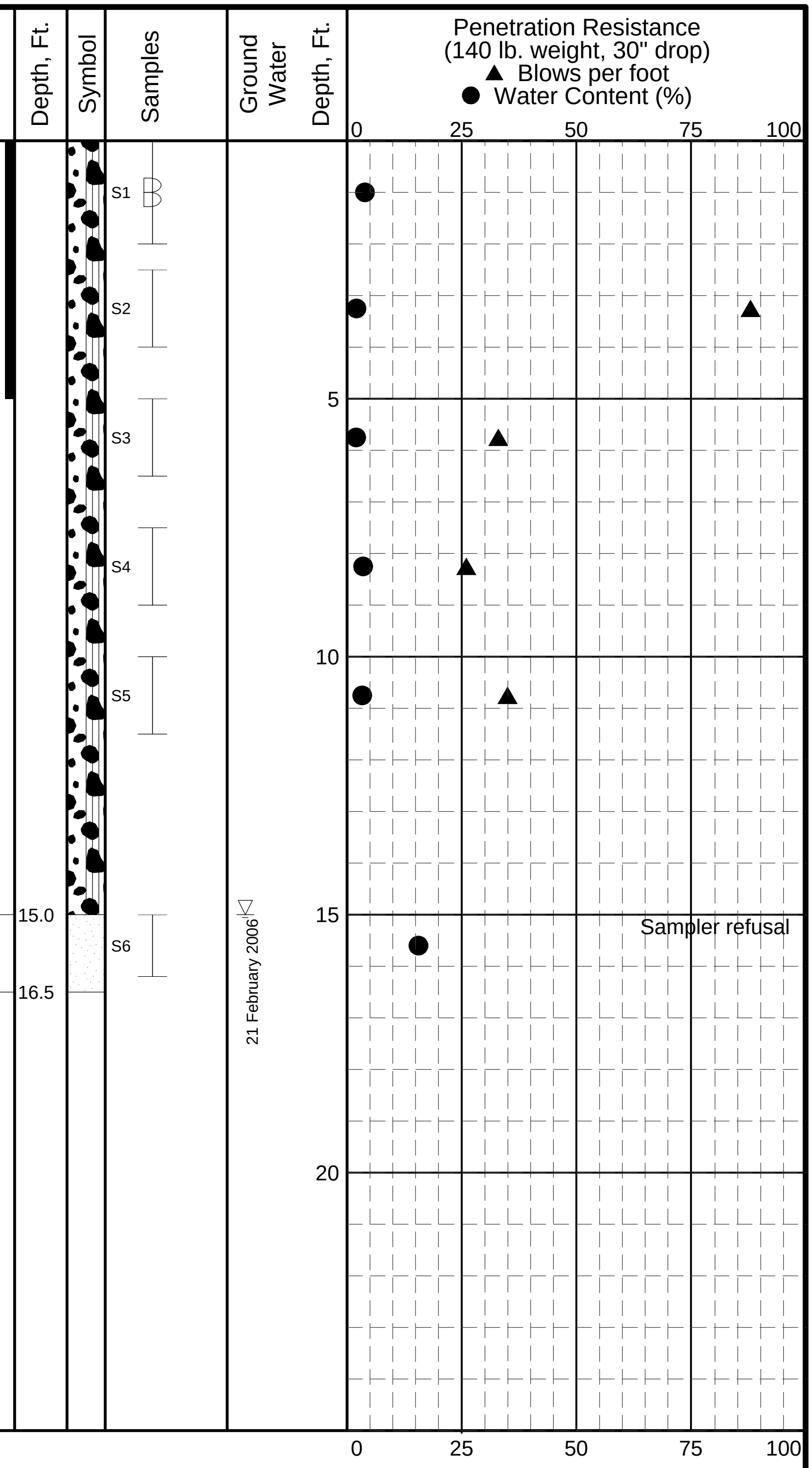
Approx. Elevation: 168 Ft.

Frozen to medium dense to dense, brown, slightly silty, sandy GRAVEL; moist [FILL]

S2: 46% Gravel, 44% Sand, 10% Fines (F1)

Very dense, brown SAND; wet

Bottom of Boring
Boring Completed 21 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

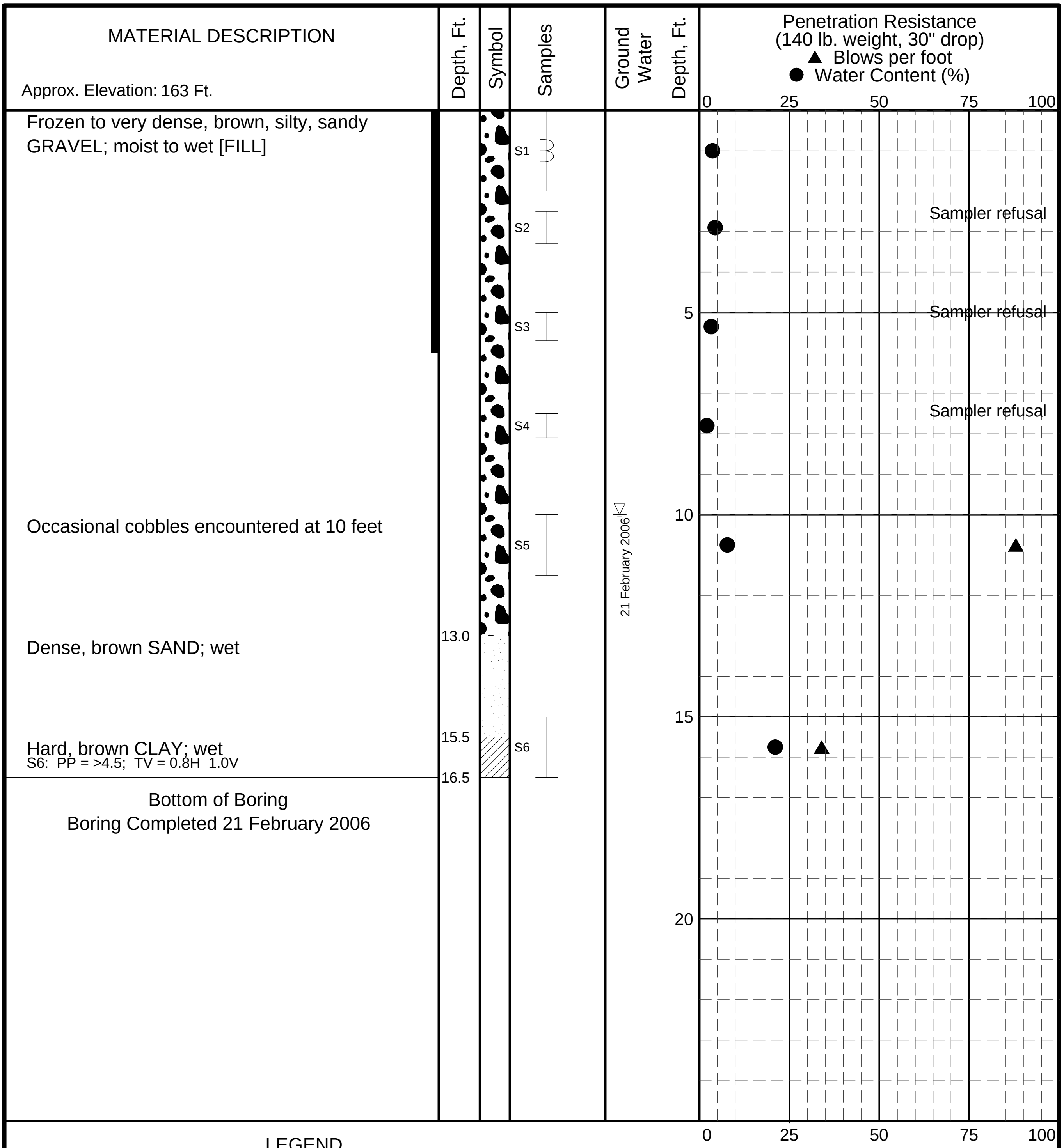
LOG OF BORING B-030
Station 304+15

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-33

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07



Frozen to very dense, brown, silty, sandy GRAVEL; moist to wet [FILL]

Occasional cobbles encountered at 10 feet

Dense, brown SAND; wet

Hard, brown CLAY; wet
S6: PP = >4.5; TV = 0.8H 1.0V

Bottom of Boring
Boring Completed 21 February 2006

LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-031
Station 314+90

March 2007
32-1-01536-003

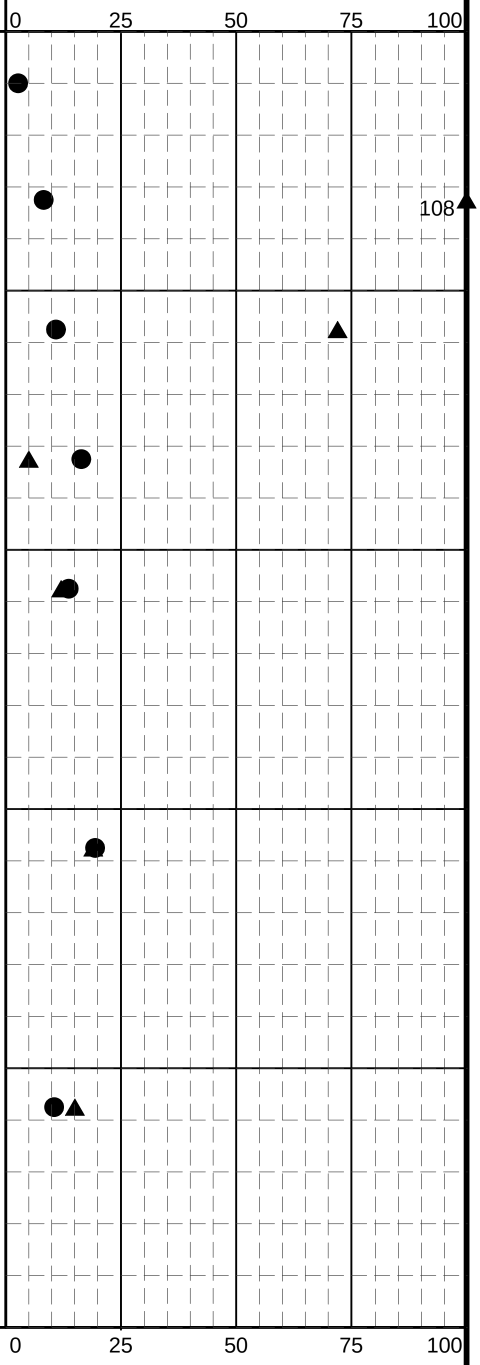
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-34

MATERIAL DESCRIPTION Approx. Elevation: 188 Ft.	Depth, Ft.	Samples
Frozen, brown, silty, gravelly SAND; moist [FILL]		S1
Frozen to medium stiff, brown, gravelly, sandy SILT; moist; scattered organics S4: PP = 2.5; TV = 0.25H	2.0	S2 S3 S4
Medium dense, brown, clayey SAND; moist; occasional organics	9.0	S5 S6
Medium dense, brown SAND; moist	18.0	
Very stiff, brown CLAY; moist	20.8	S7
Bottom of Boring Boring Completed 21 February 2006	21.5	

Groundwater not encountered during drilling on 21 February 2006

Penetration Resistance
(140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
⊽	Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |——●——| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-032
Station 319+93

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-35

MATERIAL DESCRIPTION

Approx. Elevation: 202 Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]

Frozen to medium dense, brown, gravelly, silty SAND; moist

Dense, brown, gravelly, silty SAND; moist

S5: 15% Gravel, 38% Sand, 47% Fines (F3)

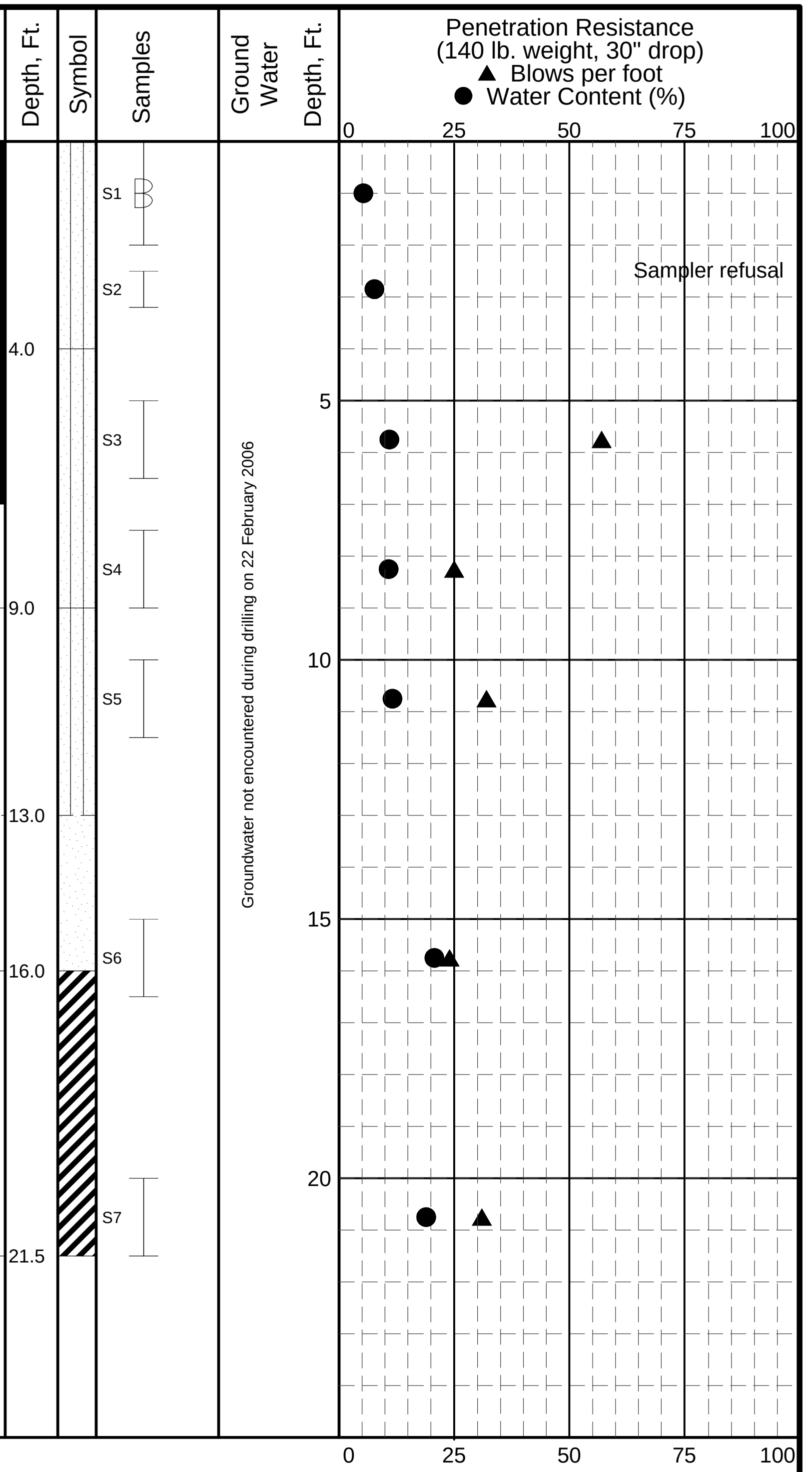
Medium dense, brown SAND; wet

Very stiff to hard, brown CLAY; wet

S6: PP = >4.5

S7: PP = 4.0; TV = 0.8H 0.8V

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ш 3" O.D. Split Spoon Sample
ß Bulk Sample
▮ Frozen

⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-033
Station 324+74

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-36

MATERIAL DESCRIPTION

Approx. Elevation: 197 Ft.

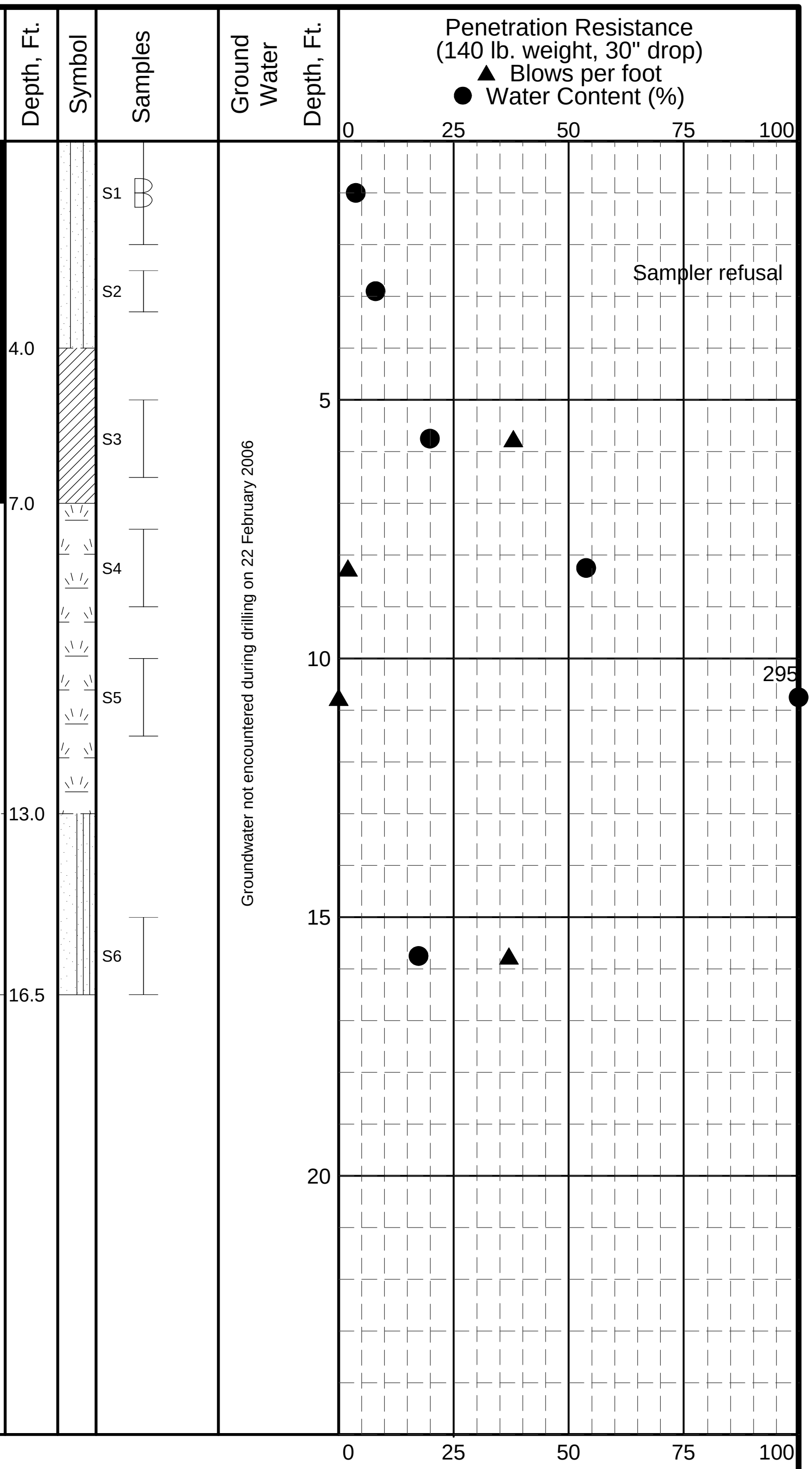
Frozen, brown, silty, gravelly SAND; moist [FILL]
S1: 29% Gravel, 54% Sand, 17% Fines (F2)

Frozen, gray, gravelly, sandy CLAY; moist

Very soft, brown PEAT; moist

Dense, gray SAND interbedded with gray, sandy clay; moist

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

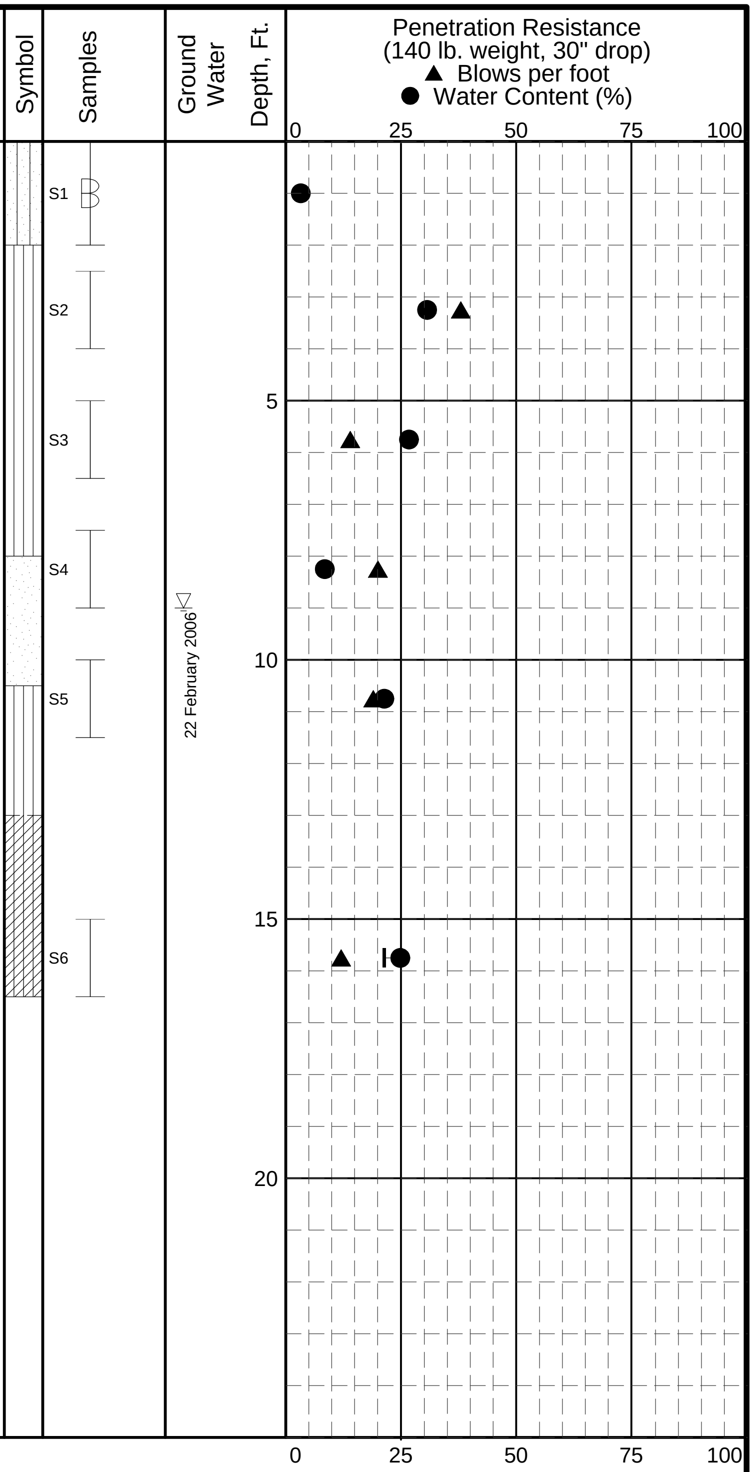
LOG OF BORING B-034
Station 329+76

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-37

MATERIAL DESCRIPTION Approx. Elevation: 207 Ft.	Depth, Ft.
Frozen, brown, silty, gravelly SAND; moist [FILL]	2.0
Frozen to stiff, brown, slightly sandy SILT; moist S2: 88% Fines (F4)	8.0
Medium dense, brown SAND; moist to wet	10.5
Very stiff, brown, sandy SILT; wet	13.0
Stiff, gray, silty CLAY; moist to wet S6: PP = 1.5-2.25; TV = 0.5H 0.5V	16.5
Bottom of Boring Boring Completed 22 February 2006	



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-035
Station 339+97

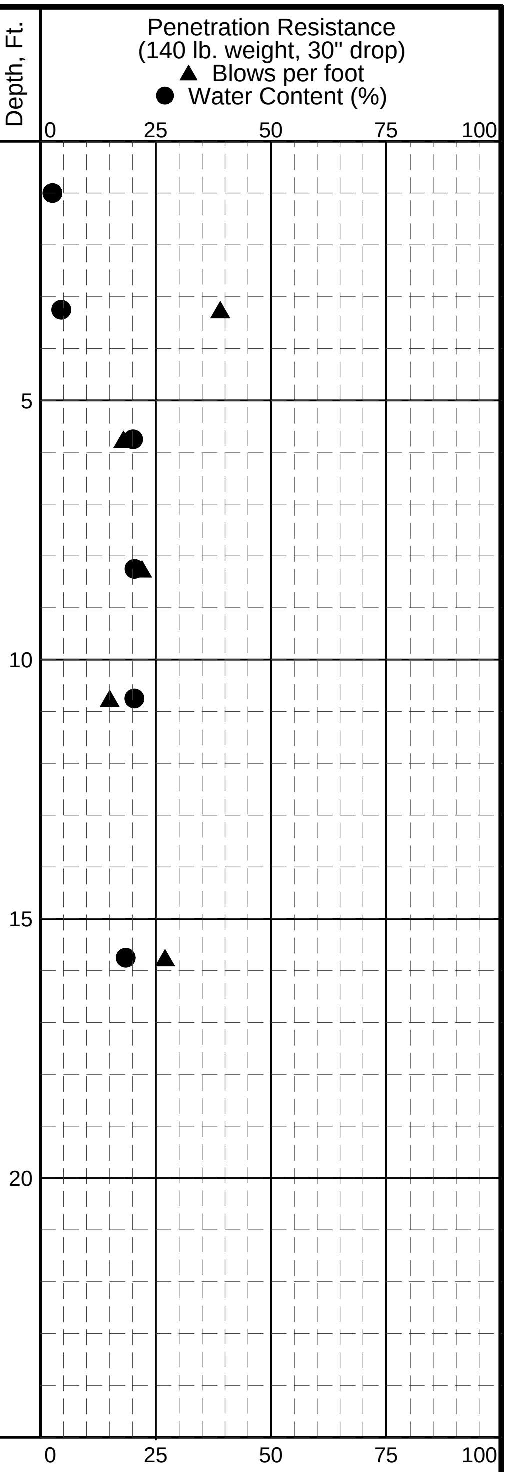
March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-38

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION Approx. Elevation: 189 Ft.	Depth, Ft.	Symbol	Samples	Ground Water
Frozen, brown, silty, gravelly SAND; moist [FILL]		█	S1	Groundwater not encountered during drilling on 22 February 2006
Dense, brown, slightly silty, SAND; moist	2.0		S2	
Very stiff, brown, sandy SILT; moist S3: 69% Fines (F4)	4.0		S3	
Stiff to very stiff, brown, slightly sandy, clayey SILT; moist S4: PP = 0.5 3 inch thick layer of brown sand at 11 feet bgs	7.0		S4 S5	
Very stiff, gray to brown, slightly gravelly, sandy SILT; moist S6: PP = silt 2.0, clay >4.5	13.0		S6	
Hard, gray CLAY; moist	16.0			
Bottom of Boring Boring Completed 22 February 2006	16.5			



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- █ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-036
Station 350+05

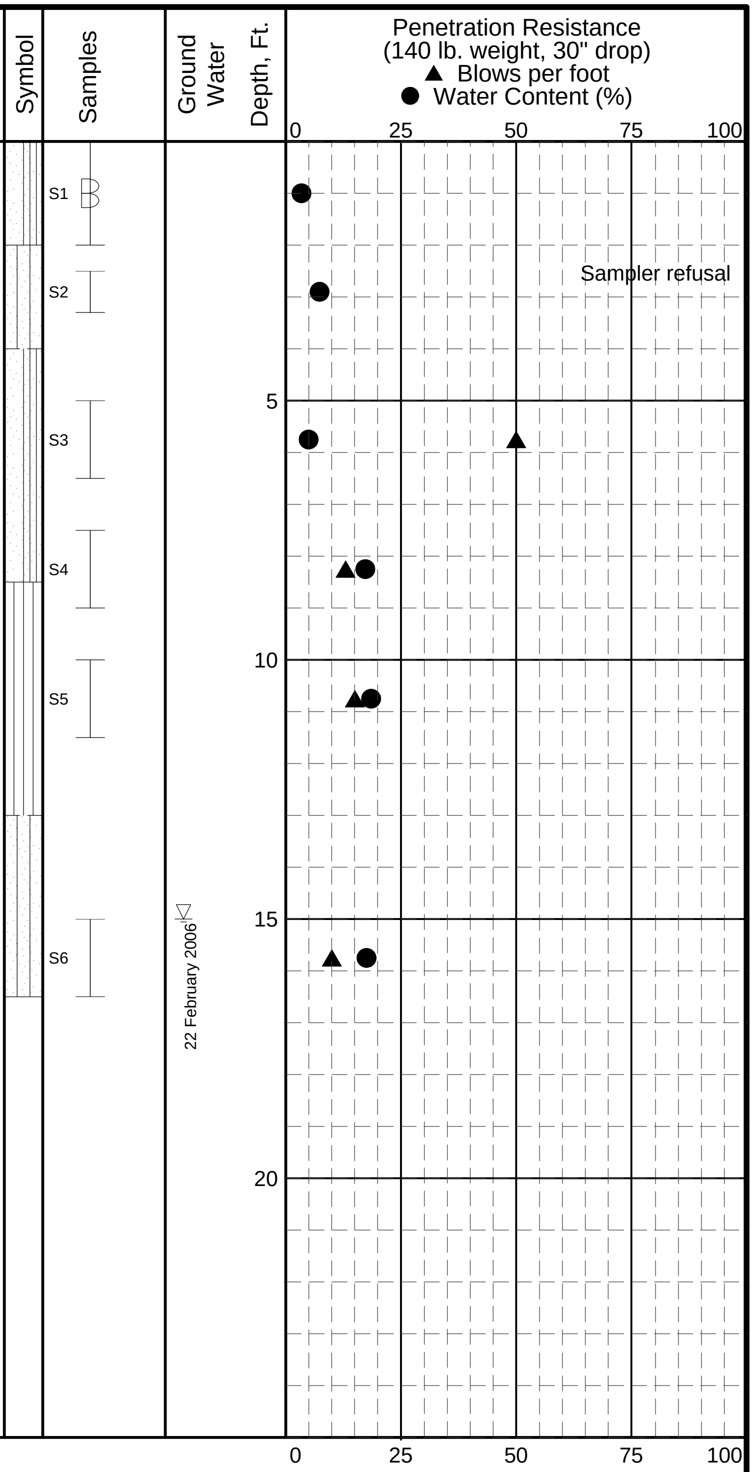
March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-39

MATERIAL DESCRIPTION Approx. Elevation: 181 Ft.	Depth, Ft.
Frozen, brown, slightly silty, slightly gravelly SAND; moist [FILL]	2.0
Very dense, brown, silty, gravelly SAND; moist [FILL] S2: 28% Gravel, 46% Sand, 25% Fines (F3)	4.0
Stiff to hard, brown, sandy SILT interbedded with medium dense to dense, brown SAND; moist	8.5
Stiff, brown, sandy SILT; moist S5: PP = 2.25	13.0
Medium dense, brown, silty SAND; moist to wet	16.5

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- Ᵽ Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-037
Station 359+97

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-40

MATERIAL DESCRIPTION

Approx. Elevation: 171 Ft.

Frozen, brown, silty, sandy GRAVEL; moist [FILL]

Frozen to stiff to very stiff, brown, slightly gravelly, sandy SILT; moist to wet
S2: 78% Fines (F4)

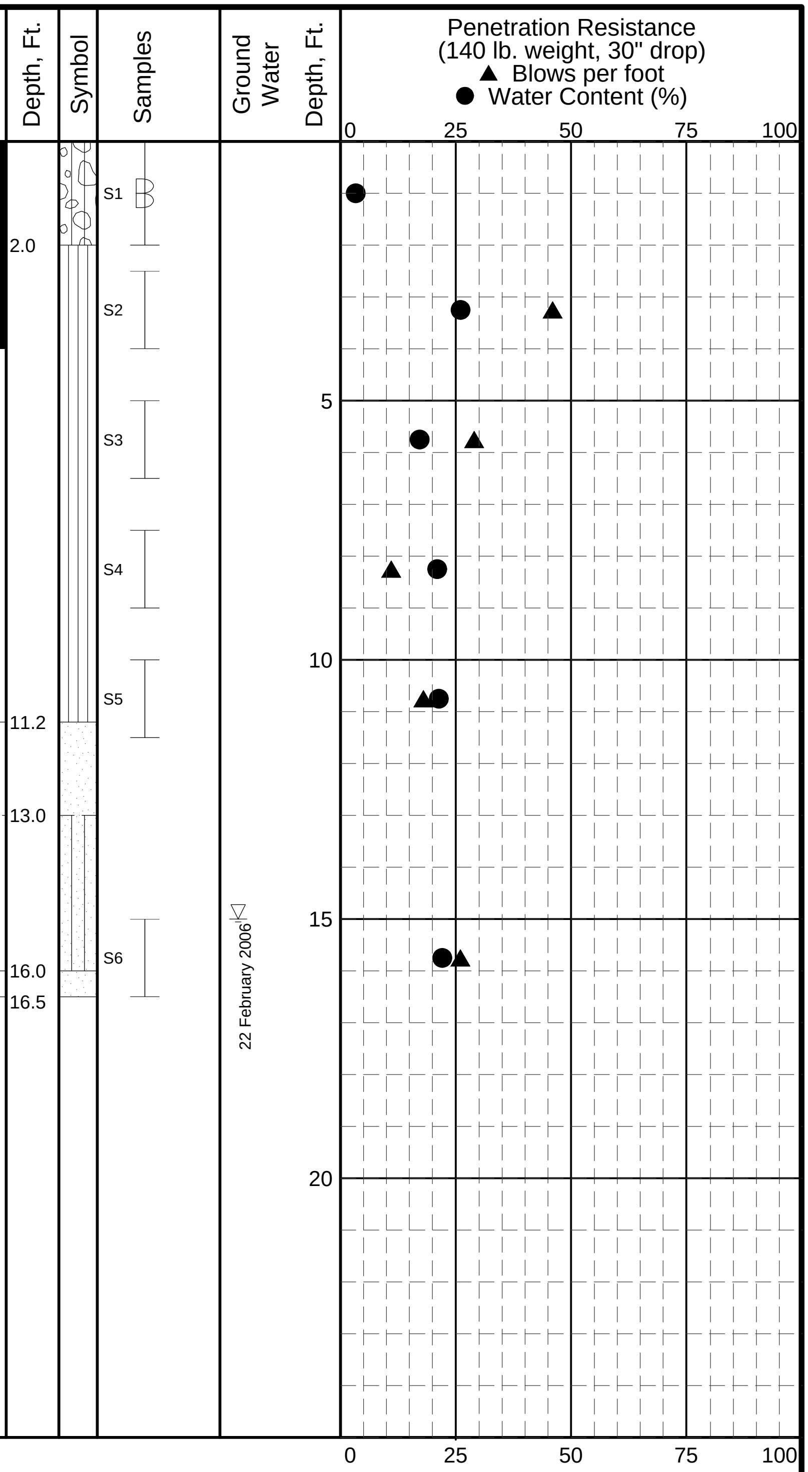
S3: 5% Gravel, 42% Sand, 53% Fines (F4)

Medium dense, brown SAND; moist

Medium dense, brown, silty SAND; moist to wet

Medium dense, brown SAND; wet

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
∇	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

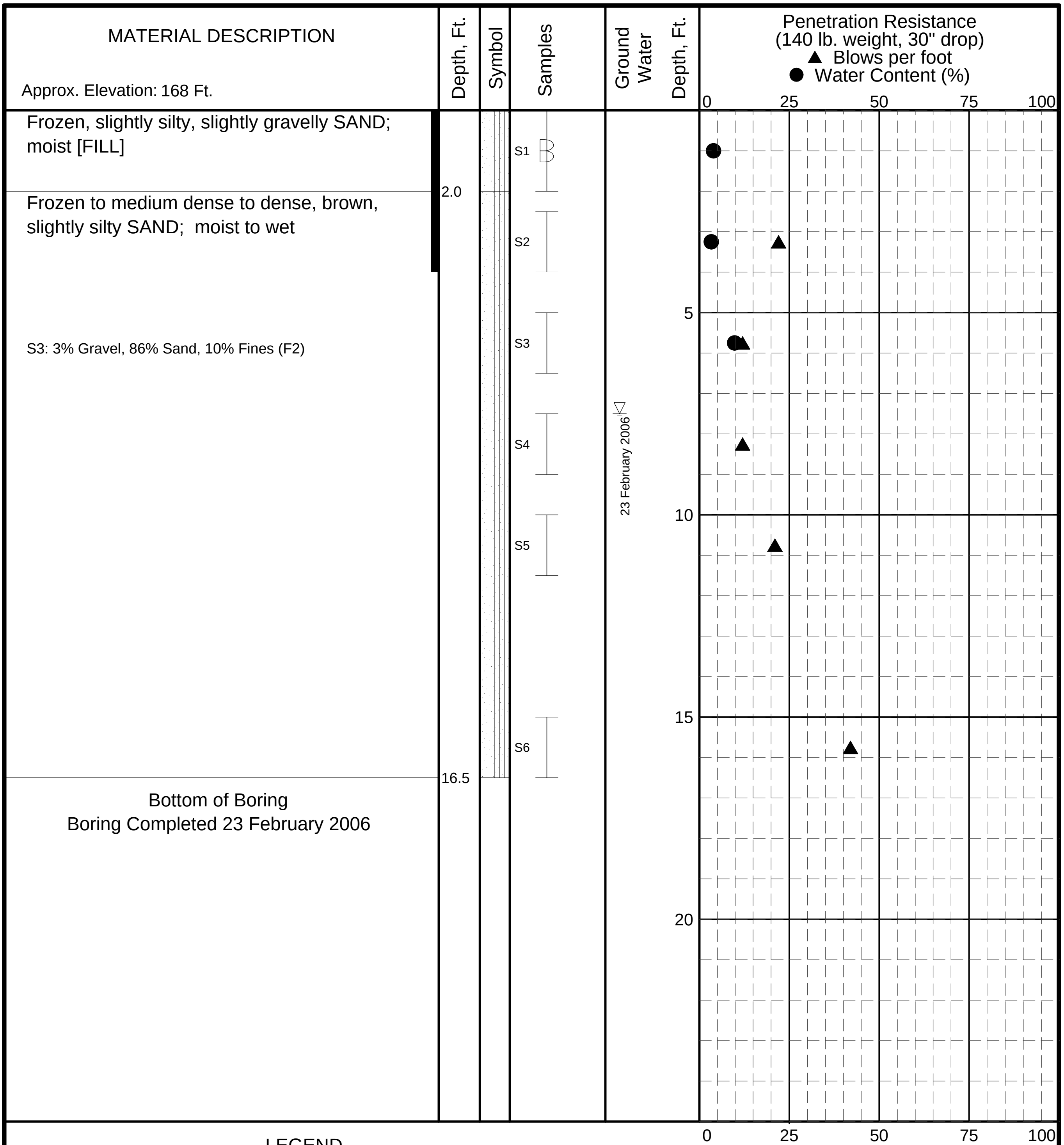
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-038
Station 364+78

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-41



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-039
Station 372+26

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-42

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

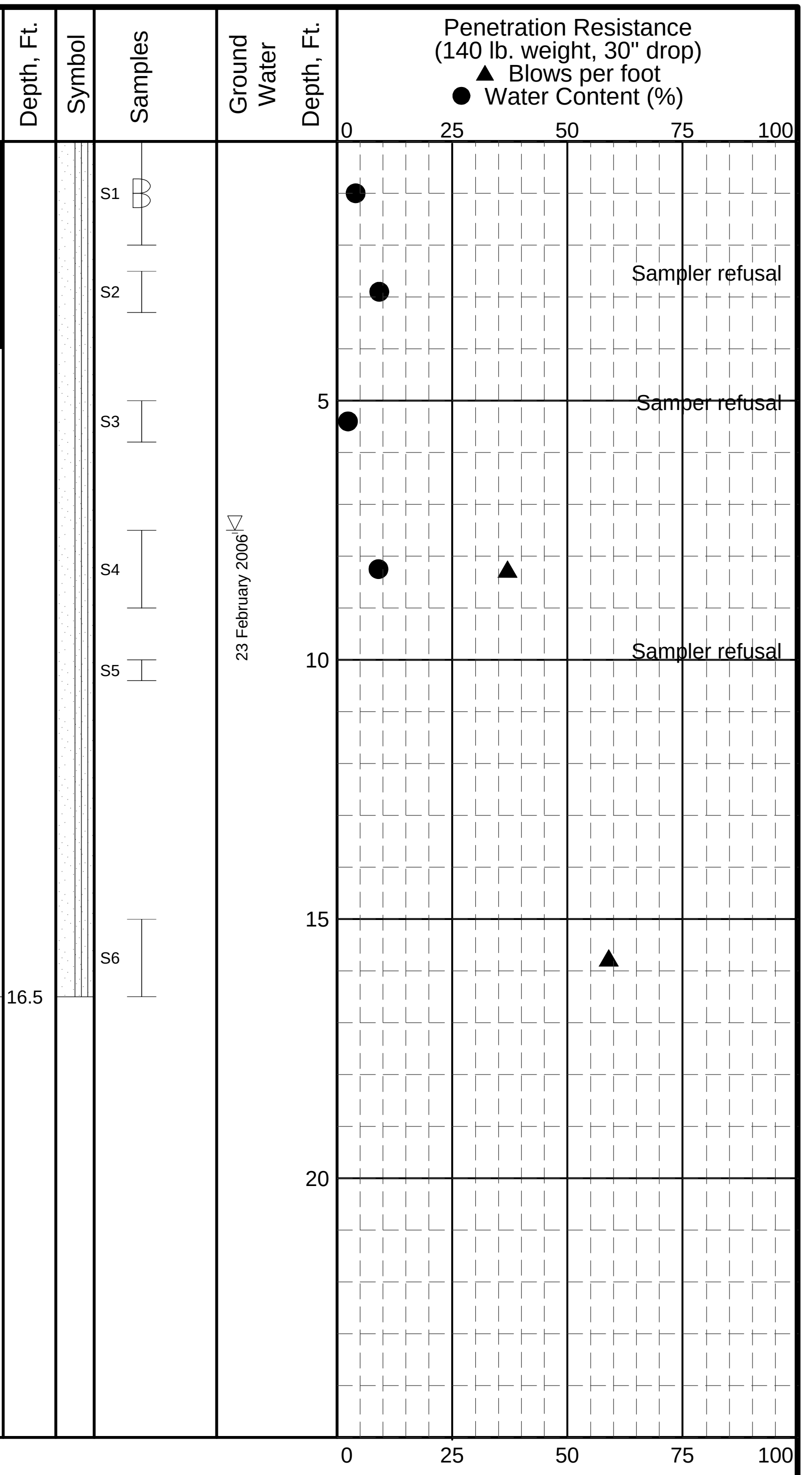
MATERIAL DESCRIPTION

Approx. Elevation: 157 Ft.

Frozen to dense to very dense, brown, slightly silty, gravelly SAND; moist to wet [FILL]

S4: 43% Gravel, 50% Sand, 8% Fines (F2)

Bottom of Boring
Boring Completed 23 February 2006



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
▮ Frozen

Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

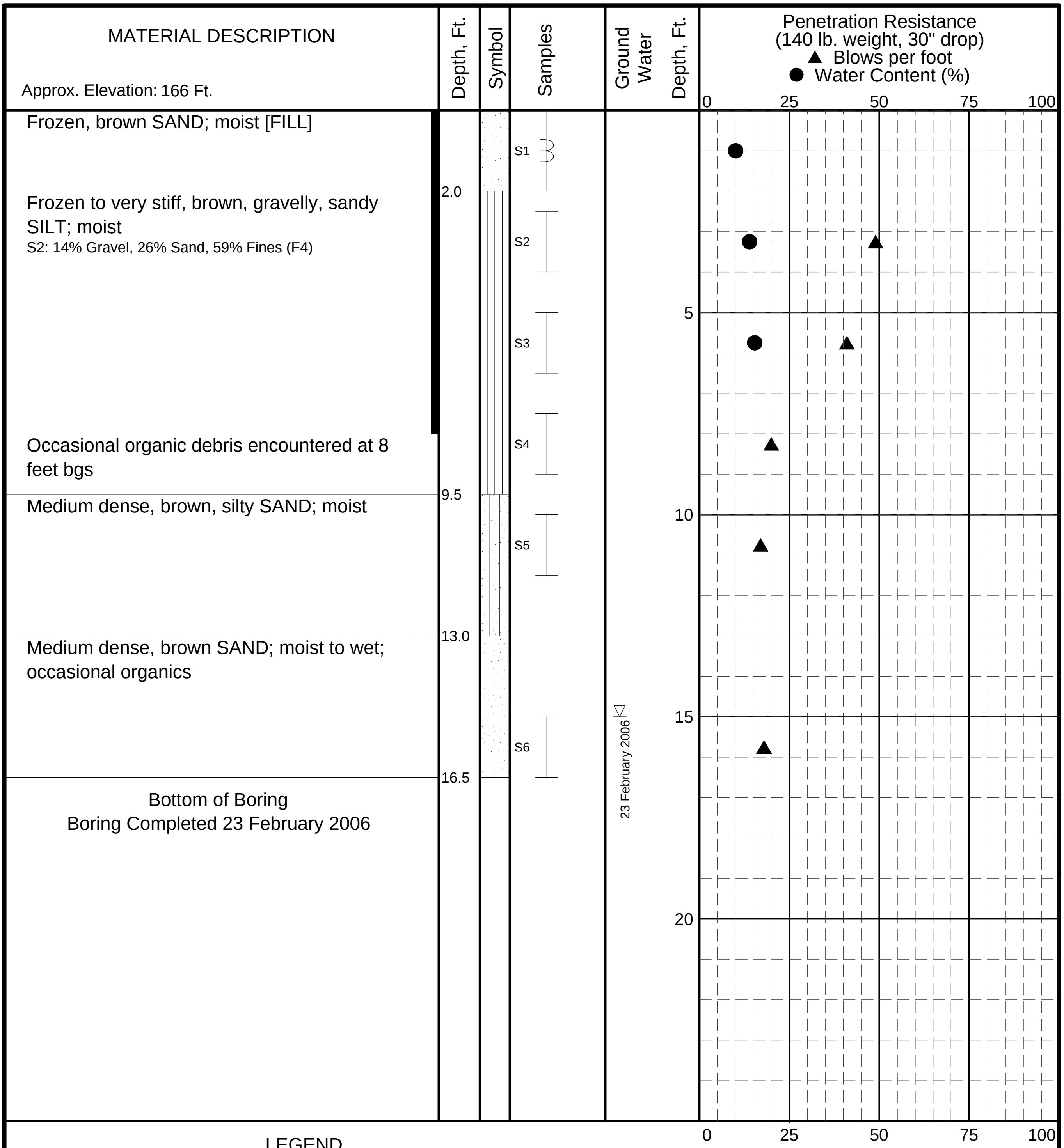
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-040
Station 384+50

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-43



Frozen, brown SAND; moist [FILL]

Frozen to very stiff, brown, gravelly, sandy SILT; moist
S2: 14% Gravel, 26% Sand, 59% Fines (F4)

Occasional organic debris encountered at 8 feet bgs

Medium dense, brown, silty SAND; moist

Medium dense, brown SAND; moist to wet; occasional organics

Bottom of Boring
Boring Completed 23 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

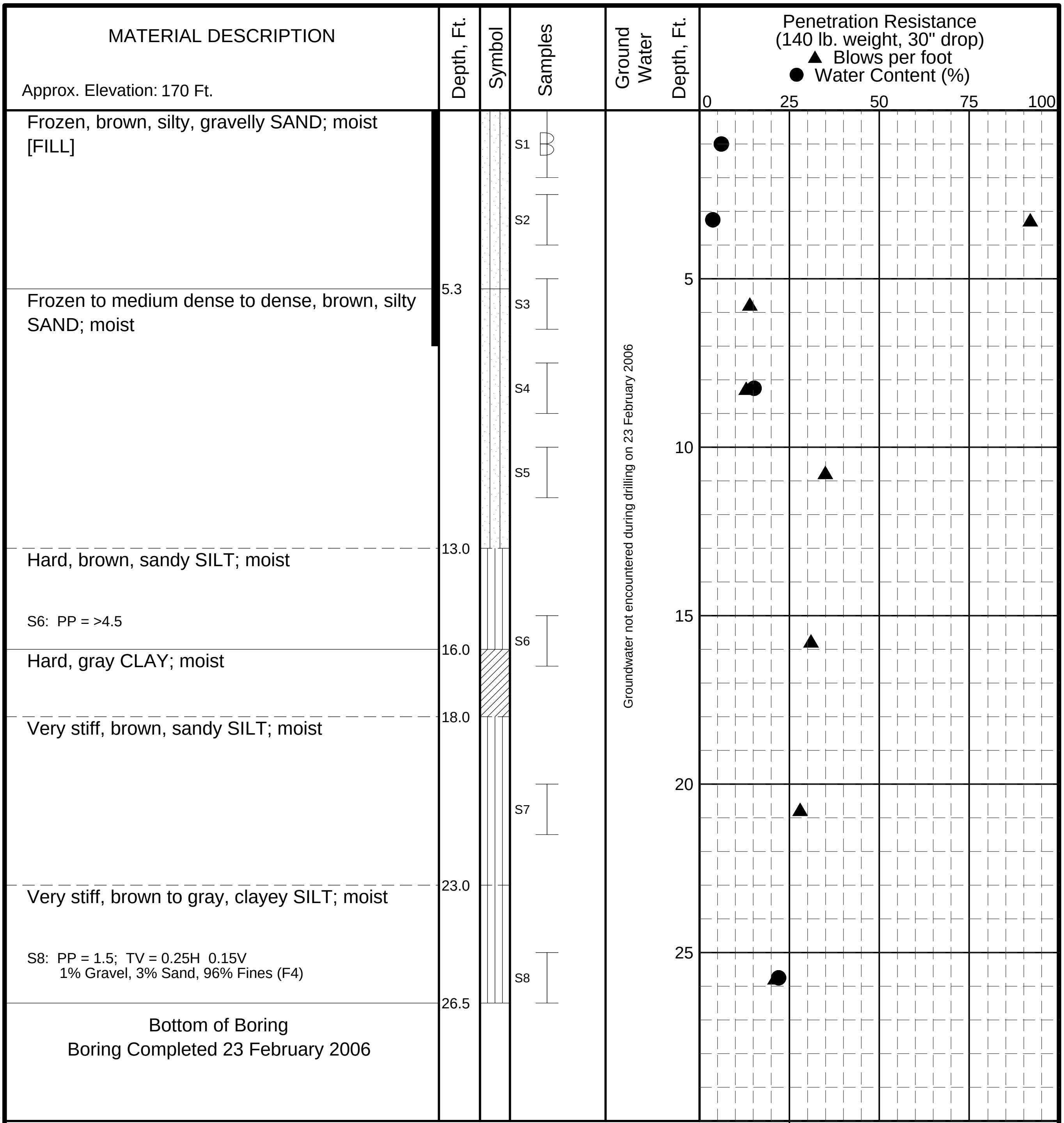
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-041
Station 395+15

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-44



Frozen, brown, silty, gravelly SAND; moist [FILL]

Frozen to medium dense to dense, brown, silty SAND; moist

Hard, brown, sandy SILT; moist

S6: PP = >4.5

Hard, gray CLAY; moist

Very stiff, brown, sandy SILT; moist

Very stiff, brown to gray, clayey SILT; moist

S8: PP = 1.5; TV = 0.25H 0.15V
1% Gravel, 3% Sand, 96% Fines (F4)

Bottom of Boring
Boring Completed 23 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ■ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

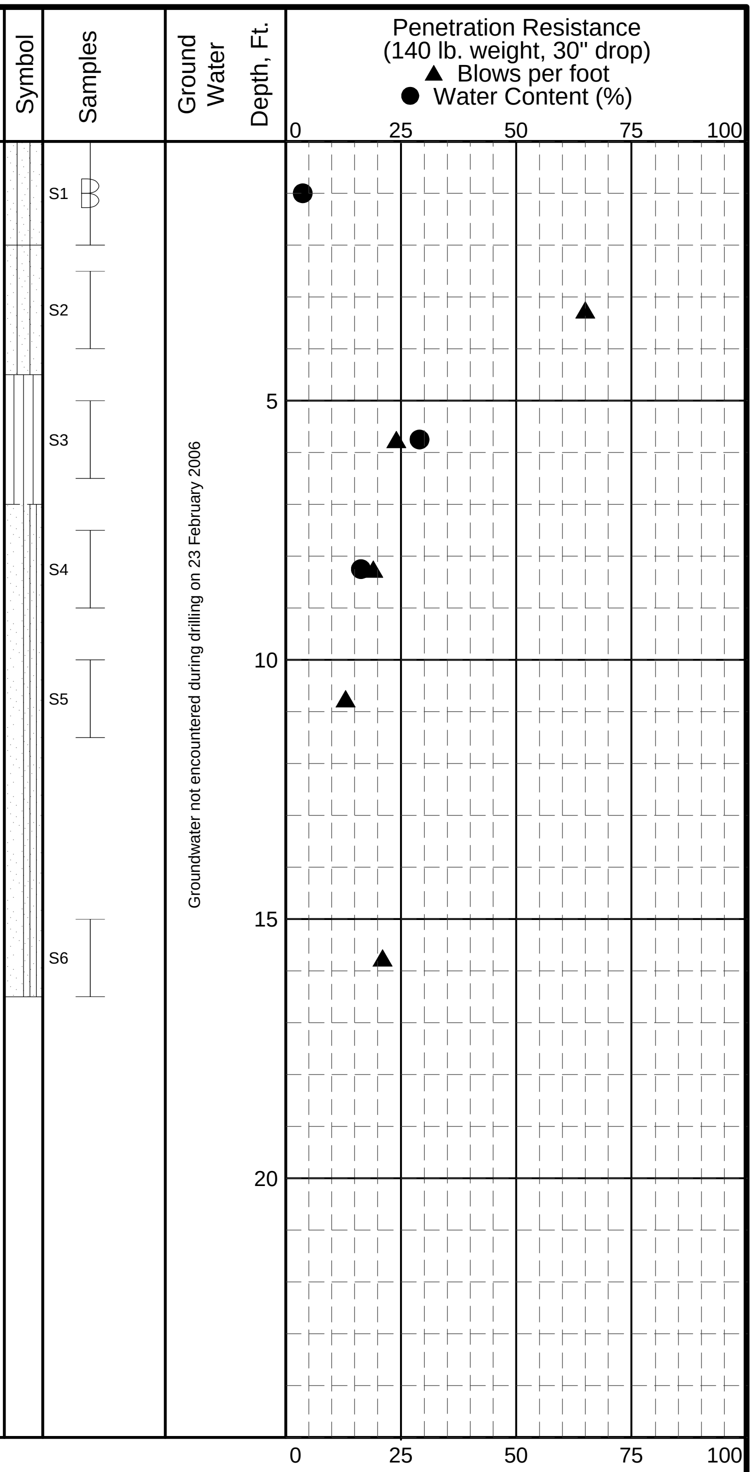
LOG OF BORING B-042
Station 399+77

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-45

MATERIAL DESCRIPTION Approx. Elevation: 181 Ft.	Depth, Ft.	Samples
Frozen, brown, silty, gravelly SAND; moist [FILL] S1: 31% Gravel, 55% Sand, 14% Fines (F2)		S1
Frozen, brown to gray, silty SAND; moist	2.0	S2
Frozen to very stiff, brown SILT; moist	4.5	S3
Medium dense, brown SAND interbedded with very stiff, brown SILT; moist	7.0	S4 S5 S6
Bottom of Boring Boring Completed 23 February 2006	16.5	



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

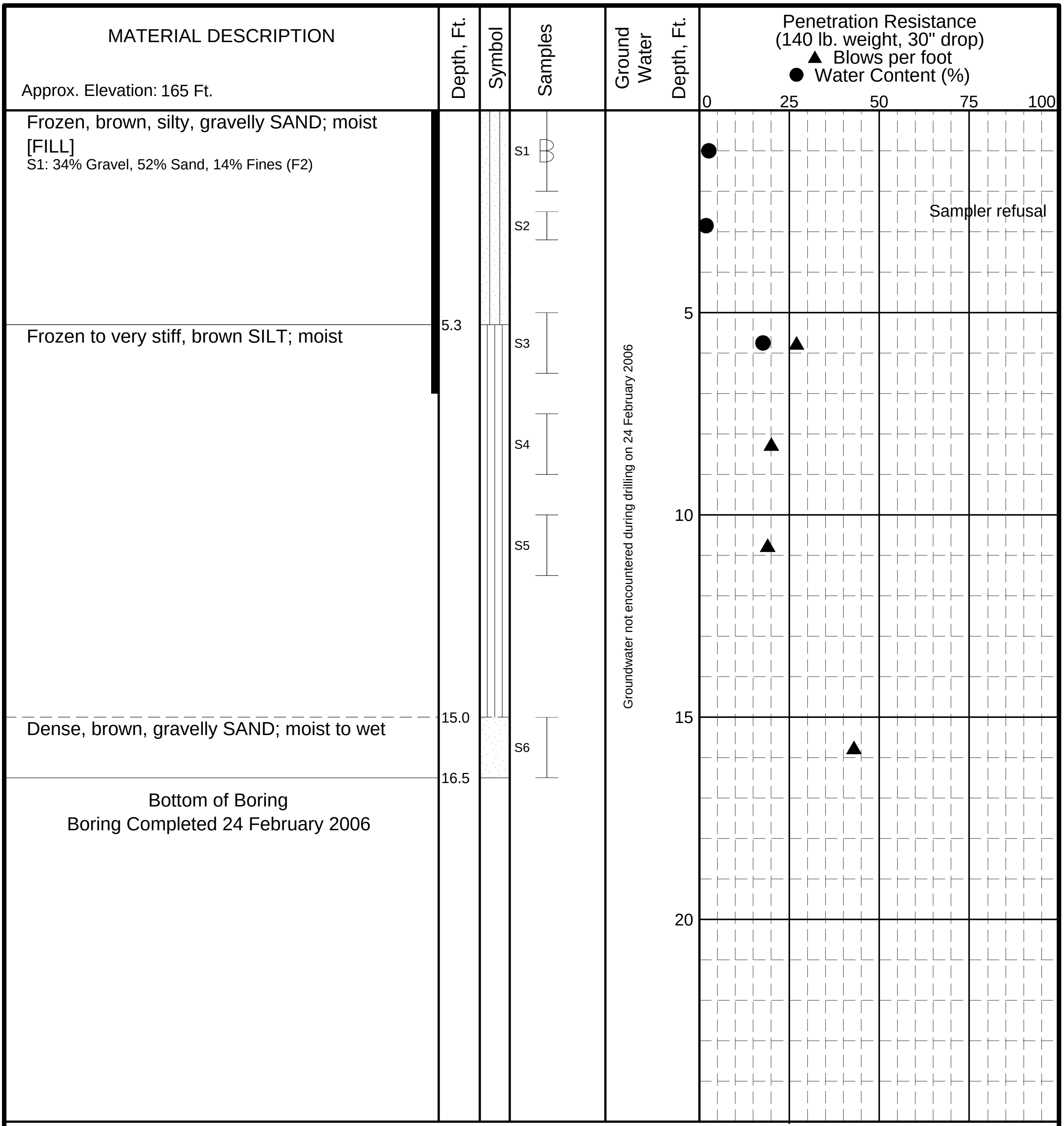
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-043
Station 404+92

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-46



Approx. Elevation: 165 Ft.

Frozen, brown, silty, gravelly SAND; moist [FILL]
S1: 34% Gravel, 52% Sand, 14% Fines (F2)

5.3

Frozen to very stiff, brown SILT; moist

15.0

Dense, brown, gravelly SAND; moist to wet

16.5

Bottom of Boring
Boring Completed 24 February 2006

LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-044
Station 409+93

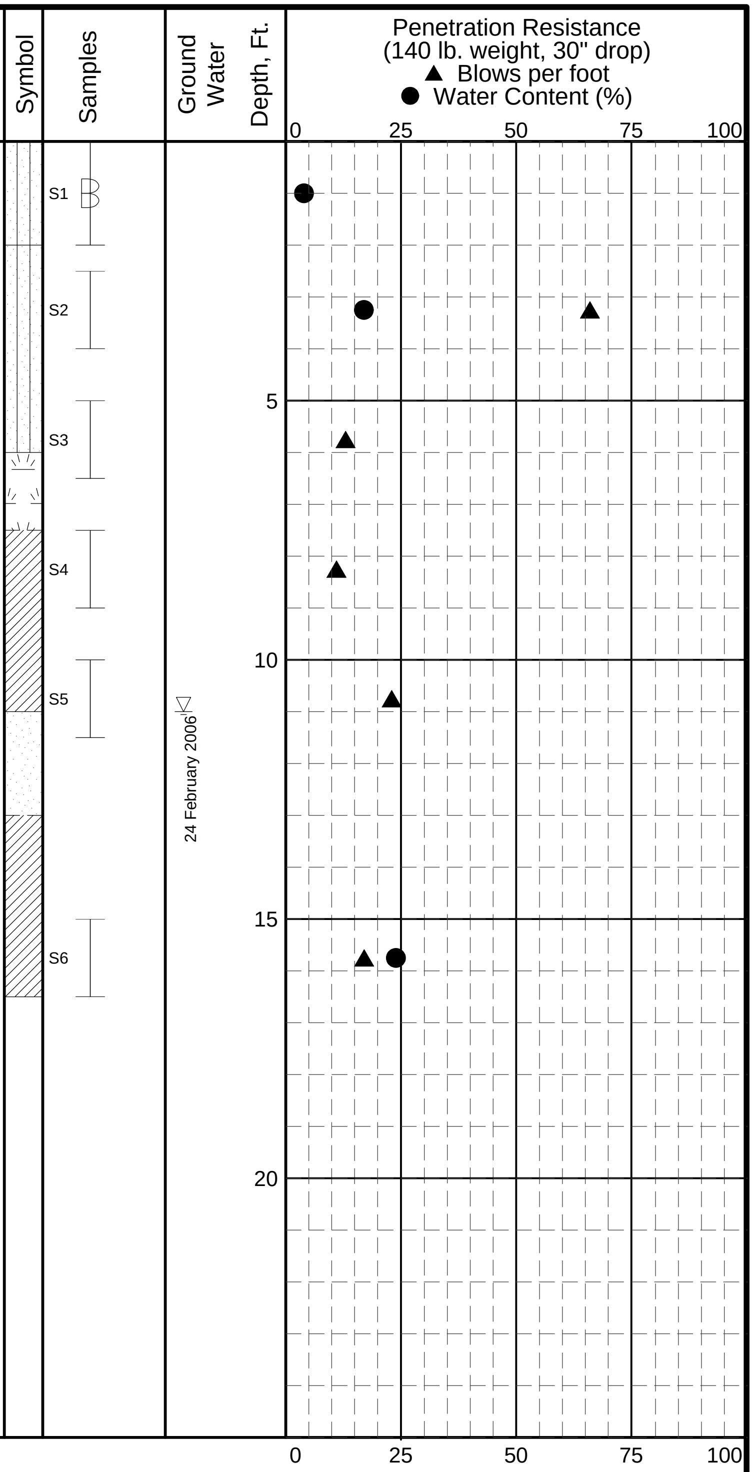
March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-47

MATERIAL DESCRIPTION Approx. Elevation: 153 Ft.	Depth, Ft.
Frozen, brown, silty, gravelly SAND; moist [FILL]	2.0
Very dense, brown to gray, gravelly, silty SAND; moist to wet S2: 26% Gravel, 41% Sand, 34% Fines (F3)	6.0
Stiff, brown PEAT; moist	7.5
Stiff to very stiff, gray CLAY; moist to wet; scattered organics S4: PP = 2.75; TV = >1V S5: PP = 2.75; TV = >1H	11.0
Medium dense, gray SAND; wet	13.0
Very stiff, gray, slightly gravelly, slightly sandy CLAY; wet S6: PP = 2.5-4.5; TV = 0.7H 0.85V 6% Gravel, 10% Sand, 84% Fines (F4)	16.5

Bottom of Boring
Boring Completed 24 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-045
Station 415+04

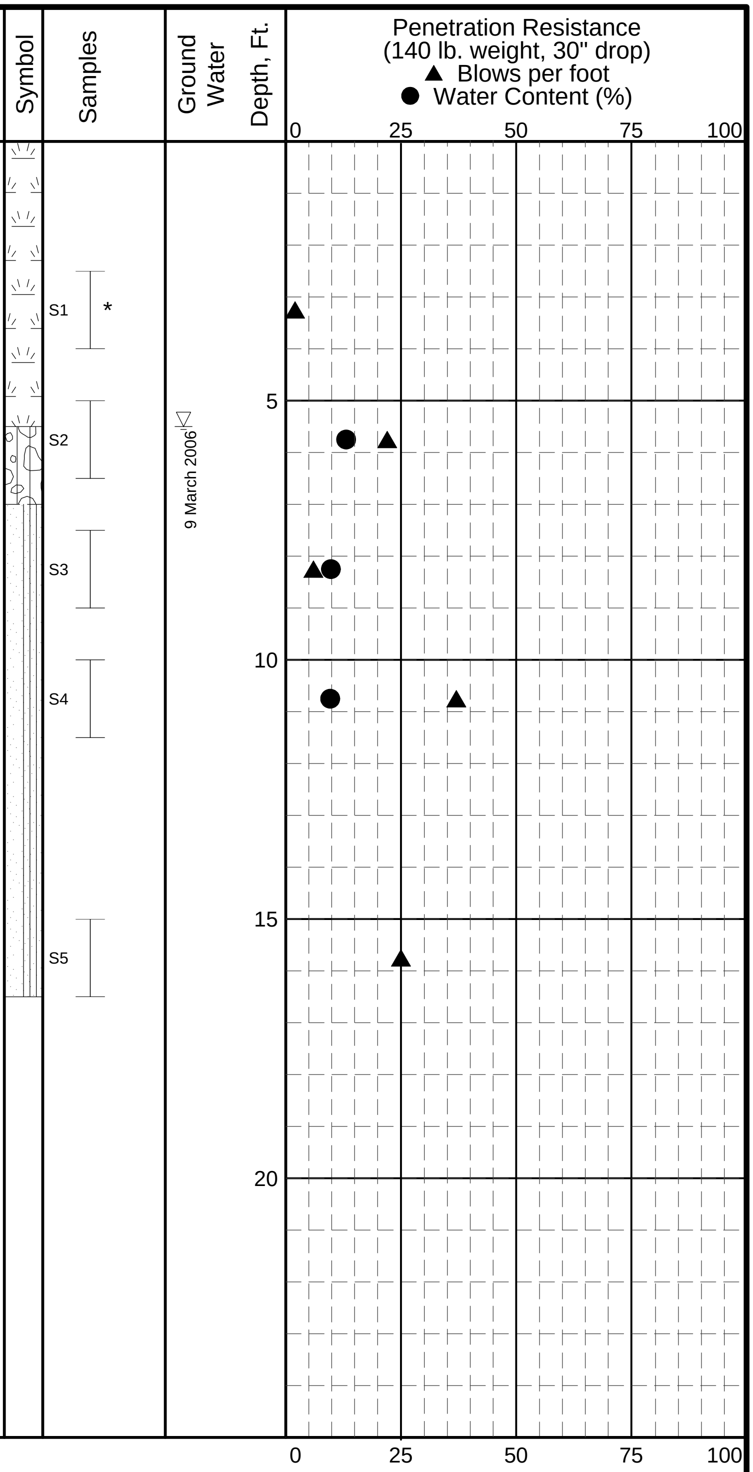
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-48

MATERIAL DESCRIPTION Approx. Elevation: 146 Ft.	Depth, Ft.
2 feet snow cover Frozen, brown, silty PEAT; moist	5.5
Medium dense, gray, silty, sandy GRAVEL; wet	7.0
Medium dense to dense, gray, slightly silty, gravelly SAND; wet S4: 37% Gravel, 55% Sand, 8% Fines (F2)	16.5

Bottom of Boring
Boring Completed 9 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-046
Station 417+85 30 ft LOC

March 2007
32-1-01536-003

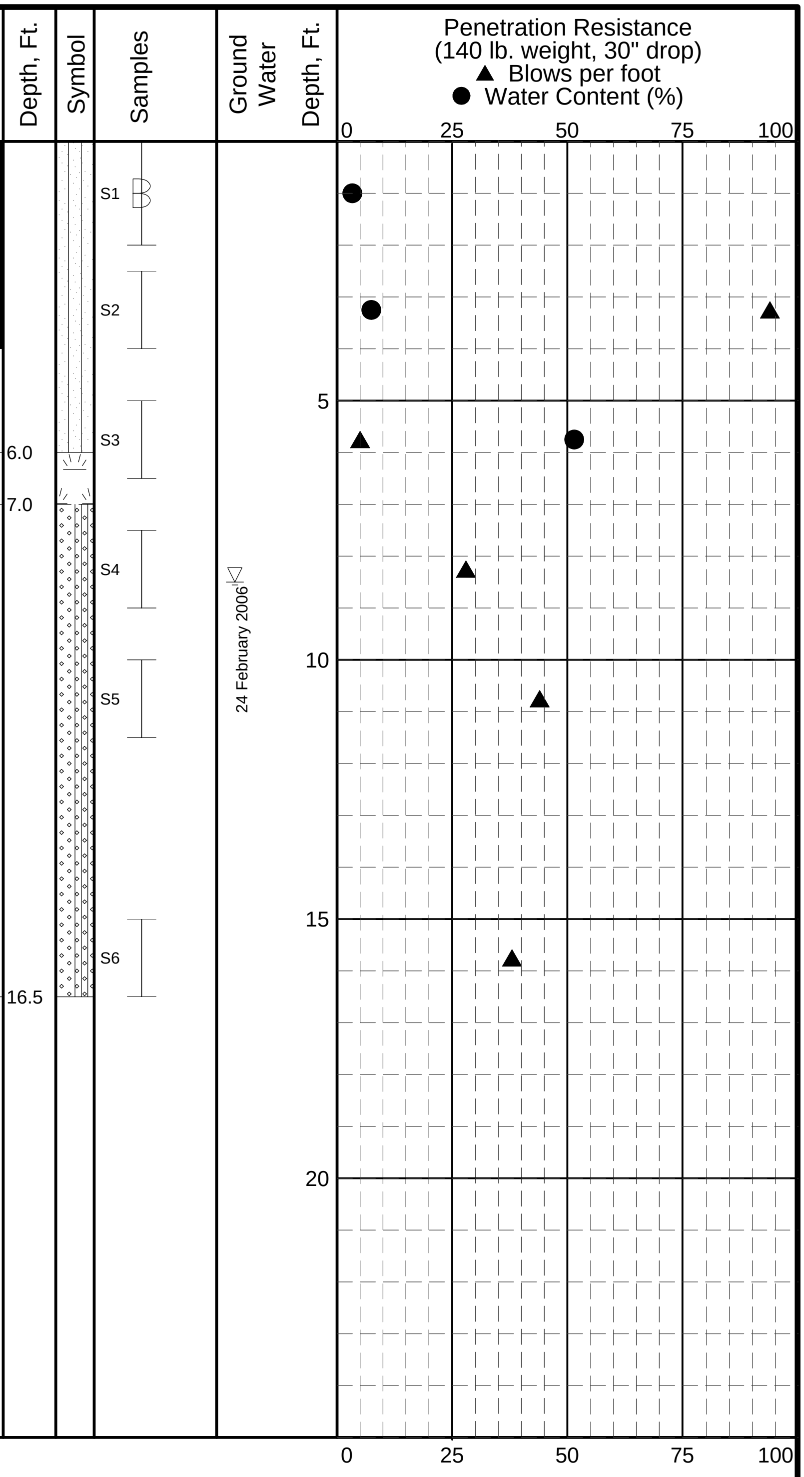
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-49

MATERIAL DESCRIPTION

Approx. Elevation: 148 Ft.

Depth, Ft.	Material Description
0.0	Frozen to medium dense, brown, silty, gravelly SAND; moist [FILL]
6.0	Soft, brown PEAT; moist
7.0	Medium dense to dense, brown, slightly silty, gravelly SAND; wet; scattered organics
16.5	Bottom of Boring Boring Completed 24 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

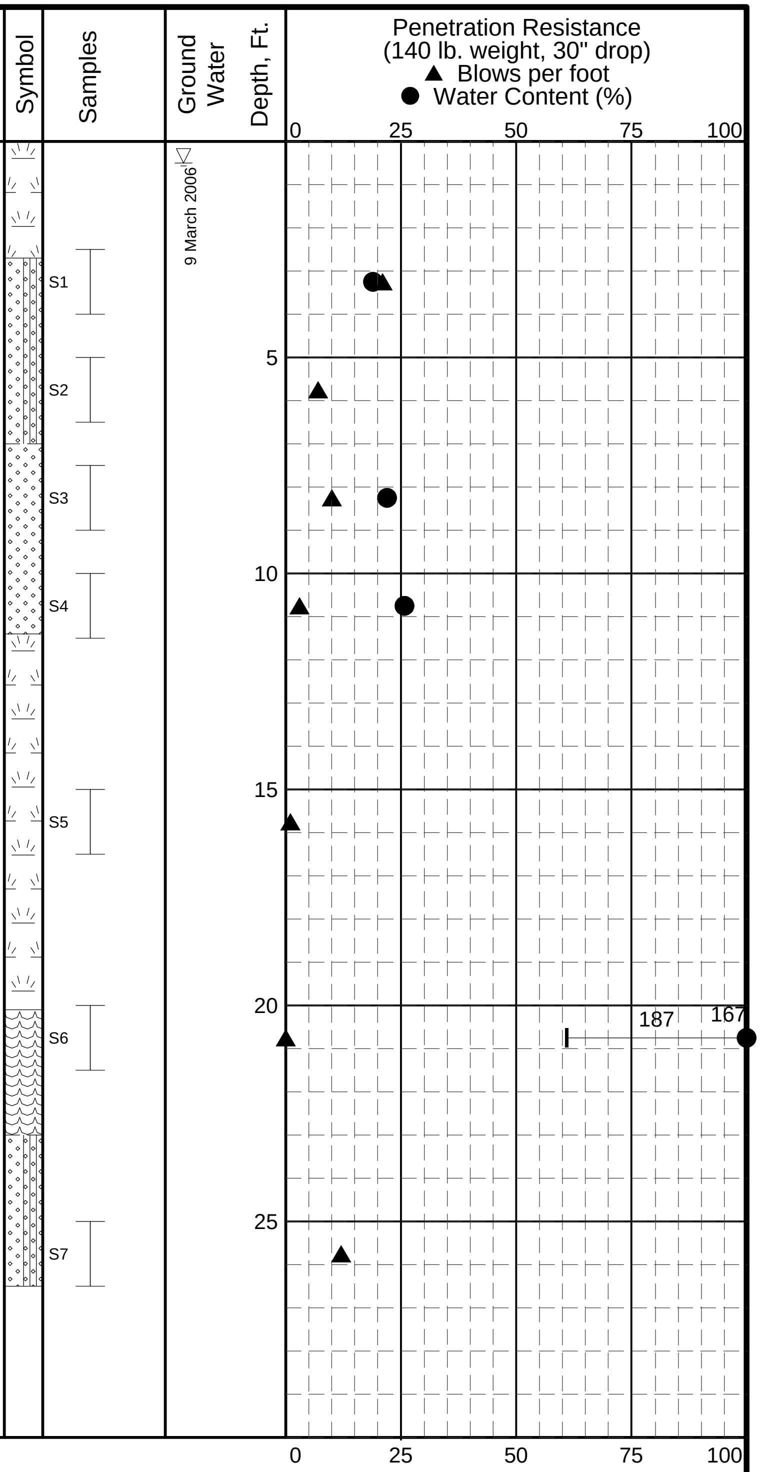
LOG OF BORING B-047
Station 420+03

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-50

MATERIAL DESCRIPTION Approx. Elevation: 145 Ft.	Depth, Ft.
2 feet snow cover over 10 inches ice cover Frozen, brown PEAT; wet	
Frozen to loose, gray, slightly gravelly, slightly silty SAND; wet	2.7
Loose to medium dense, gray SAND; wet	7.0
Very soft, brown PEAT; wet	11.4
Very soft, gray, organic CLAY; wet; with shell fragments S6: Atterberg Liquid Limit 186, Plastic Limit 61, Plasticity Index 125	20.1
Medium dense, gray, slightly silty SAND; wet	23.0
Bottom of Boring Boring Completed 9 March 2006	26.5



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-048
Station 423+94 30 ft LOC

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-51

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION

Approx. Elevation: 150 Ft.

Frozen to very loose to very dense, brown, silty, gravelly SAND; moist to wet [FILL]

13.0

Very dense, gray SAND; wet

16.0

Medium stiff, brown PEAT; wet

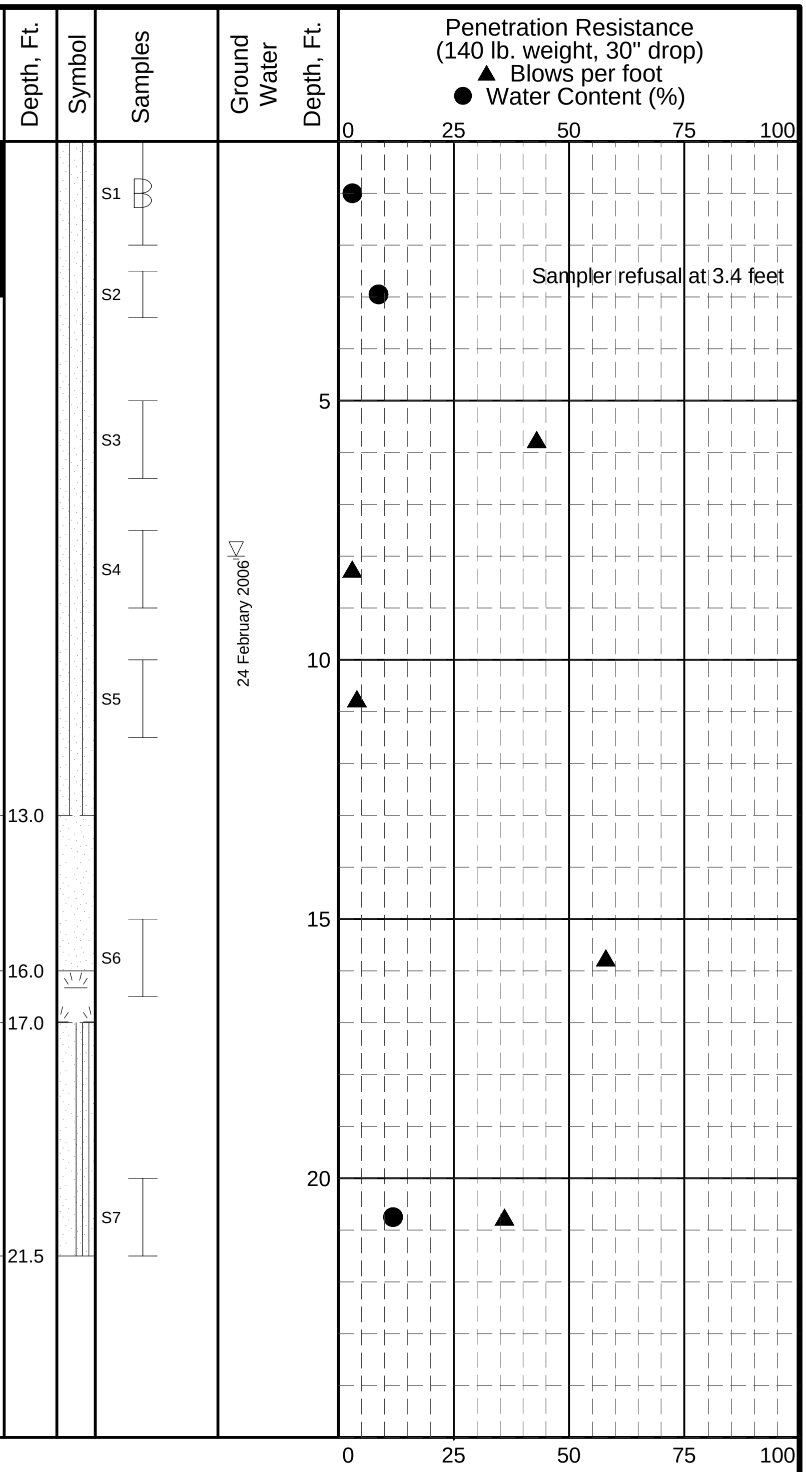
17.0

Dense, gray, slightly silty, gravelly SAND; wet

S7: 29% Gravel, 66% Sand, 5% Fines (F1)

21.5

Bottom of Boring
Boring Completed 24 February 2006



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-049
Station 427+95

March 2007
32-1-01536-003

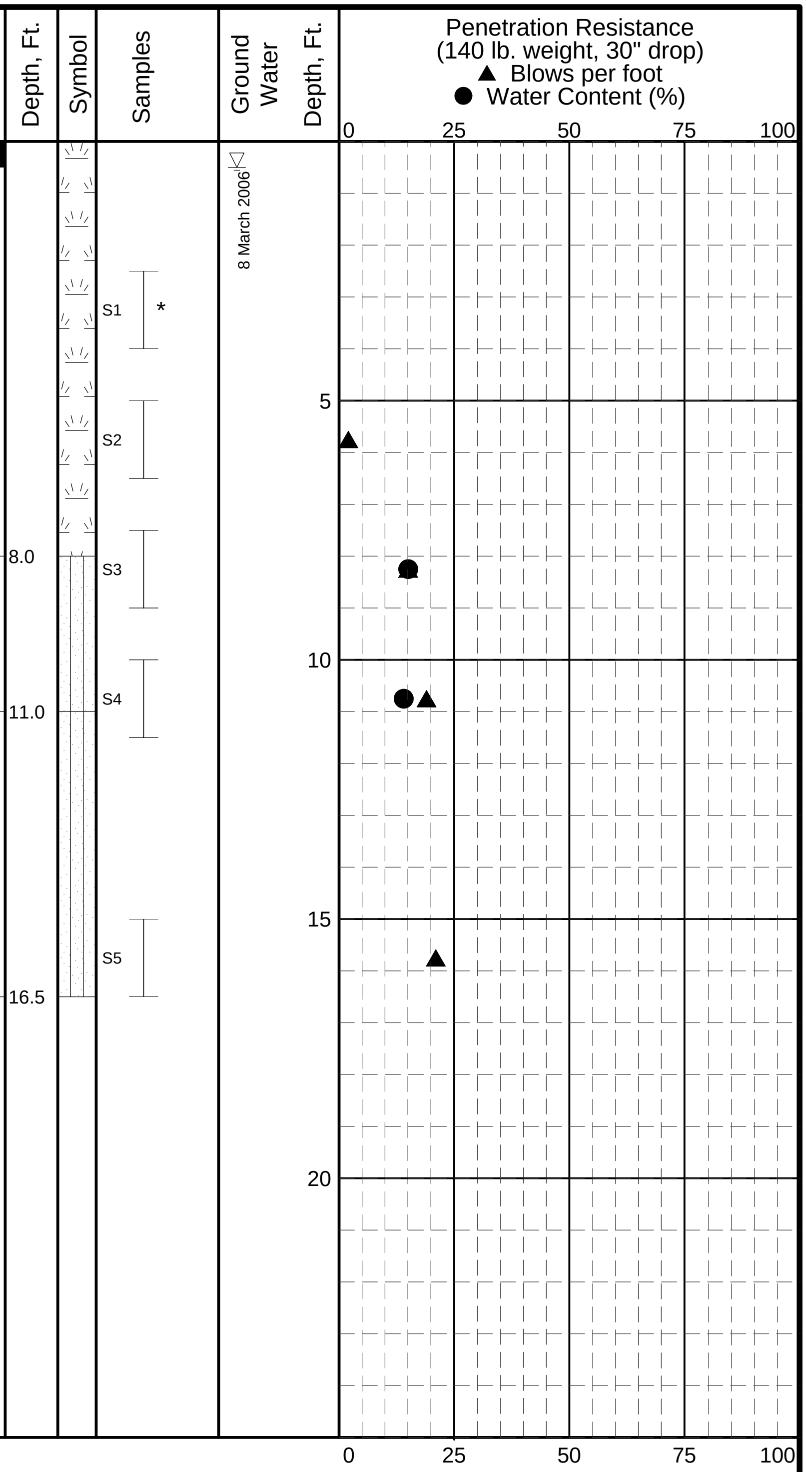
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-52

MATERIAL DESCRIPTION

Approx. Elevation: 147 Ft.

MATERIAL DESCRIPTION	Depth, Ft.
2 feet snow cover on 6 inches ice cover ▮ Frozen to soft, brown PEAT; wet	
Medium dense, gray, gravelly, silty SAND; wet	8.0
Medium dense, gray, slightly silty to silty SAND; wet	11.0
Bottom of Boring Boring Completed 8 March 2006	16.5



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ⊻ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-050
Station 431+97 30 ft LOC

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-53

MATERIAL DESCRIPTION

Approx. Elevation: 150 Ft.

Frozen to very dense, brown, silty, gravelly SAND; moist [FILL]

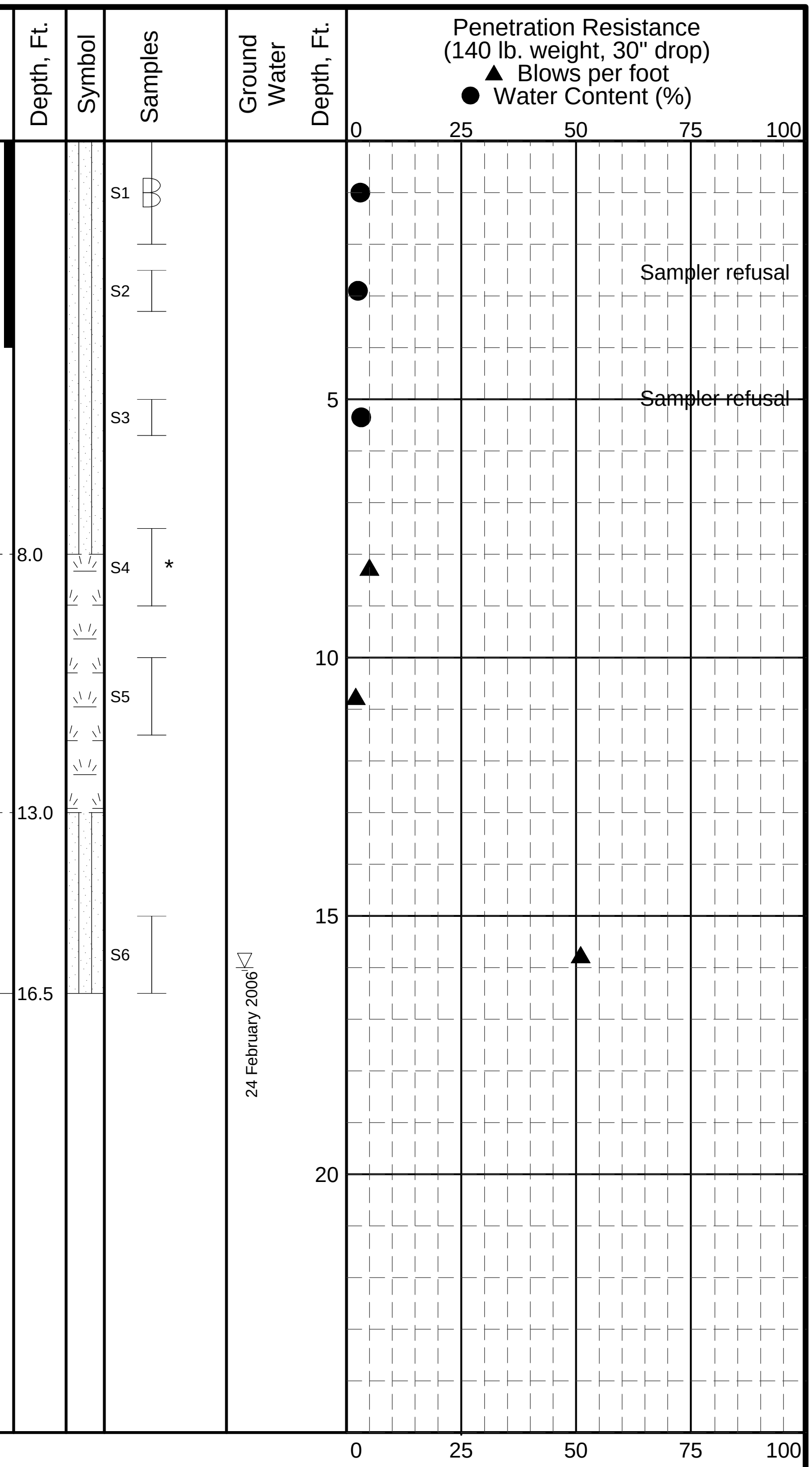
S1: 28% Gravel, 54% Sand, 18% Fines (F2)

8.0 Soft, brown PEAT; moist

13.0 Very dense, gray, silty SAND; moist to wet

16.5 Bottom of Boring

Boring Completed 24 February 2006



LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

B Bulk Sample

▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-051
Station 435+91

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-54

MATERIAL DESCRIPTION

Approx. Elevation: 147 Ft.

2 feet snow cover

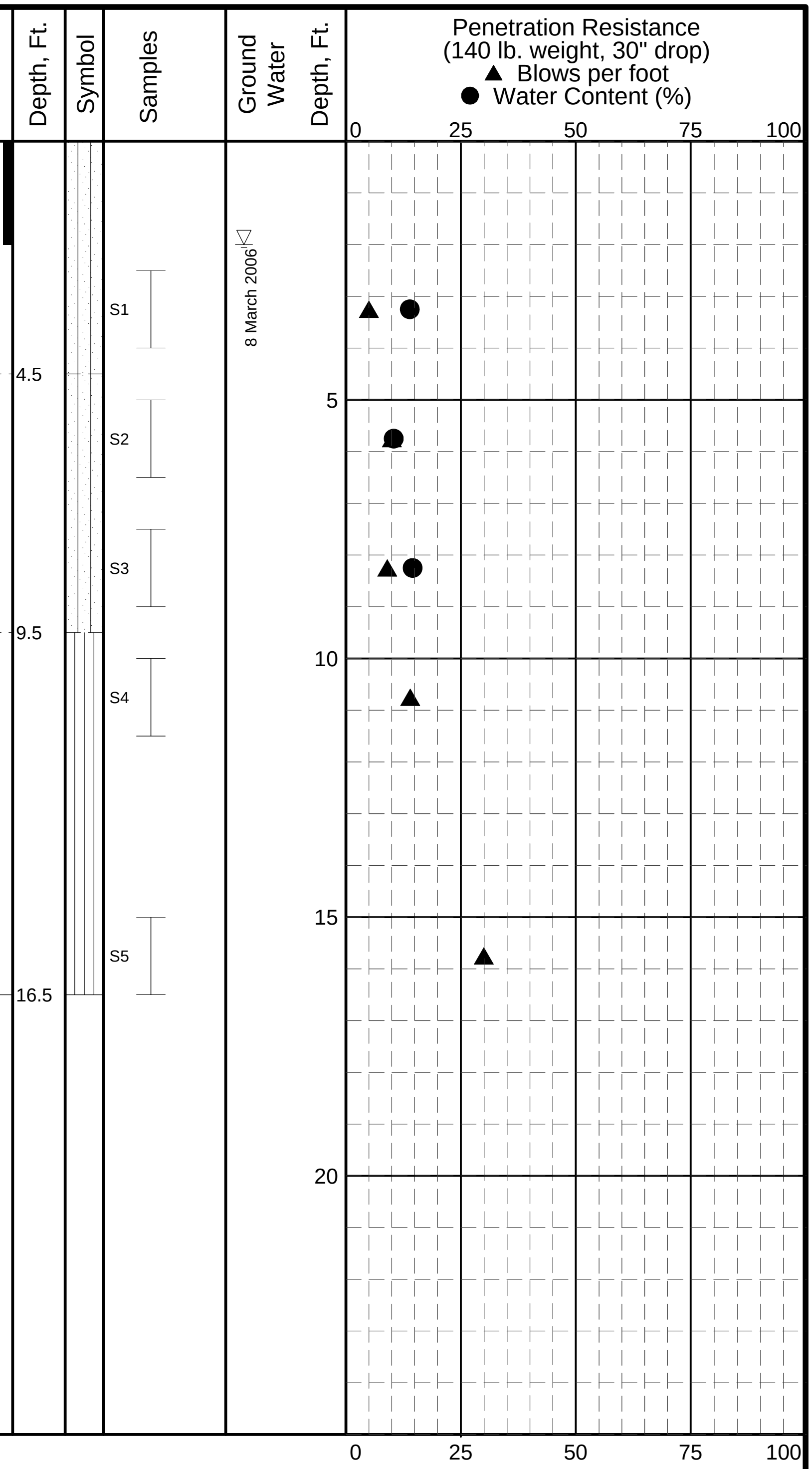
Frozen to loose, brownish green, silty SAND; wet

Medium dense, brown, gravelly, silty SAND; wet

S3: 13% Gravel, 47% Sand, 40% Fines (F3)

Stiff to very stiff, gray, gravelly, sandy SILT; wet; interbedded with ½-inch lenses of silty SAND every 6 to 10 inches

Bottom of Boring
Boring Completed 8 March 2006



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-052
Station 437+91

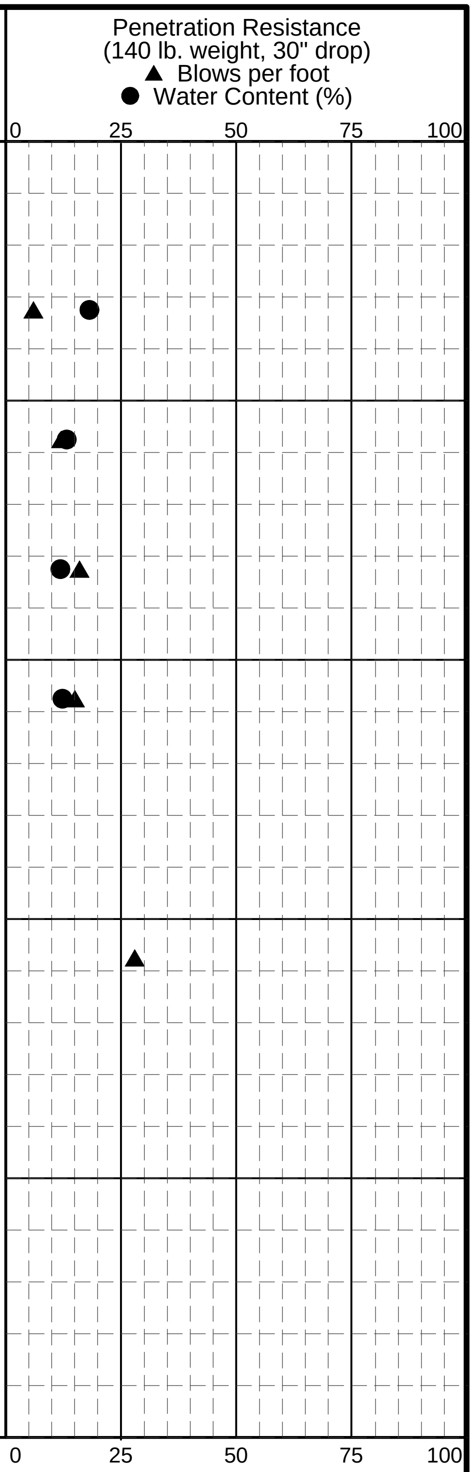
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-55

MATERIAL DESCRIPTION Approx. Elevation: 152 Ft.	Depth, Ft.	Samples	Ground Water
3 feet snow cover Frozen to medium stiff, brown SILT; moist to wet	5.5	S1	▽ 8 March 2006
Medium dense, brown, slightly gravelly, silty SAND; wet S4: 5% Gravel, 47% Sand, 48% Fines (F3)	13.0	S2 S3 S4	
Medium dense, brown, sandy, silty GRAVEL; wet	16.5	S5	

Bottom of Boring
Boring Completed 8 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

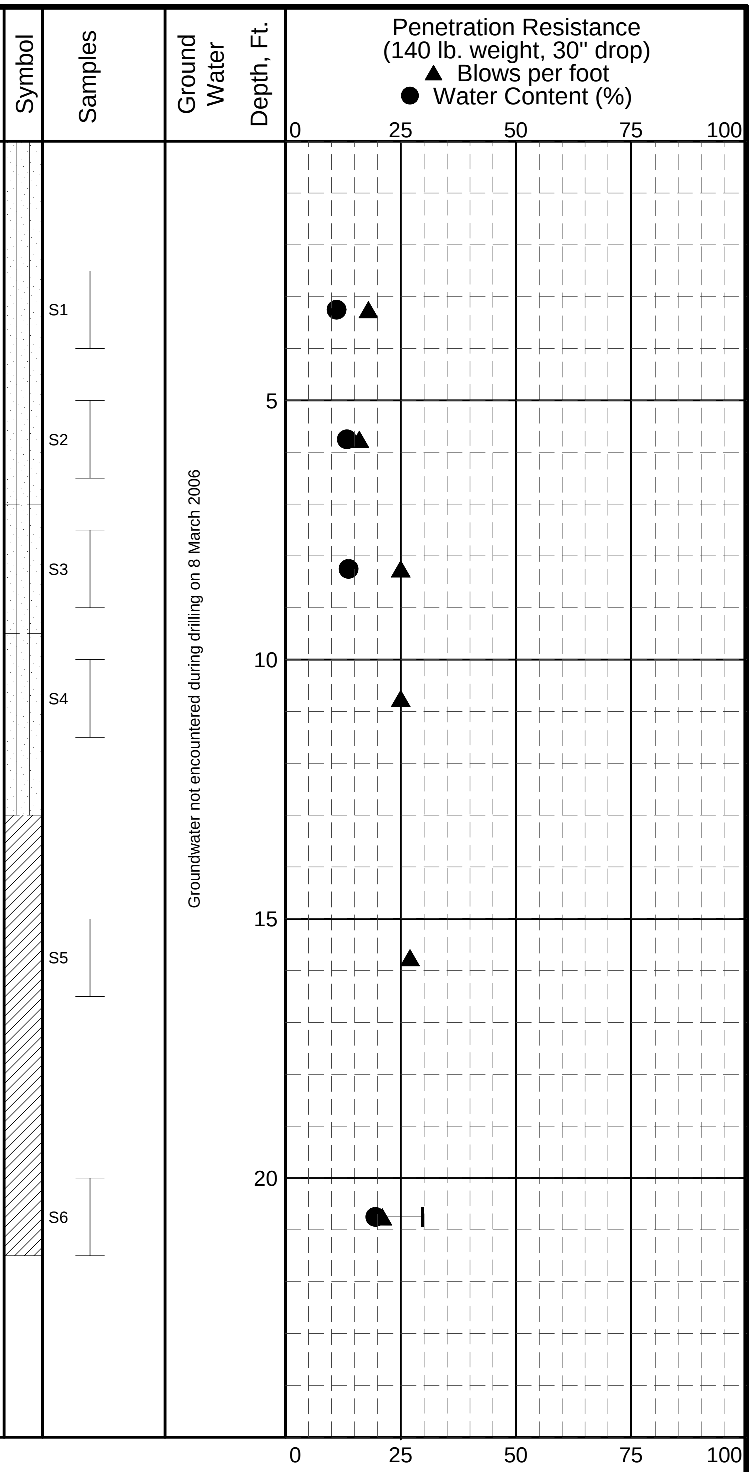
LOG OF BORING B-053
Station 439+91

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-56

MATERIAL DESCRIPTION Approx. Elevation: 168 Ft.	Depth, Ft.
2.5 feet snow cover Frozen to medium dense, brown, gravelly, silty SAND; moist	7.0
Medium dense, brown, slightly gravelly, silty SAND; moist	9.5
Medium dense, brown, silty SAND; moist	13.0
Very stiff, brown CLAY; moist S5: PP = >4.5; TV = >1H >1V S6: PP = >4.5; TV = >1H >1V	21.5
Bottom of Boring Boring Completed 8 March 2006	



Groundwater not encountered during drilling on 8 March 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-054
Station 445+25

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-57

MATERIAL DESCRIPTION

Approx. Elevation: 171 Ft.

2 feet snow cover

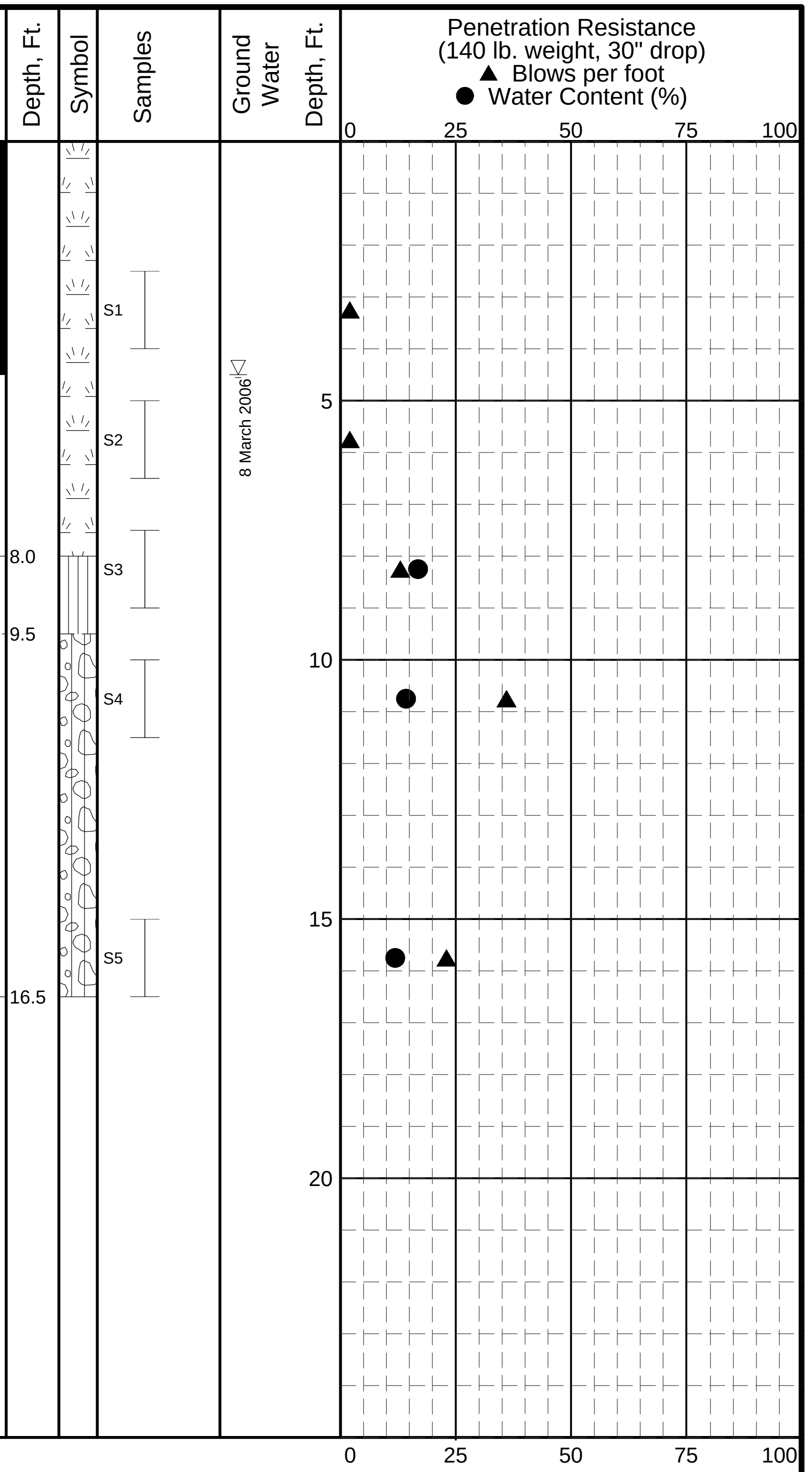
Frozen to soft, brown PEAT; moist to wet

Stiff, gray, sandy, gravelly SILT; wet

S4: 33% Gravel, 27% Sand, 40% Fines (F3)

Medium dense to dense, gray, sandy, silty GRAVEL: wet; interbedded with 2-inch layers of sandy SILT every 8 to 10 inches

Bottom of Boring
Boring Completed 8 March 2006



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

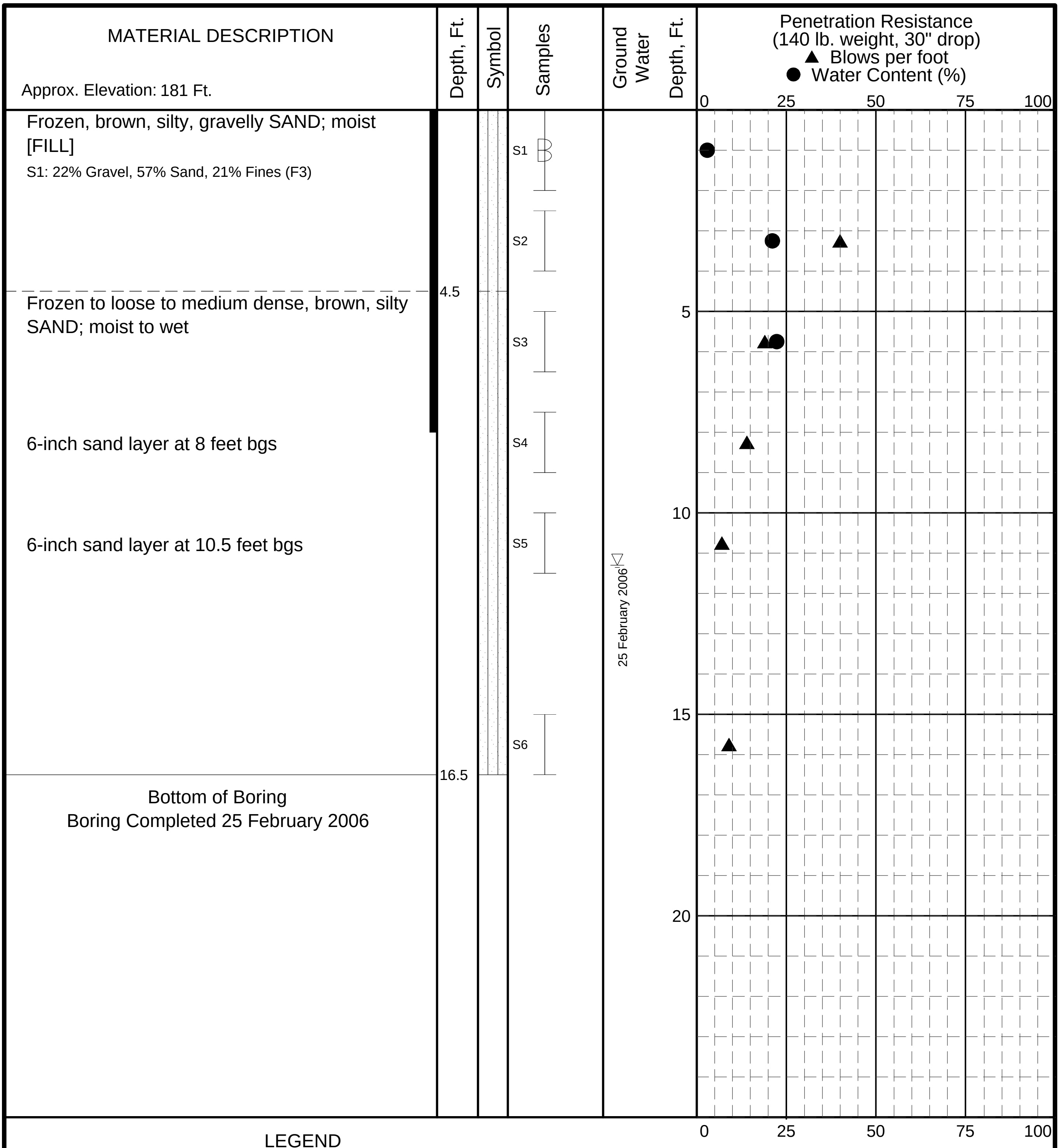
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-055
Station 450+16

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-58



Approx. Elevation: 181 Ft.

Frozen, brown, silty, gravelly SAND; moist
[FILL]
S1: 22% Gravel, 57% Sand, 21% Fines (F3)

Frozen to loose to medium dense, brown, silty SAND; moist to wet

6-inch sand layer at 8 feet bgs

6-inch sand layer at 10.5 feet bgs

Bottom of Boring
Boring Completed 25 February 2006

LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-056
Station 455+02

March 2007
32-1-01536-003

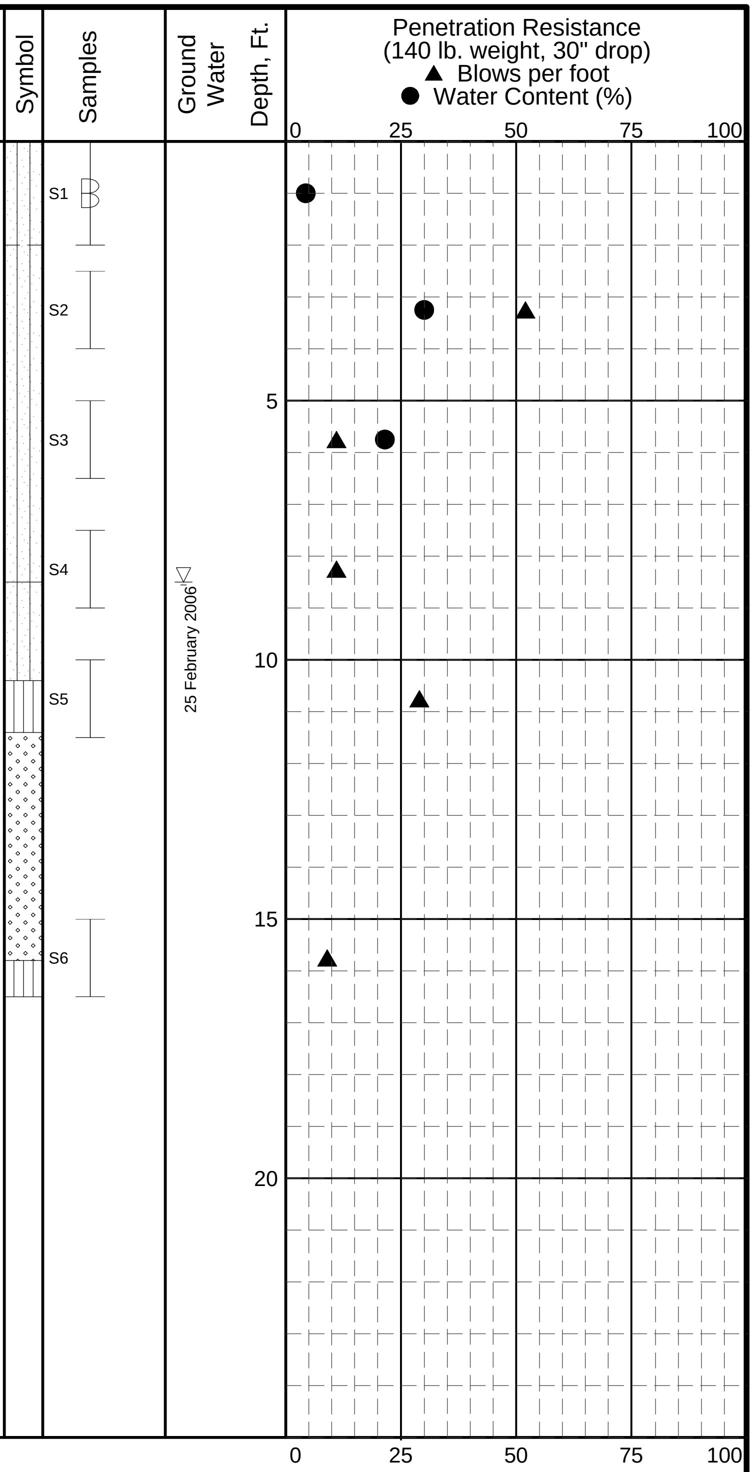
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-59

Approx. Elevation: 181 Ft.

MATERIAL DESCRIPTION	Depth, Ft.
Frozen, brown, silty, gravelly SAND; moist [FILL] S1: 26% Gravel, 56% Sand, 18% Fines (F2)	2.0
Frozen to medium dense, brown, slightly gravelly, silty SAND; moist S2: 9% Gravel, 70% Sand, 21% Fines (F3)	8.5
Medium dense, brown, silty SAND; wet	10.4
Very stiff, brownish gray, sandy SILT; wet	11.4
Medium dense, brown, SAND; wet	15.8
Stiff, gray, sandy SILT; wet; with sand partings <1/16-inch thick every 1/2 inch S6: PP = 3.25; TV = 0.65H 0.85V	16.5

Bottom of Boring
Boring Completed 25 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-057
Station 470+02

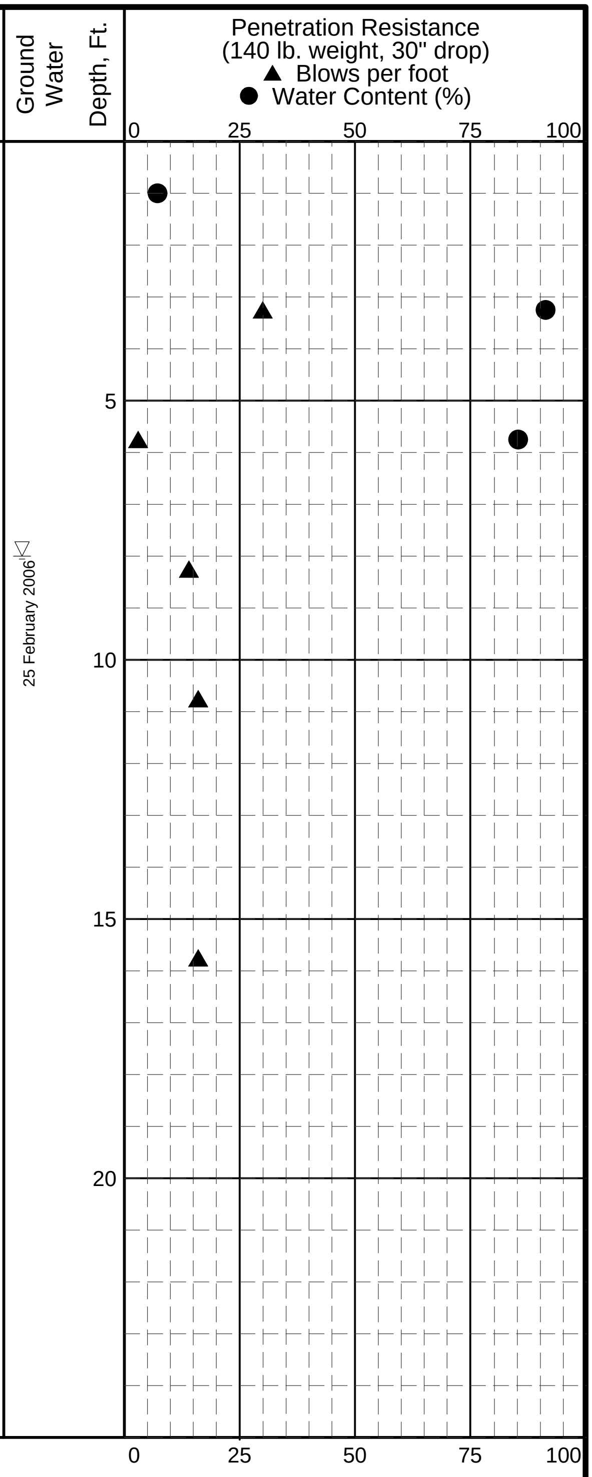
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-60

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION Approx. Elevation: 183 Ft.	Depth, Ft.	Samples
Frozen, brown, slightly gravelly, silty SAND; moist [FILL] S1: 8% Gravel, 59% Sand, 32% Fines (F3)		S1
Frozen, brown, slightly gravelly, sandy SILT; moist; scattered organics S2: 78% Fines (F4)	3.0	S2
Frozen to soft, brown, sandy SILT; moist; scattered organics	4.5	S3
Medium dense, gray, SAND; wet	8.0	S4
Very stiff, gray, sandy SILT; wet S6: PP = >4.5; TV = 0.65H 1.5V	10.5	S5 S6
Bottom of Boring Boring Completed 25 February 2006	16.5	



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-058
Station 480+14

March 2007
32-1-01536-003

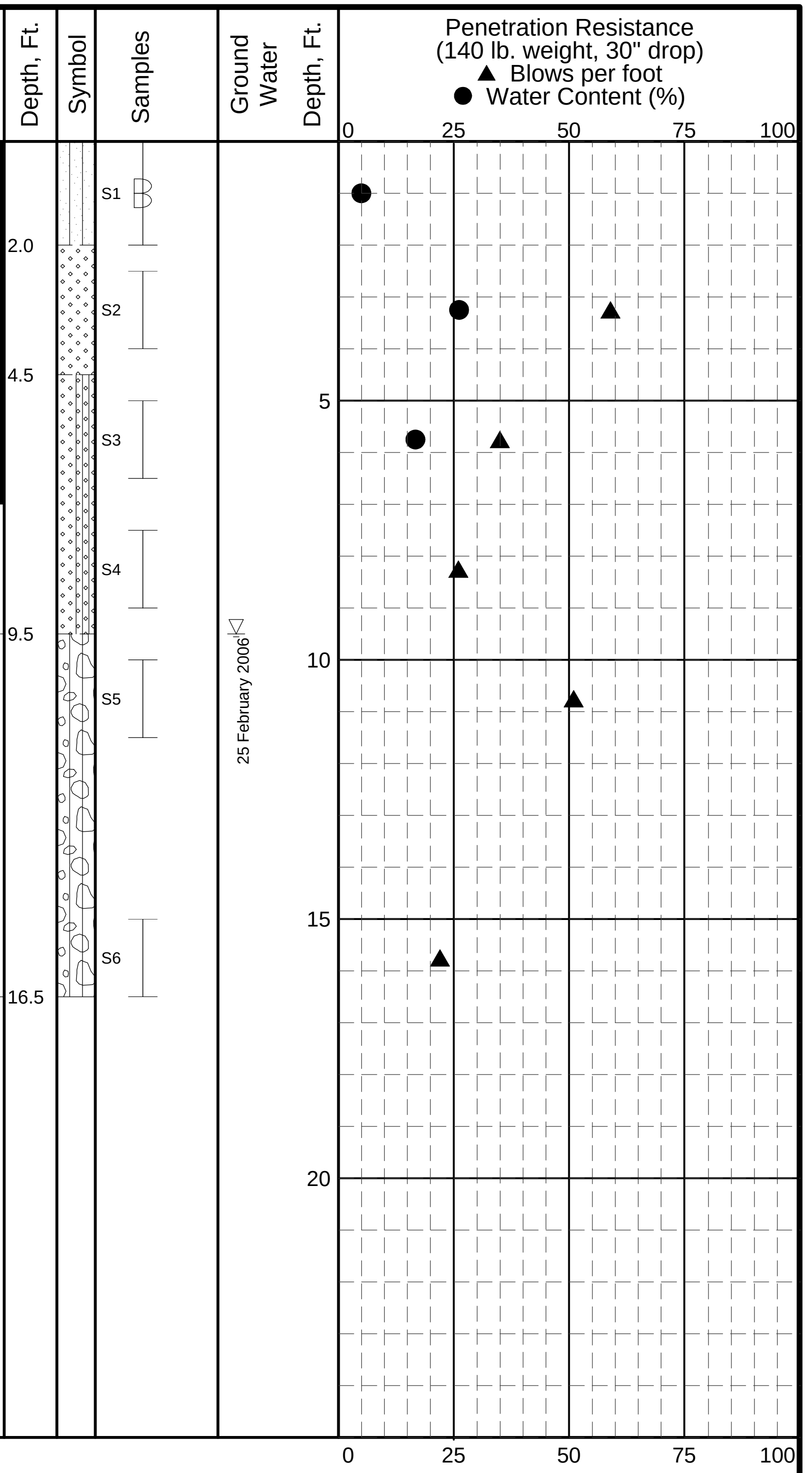
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-61

MATERIAL DESCRIPTION

Approx. Elevation: 216 Ft.

Depth, Ft.	Material Description
0 – 2.0	Frozen, brown, gravelly, silty SAND; moist S1: 13% Gravel, 56% Sand, 31% Fines (F3)
2.0 – 4.5	Frozen, brown, slightly gravelly SAND; moist
4.5 – 9.5	Frozen to medium dense, brown, slightly silty SAND; moist
9.5 – 16.5	Medium dense to very dense, brown, silty, sandy GRAVEL; wet
16.5	Bottom of Boring Boring Completed 25 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ⊻ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-059
Station 499+66

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-62

MATERIAL DESCRIPTION

Approx. Elevation: 218 Ft.

Frozen, brown, slightly gravelly, silty SAND; moist

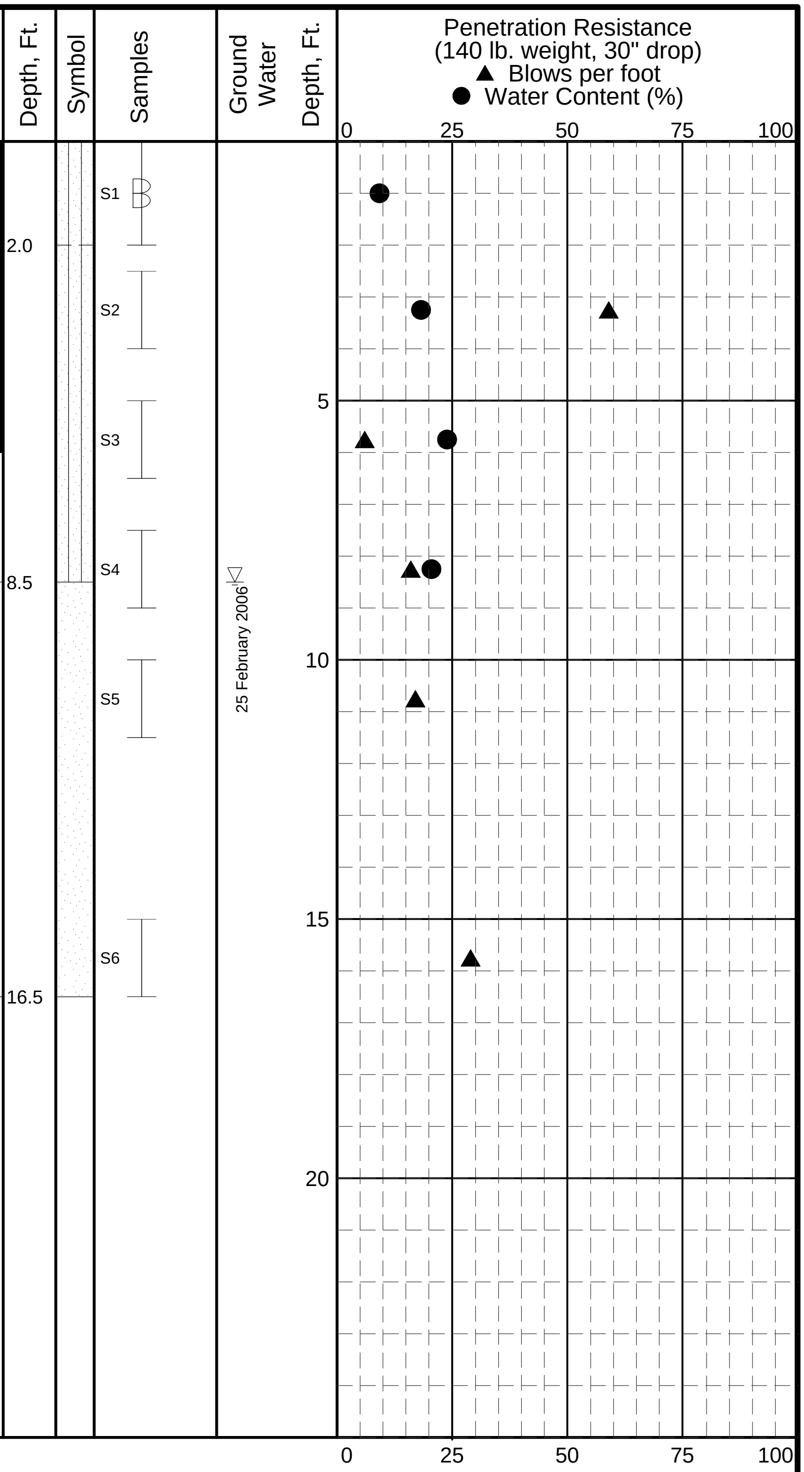
S1: 6% Gravel, 54% Sand, 40% Fines (F3)

Frozen to medium dense, brown, silty SAND; moist

S4: 0% Gravel, 67% Sand, 33% Fines (F3)

Medium dense, brown SAND; wet; interbedded with 2-inch thick brown, silty SAND every 8 to 10 inches

Bottom of Boring
Boring Completed 25 February 2006



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-060
Station 509+94

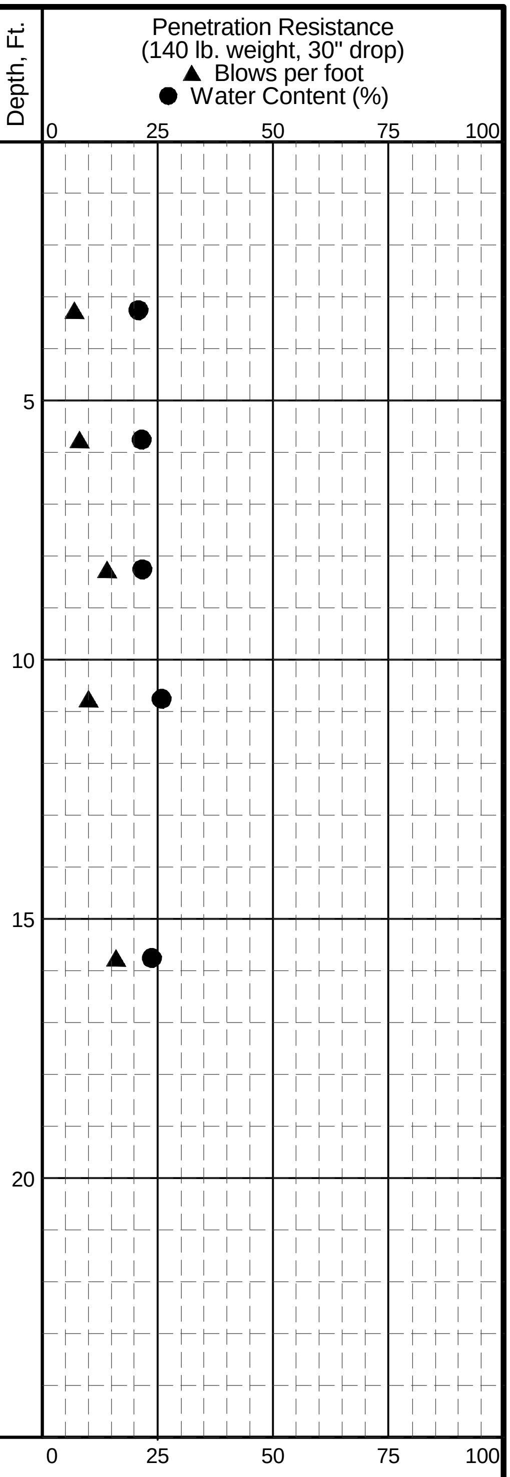
March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-63

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION Approx. Elevation: 183 Ft.	Depth, Ft.	Samples	Ground Water
2.5 feet snow cover			
Frozen, brown organic mat; moist	0.3		
Frozen, brown, slightly gravelly SILT; moist to wet			
Frozen to loose, brown, slightly gravelly, silty SAND; wet S1: 38% Fines (F3)	2.0	S1	
Loose, brown to gray, silty SAND; moist to wet; interbedded with brown SILT S2: 43% Fines (F3)	4.0	S2	
Medium dense, brown, silty SAND; wet S3: 43% Fines (F3)	7.0	S3	▽ 7 March 2006
Loose, brown SAND; wet	9.0		
Stiff, brown SILT; moist	10.5	S4	
Medium dense, brown, silty SAND; moist to wet; interbedded with brown SILT; moist	13.0	S5	
Bottom of Boring Boring Completed 7 March 2006	16.5		



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-061
Station 523+35 60 ft LOC

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-64

MATERIAL DESCRIPTION

Approx. Elevation: 199 Ft.

2 feet snow cover

Frozen, brown SILT; moist; with seams of SAND

Frozen to medium dense, brown, silty SAND; with 2-inch layers of SAND evey 4 to 8 inches

S2: 40% Fines (F3)

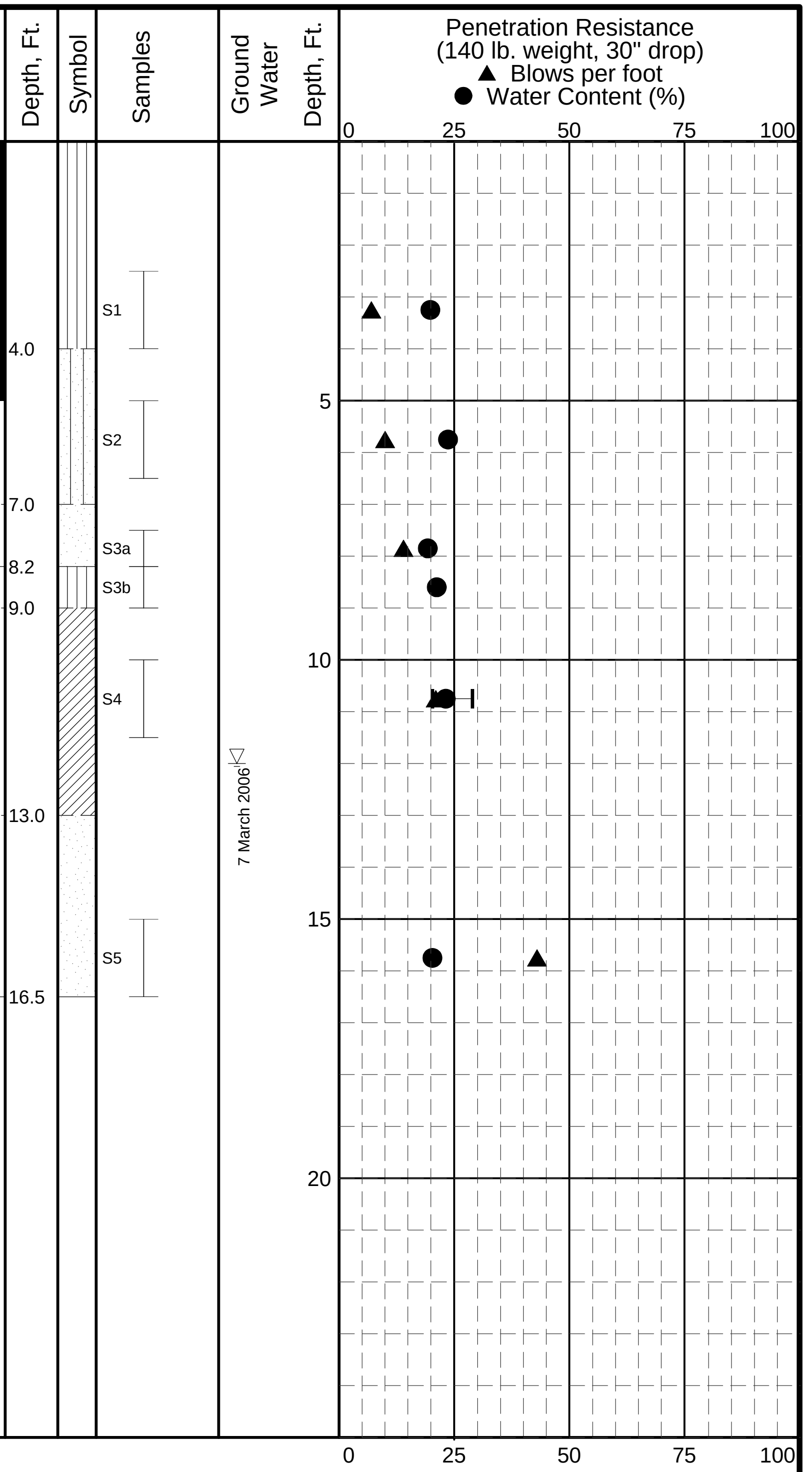
Medium dense, gray SAND; wet

Stiff, brown, sandy SILT; moist

Very stiff, gray to brown CLAY; moist

Dense, gray SAND; wet; interbedded with 1-inch lenses of SILT every 4 to 6 inches

Bottom of Boring
Boring Completed 7 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

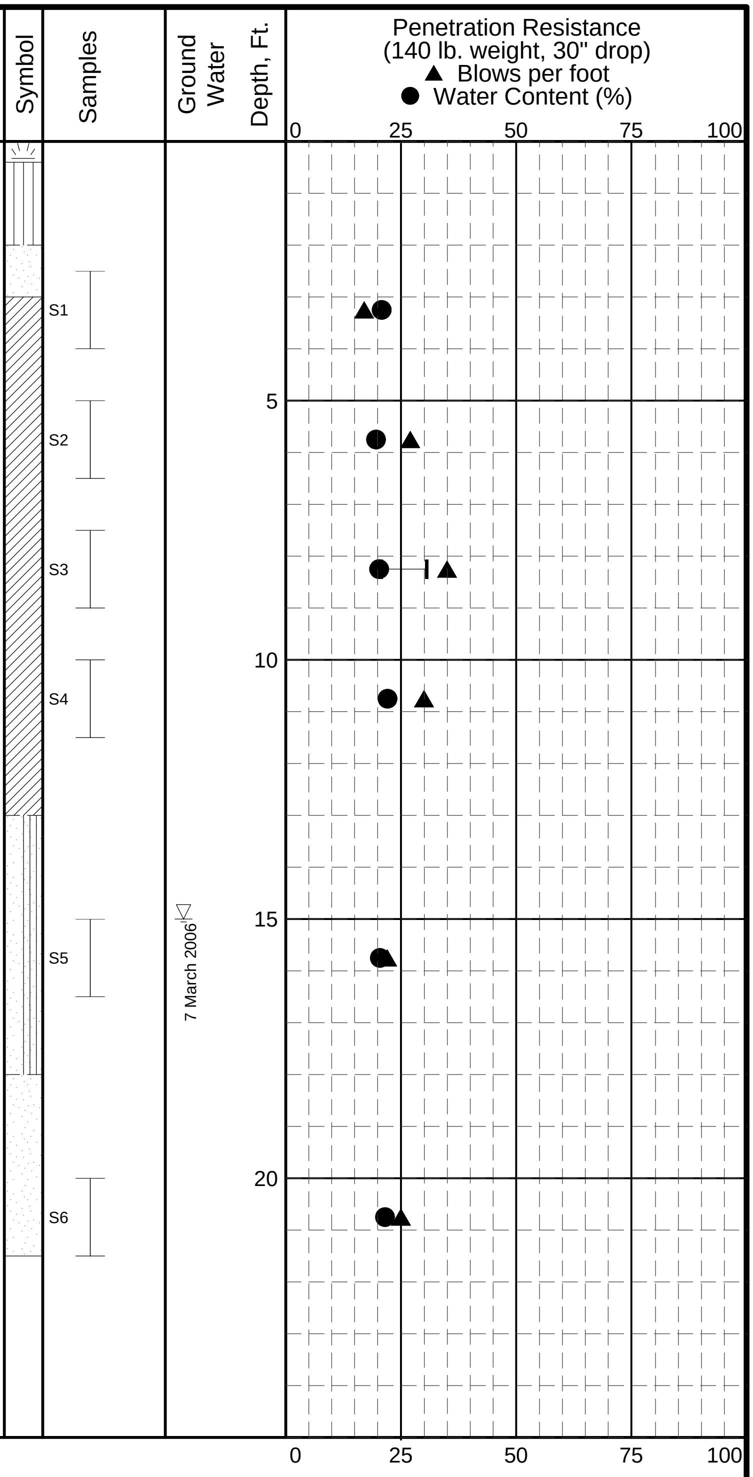
LOG OF BORING B-062
Station 532+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-65

MATERIAL DESCRIPTION Approx. Elevation: 236 Ft.	Depth, Ft.
1.5 feet snow cover	
3-inch frozen organic mat	0.4
Frozen, red-brown SILT; moist	
Frozen, brown SAND; moist	2.0
Frozen to very stiff to hard, brown CLAY; moist	3.0
Medium dense, brown, slightly silty SAND; wet; interbedded with 1-inch layers of SILT every 6 to 8 inches	13.0
Medium dense, brown SAND; wet; interbedded with 1.5-inch layers of SILT every 4 to 8 inches	18.0
Bottom of Boring Boring Completed 7 March 2006	21.5



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ■ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-063
Station 537+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-66

MATERIAL DESCRIPTION

Approx. Elevation: 245 Ft.

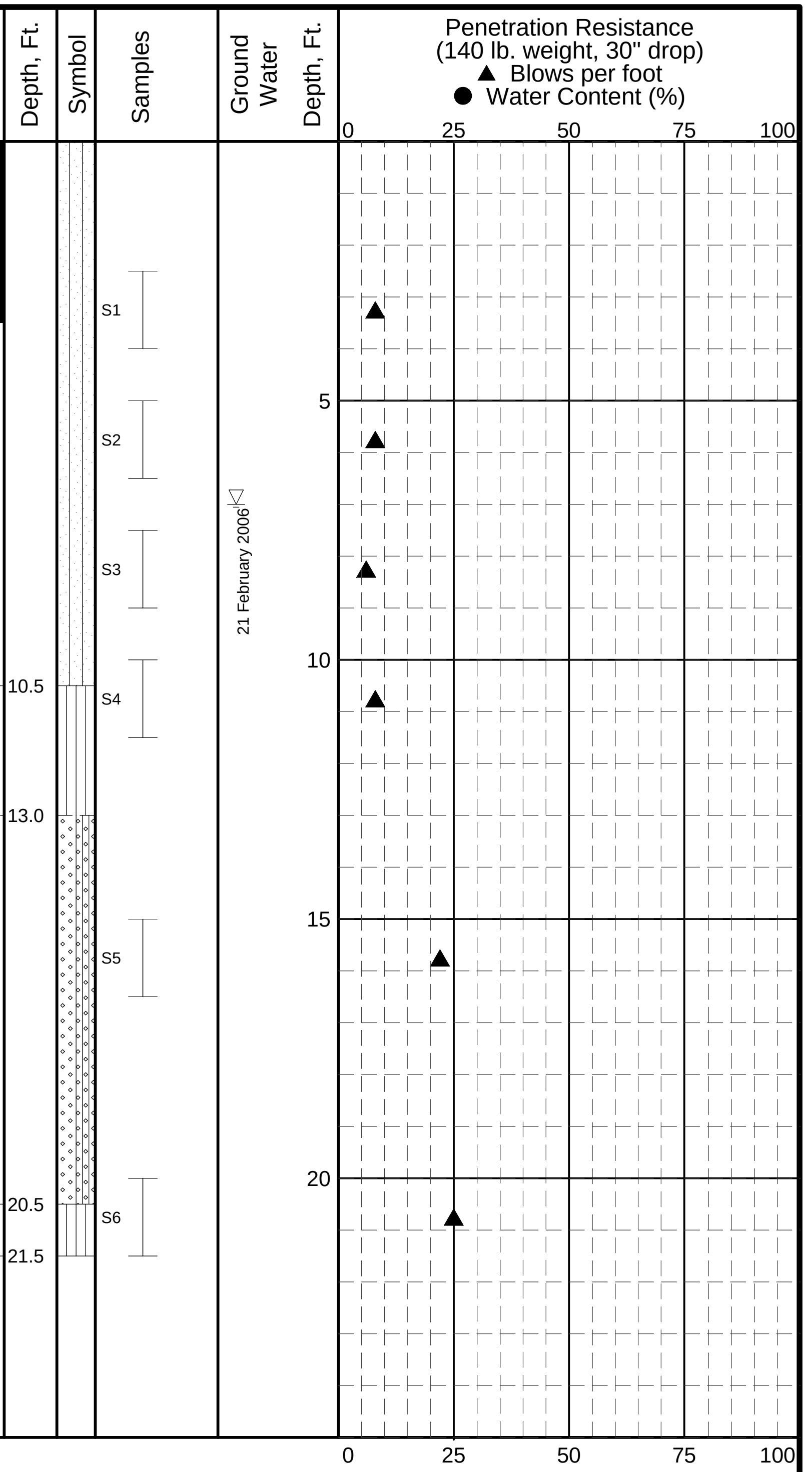
Frozen to loose, brown, silty SAND; moist to wet

Stiff, brown, sandy SILT; wet

Medium dense, brown, slightly silty SAND; wet

Very stiff, brown, slightly sandy SILT; wet
S6: PP = >4.5; TV = 0.85H 0.75V

Bottom of Boring
Boring Completed 21 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- ⫼ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

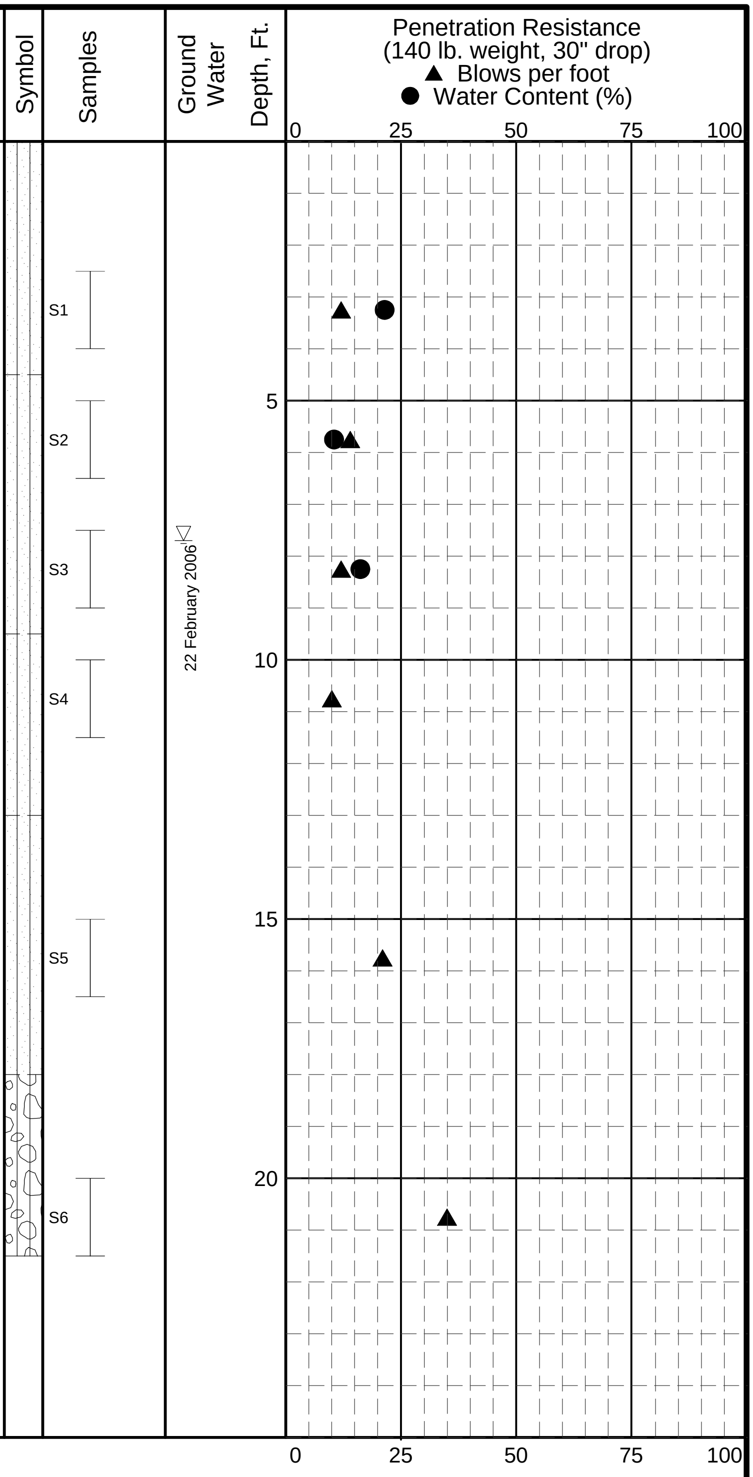
LOG OF BORING B-064
Station 545+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-67

MATERIAL DESCRIPTION Approx. Elevation: 243 Ft.	Depth, Ft.
1.5 feet snow cover Frozen, brown, silty SAND; moist	
Medium dense, brown, slightly gravelly, silty SAND; moist to wet S3: 12% Gravel, 54% Sand, 34% Fines (F3)	4.5
Medium dense, brown, silty SAND; wet	9.5
Medium dense, brown, slightly gravelly, silty SAND; wet	13.0
Dense, brown, silty, sandy GRAVEL; wet	18.0
Bottom of Boring Boring Completed 22 February 2006	21.5



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-065
Station 550+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

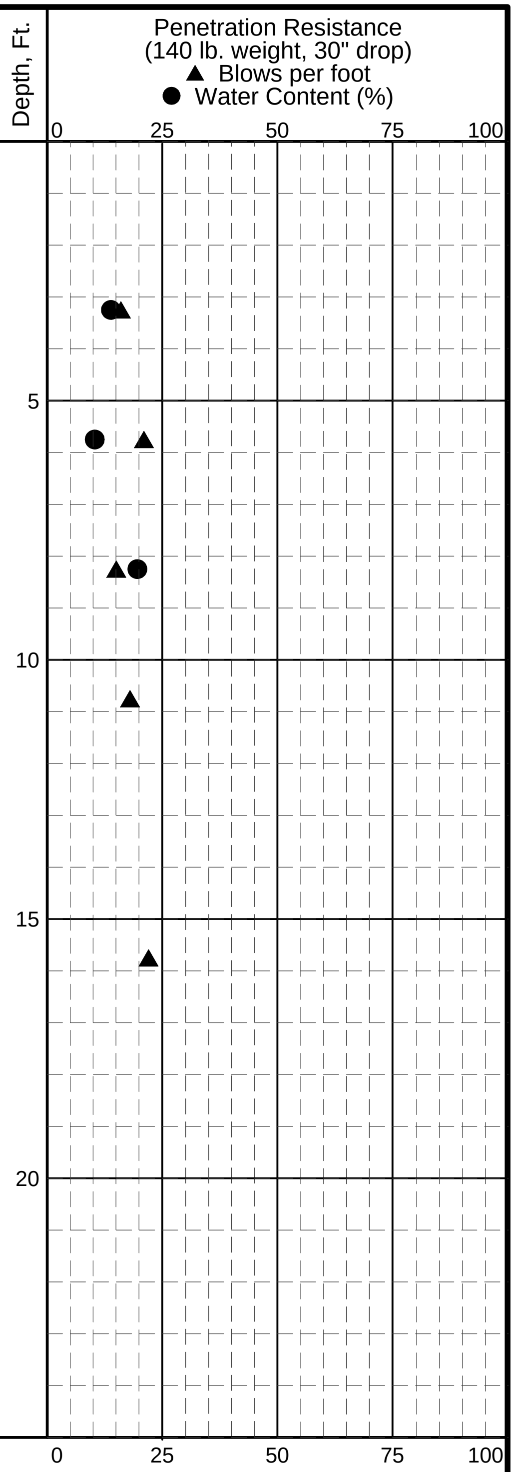
Fig. A-68

Approx. Elevation: 239 Ft.

MATERIAL DESCRIPTION	Depth, Ft.	Samples
2 feet snow cover Frozen, brown, silty SAND; moist		S1
Medium dense, brown, slightly gravelly, silty SAND; moist	4.5	S2
Very stiff, brown, slightly sandy SILT; moist	7.8	S3 S4
Medium dense, brown, gravelly SAND; moist	11.2	
Very stiff, brown, gravelly, sandy SILT; moist	13.0	S5
Bottom of Boring Boring Completed 22 February 2006	16.5	

Ground Water

Groundwater not encountered during drilling on 22 February 2006



LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

B Bulk Sample

▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-066
Station 555+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-69

MATERIAL DESCRIPTION

Approx. Elevation: 264 Ft.

Frozen to very stiff, brown, sandy SILT; moist to wet

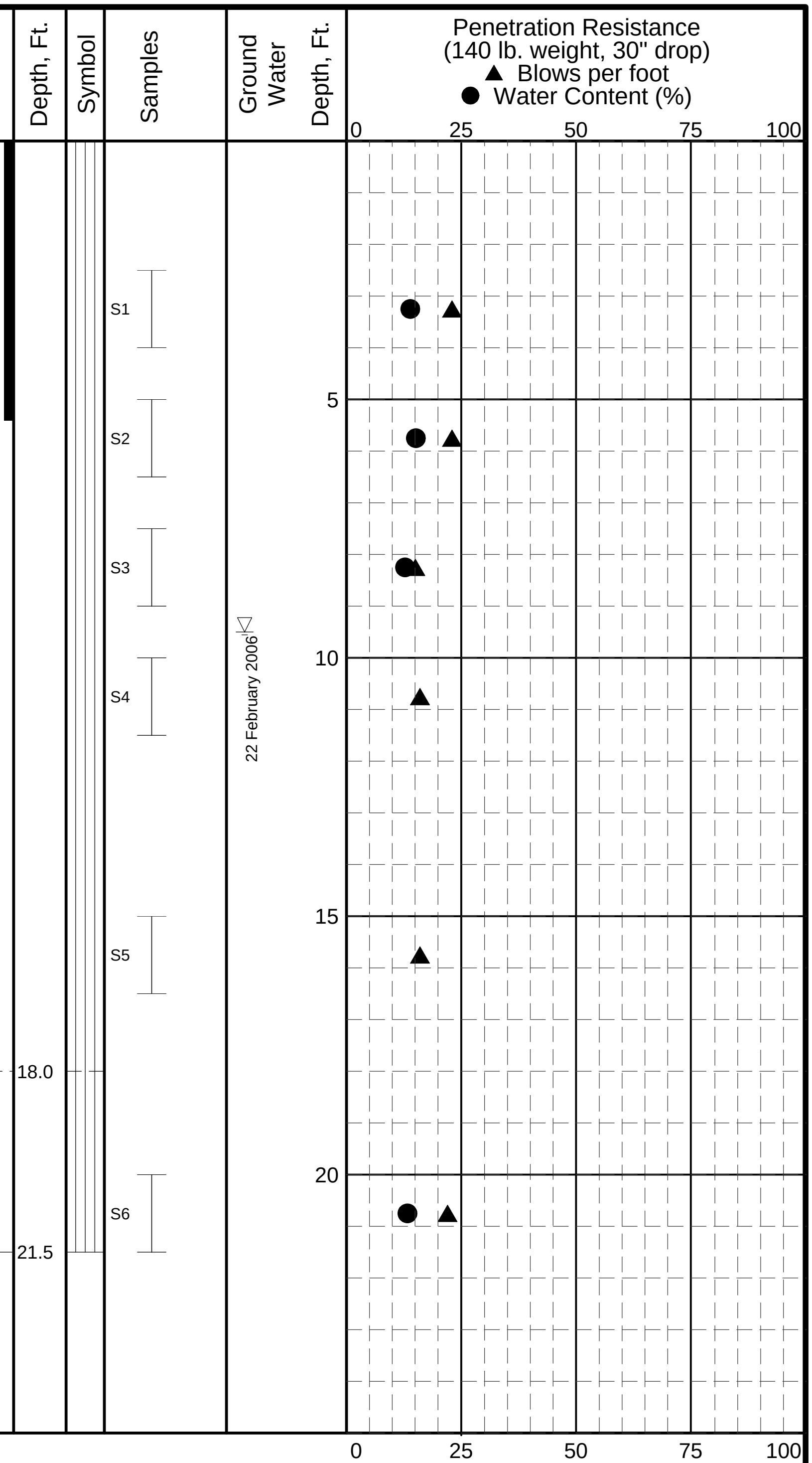
S2: 3% Gravel, 25% Sand, 72% Fines (F4)

Drilling action suggests boulder or cobbles from 13 to 14 feet bgs

Very stiff, brown, slightly gravelly, sandy SILT; wet

S6: 9% Gravel, 31% Sand, 59% Fines (F4)

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

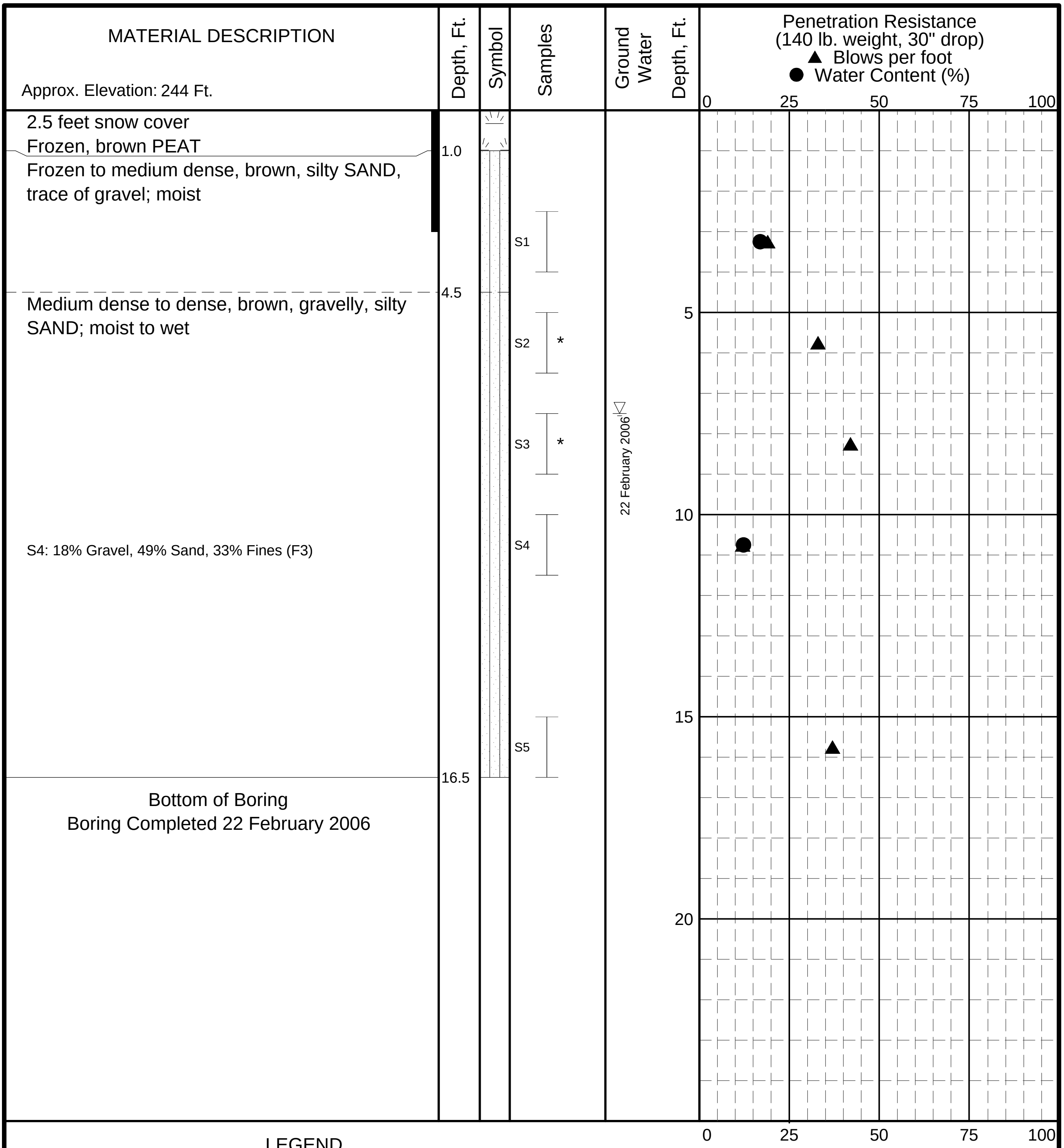
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-067
Station 560+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-70



2.5 feet snow cover

Frozen, brown PEAT

Frozen to medium dense, brown, silty SAND, trace of gravel; moist

Medium dense to dense, brown, gravelly, silty SAND; moist to wet

S4: 18% Gravel, 49% Sand, 33% Fines (F3)

Bottom of Boring
Boring Completed 22 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-068
Station 565+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-71

MATERIAL DESCRIPTION

Approx. Elevation: 236 Ft.

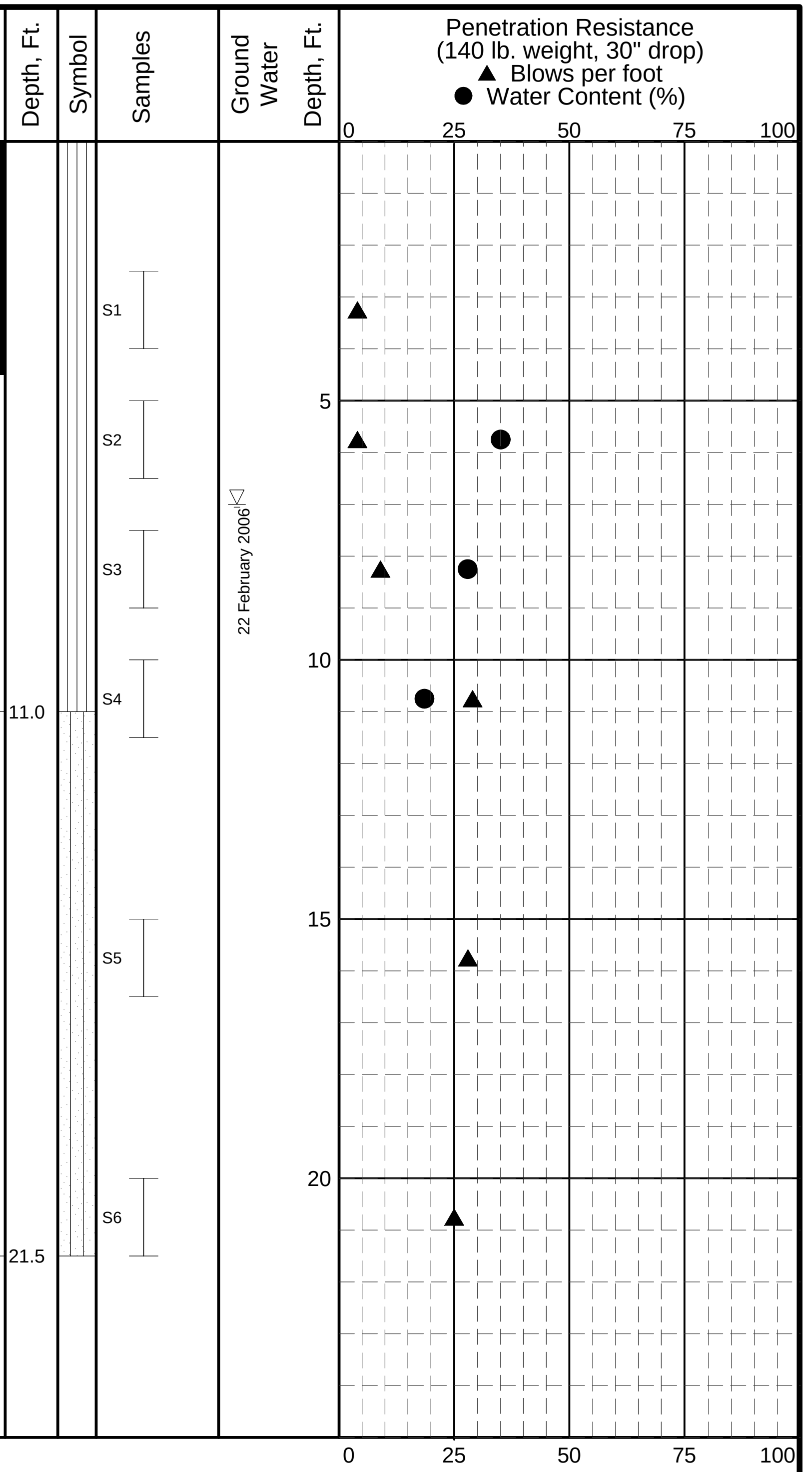
2 feet snow and brush cover

Frozen to medium stiff, brown, sandy SILT; moist to wet

S3: 0% Gravel, 13% Sand, 87% Fines (F4)

Medium dense, brown, slightly gravelly to gravelly, silty SAND; wet

Bottom of Boring
Boring Completed 22 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- Ᵽ Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

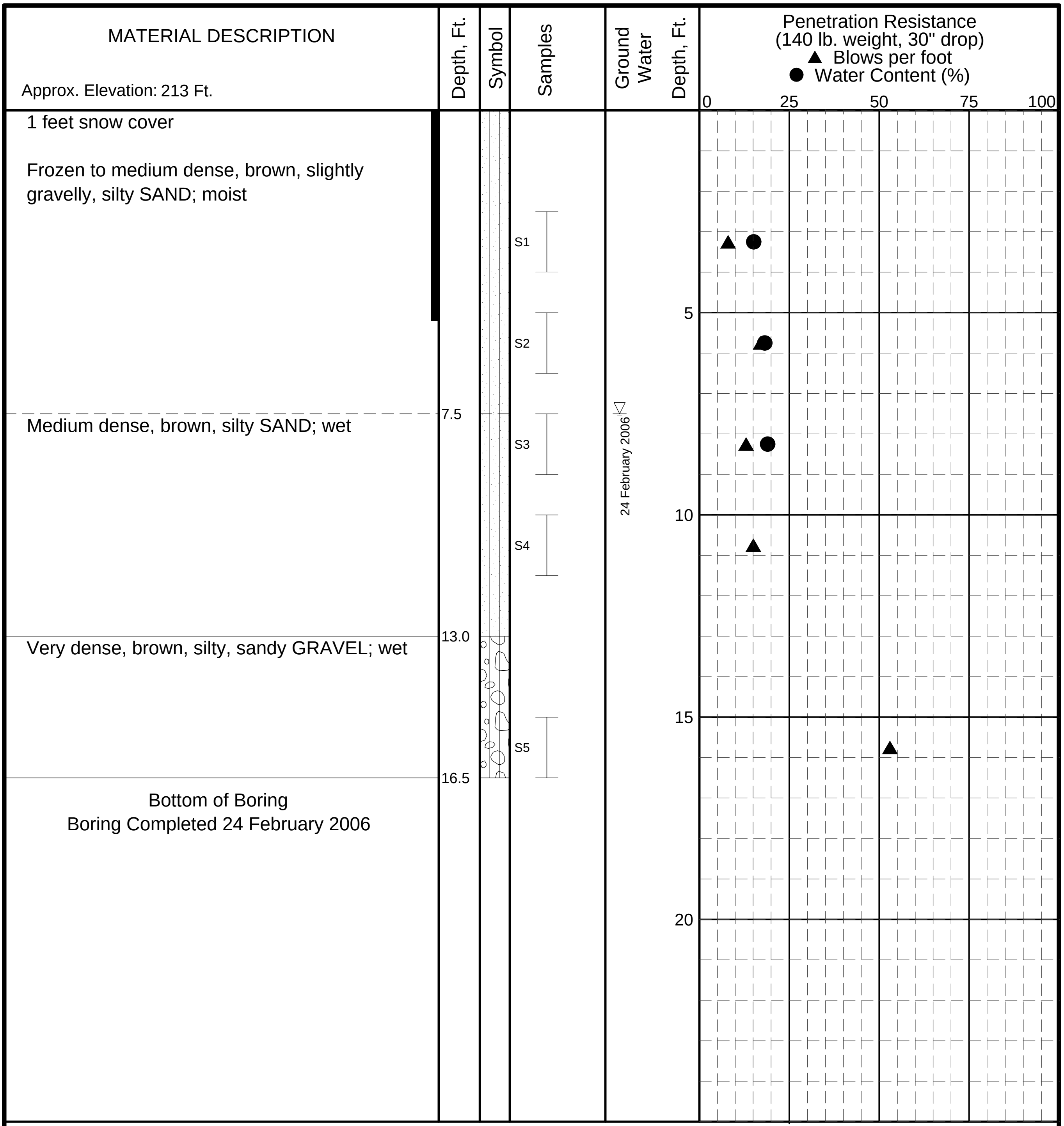
LOG OF BORING B-069
Station 571+00

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-72



1 feet snow cover

Frozen to medium dense, brown, slightly gravelly, silty SAND; moist

Medium dense, brown, silty SAND; wet

Very dense, brown, silty, sandy GRAVEL; wet

Bottom of Boring
Boring Completed 24 February 2006

LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-070
Station 575+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-73

MATERIAL DESCRIPTION

Approx. Elevation: 173 Ft.

Depth, Ft. | Symbol | Samples | Ground Water | Depth, Ft.

2 feet snow cover
Frozen, brown PEAT

1.5

Frozen to dense to very dense, brown, slightly silty, gravelly SAND; moist

S1

S2

S3: 40% Gravel, 48% Sand, 12% Fines (F2)

S3

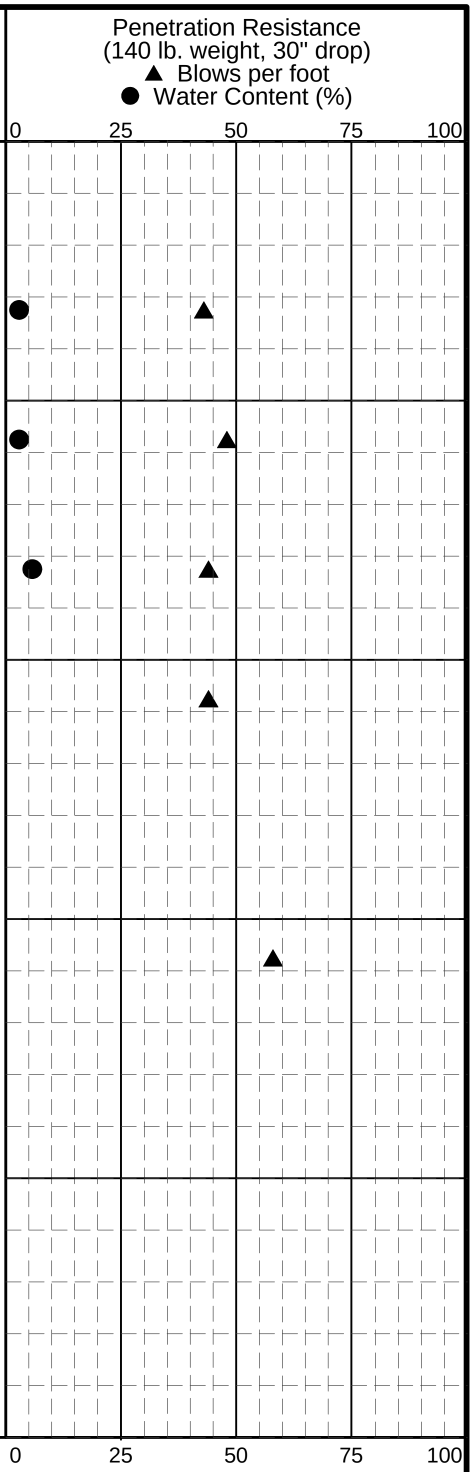
S4

S5

16.5

Bottom of Boring
Boring Completed 24 February 2006

Groundwater not encountered during drilling on 24 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

⊽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-071
Station 580+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-74

MATERIAL DESCRIPTION

Approx. Elevation: 179 Ft.

Depth, Ft.	Symbol	Samples	Ground Water	Depth, Ft.

1.5 feet snow cover

Frozen to loose to medium dense, brown, silty SAND; moist

S1

S2

6.3

Medium dense, brown, silty, sandy GRAVEL; moist

S3

9.5

Medium dense to dense, brown, silty SAND; wet

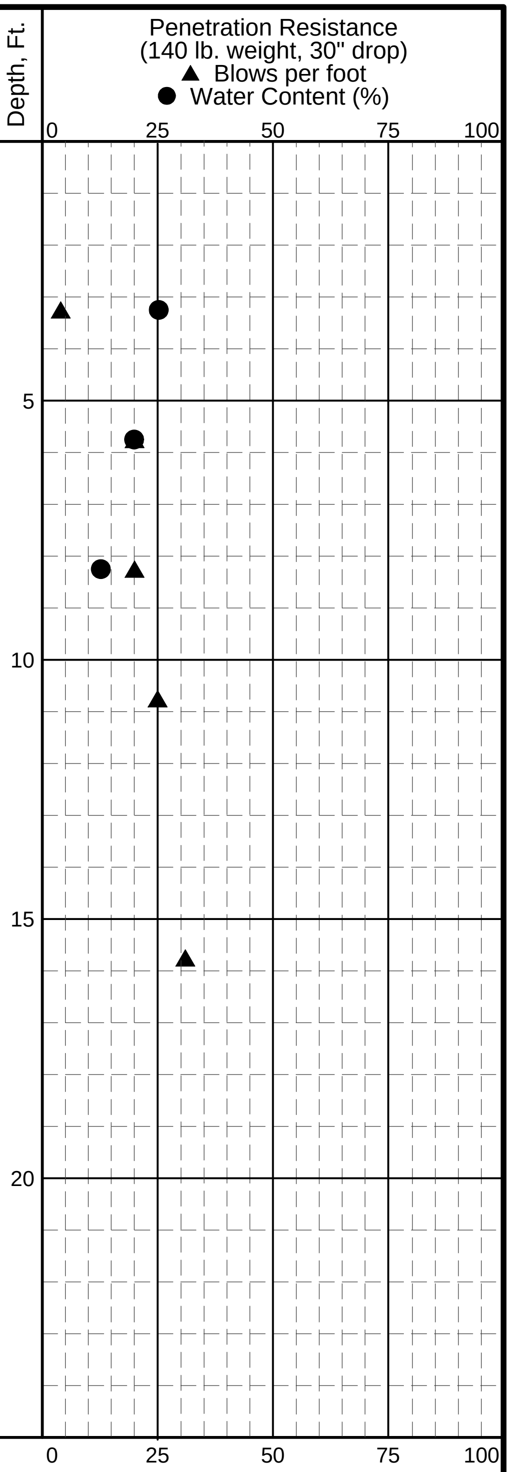
S4

S5

16.5

Bottom of Boring
Boring Completed 24 February 2006

Groundwater not encountered during drilling on 24 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
Ɓ Bulk Sample
▮ Frozen

⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-072
Station 586+00

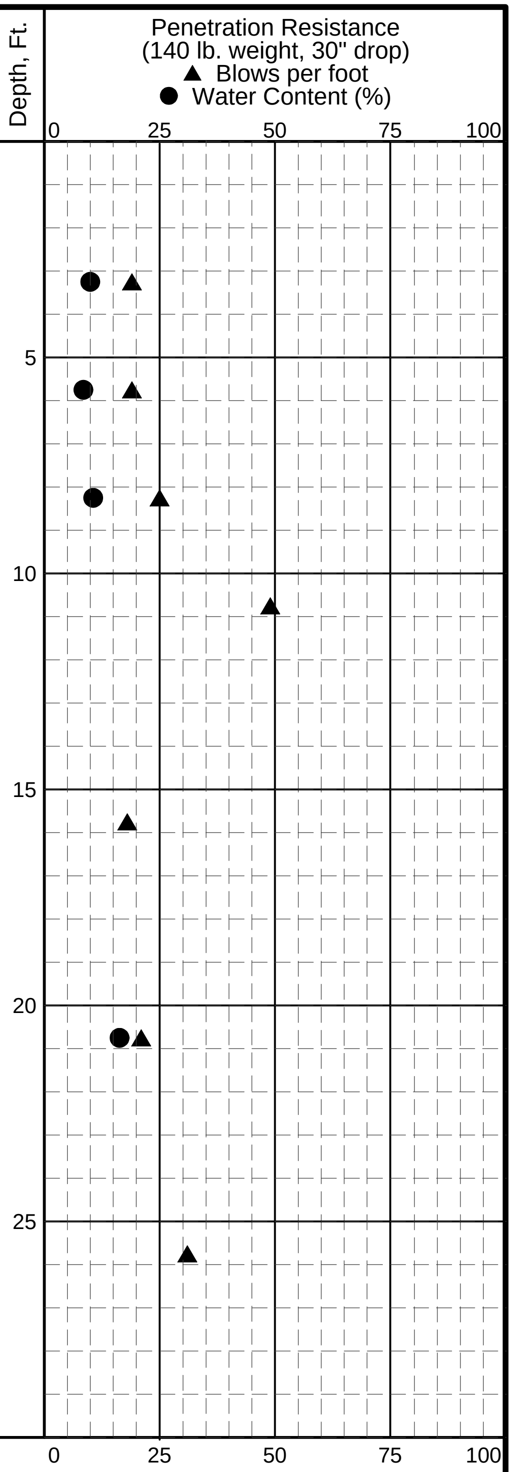
March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-75

MATERIAL DESCRIPTION Approx. Elevation: 210 Ft.	Depth, Ft.	Samples	Ground Water
2 feet snow cover Frozen, brown PEAT			
Frozen to medium dense, brown, slightly gravelly, silty SAND; moist	2.0	S1	
Medium dense to dense, brown, gravelly, silty SAND; wet	6.0	S2 S3 S4 *	▽ 24 February 2006
Very stiff, brown, sandy SILT; moist S6: 77.5% Fines (F4)	15.5	S5 S6	
Dense, brown SAND; moist	23.0	S7	
Bottom of Boring Boring Completed 24 February 2006	26.5		



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-073
Station 588+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-76

MATERIAL DESCRIPTION

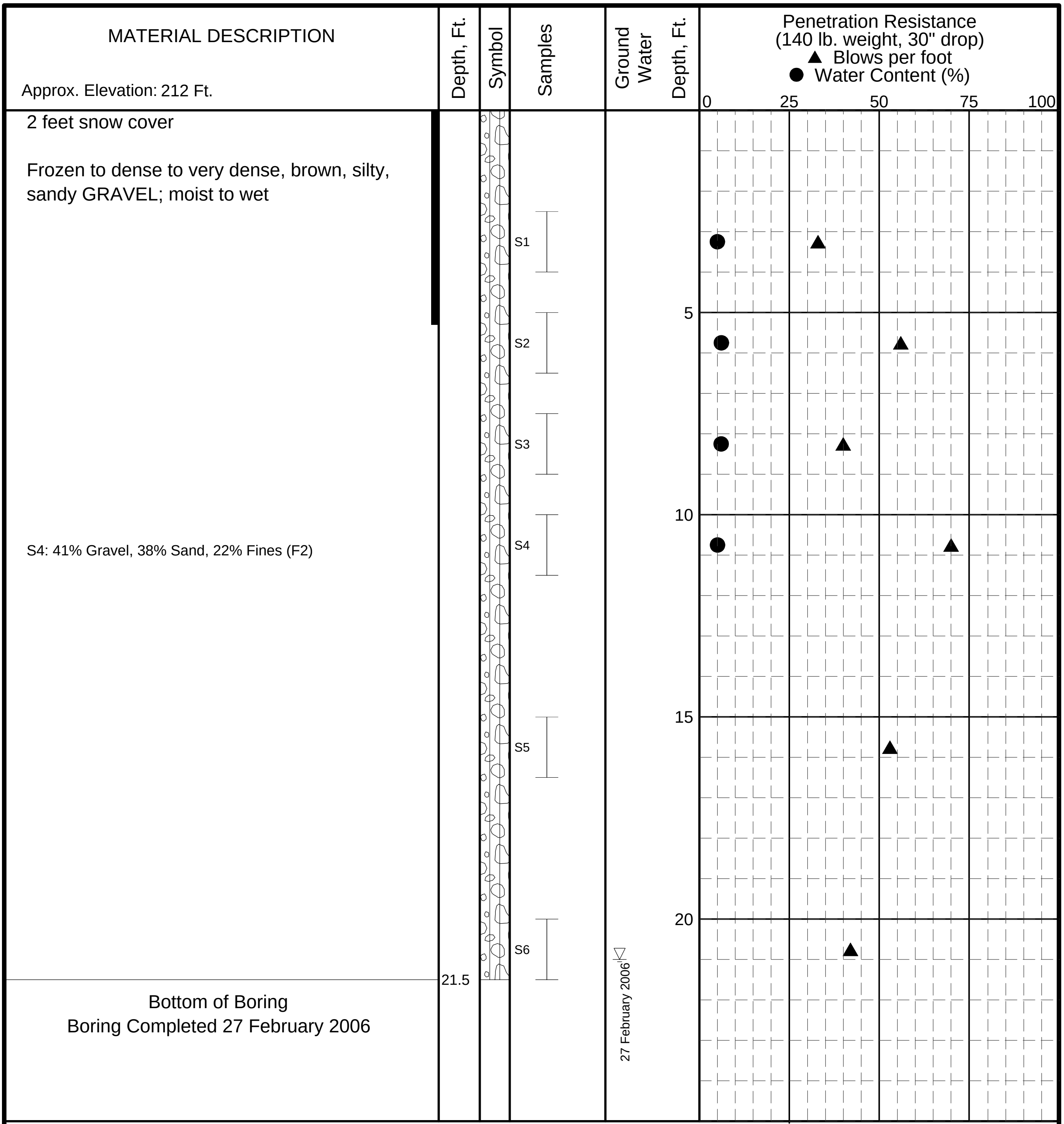
Approx. Elevation: 212 Ft.

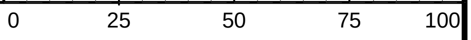
2 feet snow cover

Frozen to dense to very dense, brown, silty, sandy GRAVEL; moist to wet

S4: 41% Gravel, 38% Sand, 22% Fines (F2)

Bottom of Boring
Boring Completed 27 February 2006





LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-074
Station 593+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-77

MATERIAL DESCRIPTION

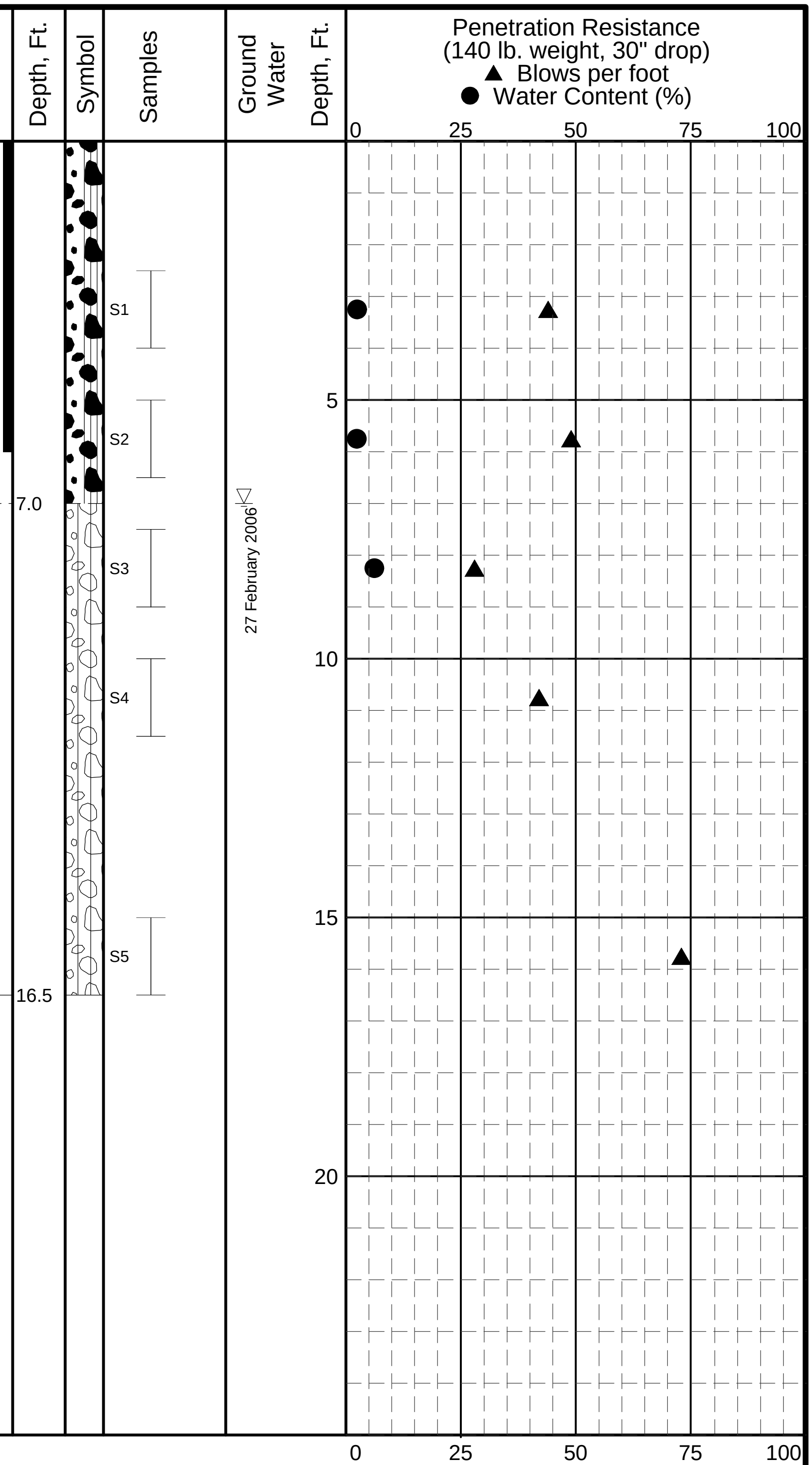
Approx. Elevation: 197 Ft.

1.5 feet snow cover

Frozen to dense, brown, slightly silty, sandy GRAVEL; moist

Medium dense to very dense, brown, silty, sandy GRAVEL; wet

Bottom of Boring
Boring Completed 27 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- ⌶ Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-075
Station 600+00

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-78

MATERIAL DESCRIPTION

Approx. Elevation: 196 Ft.

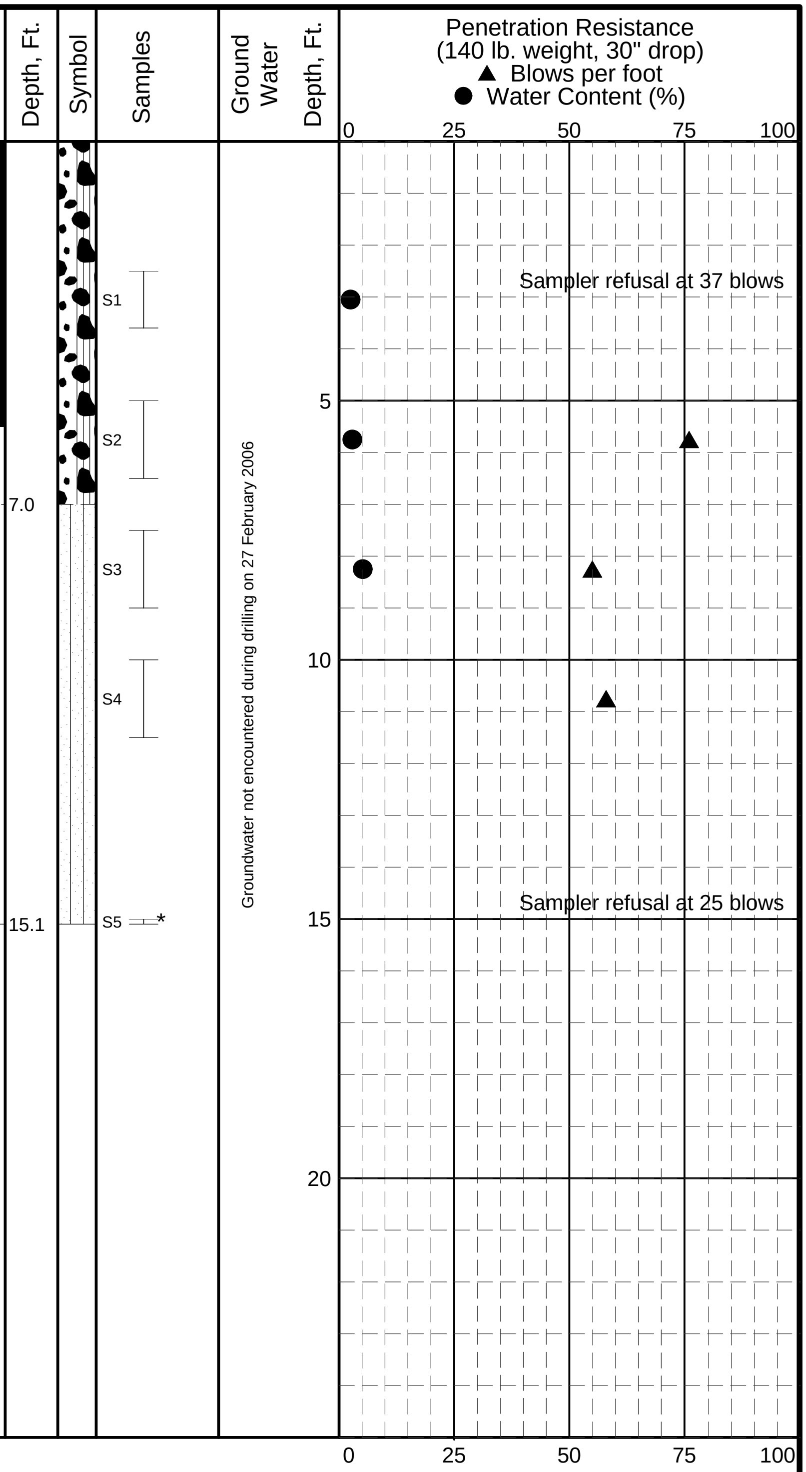
1 foot snow cover

Frozen to very dense, brown, slightly silty, sandy GRAVEL; moist

Very dense, brown, silty, gravelly SAND; moist

S3: 38% Gravel, 42% Sand, 20% Fines (F2)

Bottom of Boring
Boring Completed 27 February 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-076
Station 604+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-79

MATERIAL DESCRIPTION

Approx. Elevation: 258 Ft.

3 feet snow cover

Frozen, brown, silty, gravelly SAND; moist

Frozen to medium dense to dense, brown, silty, sandy GRAVEL; moist

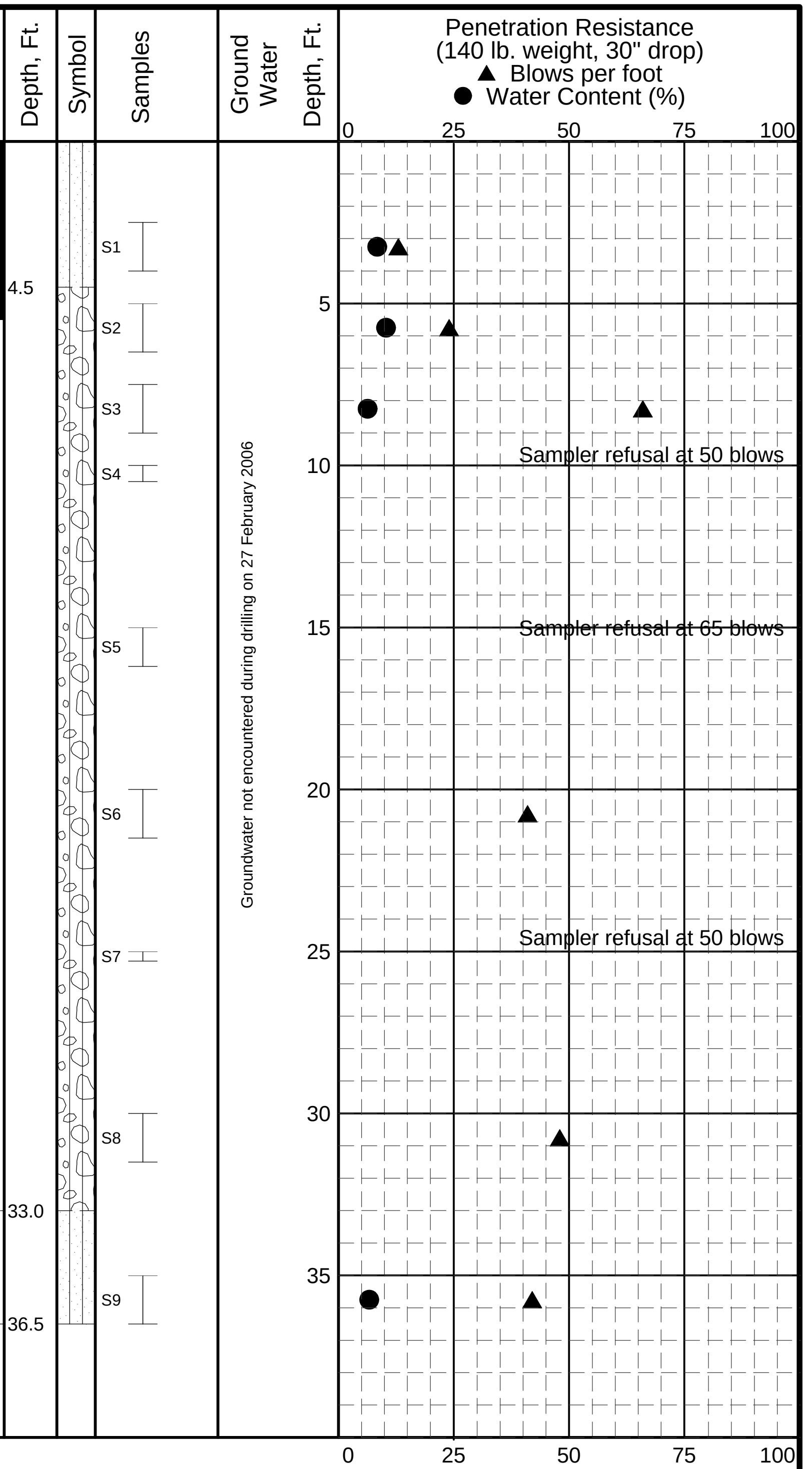
S3: 40% Gravel, 36% Sand, 24% Fines (F2)

Drilling action suggests boulders or cobbles from 20 to 35 feet bgs

Dense, brown, gravelly, silty SAND; moist

S9: 25% Gravel, 41% Sand, 34% Fines (F3)

Bottom of Boring
Boring Completed 27 February 2006



Groundwater not encountered during drilling on 27 February 2006

LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-077
Station 611+00

March 2007 32-1-01536-003

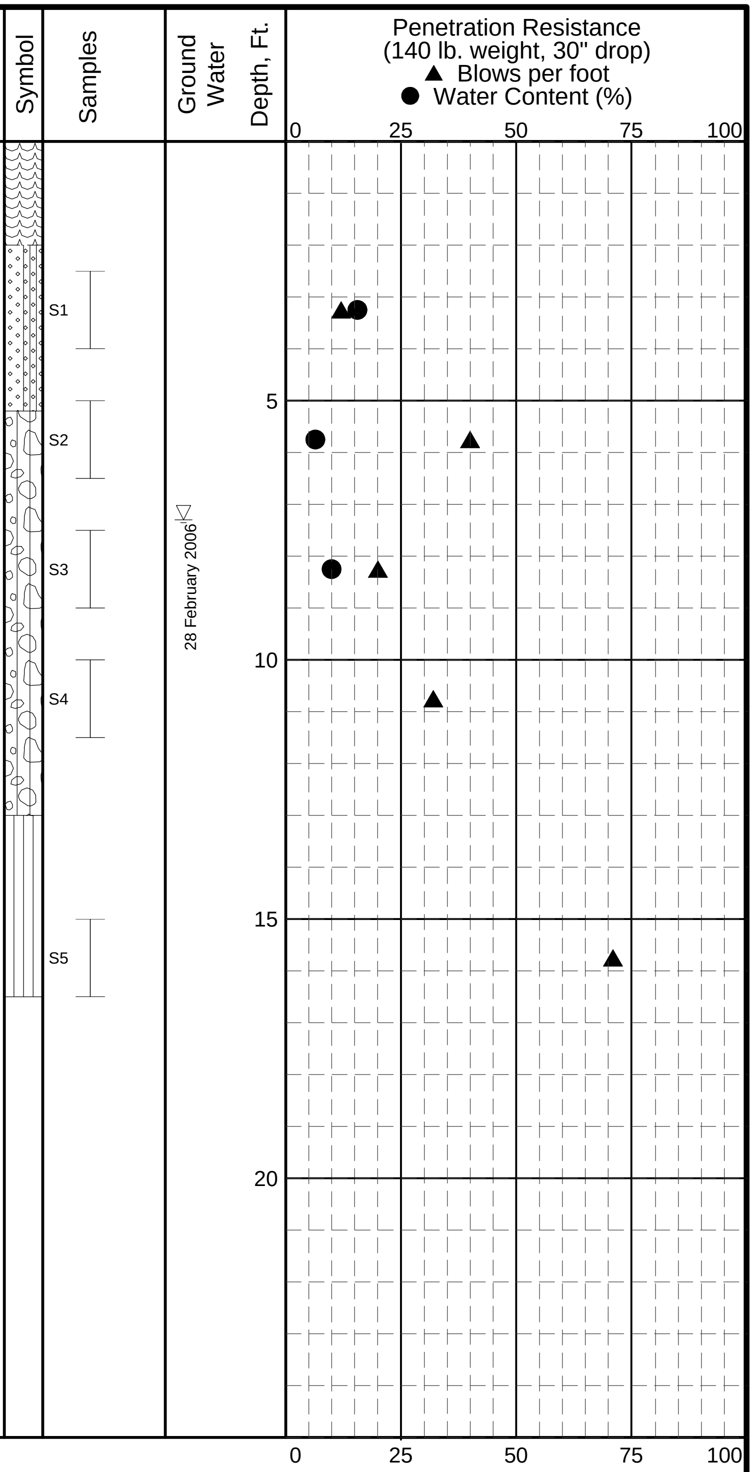
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-80

MATERIAL DESCRIPTION

Approx. Elevation: 233 Ft.

MATERIAL DESCRIPTION	Depth, Ft.
3 feet snow cover Frozen, brown, organic SILT; moist	
Frozen, brown, slightly silty SAND; moist	2.0
Medium dense to dense, brown, silty, sandy GRAVEL; moist to wet	5.2
Hard, brown, sandy, gravelly SILT; wet	13.0
Bottom of Boring Boring Completed 28 February 2006	16.5



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ∇ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-078
Station 615+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-81

MATERIAL DESCRIPTION

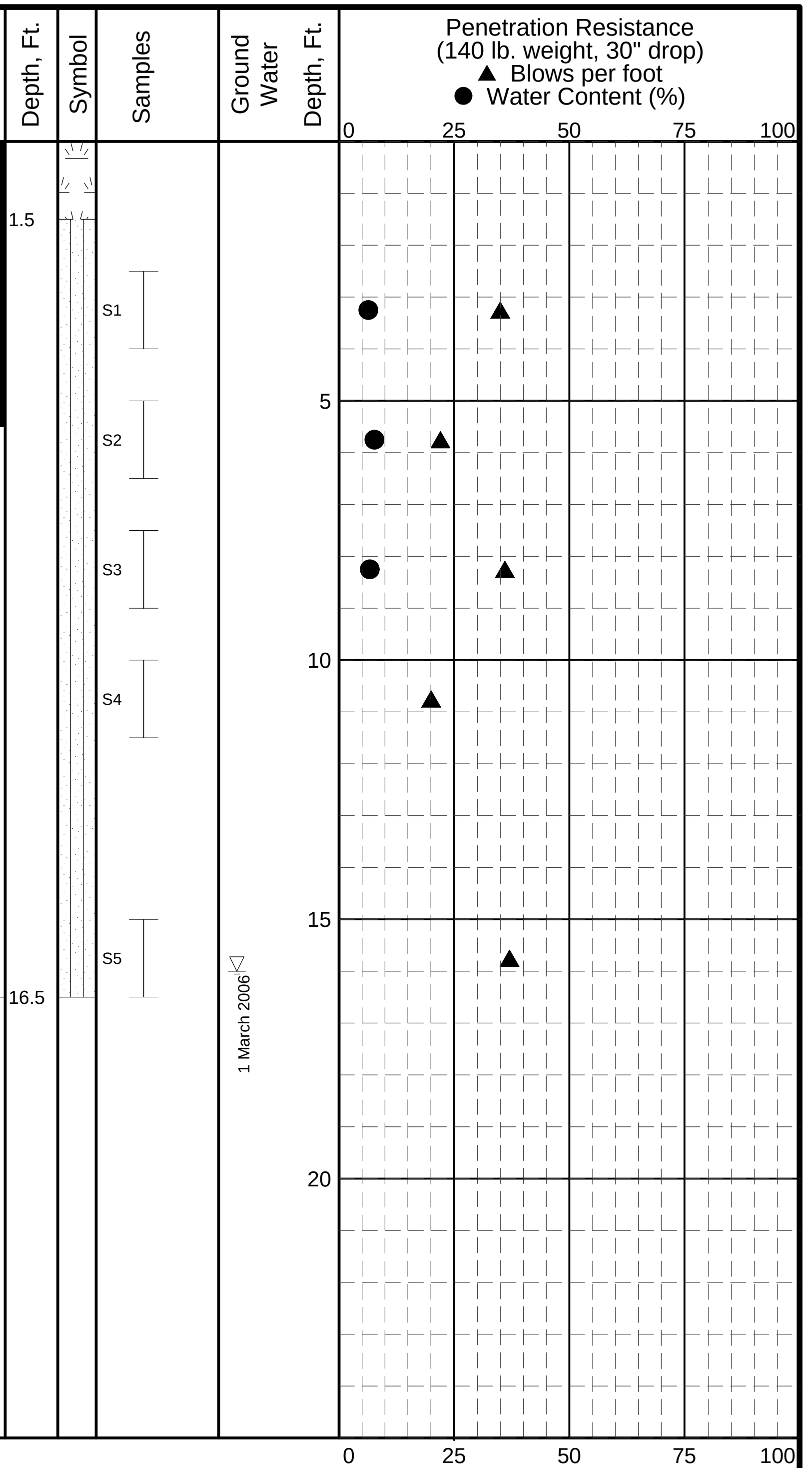
Approx. Elevation: 256 Ft.

3 feet snow cover
Frozen, brown PEAT

Frozen to medium dense to dense, brown, silty, gravelly SAND; moist to wet

S3: 30% Gravel, 47% Sand, 24% Fines (F3)

Bottom of Boring
Boring Completed 1 March 2006



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
▮ Frozen

Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-079
Station 620+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-82

MATERIAL DESCRIPTION

Approx. Elevation: 267 Ft.

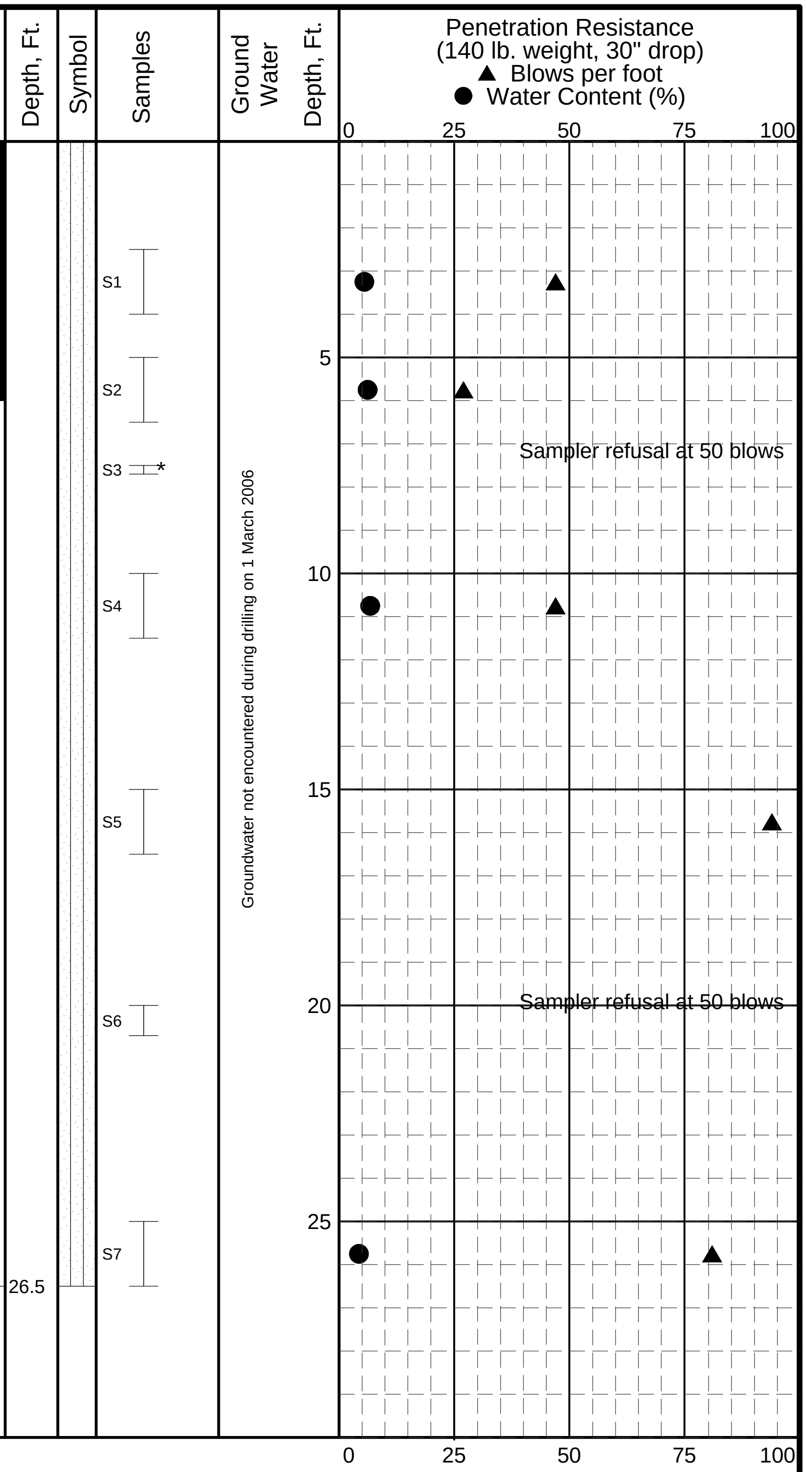
2.5 feet snow cover

Frozen to medium dense to very dense, brown, silty, gravelly SAND; moist

Drilling action suggests boulders or cobbles from 7.5 to 26.5 feet bgs

S7: 31% Gravel, 45% Sand, 24% Fines (F3)

Bottom of Boring
Boring Completed 1 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- ⌶ Bulk Sample
- ▮ Frozen
- ⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-080
Station 625+00

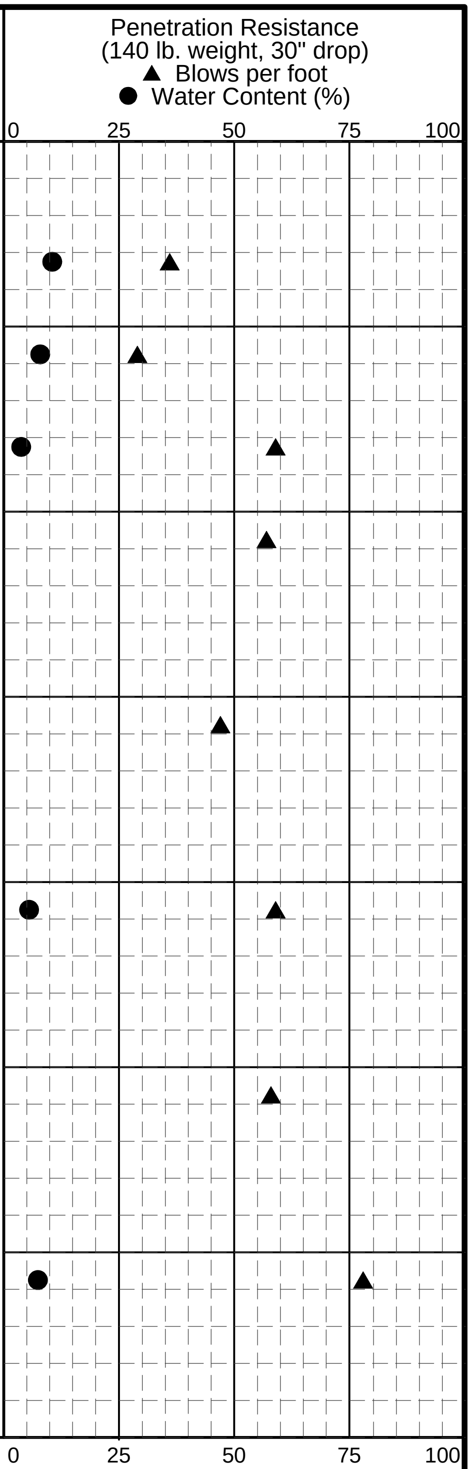
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-83

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION Approx. Elevation: 266 Ft.	Depth, Ft.	Samples	Ground Water
3 feet snow cover Frozen, brown PEAT			
Frozen to medium dense to very dense, brown, silty, gravelly SAND; moist to wet	2.0	S1 S2 S3 S4 S5	▽ 1 March 2006
S6: 33% Gravel, 43% Sand, 24% Fines (F3)		S6 S7	
Very dense, brown, gravelly, silty SAND; wet	28.0		
S8: 21% Gravel, 45% Sand, 34% Fines (F3)		S8	
Bottom of Boring Boring Completed 1 March 2006	31.5		



LEGEND

* Sample Not Recovered
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Bulk Sample
▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-081
Station 630+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-84

MATERIAL DESCRIPTION

Approx. Elevation: 242 Ft.

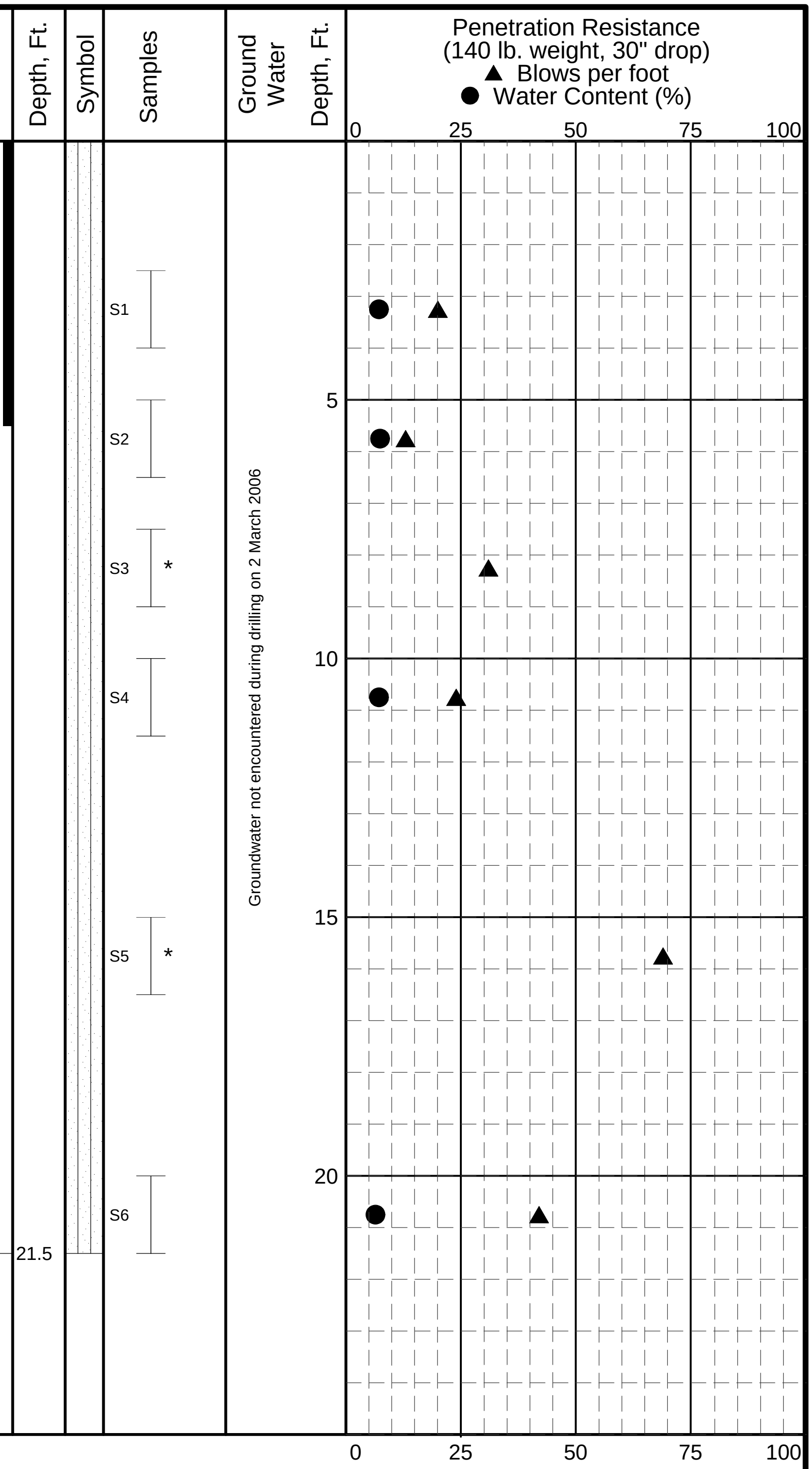
2 feet snow cover

Frozen to medium dense to very dense, brown, silty, gravelly SAND; moist

S6: 32% Gravel, 41% Sand, 27% Fines (F3)

21.5

Bottom of Boring
Boring Completed 2 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-082
Station 635+00

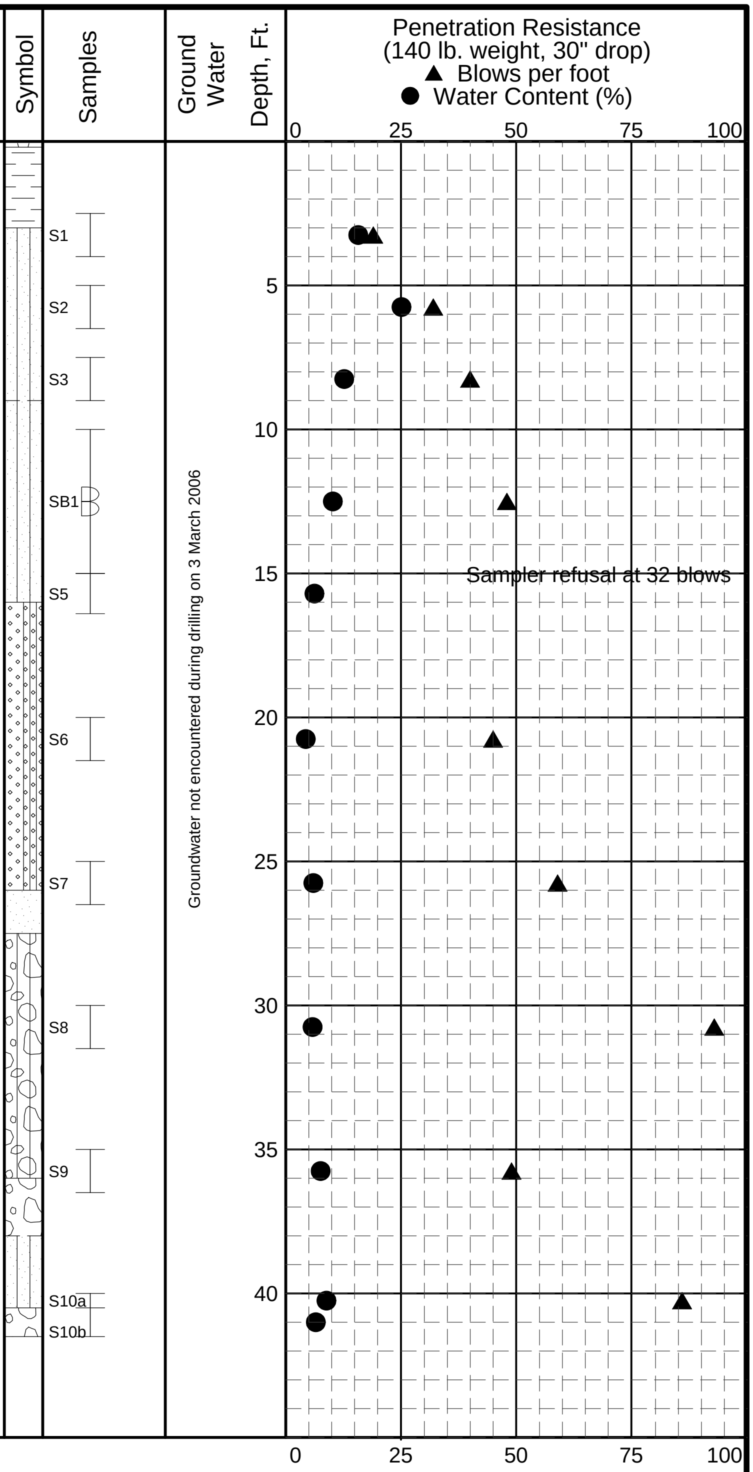
March 2007

32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-85

MATERIAL DESCRIPTION Approx. Elevation: 234 Ft.	Depth, Ft.
1.5 feet snow cover 2-inch organic mat	0.2
Frozen, brown, organic SILT; moist	
Dense, brown, silty SAND; moist	3.0
S3: 41% Fines (F3)	
Dense, brown, gravelly, silty SAND; moist	9.0
SB1: 26% Gravel, 39% Sand, 35% Fines (F3)	
Dense to very dense, gray to brown, slightly silty, gravelly SAND; moist	16.0
S6: 41% Gravel, 48% Sand, 11% Fines (F1)	
Very dense, brown SAND; moist	26.0
Dense to very dense, brown, silty, sandy GRAVEL; moist to wet	27.5
Very dense, gray, sandy GRAVEL; moist	36.0
Dense, brown, silty SAND; moist	38.0
S10a: 35% Fines (F3)	
Very dense, gray, sandy GRAVEL; moist	40.5
Bottom of Boring Boring Completed 3 March 2006	41.5



Groundwater not encountered during drilling on 3 March 2006

LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-083
Station 642+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

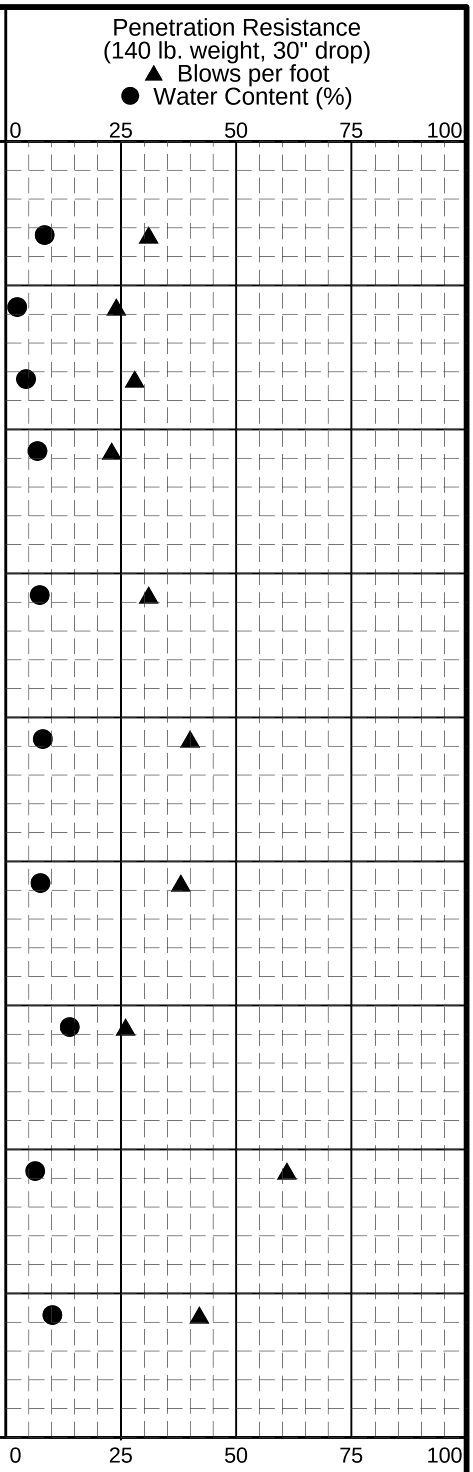
Fig. A-86

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

Approx. Elevation: 220 Ft.

MATERIAL DESCRIPTION	Depth, Ft.	Samples	Ground Water
2 feet snow cover Frozen, brown PEAT	2.0		
Dense, brown, silty GRAVEL; moist S1: 31.5% Fines (F3)	3.5	S1	
Dense, gray, slightly silty, gravelly SAND; moist S2: 43% Gravel, 49% Sand, 8% Fines (F2)	7.0	S2	
Medium dense, brown, silty GRAVEL; moist	9.0	S3	
Dense, brown, gravelly, silty SAND; moist S5: 26% Gravel, 44% Sand, 30% Fines (F3) S7: 25% Gravel, 43% Sand, 31% Fines (F3)	28.0	S4 S5 S6 S7	
Dense, brown, gravelly, sandy SILT; moist	30.5		
Medium dense, brown, slightly silty SAND; moist to wet	31.5	S8	
Very dense, brown, silty, gravelly SAND; moist to wet S9: 32% Gravel, 43% Sand, 24% Fines (F3)	40.5	S9	
Dense, brown, gravelly SAND; wet	41.5	S10	⊻ 3 March 2006

Bottom of Boring
Boring Completed 3 March 2006



LEGEND

* Sample Not Recovered
⌶ 2" O.D. Split Spoon Sample
Ⅲ 3" O.D. Split Spoon Sample
B Bulk Sample
▮ Frozen
⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-084
Station 646+00

March 2007 32-1-01536-003

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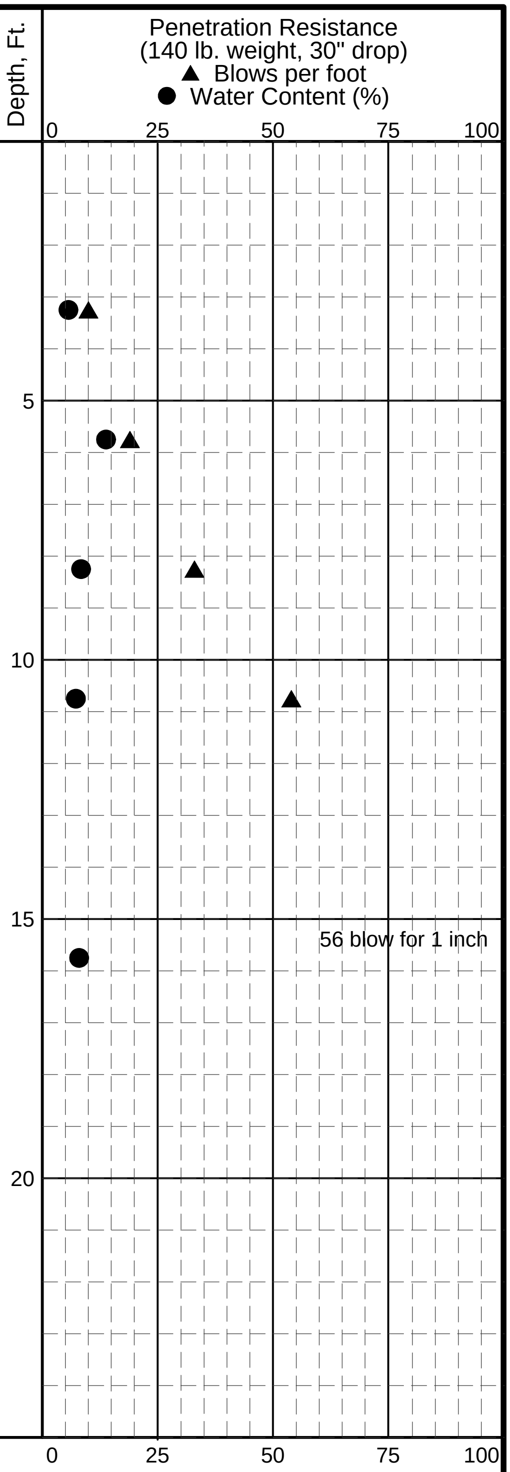
Geotechnical and Environmental Consultants

Fig. A-87

MATERIAL DESCRIPTION Approx. Elevation: 161 Ft.	Depth, Ft.	Symbol	Samples	Ground Water
2 feet snow cover Frozen, brown PEAT				
Medium dense to very dense, gray, gravelly, silty SAND; moist S1: 48% Fines (F3)	2.0		S1	Groundwater not encountered during drilling on 6 March 2006
			S2	
S3: 18% Gravel, 46% Sand, 37% Fines (F3)			S3	
S4: 34% Fines (F3)			S4	
			S5	
Bottom of Boring Boring Completed 6 March 2006	16.5			



● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

Ⓑ Bulk Sample

■ Frozen

▽ Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-085
Station 650+00

March 2007 32-1-01536-003

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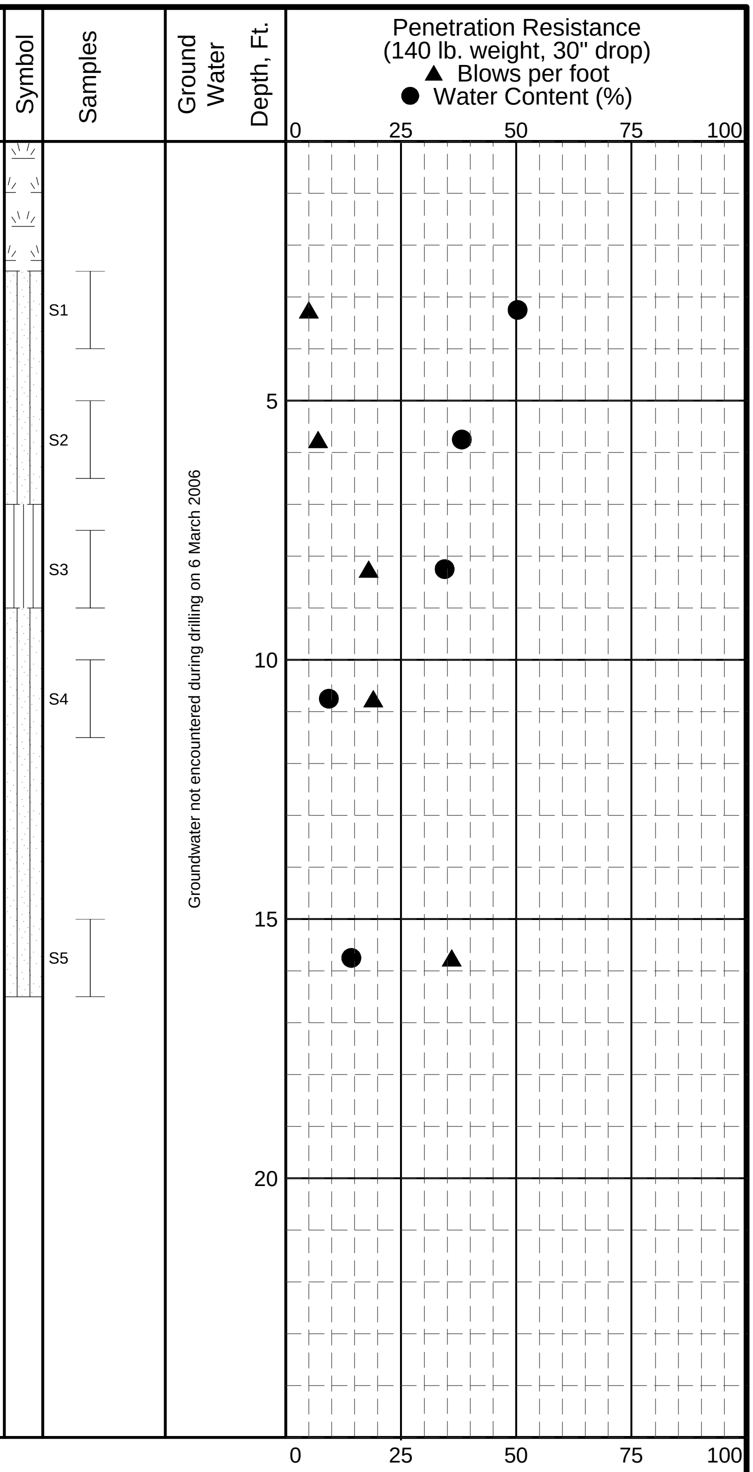
Geotechnical and Environmental Consultants

Fig. A-88

MATERIAL DESCRIPTION

Approx. Elevation: 149 Ft.

Material Description	Depth, Ft.
1.5 feet snow cover Soft, brown, silty PEAT; moist	
Loose, dark brown, slightly gravelly, silty SAND; moist; numerous organics S1: 15.9% organics S2: 6% Gravel, 54% Sand, 40% Fines (F3)	2.5
Very stiff, brown SILT; moist	7.0
Medium dense to dense, gray, slightly gravelly, silty SAND; moist S4: 44% Fines (F3)	9.0
Bottom of Boring Boring Completed 6 March 2006	16.5



LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

B Bulk Sample

▮ Frozen

⊻ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-086
Station 660+00

March 2007

32-1-01536-003

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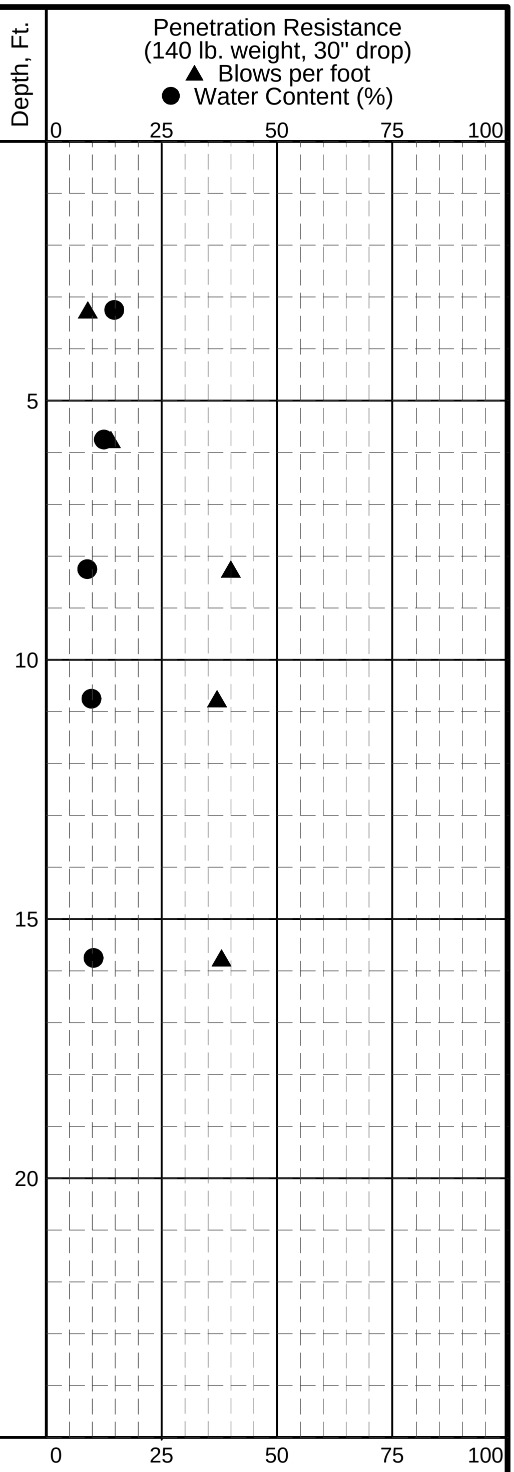
Fig. A-89

MATERIAL DESCRIPTION Approx. Elevation: 171 Ft.	Depth, Ft.	Samples	Ground Water
2 feet snow cover Soft, brown, silty PEAT; moist			
Loose to medium dense, gray, slightly gravelly, silty SAND; moist S1: 37% Fines (F3)	3.0	S1	
		S2	
Dense, gray, gravelly, silty SAND; moist S3: 20% Gravel, 51% Sand, 29% Fines (F3)	7.0	S3	
S4: 36% Fines (F3)		S4	
Dense, gray, gravelly SAND; moist to wet	13.0		▽ 6 March 2006
Dense, gray, gravelly, silty SAND; wet	15.5	S5	
Bottom of Boring Boring Completed 6 March 2006	16.5		



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- Ᵹ Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

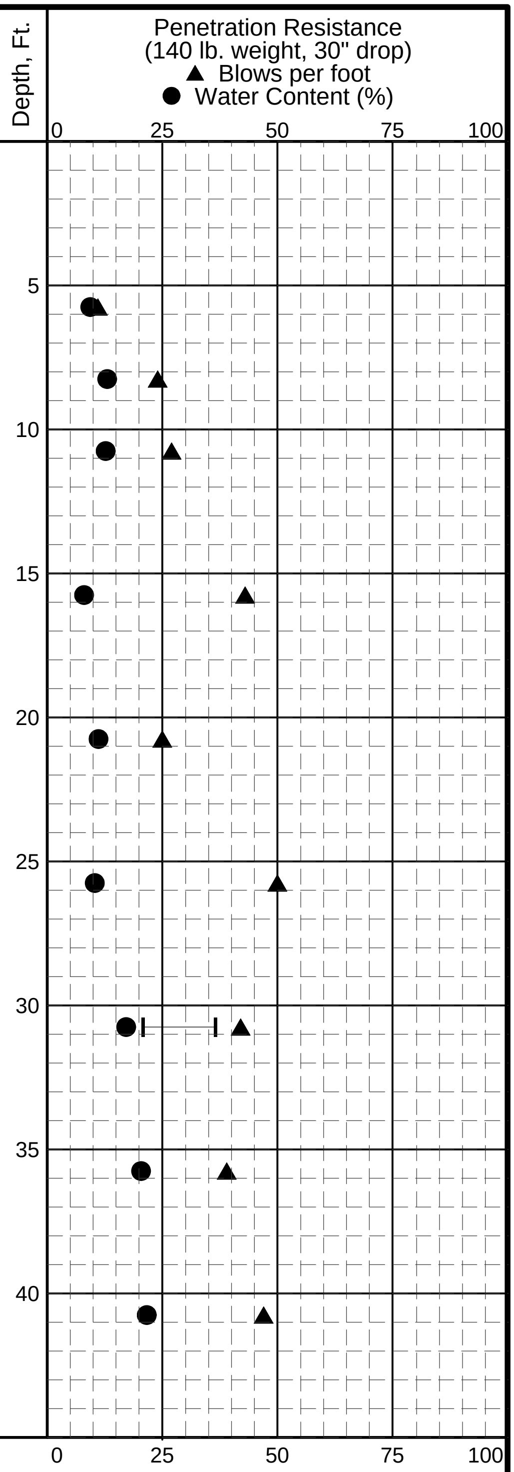
LOG OF BORING B-087
Station 670+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-90

MATERIAL DESCRIPTION Approx. Elevation: 215 Ft.	Depth, Ft.	Symbol	Samples	Ground Water
2.5 feet snow cover Frozen to medium dense to dense, brown, gravelly, silty SAND; moist to wet S1: 32% Fines (F3) S2: 19% Gravel, 56% Sand, 25% Fines (F3)			S1 S2 S3	
Medium dense to dense, brown and gray, slightly gravelly, silty SAND; moist to wet S5: 10% Gravel, 48% Sand, 42% Fines (F3) S6: 40% Fines (F3)	16.0		S4 S5 S6	▽ 17 February 2006
Hard, gray, silty CLAY; moist; with seams of silty fine SAND S7: PP = >4.5; TV = 1.2H 1.2V	27.0		S7 S8 S9	
Bottom of Boring Boring Completed 17 February 2006	41.5			



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-088
Station 677+00

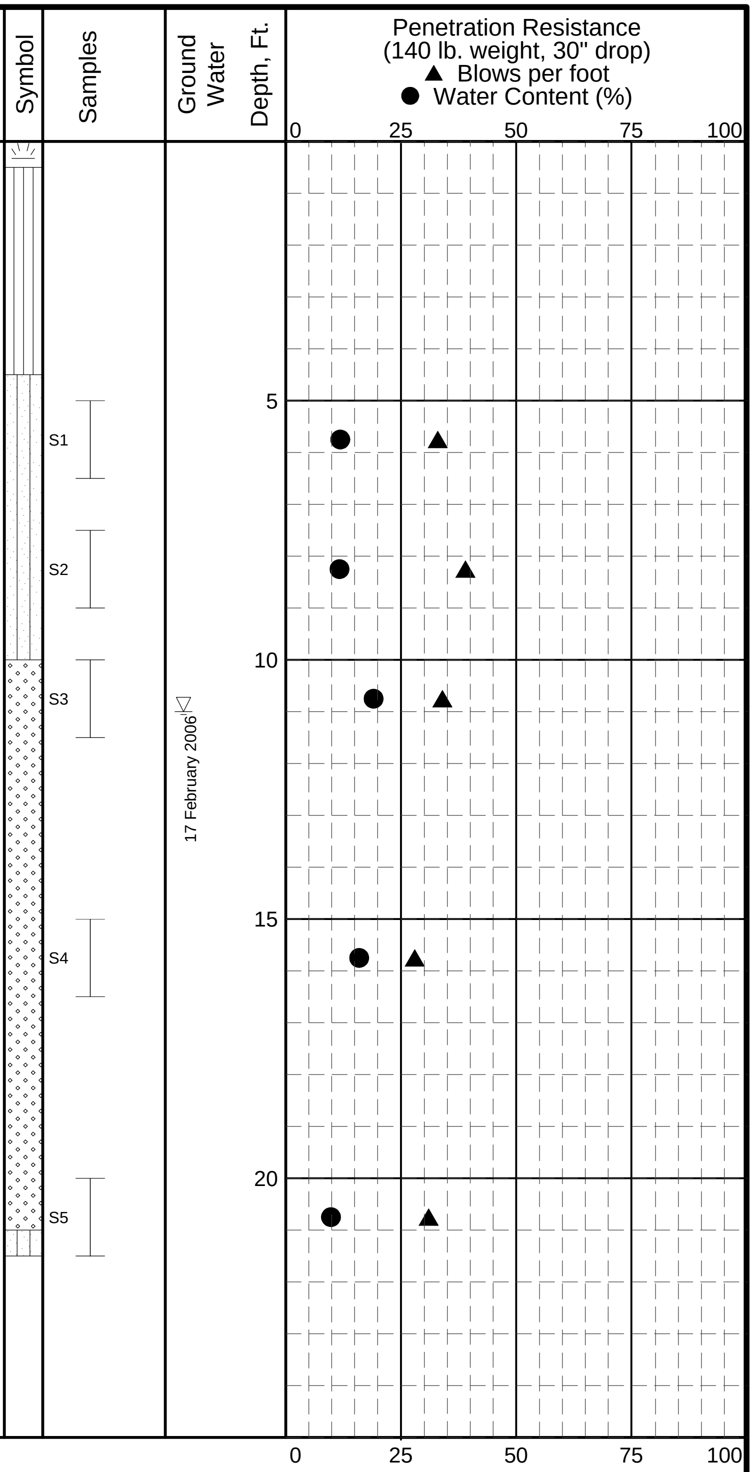
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-91

MATERIAL DESCRIPTION Approx. Elevation: 195 Ft.	Depth, Ft.
2 feet snow cover Frozen, brown, organic mat	0.5
Soft, brown, SILT; moist; numerous organics	4.5
Dense, brown to gray, silty, gravelly SAND; wet S1: 24% Gravel, 62% Sand, 14% Fines (F2)	10.0
Dense, brown to gray, slightly gravelly SAND; wet	21.0
Dense, gray, slightly gravelly, silty SAND; moist	21.5

Bottom of Boring
Boring Completed 17 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-089
Station 680+00

March 2007
32-1-01536-003

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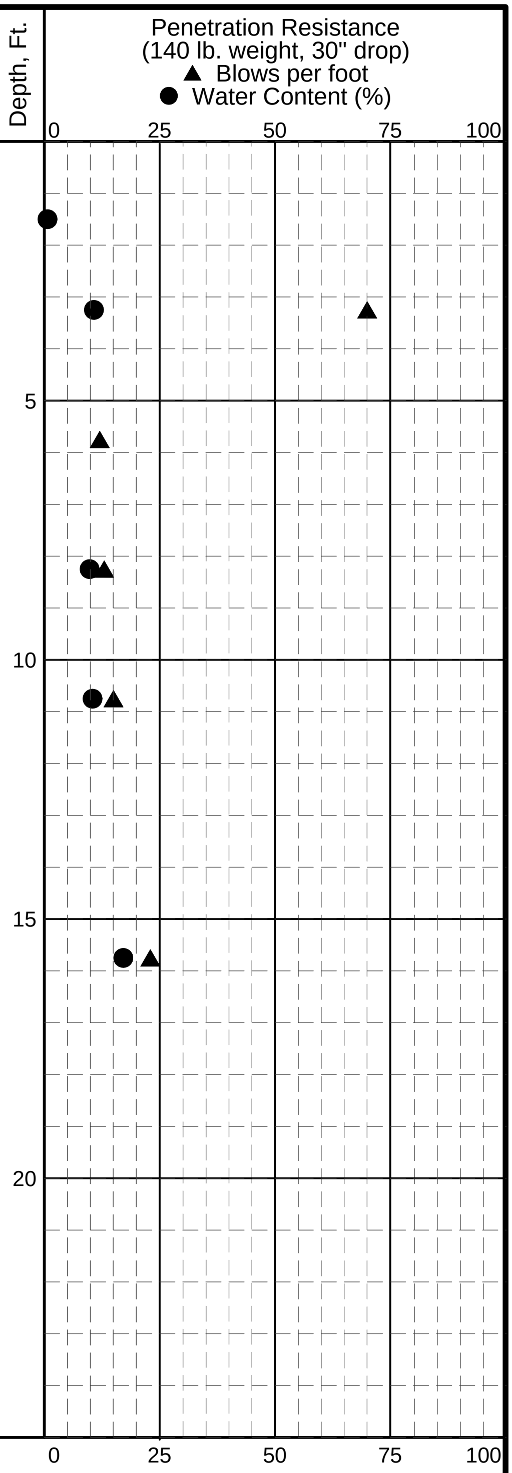
Fig. A-92

MATERIAL DESCRIPTION Approx. Elevation: 141 Ft.	Depth, Ft.	Samples	Ground Water
3 feet snow cover Frozen, brown, silty, gravelly SAND; moist SB1: 31% Gravel, 56% Sand, 13% Fines (F2)		SB1	Groundwater not encountered during drilling on 17 February 2006
Frozen, brown to gray, gravelly, silty SAND; moist S1: 24% Fines (F3)	2.5	S1	
Frozen to medium dense, gray, silty SAND to sandy SILT; moist 3-inch layer of dark brown, SILT with numerous organics at 7 feet bgs	4.0	S2 * S3	
Medium dense, gray, slightly gravelly, silty SAND; moist S4: 38% Fines (F3)	9.0	S4 S5	
Bottom of Boring Boring Completed 17 February 2006	16.5		



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

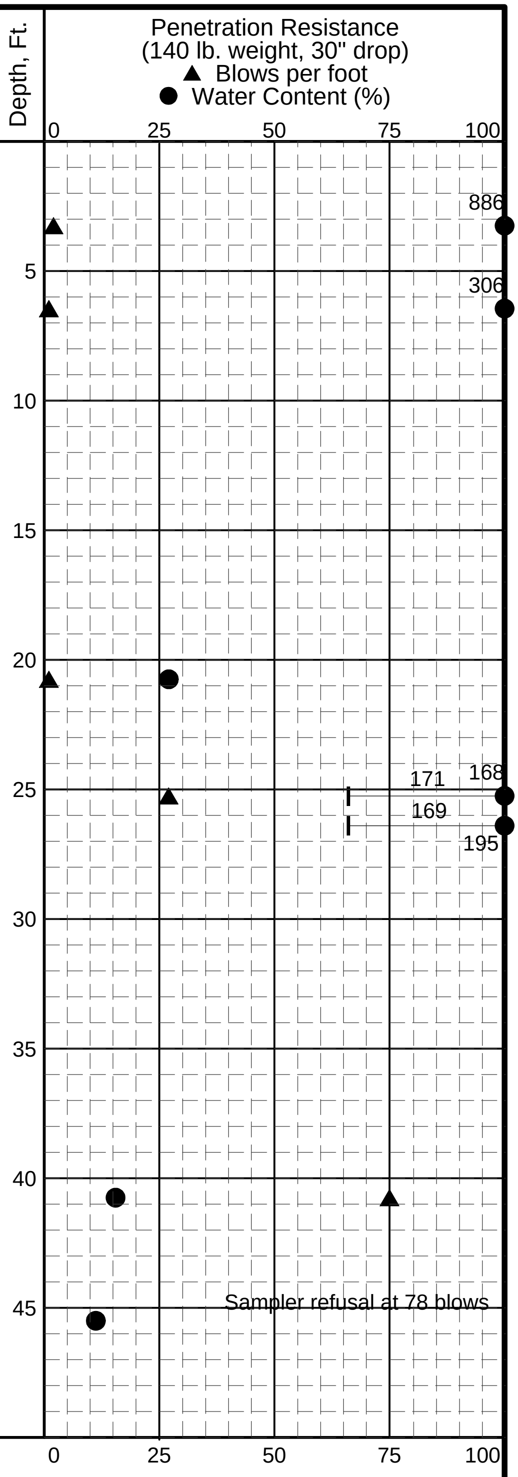
LOG OF BORING B-090
Station 690+00

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-93

MATERIAL DESCRIPTION Approx. Elevation: 140 Ft.	Depth, Ft.	Symbol	Samples	Ground Water
3 feet snow cover Frozen to very soft, dark brown, silty PEAT; moist to wet			S1 S2 S5	⊽ 16 February 2006
Soft, brown, organic SILT; wet S6a: Atterberg Liquid Limit 171, Plastic Limit 66, Plasticity Index 105	21.5		S6a	
Medium dense, gray, silty SAND; wet	25.5		S6b	
Soft, brown, organic SILT; wet; with shell fragments S6c: Atterberg Liquid Limit 169, Plastic Limit 66, Plasticity Index 103	26.3		S6c S7	
Very dense, gray, gravelly, silty SAND; wet S3: 20% Gravel, 50% Sand, 31% Fines (F3)	31.5		S3 S4	
Bottom of Boring Boring Completed 16 February 2006	46.0			



LEGEND

- * Sample Not Recovered
- ■ Shelby Tube
- Ⅲ 3" O.D. Split Spoon Sample
- Ɓ Bulk Sample
- ▮ Frozen
- ⊽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

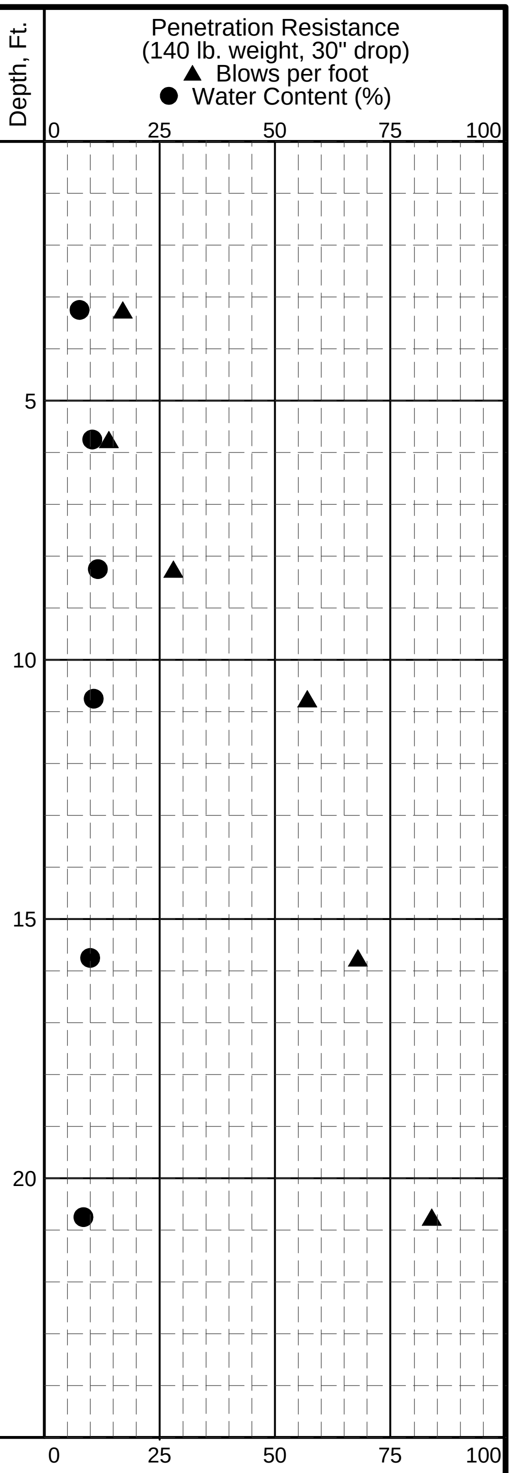
LOG OF BORING B-091
Station 695+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-94

MATERIAL DESCRIPTION Approx. Elevation: 149 Ft.	Depth, Ft.	Samples	Ground Water
2 feet snow cover Frozen, brown, sandy SILT; moist	2.0		
Medium dense to very dense, brown, gravelly, silty SAND; moist		S1	
S2: 13% Gravel, 44% Sand, 42% Fines (F3)		S2	
		S3	
		S4	
			▽ 16 February 2006
S5: 17% Gravel, 48% Sand, 35% Fines (F3)		S5	
		S6	
	21.5		
Bottom of Boring Boring Completed 16 February 2006			



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-092
Station 700+00

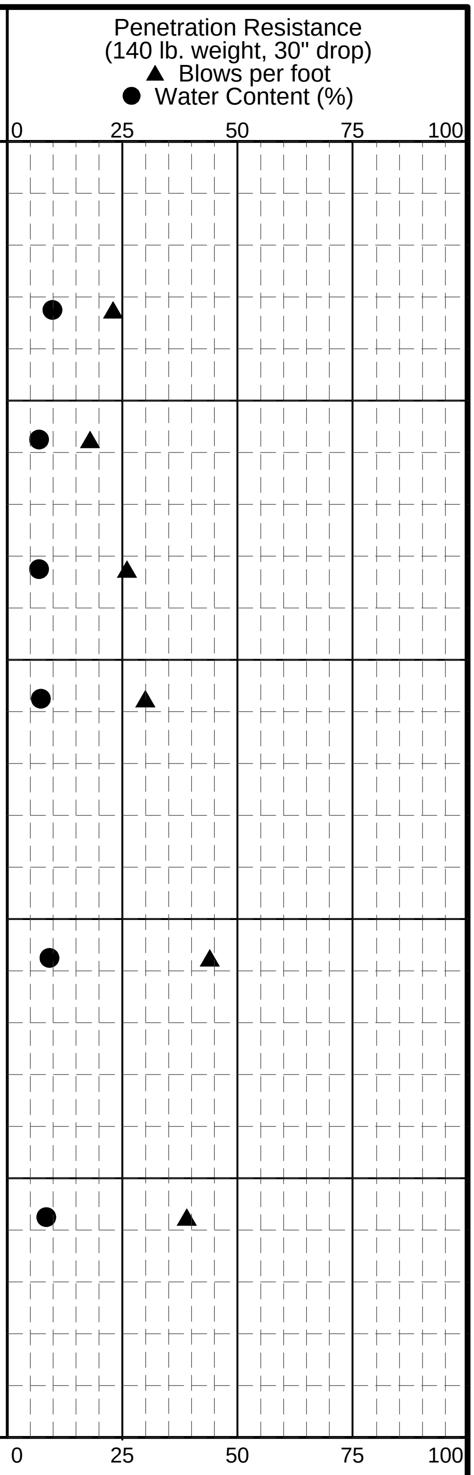
March 2007 32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-95

MATERIAL DESCRIPTION Approx. Elevation: 148 Ft.	Depth, Ft.	Samples
2 feet snow cover		
Frozen, brown PEAT	0.5	
Frozen, brown, sandy SILT; moist		
Medium dense to dense, brown, gravelly, silty SAND; moist	2.5	S1
S2: 25% Gravel, 48% Sand, 27% Fines (F3)		S2
S3: 29% Fines (F3)		S3
		S4
Dense, brown, slightly gravelly, silty SAND; moist	13.0	
S5: 11% Gravel, 52% Sand, 37% Fines (F3)		S5
		S6
Bottom of Boring Boring Completed 16 February 2006	21.5	

Ground Water: Groundwater not encountered during drilling on 16 February 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

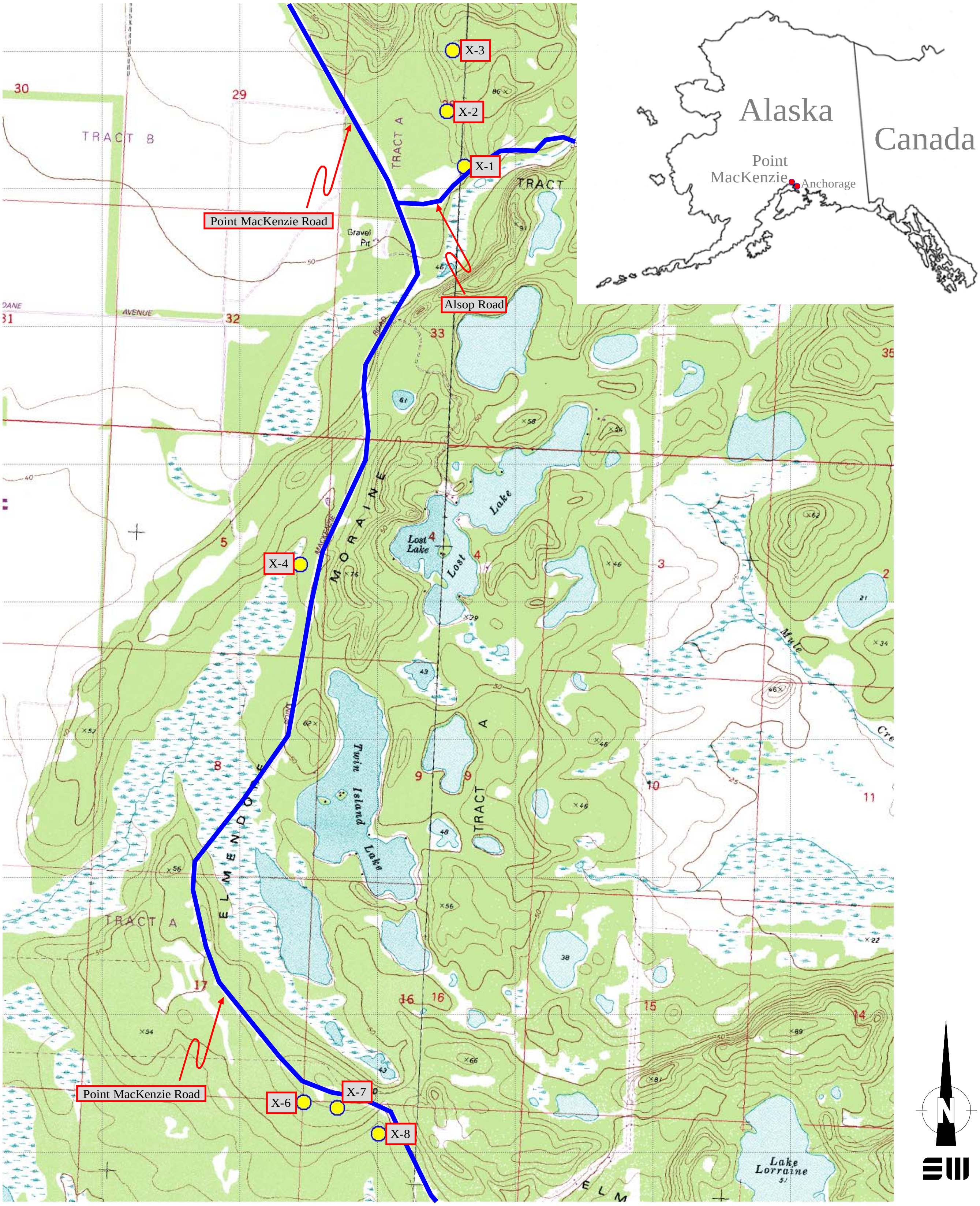
Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING B-093
Station 704+00

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-96



1927 North American Datum; Topography in Meters
Map compiled from USGS Quads: AK Tyonek A-1 NE, AK Tyonek B-1 NE, AK Tyonek B-1 SE, AK Anchorage A-8 NW, AK Anchorage A-8 NE, AK Anchorage B-8 NW, AK Anchorage B-8 SE, AK Anchorage B-8 SW, AK Anchorage B-8 NE

0 2 4
APPROXIMATE SCALE IN MILES

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

GRAVEL SOURCE SITE PLAN

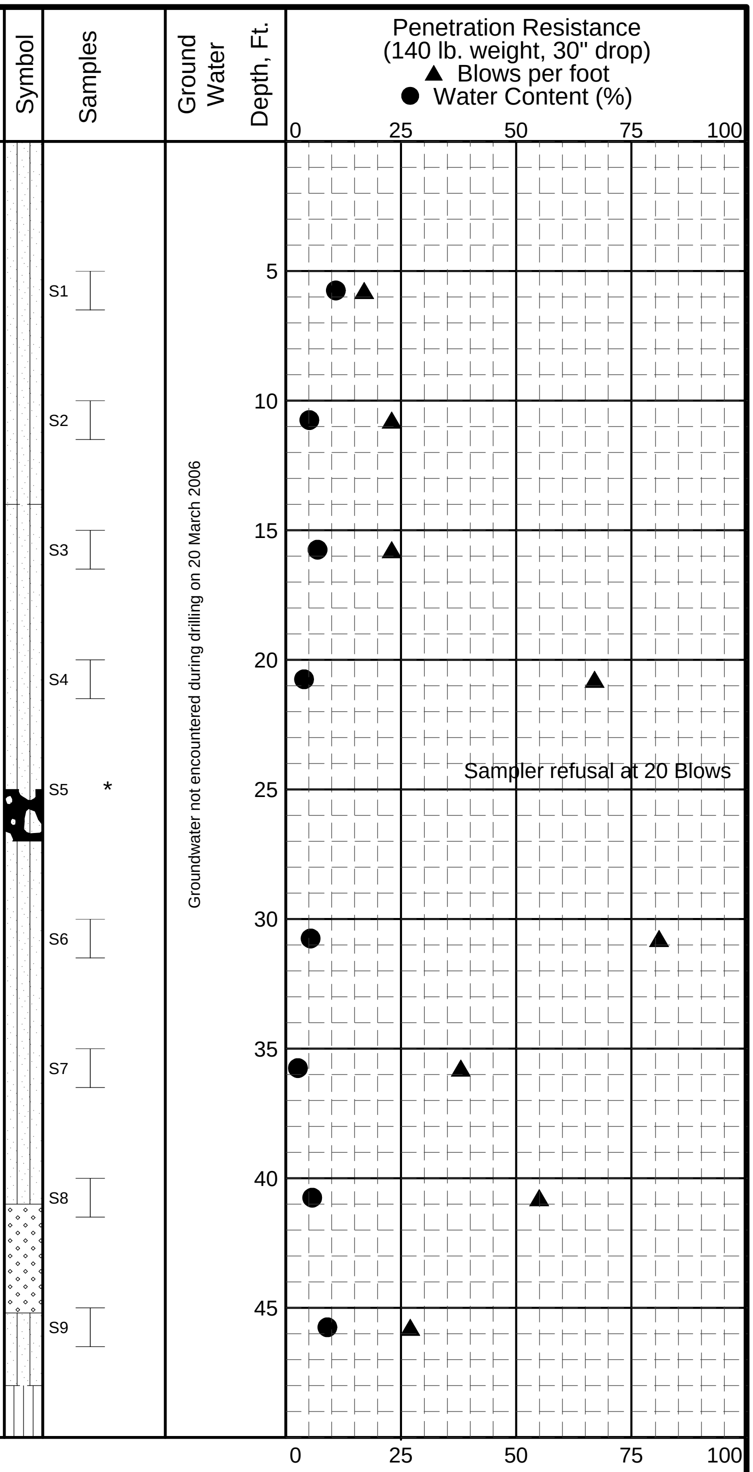
March 2007
32-1-01536-003

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. A-97

MATERIAL DESCRIPTION Approx. Elevation:	Depth, Ft.
Frozen to medium dense, brown, silty, gravelly SAND; moist S2: 32% Gravel, 45% Sand, 23% Fines (F3)	14.0
S3: 26% Gravel, 42% Sand, 32% Fines (F3) Medium dense to very dense, brown, gravelly, silty SAND; moist Drilling action and sampler refusal suggests boulder or cobbles at 25 feet bgs	27.0
	41.0
Very dense, brown SAND; moist	45.2
Medium dense, brown, gravelly, silty SAND; moist	48.0

CONTINUED NEXT PAGE



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ⊻ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-1

March 2007
32-1-01536-003

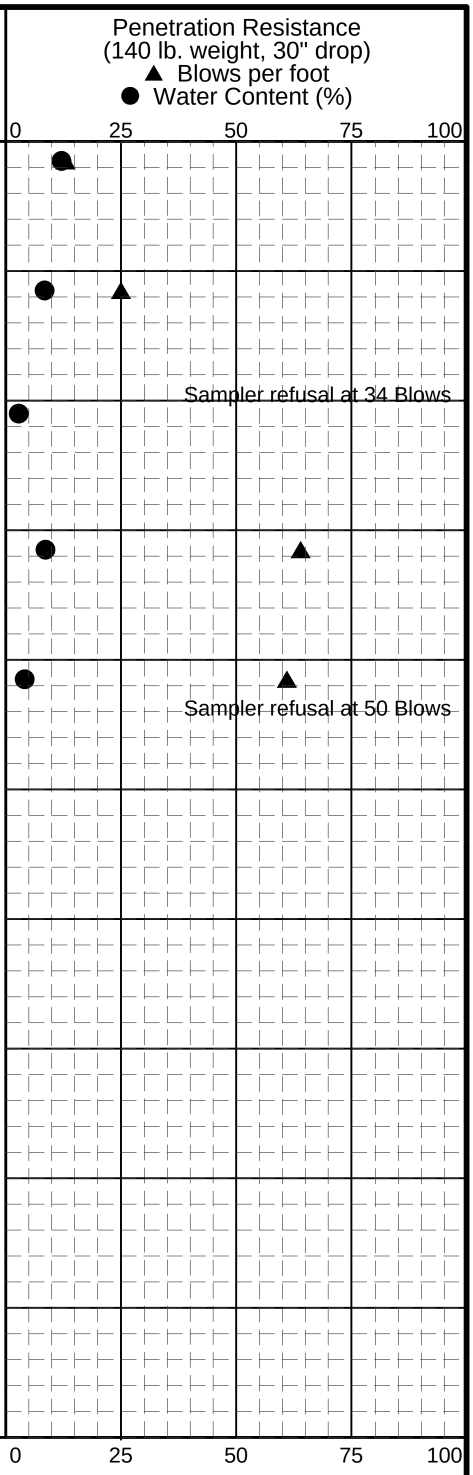
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Fig. A-98
Sheet 1 of 2

MATERIAL DESCRIPTION Approx. Elevation:	Depth, Ft.	Symbol	Samples	Ground Water
S10: 12% Gravel, 37% Sand, 51% Fines (F4)			S10	
Stiff to very stiff, brown, slightly gravelly, sandy SILT; moist				
			S11	
Very dense, brown, silty, gravelly SAND; moist	61.0		S12	
Drilling action and sampler refusal suggests boulder or cobbles from 61 to 63 feet bgs			S13	
S14: 41% Gravel, 43% Sand, 16% Fines (F2)			S14	
Auger refusal at 72.6 feet bgs	72.6		S15*	

Bottom of Boring
Boring Completed 20 March 2006

Groundwater not encountered during drilling on 20 March 2006



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen
- ▽ Ground Water Level At Time Of Drilling

● Water Content (%)
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-1

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
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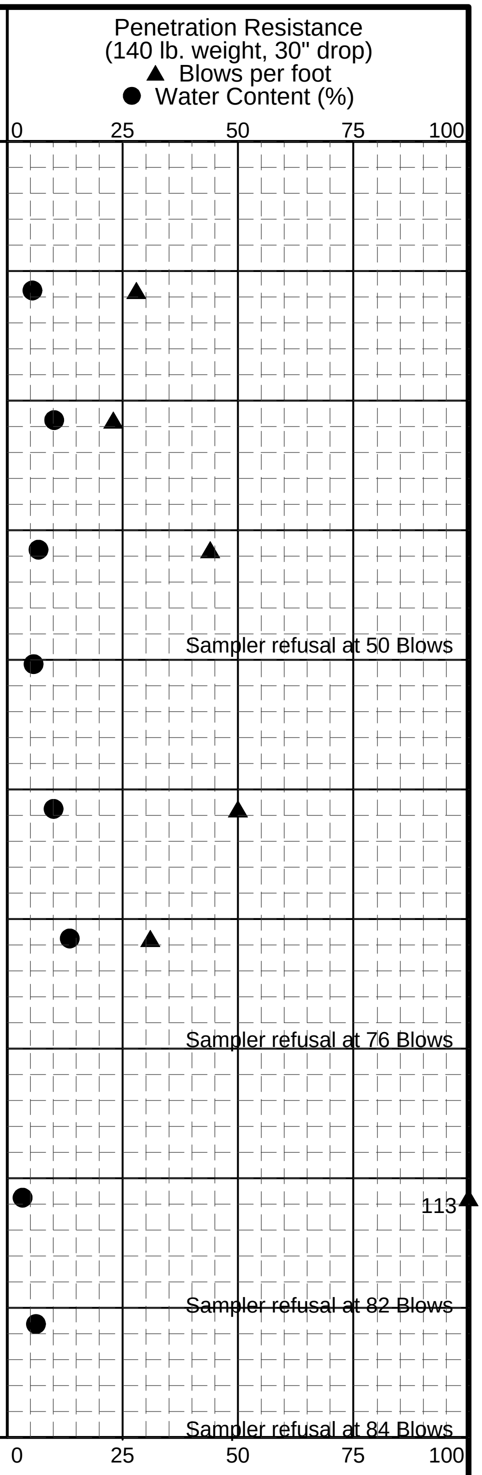
Fig. A-98
Sheet 2 of 2

MATERIAL DESCRIPTION Approx. Elevation:	Depth, Ft.	Symbol	Samples	Ground Water
Frozen to medium dense to very dense, brown, silty, gravelly SAND; moist; with occasional cobbles			S1 S2	Groundwater not encountered during drilling on 23 March 2006
S3: 30% Gravel, 43% Sand, 27% Fines (F3)			S3 S4	
Dense to very dense, brown, gravelly, silty SAND; moist	20.9		S5 S6 S7	
Very dense, brown, silty, gravelly SAND; moist S8: 33% Gravel, 51% Sand, 16% Fines (F2)	38.0		S8 S9	



CONTINUED NEXT PAGE

LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

Ɓ Bulk Sample

▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-2

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
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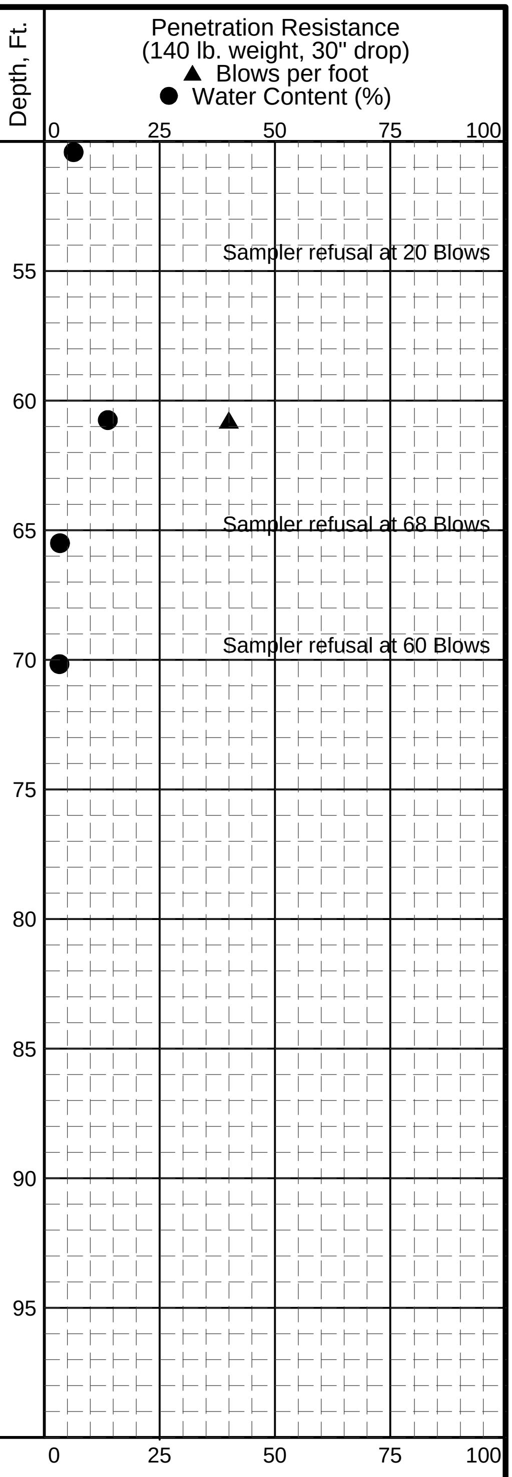
Fig. A-99
Sheet 1 of 2

MATERIAL DESCRIPTION Approx. Elevation:	Depth, Ft.	Symbol	Samples	Ground Water
Very dense, brown, silty, gravelly SAND; moist			S10 S11	Groundwater not encountered during drilling on 23 March 2006
Hard, brown, gravelly, sandy SILT; moist S12: 15% Gravel, 27% Sand, 58% Fines (F4)	58.0		S12 S13 S14	
Bottom of Boring Boring Completed 23 March 2006	70.3			



LEGEND

* Sample Not Recovered

⌶ 2" O.D. Split Spoon Sample

Ⅲ 3" O.D. Split Spoon Sample

B Bulk Sample

▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├─●─┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-2

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
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Fig. A-99
Sheet 2 of 2

MATERIAL DESCRIPTION

Approx. Elevation:

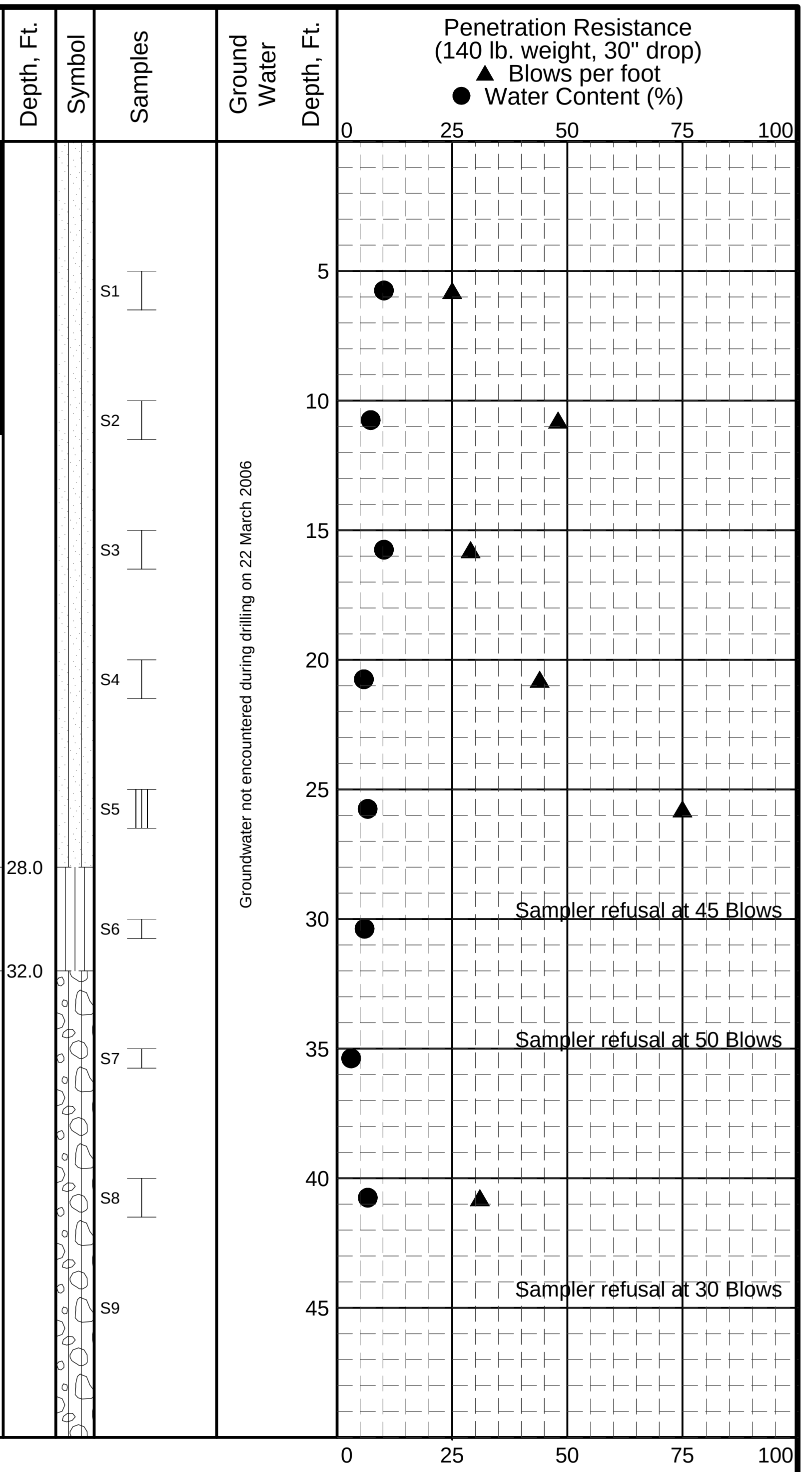
Frozen to medium dense to very dense, brown, silty, gravelly SAND; moist; with occasional cobbles and boulders

S5: 35% Gravel, 37% Sand, 28% Fines (F3)

Hard, brown, sandy, gravelly SILT; moist

Dense to very dense, brown, silty, sandy GRAVEL; moist; occasional cobbles and boulders

CONTINUED NEXT PAGE



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
⊽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-3

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
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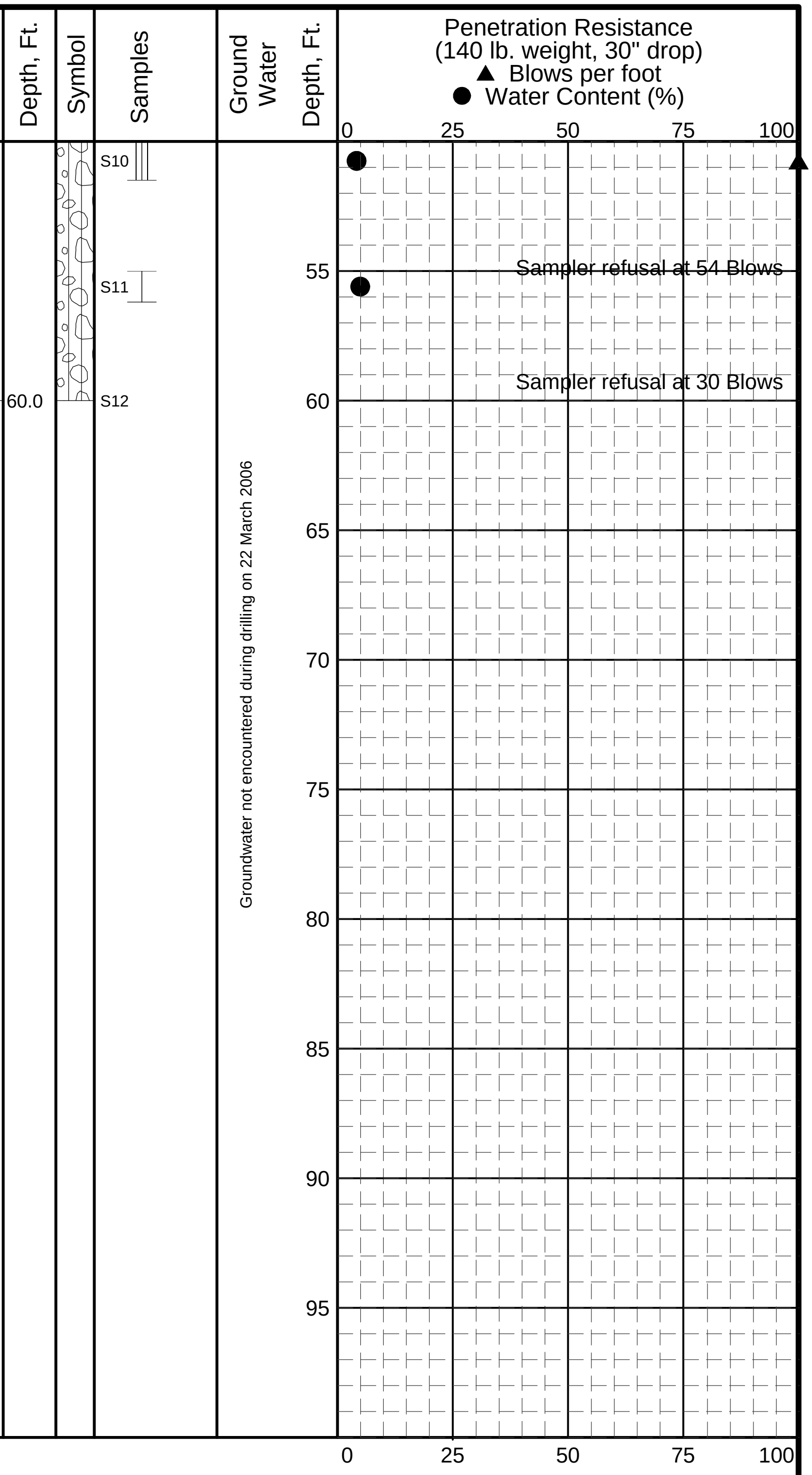
Fig. A-100
Sheet 1 of 2

MATERIAL DESCRIPTION

Approx. Elevation:

S10: 47% Gravel, 33% Sand, 19% Fines (F2)
Dense to very dense, brown, silty, sandy GRAVEL; moist; occasional cobbles and boulders

Bottom of Boring
Boring Completed 22 March 2006



Groundwater not encountered during drilling on 22 March 2006

LEGEND

*	Sample Not Recovered	⊻	Ground Water Level At Time Of Drilling
⌶	2" O.D. Split Spoon Sample		
Ⅲ	3" O.D. Split Spoon Sample		
B	Bulk Sample		
▮	Frozen		

● Water Content (%)
Plastic Limit ├──●──┤ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-3

March 2007
32-1-01536-003

SHANNON & WILSON, INC.
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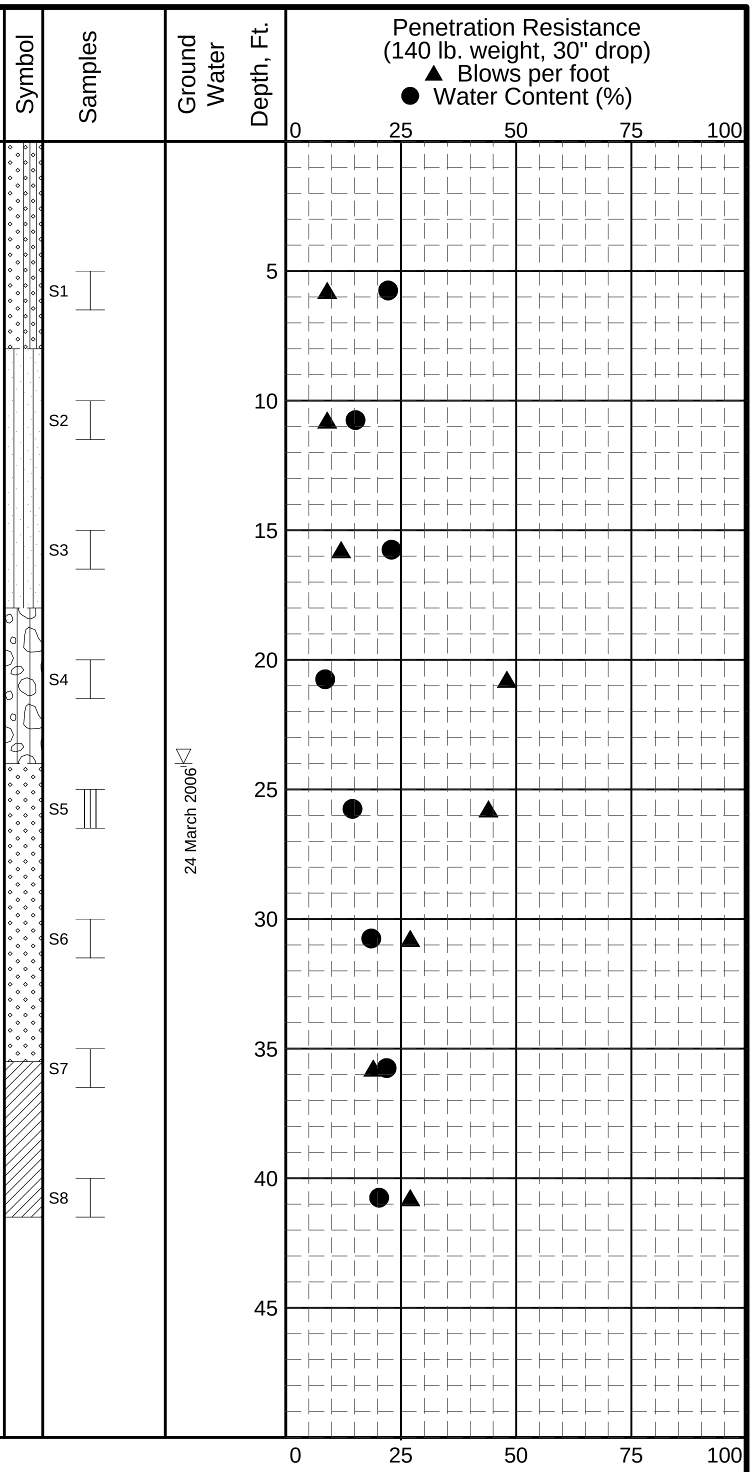
Fig. A-100
Sheet 2 of 2

MATERIAL DESCRIPTION Approx. Elevation:	Depth, Ft.
Frozen to loose, brown, slightly silty, slightly gravelly SAND; moist	
Stiff, brown, sandy SILT; moist S3: 78% Fines (F4)	8.0
Dense, brown, silty, sandy GRAVEL; moist	18.0
Medium dense to dense, brown, silty SAND; wet S6: 16% Fines (F2) 1-foot sand heave at 31.5 feet bgs	24.0
Very stiff, gray CLAY; wet	35.5
Bottom of Boring Boring Completed 24 March 2006	41.5



LEGEND

- * Sample Not Recovered
- ⌶ 2" O.D. Split Spoon Sample
- Ⅲ 3" O.D. Split Spoon Sample
- B Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit ├──●──┤ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-4

March 2007 32-1-01536-003

SHANNON & WILSON, INC.
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Fig. A-101

GEOTECHNICAL LOG FEB 06 WORK.GPJ S&W_GEO1.GDT 3/6/07

MATERIAL DESCRIPTION

Approx. Elevation:

Frozen to medium dense, brown, silty, gravelly SAND; moist

8.0

Dense to very dense, brown, gravelly, silty SAND; moist

S2: 40% Fines (F3)

17.0

Very stiff to hard, brownish-gray, sandy SILT; moist to wet

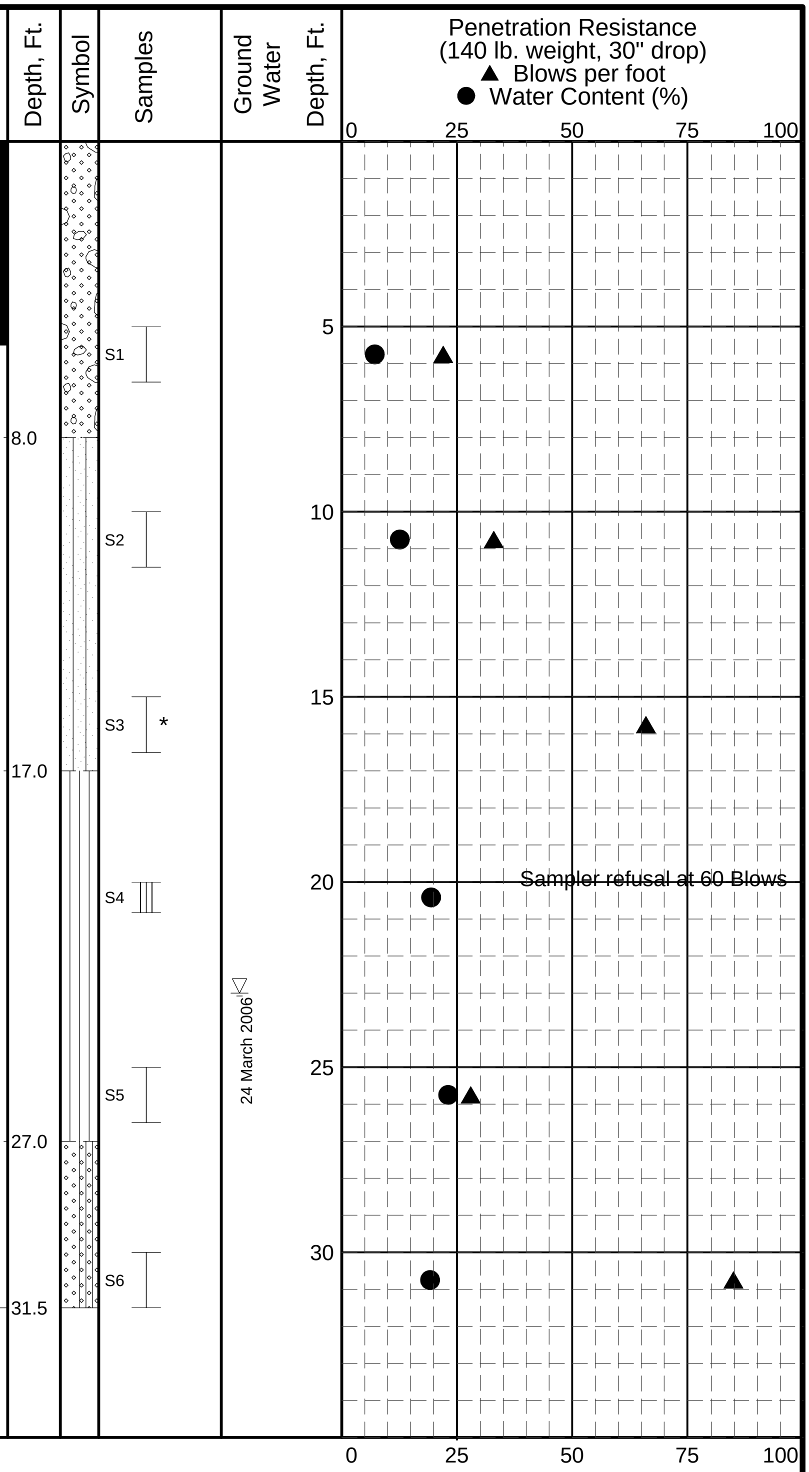
2-foot sand heave at 26.5 feet bgs

27.0

Very dense, brown, slightly silty SAND; wet

31.5

Bottom of Boring
Boring Completed 24 March 2006



LEGEND

- * Sample Not Recovered
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Bulk Sample
- ▮ Frozen

▽ Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-6

March 2007
32-1-01536-003

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Fig. A-102

MATERIAL DESCRIPTION

Approx. Elevation:

Frozen to medium dense, brown, slightly silty to silty SAND; moist to wet

S3: 50% Fines (F3)

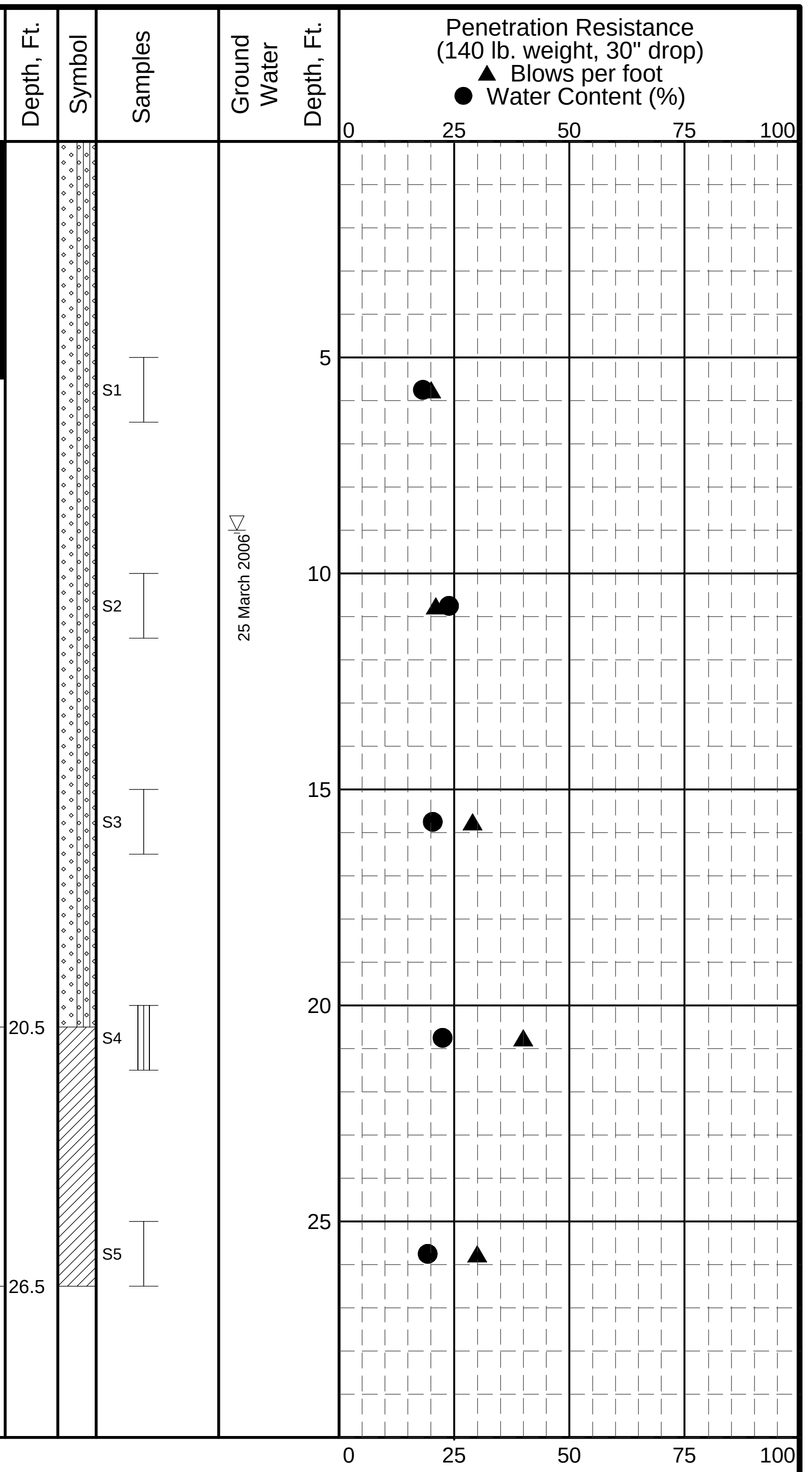
20.5

Hard, gray CLAY; wet; with 2-inch layers of brown SAND

3-foot sand heave at 26.5 feet bgs

26.5

Bottom of Boring
Boring Completed 25 March 2006



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |——●——| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-7

March 2007 32-1-01536-003

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Fig. A-103

MATERIAL DESCRIPTION

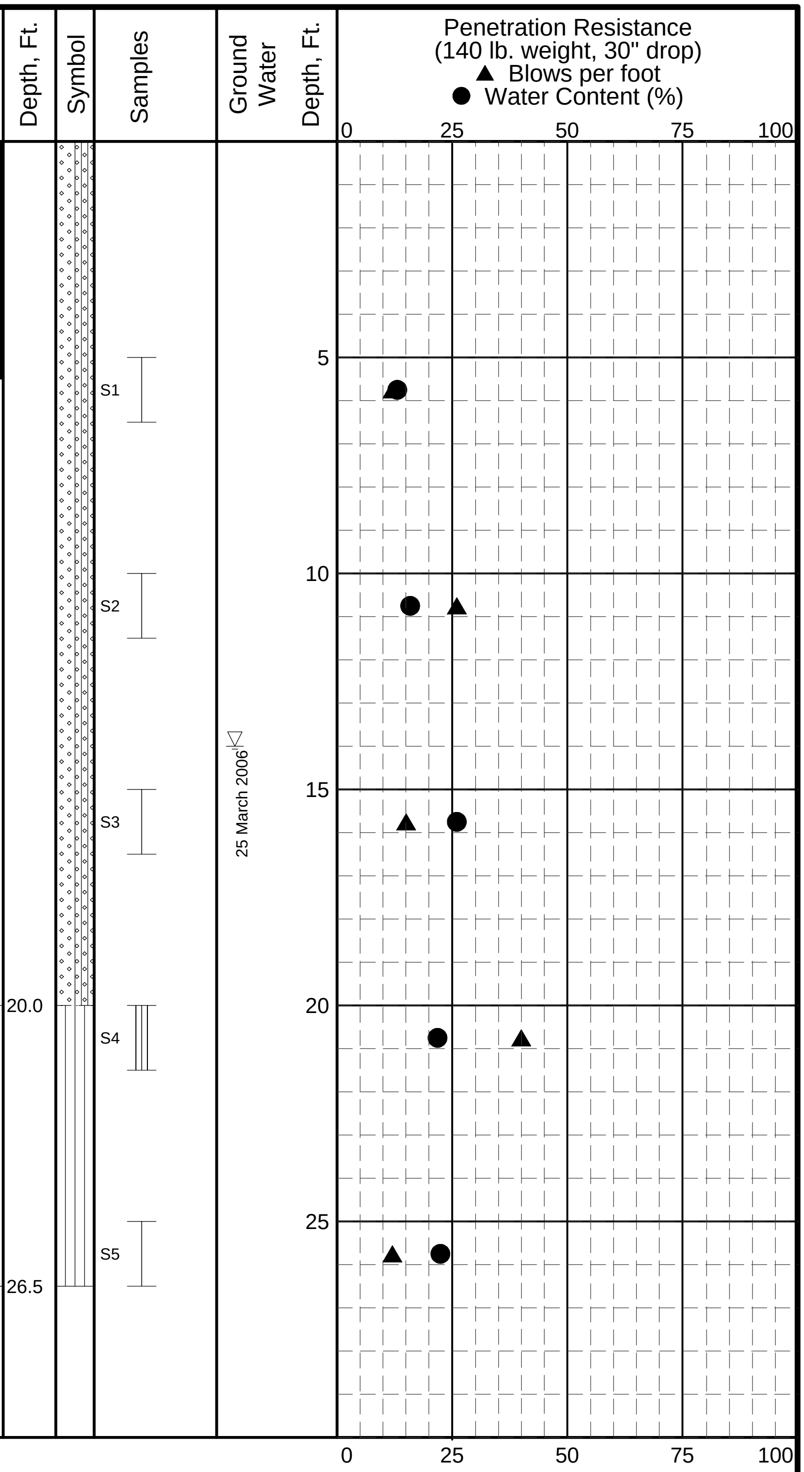
Approx. Elevation:

Frozen to medium dense, brown, slightly silty to silty SAND; moist to wet

Very stiff, gray, sandy SILT; wet
S4: 68% Fines (F4)

2-foot sand heave at 25 feet bgs

Bottom of Boring
Boring Completed 25 March 2006



LEGEND

*	Sample Not Recovered
⌶	2" O.D. Split Spoon Sample
Ⅲ	3" O.D. Split Spoon Sample
B	Bulk Sample
▮	Frozen
▽	Ground Water Level At Time Of Drilling

● Water Content (%)

Plastic Limit |—●—| Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

LOG OF BORING X-8

March 2007 32-1-01536-003

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Fig. A-104

APPENDIX B

LABORATORY TEST PROCEDURES AND RESULTS

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LIST OF FIGURES

APPENDIX B
LABORATORY TEST PROCEDURES AND RESULTS

Laboratory tests were performed on selected soil samples from the road alignment borings as well as the gravel source investigations to verify visual classifications and to estimate engineering characteristics pertinent to the design of the proposed road and associated improvements. The following sections discuss each of the tests performed for the various properties required.

B.1 Classification Tests

Soil samples shipped to our laboratory were classified in the laboratory and their descriptions were checked against those in the field. These descriptions were used in the preparation of our final logs, Figures A-4 through A-96 and Figures A-98 through A-104 in Appendix A. The Unified Soil Classification System (ASTM D-2488 & 2487-90) was used to classify soils and the criteria for the Unified Soil Classification System is included as Table B-1. A soil testing summary is presented in Table B-2 for the road alignment and Table B-3 for the gravel source. Note that not all Pocket Penetrometer readings are included in the soil testing summary. Samples that were tested in the laboratory include the field Pocket Penetrometer reading on Tables B-2 and B-3. If a sample was not tested in the laboratory, the results are shown on the boring logs in Appendix A.

Water Content Estimations

Following the visual classification of selected soil samples, a portion of the material was weighted and oven dried to estimate the natural water content of the soil. The water contents, generally based on ASTM D-2216, are tabulated in Appendix B as Table B-2, Table B-3 and are presented graphically on the boring logs in Appendix A.

Grain Size Analyses

Grain size classification tests were conducted on samples from our borings to confirm the field classification of soils encountered in our explorations. The gradation testing generally followed the mechanical sieve procedures described in ASTM D-422. The grain size testing results are presented in Appendix B as Figures B-1 and B-2, presented in the soils testing report in Table B-2, and summarized on the boring logs as percent gravel, percent sand, and percent fines.

Atterberg Limits

Atterberg limits were estimated for several samples of the native fine-grained soils encountered in the explorations. The test was performed in general accordance with ASTM D-4318. This analysis provides an estimate of the plasticity characteristics of the silt or clay. The results of this test are summarized in Figure B-3 of Appendix B, on the soils testing report in Table B-2, and on the boring logs presented in Appendix A.

Unified Soil Classification System

GROUP NAME **Criteria for Assigning Group Names and Group Symbols**				**Soil Classification Group Symbol with Generalized Group Descriptions**	
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	Clean GRAVELS Less than 5% fines	▨	GW	Well-graded Gravels
			▨	GP	Poorly-graded Gravels
		GRAVELS with fines More than 12% fines	▨	GM	Gravel & Silt Mixtures
			▨	GC	Gravel & Clay Mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	Clean SANDS Less than 5% fines	▨	SW	Well-graded Sands
			▨	SP	Poorly-graded Sands
		SANDS with fines More than 12% fines	▨	SM	Sand & Silt Mixtures
			▨	SC	Sand & Clay Mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit 50% or less	INORGANIC	▨	ML	Non-plastic & Low-plasticity Silts
			▨	CL	Low-plasticity Clays
		ORGANIC	▨	OL	Non-plastic and Low-plasticity Organic Clays Non-plastic and Low-plasticity Organic Silts
	SILTS AND CLAYS Liquid limit greater than 50%	INORGANIC	▨	CH	High-plasticity Clays
			▨	MH	High-plasticity Silts
		ORGANIC	▨	OH	High-plasticity Organic Clays High-plasticity Organic Silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		▨	PT	Peat

Organic Content

Adjective	Percent by Volume
Occasional	0-1
Scattered	1-10
Numerous	10-30
Organic	30-50, minor constituent
Peat	50-100, MAJOR constituent

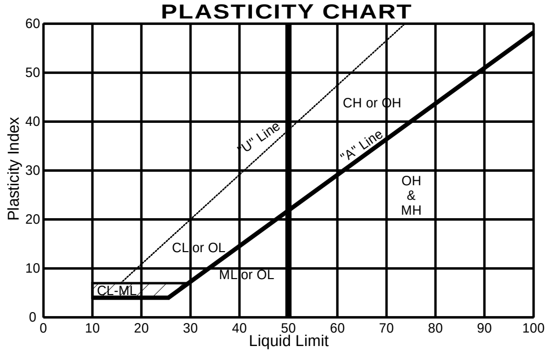
Descriptive Terminology Denoting Component Proportions

Description	Range of Proportion
Add the adjective "slightly"	5 - 12%
Add soil adjective[(a)]	12 - 50%
Major proportion in upper case, (e.g., SAND)	>50%

(a) Use gravelly, sandy, or silty as appropriate

NOTE: The soil descriptions used in the boring logs lists constituents from smallest percentage to largest percentage.

PLASTICITY CHART



Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

SOIL CLASSIFICATION LEGEND

March 2007

32-1-01536-003

SHANNON & WILSON, INC.
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Table B-1

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	0	2.5	5
Test Hole No.			B-001	B-001	B-001	B-002	B-002	B-002
Field Sample No.			S1	S2	S3	S1	S2	S3
Date Sampled			February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006
Lab No.			B-001S1	B-001S2	B-001S3	B-002S1	B-002S2	B-002S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	99.0%					
	0.75"	19mm	94.0%					
	0.5"	12.5mm	84.0%					
	0.375"	9.5mm	76.0%					
	0.25"	6.3mm						
	#4	4.75mm	58.0%					
	#8	2.36mm	46.0%					
	#10	2mm						
	#16	1.18mm	37.0%					
	#30	0.6mm	30.0%					
	#40	0.425mm						
	#50	0.3mm	22.0%					
	#100	0.15mm	17.0%					
	#200	0.075mm	14.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.5%	2.8%	1.7%	2.9%	2.7%	2.7%
Organic Content %								
% Gravel			42%					
% Sand			45%					
% Silt & Clay			14%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			10	0	2.5	5	0	2.5
Test Hole No.			B-002	B-003	B-003	B-003	B-004	B-004
Field Sample No.			S5	S1	S2	S3	S1	S2
Date Sampled			February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006
Lab No.			B-002S5	B-003S1	B-003S2	B-003S3	B-004S1	B-004S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%				100.0%	
	1"	25mm	96.0%				98.0%	
	0.75"	19mm	83.0%				97.0%	
	0.5"	12.5mm	72.0%				89.0%	
	0.375"	9.5mm	66.0%				82.0%	
	0.25"	6.3mm						
	#4	4.75mm	48.0%				54.0%	
	#8	2.36mm	38.0%				37.0%	
	#10	2mm						
	#16	1.18mm	31.0%				28.0%	
	#30	0.6mm	25.0%				25.0%	
	#40	0.425mm						
	#50	0.3mm	18.0%				18.0%	
	#100	0.15mm	12.0%				14.0%	
	#200	0.075mm	9.0%				11.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.6%	2.8%	4.0%	4.2%	2.5%	3.2%
Organic Content %								
% Gravel			52%				46%	
% Sand			39%				43%	
% Silt & Clay			9%				11%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			5	0	2.5	10	15	0
Test Hole No.			B-004	B-005	B-005	B-005	B-005	B-006
Field Sample No.			S3	S1	S2	S5	S6	S1
Date Sampled			February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006
Lab No.			B-004S3	B-005S1	B-005S2	B-005S5	B-005S6	B-006S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%			100.0%		
	1"	25mm	94.0%			92.0%		
	0.75"	19mm	93.0%			88.0%		
	0.5"	12.5mm	81.0%			77.0%		
	0.375"	9.5mm	74.0%			69.0%		
	0.25"	6.3mm						
	#4	4.75mm	53.0%			53.0%		
	#8	2.36mm	39.0%			40.0%		
	#10	2mm						
	#16	1.18mm	28.0%			32.0%		
	#30	0.6mm	20.0%			27.0%		
	#40	0.425mm						
	#50	0.3mm	15.0%			17.0%		
	#100	0.15mm	11.0%			8.0%		
	#200	0.075mm	8.0%			5.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.1%	3.0%	3.6%	2.2%	1.9%	3.2%
Organic Content %								
% Gravel			47%			47%		
% Sand			45%			48%		
% Silt & Clay			8%			5%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	0	2.5	5	7.5
Test Hole No.			B-006	B-006	B-007	B-007	B-007	B-007
Field Sample No.			S2	S3	S1	S2	S3	S4
Date Sampled			February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006
Lab No.			B-006S2	B-006S3	B-007S1	B-007S2	B-007S3	B-007S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.2%	2.2%	2.8%	3.2%	3.7%	3.2%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			10	0	2.5	5	0
Test Hole No.			B-007	B-008	B-008	B-008	B-009
Field Sample No.			S5	S1	S2	S3	S1
Date Sampled			February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 14, 2006
Lab No.			B-007S5	B-008S1	B-008S2	B-008S3	B-009S1
Percent Passing Sieve Size	3"	75mm					
	2"	50mm					
	1.5"	37.5mm					
	1"	25mm	100.0%				
	0.75"	19mm	95.0%				
	0.5"	12.5mm	82.0%				
	0.375"	9.5mm	76.0%				
	0.25"	6.3mm					
	#4	4.75mm	66.0%				
	#8	2.36mm	57.0%				
	#10	2mm					
	#16	1.18mm	48.0%				
	#30	0.6mm	38.0%				
	#40	0.425mm					
	#50	0.3mm	26.0%				
	#100	0.15mm	15.0%				
	#200	0.075mm	10.0%				
DOTTSD							
Liquid Limit							
Plastic Index							
Moisture Content %			4.8%	2.6%	4.1%	8.5%	2.8%
Organic Content %							
% Gravel			34%				
% Sand			55%				
% Silt & Clay			10%				
Max. Dry Density							
Opt. Moisture %							
Unconsol. Unconfined Triaxial U_u							
Coeff. Of Consolidation C_v							
Unc. Comp. Strength Q_u							
Pocket Pen Value							

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	7.5	0	2.5	5
Test Hole No.			B-009	B-009	B-009	B-010	B-010	B-010
Field Sample No.			S2	S3	S4	S1	S2	S3
Date Sampled			February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006
Lab No.			B-009S2	B-009S3	B-009S4	B-010S1	B-010S2	B-010S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%		100.0%		
	1"	25mm		95.0%		99.0%		
	0.75"	19mm		95.0%		95.0%		
	0.5"	12.5mm		88.0%		83.0%		
	0.375"	9.5mm		83.0%		73.0%		
	0.25"	6.3mm						
	#4	4.75mm		74.0%		55.0%		
	#8	2.36mm		66.0%		42.0%		
	#10	2mm						
	#16	1.18mm		60.0%		34.0%		
	#30	0.6mm		54.0%		25.0%		
	#40	0.425mm						
	#50	0.3mm		46.0%		16.0%		
	#100	0.15mm		38.0%		11.0%		
	#200	0.075mm		31.0%		9.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			4.3%	10.0%	8.5%	3.0%	9.9%	3.3%
Organic Content %								
% Gravel				26%		46%		
% Sand				43%		46%		
% Silt & Clay				31%		9%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	0	2.5
Test Hole No.			B-010	B-011	B-011	B-011	B-012	B-012
Field Sample No.			S6	S1	S2	S3	S1	S2
Date Sampled			February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006
Lab No.			B-010S6	B-011S1	B-011S2	B-011S3	B-012S1	B-012S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	95.0%					
	0.75"	19mm	83.0%					
	0.5"	12.5mm	72.0%					
	0.375"	9.5mm	65.0%					
	0.25"	6.3mm						
	#4	4.75mm	52.0%					
	#8	2.36mm	42.0%					
	#10	2mm						
	#16	1.18mm	33.0%					
	#30	0.6mm	23.0%					
	#40	0.425mm						
	#50	0.3mm	14.0%					
	#100	0.15mm	10.0%					
	#200	0.075mm	8.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.7%	1.8%	3.6%	1.8%	2.1%	1.7%
Organic Content %								
% Gravel			48%					
% Sand			44%					
% Silt & Clay			8%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			20	0	2.5	15	30	0
Test Hole No.			B-012	B-013	B-013	B-013	B-013	B-014
Field Sample No.			S7	S1	S2	S6	S9	S1
Date Sampled			February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 15, 2006
Lab No.			B-012S7	B-013S1	B-013S2	B-013S6	B-013S9	B-014S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%				100.0%	
	1"	25mm	94.0%				93.0%	
	0.75"	19mm	88.0%				87.0%	
	0.5"	12.5mm	77.0%				76.0%	
	0.375"	9.5mm	68.0%				69.0%	
	0.25"	6.3mm						
	#4	4.75mm	51.0%				52.0%	
	#8	2.36mm	40.0%				39.0%	
	#10	2mm						
	#16	1.18mm	30.0%				28.0%	
	#30	0.6mm	21.0%				21.0%	
	#40	0.425mm						
	#50	0.3mm	13.0%				14.0%	
	#100	0.15mm	8.0%				9.0%	
	#200	0.075mm	6.0%				7.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.0%	3.3%	2.4%	1.9%	2.5%	2.4%
Organic Content %								
% Gravel			49%				48%	
% Sand			45%				45%	
% Silt & Clay			6%				7%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			5	5	40	0	2.5	5
Test Hole No.			B-014	B-014	B-014	B-015	B-015	B-015
Field Sample No.			S3	S4	S11	S1	S2	S3
Date Sampled			February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006
Lab No.			B-014S3	B-014S4	B-014S11	B-015S1	B-015S2	B-015S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%				
	1"	25mm		95.0%	100.0%			
	0.75"	19mm		88.0%	95.0%			
	0.5"	12.5mm		77.0%	84.0%			
	0.375"	9.5mm		69.0%	76.0%			
	0.25"	6.3mm						
	#4	4.75mm		54.0%	56.0%			
	#8	2.36mm		40.0%	42.0%			
	#10	2mm						
	#16	1.18mm		30.0%	30.0%			
	#30	0.6mm		23.0%	19.0%			
	#40	0.425mm						
	#50	0.3mm		16.0%	12.0%			
	#100	0.15mm		11.0%	8.0%			
	#200	0.075mm		8.0%	6.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			1.7%	1.7%	2.5%	2.6%	7.7%	3.9%
Organic Content %								
% Gravel				46%	44%			
% Sand				46%	50%			
% Silt & Clay				8%	6%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	25	0	2.5	5	10
Test Hole No.			B-015	B-015	B-016	B-016	B-016	B-016
Field Sample No.			S6	S8	S1	S2	S3	S5
Date Sampled			February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006
Lab No.			B-015S6	B-015S8	B-016S1	B-016S2	B-016S3	B-016S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	80.0%					
	0.75"	19mm	71.0%					
	0.5"	12.5mm	67.0%					
	0.375"	9.5mm	63.0%					
	0.25"	6.3mm						
	#4	4.75mm	51.0%					
	#8	2.36mm	41.0%					
	#10	2mm						
	#16	1.18mm	32.0%					
	#30	0.6mm	24.0%					
	#40	0.425mm						
	#50	0.3mm	16.0%					
	#100	0.15mm	11.0%					
	#200	0.075mm	7.0%					
DOTTSD				Non-Plastic				Non-Plastic
Liquid Limit								
Plastic Index								
Moisture Content %			2.7%	25.5%	2.7%	2.7%	4.1%	8.9%
Organic Content %								
% Gravel			49%					
% Sand			44%					
% Silt & Clay			7%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value				0.25				

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			30	0	2.5	5	0	2.5
Test Hole No.			B-016	B-017	B-017	B-017	B-018	B-018S2
Field Sample No.			S9	S1	S2	S3	S1	S2
Date Sampled			February 15, 2006	February 15, 2006	February 15, 2006	February 15, 2006	February 16, 2006	February 16, 2006
Lab No.			B-016S9	B-017S1	B-017S2	B-017S3	B-018S1	B-018S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%				100.0%	
	1"	25mm	93.0%				99.0%	
	0.75"	19mm	83.0%				98.0%	
	0.5"	12.5mm	76.0%				92.0%	
	0.375"	9.5mm	69.0%				86.0%	
	0.25"	6.3mm						
	#4	4.75mm	56.0%				73.0%	
	#8	2.36mm	43.0%				63.0%	
	#10	2mm						
	#16	1.18mm	31.0%				54.0%	
	#30	0.6mm	22.0%				47.0%	
	#40	0.425mm						
	#50	0.3mm	14.0%				37.0%	
	#100	0.15mm	9.0%				27.0%	
	#200	0.075mm	6.0%				21.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.4%	4.3%	2.0%	1.8%	4.1%	1.5%
Organic Content %								
% Gravel			45%				27%	
% Sand			49%				52%	
% Silt & Clay			6%				21%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			7.5	0	2.5	15	25	0
Test Hole No.			B-018	B-019	B-019	B-019	B-019	B-020
Field Sample No.			S4	S1	S2	S6	S8	S1
Date Sampled			February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006
Lab No.			B-018S1	B-019S1	B-019S2	B-019S6	B-019S8	B-020S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm					100.0%	
	1"	25mm				100.0%	83.0%	
	0.75"	19mm				90.0%	74.0%	
	0.5"	12.5mm				82.0%	70.0%	
	0.375"	9.5mm				72.0%	61.0%	
	0.25"	6.3mm						
	#4	4.75mm				54.0%	45.0%	
	#8	2.36mm				42.0%	33.0%	
	#10	2mm						
	#16	1.18mm				33.0%	23.0%	
	#30	0.6mm				23.0%	15.0%	
	#40	0.425mm						
	#50	0.3mm				10.0%	11.0%	
	#100	0.15mm				6.0%	8.0%	
	#200	0.075mm				4.0%	7.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.7%	1.5%	1.2%	1.7%	1.2%	2.7%
Organic Content %								
% Gravel						46%	55%	
% Sand						49%	38%	
% Silt & Clay						4%	7%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value			>4.5					

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	0	2.5	0	2.5
Test Hole No.			B-020	B-020	B-021	B-021	B-022	B-022
Field Sample No.			S2	S3	S1	S2	S1	S2
Date Sampled			February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 17, 2006	February 17, 2006
Lab No.			B-020S2	B-020S3	B-021S1	B-021S2	B-022S1	B-022S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm			100.0%			
	1"	25mm			97.0%			
	0.75"	19mm			91.0%			
	0.5"	12.5mm			80.0%			
	0.375"	9.5mm			71.0%			
	0.25"	6.3mm						
	#4	4.75mm			53.0%			
	#8	2.36mm			41.0%			
	#10	2mm						
	#16	1.18mm			32.0%			
	#30	0.6mm			25.0%			
	#40	0.425mm						
	#50	0.3mm			17.0%			
	#100	0.15mm			13.0%			
	#200	0.075mm			10.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.3%	11.0%	3.0%	4.9%	2.6%	2.4%
Organic Content %								
% Gravel					47%			
% Sand					42%			
% Silt & Clay					10%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			5	7.5	0	2.5	5	7.5
Test Hole No.			B-022	B-022	B-023	B-023	B-023	B-023
Field Sample No.			S3	S4	S1	S2	S3	S4
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-022S3	B-022S4	B-023S1	B-023S2	B-023S3	B-023S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						100.0%
	1"	25mm		100.0%				79.0%
	0.75"	19mm		94.0%				77.0%
	0.5"	12.5mm		81.0%				71.0%
	0.375"	9.5mm		76.0%				68.0%
	0.25"	6.3mm						
	#4	4.75mm		65.0%				59.0%
	#8	2.36mm		55.0%				49.0%
	#10	2mm						
	#16	1.18mm		47.0%				40.0%
	#30	0.6mm		38.0%				30.0%
	#40	0.425mm						
	#50	0.3mm		29.0%				21.0%
	#100	0.15mm		23.0%				15.0%
	#200	0.075mm		20.0%				12.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			54.8%	5.6%	3.2%	2.2%	1.5%	1.8%
Organic Content %								
% Gravel				35%				41%
% Sand				45%				47%
% Silt & Clay				20%				12%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	0	2.5	5
Test Hole No.			B-024	B-024	B-024	B-025	B-025	B-025
Field Sample No.			S1	S2	S3	S1	S2	S3
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-024S1	B-024S2	B-024S3	B-025S1	B-025S2	B-025S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						100.0%
	0.75"	19mm						80.0%
	0.5"	12.5mm						63.0%
	0.375"	9.5mm						60.0%
	0.25"	6.3mm						
	#4	4.75mm						48.0%
	#8	2.36mm						38.0%
	#10	2mm						
	#16	1.18mm						28.0%
	#30	0.6mm						22.0%
	#40	0.425mm						
	#50	0.3mm						16.0%
	#100	0.15mm						13.0%
	#200	0.075mm						10.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.8%	1.1%	1.1%	3.0%	0.9%	0.5%
Organic Content %								
% Gravel								52%
% Sand								38%
% Silt & Clay								10%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	7.5	0	2.5	5
Test Hole No.			B-026	B-026	B-026	B-027	B-027	B-027
Field Sample No.			S1	S2	S4	S1	S2	S3
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-026S1	B-026S2	B-026S4	B-027S1	B-027S2	B-027S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						100.0%
	0.75"	19mm						89.0%
	0.5"	12.5mm						86.0%
	0.375"	9.5mm						77.0%
	0.25"	6.3mm						
	#4	4.75mm						56.0%
	#8	2.36mm						42.0%
	#10	2mm						
	#16	1.18mm						31.0%
	#30	0.6mm						23.0%
	#40	0.425mm						
	#50	0.3mm						17.0%
	#100	0.15mm						12.0%
	#200	0.075mm						9.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.8%	0.3%	0.3%	2.8%	0.9%	1.6%
Organic Content %								
% Gravel								44%
% Sand								47%
% Silt & Clay								9%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	7.5	10	15
Test Hole No.			B-028	B-028	B-028	B-028	B-028	B-028
Field Sample No.			S1	S2	S3	S4	S5	S6
Date Sampled			February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006
Lab No.			B-028S1	B-028S2	B-028S3	B-028S4	B-028S5	B-028S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			4.0%	30.2%	376.8%	94.8%	106.5%	21.3%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								2.5

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	7.5	15	0
Test Hole No.			B-029	B-029	B-029	B-029	B-029	B-030
Field Sample No.			S1	S2	S3	S4	S6	S1
Date Sampled			February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006
Lab No.			B-029S1	B-029S2	B-029S3	B-029S4	B-029S6	B-030S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	94.0%					
	0.75"	19mm	91.0%					
	0.5"	12.5mm	83.0%					
	0.375"	9.5mm	75.0%					
	0.25"	6.3mm						
	#4	4.75mm	57.0%					
	#8	2.36mm	42.0%					
	#10	2mm						
	#16	1.18mm	31.0%					
	#30	0.6mm	25.0%					
	#40	0.425mm						
	#50	0.3mm	20.0%					
	#100	0.15mm	16.0%					
	#200	0.075mm	14.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.3%	2.8%	2.2%	3.5%	21.2%	3.9%
Organic Content %								
% Gravel			43%					
% Sand			43%					
% Silt & Clay			14%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	7.5	10	15	0
Test Hole No.			B-030	B-030	B-030	B-030	B-030	B-031
Field Sample No.			S2	S3	S4	S5	S6	S1
Date Sampled			February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006
Lab No.			B-030S2	B-030S3	B-030S4	B-030S5	B-030S6	B-031S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	85.0%					
	0.75"	19mm	82.0%					
	0.5"	12.5mm	74.0%					
	0.375"	9.5mm	69.0%					
	0.25"	6.3mm						
	#4	4.75mm	54.0%					
	#8	2.36mm	43.0%					
	#10	2mm						
	#16	1.18mm	33.0%					
	#30	0.6mm	24.0%					
	#40	0.425mm						
	#50	0.3mm	18.0%					
	#100	0.15mm	14.0%					
	#200	0.075mm	10.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.1%	2.0%	3.5%	3.3%	15.6%	3.7%
Organic Content %								
% Gravel			46%					
% Sand			44%					
% Silt & Clay			10%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	7.5	10	15	0
Test Hole No.			B-031	B-031	B-031	B-031	B-031	B-032
Field Sample No.			S2	S3	S4	S5	S6	S1
Date Sampled			February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006
Lab No.			B-031S2	B-031S3	B-031S4	B-031S5	B-031S6	B-032S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			4.4%	3.3%	2.1%	7.7%	21.1%	2.7%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value							>4.5	

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	5	7.5	10	15	20
Test Hole No.			B-032	B-032	B-032	B-032	B-032	B-032
Field Sample No.			S2	S3	S4	S5	S6	S7
Date Sampled			February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006	February 21, 2006
Lab No.			B-032S2	B-032S3	B-032S4	B-032S5	B-032S6	B-032S7
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			8.2%	10.9%	16.4%	13.7%	19.4%	10.5%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value					2.5			

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	7.5	10	15
Test Hole No.			B-033	B-033	B-033	B-033	B-033	B-033
Field Sample No.			S1	S2	S3	S4	S5	S6
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-033S1	B-033S2	B-033S3	B-033S4	B-033S5	B-033S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm					100.0%	
	0.75"	19mm					98.0%	
	0.5"	12.5mm					95.0%	
	0.375"	9.5mm					92.0%	
	0.25"	6.3mm						
	#4	4.75mm					85.0%	
	#8	2.36mm					78.0%	
	#10	2mm						
	#16	1.18mm					73.0%	
	#30	0.6mm					68.0%	
	#40	0.425mm						
	#50	0.3mm					61.0%	
	#100	0.15mm					54.0%	
	#200	0.075mm					47.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			5.3%	7.7%	10.9%	10.8%	11.6%	20.7%
Organic Content %								
% Gravel							15%	
% Sand							38%	
% Silt & Clay							47%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								>4.5

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			20	0	2.5	5	7.5	10
Test Hole No.			B-033	B-034	B-034	B-034	B-034	B-034
Field Sample No.			S7	S1	S2	S3	S4	S5
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-033S7	B-034S1	B-034S2	B-034S3	B-034S4	B-034S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm		100.0%				
	0.75"	19mm		98.0%				
	0.5"	12.5mm		91.0%				
	0.375"	9.5mm		86.0%				
	0.25"	6.3mm						
	#4	4.75mm		71.0%				
	#8	2.36mm		57.0%				
	#10	2mm						
	#16	1.18mm		47.0%				
	#30	0.6mm		38.0%				
	#40	0.425mm						
	#50	0.3mm		28.0%				
	#100	0.15mm		21.0%				
	#200	0.075mm		17.0%				
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			18.9%	3.7%	8.0%	19.8%	53.8%	295.4%
Organic Content %								
% Gravel				29%				
% Sand				54%				
% Silt & Clay				17%				
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value			4.0					

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	7.5	10
Test Hole No.			B-034	B-035	B-035	B-035	B-035	B-035
Field Sample No.			S6	S1	S2	S3	S4	S5
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-034S6	B-035S1	B-035S2	B-035S3	B-035S4	B-035S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			17.4%	3.3%	30.7%	26.7%	8.5%	21.4%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay					88%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	7.5	10
Test Hole No.			B-035	B-036	B-036	B-036	B-036	B-036
Field Sample No.			S6	S1	S2	S3	S4	S5
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-035S6	B-036S1	B-036S2	B-036S3	B-036S4	B-036S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit			25					
Plastic Index			4					
Moisture Content %			24.9%	2.6%	4.5%	20.1%	20.4%	20.4%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay						69%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value			1.5-2.25				0.5	

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	7.5	10
Test Hole No.			B-036	B-037	B-037	B-037	B-037	B-037
Field Sample No.			S6	S1	S2	S3	S4	S5
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-036S6	B-037S1	B-037S2	B-037S3	B-037S4	B-037S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm			100.0%			
	0.75"	19mm			95.0%			
	0.5"	12.5mm			89.0%			
	0.375"	9.5mm			85.0%			
	0.25"	6.3mm						
	#4	4.75mm			72.0%			
	#8	2.36mm			61.0%			
	#10	2mm						
	#16	1.18mm			52.0%			
	#30	0.6mm			46.0%			
	#40	0.425mm						
	#50	0.3mm			39.0%			
	#100	0.15mm			31.0%			
	#200	0.075mm			25.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			18.5%	3.4%	7.3%	5.0%	17.3%	18.5%
Organic Content %								
% Gravel					28%			
% Sand					46%			
% Silt & Clay					25%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value			2.0->4.5					2.25

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	7.5	10
Test Hole No.			B-037	B-038	B-038	B-038	B-038	B-038
Field Sample No.			S6	S1	S2	S3	S4	S5
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-037S6	B-038S1	B-038S2	B-038S3	B-038S4	B-038S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm				100.0%		
	0.5"	12.5mm				97.0%		
	0.375"	9.5mm				97.0%		
	0.25"	6.3mm						
	#4	4.75mm				95.0%		
	#8	2.36mm				94.0%		
	#10	2mm						
	#16	1.18mm				93.0%		
	#30	0.6mm				91.0%		
	#40	0.425mm						
	#50	0.3mm				82.0%		
	#100	0.15mm				65.0%		
	#200	0.075mm				53.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			17.5%	3.3%	26.0%	17.2%	21.0%	21.3%
Organic Content %								
% Gravel						5%		
% Sand						42%		
% Silt & Clay					78%	53%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			15	0	2.5	5	0	2.5
Test Hole No.			B-038	B-039	B-039	B-039	B-040	B-040
Field Sample No.			S6	S1	S2	S3	S1	S2
Date Sampled			February 22, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006
Lab No.			B-038S6	B-039S1	B-039S2	B-039S3	B-040S1	B-040S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm				100.0%		
	0.75"	19mm				98.0%		
	0.5"	12.5mm				98.0%		
	0.375"	9.5mm				97.0%		
	0.25"	6.3mm						
	#4	4.75mm				96.0%		
	#8	2.36mm				96.0%		
	#10	2mm						
	#16	1.18mm				95.0%		
	#30	0.6mm				92.0%		
	#40	0.425mm						
	#50	0.3mm				45.0%		
	#100	0.15mm				19.0%		
	#200	0.075mm				10.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			22.1%	3.9%	3.3%	9.8%	4.0%	9.2%
Organic Content %								
% Gravel						3%		
% Sand						86%		
% Silt & Clay						10%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			5	7.5	0	2.5	5	0
Test Hole No.			B-040	B-040	B-041	B-041	B-041	B-042
Field Sample No.			S3	S4	S1	S2	S3	S1
Date Sampled			February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006
Lab No.			B-040S3	B-040S4	B-041S1	B-041S2	B-041S3	B-042S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm		100.0%		100.0%		
	0.75"	19mm		86.0%		96.0%		
	0.5"	12.5mm		78.0%		94.0%		
	0.375"	9.5mm		72.0%		93.0%		
	0.25"	6.3mm						
	#4	4.75mm		57.0%		86.0%		
	#8	2.36mm		45.0%		81.0%		
	#10	2mm						
	#16	1.18mm		36.0%		77.0%		
	#30	0.6mm		26.0%		74.0%		
	#40	0.425mm						
	#50	0.3mm		17.0%		69.0%		
	#100	0.15mm		11.0%		65.0%		
	#200	0.075mm		8.0%		59.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.4%	9.0%	10.1%	13.9%	15.4%	6.1%
Organic Content %								
% Gravel				43%		14%		
% Sand				50%		26%		
% Silt & Clay				8%		59%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			2.5	7.5	25	0	5	7.5
Test Hole No.			B-042	B-042	B-042	B-043	B-043	B-043
Field Sample No.			S2	S4	S8	S1	S3	S4
Date Sampled			February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006	February 23, 2006
Lab No.			B-042S2	B-042S3	B-042S4	B-043S1	B-043S3	B-043S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm				100.0%		
	1"	25mm				99.0%		
	0.75"	19mm				96.0%		
	0.5"	12.5mm			100.0%	91.0%		
	0.375"	9.5mm			99.0%	86.0%		
	0.25"	6.3mm						
	#4	4.75mm			99.0%	69.0%		
	#8	2.36mm			98.0%	54.0%		
	#10	2mm						
	#16	1.18mm			98.0%	41.0%		
	#30	0.6mm			97.0%	31.0%		
	#40	0.425mm						
	#50	0.3mm			97.0%	22.0%		
	#100	0.15mm			97.0%	17.0%		
	#200	0.075mm			96.0%	14.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.7%	15.2%	22.0%	3.7%	29.0%	16.3%
Organic Content %								
% Gravel					1%	31%		
% Sand					3%	55%		
% Silt & Clay					96%	14%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value					1.5			

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Andrew Lee

Depth			0	2.5	5	0	2.5	7.5
Test Hole No.			B-044	B-044	B-044	B-045	B-045	B-045
Field Sample No.			S1	S2	S3	S1	S2	S6
Date Sampled			February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006
Lab No.			B-044S1	B-044S2	B-044S3	B-045S1	B-045S2	B-045S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%				100.0%	
	1"	25mm	99.0%				95.0%	100.0%
	0.75"	19mm	98.0%				95.0%	98.0%
	0.5"	12.5mm	92.0%				91.0%	97.0%
	0.375"	9.5mm	86.0%				85.0%	96.0%
	0.25"	6.3mm						
	#4	4.75mm	66.0%				74.0%	94.0%
	#8	2.36mm	49.0%				65.0%	93.0%
	#10	2mm						
	#16	1.18mm	37.0%				58.0%	92.0%
	#30	0.6mm	28.0%				52.0%	91.0%
	#40	0.425mm						
	#50	0.3mm	22.0%				45.0%	88.0%
	#100	0.15mm	17.0%				39.0%	85.0%
	#200	0.075mm	14.0%				34.0%	84.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.6%	1.9%	17.7%	4.0%	16.9%	23.9%
Organic Content %								
% Gravel			34%				26%	6%
% Sand			52%				41%	10%
% Silt & Clay			14%				34%	84%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								2.5-4.5

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski & Andrew Lee

Depth			5	7.5	10	0	2.5	5
Test Hole No.			B-046	B-046	B-046	B-047	B-047	B-047
Field Sample No.			S2	S3	S4	S1	S2	S3
Date Sampled			March 9, 2006	March 9, 2006	March 9, 2006	February 24, 2006	February 24, 2006	February 24, 2006
Lab No.			B-046S2	B-046S3	B-046S4	B-047S1	B-047S2	B-047S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm			100.0%			
	0.5"	12.5mm			86.0%			
	0.375"	9.5mm			80.0%			
	0.25"	6.3mm						
	#4	4.75mm			63.0%			
	#8	2.36mm			50.0%			
	#10	2mm						
	#16	1.18mm			39.0%			
	#30	0.6mm			29.0%			
	#40	0.425mm						
	#50	0.3mm			17.0%			
	#100	0.15mm			11.0%			
	#200	0.075mm			8.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			13.1%	9.8%	9.6%	3.3%	7.4%	51.5%
Organic Content %								
% Gravel					37%			
% Sand					55%			
% Silt & Clay					8%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski & Andrew Lee

Depth			2.5	7.5	10	20	0	2.5
Test Hole No.			B-048	B-048	B-048	B-048	B-049	B-049
Field Sample No.			S1	S3	S4	S6	S1	S2
Date Sampled			March 9, 2006	March 9, 2006	March 9, 2006	March 9, 2006	February 24, 2006	February 24, 2006
Lab No.			B-048S1	B-048S3	B-048S4	B-048S6	B-049S1	B-049S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit						187		
Plastic Index						126		
Moisture Content %			18.9%	22.0%	25.8%	166.5%	3.0%	8.7%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski & Andrew Lee

Depth			20	7.5	10	0	2.5	5
Test Hole No.			B-049	B-050	B-050	B-051	B-051	B-051
Field Sample No.			S7	S3	S4	S1	S2	S3
Date Sampled			February 24, 2006	March 8, 2006	March 8, 2006	February 24, 2006	February 24, 2006	February 24, 2006
Lab No.			B-049S7	B-050S3	B-050S4	B-051S1	B-051S2	B-051S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	91.0%			100.0%		
	0.75"	19mm	90.0%			99.0%		
	0.5"	12.5mm	87.0%			95.0%		
	0.375"	9.5mm	82.0%			89.0%		
	0.25"	6.3mm						
	#4	4.75mm	71.0%			72.0%		
	#8	2.36mm	59.0%			57.0%		
	#10	2mm						
	#16	1.18mm	45.0%			46.0%		
	#30	0.6mm	28.0%			36.0%		
	#40	0.425mm						
	#50	0.3mm	14.0%			27.0%		
	#100	0.15mm	8.0%			22.0%		
	#200	0.075mm	5.0%			18.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			11.8%	15.0%	14.0%	3.0%	2.5%	3.2%
Organic Content %								
% Gravel			29%			28%		
% Sand			66%			54%		
% Silt & Clay			5%			18%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			2.5	5	7.5	2.5	5	7.5
Test Hole No.			B-052	B-052	B-052	B-053	B-053	B-053
Field Sample No.			S1	S2	S3	S1	S2	S3
Date Sampled			March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006
Lab No.			B-052S1	B-052S2	B-052S3	B-053S1	B-053S2	B-053S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm			100.0%			
	0.75"	19mm			96.0%			
	0.5"	12.5mm			91.0%			
	0.375"	9.5mm			90.0%			
	0.25"	6.3mm						
	#4	4.75mm			87.0%			
	#8	2.36mm			84.0%			
	#10	2mm						
	#16	1.18mm			81.0%			
	#30	0.6mm			76.0%			
	#40	0.425mm						
	#50	0.3mm			70.0%			
	#100	0.15mm			56.0%			
	#200	0.075mm			40.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			13.9%	10.4%	14.5%	18.2%	13.2%	11.9%
Organic Content %								
% Gravel					13%			
% Sand					47%			
% Silt & Clay					40%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			10	2.5	5	7.5	20	7.5
Test Hole No.			B-053	B-054	B-054	B-054	B-054	B-055
Field Sample No.			S4	S1	S2	S3	S6	S3
Date Sampled			March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006	March 8, 2006
Lab No.			B-053S4	B-054S1	B-054S2	B-054S3	B-054S6	B-055S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm	100.0%					
	0.25"	6.3mm						
	#4	4.75mm	95.0%					
	#8	2.36mm	92.0%					
	#10	2mm						
	#16	1.18mm	89.0%					
	#30	0.6mm	85.0%					
	#40	0.425mm						
	#50	0.3mm	76.0%					
	#100	0.15mm	62.0%					
	#200	0.075mm	48.0%					
DOTTSD								
Liquid Limit							30	
Plastic Index							10	
Moisture Content %			12.3%	11.1%	13.3%	13.7%	19.5%	16.8%
Organic Content %								
% Gravel			5%					
% Sand			47%					
% Silt & Clay			48%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value							>4.5	

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			10	15	0	2.5	5	0
Test Hole No.			B-055	B-055	B-056	B-056	B-056	B-057
Field Sample No.			S4	S5	S1	S2	S3	S1
Date Sampled			March 8, 2006	March 8, 2006	February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006
Lab No.			B-055S4	B-055S5	B-056S1	B-056S2	B-056S3	B-057S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm	100.0%		100.0%			100.0%
	0.75"	19mm	97.0%		99.0%			99.0%
	0.5"	12.5mm	84.0%		95.0%			95.0%
	0.375"	9.5mm	80.0%		92.0%			91.0%
	0.25"	6.3mm						
	#4	4.75mm	67.0%		78.0%			74.0%
	#8	2.36mm	58.0%		63.0%			59.0%
	#10	2mm						
	#16	1.18mm	52.0%		51.0%			48.0%
	#30	0.6mm	47.0%		41.0%			40.0%
	#40	0.425mm						
	#50	0.3mm	44.0%		32.0%			29.0%
	#100	0.15mm	41.0%		26.0%			22.0%
	#200	0.075mm	40.0%		21.0%			18.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			14.2%	11.9%	2.9%	21.1%	22.3%	4.3%
Organic Content %								
% Gravel			33%		22%			26%
% Sand			27%		57%			56%
% Silt & Clay			40%		21%			18%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			2.5	5	0	2.5	5	0
Test Hole No.			B-057	B-057	B-058	B-058	B-058	B-059
Field Sample No.			S2	S3	S1	S2	S3	S1
Date Sampled			February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006
Lab No.			B-057S2	B-057S3	B-058S1	B-058S2	B-058S3	B-059S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm	100.0%		100.0%			100.0%
	0.5"	12.5mm	99.0%		99.0%			99.0%
	0.375"	9.5mm	97.0%		98.0%			97.0%
	0.25"	6.3mm						
	#4	4.75mm	91.0%		92.0%			87.0%
	#8	2.36mm	85.0%		81.0%			73.0%
	#10	2mm						
	#16	1.18mm	77.0%		69.0%			61.0%
	#30	0.6mm	67.0%		59.0%			51.0%
	#40	0.425mm						
	#50	0.3mm	45.0%		47.0%			43.0%
	#100	0.15mm	28.0%		38.0%			36.0%
	#200	0.075mm	21.0%		32.0%			31.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			30.0%	21.5%	7.2%	91.3%	85.4%	5.0%
Organic Content %								
% Gravel			9%		8%			13%
% Sand			70%		59%			56%
% Silt & Clay			21%		32%	78%		31%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			2.5	5	0	2.5	5	7.5
Test Hole No.			B-059	B-059	B-060	B-060	B-060	B-060
Field Sample No.			S2	S3	S1	S2	S3	S4
Date Sampled			February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006	February 25, 2006
Lab No.			B-059S2	B-059S3	B-060S1	B-060S2	B-060S3	B-060S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm			100.0%			
	0.375"	9.5mm			98.0%			100.0%
	0.25"	6.3mm						
	#4	4.75mm			94.0%			99.8%
	#8	2.36mm			87.0%			99.5%
	#10	2mm						
	#16	1.18mm			79.0%			99.0%
	#30	0.6mm			72.0%			97.0%
	#40	0.425mm						
	#50	0.3mm			61.0%			82.0%
	#100	0.15mm			46.0%			46.0%
	#200	0.075mm			40.0%			33.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			26.2%	16.7%	9.2%	18.2%	23.9%	20.5%
Organic Content %								
% Gravel					6%			0%
% Sand					54%			67%
% Silt & Clay					40%			33%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			2.5	5	7.5	10	15	2.5
Test Hole No.			B-061	B-061	B-061	B-061	B-061	B-062
Field Sample No.			S1	S2	S3	S4	S5	S1
Date Sampled			March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006
Lab No.			B-061S1	B-061S2	B-061S3	B-061S4	B-061S5	B-062S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			20.8%	21.5%	21.7%	25.9%	23.7%	19.8%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay			38%	43%	43%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			5	7.5	8.2	10	15	2.5
Test Hole No.			B-062	B-062	B-062	B-062	B-062	B-063
Field Sample No.			S2	S3a	S3b	S4	S5	S1
Date Sampled			March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006
Lab No.			B-062S2	B-062S3a	B-062S3b	B-062S4	B-062S5	B-063S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit						29		
Plastic Index						9		
Moisture Content %			23.7%	19.3%	21.2%	23.2%	20.3%	20.8%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay			40%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne & Elizabeth A. Karcheski

Depth			5	7.5	10	15	20	2.5
Test Hole No.			B-063	B-063	B-063	B-063	B-063	B-065
Field Sample No.			S2	S3	S4	S5	S6	S1
Date Sampled			March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	March 7, 2006	February 22, 2006
Lab No.			B-063S2	B-063S3	B-063S4	B-063S5	B-063S6	B-065S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit				30				
Plastic Index				9				
Moisture Content %			19.6%	20.3%	22.1%	20.4%	21.5%	21.4%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	7.5	2.5	5	7.5	2.5
Test Hole No.			B-065	B-065	B-066	B-066	B-066	B-067
Field Sample No.			S2	S3	S1	S2	S3	S1
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-065S2	B-065S3	B-066S1	B-066S2	B-066S3	B-067S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm		100.0%				
	0.75"	19mm		96.0%				
	0.5"	12.5mm		93.0%				
	0.375"	9.5mm		92.0%				
	0.25"	6.3mm						
	#4	4.75mm		88.0%				
	#8	2.36mm		85.0%				
	#10	2mm						
	#16	1.18mm		82.0%				
	#30	0.6mm		79.0%				
	#40	0.425mm						
	#50	0.3mm		69.0%				
	#100	0.15mm		51.0%				
	#200	0.075mm		34.0%				
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			10.5%	16.2%	13.8%	10.3%	19.6%	13.9%
Organic Content %								
% Gravel				12%				
% Sand				54%				
% Silt & Clay				34%				
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	7.5	20	2.5	10	5
Test Hole No.			B-067	B-067	B-067	B-068	B-068	B-069
Field Sample No.			S2	S3	S6	S1	S4	S2
Date Sampled			February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006	February 22, 2006
Lab No.			B-067S2	B-067S3	B-067S6	B-068S1	B-068S2	B-069S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm					100.0%	
	0.75"	19mm	100.0%		100.0%		97.0%	
	0.5"	12.5mm	99.0%		99.0%		89.0%	
	0.375"	9.5mm	99.0%		97.0%		87.0%	
	0.25"	6.3mm						
	#4	4.75mm	97.0%		91.0%		82.0%	
	#8	2.36mm	95.0%		87.0%		77.0%	
	#10	2mm						
	#16	1.18mm	94.0%		84.0%		73.0%	
	#30	0.6mm	92.0%		81.0%		68.0%	
	#40	0.425mm						
	#50	0.3mm	87.0%		76.0%		58.0%	
	#100	0.15mm	80.0%		68.0%		44.0%	
	#200	0.075mm	72.0%		59.0%		33.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.1%	12.8%	13.3%	16.9%	12.3%	35.1%
Organic Content %								
% Gravel			3%		9%		18%	
% Sand			25%		31%		49%	
% Silt & Clay			72%		59%		33%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			7.5	10	2.5	5	7.5	2.5
Test Hole No.			B-069	B-069	B-070	B-070	B-070	B-071
Field Sample No.			S3	S4	S1	S2	S3	S1
Date Sampled			February 22, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006
Lab No.			B-069S3	B-069S4	B-070S1	B-070S2	B-070S3	B-071S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm	100.0%					
	#8	2.36mm	99.9%					
	#10	2mm						
	#16	1.18mm	99.6%					
	#30	0.6mm	99.0%					
	#40	0.425mm	97.0%					
	#50	0.3mm	94.0%					
	#100	0.15mm	89.0%					
	#200	0.075mm	87.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			27.9%	18.5%	15.1%	18.2%	19.0%	2.9%
Organic Content %								
% Gravel			0%					
% Sand			13%					
% Silt & Clay			87%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	7.5	2.5	5	7.5	2.5
Test Hole No.			B-071	B-071	B-072	B-072	B-072	B-073
Field Sample No.			S2	S3	S1	S2	S3	S1
Date Sampled			February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006	February 24, 2006
Lab No.			B-071S2	B-071S3	B-072S1	B-072S2	B-072S3	B-073S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%				
	1"	25mm		91.0%				
	0.75"	19mm		87.0%				
	0.5"	12.5mm		81.0%				
	0.375"	9.5mm		75.0%				
	0.25"	6.3mm						
	#4	4.75mm		60.0%				
	#8	2.36mm		51.0%				
	#10	2mm						
	#16	1.18mm		44.0%				
	#30	0.6mm		38.0%				
	#40	0.425mm						
	#50	0.3mm		29.0%				
	#100	0.15mm		19.0%				
	#200	0.075mm		12.0%				
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.9%	5.8%	25.2%	19.9%	12.7%	10.0%
Organic Content %								
% Gravel				40%				
% Sand				48%				
% Silt & Clay				12%				
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	7.5	20	2.5	5	7.5
Test Hole No.			B-073	B-073	B-073	B-074	B-074	B-074
Field Sample No.			S2	S3	S6	S1	S2	S3
Date Sampled			February 24, 2006	February 24, 2006	February 24, 2006	February 27, 2006	February 27, 2006	February 27, 2006
Lab No.			B-073S2	B-073S3	B-073S4	B-074S1	B-074S2	B-074S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			8.5%	10.6%	16.3%	5.0%	6.1%	6.0%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay					78%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			10	2.5	5	7.5	2.5	5
Test Hole No.			B-074	B-075	B-075	B-075	B-076	B-076
Field Sample No.			S4	S1	S2	S3	S1	S2
Date Sampled			February 27, 2006	February 27, 2006	February 27, 2006	February 27, 2006	February 27, 2006	February 27, 2006
Lab No.			B-074S4	B-075S1	B-075S2	B-075S3	B-076S1	B-076S2
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	86.0%					
	0.75"	19mm	82.0%					
	0.5"	12.5mm	75.0%					
	0.375"	9.5mm	70.0%					
	0.25"	6.3mm						
	#4	4.75mm	59.0%					
	#8	2.36mm	52.0%					
	#10	2mm						
	#16	1.18mm	47.0%					
	#30	0.6mm	42.0%					
	#40	0.425mm						
	#50	0.3mm	35.0%					
	#100	0.15mm	28.0%					
	#200	0.075mm	22.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			5.0%	2.4%	2.4%	6.2%	2.5%	2.9%
Organic Content %								
% Gravel			41%					
% Sand			38%					
% Silt & Clay			22%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			7.5	2.5	5	7.5	35	2.5
Test Hole No.			B-076	B-077	B-077	B-077	B-077	B-078
Field Sample No.			S3	S1	S2	S3	S9	S1
Date Sampled			February 27, 2006	February 27, 2006	February 27, 2006	February 27, 2006	February 27, 2006	February 28, 2006
Lab No.			B-076S3	B-077S1	B-077S2	B-077S3	B-077S9	B-078S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%			100.0%	100.0%	
	1"	25mm	87.0%			85.0%	97.0%	
	0.75"	19mm	82.0%			76.0%	91.0%	
	0.5"	12.5mm	75.0%			72.0%	85.0%	
	0.375"	9.5mm	71.0%			68.0%	82.0%	
	0.25"	6.3mm						
	#4	4.75mm	62.0%			60.0%	75.0%	
	#8	2.36mm	54.0%			54.0%	70.0%	
	#10	2mm						
	#16	1.18mm	47.0%			48.0%	66.0%	
	#30	0.6mm	41.0%			43.0%	62.0%	
	#40	0.425mm						
	#50	0.3mm	34.0%			37.0%	54.0%	
	#100	0.15mm	26.0%			30.0%	43.0%	
	#200	0.075mm	20.0%			24.0%	34.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			5.2%	8.4%	10.3%	6.3%	6.7%	15.5%
Organic Content %								
% Gravel			38%			40%	25%	
% Sand			42%			36%	41%	
% Silt & Clay			20%			24%	34%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	7.5	2.5	5	7.5	2.5
Test Hole No.			B-078	B-078	B-079	B-079	B-079	B-080
Field Sample No.			S2	S3	S1	S2	S3	S1
Date Sampled			February 28, 2006	February 28, 2006	March 1, 2006	March 1, 2006	March 1, 2006	March 1, 2006
Lab No.			B-078S2	B-078S3	B-079S1	B-079S2	B-079S3	B-080S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm					100.0%	
	0.75"	19mm					93.0%	
	0.5"	12.5mm					88.0%	
	0.375"	9.5mm					84.0%	
	0.25"	6.3mm						
	#4	4.75mm					70.0%	
	#8	2.36mm					60.0%	
	#10	2mm						
	#16	1.18mm					53.0%	
	#30	0.6mm					47.0%	
	#40	0.425mm						
	#50	0.3mm					39.0%	
	#100	0.15mm					31.0%	
	#200	0.075mm					24.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.4%	9.9%	6.4%	7.7%	6.7%	5.5%
Organic Content %								
% Gravel							30%	
% Sand							47%	
% Silt & Clay							24%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	10	25	2.5	5	7.5
Test Hole No.			B-080	B-080	B-080	B-081	B-081	B-081
Field Sample No.			S2	S4	S7	S1	S2	S3
Date Sampled			March 1, 2006	March 1, 2006	March 1, 2006	March 1, 2006	March 1, 2006	March 1, 2006
Lab No.			B-080S2	B-080S4	B-080S7	B-081S1	B-081S2	B-081S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm			100.0%			
	1"	25mm			99.9%			
	0.75"	19mm			94.0%			
	0.5"	12.5mm			88.0%			
	0.375"	9.5mm			82.0%			
	0.25"	6.3mm						
	#4	4.75mm			69.0%			
	#8	2.36mm			61.0%			
	#10	2mm						
	#16	1.18mm			55.0%			
	#30	0.6mm			49.0%			
	#40	0.425mm						
	#50	0.3mm			41.0%			
	#100	0.15mm			32.0%			
	#200	0.075mm			24.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.2%	6.8%	4.3%	10.5%	7.9%	3.8%
Organic Content %								
% Gravel					31%			
% Sand					45%			
% Silt & Clay					24%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski & Steff Browne

Depth			20	30	2.5	5	7.5	10
Test Hole No.			B-081	B-081	B-082	B-082	B-082	B-082
Field Sample No.			S6	S8	S1	S2	S4	S6
Date Sampled			March 1, 2006	March 1, 2006	March 2, 2006	March 2, 2006	March 2, 2006	March 2, 2006
Lab No.			B-081S6	B-081S8	B-082S1	B-082S2	B-082S4	B-082S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					100.0%
	1"	25mm	96.0%	100.0%				93.0%
	0.75"	19mm	92.0%	94.0%				86.0%
	0.5"	12.5mm	83.0%	91.0%				81.0%
	0.375"	9.5mm	79.0%	87.0%				77.0%
	0.25"	6.3mm						
	#4	4.75mm	67.0%	79.0%				68.0%
	#8	2.36mm	60.0%	74.0%				61.0%
	#10	2mm						
	#16	1.18mm	54.0%	69.0%				56.0%
	#30	0.6mm	48.0%	64.0%				51.0%
	#40	0.425mm						
	#50	0.3mm	41.0%	56.0%				45.0%
	#100	0.15mm	32.0%	44.0%				36.0%
	#200	0.075mm	24.0%	34.0%				27.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			5.5%	7.4%	7.2%	7.4%	7.2%	6.4%
Organic Content %								
% Gravel			33%	21%				32%
% Sand			43%	45%				41%
% Silt & Clay			24%	34%				27%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			2.5	5	7.5	10	15	20
Test Hole No.			B-083	B-083	B-083	B-083	B-083	B-083
Field Sample No.			S1	S2	S3	SB1	S5	S6
Date Sampled			March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006
Lab No.			B-083S1	B-083S2	B-083S3	B-083SB1	B-083S5	B-083S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						100.0%
	1"	25mm				100.0%		89.0%
	0.75"	19mm				98.0%		84.0%
	0.5"	12.5mm				90.0%		78.0%
	0.375"	9.5mm				86.0%		72.0%
	0.25"	6.3mm						
	#4	4.75mm				74.0%		59.0%
	#8	2.36mm				67.0%		48.0%
	#10	2mm						
	#16	1.18mm				63.0%		39.0%
	#30	0.6mm				59.0%		31.0%
	#40	0.425mm						
	#50	0.3mm				52.0%		22.0%
	#100	0.15mm				43.0%		15.0%
	#200	0.075mm				35.0%		11.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.7%	25.1%	12.7%	10.2%	6.2%	4.3%
Organic Content %								
% Gravel						26%		41%
% Sand						39%		48%
% Silt & Clay					41%	35%		11%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			25	30	35	40	40.5	2.5
Test Hole No.			B-083	B-083	B-083	B-083	B-083	B-084
Field Sample No.			S7	S8	S9	S10a	S10b	S1
Date Sampled			March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006
Lab No.			B-083S7	B-083S8	B-083S9	B-083S10a	B-083S10b	B-084S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.0%	5.8%	7.6%	8.9%	6.5%	8.4%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay						35%		32%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			5	7.5	10	15	20	25
Test Hole No.			B-084	B-084	B-084	B-084	B-084	B-084
Field Sample No.			S2	S3	S4	S5	S6	S7
Date Sampled			March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006	March 3, 2006
Lab No.			B-084S2	B-084S3	B-084S4	B-084S5	B-084S6	B-084S7
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm				100.0%		
	1"	25mm	100.0%			96.0%		100.0%
	0.75"	19mm	87.0%			90.0%		96.0%
	0.5"	12.5mm	80.0%			83.0%		86.0%
	0.375"	9.5mm	72.0%			79.0%		83.0%
	0.25"	6.3mm						
	#4	4.75mm	57.0%			74.0%		75.0%
	#8	2.36mm	44.0%			69.0%		69.0%
	#10	2mm						
	#16	1.18mm	34.0%			64.0%		64.0%
	#30	0.6mm	25.0%			59.0%		59.0%
	#40	0.425mm						
	#50	0.3mm	17.0%			51.0%		51.0%
	#100	0.15mm	11.0%			40.0%		40.0%
	#200	0.075mm	8.0%			30.0%		31.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			2.5%	4.4%	6.9%	7.4%	8.0%	7.5%
Organic Content %								
% Gravel			43%			26%		25%
% Sand			49%			44%		43%
% Silt & Clay			8%			30%		31%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			30	35	40	2.5	5	7.5
Test Hole No.			B-084	B-084	B-084	B-085	B-085	B-085
Field Sample No.			S8	S9	S10	S1	S2	S3
Date Sampled			March 3, 2006	March 3, 2006	March 3, 2006	March 6, 2006	March 6, 2006	March 6, 2006
Lab No.			B-084S8	B-084S9	B-084S10	B-085S1	B-085S2	B-085S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%				
	1"	25mm		97.0%				100.0%
	0.75"	19mm		88.0%				93.0%
	0.5"	12.5mm		81.0%				89.0%
	0.375"	9.5mm		76.0%				87.0%
	0.25"	6.3mm						
	#4	4.75mm		68.0%				82.0%
	#8	2.36mm		60.0%				79.0%
	#10	2mm						
	#16	1.18mm		55.0%				75.0%
	#30	0.6mm		50.0%				71.0%
	#40	0.425mm						
	#50	0.3mm		43.0%				61.0%
	#100	0.15mm		33.0%				48.0%
	#200	0.075mm		24.0%				37.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			13.9%	6.4%	10.1%	5.7%	13.8%	8.4%
Organic Content %								
% Gravel				32%				18%
% Sand				43%				46%
% Silt & Clay				24%		48%		37%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			10	15	2.5	5	7.5	10
Test Hole No.			B-085	B-085	B-086	B-086	B-086	B-086
Field Sample No.			S4	S5	S1	S2	S3	S4
Date Sampled			March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006
Lab No.			B-085S4	B-085S5	B-086S1	B-086S2	B-086S3	B-086S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm				100.0%		
	0.5"	12.5mm				98.0%		
	0.375"	9.5mm				97.0%		
	0.25"	6.3mm						
	#4	4.75mm				94.0%		
	#8	2.36mm				90.0%		
	#10	2mm						
	#16	1.18mm				86.0%		
	#30	0.6mm				78.0%		
	#40	0.425mm						
	#50	0.3mm				66.0%		
	#100	0.15mm				52.0%		
	#200	0.075mm				40.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			7.3%	8.0%	50.3%	38.2%	34.5%	9.4%
Organic Content %					16%			
% Gravel						6%		
% Sand						54%		
% Silt & Clay			34%			40%		44%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			15	2.5	5	7.5	10	15
Test Hole No.			B-086	B-087	B-087	B-087	B-087	B-087
Field Sample No.			S5	S1	S2	S3	S4	S5
Date Sampled			March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006	March 6, 2006
Lab No.			B-086S5	B-087S1	B-087S2	B-087S3	B-087S4	B-087S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm				100.0%		
	0.75"	19mm				96.0%		
	0.5"	12.5mm				91.0%		
	0.375"	9.5mm				87.0%		
	0.25"	6.3mm						
	#4	4.75mm				80.0%		
	#8	2.36mm				74.0%		
	#10	2mm						
	#16	1.18mm				69.0%		
	#30	0.6mm				64.0%		
	#40	0.425mm						
	#50	0.3mm				55.0%		
	#100	0.15mm				41.0%		
	#200	0.075mm				29.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			14.2%	14.7%	12.5%	8.9%	9.8%	10.2%
Organic Content %								
% Gravel						20%		
% Sand						51%		
% Silt & Clay				37%		29%	36%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			2.5	5	7.5	10	15	20
Test Hole No.			B-088	B-088	B-088	B-088	B-088	B-088
Field Sample No.			S1	S2	S3	S4	S5	S6
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-088S1	B-088S2	B-088S3	B-088S4	B-088S5	B-088S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm		100.0%			100.0%	
	0.75"	19mm		94.0%			98.0%	
	0.5"	12.5mm		88.0%			94.0%	
	0.375"	9.5mm		85.0%			93.0%	
	0.25"	6.3mm						
	#4	4.75mm		81.0%			90.0%	
	#8	2.36mm		77.0%			87.0%	
	#10	2mm						
	#16	1.18mm		74.0%			84.0%	
	#30	0.6mm		70.0%			80.0%	
	#40	0.425mm						
	#50	0.3mm		59.0%			70.0%	
	#100	0.15mm		38.0%			55.0%	
	#200	0.075mm		25.0%			42.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			9.3%	13.0%	12.7%	8.0%	11.1%	10.3%
Organic Content %								
% Gravel				19%			10%	
% Sand				56%			48%	
% Silt & Clay			32%	25%			42%	40%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

TABLE B-2
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			25	35	40	2.5	5	7.5
Test Hole No.			B-088	B-088	B-088	B-089	B-089	B-089
Field Sample No.			S7	S8	S9	S1	S2	S3
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-088S7	B-088S8	B-088S9	B-089S1	B-089S2	B-089S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm				100.0%		
	1"	25mm				96.0%		
	0.75"	19mm				92.0%		
	0.5"	12.5mm				90.0%		
	0.375"	9.5mm				86.0%		
	0.25"	6.3mm						
	#4	4.75mm				76.0%		
	#8	2.36mm				68.0%		
	#10	2mm						
	#16	1.18mm				60.0%		
	#30	0.6mm				50.0%		
	#40	0.425mm						
	#50	0.3mm				32.0%		
	#100	0.15mm				20.0%		
	#200	0.075mm				14.0%		
DOTTSD								
Liquid Limit			37					
Plastic Index			16					
Moisture Content %			17.1%	20.4%	21.6%	11.8%	11.7%	19.1%
Organic Content %								
% Gravel						24%		
% Sand						62%		
% Silt & Clay						14%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value			>4.5					

SOILS TESTING REPORT

Project Name:	Knik Arm Bridge, Mat-Su Access Route
Project No.:	32-1-01536-003
Sampled By:	Steff Browne

Depth			10	20	0.5	2.5	5	7.5
Test Hole No.			B-089	B-089	B-090	B-090	B-090	B-090
Field Sample No.			S4	S5	SB1	S1	S3	S4
Date Sampled			February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006	February 17, 2006
Lab No.			B-089S4	B-089S5	B-090SB1	B-090S1	B-090S3	B-090S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm			100.0%			
	1"	25mm			99.0%			
	0.75"	19mm			97.0%			
	0.5"	12.5mm			90.0%			
	0.375"	9.5mm			85.0%			
	0.25"	6.3mm						
	#4	4.75mm			69.0%			
	#8	2.36mm			58.0%			
	#10	2mm						
	#16	1.18mm			49.0%			
	#30	0.6mm			41.0%			
	#40	0.425mm						
	#50	0.3mm			30.0%			
	#100	0.15mm			19.0%			
	#200	0.075mm			13.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.9%	9.8%	0.7%	10.8%	9.8%	10.5%
Organic Content %								
% Gravel					31%			
% Sand					56%			
% Silt & Clay					13%	24%		38%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			10	2.5	5	40	45	20
Test Hole No.			B-090	B-091	B-091	B-091	B-091	B-091
Field Sample No.			S5	S1	S2	S3	S4	S5
Date Sampled			February 17, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006
Lab No.			B-090S5	B-091S1	B-091S2	B-091S3	B-091S4	B-091S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm				100.0%		
	0.75"	19mm				96.0%		
	0.5"	12.5mm				90.0%		
	0.375"	9.5mm				87.0%		
	0.25"	6.3mm						
	#4	4.75mm				80.0%		
	#8	2.36mm				75.0%		
	#10	2mm						
	#16	1.18mm				70.0%		
	#30	0.6mm				65.0%		
	#40	0.425mm						
	#50	0.3mm				55.0%		
	#100	0.15mm				42.0%		
	#200	0.075mm				31.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			17.1%	885.8%	305.6%	15.5%	11.2%	27.1%
Organic Content %								
% Gravel						20%		
% Sand						50%		
% Silt & Clay						31%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			25	26.3	2.5	5	7.5	10
Test Hole No.			B-091	B-091	B-092	B-092	B-092	B-092
Field Sample No.			S6a	6b	S1	S2	S3	S4
Date Sampled			February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006
Lab No.			B-091S6a	B-091S6b	B-092S1	B-092S2	B-092S3	B-092S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm				100.0%		
	0.75"	19mm				94.0%		
	0.5"	12.5mm				92.0%		
	0.375"	9.5mm				91.0%		
	0.25"	6.3mm						
	#4	4.75mm				87.0%		
	#8	2.36mm				84.0%		
	#10	2mm						
	#16	1.18mm				81.0%		
	#30	0.6mm				78.0%		
	#40	0.425mm						
	#50	0.3mm				69.0%		
	#100	0.15mm				55.0%		
	#200	0.075mm				42.0%		
DOTTSD								
Liquid Limit			171	169				
Plastic Index			105	103				
Moisture Content %			167.6%	195.2%	7.6%	10.4%	11.6%	10.7%
Organic Content %								
% Gravel						13%		
% Sand						44%		
% Silt & Clay						42%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			15	20	2.5	5	7.5	10
Test Hole No.			B-092	B-092	B-093	B-093	B-093	B-093
Field Sample No.			S5	S6	S1	S2	S3	S4
Date Sampled			February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006	February 16, 2006
Lab No.			B-092S5	B-092S6	B-093S1	B-093S2	B-093S3	B-093S4
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm	100.0%					
	0.75"	19mm	94.0%			100.0%		
	0.5"	12.5mm	90.0%			88.0%		
	0.375"	9.5mm	88.0%			84.0%		
	0.25"	6.3mm						
	#4	4.75mm	83.0%			75.0%		
	#8	2.36mm	80.0%			68.0%		
	#10	2mm						
	#16	1.18mm	76.0%			63.0%		
	#30	0.6mm	72.0%			58.0%		
	#40	0.425mm						
	#50	0.3mm	64.0%			50.0%		
	#100	0.15mm	49.0%			38.0%		
	#200	0.075mm	35.0%			27.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			9.9%	8.5%	9.8%	6.9%	6.9%	7.3%
Organic Content %								
% Gravel			17%			25%		
% Sand			48%			38%		
% Silt & Clay			35%			27%	29%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Steff Browne

Depth			15	20				
Test Hole No.			B-093	B-093				
Field Sample No.			S5	S6				
Date Sampled			February 16, 2006	February 16, 2006				
Lab No.			B-093S5	B-093S6				
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm	100.0%					
	0.5"	12.5mm	96.0%					
	0.375"	9.5mm	95.0%					
	0.25"	6.3mm						
	#4	4.75mm	89.0%					
	#8	2.36mm	85.0%					
	#10	2mm						
	#16	1.18mm	82.0%					
	#30	0.6mm	77.0%					
	#40	0.425mm						
	#50	0.3mm	67.0%					
	#100	0.15mm	52.0%					
	#200	0.075mm	37.0%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			9.2%	8.5%				
Organic Content %								
% Gravel			11%					
% Sand			52%					
% Silt & Clay			37%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3
Page 1 of 10

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			5	10	15	20	30	35
Test Hole No.			X-1	X-1	X-1	X-1	X-1	X-1
Field Sample No.			S1	S2	S3	S4	S6	S7
Date Sampled			March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006
Lab No.			X-1S1	X-1S2	X-1S3	X-1S4	X-1S6	X-1S7
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%	100.0%			
	1"	25mm		91.0%	93.0%			
	0.75"	19mm		86.0%	90.0%			
	0.5"	12.5mm		79.0%	85.0%			
	0.375"	9.5mm		76.0%	82.0%			
	0.25"	6.3mm						
	#4	4.75mm		68.0%	74.0%			
	#8	2.36mm		60.0%	66.0%			
	#10	2mm						
	#16	1.18mm		54.0%	60.0%			
	#30	0.6mm		48.0%	54.0%			
	#40	0.425mm						
	#50	0.3mm		40.0%	46.0%			
	#100	0.15mm		30.0%	38.0%			
	#200	0.075mm		23.0%	32.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			10.9%	5.1%	6.9%	4.0%	5.4%	2.6%
Organic Content %								
% Gravel				32%	26%			
% Sand				45%	42%			
% Silt & Clay				23%	32%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3
Page 2 of 10

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			40	45	50	55	60	65
Test Hole No.			X-1	X-1	X-1	X-1	X-1	X-1
Field Sample No.			S8	S9	S10	S11	S12	S13
Date Sampled			March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006	March 20, 2006
Lab No.			X-1S8	X-1S9	X-1S10	X-1S11	X-1S12	X-1S13
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm			100.0%			
	1"	25mm			99.0%			
	0.75"	19mm			99.0%			
	0.5"	12.5mm			95.0%			
	0.375"	9.5mm			93.0%			
	0.25"	6.3mm						
	#4	4.75mm			88.0%			
	#8	2.36mm			83.0%			
	#10	2mm						
	#16	1.18mm			78.0%			
	#30	0.6mm			75.0%			
	#40	0.425mm						
	#50	0.3mm			69.0%			
	#100	0.15mm			61.0%			
	#200	0.075mm			51.0%			
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			5.7%	9.0%	12.1%	8.4%	2.8%	8.6%
Organic Content %								
% Gravel					12%			
% Sand					37%			
% Silt & Clay					51%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			70	5	10	15	20	25
Test Hole No.			X-1	X-2	X-2	X-2	X-2	X-2
Field Sample No.			S14	S1	S2	S3	S4	S5
Date Sampled			March 20, 2006	March 23, 2006	February 13, 2006	February 13, 2006	February 13, 2006	February 13, 2006
Lab No.			X-1S14	X-2S1	X-2S2	X-2S3	X-2S4	X-2S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%			100.0%		
	1"	25mm	93.0%			92.0%		
	0.75"	19mm	91.0%			89.0%		
	0.5"	12.5mm	89.0%			85.0%		
	0.375"	9.5mm	72.0%			80.0%		
	0.25"	6.3mm						
	#4	4.75mm	59.0%			70.0%		
	#8	2.36mm	49.0%			62.0%		
	#10	2mm						
	#16	1.18mm	41.0%			55.0%		
	#30	0.6mm	34.0%			49.0%		
	#40	0.425mm						
	#50	0.3mm	27.0%			42.0%		
	#100	0.15mm	21.0%			34.0%		
	#200	0.075mm	16.0%			27.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			4.1%	5.5%	10.2%	6.8%	5.7%	10.0%
Organic Content %								
% Gravel			41%			30%		
% Sand			43%			43%		
% Silt & Clay			16%			27%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			30	40	45	50	60	65
Test Hole No.			X-2	X-2	X-2	X-2	X-2	X-2
Field Sample No.			S6	S8	S9	S10	S12	S13
Date Sampled			March 23, 2006	March 23, 2006	March 23, 2006	March 23, 2006	March 23, 2006	March 23, 2006
Lab No.			X-2S6	X-2S8	X-2S9	X-2S10	X-2S12	X-2S13
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm		100.0%				
	1"	25mm		97.0%				
	0.75"	19mm		96.0%			100.0%	
	0.5"	12.5mm		89.0%			96.0%	
	0.375"	9.5mm		84.0%			92.0%	
	0.25"	6.3mm						
	#4	4.75mm		67.0%			85.0%	
	#8	2.36mm		54.0%			80.0%	
	#10	2mm						
	#16	1.18mm		43.0%			75.0%	
	#30	0.6mm		35.0%			71.0%	
	#40	0.425mm						
	#50	0.3mm		28.0%			66.0%	
	#100	0.15mm		21.0%			62.0%	
	#200	0.075mm		16.0%			58.0%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			13.5%	3.3%	6.2%	6.3%	13.8%	3.4%
Organic Content %								
% Gravel				33%			15%	
% Sand				51%			27%	
% Silt & Clay				16%			58%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			70	5	10	15	20	25
Test Hole No.			X-2	X-3	X-3	X-3	X-3	X-3
Field Sample No.			S14	S1	S2	S3	S4	S5
Date Sampled			March 23, 2006	March 22, 2006	March 22, 2006	March 22, 2006	March 22, 2006	March 22, 2006
Lab No.			X-2S14	X-3S1	X-3S2	X-3S3	X-3S4	X-3S5
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						100.0%
	1.5"	37.5mm						95.0%
	1"	25mm						88.0%
	0.75"	19mm						86.0%
	0.5"	12.5mm						79.0%
	0.375"	9.5mm						74.0%
	0.25"	6.3mm						
	#4	4.75mm						65.0%
	#8	2.36mm						58.0%
	#10	2mm						
	#16	1.18mm						52.0%
	#30	0.6mm						47.0%
	#40	0.425mm						
	#50	0.3mm						43.0%
	#100	0.15mm						34.0%
	#200	0.075mm						28.0%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.3%	10.2%	7.3%	10.2%	5.8%	6.6%
Organic Content %								
% Gravel								35%
% Sand								37%
% Silt & Clay								28%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			30	35	40	50	55	5
Test Hole No.			X-3	X-3	X-3	X-3	X-3	X-4
Field Sample No.			S6	S7	S8	S10	S11	S1
Date Sampled			March 22, 2006	March 22, 2006	March 22, 2006	March 22, 2006	March 22, 2006	March 24, 2006
Lab No.			X-3S6	X-3S7	X-3S8	X-3S10	X-3S11	B-010S3
Percent Passing Sieve Size	3"	75mm						
	2"	50mm				100.0%		
	1.5"	37.5mm				86.0%		
	1"	25mm				74.0%		
	0.75"	19mm				70.0%		
	0.5"	12.5mm				63.0%		
	0.375"	9.5mm				60.0%		
	0.25"	6.3mm						
	#4	4.75mm				53.0%		
	#8	2.36mm				46.0%		
	#10	2mm						
	#16	1.18mm				40.0%		
	#30	0.6mm				35.0%		
	#40	0.425mm						
	#50	0.3mm				30.0%		
	#100	0.15mm				24.0%		
	#200	0.075mm				19.0%		
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.0%	3.0%	6.7%	4.1%	4.9%	22.2%
Organic Content %								
% Gravel						47%		
% Sand						33%		
% Silt & Clay						19%		
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

TABLE B-3
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Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			10	15	20	25	30	35
Test Hole No.			X-4	X-4	X-4	X-4	X-4	X-4
Field Sample No.			S2	S3	S4	S5	S6	S7
Date Sampled			March 24, 2006	March 24, 2006	March 24, 2006	March 24, 2006	March 24, 2006	March 24, 2006
Lab No.			X-4S2	X-4S3	X-4S4	X-4S5	X-4S6	X-4S7
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.1%	22.9%	8.6%	14.5%	18.6%	21.9%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay				78%			16%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			40	5	10	15	25	30
Test Hole No.			X-4	X-6	B-013	B-013	B-013	B-014
Field Sample No.			S8	S1	S2	S4	S5	S6
Date Sampled			February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 14, 2006	February 15, 2006
Lab No.			X-4S8	X-6S1	X-6S2	X-6S4	X-6S5	X-6S6
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			20.3%	7.2%	12.6%	19.4%	23.1%	19.1%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay					40%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

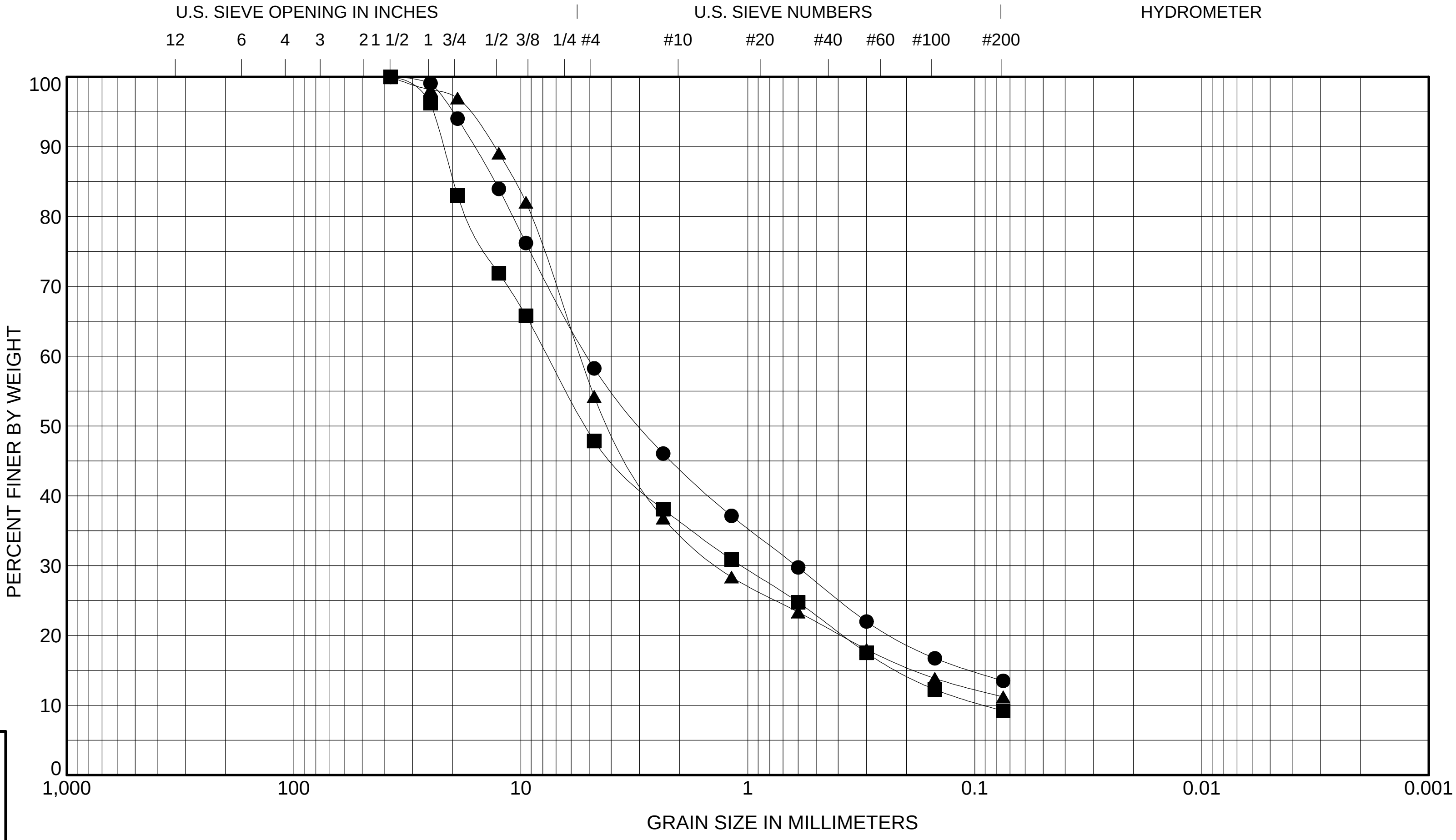
Depth			5	10	15	20	25	5
Test Hole No.			X-7	X-7	X-7	X-7	X-7	X-8
Field Sample No.			S1	S2	S3	S4	S5	S1
Date Sampled			March 25, 2006	March 25, 2006	March 25, 2006	March 25, 2006	March 25, 2006	March 25, 2006
Lab No.			X-7S1	X-7S2	X-7S3	X-7S4	X-7S5	X-8S1
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			18.2%	23.9%	20.3%	22.5%	19.2%	13.1%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay					50%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

GRAVEL SOURCE SOILS TESTING REPORT

Project Name: Knik Arm Bridge, Mat-Su Access Route

Project No.: 32-1-01536-003 Sampled By: Elizabeth A. Karcheski

Depth			10	15	20	25		
Test Hole No.			X-8	X-8	X-8	X-8		
Field Sample No.			S2	S3	S4	S5		
Date Sampled			March 25, 2006	March 25, 2006	March 25, 2006	March 25, 2006		
Lab No.			X-8S2	X-8S3	X-8S4	X-8S5		
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#30	0.6mm						
	#40	0.425mm						
	#50	0.3mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.9%	26.0%	21.8%	22.4%		
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay					68%			
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-001 S1**	**0.0 - 2.0**	**Silty, gravelly SAND (SM)**					
■	**B-002 S5**	**10.0 - 11.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**1.7**	**84.6**
▲	**B-004 S1**	**0.0 - 2.0**	**Slightly silty, sandy GRAVEL (GP-GM)**				**6.1**	**100.3**

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-001 S1**	**0.0 - 2.0**	**37.5**	**5.08**	**0.61**		**42**	**45**	**14**	
■	**B-002 S5**	**10.0 - 11.5**	**37.5**	**7.59**	**1.07**	**0.09**	**52**	**39**	**9**	
▲	**B-004 S1**	**0.0 - 2.0**	**37.5**	**5.48**	**1.35**		**46**	**43**	**11**	

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Point MacKenzie, Alaska

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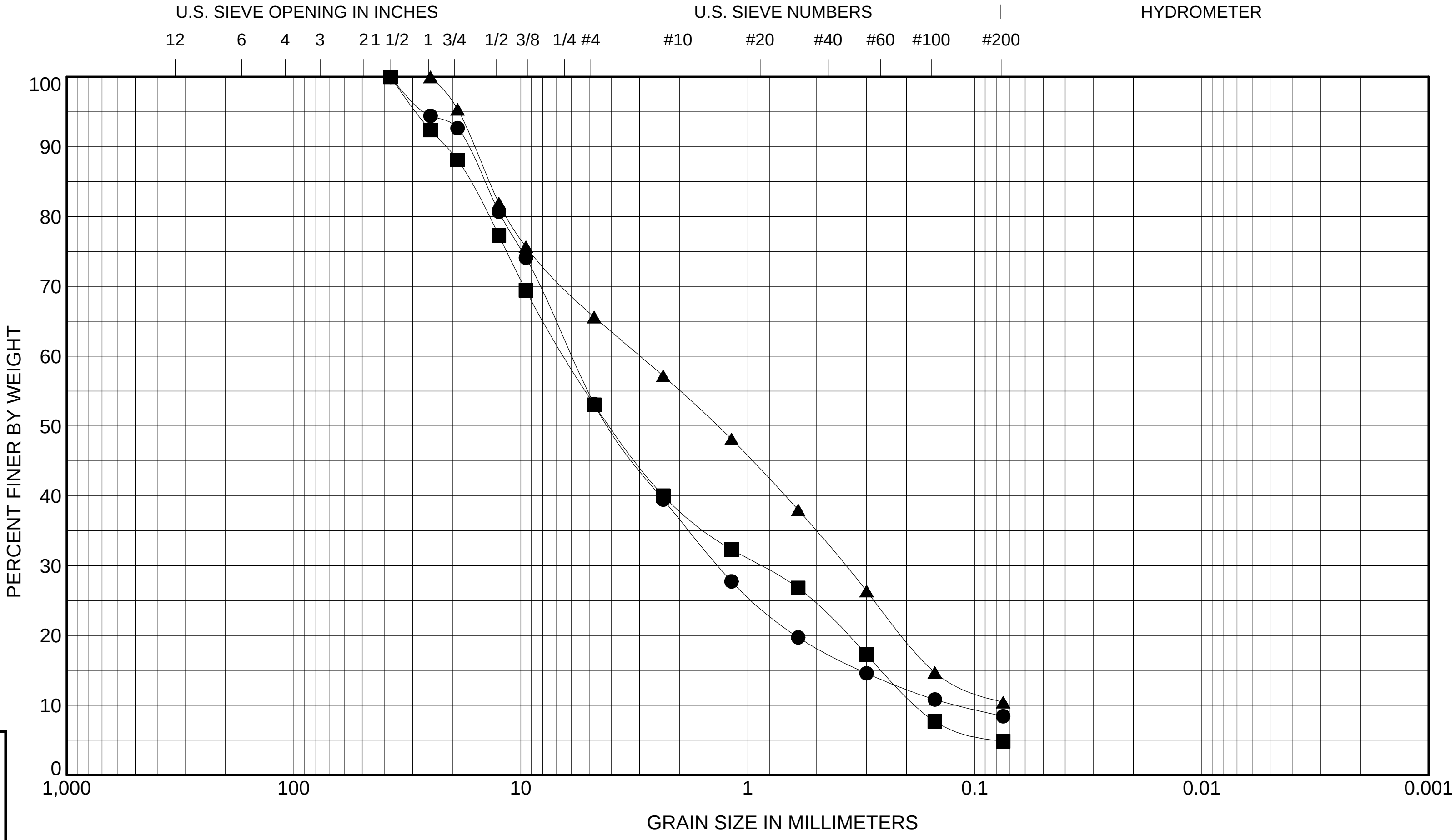

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-004 S3**	**5.0 - 6.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**2.6**	**50.5**
■	**B-005 S5**	**10.0 - 11.5**	**Slightly silty, gravelly SAND (SP-SM)**				**0.7**	**35.9**
▲	**B-007 S5**	**10.0 - 11.5**	**Slightly silty, gravelly SAND (SP-SM)**				**0.7**	**42.7**

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-004 S3**	**5.0 - 6.5**	**37.5**	**5.96**	**1.35**	**0.12**	**47**	**45**	**8**	
■	**B-005 S5**	**10.0 - 11.5**	**37.5**	**6.37**	**0.89**	**0.18**	**47**	**48**	**5**	
▲	**B-007 S5**	**10.0 - 11.5**	**25**	**2.98**	**0.37**		**34**	**55**	**10**	

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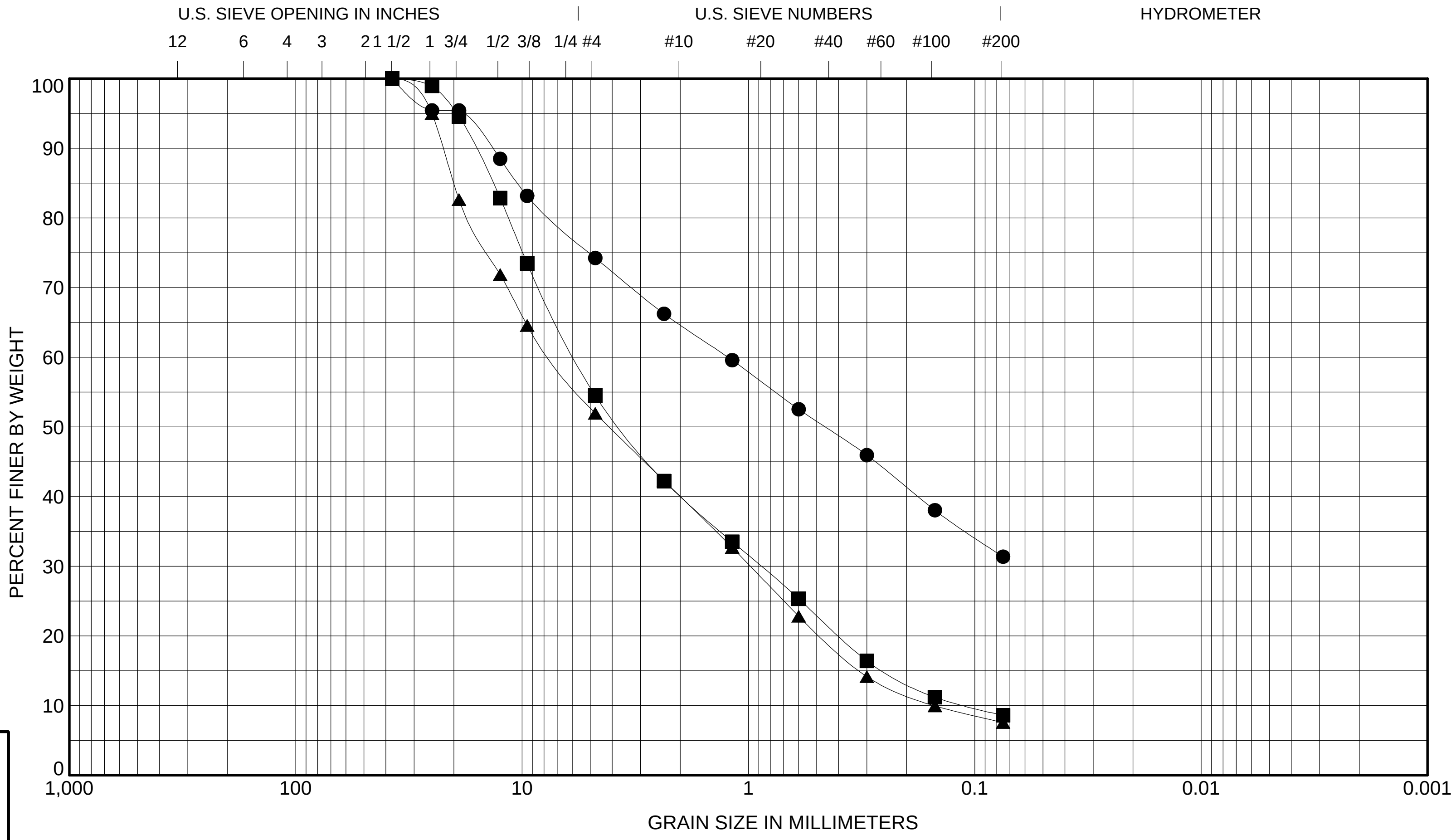

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
● **B-009 S3**	**5.0 - 6.0**	**Gravelly, silty SAND (SM)**					
■ **B-010 S1**	**0.0 - 2.0**	**Slightly silty, gravelly SAND (SW-SM)**				**1.2**	**53.3**
▲ **B-010 S6**	**15.0 - 16.3**	**Slightly silty, sandy GRAVEL (GP-GM)**				**0.9**	**48.9**

Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **B-009 S3**	**5.0 - 6.0**	**37.5**	**1.23**			**26**	**43**	**31**	
■ **B-010 S1**	**0.0 - 2.0**	**37.5**	**5.81**	**0.88**	**0.11**	**46**	**46**	**9**	
▲ **B-010 S6**	**15.0 - 16.3**	**37.5**	**7.39**	**0.98**	**0.15**	**48**	**44**	**8**	

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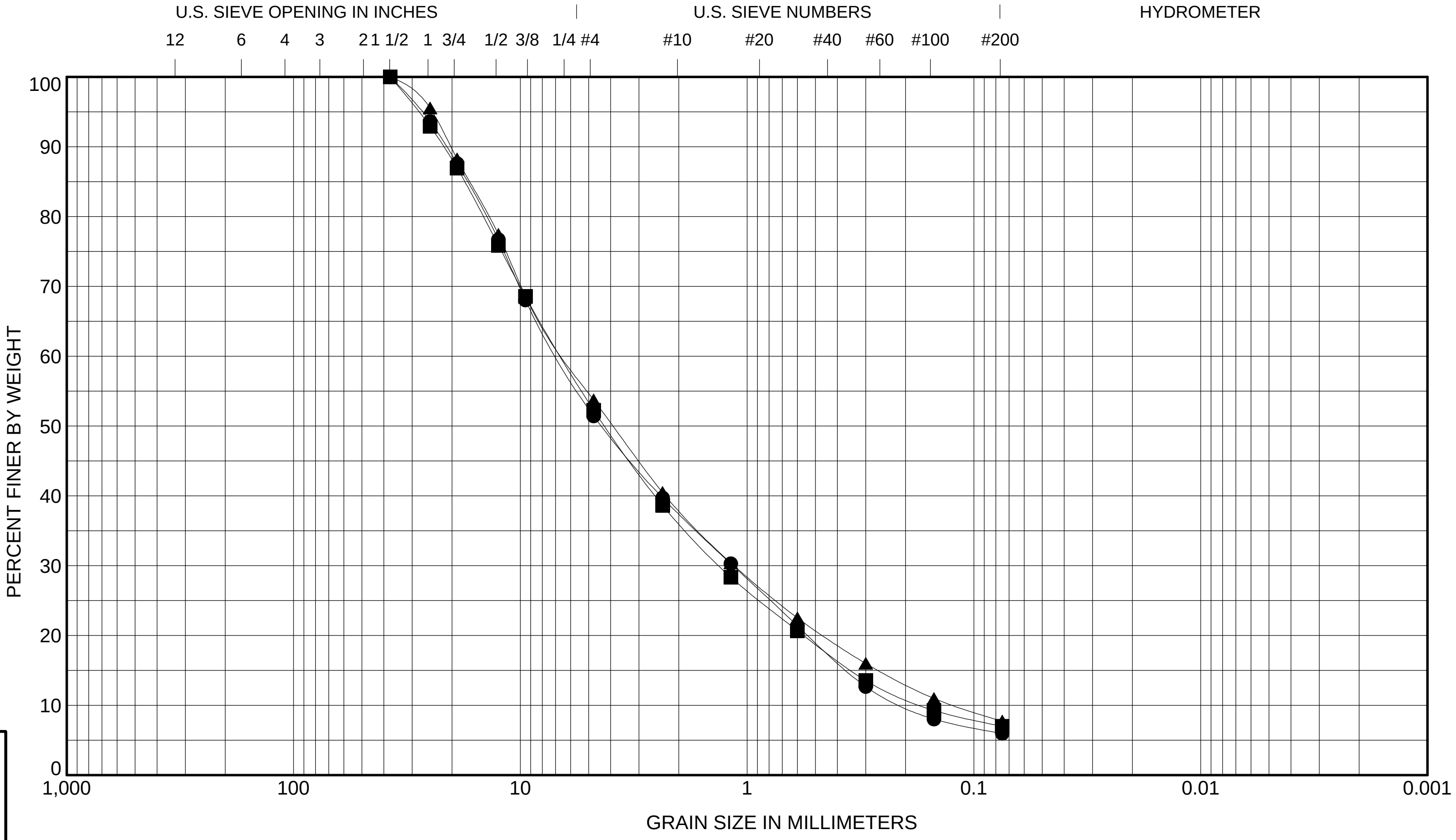

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-012 S7**	**20.0 - 21.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**1.0**	**33.7**
■	**B-013 S9**	**30.0 - 31.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**1.6**	**39.0**
▲	**B-014 S4**	**7.5 - 9.0**	**Slightly silty, gravelly SAND (SW-SM)**				**1.7**	**52.2**

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-012 S7**	**20.0 - 21.5**	**37.5**	**6.79**	**1.16**	**0.2**	**49**	**45**	**6**	
■	**B-013 S9**	**30.0 - 31.5**	**37.5**	**6.6**	**1.32**	**0.17**	**48**	**45**	**7**	
▲	**B-014 S4**	**7.5 - 9.0**	**37.5**	**6.36**	**1.14**	**0.12**	**46**	**46**	**8**	

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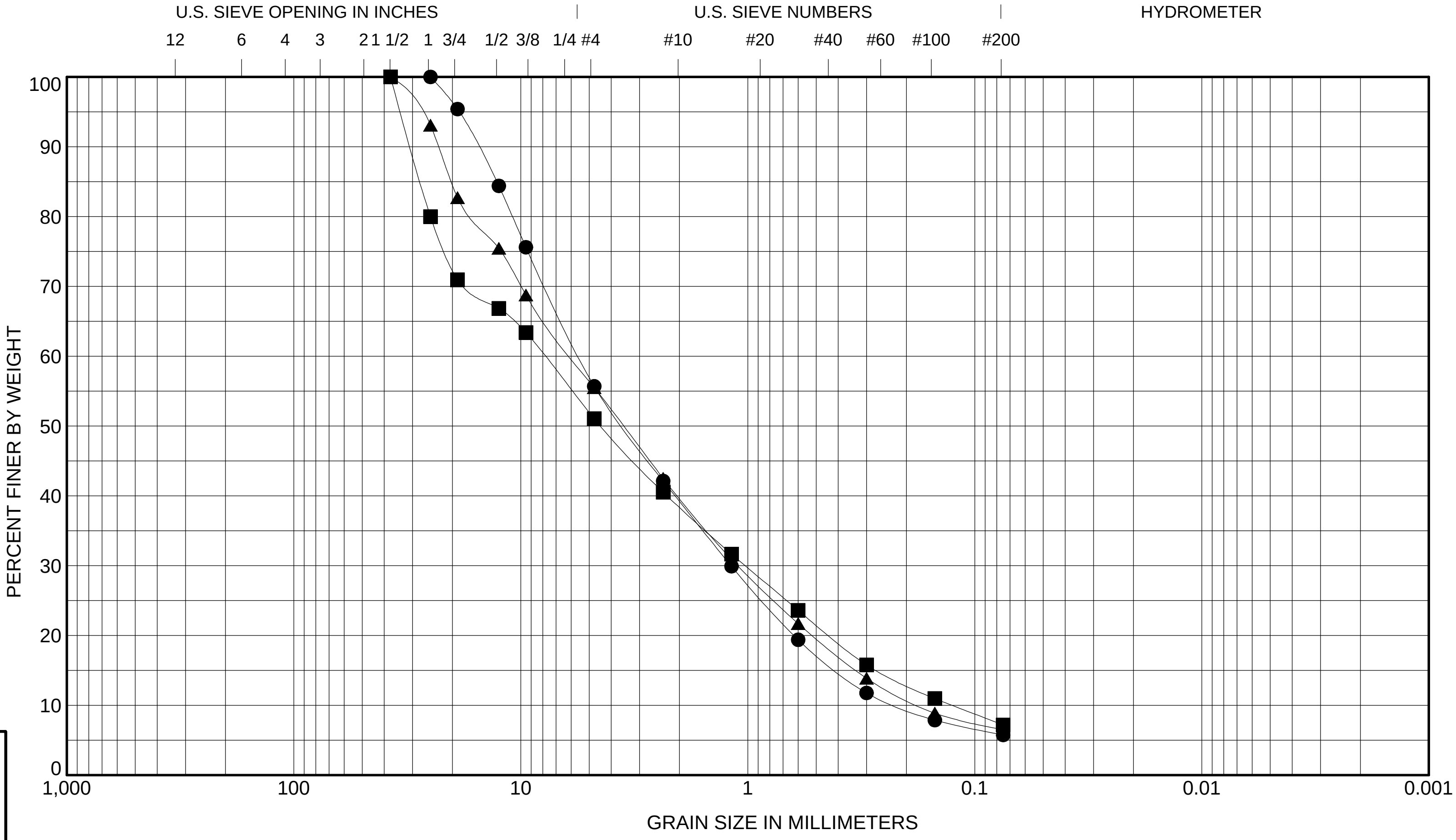

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-014 S11**	**40.0 - 41.5**	**Slightly silty, gravelly SAND (SW-SM)**				**1.2**	**25.2**
■	**B-015 S6**	**15.0 - 16.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**1.1**	**62.6**
▲	**B-016 S9**	**30.0 - 31.5**	**Slightly silty, gravelly SAND (SW-SM)**				**1.2**	**34.3**

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-014 S11**	**40.0 - 41.5**	**25**	**5.52**	**1.19**	**0.22**	**44**	**50**	**6**	
■	**B-015 S6**	**15.0 - 16.5**	**37.5**	**7.85**	**1.03**	**0.13**	**49**	**44**	**7**	
▲	**B-016 S9**	**30.0 - 31.5**	**37.5**	**6.01**	**1.1**	**0.18**	**45**	**49**	**6**	

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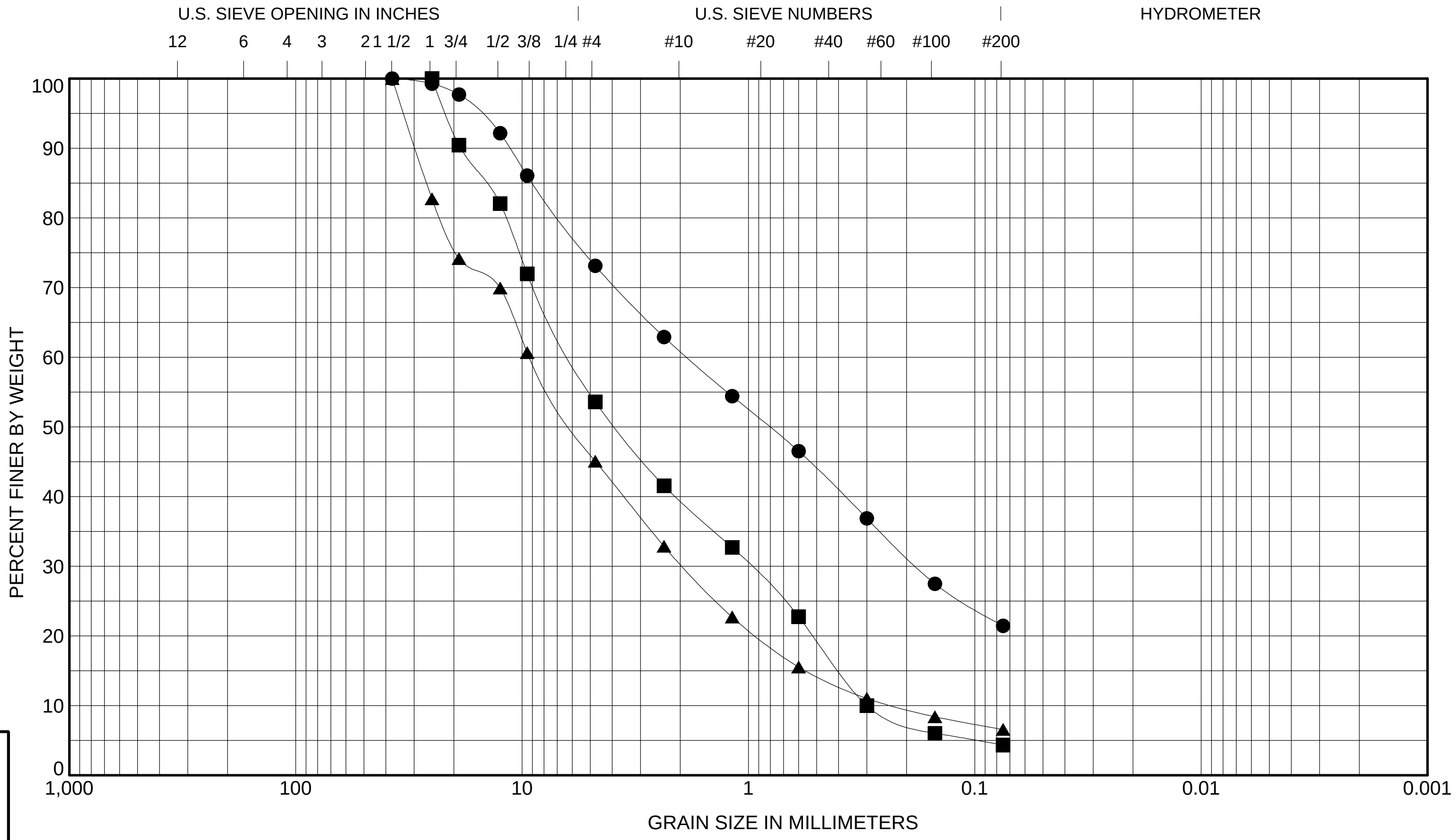

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-018 S1**	**0.0 - 1.5**	**Silty, gravelly SAND (SM)**					
■	**B-019 S6**	**15.0 - 16.5**	**Gravelly SAND (SP)**				**0.5**	**20.2**
▲	**B-019 S8**	**25.0 - 26.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**1.8**	**40.3**

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-018 S1**	**0.0 - 1.5**	**37.5**	**1.86**	**0.18**		**27**	**52**	**21**	
■	**B-019 S6**	**15.0 - 16.5**	**25**	**6.05**	**0.98**	**0.3**	**46**	**49**	**4**	
▲	**B-019 S8**	**25.0 - 26.5**	**37.5**	**9.23**	**1.94**	**0.23**	**55**	**38**	**7**	

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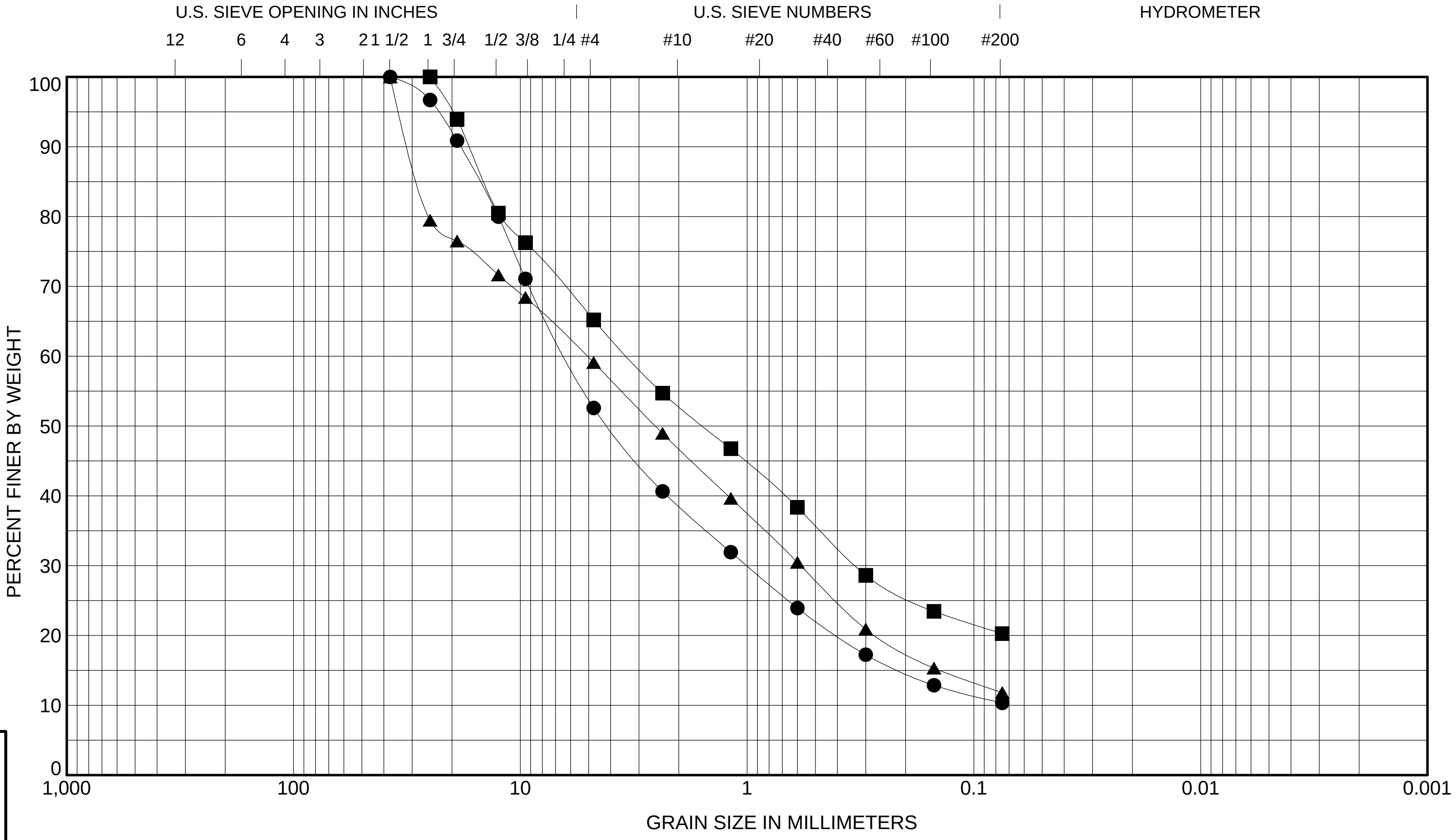
GRAIN SIZE CLASSIFICATION

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-021 S1	0.0 - 1.5	**Slightly silty, sandy GRAVEL (GW-GM)**				2.3	91.9
■	B-022 S4	7.5 - 9.0	**Silty, gravelly SAND (SM)**					
▲	B-023 S4	7.5 - 9.0	**Slightly silty, gravelly SAND (SW-SM)**				1.3	97.1

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-021 S1	0.0 - 1.5	37.5	6.27	1		47	42	10	
■	B-022 S4	7.5 - 9.0	25	3.36	0.33		35	45	20	
▲	B-023 S4	7.5 - 9.0	37.5	5.08	0.58		41	47	12	

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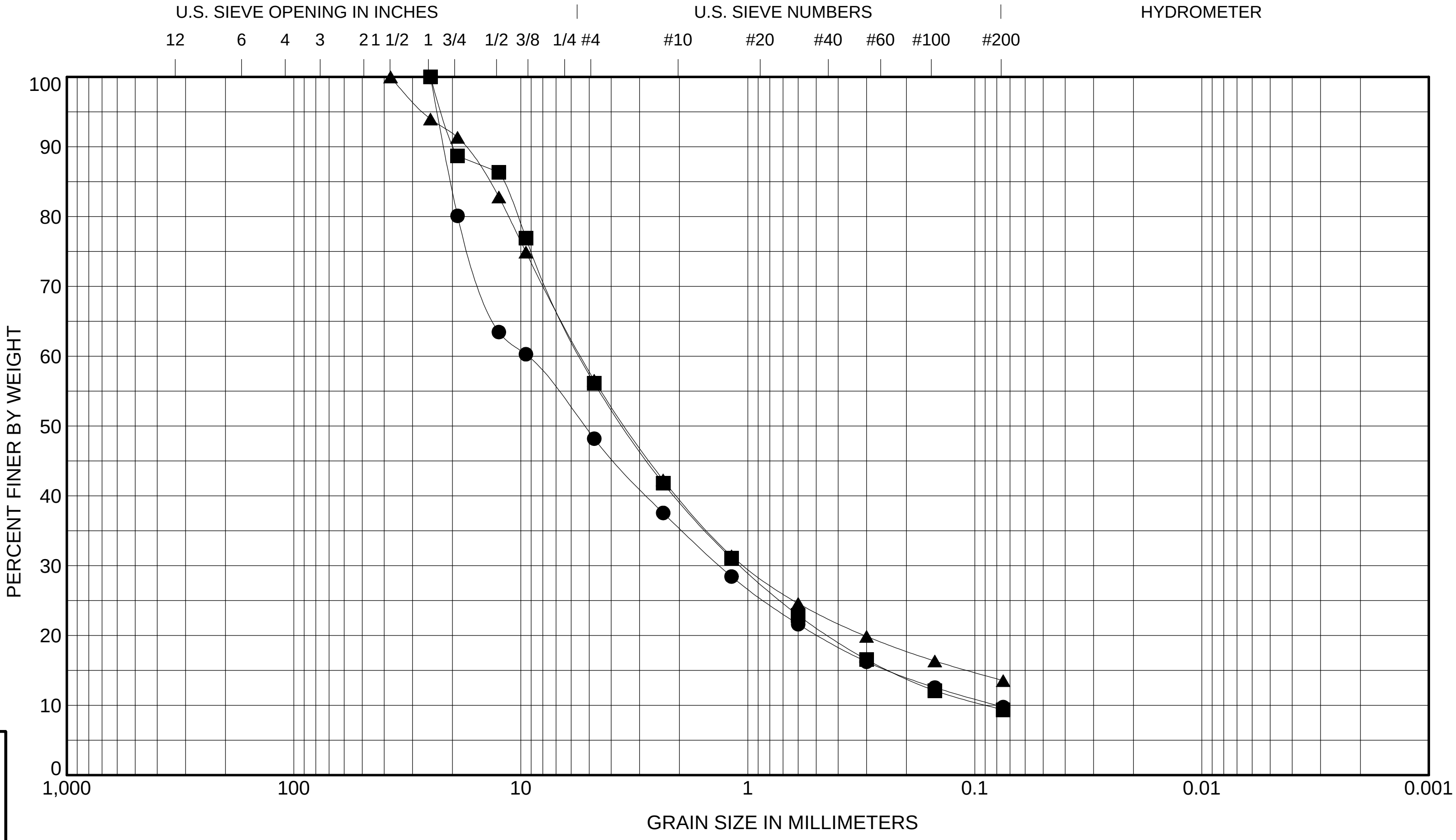

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-025 S3**	**5.0 - 6.5**	**Slightly silty, sandy GRAVEL (GW-GM)**				**2.4**	**116.9**
■	**B-027 S3**	**5.0 - 6.5**	**Slightly silty, gravelly SAND (SW-SM)**				**2.4**	**61.3**
▲	**B-029 S1**	**0.0 - 2.0**	**Silty, sandy GRAVEL (GM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-025 S3**	**5.0 - 6.5**	**25**	**9.35**	**1.33**	**0.08**	**52**	**38**	**10**	
■	**B-027 S3**	**5.0 - 6.5**	**25**	**5.4**	**1.08**	**0.09**	**44**	**47**	**9**	
▲	**B-029 S1**	**0.0 - 2.0**	**37.5**	**5.41**	**1.03**		**43**	**43**	**14**	

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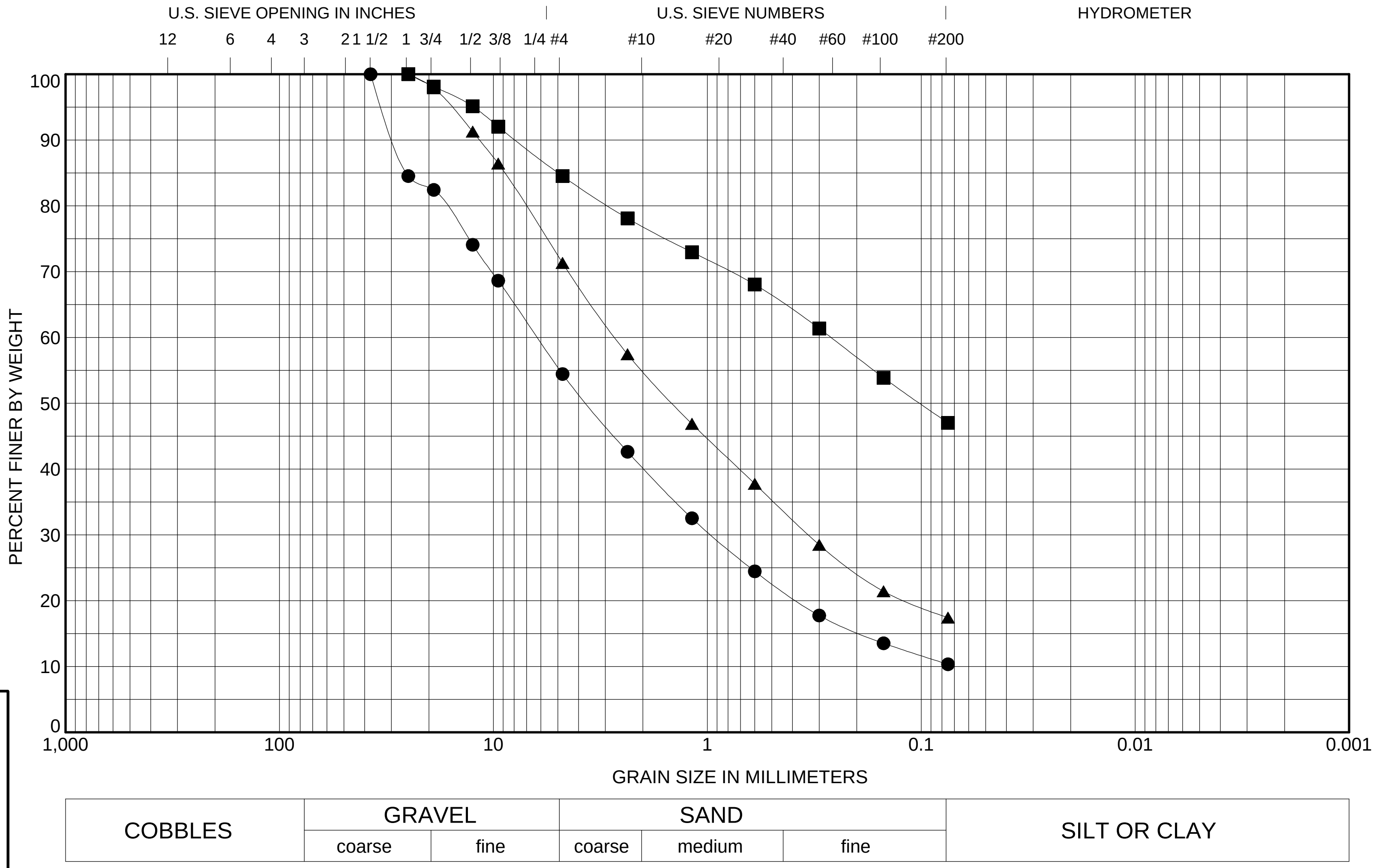

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-030 S2**	**2.5 - 4.0**	**Slightly silty, sandy GRAVEL (GW-GM)**				**2.1**	**89.5**
■	**B-033 S5**	**10.0 - 11.5**	**Gravelly, silty SAND (SM)**					
▲	**B-034 S1**	**0.0 - 2.0**	**Silty, gravelly SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-030 S2**	**2.5 - 4.0**	**37.5**	**6.23**	**0.95**		**46**	**44**	**10**	
■	**B-033 S5**	**10.0 - 11.5**	**25**	**0.26**			**15**	**38**	**47**	
▲	**B-034 S1**	**0.0 - 2.0**	**25**	**2.68**	**0.34**		**29**	**54**	**17**	

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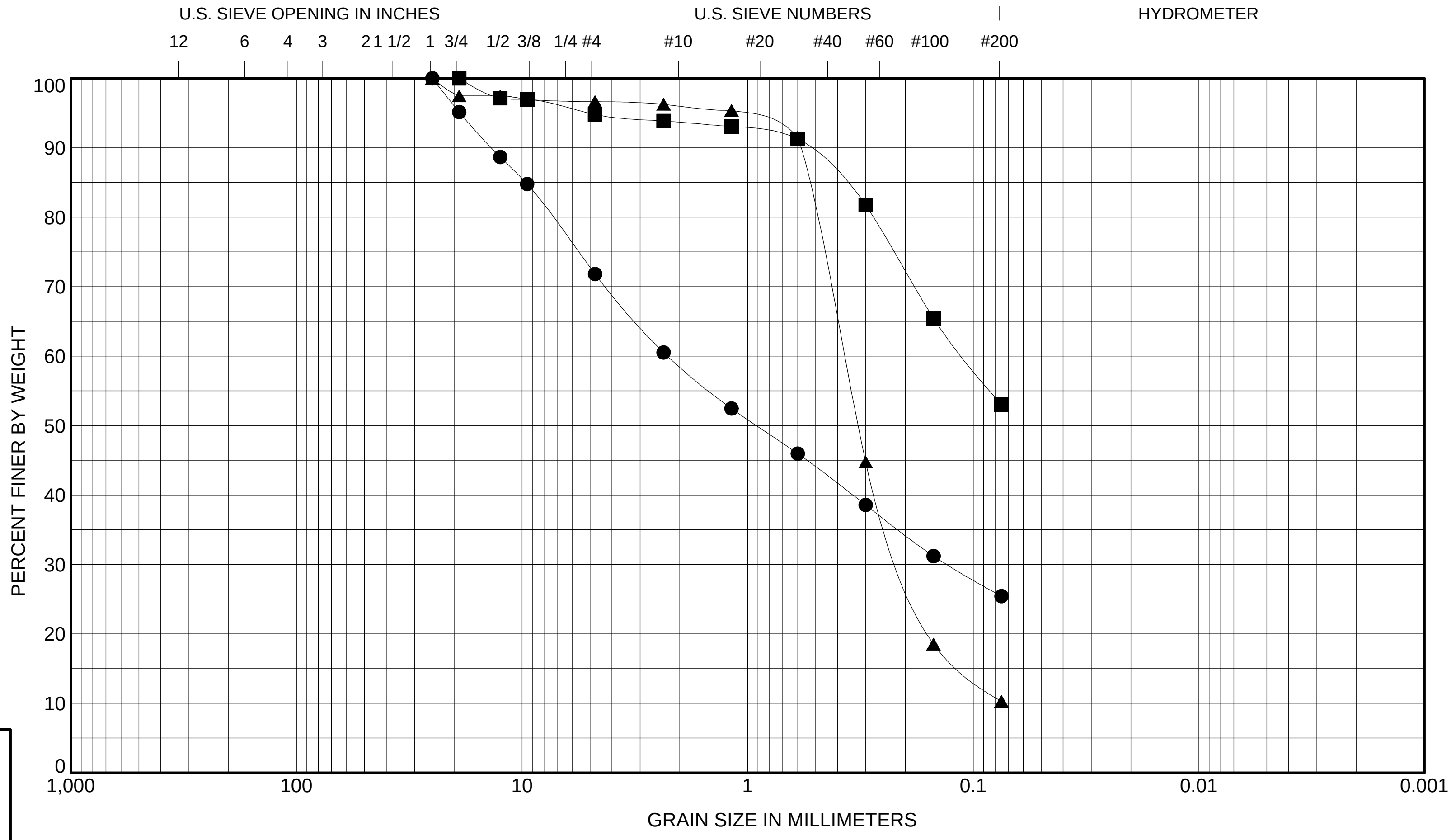

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-037 S2**	**2.5 - 3.3**	**Silty, gravelly SAND (SM)**					
■	**B-038 S3**	**5.0 - 6.5**	**Slightly gravelly, sandy SILT (ML)**					
▲	**B-039 S3**	**5.0 - 6.5**	**Slightly silty SAND (SP-SM)**				**1.5**	**5.1**

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-037 S2**	**2.5 - 3.3**	**25**	**2.26**	**0.13**		**28**	**46**	**25**	
■	**B-038 S3**	**5.0 - 6.5**	**19**	**0.11**			**5**	**42**	**53**	
▲	**B-039 S3**	**5.0 - 6.5**	**25**	**0.38**	**0.2**		**3**	**86**	**10**	

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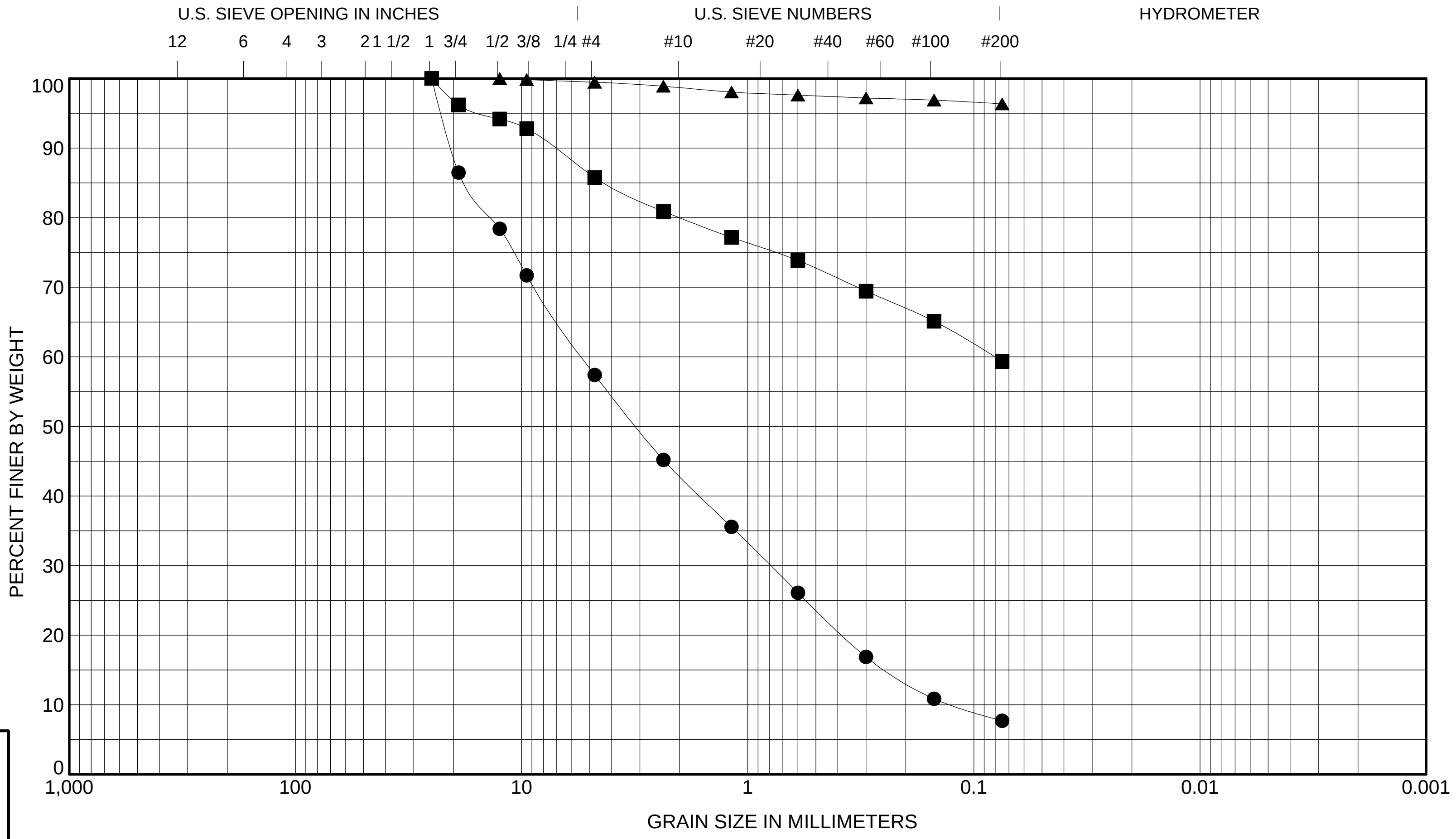

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-040 S4**	**7.5 - 9.0**	**Slightly silty, gravelly SAND (SP-SM)**				**0.9**	**43.4**
■	**B-041 S2**	**2.5 - 4.0**	**Gravelly, sandy SILT (ML)**					
▲	**B-042 S8**	**25.0 - 26.5**	**SILT (ML)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-040 S4**	**7.5 - 9.0**	**25**	**5.39**	**0.79**	**0.12**	**43**	**50**	**8**	
■	**B-041 S2**	**2.5 - 4.0**	**25**	**0.08**			**14**	**26**	**59**	
▲	**B-042 S8**	**25.0 - 26.5**	**12.5**				**1**	**3**	**96**	

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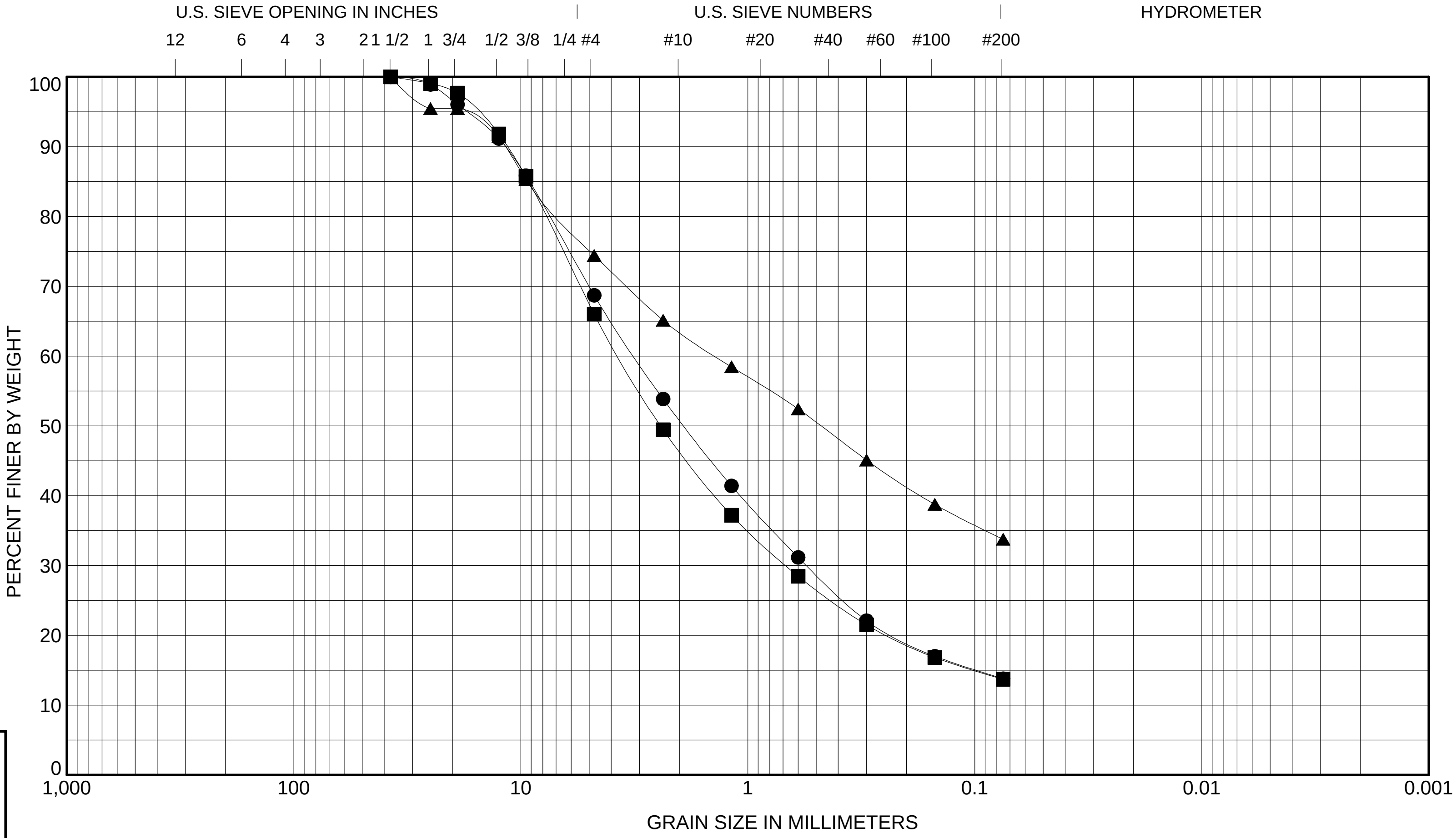

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-043 S1**	**0.0 - 1.5**	**Silty, gravelly SAND (SM)**					
■	**B-044 S1**	**0.0 - 1.5**	**Silty, gravelly SAND (SM)**					
▲	**B-045 S2**	**2.5 - 4.0**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-043 S1**	**0.0 - 1.5**	**37.5**	**3.15**	**0.55**		**31**	**55**	**14**	
■	**B-044 S1**	**0.0 - 1.5**	**37.5**	**3.68**	**0.68**		**34**	**52**	**14**	
▲	**B-045 S2**	**2.5 - 4.0**	**37.5**	**1.38**			**26**	**41**	**34**	

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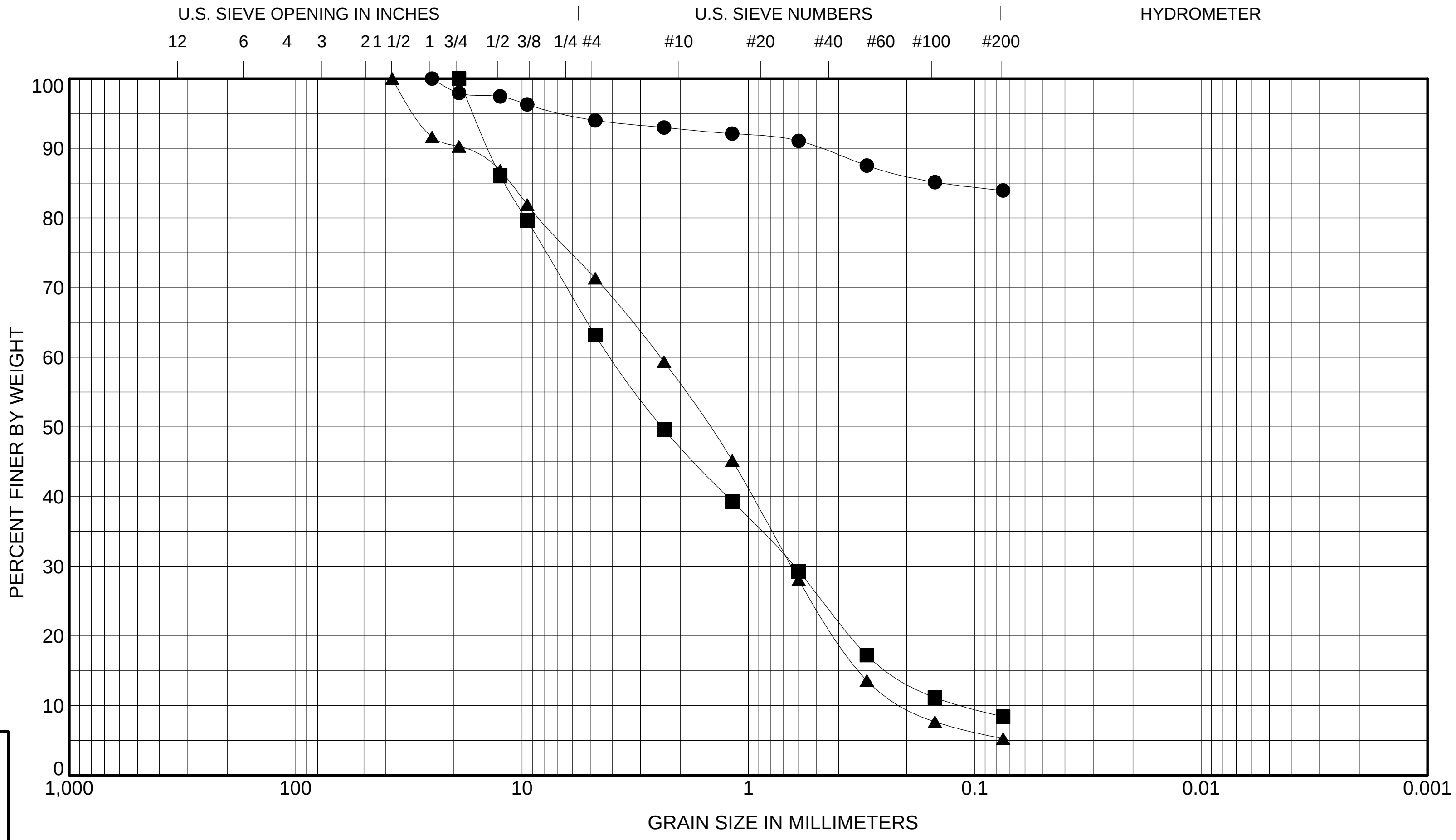

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-045 S6**	**15.0 - 16.5**	**Slightly gravelly, slightly sandy CLAY (CL)**					
■	**B-046 S4**	**10.0 - 11.5**	**Slightly silty, gravelly SAND (SP-SM)**				**0.9**	**36.0**
▲	**B-049 S7**	**20.0 - 21.5**	**Slightly silty, gravelly SAND (SP-SM)**				**0.9**	**12.5**

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-045 S6**	**15.0 - 16.5**	**25**				**6**	**10**	**84**	
■	**B-046 S4**	**10.0 - 11.5**	**19**	**4.03**	**0.63**	**0.11**	**37**	**55**	**8**	
▲	**B-049 S7**	**20.0 - 21.5**	**37.5**	**2.45**	**0.65**	**0.2**	**29**	**66**	**5**	

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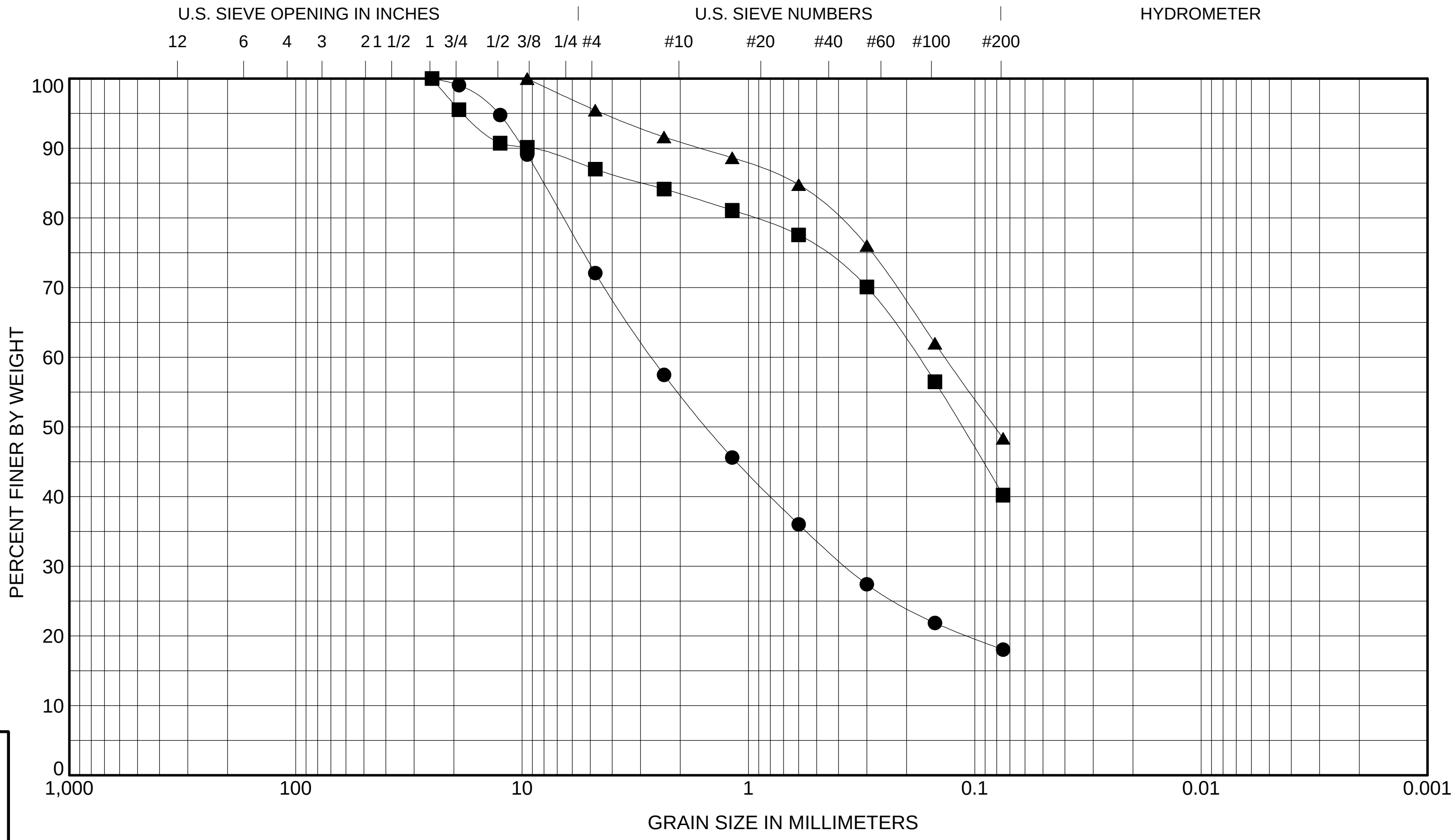

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-051 S1**	**0.0 - 1.5**	**Silty, gravelly SAND (SM)**					
■	**B-052 S3**	**7.5 - 9.0**	**Gravelly, silty SAND (SM)**					
▲	**B-053 S4**	**10.0 - 11.5**	**Slightly gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-051 S1**	**0.0 - 1.5**	**25**	**2.66**	**0.37**		**28**	**54**	**18**	
■	**B-052 S3**	**7.5 - 9.0**	**25**	**0.18**			**13**	**47**	**40**	
▲	**B-053 S4**	**10.0 - 11.5**	**9.5**	**0.14**			**5**	**47**	**48**	

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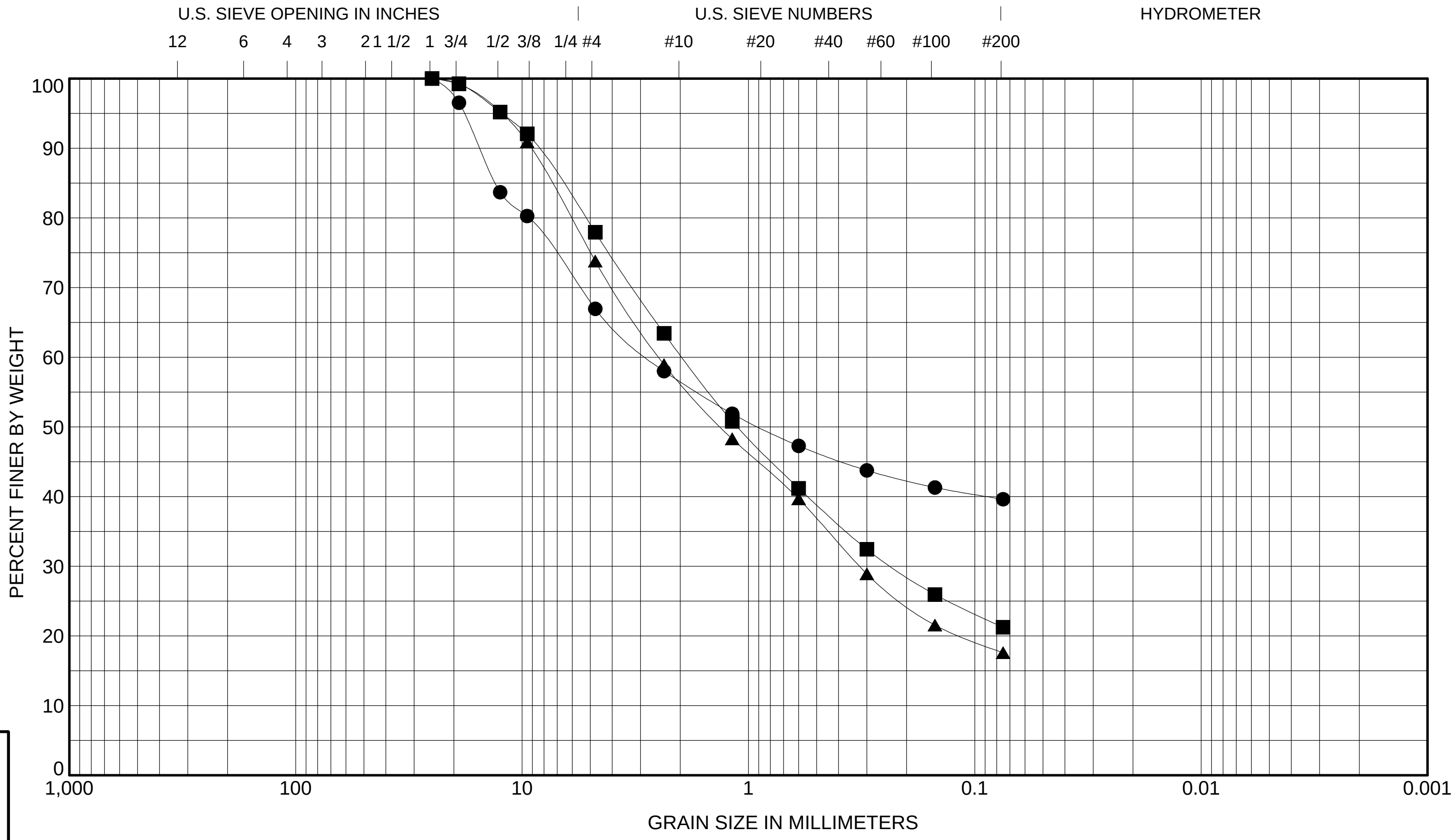

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-055 S4**	**10.0 - 11.5**	**Sandy, silty GRAVEL (GM)**					
■	**B-056 S1**	**0.0 - 2.0**	**Silty, gravelly SAND (SM)**					
▲	**B-057 S1**	**0.0 - 2.0**	**Silty, gravelly SAND (SM)**					

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-055 S4**	**10.0 - 11.5**	**25**	**2.76**			**33**	**27**	**40**	
■	**B-056 S1**	**0.0 - 2.0**	**25**	**1.95**	**0.23**		**22**	**57**	**21**	
▲	**B-057 S1**	**0.0 - 2.0**	**25**	**2.48**	**0.32**		**26**	**56**	**18**	

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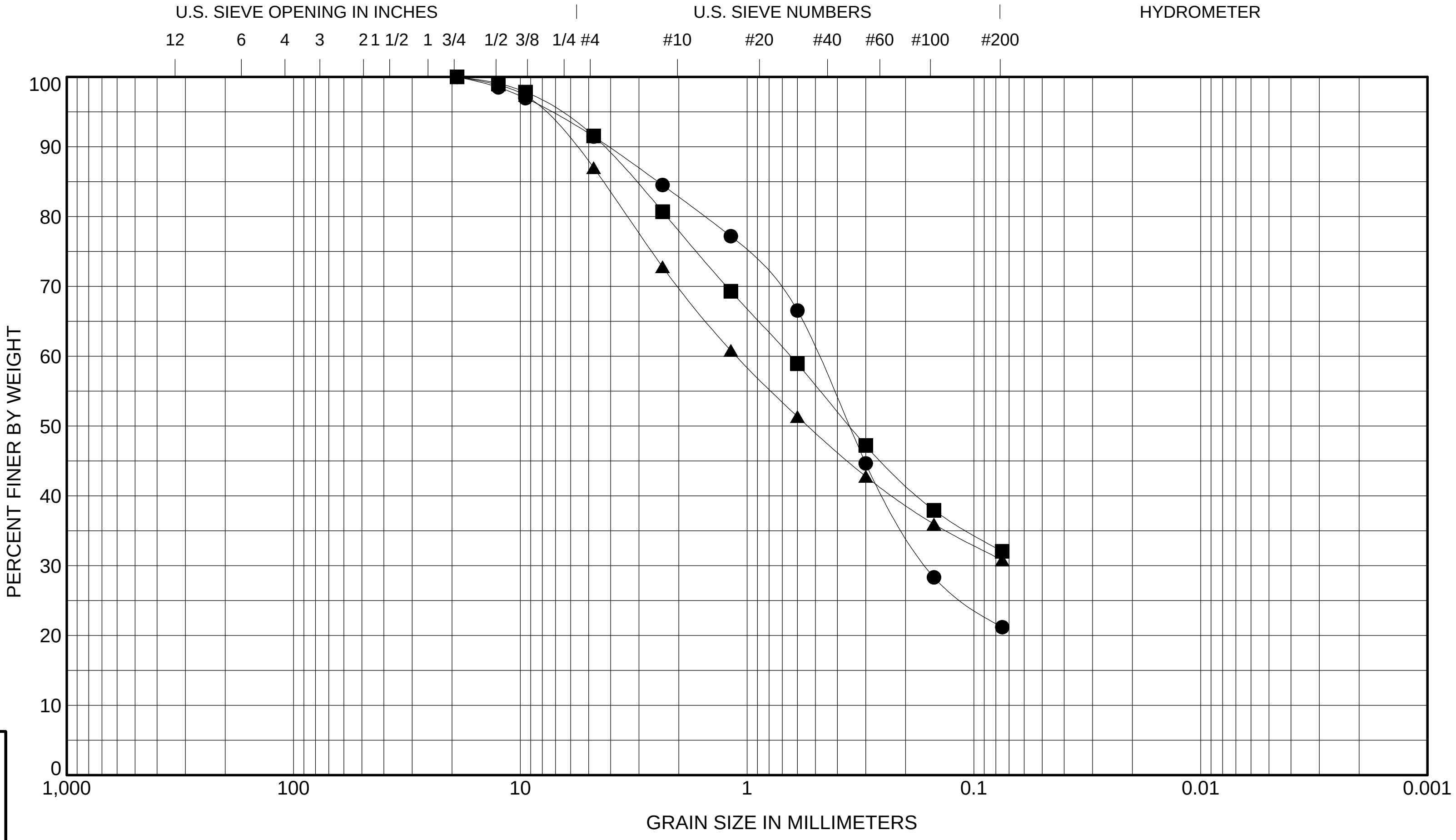

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-057 S2**	**5.0 - 6.5**	**Slightly gravelly, silty SAND (SM)**					
■	**B-058 S1**	**0.0 - 2.0**	**Slightly gravelly, silty SAND (SM)**					
▲	**B-059 S1**	**0.0 - 2.0**	**Gravelly, silty SAND (SM)**					

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-057 S2**	**5.0 - 6.5**	**19**	**0.49**	**0.16**		**9**	**70**	**21**	
■	**B-058 S1**	**0.0 - 2.0**	**19**	**0.64**			**8**	**59**	**32**	
▲	**B-059 S1**	**0.0 - 2.0**	**19**	**1.11**			**13**	**56**	**31**	

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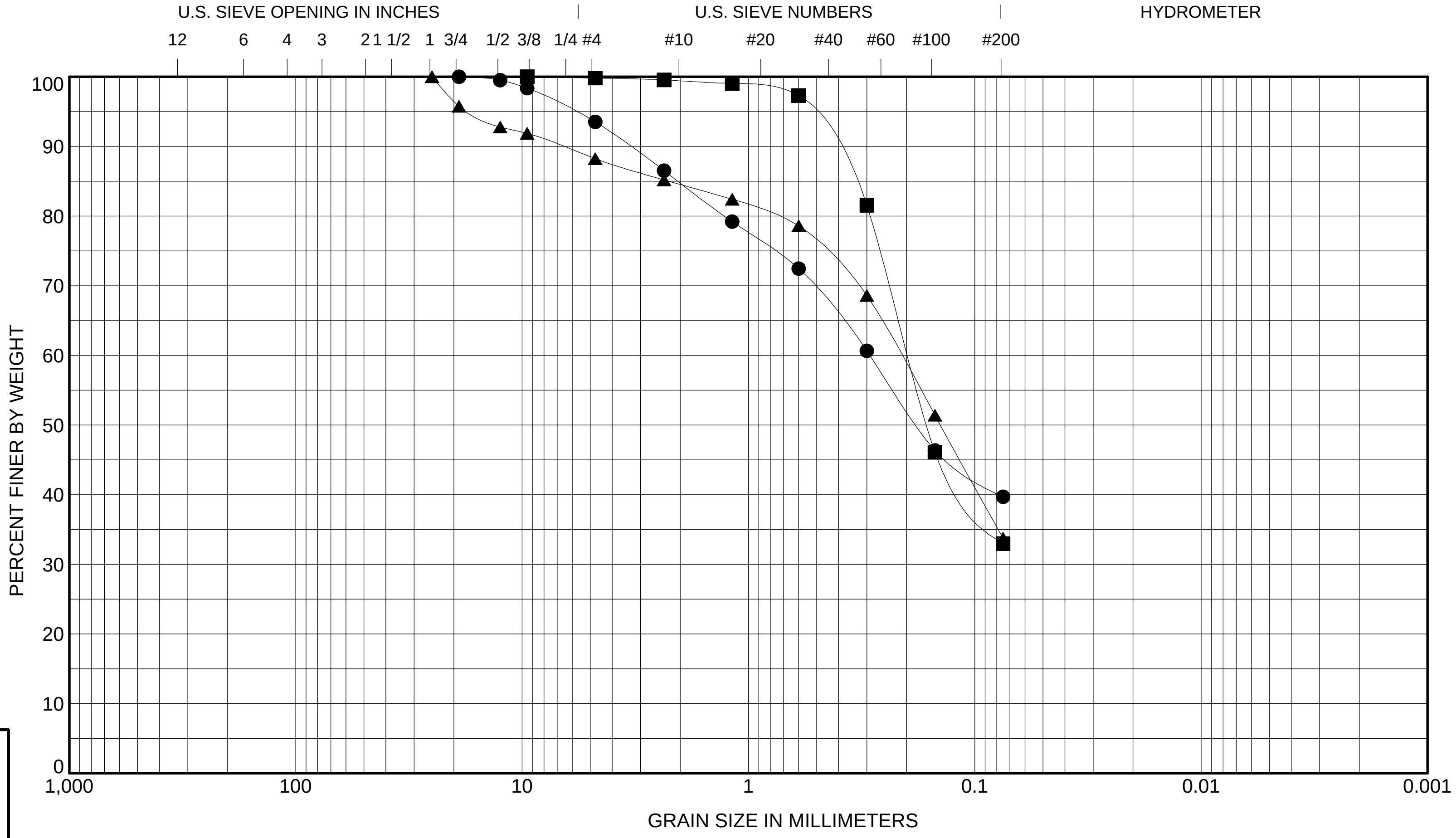

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-060 S1**	**0.0 - 2.0**	**Slightly gravelly, silty SAND (SM)**					
■	**B-060 S4**	**7.5 - 9.0**	**Silty SAND (SM)**					
▲	**B-065 S3**	**7.5 - 9.0**	**Slightly gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-060 S1**	**0.0 - 2.0**	**19**	**0.29**			**6**	**54**	**40**	
■	**B-060 S4**	**7.5 - 9.0**	**9.5**	**0.2**			**0**	**67**	**33**	
▲	**B-065 S3**	**7.5 - 9.0**	**25**	**0.21**			**12**	**54**	**34**	

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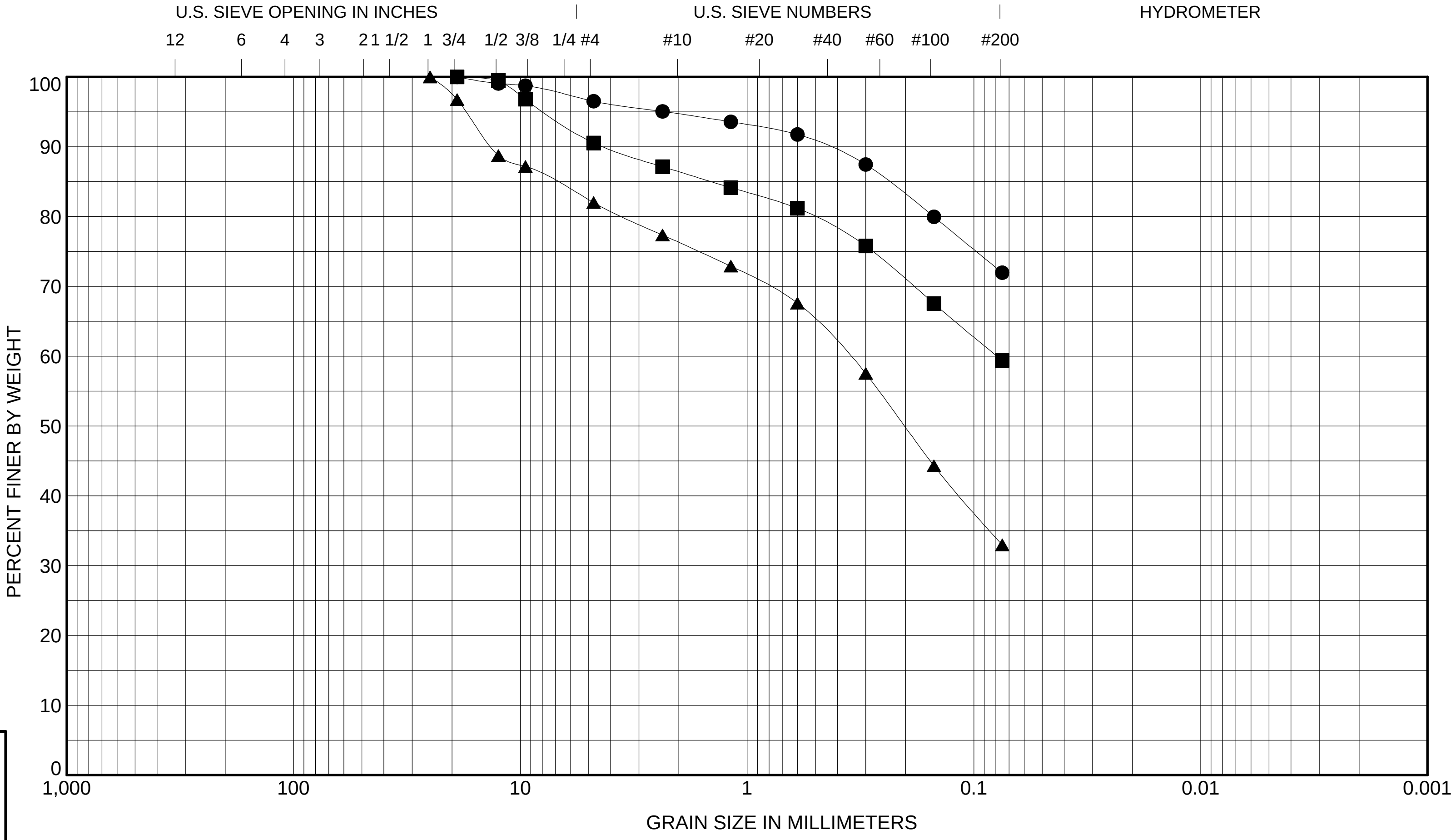

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-067 S2**	**5.0 - 6.5**	**Sandy SILT (ML)**					
■	**B-067 S6**	**20.0 - 21.5**	**Slightly gravelly, sandy SILT (ML)**					
▲	**B-068 S4**	**10.0 - 11.5**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-067 S2**	**5.0 - 6.5**	**19**				**3**	**25**	**72**	
■	**B-067 S6**	**20.0 - 21.5**	**19**	**0.08**			**9**	**31**	**59**	
▲	**B-068 S4**	**10.0 - 11.5**	**25**	**0.36**			**18**	**49**	**33**	

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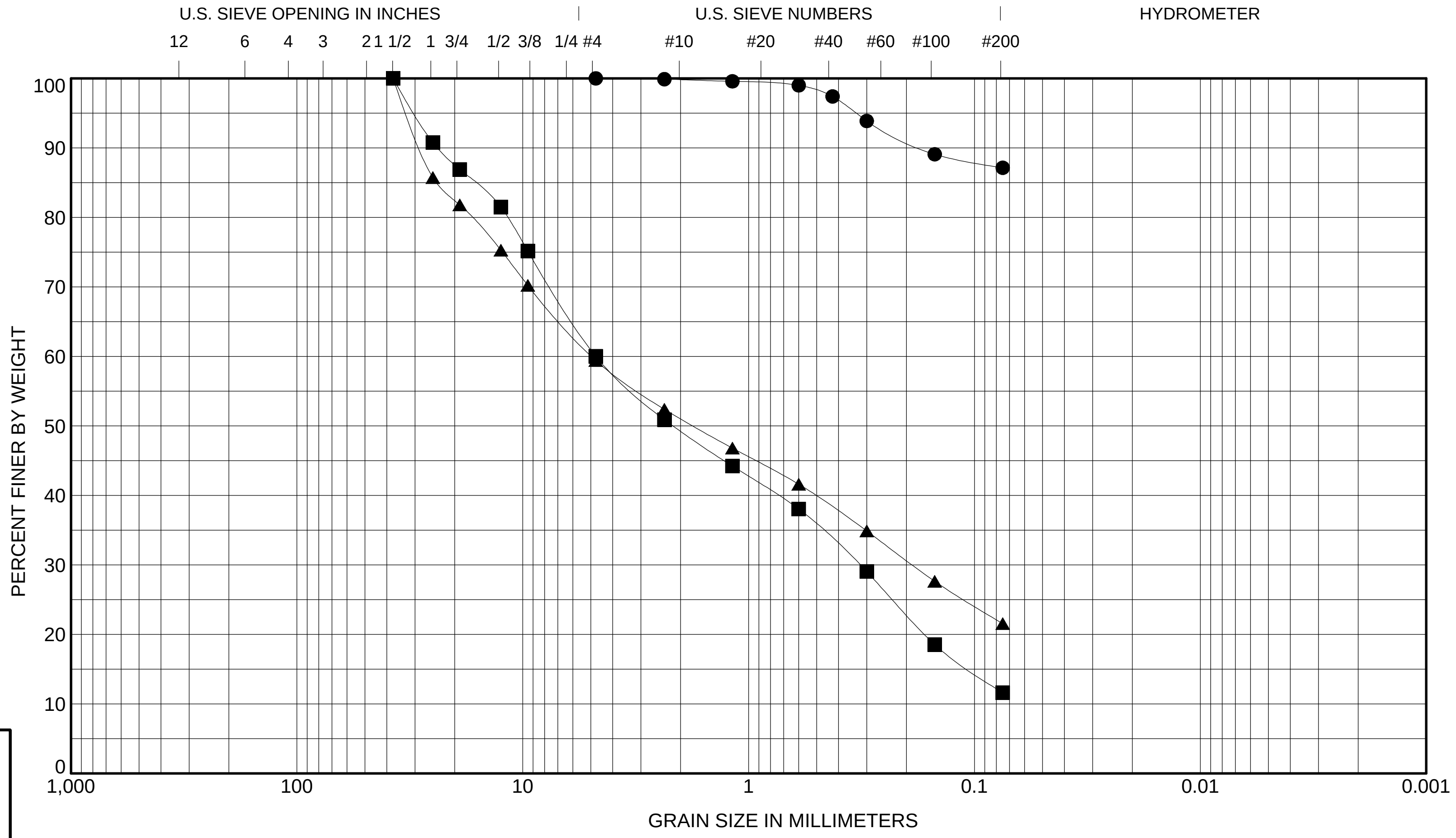

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-069 S3**	**7.5 - 9.0**	**Sandy SILT (ML)**					
■	**B-071 S3**	**7.5 - 9.0**	**Slightly silty, gravelly SAND (SP-SM)**				**0.3**	**74.5**
▲	**B-074 S4**	**10.0 - 11.5**	**Silty, sandy GRAVEL (GM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-069 S3**	**7.5 - 9.0**	**4.75**				**0**	**13**	**87**	
■	**B-071 S3**	**7.5 - 9.0**	**37.5**	**4.74**	**0.32**		**40**	**48**	**12**	
▲	**B-074 S4**	**10.0 - 11.5**	**37.5**	**4.94**	**0.19**		**41**	**38**	**22**	

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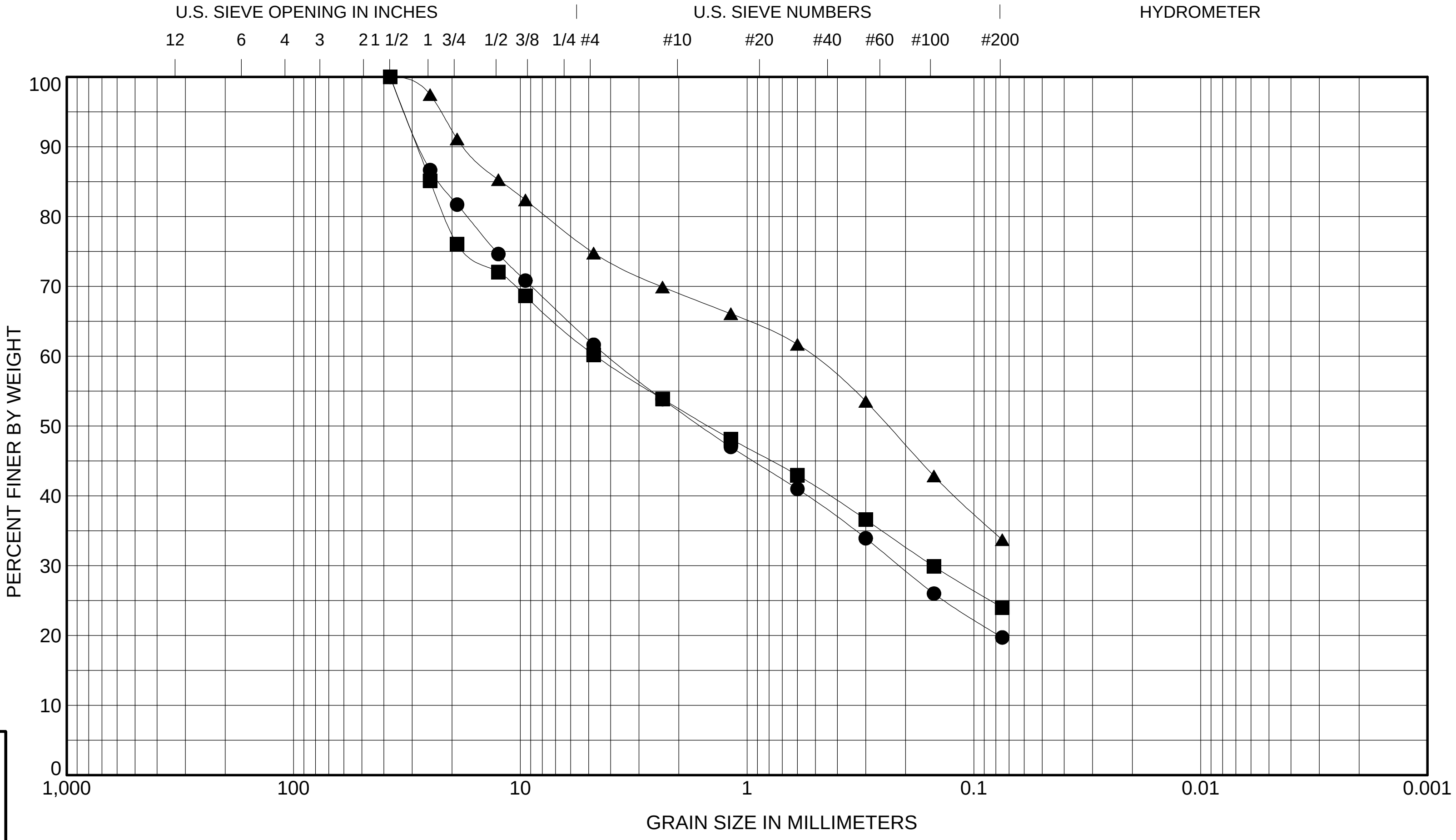

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-076 S3**	**7.5 - 9.0**	**Silty, gravelly SAND (SM)**					
■	**B-077 S3**	**7.5 - 9.0**	**Silty, sandy GRAVEL (GM)**					
▲	**B-077 S9**	**35.0 - 36.5**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-076 S3**	**7.5 - 9.0**	**37.5**	**4.1**	**0.21**		**38**	**42**	**20**	
■	**B-077 S3**	**7.5 - 9.0**	**37.5**	**4.64**	**0.15**		**40**	**36**	**24**	
▲	**B-077 S9**	**35.0 - 36.5**	**37.5**	**0.52**			**25**	**41**	**34**	

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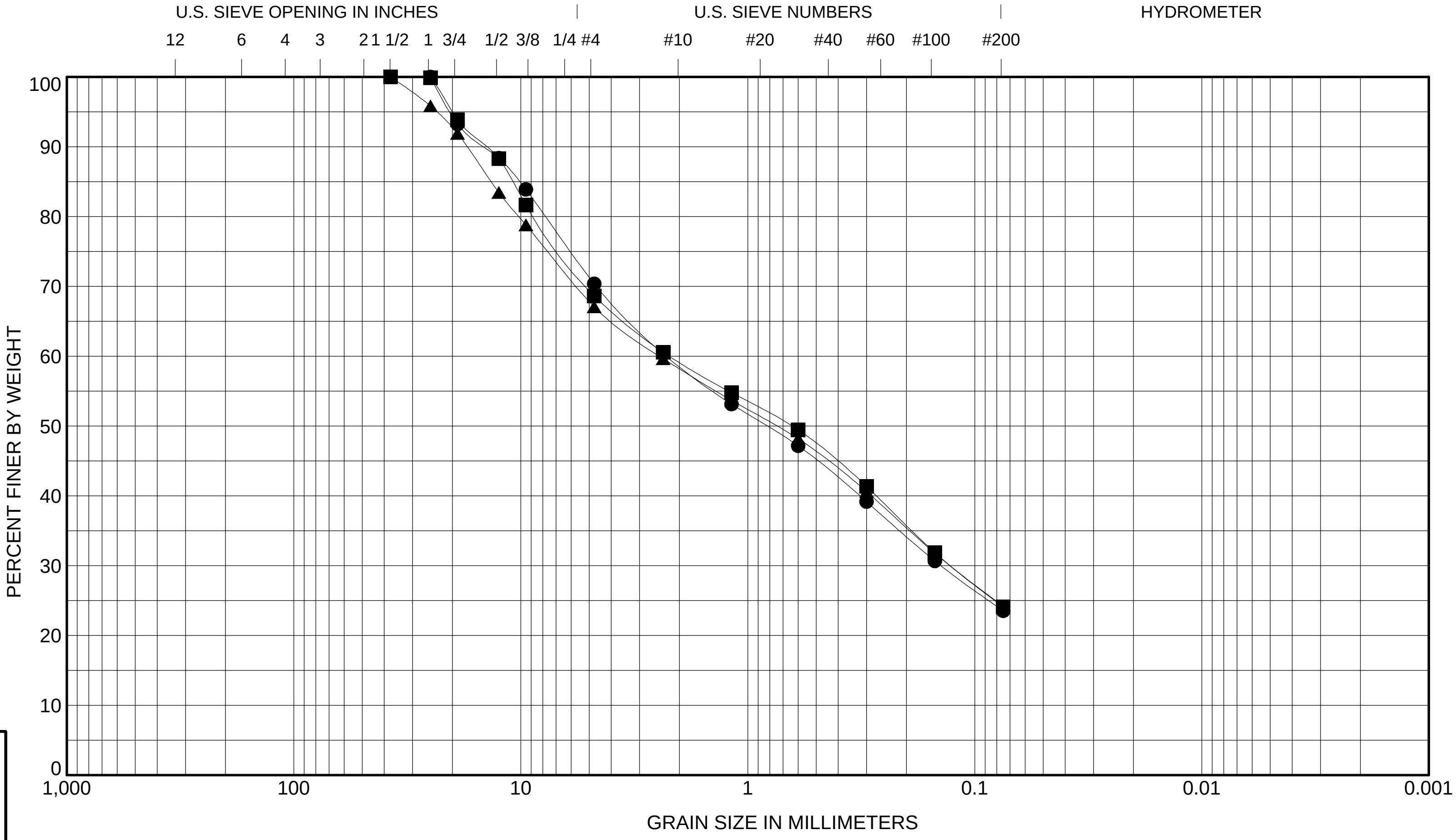

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-079 S3**	**7.5 - 9.0**	**Silty, gravelly SAND (SM)**					
■	**B-080 S7**	**25.0 - 26.5**	**Silty, gravelly SAND (SM)**					
▲	**B-081 S6**	**20.0 - 21.5**	**Silty, gravelly SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-079 S3**	**7.5 - 9.0**	**25**	**2.29**	**0.14**		**30**	**47**	**24**	
■	**B-080 S7**	**25.0 - 26.5**	**37.5**	**2.2**	**0.13**		**31**	**45**	**24**	
▲	**B-081 S6**	**20.0 - 21.5**	**37.5**	**2.44**	**0.13**		**33**	**43**	**24**	

Knik Arm Crossing, Mat-Su Access Route
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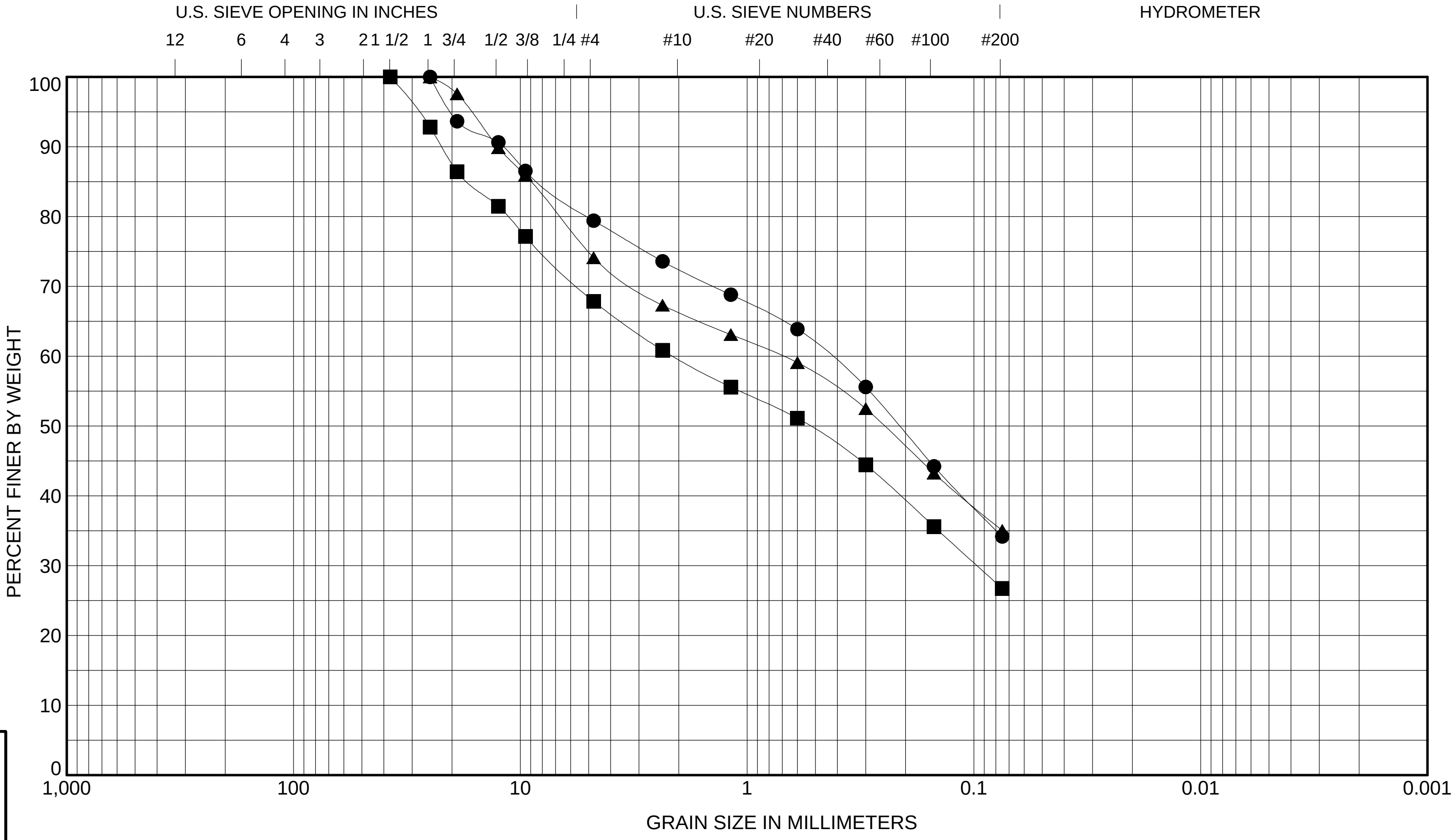

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-081 S8**	**30.0 - 31.5**	**Gravelly, silty SAND (SM)**					
■	**B-082 S6**	**20.0 - 21.5**	**Silty, gravelly SAND (SM)**					
▲	**B-083 SB1**	**10.0 - 15.0**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-081 S8**	**30.0 - 31.5**	**25**	**0.43**			**21**	**45**	**34**	
■	**B-082 S6**	**20.0 - 21.5**	**37.5**	**2.11**	**0.1**		**32**	**41**	**27**	
▲	**B-083 SB1**	**10.0 - 15.0**	**25**	**0.7**			**26**	**39**	**35**	

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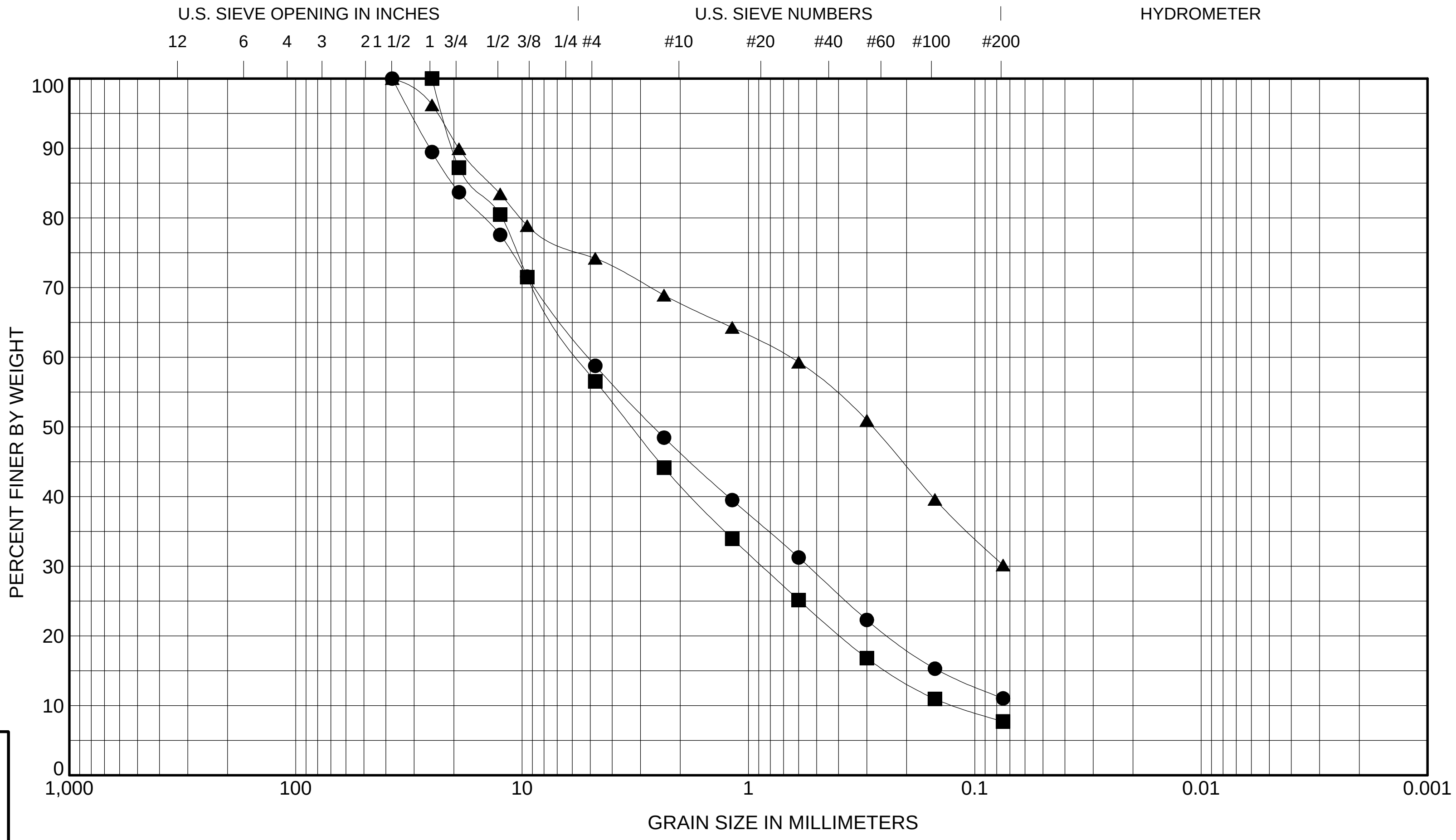

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-083 S6**	**20.0 - 21.5**	**Slightly silty, gravelly SAND (SP-SM)**				**0.9**	**80.1**
■	**B-084 S2**	**5.0 - 6.5**	**Slightly silty, gravelly SAND (SW-SM)**				**1.1**	**45.7**
▲	**B-084 S5**	**15.0 - 16.5**	**Gravelly, silty SAND (SM)**					

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-083 S6**	**20.0 - 21.5**	**37.5**	**5.08**	**0.54**		**41**	**48**	**11**	
■	**B-084 S2**	**5.0 - 6.5**	**25**	**5.57**	**0.87**	**0.12**	**43**	**49**	**8**	
▲	**B-084 S5**	**15.0 - 16.5**	**37.5**	**0.66**			**26**	**44**	**30**	

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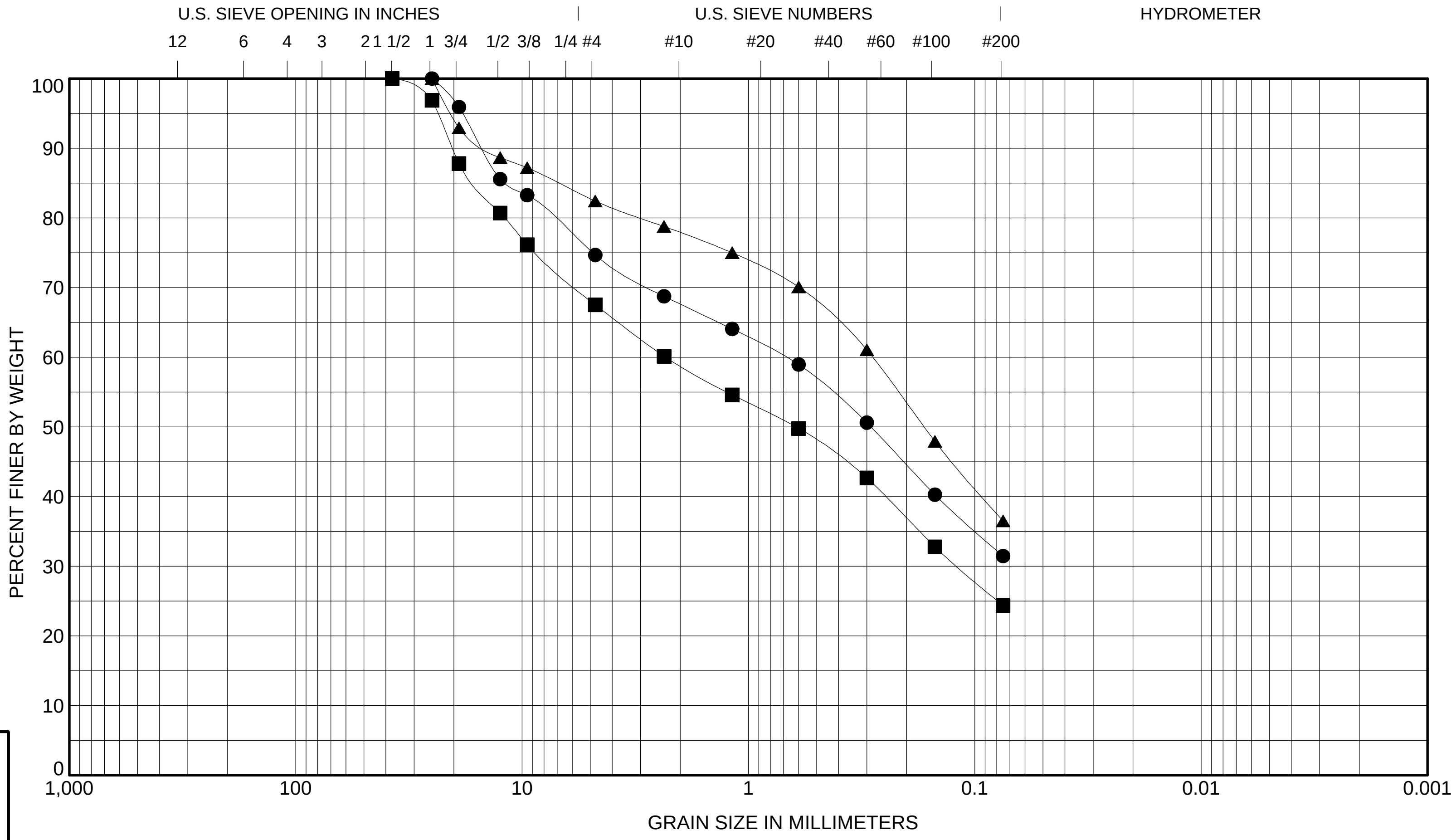

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-084 S7**	**25.0 - 26.5**	**Gravelly, silty SAND (SM)**					
■	**B-084 S9**	**35.0 - 36.5**	**Silty, gravelly SAND (SM)**					
▲	**B-085 S3**	**7.5 - 9.0**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-084 S7**	**25.0 - 26.5**	**25**	**0.69**			**25**	**43**	**31**	
■	**B-084 S9**	**35.0 - 36.5**	**37.5**	**2.32**	**0.12**		**32**	**43**	**24**	
▲	**B-085 S3**	**7.5 - 9.0**	**25**	**0.28**			**18**	**46**	**37**	

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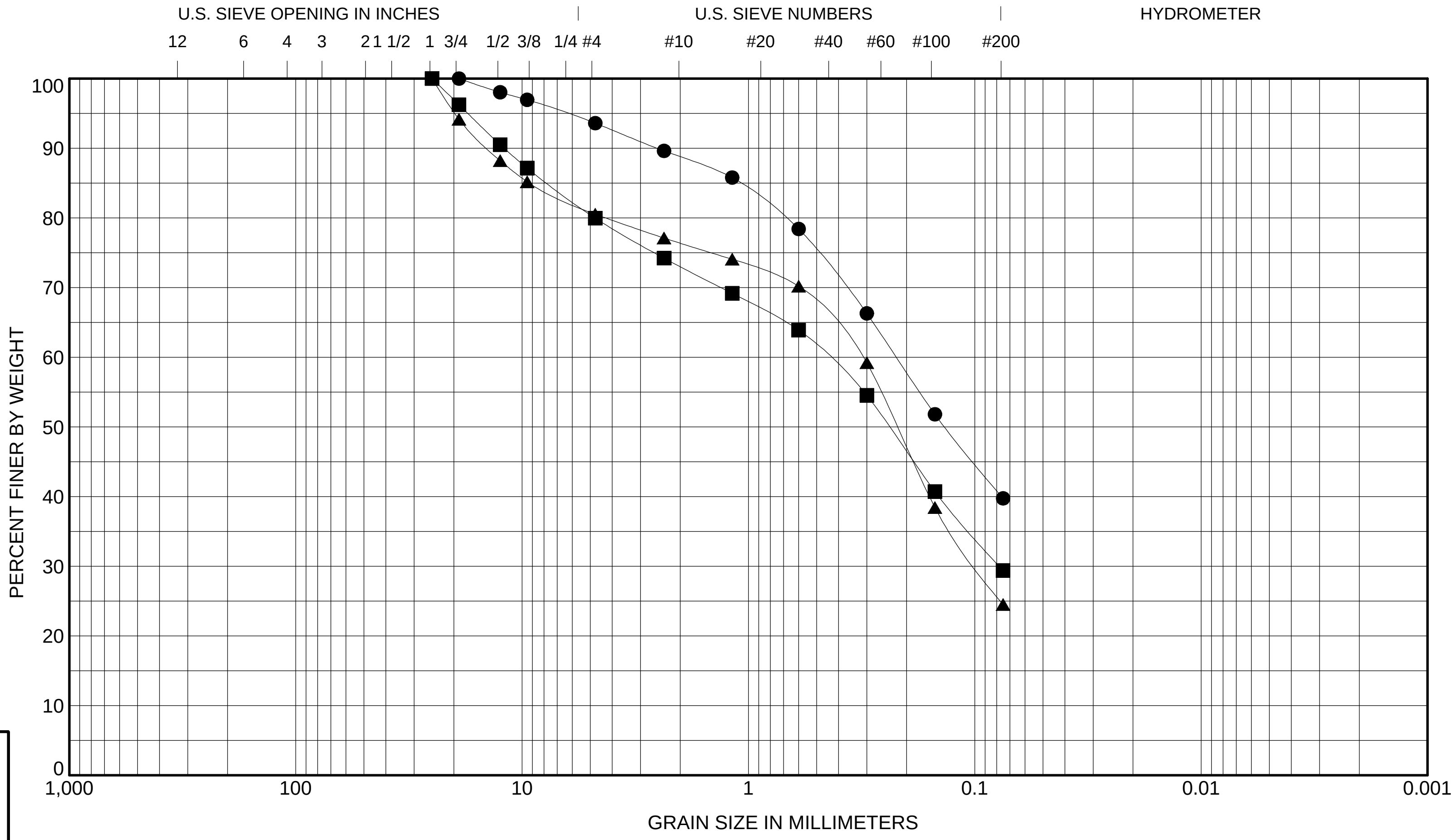

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-086 S2**	**5.0 - 6.5**	**Slightly gravelly, silty SAND (SM)**					
■	**B-087 S3**	**7.5 - 9.0**	**Gravelly, silty SAND (SM)**					
▲	**B-088 S2**	**7.5 - 9.0**	**Gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-086 S2**	**5.0 - 6.5**	**19**	**0.22**			**6**	**54**	**40**	
■	**B-087 S3**	**7.5 - 9.0**	**25**	**0.45**	**0.08**		**20**	**51**	**29**	
▲	**B-088 S2**	**7.5 - 9.0**	**25**	**0.32**	**0.1**		**19**	**56**	**25**	

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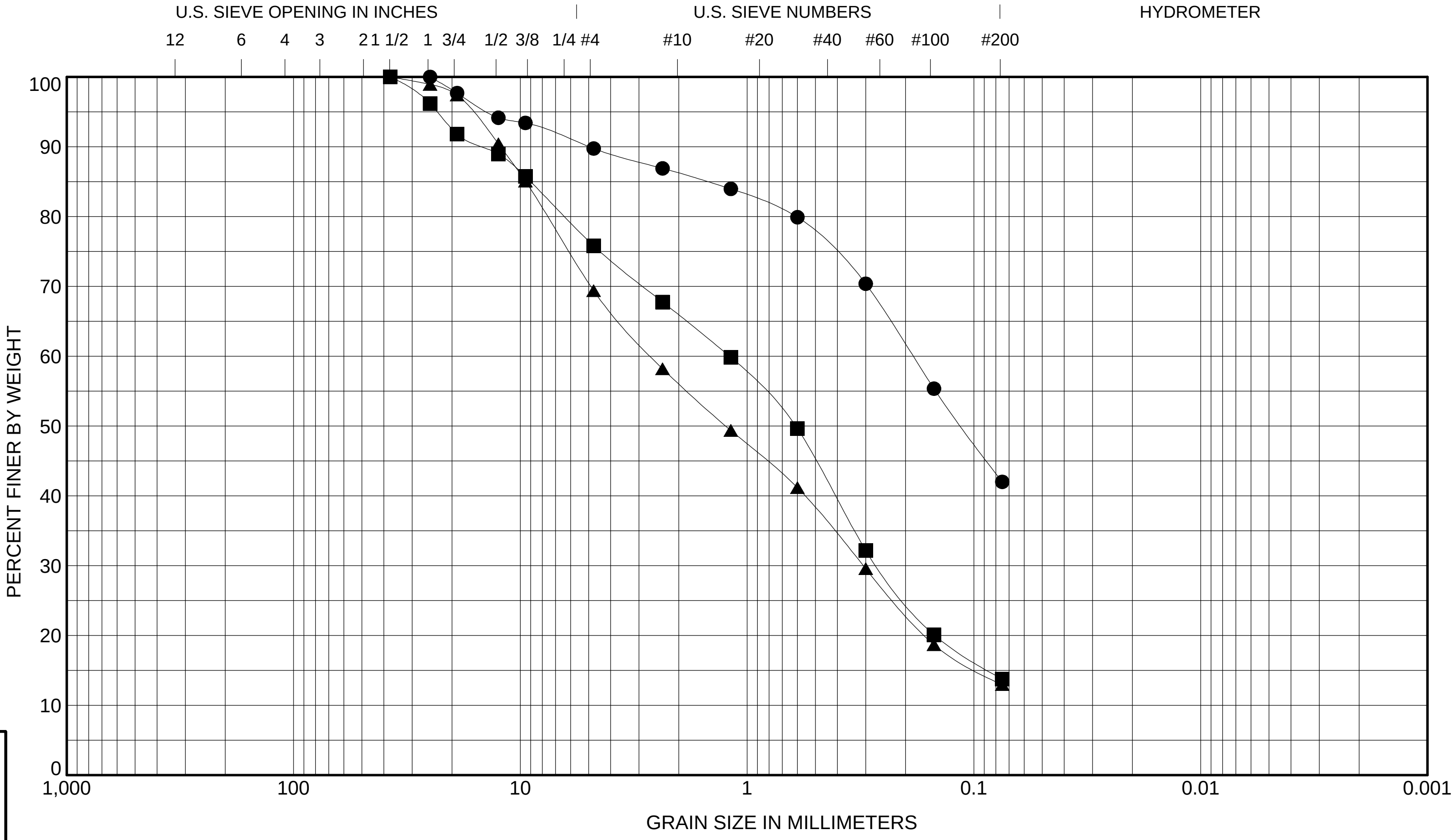

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-088 S5**	**20.0 - 21.5**	**Slightly gravelly, silty SAND (SM)**					
■	**B-089 S1**	**5.0 - 6.5**	**Silty, gravelly SAND (SM)**					
▲	**B-090 SB1**	**0.5 - 2.5**	**Silty, gravelly SAND (SM)**					

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-088 S5**	**20.0 - 21.5**	**25**	**0.19**			**10**	**48**	**42**	
■	**B-089 S1**	**5.0 - 6.5**	**37.5**	**1.2**	**0.26**		**24**	**62**	**14**	
▲	**B-090 SB1**	**0.5 - 2.5**	**37.5**	**2.64**	**0.31**		**31**	**56**	**13**	

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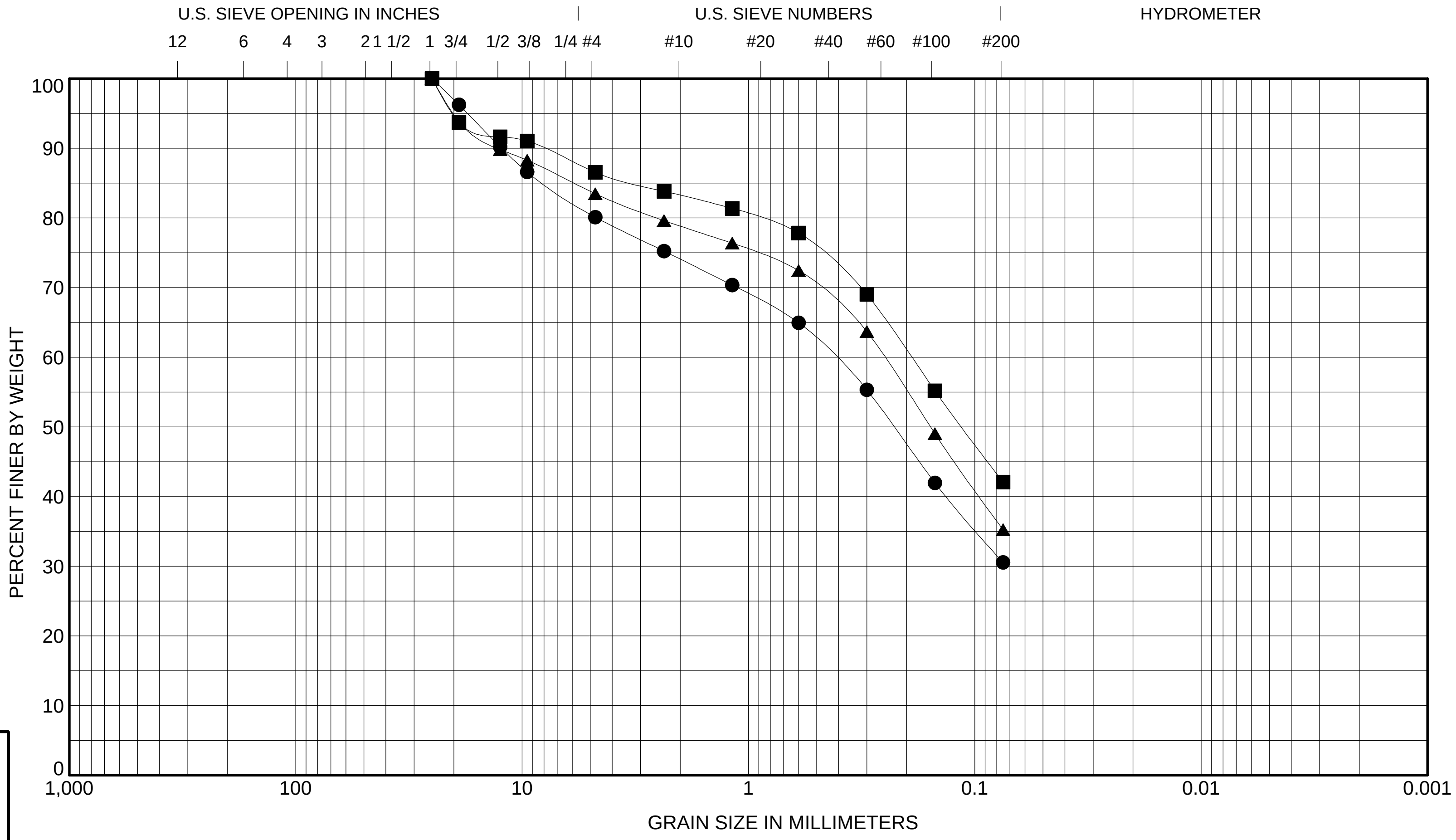

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
● **B-091 S3**	**40.0 - 41.5**	**Gravelly, silty SAND (SM)**					
■ **B-092 S2**	**5.0 - 6.5**	**Gravelly, silty SAND (SM)**					
▲ **B-092 S5**	**15.0 - 16.5**	**Gravelly, silty SAND (SM)**					

Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **B-091 S3**	**40.0 - 41.5**	**25**	**0.42**			**20**	**50**	**31**	
■ **B-092 S2**	**5.0 - 6.5**	**25**	**0.19**			**13**	**44**	**42**	
▲ **B-092 S5**	**15.0 - 16.5**	**25**	**0.25**			**17**	**48**	**35**	

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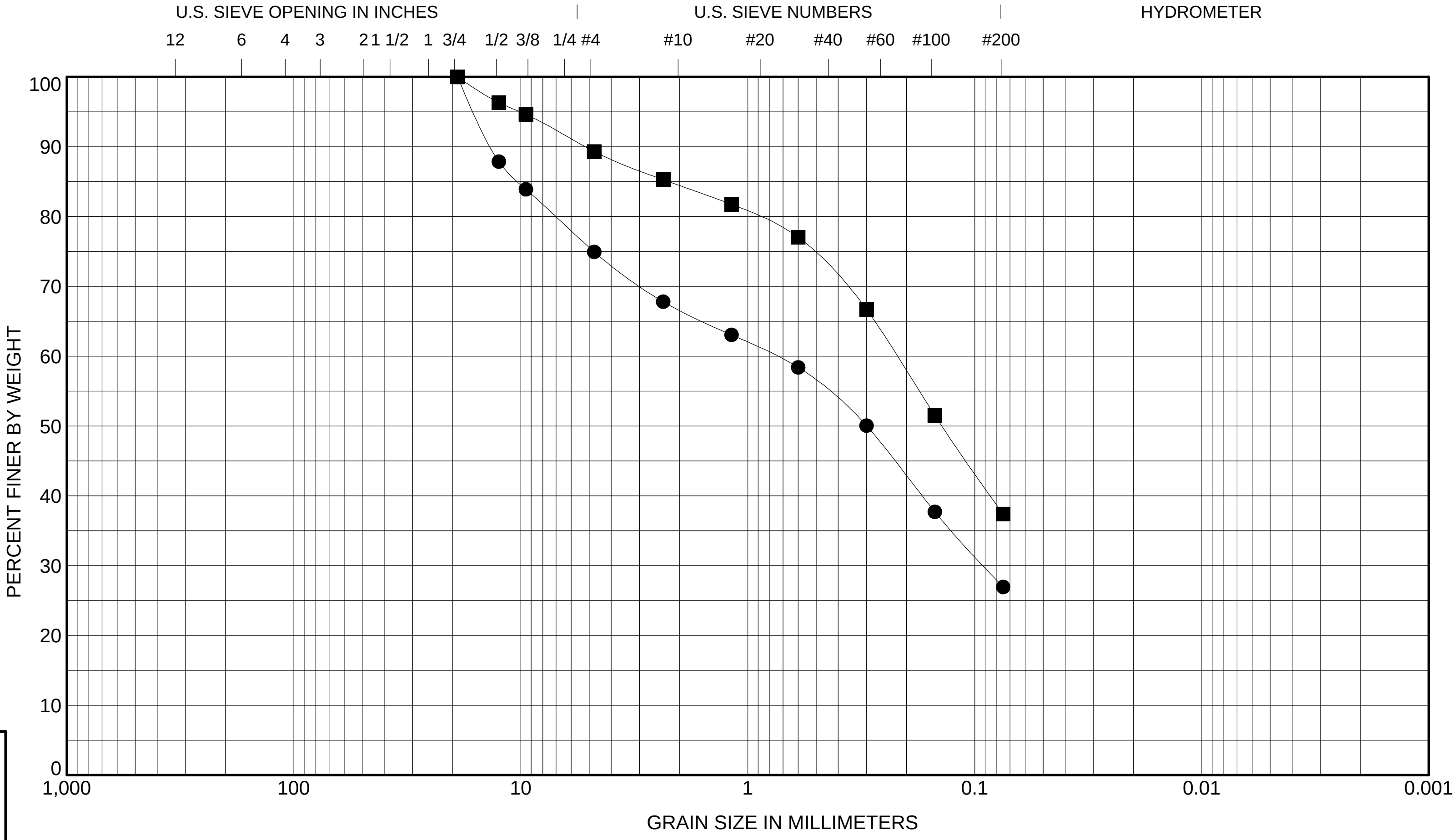

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**B-093 S2**	**5.0 - 6.5**	**Gravelly, silty SAND (SM)**					
■	**B-093 S5**	**15.0 - 16.5**	**Slightly gravelly, silty SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-093 S2**	**5.0 - 6.5**	**19**	**0.76**	**0.09**		**25**	**48**	**27**	
■	**B-093 S5**	**15.0 - 16.5**	**19**	**0.22**			**11**	**52**	**37**	

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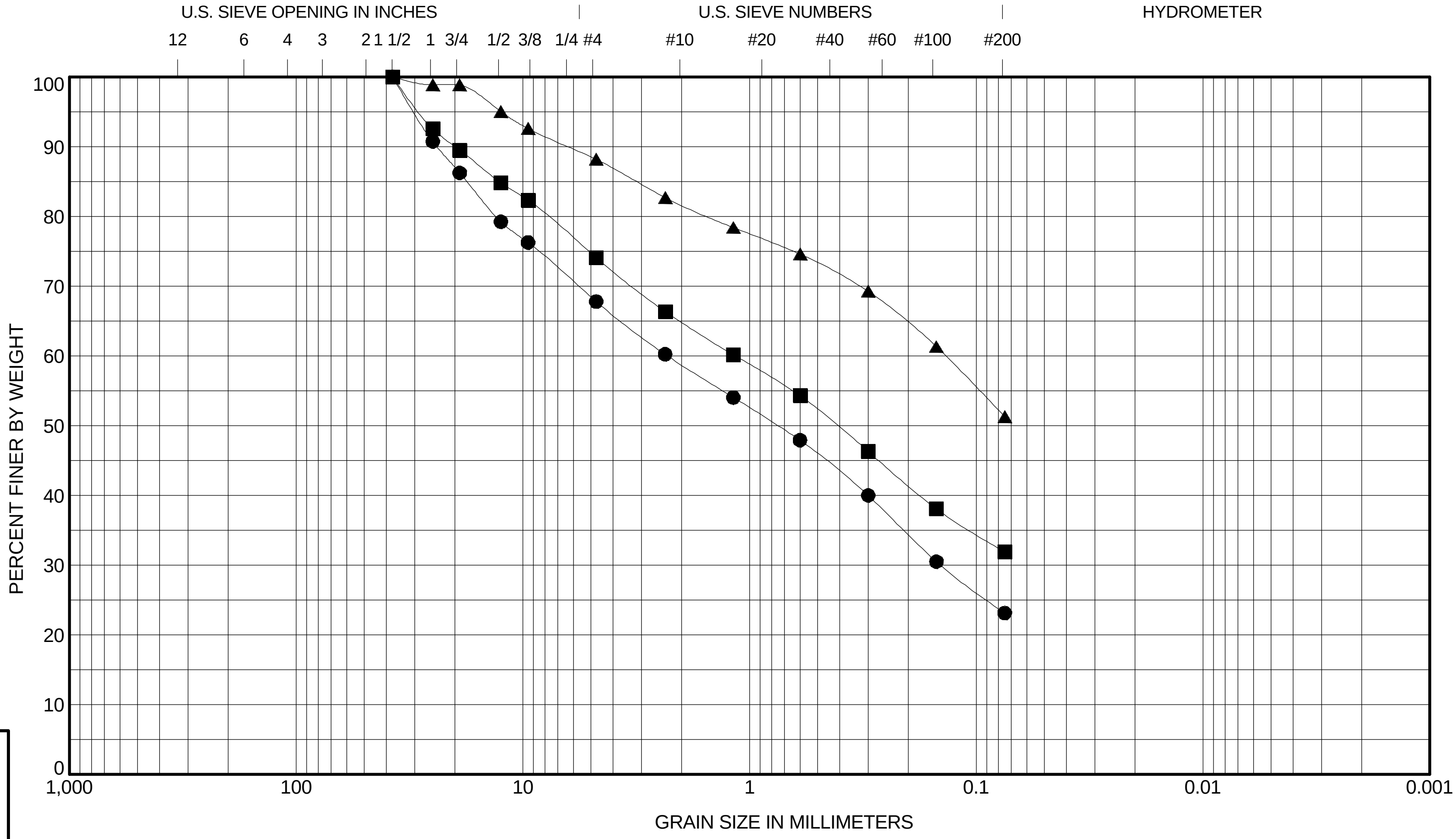

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**X-1 S2**	**10.0 - 11.5**	**Silty, gravelly SAND (SM)**					
■	**X-1 S3**	**15.0 - 16.5**	**Gravelly, silty SAND (SM)**					
▲	**X-1 S10**	**50.0 - 51.5**	**Slightly gravelly, sandy SILT (ML)**					

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**X-1 S2**	**10.0 - 11.5**	**37.5**	**2.3**	**0.14**		**32**	**45**	**23**	
■	**X-1 S3**	**15.0 - 16.5**	**37.5**	**1.16**			**26**	**42**	**32**	
▲	**X-1 S10**	**50.0 - 51.5**	**37.5**	**0.14**			**12**	**37**	**51**	

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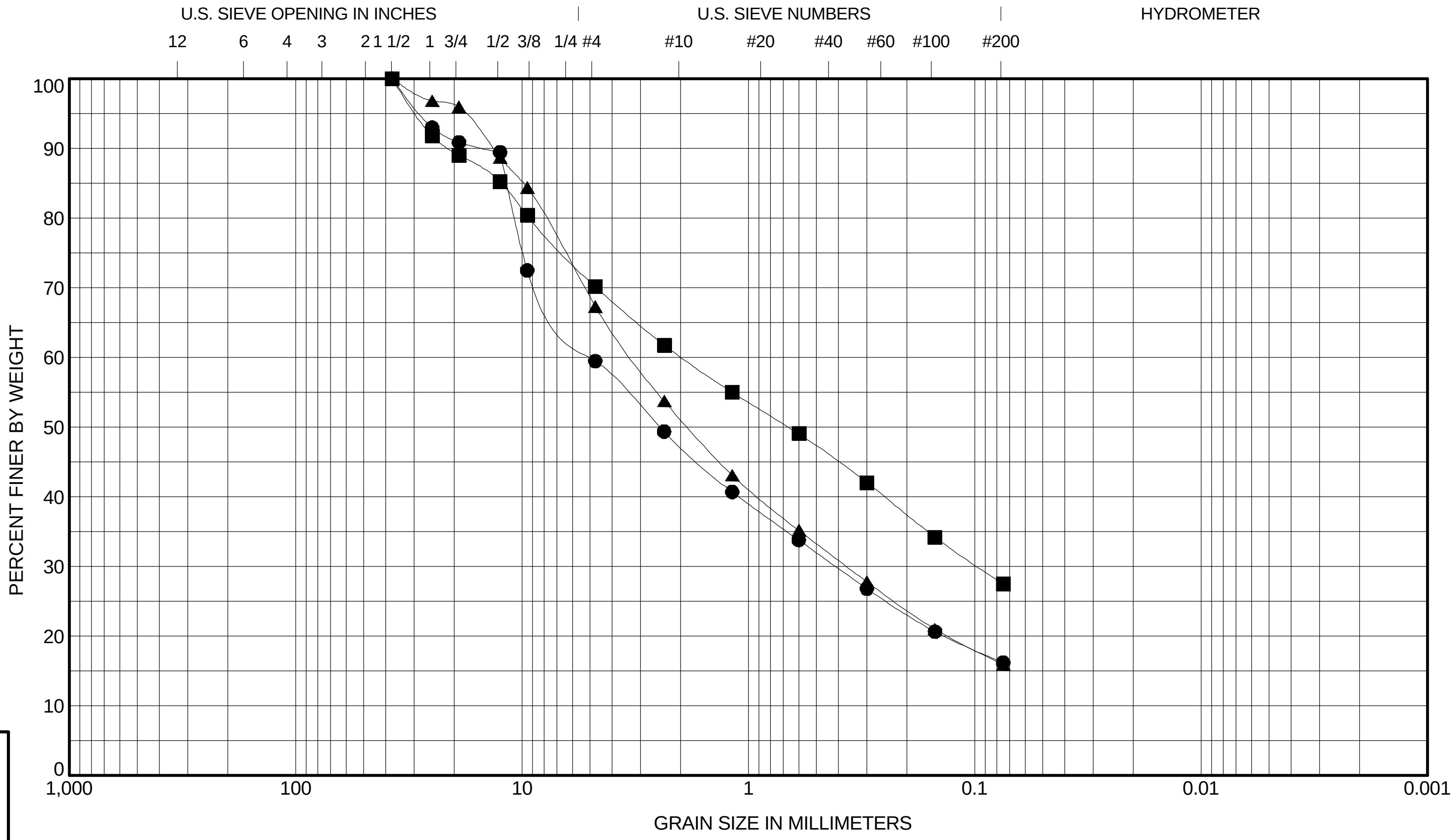

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**X-1 S14**	**70.0 - 71.5**	**Silty, gravelly SAND (SM)**					
■	**X-2 S3**	**15.0 - 16.5**	**Silty, gravelly SAND (SM)**					
▲	**X-2 S8**	**40.0 - 41.5**	**Silty, gravelly SAND (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**X-1 S14**	**70.0 - 71.5**	**37.5**	**4.89**	**0.41**		**41**	**43**	**16**	
■	**X-2 S3**	**15.0 - 16.5**	**37.5**	**1.97**	**0.1**		**30**	**43**	**27**	
▲	**X-2 S8**	**40.0 - 41.5**	**37.5**	**3.26**	**0.37**		**33**	**51**	**16**	

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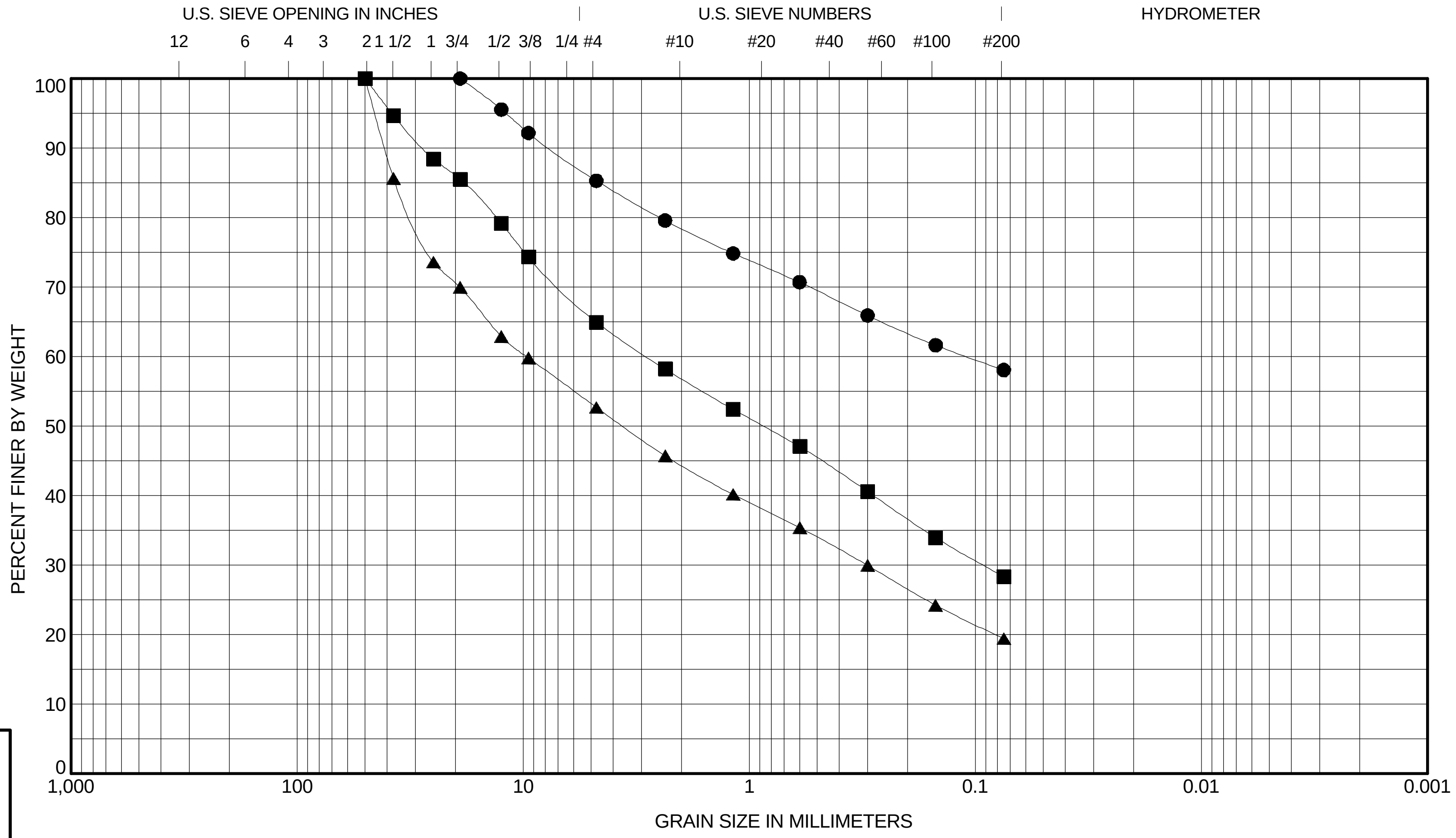

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	**X-2 S12**	**60.0 - 61.5**	**Gravelly, sandy SILT (ML)**					
■	**X-3 S5**	**25.0 - 26.5**	**Silty, gravelly SAND (SM)**					
▲	**X-3 S10**	**50.0 - 51.5**	**Silty, sandy GRAVEL (GM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**X-2 S12**	**60.0 - 61.5**	**19**	**0.11**			**15**	**27**	**58**	
■	**X-3 S5**	**25.0 - 26.5**	**50**	**2.84**	**0.09**		**35**	**37**	**28**	
▲	**X-3 S10**	**50.0 - 51.5**	**50**	**9.68**	**0.3**		**47**	**33**	**19**	

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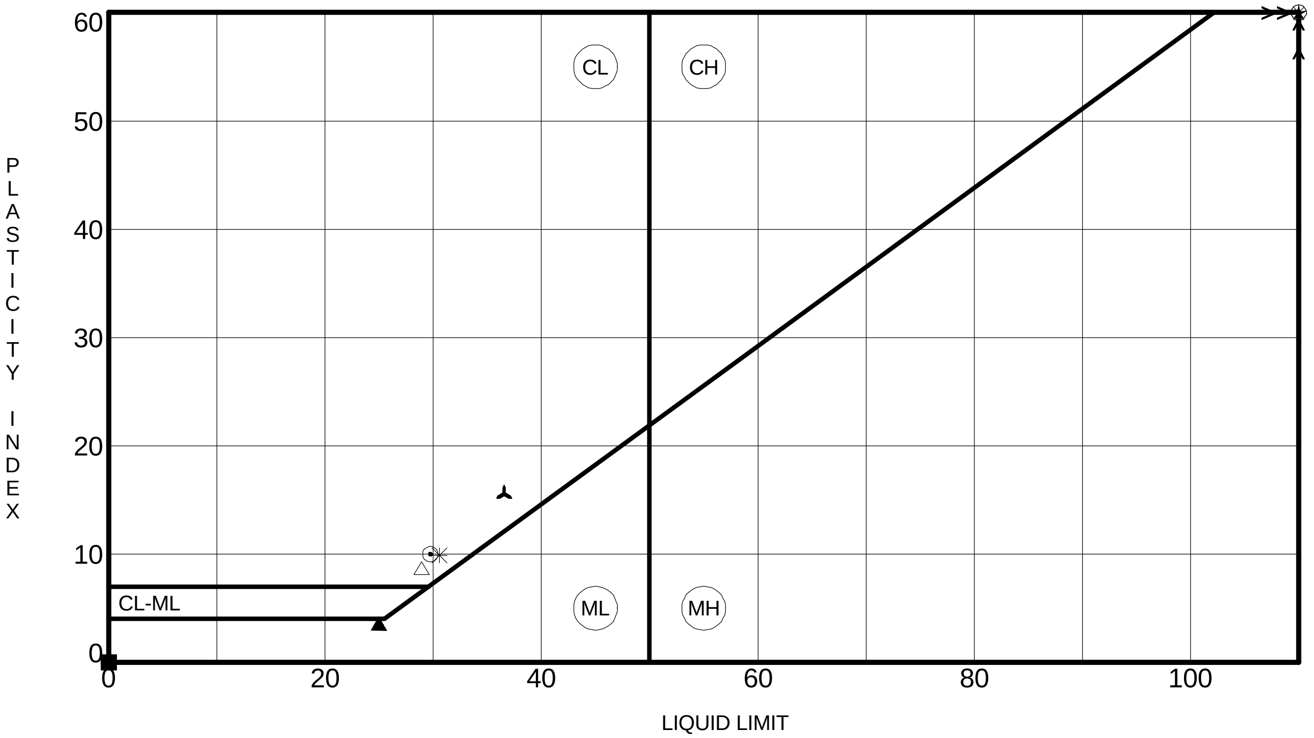

Boring		Depth, Ft	LL	PL	PI	Fines	Classification
●	**B-015**	**25.0 - 26.5**	**NP**	**NP**	**NP**		**Non-Plastic**
■	**B-016**	**10.0 - 11.5**	**NP**	**NP**	**NP**		**Non-Plastic**
▲	**B-035**	**15.0 - 16.5**	**25**	**21**	**4**		**ML**
○	**B-048**	**20.0 - 21.5**	**187**	**61**	**126**		**OH**
⊙	**B-054**	**20.0 - 21.5**	**30**	**20**	**10**		**CL**
△	**B-062**	**10.0 - 11.5**	**29**	**20**	**9**		**CL**
✳	**B-063**	**7.5 - 9.0**	**31**	**21**	**10**		**CL**
⅄	**B-088**	**30.0 - 31.5**	**37**	**21**	**16**		**CL**
⊗	**B-091**	**25.0 - 26.5**	**171**	**66**	**105**		**OH**
★	**B-091**	**26.3 - 27.8**	**169**	**66**	**103**		**OH**

Knik Arm Crossing, Mat-Su Access Route
Point MacKenzie, Alaska

ATTERBERG LIMITS RESULTS

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Fig. B-3

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMETAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to 32-1-01536-003

Date: March 2007
To: PND Engineering
Re: Knik Arm Crossing, Mat-Su Access Route

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland