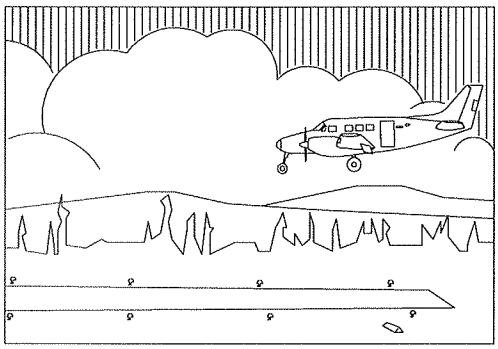
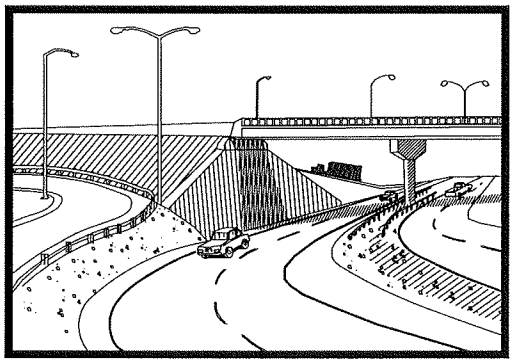
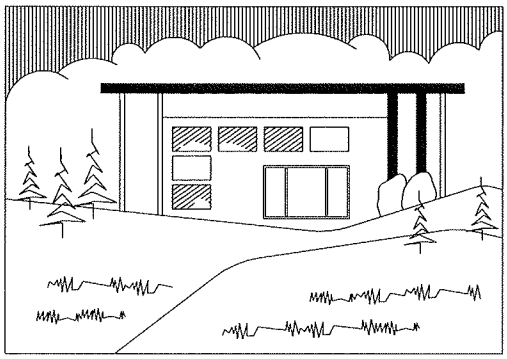
GEOTECHNICAL REPORT

AMBLER AIRPORT REHABILITATION
and
AMBLER SEWAGE LAGOON ROAD

AKSAS 61303 and 61056







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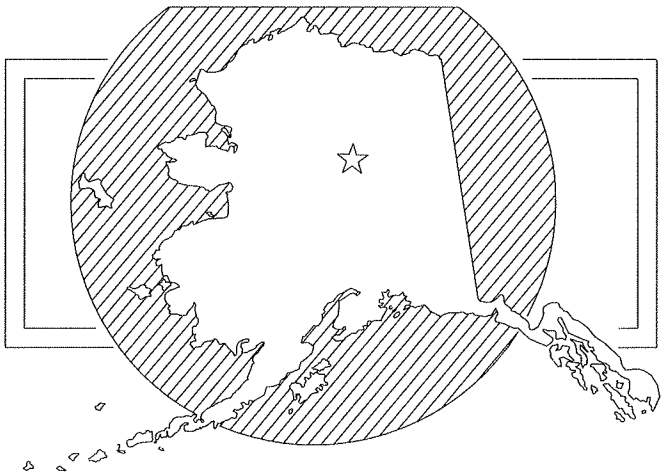

NORTHERN REGION

JUNE 2013

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AKSAS NUMBER: 61303
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AKSAS NUMBER: 61056
JUNE 2013

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Contents

Summary

The Alaska Department of Transportation and Public Facilities (ADOT&PF) Northern Region design engineers are evaluating improvements to the Ambler Airport (Figure 1). Potential improvements include these design elements.

- Lengthen the existing main runway to 4,000 feet and widen to 75 feet.
- Lengthen the existing Runway Safety Area (RSA) to 4,600 feet and widen to 150 feet.
- Overlay runways, taxiway, apron, and embankments with surface course material or pavement.
- Remove terrain obstructions at the southwest corner of the intersecting runways, and use material as potential borrow.
- Construct new Snow Removal Equipment Building (SREB) at current SREB location.
- Realign 850 feet of airport access road.
- Rehabilitate and resurface 2,750 feet of airport access road.
- Construct permanent drainage structure at Grizzly Creek.

The design element to overlay the runways, taxiway and apron, embankments, including the airport access road, is dependent on the presents of Naturally Occurring Asbestos (NOA) in those areas and local material sites. Geotechnical considerations and NOA testing will determine the final overlay decision, options being considered are:

- Rehabilitate and apply crushed aggregate surface to all operational surfaces and access road using a local material source.
- Rehabilitate and apply crushed aggregate surface to all operational surfaces and access road using non-NOA material sources not in the local area.
- Rehabilitate and apply asphalt surfacing to all operational surfaces and access road.

To assist with evaluation and planning, Northern Region Materials Section (NRMS) personnel conducted a geotechnical investigation with drilling explorations for all airport improvements (Figure 2). This report presents the results of the investigation, including improvements to the Ambler sewage lagoon road. This investigation and report does not give information related to material sources, except in the terrain obstruction area. The material source investigation was completed under a separate report dated 2013.

This report will discuss each of the above mentioned design elements in separate sections, as indicated below:

1. Northern main runway, northern main runway extension, crosswind runway, and terrain obstruction area.
2. Southern main runway, southern main runway extension, existing aircraft parking apron, taxiway, and SREB.
3. Existing airport access road and proposed new access road realignment.
4. Proposed new aircraft parking apron expansion and SREB, north of the existing parking apron. This design element is no longer being considered. The existing apron is the only consideration.

5. Ambler sewage lagoon road improvements. This is discussed last under a separate project, but included in this report.

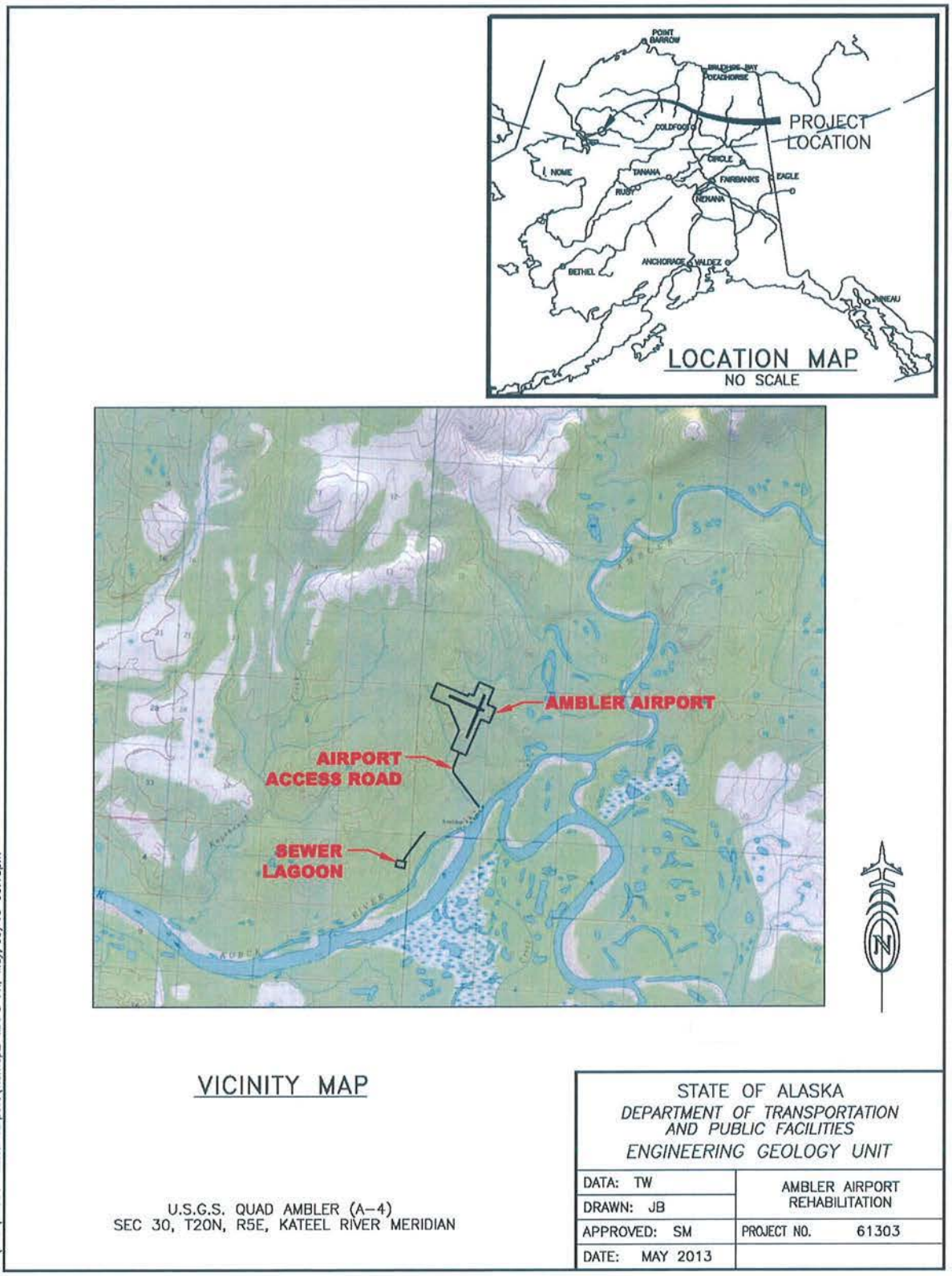

Figure 1: Ambler Airport Location and Vicinity Map.

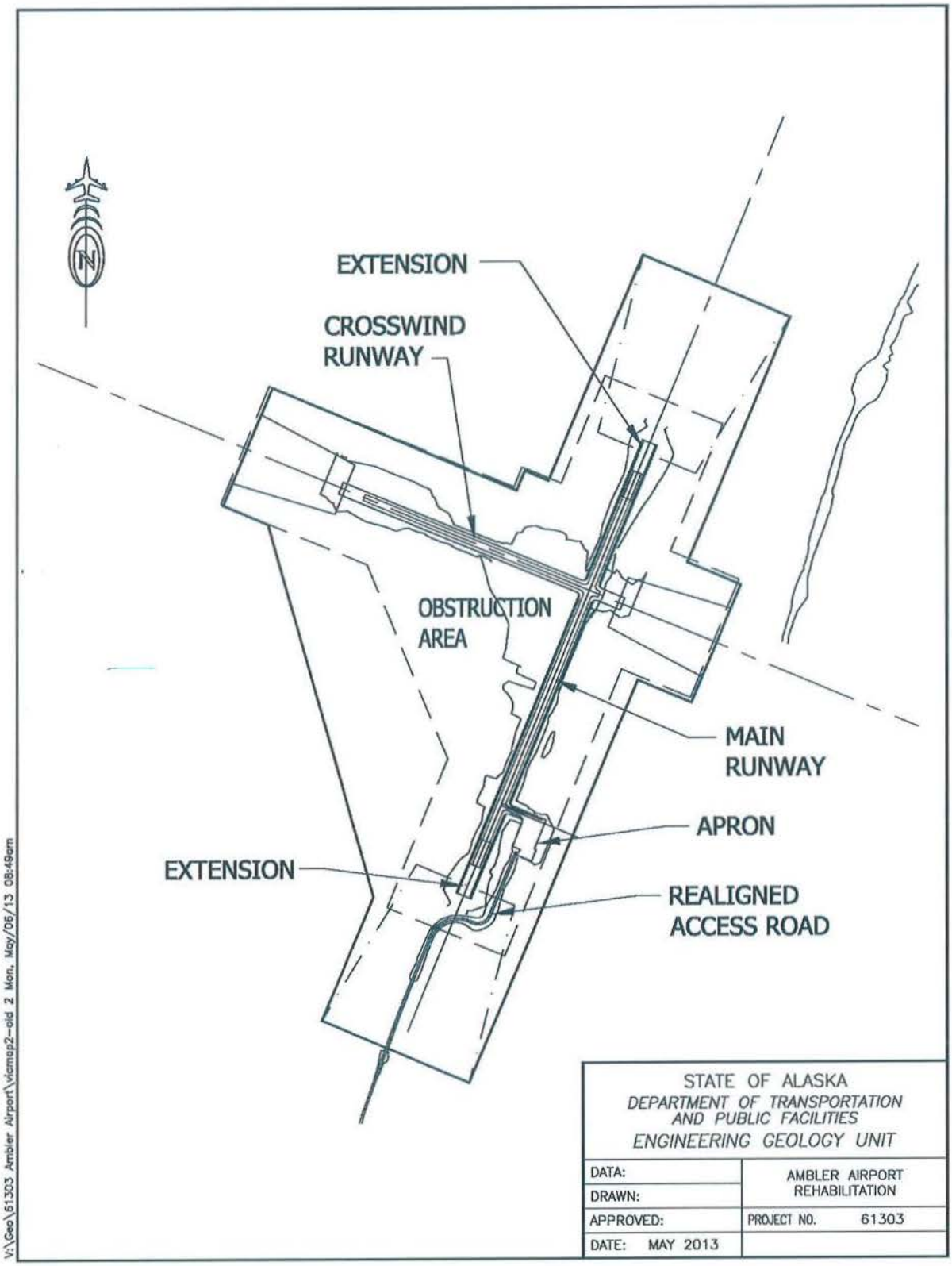

Figure 2: Ambler Airport Improvements Design Elements.

Introduction

This report documents physical site conditions and subsurface geotechnical conditions, provides interpretation of anticipated site conditions, and recommends design and construction criteria for the project. This report is intended to serve as a geotechnical guide during project design and a geotechnical reference during construction.

The purpose of this project and the geotechnical investigation presented here is to improve safety and efficiency at the Ambler Airport. The Village of Ambler is often supplied by air freight making the airport essential to the community. The current runway length does not support fully loaded larger aircraft. In addition, the existing runway's deteriorating surface causes operational problems that result in frequent closures during the spring breakup due to soft conditions.

The existing Ambler airport (AFM) main runway with access road was originally constructed in 1978, with improvements in 1989 to include expanding the main runway to its current length and adding the crosswind runway. The main runway is currently approximately 3,000 feet in length with a 60 foot wide gravel runway surface and approximately 270 foot overruns, located 1 mile northwest of the village of Ambler at N67°06.38' and W157°51.45' and at 334 feet above mean sea level. The main runway, 18-36 is oriented northeast and southwest, with a slight slope up to the northeast and crowned in the center with no line of sight between runway ends. The crosswind runway, 09-27 is 2,400 feet in length with a 60 feet wide gravel runway surface that is often closed due to a deteriorating surface. The runway slopes uphill from east to west, and is oriented southeast and northwest (FAA Supplement Alaska, 2012).

The airport improvements and sewer lagoon road geotechnical field investigation was conducted from February 11th thru March 5th, 2013. A total of 59 test holes (TH) were drilled as part of this investigation:

- Nineteen test holes drilled on the main runway including overruns and proposed extension areas.
- Eight test holes drilled on the crosswind runway.
- Seven test holes drilled in the terrain obstruction area.
- Three test holes drilled on the existing taxiway and parking apron, including SREB area.
- Six test holes drilled on the existing airport access road, and four holes drilled in the proposed access road realignment area.
- Two test holes drilled in proposed new apron expansion area, and 5 test holes drilled in proposed new SREB area. Area is no longer considered under this project.
- Five test holes drilled on the Ambler sewer lagoon road.

To support the investigation, a total of 283 soil samples were collected from the test hole locations. Samples were collected for NOA testing, organic and moisture content testing, moisture density relationship, gradation with classification, and frozen unit weight.

Physical Setting

Location

Ambler is an Inupiat village of approximately 276 people located on the north bank of the Kobuk River, and near the confluence of the Ambler and Kobuk Rivers. Ambler is about 138 miles east of Kotzebue in northwestern Alaska, and within the boundaries of the Northwest Arctic Borough.

Ambler is not linked by any road and travelling to the area is by small aircraft throughout the year with scheduled flight service from Kotzebue. The Kobuk River is navigable from early July to mid-October.

Climate

The Environmental Atlas of Alaska (Hartman, 1984) indicates the village of Ambler is located in the continental climate zone of Alaska, characterized by pronounced temperature variations throughout the day and year, low precipitation, low cloudiness, and low humidity. Surface winds are generally light with average annual wind speeds of 6.5 mph with the prevailing wind direction at NNE. The project area receives continuous sunlight or twilight from late May to late July, and almost no sunlight in December. Table 1 below is a summary of climate data for Ambler.

Table 1: Climate Data Summary. Ambler West (500260), period of Record: 1981 to 2010. Snowfall and depth data are from December 1981 to March 1992.

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max. Temp. (F)	0.1	1.0	13.8	27.7	50.4	69.2	70.6	61.7	48.2	26.9	7.8	5.7	32.0
Min. Temp. (F)	-16.8	-19.3	-10.1	5.3	28.6	43.2	47.2	41.9	32.1	12.7	-5.9	-10.6	12.4
Total Precip. (in.)	1.22	1.13	1.04	1.34	1.41	1.41	2.91	4.52	4.18	1.73	0.82	1.71	23.42
Total Snowfall (in.)	19.7	16.7	17.6	17.2	4.1	0.0	0.0	0.0	3.7	17.9	9.6	27.5	134.0
Snow Depth (in.)	32	35	37	30	7	0	0	0	0	5	10	20	15

Data source: Western Regional Climate Center, wrcc@dri.edu.

The following Table 2 is the thawing and freezing index for Ambler. The thawing index, or degree-days above freezing, is a measure of thawing that occurs during the year. The thawing index listed below takes the annual thawing-degree days (TDD) for the last thirty years and averages them. The design thawing index takes the average of the three warmest (highest) TDD over the last thirty years.

Likewise, the freezing index, or degree-days below freezing, can be used to calculate the depth of ground freezing during winter. The freezing index listed below averages the annual freezing-degree-days (FDD) for the past thirty years. The design freezing index averages the three coldest (highest) FDD for the same period.

Table 2: Thawing and Freezing Index, Ambler Alaska.

Thawing Index	2200 Fahrenheit degree-days
Freezing Index	6300 Fahrenheit degree-days
Design Thawing Index	2600 Fahrenheit degree-days
Design Freezing Index	7100 Fahrenheit degree-days

Geology and Topography

The village of Ambler is located in the Western Alaska physiographic province and within the Kobuk - Selawik and Ambler-Chandalar Ridge Lowlands (Wahrhaftig, 1965), in the northern portion of the Selawik topographic quadrangle and just south of the Baird Mountains quadrangle, both within the Kateel River Meridian. The Kobuk river lowlands consist mainly of sand and gravel broad river flood plains with numerous lakes and swampy terrain. The river is bordered by gravel and sand terraces 100 to 200 feet above the river level (Wahrhaftig, 1965).

The airport is situated on a broad alluvial fan extending from Jade Mountain at about 1.5 miles north. Jade Mountain is a small mountain range parallel to the southern slope of the Brooks Range. Bedrock within the Brooks Range and Jade Mountain are underlain primarily by metasedimentary rocks, with serpentine rocks containing asbestos mapped at the Jade Mountains. The asbestos eroded from these rocks and was transported throughout the area (Patton, 1968).

The surface geology mapped near the airport consists of well-rounded fine to coarse sand in stabilized dunes, and till and outwash gravel and sand deposits (Fernald, 1964). Moderately thick to thin continuous permafrost underlies most areas near Ambler. Discontinuous permafrost underlies areas of coarse grained deposits near the Kobuk River.

Ambler lies in an area of low seismic activity (Figure 3), and as a result falls under Seismic Zone 2B according to The Uniform Building Code, 1997 version. The United States Geological Survey Seismic hazard map from 2007 gives the area a peak ground acceleration of .10g to .25g, with a 10 percent probability of exceedance in 50 years. The mapped fault shown in red on Figure 3 is the Kobuk Fault and is mapped approximately 30 miles east of Ambler.

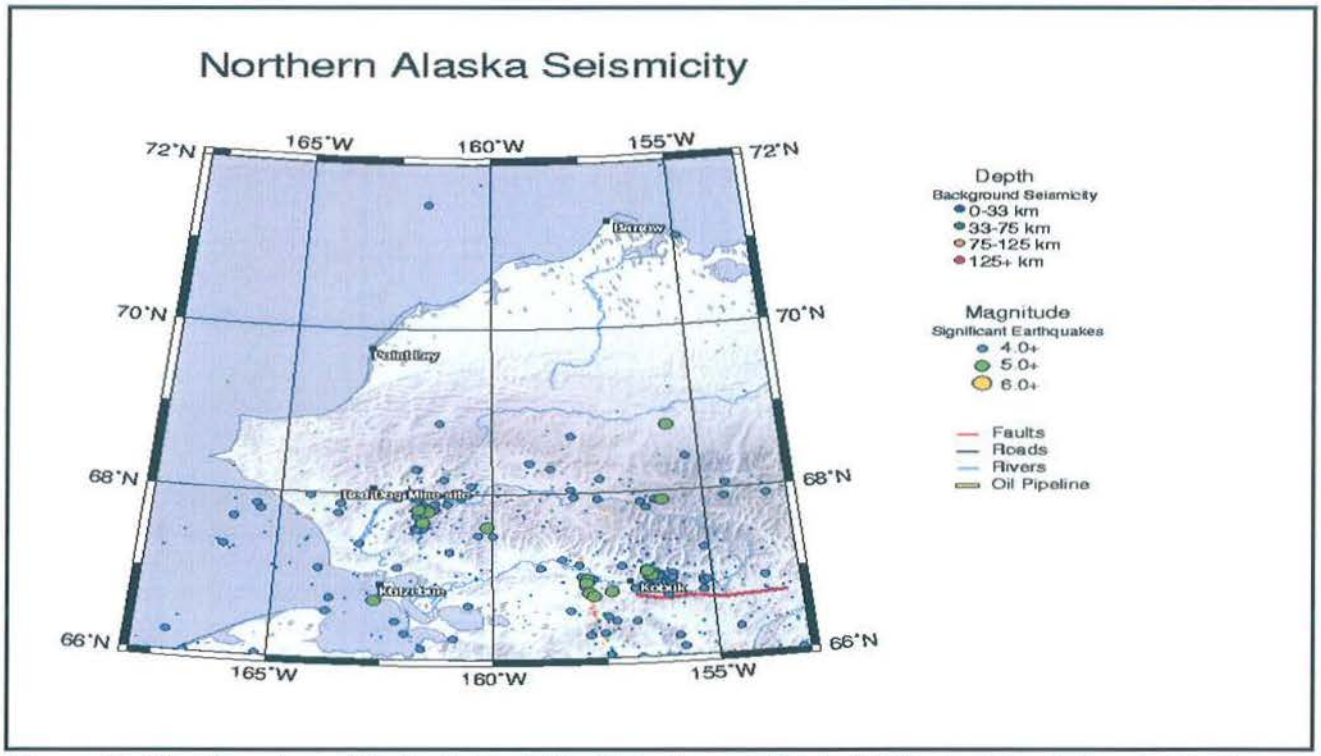

Figure 3: Northwestern Alaska Seismicity, Data from 1958 to 2003. Ambler is located in the lower center of the figure and west of Kobuk. Source: Alaska Earthquake Information Center. www.aeic.alaska.edu

Field Investigation

Methods

This geotechnical investigation was conducted by NRMS personnel consisting of drillers S. Parker and P. Lanigan, and engineering geologist T. Weiss. A Mobile B-24 drill mounted on a Raid Trac carrier was used to drill the test holes. The drill rig was equipped with 4.5- inch O.D. solid flight augers, and 4.4-inch O.D. hollow stem augers.

The solid flight auger drilling method was accomplished with relative ease at 43 test hole locations, with disturbed soil samples collected from the auger cuttings returned to the surface and placed into either small sized metal tins or larger sized canvas bags. As drilling proceeded, temperatures of the drill cuttings were selectively tested with a Fisher Scientific digital hand held thermometer and recorded on the test hole logs.

More detailed drilling and soil sampling was accomplished at 16 selected locations using the hollow stem auger method and two different soil samplers depending on drilling conditions. The samplers are a 1.25-inch I.D. five feet in length split-barrel continuous drill core sampler with a cutting bit used in frozen material, and a 1.25- inch I.D. two feet in length split-spoon sampler used in thawed material, when encountered. Both samplers were lowered inside the hollow stem auger.

Continuous drill core samples were relatively undisturbed, except when tightly frozen silt material was encountered. Frictional heat from drilling often thawed the outside of the samples and in some cases completely. Disturbed samples were collected with the split-spoon sampler when thawed material was encountered. The sampler was driven using a 140 pound safety hammer and 30-inch free-fall distance using a hydraulic cathead and rope. The penetration resistance was recorded by hammer blow counts as the sampler advanced every 6-inchs to two feet in depth.

Recovered samples were photographed and the temperature was recorded. Samples were placed into canvas bags, plastic bags, or metal tins sealed with vinyl tape. Most frozen core samples were stored in a frozen state through transport until laboratory testing.

Two test holes were selected to receive thermistor strings, these test holes were TH13-019 drilled on the main runway and TH13-065. TH13-065 was drilled in the area to the northeast of the existing parking apron and once considered for a new SREB, but no longer a part of this project. The thermistor strings were Digital Temperature Acquisition Cables (TAC) and manufactured by BeadedStream Services LLC in Anchorage, Alaska. After completion of drilling and logging of the test hole subsurface soil conditions, a ½-inch PVC pipe was placed in the hole and backfilled with auger cuttings. The TAC was lowered down the pipe and a solar powered data logger was connected to the TAC. The TAC at TH13-019 had a total length of 27 feet, with a 10 foot lead and temperature sensors spaced at 1, 2, 2, 2, 5 and 5 feet apart. The TAC at TH13-065 had a total length of 42 feet, with a 10 foot lead and temperature sensors spaced at 1, 2, 2, 2, 5, 5, 5, 5, and 5 feet apart. The results of these thermistor strings and recordings from them are given in Appendix D.

Drilling and test hole conditions were logged in the field using the Unified Soil Classification System (USCS). Test hole logs are presented in Appendix A, with a key to the logs and the USCS in Appendix G. All test hole locations were recorded using a hand held Global Positioning System (GPS), Garmin GPS 72 model using the North American Datum (NAD) 83. The GPS has an

accuracy of plus or minus 50 feet. After drilling and sample collection, all test holes were backfilled with auger cuttings to the surface and tamped flush.

Laboratory Soil Testing

Laboratory analysis of selected representative soil samples was conducted by the Northern Region Materials Laboratory (NRML), and Shannon and Wilson, Inc in Fairbanks. The testing program by NRML included gradations with classification, moisture and organic content analysis, moisture density relationship (Proctor), and liquid and plastic limits. The laboratory testing program by NRML was performed in accordance with the test methods indicated below in Table 3. Laboratory testing of frozen soil core samples were accomplished by Shannon and Wilson, and testing included dry and wet frozen unit weights and moisture content analysis.

Table 3: Northern Region Material Laboratory Test Methods.

Test Method	AASHTO	ASTM
Index Tests		
Gradation	T27	C136
Minus #200 Gradation	T11	C117
Hydrometer	T88	D422
Liquid Limit	T89	D4318
Plastic Limit	T90	D4318
Moisture Content – Aggregate Soil	T255 T265	C566 D2216
Organic Content (Burn)	T267	
Proctor	T180	D1557
USCS Classification	D2487	
Fine Specific Gravity	T100	D854
Coarse Specific Gravity	T85	D127

Small metal tin samples were collected for NOA testing at most test hole locations within approximately seven feet of the surface at the runways, access road, lagoon road, and parking apron and taxiway locations. Samples were sealed in the field shortly after collection and transported upon completion of field work. The samples were then packaged into groupings of approximately 20 and shipped to EMSL Analytical, Inc. in San Leandro , CA for asbestos testing in accordance with the California Air Resources Board (CARB) 435 Transmission Electron Microscopy (TEM) method level B with a sensitivity of 0.1 percent. The samples at the lab are crushed using a mill to produce a material of which the majority is less than 200 Tyler mesh (0.75 microns). The analytical results are reported in percent asbestos as derived from a 400 point counting technique (EMSL, 2013). The results of this NOA testing are summarized in Appendix C, which includes a chart indicating depth of sample, NOA results in number of asbestos structures found, and sample location by design element.

Subsurface Findings

1. Northern Main Runway and Extension, Crosswind Runway and Terrain Obstruction Area

The northern end of the main runway is proposed to be lengthened 800 feet and widened to 75 feet with the RSA widened to 150 feet. Both the crosswind and main runways are proposed to be

resurfaced with surface course material or pavement (Figure 4). A terrain obstruction area between the main and crosswind runways and at the southwest corner of the intersection of the two, does not allow for clear line of site visibility. The area is proposed to be cleared and reduced in elevation to allow for better visibility (Figure 5).

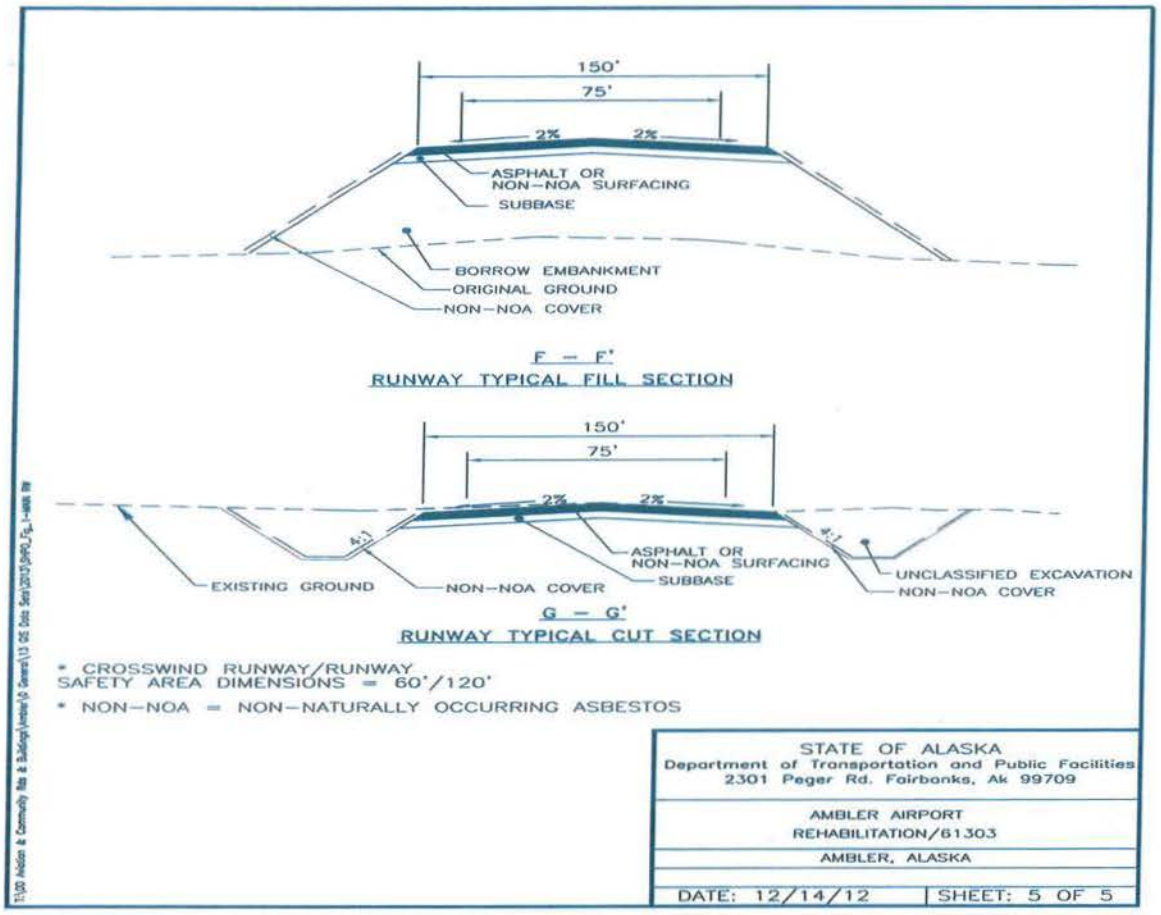

Figure 4: Main and Crosswind Runway Rehabilitation Typical Section.

Test holes drilled for the northern portion of the main runway, extension area, and crosswind runway were spaced from approximately 250 to 400 feet apart, (Figure 5) and (Appendix A). One test hole, TH13-011 originally planned for the obstruction area was moved to the toe of the crosswind runway embankment, but still shown as part of the obstruction area drilling. All test holes were drilled from 14.5 to 30 feet in depth. Test holes drilled for each of the design elements and the subsurface finding are discussed in the order given below:

- Seven test holes (TH13-004 to 006, 008, 044, 046 and 019) were drilled along the northern portion of the main runway including the intersection of the main runway with the crosswind runway.
- Three test holes (TH13-001 to 003) drilled for the northern main runway extension area.
- Eight test holes (TH13-012 to 016, 045, 007 and 047) drilled along the crosswind runway.
- Seven test holes (TH13-009 to 011, 017, 018, 048 and 049) drilled in the terrain obstruction area.

Test hole subsurface finding will be summarized below, with a summary of previous geotechnical investigations included. All test hole logs are presented in Appendix A, with complete laboratory test

results in Appendix B. Asbestos sample test results are shown in Appendix C, and thermistor results in Appendix D. All previous geotechnical investigations logs, laboratory results and profiles are given in Appendix E. Additional photographs are presented in Appendix F.

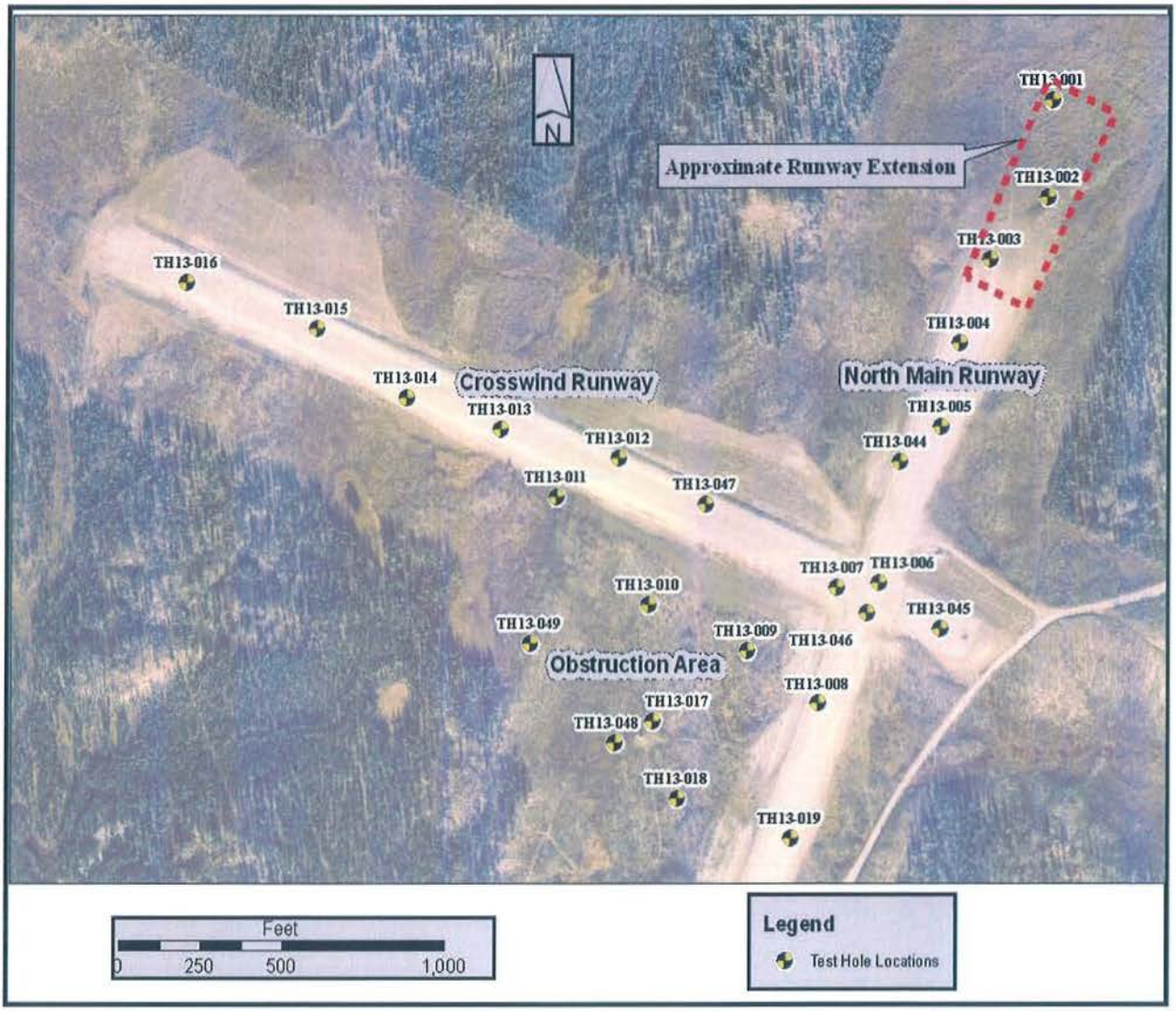

Figure 5: Northern Main Runway and Extension, Crosswind Runway, and Terrain Obstruction Area with Test Hole Locations.

A. Northern Main Runway Subsurface Findings

The northern portion of the main runway is gradually sloping from south to north, and at the time of our investigation snow was pushed from east to west and piled along the western edge. Snow piles were largest at the intersection with the crosswind runway.

The embankment on the western side of the runway is at or slightly below the elevation of original ground. The embankment on the east side is 8 to 15 feet above original ground, and the terrain at the toe of the embankment is uneven with some low depressions (Figure 6). The main runway was originally built between cut and fills from south to north and from west to east, as indicated from as-build drawings from 1978 and 1989 and presented in Appendix E. A profile of original ground elevation is presented in Appendix A with existing ground elevation, test hole locations and logs.

Figure 6: Northern portion of the main runway and the eastern embankment slope looking north. The main runway is shown on the left, with the eastern portion of the crosswind runway in the background. Photo is taken near TH13-019 with a low depression area shown at the toe of the embankment in the center of the picture.

Test holes located on the runway or safety overrun areas of the northern main runway were drilled up to 50 feet left or right of centerline. TH13-005, 046, and 019 were drilled with the hollow stem auger method, and the remaining drilled solid stem auger method. These seven test holes encountered the following subsurface conditions:

- Approximately 6 inches thick base course (surface layer) material consisting of frozen silty sand with gravel.
- Thawed material was encountered from 9.5 to 16 feet in depth at TH13-004, 11.0 to 12.5 at TH13-019, and TH13-008 from 7 to 9 feet in depth.
- Moisture content samples in thawed material and only from TH13-004 indicated 11.5 and 17. 5 percent, with organic content at 0.6 percent.
- Seasonal frost material was encountered from the surface to depths of 7 to 11 feet. Permafrost was encountered from 9 to 16 feet in depth. TH13-046, 044, 006, and 005 were frozen to depths explored, and therefore permafrost depth could not be determined.
- Moisture contents in the frozen material ranged from 4.9 to 25.3 percent.
- Organic contents in frozen material were slight and ranged from 0.3 to 3 percent.
- Asbestos sample results ranged from 0.2 percent by weight (74 asbestos structures) to less than 0.1 percent by weight (zero structures). The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample and percent by weight:
  1. TH13-006 at 0.5 feet in depth and 74 structures or 0.2 percent by weight.
  2. TH13-019 at 1 foot in depth and 36 structures or less than 0.1 percent by weight.

3. TH13-005 at 4.3 feet and 8 structures or less than 0.1 percent by weight.
4. TH13-004 at 2.5 feet and 3 structures or less than 0.1 percent by weight.
5. TH13-006 at 2.5 feet and 3 structures or less than 0.1 percent by weight.
6. TH13-008 at 5 feet and 3 structures or less than 0.1 percent by weight.

Visible Ice was not encountered in any test holes on the northern main runway to the depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), nonvisible bonded with excess ice (Nbe), and poorly bonded or friable (Nf). See Appendix G for a key to frozen ground classification. Groundwater or perched water was not encountered in any test holes.

Soil material described in the field or classified as silty sand or sandy silt was mostly fine sand. The material met little resistance during drilling. This is in contrast to well bonded frozen silt, silt with sand, or sandy silt material that was mostly difficult to drill, and at some locations caused auger refusal. Auger refusal was generally encountered near the intersection of the main runway with the crosswind runway. Photos of the two different materials are included in Appendix F.

Selected laboratory test results for the northern portion of the main runway are summarized below in Table 4. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile shown in Appendix A and E.

Table 4: Summary of Selected Laboratory Test Results from Test Holes at the Northern Portion of the Main Runway.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-019\36+00	20		0-11\12.5-20	13.0,6.5,9.4	Fill 8
TH13-008\40+00	16		0-7\9-16	25.1,24.6,28.0	Fill 2
TH13-046\42+00	15		0-15	4.9, 19.4	Cut 1.5
TH13-006\43+50	15	85.6	0-15	22.6,25.3	Fill 2
TH13-044\46+50	20		0-20	16.8,9.4,11.6	Cut 4
TH13-005\48+00	14.5	76.4,75.5,72.7	0-14.5	20.4,21.0,22.0	Fill 11
TH13-004\50+50	20	46.6	0-9.5\16-20	12.8,11.4,17.5,20.9	Fill 21

Table 5 below is the laboratory test results for frozen unit weight testing provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 5: Northern Main Runway Frozen Unit Weight of Soil Test Results.

Test Hole\ Station	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-046/42+00	5 - 10	119.6	93.0	28.7	Silt w/sand
TH13-019/36+00	15 - 20	101.7	90.7	12.1	silty Sand

A scatter plot of the relationship between sample moisture content and depth is represented below in Figure 7 for all test hole locations and samples collected along the main runway including the southern portion. The thick black line is the best-fit linear trend line of the values with the calculated equation displayed near the line.

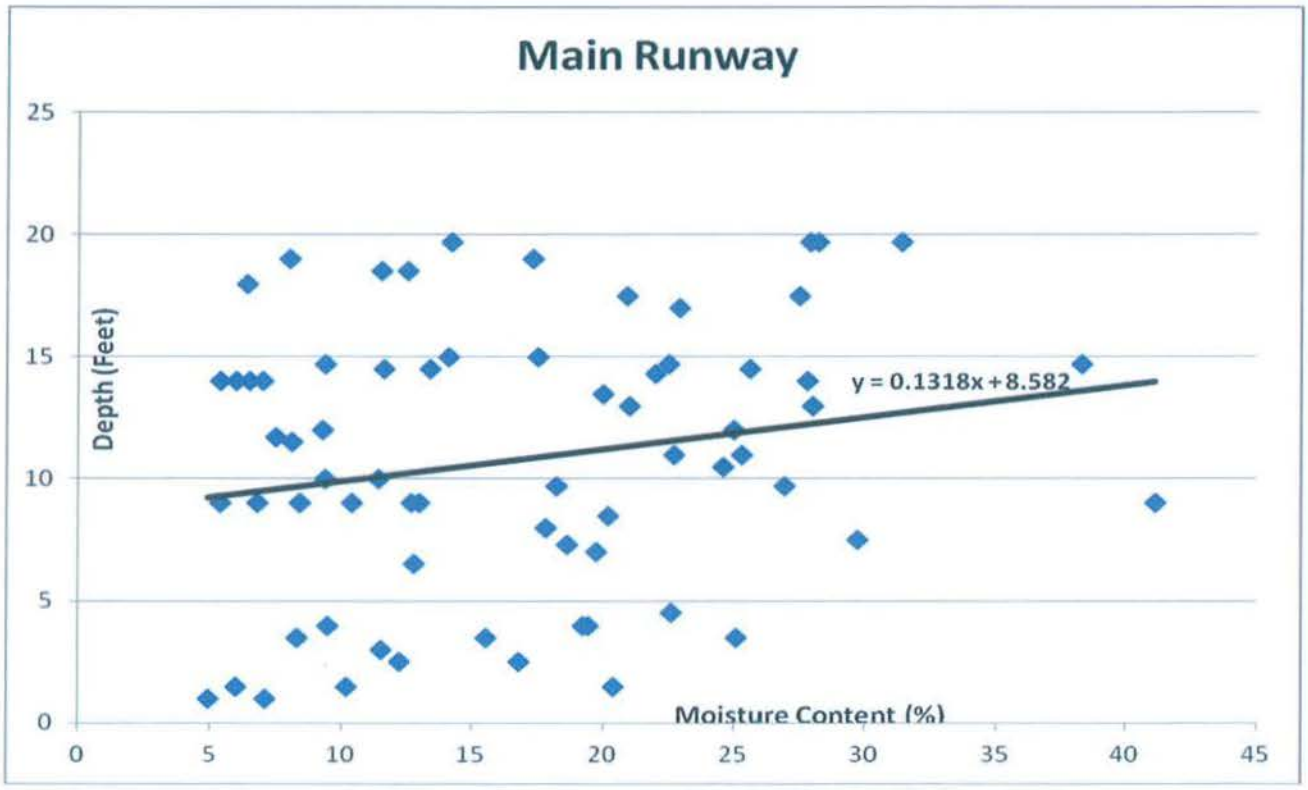

Figure 7: Main Runway Moisture Content verses Depth Chart with Trend Line.

B. Proposed Northern Main Runway Extension Subsurface Findings

Test holes located for the proposed northern main runway extension area were drilled on a gradual to moderate slope extending out from the end of the exiting runway embankment to the north. TH13-003 was drilled near the crest of the slope and TH13-002 near the toe. TH13-001 was drilled on a slope that appeared to be natural (Figure 5 and Appendix A). At the time of our field work snow was approximately two to three feet deep, but a trail was cleared to provide better drill rig access. TH13-001 was drilled using the hollow stem auger method. The three test holes encountered the following subsurface conditions:

- One foot thick organic mat at TH13-001 and 002.
- Thawed material from 5.5 to 9 feet in depth at TH13-001, and from 12 and 13 feet to the depth explored at 20 feet in TH13-002 and 003.
- Moisture contents in thawed material ranged from 9.3 to 29.7 percent, with the highest moisture content sampled from TH13-001 and appeared to be associated with a perched water table. Two organic contents indicated 0.9 and 1.7 percent.
- Seasonal frost material was encountered from the surface to 5.5 feet in depth at TH13-001, and 12 and 13 feet at TH13-002 and 003 respectively. Permafrost was encountered in TH13-001 from 9 feet to the depth explored at 20 feet.

- Moisture contents in the frozen material ranged from 6.8 to 38.3 percent. The higher moisture content results were also encountered in TH13-001.
- Organic contents in frozen material were slight and ranged from 0.6 to 1.0 percent.
- Two asbestos samples collected at TH13-003 from 1 foot and 4.5 feet in depth, indicated less than 0.1 percent by weight and 14 asbestos structures, and less than 0.1 percent by weight and 1 asbestos structure, respectively.

Visible Ice was not encountered in any northern main runway extension test holes to the depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), nonvisible bonded with excess ice (Nbe), and poorly bonded or friable (Nf). See Appendix G for a key to frozen ground classification.

Selected laboratory test results for the northern main runway extension area are summarized below in Table 6. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 6: Summary of Selected Laboratory Test Results for Test Holes at the Proposed Northern Main Runway Extension Area.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-003\52+50	20	69.1	0-13	8.3,8.4,14.1	Fill 20
TH13-002\55+50	20		0-12	11.5,6.8,9.3,11.5	None
TH13-001\58+00	20		0-5.5\9-20	29.7,38.3,31.4	None

Table 7 below is the laboratory test results for frozen unit weight testing from samples at TH13-001, and provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 7: Proposed Northern Main Runway Extension Area, Frozen Unit Weight of Soil Test Results.

Test Hole\ Station	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-001\58+00	0 - 5	75.1	*27.8	170.1	Silt w/sand
TH13-001	0 - 5	113.4	76.9	47.5	Silt w/sand
TH13-001	10 - 14.5	119.6	87.3	37.0	sandy Silt
TH13-001	15 - 19	117.8	86.5	36.2	sandy Silt

* numerous organics associated with surficial topsoil.

C. Crosswind Runway Subsurface Findings

The crosswind runway was snow covered and closed at the start of our investigation. Due to the possible conflict of our drilling work with landing aircraft, the crosswind runway was plowed and opened. The surface of the crosswind runway appeared to be in good condition. However, the

runway maintenance person in Ambler, Mr. Alvin Williams, stated the crosswind runway is mostly closed during the summer due to pot holes, cracking and voids. Mr. Williams also stated that most damage to the runway occurs between TH13-012 to TH13-014, and just west of the intersection with the main runway and near TH13-007.

According to as-built drawings the crosswind runway was built approximately 10 years after the original main runway construction, and was built with a deep fill between cut areas as indicated in Appendix A and E.

TH13-045 was drilled on the crosswind runway and east of the main runway, all the other seven test holes were drilled to the west of the main runway (Figure 5 and Appendix A). Test holes located on the runway or overrun areas of the crosswind runway were drilled left or right of centerline with some near the edge of the embankment. TH13-047, 013 and 016 were drilled using the hollow stem auger method, and the remaining test holes using the solid stem auger method. These eight test holes encountered the following subsurface soil conditions:

- Approximately 6 inches thick base coarse material consisting of frozen silty sand with gravel.
- Thawed material was encountered from 16.5 to 27.5 feet in TH13-045, and 13.0 feet to the depth explored at 20 feet in TH13-012.
- Moisture contents in thawed material indicated 6.5 and 17.3 percent in TH13-012 and TH13-045, respectively, with one organic content at 0.2 percent in TH13-045.
- Seasonal frost material was encountered from the surface to 13 and 16.5 feet in depth in TH13-012 and 045, respectively. Permafrost was encountered in TH13-045 at 27.5 feet to the depth explored at 30 feet and consisted of silt with sand material. TH13-007, 047, 013, 014, 015 and 016 were all frozen to depths explored, and therefore permafrost depth could not be determined.
- Moisture contents in the frozen material ranged from 14.2 to 32.5 percent, with higher moisture contents encountered in TH13-014 and 013. These test holes were located in the fill area of the crosswind runway.
- Organic contents in frozen material were slight and ranged from 0.2 to 1.0 percent.
- Asbestos sample results ranged from 0.1 percent by weight and 23 asbestos structures to less than 0.1 percent by weight and 0 asbestos structures. The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample:
    1. TH13-016 at 1.5 feet in depth and 23 structures and 0.1 percent by weight.
    2. TH13-007 at 1 foot in depth and 5 structures and less than 0.1 percent by weight.
    3. TH13-015 at 5.5 feet and 3 structures and less than 0.1 percent by weight.

Visible Ice was not encountered in any crosswind test holes to the depths explored, Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), nonvisible bonded with excess ice (Nbe), and poorly bonded or friable (Nf). Groundwater was not encountered in any test hole locations.

TH13-011 was drilled at the toe on the south side of the crosswind runway embankment, and in a low area adjacent to the terrain obstruction area (Figure 5 and Appendix A). This test hole was moved slightly to provide subsurface information at the toe of the crosswind runway embankment. The test hole encountered:

- 1 foot thick organic mat.
- Silty sand material from 1 foot to the depth explored at 20 feet.

- Seasonally frozen material to 12.5 feet and thawed to 20 feet.
- Moisture contents indicated 16.7 percent at 10 feet, 25.5 percent at 13.5 feet, and 29.1 percent at 19 feet in depth.

Selected laboratory test results for the crosswind runway are summarized below in Table 8. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original crosswind runway profile.

Table 8: Summary of Selected Laboratory Test Results from Test Holes at the Crosswind Runway.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-045\504+00	30	82.8	0-16.5\27.5-30	12.2,20.2,13.4,17.3,19.3	Fill 10
TH13-007\507+00	20	91.0	0-20	15.5,22.7,25.6,	Fill 3
TH13-047\511+50	20		0-20	21.2,11.1,6.2,24.2	Cut 10
TH13-012\515+00	20		0-13	23.5,14.2,15.0,6.5	Fill 9
TH13-011\516+00	20		0-12.5	16.7,25.5,29.1	None
TH13-013\518+50	20	90.5	0-20	26.6,23.1	Fill 10
TH13-014\521+50	20	92.3,91.6,79.4	0-20	32.5,28.7	Fill 8
TH13-015\525+50	15	45.1,93.0	0-15	17.5,22.0,25.2	Cut 6
TH13-016\529+00	20	66.5	0-20	15.4,12.7,10.8	Cut 6

Table 9 below is the laboratory test results for frozen unit weight testing from samples collected at the crosswind runway, and provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 9: Crosswind Runway Frozen Unit Weight of Soil Test Results.

Test Hole\ Station	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-047\511+50	5 - 10	127.6	101.9	25.3	silty Sand
TH13-047	15 - 19.5	118.4	91.1	29.9	silty Sand
TH13-013\518+50	10 - 15	121.4	97.9	24.0	sandy Silt
TH13-013	15 - 20	126.5	93.9	34.6	sandy Silt

A scatter plot of the relationship between sample moisture content and depth is represented below in Figure 9 for all test hole locations and samples collected along the crosswind runway. The thick black line is the best-fit linear trend line of the values with the calculated equation displayed near the line.

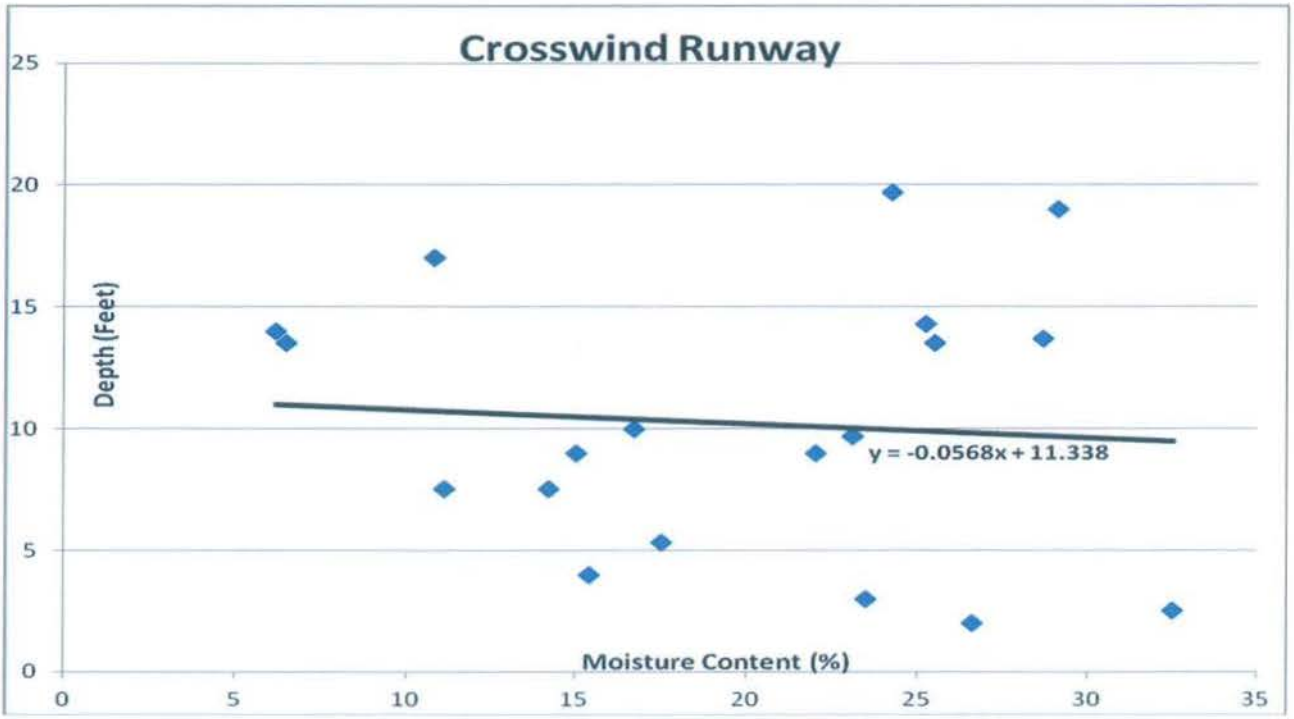

Figure 9: Crosswind Runway Moisture Content verses Depth Chart with Trend Line.

D. Terrain Obstruction Area Subsurface Findings

The terrain obstruction area at the southwest corner of the main and crosswind runways is up to approximately 10 feet higher in elevation than the runways, and does not provide visibility between the two. The area has an undulating surface with spruce trees up to 6 inches in diameter and overall gradually slopes to the south and southwest. TH13-048 is located in a distrubed area and lower in elevation than areas to the north, this area could have distrubance related to a nearby weather station and antennas. The obstruction area was snow covered at the time of our investigation with up to 3 feet of snow and some drifting. A small trail was plowed to provide drill rig access.

We located test holes in the terrain obstruction area to determine the use of the excavated material as borrow. TH13-011 was located to provide subsurface information in a low area and near the toe of the crosswind runway embankment (Figure 5 and Appendix A). All test holes were drilled using the solid stem auger method. These seven test holes encountered the following subsurface conditions:

- 1 foot thick organic mat.
- Thawed material was encountered in all test holes except TH13-048, and at depths from 12 to 12.5 feet and continued to the depths explored at 15 feet. The depth to thawed material was relatively consistent, and material consisted of silt and fine silty sand. Temperatures were recorded in drilled auger cuttings and consistently changed at the 12 foot depth, indicating the transition to thawed soil.
- Moisture contents in thawed material ranged from 8.9 to 29.1 percent. Higher moistures were collected from TH13-011, located at the toe of the crosswind runway embankment and in a low area.
- Seasonally frozen material was encountered from the surface to 12 feet in depth. Permafrost was not encountered in any test holes. TH13-048 was frozen to the depth explored at 15 feet and therefore permafrost depth could not be determined.

- Moisture contents in the frozen material ranged from 7.5 to 16.7 percent. Higher moisture contents were encountered in TH13-048 with 28.4 and 31.8 percent collected in silt material, and a high organic layer from 2 to 5 feet in depth yielded a moisture content of 115.5 percent.
- Organic contents in frozen material were slight and ranged from 0.2 to 1.1 percent. At TH13-048 the high organic material encountered from 2 to 5 feet indicated 44.0 percent organics.
- Asbestos sample results ranged from less than 0.1 percent by weight and 12 asbestos structures to less than 0.1 percent by weight and zero asbestos structures. The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample:
  1. TH13-018 at 2 feet in depth and 12 structures and less than 0.1 percent by weight.
  2. TH13-049 at 3 feet in depth and 2 structures and less than 0.1 percent by weight.

Visible Ice was not encountered in any test holes in the terrain obstruction area to the depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), nonvisible bonded with excess ice (Nbe), and poorly bonded or friable (Nf).

Selected laboratory test results for the terrain obstruction area are summarized below in Table 10. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 10: Summary of Selected Laboratory Test Results from Test Holes Located in the Terrain Obstruction Area.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-009\40+50	15	85.0	0-12	11.7,8.9	None
TH13-010\512+50	15	50.2,45.3	0-12	7.5	None
TH13-011\516+00	20		0-12.5	16.7,25.5,29.1	None
TH13-017\38+00	15		0-12	10.9,14.9	None
TH13-018\35+50	15	62.9	0-12		None
TH13-048\36+50	15		0-15	115.5,31.8,28.4	None
TH13-049\515+00	15	51.4	0-12.5	9.4	None

E. Previous Geotechnical Investigations Subsurface Findings

Previous airport geotechnical investigations were accomplished in 1973, 1985 and 1986. The 1973 investigation was for the original main runway and included the 2,600 foot main runway with 250 foot safety overrun to the north and 150 foot safety overrun to the south, parking apron and airport access road. The 1985 and 86 investigations included the crosswind runway, main runway expansion to 3,000 feet with 250 foot safety overruns, and expanding the parking apron. The 1973 investigation was performed in July and included drilling seven test holes along the main runway to depths of 15 to 25 feet. The 1985 investigation was drilled in September. A summary of these previous test holes are given below in Table 11 with locations shown in Appendix E. The table also indicates frozen

material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 11: Summary of Previous Test Hole Locations, Main Runway.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH73-16\19+90	20	65.8	None		At Transition
TH73-17\24+00	15		None		At Transition
TH73-18\28+00	15		None		Cut 4
TH73-19\32+00	15		None		Fill 7.5
TH73-20\36+00	25	79.3	12		Fill 8
TH73-21\40+00	15	81.8	None	13.7	Fill 1.5
TH73-22\44+00	15		7		Fill 2
TH85-6\22+00	15		11.5		Cut 6
TH85-7\26+00	11	66.0	8.5	17.1	Fill 14.5
TH85-8\30+00	11		9.5		Cut 5.5
TH85-9\34+00	11		9.5		Fill 3.5
TH85-10\38+00	11	60.0	9	13.2	Fill 6.5
TH85-11\42+00	11		9		Cut 1
TH85-12\45+00	11		10		Fill 0.5

The investigations performed in 1985 and 86 included eight test holes drilled for the crosswind runway and one hole near the eastern end, and all drilled to depths of 15 to 23 feet. The 1985 test holes were drilled and logged in September and in July for the 1986 investigation. A summary of these holes are shown below in Table 12 with locations and additional information in Appendix E. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original crosswind runway profile.

Table 12: Summary of Previous Test Hole Locations, Crosswind Runway.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH85-13\501+50	15	87.0	None	13.1	Fill 3
TH85-15\509+00	23	64.0	1.5	13.0,13.7,9.6	Cut 12
TH85-16\513+00	15	51.0	1.5	11.2	At Transition
TH85-17\517+00	17		None	19.7,30.2	Fill 12
TH85-18\522+00	15		14		Fill 6
TH86-1\519+50	15		None	35.0	Fill 12
TH86-2\524+50	15	95.0	4	13.8	Cut 3
TH86-3\528+00	15	87.0	4	10.6	Cut 12
TH86-4\530+00	15	70.0	4	5.1	Cut 10

2. Southern Main Runway and Extension, Existing Parking Apron, Taxiway and SREB

The southern end of the main runway is proposed to be lengthened by 800 feet and widened to 75 feet with the RSA widened to 150 feet. The runway, existing apron and taxiway area are proposed to be resurfaced with surface coarse material or pavement. The existing SREB is located at the southeast corner of the parking apron (Figure 10).

Test holes drilled for the southern portion of the main runway, existing aircraft parking apron, taxiway and SREB area were spaced from approximately 200 to 300 feet apart, and drilled from 16 to 35 feet in depth. Test holes drilled for each of the design elements and discussed in order are:

- Six test holes (TH13-020 to 023, 050 and 051) drilled along the southern portion of the existing runway.
- Three test holes (TH13-024 to 026) drilled for the main runway southern extension area.
- One test hole (TH13-053) drilled on the existing taxiway.
- Two test holes (TH13-053 and 054) drilled on the existing aircraft parking apron and SREB area.

Test hole subsurface finding will be summarized below, with a summary of previous geotechnical investigations included. All test hole logs are presented in Appendix A, with complete laboratory test results in Appendix B. Asbestos sample test results are shown in Appendix C, and thermistor results in Appendix D. All previous geotechnical investigations logs, laboratory results and profiles are given in Appendix E. Additional photographs are presented in Appendix F.

A. Southern Main Runway Subsurface Findings

The southern portion of the main runway gradually slopes up from south to north, and at the time of our investigation snow was pushed from east to west and piled along the western edge. The embankment on the western side of the runway is at or slightly below the elevation of original ground, with a low area to the west near TH13-022. Original ground at the toe of the embankment on the east side is uneven with possible fill material spread over an area to the north of the existing parking apron and taxiway, and near TH13-021. The embankment is 10 to 20 feet higher than original ground at the southern end of the existing runway. The main runway was originally built between cut and fills from south to north and from west to east, as shown in Appendix E with as-build drawings from 1978 and 1987.

Test holes located on the runway or safety overrun areas of the southern main runway were drilled from up to 30 feet left or right of centerline. TH13-050 and 022 were drilled using the hollow stem auger method. The six test holes encountered the following subsurface conditions:

- Approximately 6 inches to two feet thick base course (surface layer) material consisting of frozen silty sand with gravel.
- Thawed material was not encountered in any test holes.
- Frozen material was encountered throughout all six test holes to depths drilled at 20 feet, and therefore the boundary between seasonal frost and permafrost depth could not be determined.
- Soil temperatures recorded from drilled auger cuttings ranged from 30.7 to 31.9 degrees Fahrenheit.

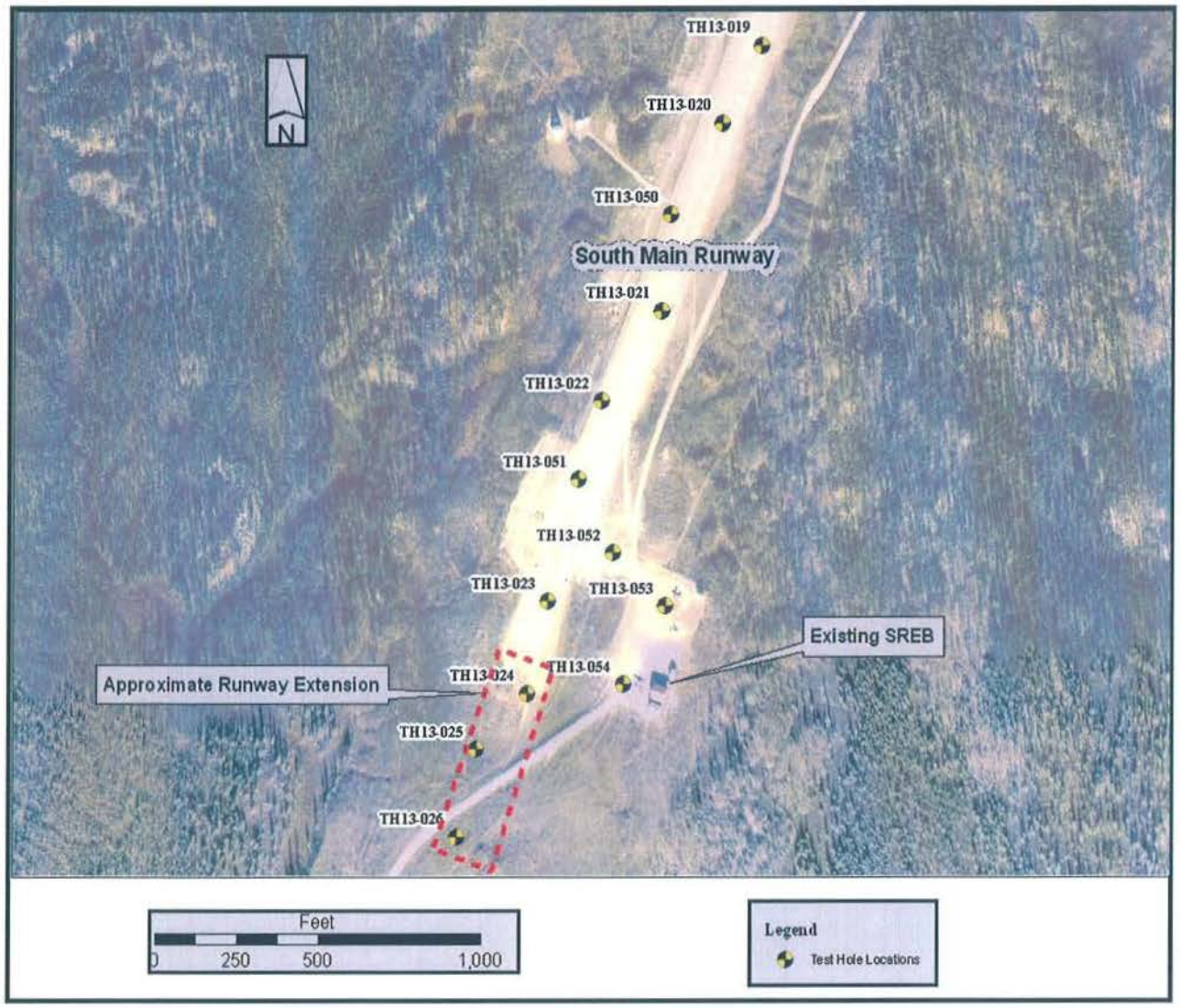

Figure 10: Southern Main Runway and Extension, Existing Aircraft Parking Apron, Taxiway and SREB with Test Hole Locations.

- Soil temperatures recorded in core samples ranged from 30.4 to 31.6 degrees Fahrenheit.
- Moisture contents in the frozen material ranged from 6 to 41 percent.
- Organic contents in frozen material were slight and ranged from 0.5 to 2 percent.
- Asbestos sample results ranged from less than 0.1 percent by weight and 50 asbestos structures to less than 0.1 percent by weight and zero structures. The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample:
  1. TH13-021 at 1.5 feet in depth and 50 structures and less than 0.1 percent by weight.
  2. TH13-020 at 7 feet in depth and 43 structures and less than 0.1 percent by weight.
  3. TH13-021 at 6.5 feet and 22 structures and less than 0.1 percent by weight.

Visible Ice was not encountered in any test holes located on the southern main runway to the depths explored. Frozen material was classified as nonvisible bonded with no excess ice (Nbn) and poorly bonded or friable (Nf). Groundwater or a perched water table was not encountered.

Selected laboratory test results for the southern portion of the main runway are summarized below in Table 13. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile. A scatter plot of moisture content versus depth is represented in Figure 7 for all test hole locations along the main runway.

Table 13: Summary of Selected Laboratory Test Results from Test Holes at the Southern Portion of the Main Runway.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-023\19+50	20	67.5	0-20	25.0,12.5	Fill 1
TH13-022\25+00	20		0-20	6.0,41.1,19.7,26.9,14.2	Fill 4
TH13-021\28+00	20	57.0	0-20	6.0,6.4	Cut 4
TH13-020\33+50	20	78.9	0-20	19.2,27.8,27.5	Fill 4
TH13-051\23+00	20		0-20	17.8,20.0,22.9	Cut 4
TH13-050\30+50	20		0-20	7.1,18.6,18.2,28.2	Cut 2.5

Table 14 below is the laboratory test results for frozen unit weight testing from samples collected at the southern portion of the main runway, and provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 14: Southern Main Runway Frozen Unit Weight of Soil Laboratory Test Results.

Test Hole\ Station	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-050\30+50	10 - 14.5	120.9	92.5	30.7	Silt w/sand
TH13-050	15 - 19	123.7	95.3	29.8	sandy Silt
TH13-022\25+00	10 - 15	130.7	105.8	23.5	sandy Silt
TH13-022	15 - 19.5	119.0	93.7	27.0	sandy Silt

B. Proposed Southern Main Runway Extension Subsurface Findings

The proposed southern main runway extension area is 10 to 20 feet lower in elevation than the existing runway, with a moderate sloping embankment. TH13-024 was located near the crest of the embankment and TH13-025 near the toe (Figure 10). At the time of our investigation snow was 2 to 4 feet in depth and a road was plowed to each location. The area around TH13-025 and TH13-026 has moderately thick vegetation consisting mostly of brush, with the airport access road between the two test holes.

Test holes located in the southern main runway extension area were drilled up to approximately 25 feet left or right of the proposed centerline. TH13-025 was drilled using the hollow stem auger method. The three test holes encountered the following subsurface conditions:

- Six inches to 1 foot organic mat.

- Thawed material was encountered in TH13-026 from 13 to the depth explored at 35 feet, and 18.5 to the depth explored at 20 feet in TH13-024.
- Moisture contents in thawed material indicated 7 and 8 percent. Visible higher moisture was encountered in TH13-026 from approximately 22 feet to the depth explored at 35 feet.
- Seasonally frozen material was encountered from the surface to 13 and 18.5 feet at TH13-026 and TH13-024, respectively. TH13-025 encountered frozen material throughout to the depth explored at 20 feet. Permafrost depth could not be determined from any of the three test holes. Frozen material consisted of sandy silt and fine silty sand.
- At TH13-026 and 024 soil temperatures recorded from drilled auger cuttings ranged from 28.7 to 41.2 degrees Fahrenheit.
- At TH13-025 temperatures recorded in soil core samples ranged from 31.4 to 32.2 degrees Fahrenheit.
- Moisture contents in frozen material ranged from 5.4 to 27.9 percent. The higher moisture content was sampled from the bottom of TH13-025 at 19.5 feet.
- Organic contents were slight and ranged from 0.5 to 0.6 percent.
- Asbestos results from one sample collected at TH13-026 and four feet in depth indicated less than 0.1 percent by weight and zero asbestos structures.

Visible Ice was not encountered in any test holes on the southern main runway extension area to the depths explored. Frozen material was classified as nonvisible bonded with no excess ice (Nbn) and poorly bonded or friable (Nf). Groundwater or a perched water table was not encountered, but may exist at depth in TH13-026.

SPT blow counts from the hollow stem auger test hole drilled at TH13-025 and from 10 to 12 feet in depth indicated 3, 5, 4 and 5 blow counts per each six inches the sampler was driven. The sample and blow counts given were performed in marginally frozen silty sand material.

Selected laboratory test results for the southern main runway extension area are summarized below in Table 15. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 15: Summary of Selected Laboratory Test Results from Test Holes at the Southern Main Runway Extension Area.

Test Hole and Station	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-026\12+50	35	69.0	0-13	5.4, 7.0	None
TH13-025\15+00	20		0-20	10.2,10.4,7.5,27.9	None
TH13-024\18+00	20		0-18.5	9.5,8.1,5.4,8.0	Fill 2

Table 16 below is the laboratory test results for frozen unit weight testing from samples collected at the southern main runway extension area, and provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 16: Southern Main Runway Extension Area Frozen Unit Weight of Soil Test Results.

Test Hole\ Station	Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-025\15+00	10 - 11.5	119.5	110.3	8.3	silty Sand
TH13-025	15 - 19.5	123.8	99.6	24.2	silty Sand

C. Existing Aircraft Parking Apron, Taxiway and SREB Area Subsurface Findings

The existing aircraft parking apron, taxiway and SREB area was snow covered at the time of our investigation with large snow piles to the west of the apron, and between the runway and apron. The SREB building is located at the southeast corner of the apron, with a cold storage building south of it and two old abandoned buildings and a fuel tank to the north (Figures 10 and 11). To the south of the SREB and apron the original ground slopes moderately to the south. Two test holes were drilled on the existing parking apron and one on the taxiway.

Figure 11: Ambler Airport Existing Aircraft Parking Apron and SREB. View is looking south.

At the time of our investigation, the drill plan was to expand the existing apron and build a new SREB to the north and northeast of the existing apron. This plan is no longer being considered, but our investigation focused in the area to the north of the existing apron. These explorations are discussed in section four of this report under the heading; "not considered new proposed aircraft parking apron and SREB expansion area".

Test holes located on the existing aircraft parking apron and taxiway including the existing SREB area were drilled from 16 to 20 feet in depth. These three test holes encountered the following subsurface conditions:

- Approximately 6 inches thick base course (surface layer) material consisting of frozen silty sand with gravel.
- Thawed material was not encountered.
- Frozen material was encountered to depths explored in all three test holes. Permafrost depth could not be determined from any of the test holes.
- Moisture contents ranged from 9.1 to 26.1 percent. Organic contents were slight at 0.5 and 0.6 percent.
- Asbestos testing results from one sample collected at each test hole indicated less than 0.1 percent by weight and one asbestos structure for all three holes.

Visible Ice was not encountered in any test holes on the existing parking apron, taxiway and SREB area to depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), and poorly bonded or friable (Nf). Groundwater or a perched water table was not encountered.

Selected laboratory test results for the existing parking apron, taxiway and SREB area are summarized below in Table 17. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 17: Summary of Selected Laboratory Test Results from Test Holes at the Existing Parking Apron, Taxiway and SREB Area.

Test Hole and Station	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-052\101+00	16		0-16	10.0,9.1	Cut 2
TH13-053\103+50	20	75.7	0-20	24.9,24.7,12.8,14.2	Fill 3
TH13-054\103+00	16	77.8	0-16	26.1,20.4	Fill 2

D. Previous Geotechnical Investigations Subsurface Findings

A summary of previous geotechnical and laboratory test results from investigations preformed in 1973, 1985 and 86 are given below in Tables 18 for the southern portion of the main runway, and Table 19 for the existing aircraft parking apron, taxiway and SREB area. Additional information is presented in Appendix E.

Table 18: Summary of Previous Test Hole Locations, Southern Portion of Main Runway.

Test Hole and Station	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH73-16\19+90	20	65.8	None		At Transition
TH73-17\24+00	15		None		At Transition
TH73-18\28+00	15		None		Cut 4

Test Hole and Station	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH73-19\32+00	15		None		Fill 7.5
TH73-20\36+00	25	79.3	12		Fill 8
TH73-21\40+00	15	81.8	None	13.7	Fill 1.5
TH73-22\44+00	15		7		Fill 2
TH85-1\15+50	11		None		None
TH85-6\22+00	15		11.5		Cut 6
TH85-7\26+00	11	66.0	8.5	17.1	Fill 14.5
TH85-8\30+00	11		9.5		Cut 5.5
TH85-9\34+00	11		9.5		Fill 3.5
TH85-10\38+00	11	60.0	9	13.2	Fill 6.5
TH85-11\42+00	11		9		Cut 1
TH85-12\45+00	11		10		Fill 0.5

Table 19: Summary of Previous Test Hole Locations, Existing Aircraft Parking Apron, Taxiway and SREB.

Test Hole	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH85-2\13+00	15	79.0	11.5	13.4	Fill 2
TH85-3\14+50	11		10		Fill 3
TH85-4\14+50	11		None		Fill 2.5
TH85-5\13+00	11		None	19.1	Fill 2
TH73-15\13+00	10		None		Fill 2

3. Existing Airport Access Road and Realignment Area

The existing airport access road is proposed to be realigned around the southern end of the proposed main runway extension, with approximately 850 feet realignment to the northeast of the main runway and south of the existing aircraft parking apron. The existing access road is proposed to be rehabilitated and together with the realignment portion to be resurfaced with surface coarse material or pavement (Figure 12).

The Grizzly Creek Bridge at Grizzly Creek and approximately 2,000 feet south of the main runway is proposed to be replaced with two culverts and the work is being performed under a separate project. R&M Consultants, Inc. in Anchorage, Alaska performed a geotechnical investigation for Grizzly Creek in 2004 with a report dated August 2005 (R&M Consultants, 2005). Our investigation drilled one test hole with a planned second test hole near Grizzly Creek to supplement the report stated above. Due to limited winter access near the bridge and auger refusal in frozen material with gravel, our investigation was limited at Grizzly Creek but results are given for the one shallow test hole.

Test holes drilled for the access road and realignment area were spaced from approximately 250 to 500 feet apart. The test holes on the existing access road were spaced wider to the north of Grizzly Creek as the subsurface material appeared to be consistent (Figure 12). Test Holes were drilled from 3 to 30 feet in depth, and included the following:

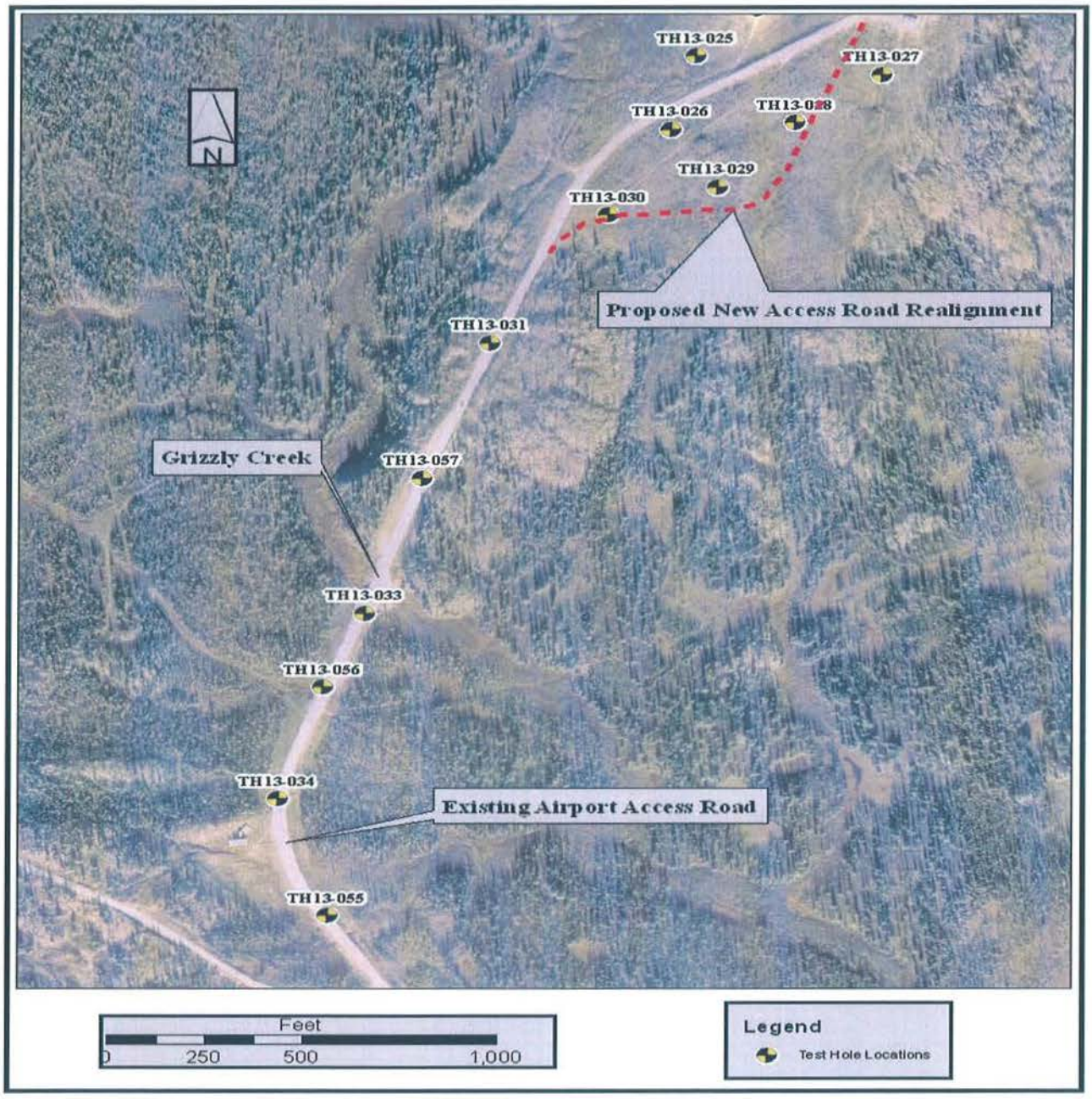

Figure 12: Ambler Airport Existing Access Road and Proposed New Realignment, with Test Hole Locations.

- Four test holes (TH13-027 to 030) drilled near the proposed access road realignment, with one test hole TH13-027 moved to the east of the alignment to supplement possible apron expansion.
- Five test holes (TH13-031 and 034, 055 to 057) drilled approximately five feet left or right of the existing access road centerline.
- One test hole (TH13-033) drilled at Grizzly Creek, with limited results due to auger refusal in frozen material with gravel.

A. Existing Access Road Subsurface Findings

The existing access road was snow covered at the time of our investigation with drifting snow at the toe of the embankment. The condition of the road embankment or surface could not be determined. The embankment appeared to be 3 to 6 feet higher than original ground elevation from near the village of Ambler to Grizzly Creek, and none to minor embankment height north of Grizzly Creek as the road passes through approximately 10 foot high moderately sloping cut slopes. A low area was noted near TH13-055 and 034 with a culvert just south of TH13-055.

Test holes located on the existing access road encountered the following subsurface conditions:

- Approximately 1 foot thick base course (surface layer) material consisting of frozen silty sand with gravel.
- Approximately 1 to 5 foot thick embankment material consisting of frozen silt with sand, sandy silt or fine silty sand material. Cobbles were noted at two locations near the surface at TH13-033 and 056.
- Frozen material was encountered in all test holes to depths explored, and therefore permafrost depth could not be determined.
- All test holes were drilled with solid flight augers and soil temperatures in auger cuttings ranged from 27.4 to 32.1 degrees Fahrenheit. These were recorded at test holes TH13-031 and 057.
- Moisture contents ranged from 6.7 to 58.4 percent. The higher moisture contents were encountered in test holes south of Grizzly Creek and lower in test holes north. This also applied to organic contents, with 0.5 and 4.2 percent organics south, and 0.4 and 2.2 percent north.
- Asbestos sample results ranged from 0.2 percent by weight and 56 asbestos structures to less than 0.1 percent by weight and zero structures. The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample:
    1. TH13-033 at 1 foot in depth and 56 structures and 0.2 percent by weight.
    2. TH13-033 at 3 feet in depth and 51 structures and 0.1 percent by weight.
    3. TH13-056 at 2 feet in depth and 51 structures and 0.1 percent by weight.
    4. TH13-055 at 2.5 feet in depth and 41 structures and 0.2 percent by weight.
    5. TH13-057 at 5.5 feet in depth and 6 structures and less than 0.1 percent by weight.

B. Realignment Area Subsurface Findings

The road realignment area was snow covered from 2 to 3 feet in depth, and a trail was plowed for drill rig access. The area slopes gradually from north to south with a few high mounds interrupting drainage, one of these mounds is located at TH13-028. The drainage areas are shallow and wide with TH13-029 located in one drainage area.

Test holes located near the proposed access road realignment area encountered the following subsurface conditions:

- Approximately 1 foot thick organic mat.
- Thawed material was encountered in all but one test hole, and from 12.5 feet to depths explored at 30 feet.
- Moisture contents in thawed material ranged from 7.5 to 26.8 percent. TH13-029 was noted to be wet at 25 feet in depth.

- Frozen material was encountered in all test holes from the surface to 12.5 to 14.5 feet in depth with TH13-028 frozen to the depth explored at 20 feet. Permafrost depth could not be determined in any test holes.
- Test holes drilled with solid flight augers encountered soil temperatures ranging from 21.4 to 38.3 degrees Fahrenheit in auger cutting.
- TH13-028 was drilled with hollow stem augers and one recovered soil core encountered a soil temperature of 31.5 degrees Fahrenheit at 18.5 feet in depth. All test holes indicated increased temperature with depth.
- Moisture contents in frozen material ranged from 3.2 to 18 percent. Organic contents from four samples ranged between 0.3 and 0.5 percent.
- Two asbestos samples collected at TH13-029 from 2.5 and 5.5 feet in depth, indicated less than 0.1 percent by weight and one or zero asbestos structures.

Visible Ice was not encountered in any test holes at the existing access road or proposed realignment area to depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), and poorly bonded or friable (Nf). Groundwater or a perched water table was not encountered, but wet conditions were noted in TH13-029 at 25 feet.

Selected laboratory test results for the existing access road and realignment area are summarized below in Table 20. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original access road profile shown in Appendix A and E.

Table 20: Summary of Selected Laboratory Test Results from Test Holes at the Existing Access Road and Realignment Area.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-027\46+00	20		0-13	18.0,6.2,9.9	None
TH13-028\43+60	20	29.3	0-20	11.4,3.6,5.1,8.2,3.2	None
TH13-029\40+00	30	49.4	0-14.5	6.8,22.6,26.5,22.2	None
TH13-030\36+50	20		0-12.5	12.8,5.1,7.5,8.2	None
TH13-031\31+00	15		0-13	8.9,8.6,9.4,6.7	Fill 3
TH13-033\21+50	4		0-4		Fill 7
TH13-034\15+00	15	71.6	0-15	21.8,20.6,49.0,58.4	At Transition
TH13-055\11+00	15		0-15	21.7,22.8,32.7	Fill 8
TH13-056\19+00	3	28.3	0-3		Fill 5
TH13-057\26+50	15	72.1	0-15	6.9,9.2	Cut 4

Table 21 below is the laboratory test results for frozen unit weight testing from samples collected at the road realignment area and TH13-028. Results are provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates the material classification for each sample.

Table 21: Proposed Access Road Realignment Area Frozen Unit Weight of Soil Test Results.

Test Hole\ Station	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-028\43+60	10 - 14.5	94.4	87.9	7.5	silty Sand
TH13-028	15 - 19.5	95.8	88.4	8.3	silty Sand

C. Previous Access Road Geotechnical Investigation Subsurface Findings

Previous geotechnical and laboratory test results from the investigation preformed in 1973 are given below in Table 22 for the existing access road. Additional information is shown in Appendix E.

Table 22: Summary of Previous Test Holes Drilled at the Existing Airport Access Road.

Test Hole	*Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH73-14	15		None		Fill 4
TH73-13	15		None		Fill 1
TH73-12\30+00	15		None		Fill 3
TH73-11\26+00	11	67.6	None		Fill 2
TH13-10\23+50	20		None		Cut 5
TH73-09\22+00	12.5		10		Fill 10
TH73-08\18+00	10		6		Fill 6
TH73-07\14+00	20	55.4	None	10.4	Cut 5
TH73-06\11+00	10	40.9	None	24.5	Fill 8
TH73-05	15	81.5	None	16.6	Cut 3
TH73-04	10		5		Fill 4

4. Not Considered Proposed New Aircraft Parking Apron and SREB Expansion Area

At the time of our investigation, the drill plan was to expand the existing parking apron and build a new SREB to the north and northeast of the existing apron and SREB. This plan is no longer being considered. The results of this drilling are presented here.

Test holes drilled included the following:

- Five test holes (TH13-061 to 065) drilled at new SREB area.
- Two test holes (TH13-059 and 060) drilled for new parking apron extension (Figure 13).

All test holes were drilled from 16 to 30 feet in depth. In the new SREB area, TH13-063 was located in a low depression approximately 10 feet in depth and 30 feet in diameter and the remaining test holes located around the edge of the depression. The results of this drilling are presented in Appendix A with laboratory test results presented in Appendix B. SPT blow counts from hollow stem auger test holes drilled at the no longer considered proposed new SREB area are included in the test hole logs presented in Appendix A, Figure 27 and page 57.

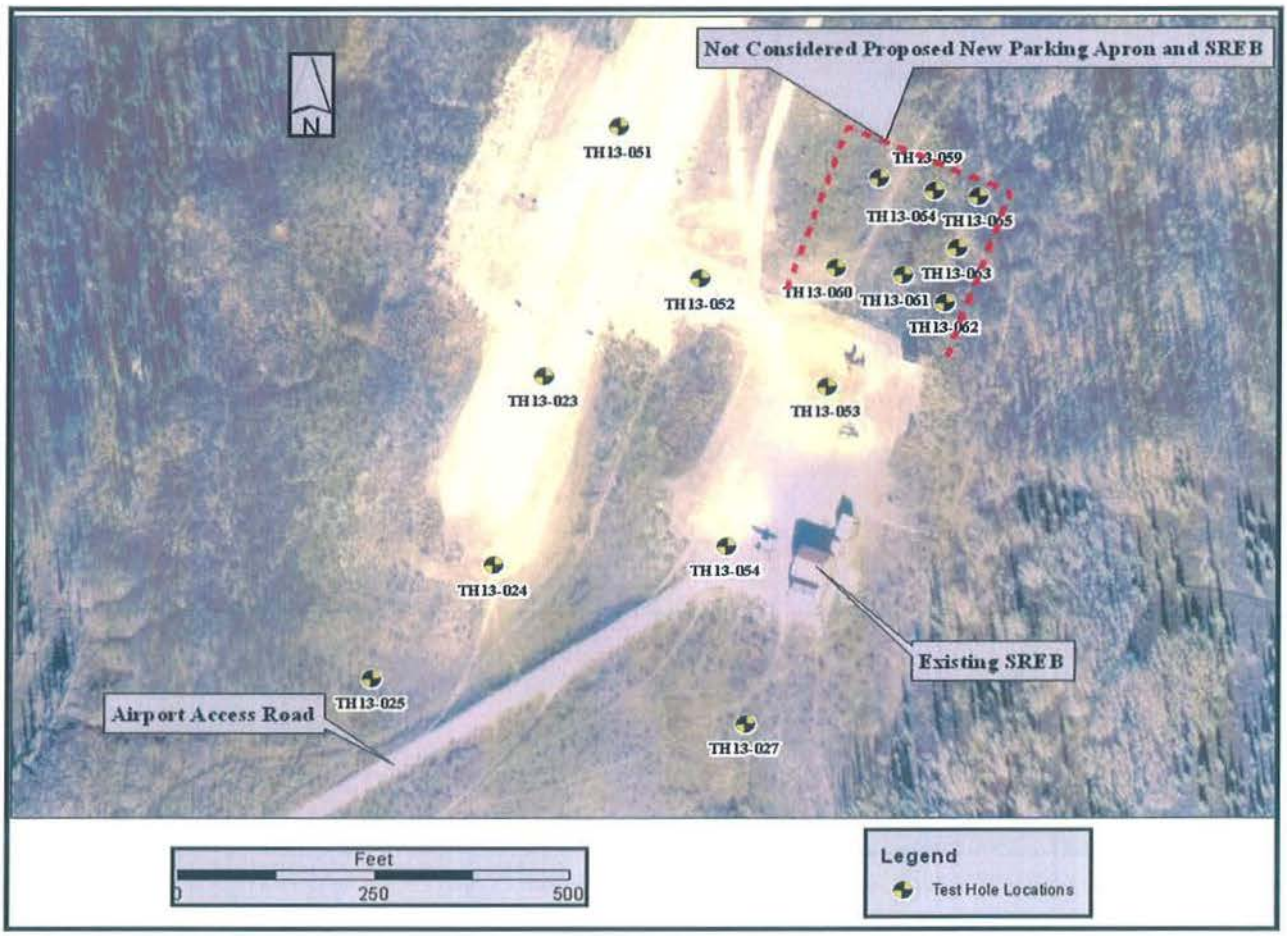

Figure 13: Not Considered Proposed New Aircraft Parking Apron and SREB Area, with Test Hole Locations.

Selected laboratory test results for the expansion area are summarized below in Table 23. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 23: Summary of Selected Laboratory Test Results from Test Holes at the Proposed New Aircraft Parking Apron Extension and SREB Area, Not Considered.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-059	24	51.3	0-24	7.1,9.5,10.1	None?
TH13-060	16		0-16	6.6,8.6,8.6,9.5	Fill 1-3?
TH13-061	27.5	67.9	0-8.5 and 13.5-27.5	18.3,15.7,6.8,22.7	None
TH13-062	30	64.5	0-8 and 11.5-30	7.6,28.8,18.6	None
TH13-063	30	67.5,48.0	0-4.5	6.9,5.5,7.0,25.2,25.5	None
TH13-064	24	91.2,67.8	0-19 and 21.5-24	8.8,12.3,10.9,12.4	None
TH13-065	30	81.4,59.2	0-10.5	3.6,10.0,13.0	None

Selected laboratory test results for the expansion area are summarized below in Table 23. The table also indicates frozen material depth, and depth to original ground indicating cut or fill depth from the original main runway profile.

Table 23: Summary of Selected Laboratory Test Results from Test Holes at the Proposed New Aircraft Parking Apron Extension and SREB Area, Not Considered.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Cut/Fill (feet)*
TH13-059	24	51.3	0-24	7.1,9.5,10.1	None?
TH13-060	16		0-16	6.6,8.6,8.6,9.5	Fill 1-3?
TH13-061	27.5	67.9	0-8.5 and 13.5-27.5	18.3,15.7,6.8,22.7	None
TH13-062	30	64.5	0-8 and 11.5-30	7.6,28.8,18.6	None
TH13-063	30	67.5,48.0	0-4.5	6.9,5.5,7.0,25.2,25.5	None
TH13-064	24	91.2,67.8	0-19 and 21.5-24	8.8,12.3,10.9,12.4	None
TH13-065	30	81.4,59.2	0-10.5	3.6,10.0,13.0	None

Table 24 below is the laboratory test results for frozen unit weight testing from samples collected at the expansion area, and provided by Shannon and Wilson, Inc. in Fairbanks. The table also indicates material classification at sample depth.

Table 24: Not Considered Proposed New SREB Area Frozen Unit Weight of Soil Test Results.

Test Hole	Sample Depth (feet)	Moist Unit Weight (pcf)	Dry Unit Weight (pcf)	Gravimetric Moisture Content (%)	Material Classification
TH13-061	15 - 16.5	106.2	100.0	6.3	silty Sand
TH13-061	20 - 24.5	124.5	96.4	29.2	silty Sand
TH13-062	10 - 12	100.3	91.6	9.5	silty Sand
TH13-062	15 - 17	106.6	102.2	4.3	silty Sand
TH13-062	20 - 25	93.4	89.3	4.6	silty Sand
TH13-064	5 - 10	102.3	94.4	8.4	Silt
TH13-064	15 - 20	80.7	72.2	11.8	silty Sand
TH13-065	6.5 - 9	107.6	101.7	5.8	silty Sand

Expected Physical Site Conditions

Based on variability common in natural environments, climate of the project area and conditions observed in this investigation, anticipate the following physical conditions:

- Expect frozen ground, either seasonally or perennially frozen within the project area at any time of the year.
- Expect perched groundwater on top of frozen layers.
- Expect pumping of silt soils at the bottom of excavations.
- Between those areas not explored expect to encounter areas of massive ice in foundation soils.
- Expect ice-rich soil to be wet and unstable upon thawing.
- Expect thaw bulbs in the vicinity of culverts.
- Expect difficulty handling moist or wet thawed silty soils.

Comments and Recommendations

Our investigation took place during the winter and surface conditions of the runways, apron, taxiway and access road was not observed. According to maintenance staff, the existing main runway gravel surface is in relatively good working condition, with minor thaw rutting and cracking reported during spring break-up. The crosswind runway is reported to have more extensive damage during break-up, which is generally concentrated in the middle of the runway and near the intersection with the main runway, and causes periodic closures.

Comments

- Both the crosswind and main runways currently have a thin surface layer approximately 6 inches thick, and slightly thicker up to approximately 2 feet thick at the southern end of the main runway.
- Two different materials were encountered during drilled:
    1. A low drill resistance material that was marginally frozen, poorly bonded and friable. This material was sandy in nature and probably related to the mapped surface dune deposits. The material appeared to be thaw stable, and was generally associated with lower natural moistures.
    2. A high drill resistance material that was frozen and well bonded. This material was silty in nature and thaw unstable, and generally associated with higher natural moistures.
- The limits of these two materials are not clearly defined, but in general, sandy material was encountered along the southern portion of the airport. Silty material encountered at the intersection of the two runways and along the crosswind runway.
- Scatter plots of moisture content versus depth indicate moisture contents decrease with depth on the crosswind runway, and increase with depth on the main runway. This may explain the poor condition of the crosswind runway during spring break-up.
- In general, NOA results indicated higher value samples were collected from the main runway and access road locations. NOA values decreased with depth, indicating the surface course material source may locally have NOA values above 0.25 percent. See Appendix C for NOA sample results and the attached chart.
- From as-built drawings and profiles of the main and crosswind runways it is apparent that many cut and fill transitions exist along both runways.

- We encountered thawed wet soil in some test holes at depth, mainly south of the airport and in low areas. Locations included the southern main runway extension area and new access road realignment area. The wet soil conditions could be related to the previous summer and fall high rain events.
- Drilling along the northern portion of the existing access road and north of Grizzly Creek encountered generally sandy material. South of Grizzly Creek test holes encountered predominately silty material underlying the embankment.

Recommendations

North and South Main Runway Extension Areas

Paved Surface

- Remove organic mat and organic silts, stockpile for growth media. Estimate this at two (2) feet for volume calculations.
- Drilling at the northern runway extension area and at TH13-001 indicated a possible perched water table. If loose, wet soils are encountered, sub-excavate the wet material and replace with compacted fill.
- Construct embankment to base of non-frost susceptible (NFS) material (NFS material is classified as material with less than 6% passing the #200 sieve) with local materials meeting standard specifications for airport embankments.
- If the embankment below the NFS material is constructed of frost-susceptible material, place a separation geotextile between the two materials.
- Bench new fills into the exiting embankment.
- Construct remaining embankment and structural section as along the main runway.
- Along embankment slopes, ensure edges of the any non-frost susceptible material layers are open to drain; cover with organic material rather than silt.

Gravel Surface

- Remove organic mat and organic silts, stockpile for growth media. Estimate this at two (2) feet for volume calculations.
- Drilling at the northern runway extension area and at TH13-001 indicated a possible perched water table. If wet soil conditions are encountered in foundation material, sub-excavate the wet material and install a woven geotextile fabric.
- Construct embankment to base of non-frost susceptible (NFS) material with local materials meeting standard specifications for airport embankments.
- Place sufficient NFS material to ensure the base of the NFS material, when combined with any base and surface courses, is a total of four (4) feet below the surface. Install separation fabric beneath the NFS material.
- Bench new fills into the exiting embankment.
- We recommend at least 8 inches of surface course.

Existing Main and Crosswind Runways

Paved Surface

- Beneath the main and crosswind runways, safety area, taxiway and apron, excavate and replace the upper embankment with non-frost susceptible material to an effective depth of eight (8) feet. Foam board insulation can be substituted for the NFS embankment material at a rate of 1-inch insulation per foot of NFS material.

- Minimum NFS section thickness is four (4) feet, excluding insulation. The minimum depth to the top of insulation is three (3) feet.
- Install non-woven separation geotextile at the base of the NFS material along the main runway, and reinforcement geotextile along the crosswind runway and under the runway intersection.
- Ensure edges of the NFS layer are open to drain; cover slopes with organic material rather than silt.
- From Station 25+00 to 27+00 drilling encountered organic and high moisture content soils. This corresponds to a fill area indicated from the original main runway profile (Appendix A, Figure 16, Page 46). Sub-excavate this station interval to remove the high moisture and organic soils to a minimum depth of eight (8) feet.
- Construct the embankment to the base of the NFS section with local materials meeting standard specifications for airport embankments.

Gravel Surface

- Either sub-excavate, or raise the grade to ensure the base of the NFS material, when combined with base and surface courses, is a total of four (4) feet below the surface along the taxiway, apron, main and crosswind runways and safety area.
- Install separation geotextile beneath the NFS material.
- We recommend at least eight (8) inches of surface course.

Terrain Obstruction Area and Use of Excavated Materials

- Most of the terrain obstruction drilling encountered marginally frozen, poorly bonded and friable silty sand or sandy silt material.
- This material meets standard specifications for Select Materials Type C, and also airport embankment material.
- One Proctor value indicated optimum moisture content of 14.6%. Samples collected in the area indicated most NM contents in these soils to be at or near optimum moisture.
- Some material may be above optimum moisture requiring draining and drying to achieve optimum compaction.
- Optimum compaction is necessary to avoid differential settlement beneath the runway extension areas.
- NOA contents were all below 0.25%.

Airport Access Road and Realignment

Paved Surface

- Under the re-alignment section, remove organic mat and organic silts, stockpile for growth media. Estimate this at two (2) feet for volume calculations.
- Construct embankment with locally available materials meeting standard specifications for Select Materials, Type C to within forty-two (42) inches of the finished surface. On top of this material place NFS material to the base course layer.
- Install a separation geotextile at the base of the NFS materials.

Gravel Surface

- Remove organic mat and organic silts, stockpile for growth media. Estimate this at two (2) feet for volume calculations.

- Construct embankment with locally available materials meeting standard specifications for Select Materials, Type C.
- Place at least two (2) feet of Select Material, Type B beneath the surface course. If there is the possibility of paving this road in the future, consider increasing the thickness of this layer to forty-two (42) inches.
- Install a separation geotextile at the base of the NFS material.
- We recommend a minimum surface course thickness of eight (8) inches.

Material Sources

Materials source information is not included in this report. A separate report dated April 2013 under project number AKSAS 60851 and titled Ambler Airport Rehabilitation Material Site Report contains information related to all potential material sources for the project.

Ambler Sewage Lagoon Road

The sewage lagoon was originally built for the village of Ambler in approximately 2005 and located approximately ¾ miles southwest, with a cleared and rough access road built as part of the project. The purpose of this project and geotechnical investigation is to rehabilitate the approximately 2,800 liner foot access road, and overlay with surface course material or pavement. Five test holes were drilled along the approximate road alignment with all test holes located on the southeast side of the existing road, and to depths of 10.5 to 15 feet and 400 to 800 feet between holes (Figure 14).

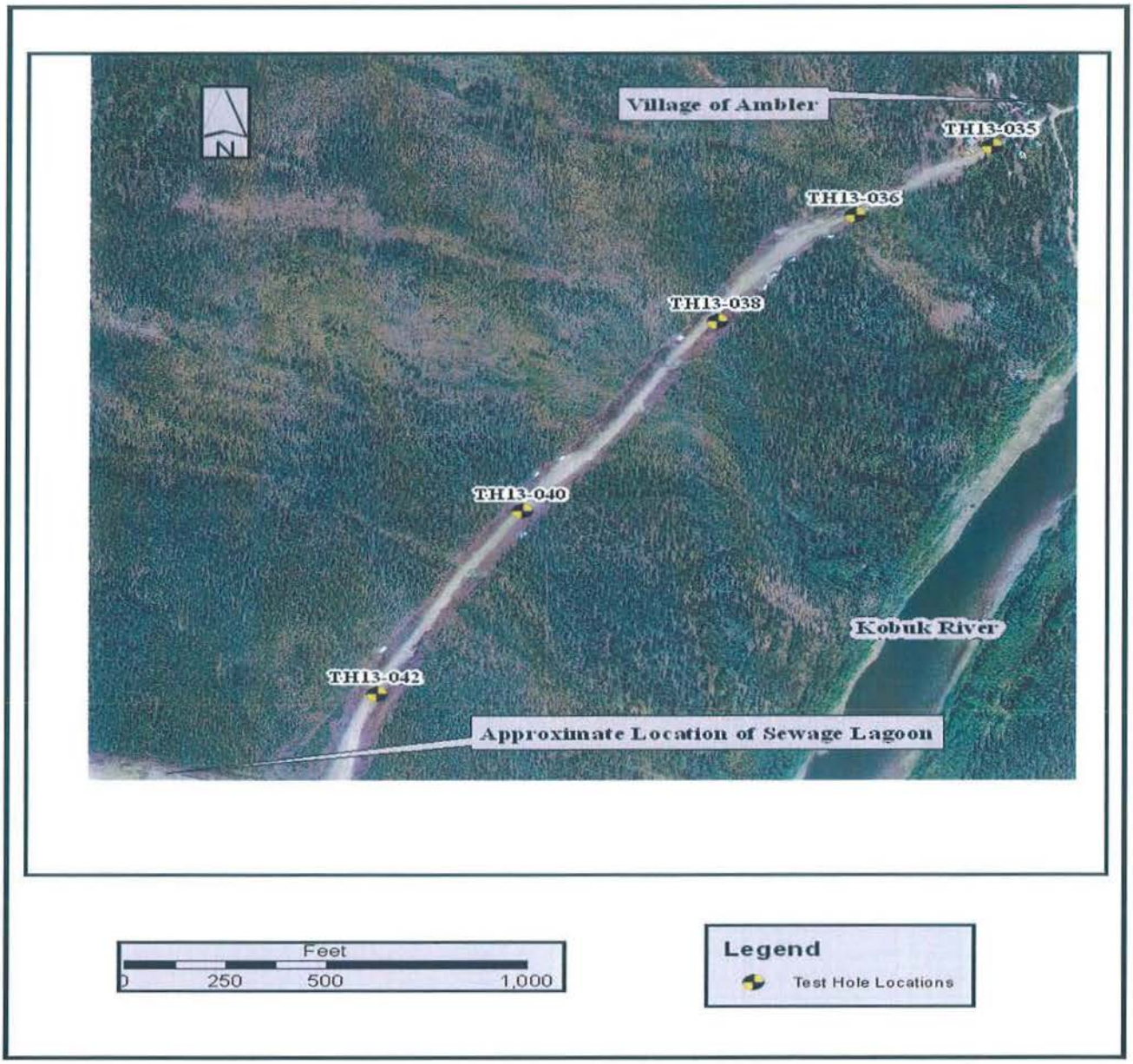

Figure 14: Ambler Sewer Lagoon Road with Test Hole Locations.

The existing lagoon road was snow covered at the time of our investigation and the limits of the road were difficult to determine as well as the location of the sewer line. Mr. Alvin Williams was contacted and he stated the sewer line was located on the northwest side of the road.

Test holes located near the existing lagoon road encountered the following subsurface conditions:

- Approximately 6 inches organic mat, or 1 foot to 1.5 feet thick embankment material consisting of frozen silty sand with gravel.
- Seasonally frozen material was encountered in all test holes to depths ranging from 10.5 to 13 feet, with frozen material encountered throughout TH13-038 to the depth explored at 10.5 feet. Permafrost depth could not be determined in any test holes.
- Moisture contents in frozen material ranged from 16.2 to 39.5 percent, with the highest moisture sampled from TH13-036 and near a peat layer. Organic contents ranged from 0.5 to 4.7 percent.
- All test holes were drilled with solid flight augers and soil temperatures recorded in auger cuttings were 33.2 and 31.7 degrees Fahrenheit in TH13-036 and 035, respectively.
- Thawed material was encountered from 10.5 to depths explored at 15 feet. Moisture contents ranged from 15 to 24.3 percent.
- Asbestos sample results ranged from less than 0.1 percent by weight and 9 asbestos structures to less than 0.1 percent by weight and zero structures. The highest asbestos results are given below with test hole number and depth, and the number of asbestos structures found larger than one per sample:
    1. TH13-038 at 3 feet in depth and 9 structures and less than 0.1 percent by weight.
    2. TH13-035 at 3 feet in depth and 2 structures and less than 0.1 percent by weight.
    3. TH13-042 at 2.5 feet in depth and 2 structures and less than 0.1 percent by weight.

Visible Ice was encountered in TH13-036 from 9 to 10.5 feet in depth, all other test holes did not encountered visible ice to depths explored. Frozen material encountered was classified as nonvisible bonded with no excess ice (Nbn), nonvisible poorly bonded or friable (Nf), and visible ice with inclusions (Vx). See Appendix G for a key to frozen ground classification. Groundwater or perched water was not encountered, but wet soil conditions were noted in TH13-036 and 040 near the bottom of the holes at 11.5 and 13 feet respectively.

Selected laboratory test results for the sewer lagoon road are summarized below in Table 25. The table indicates frozen material depth, and estimates embankment fill depth.

Table 25: Summary of Selected Laboratory Test Results from Test Holes at the Sewer Lagoon Road.

Test Hole and Station	*Hole Depth (feet)*	*Percent Passing #200*	*Frozen Material Depth (feet)*	*Moisture Content (%)*	*Fill (feet)*
TH13-035	15	84.2,53.0	0-13		1-2?
TH13-036	15	39.1	0-10.5	39.5,24.3	1-3?
TH13-038	10.5		0-10.5	23.6,16.2	None
TH13-040	15		0-11	27.7,23.8,15	None
TH13-042	15		0-12	22.8,16.0	None

Previous explorations were performed in August 29 thru 31, 2002 by Duane Miller and Associates. Five test holes were excavated with a hand auger and shovel to depth of 2 to 4.5 feet (DM&A, 2003).

Expected Physical Site Conditions

Based on variability common in natural environments, climate of the project area and conditions observed in this investigation, anticipate the following physical conditions:

- Expect frozen ground, either seasonally or perennially frozen within the project area at any time of the year.
- Expect perched groundwater on top of frozen layers.
- Expect pumping of silt soils at the bottom of excavations.
- Expect to encounter areas of massive ice in foundation soils.
- Expect ice-rich soil will be wet and unstable upon thawing.
- Expect thaw bulbs in the vicinity of culverts.
- Expect difficulty handling moist or wet thawed silty soils.

Recommendations

The condition of the existing lagoon road could not be determined during this investigation.

These geotechnical recommendations are based on the results of this investigation.

Paving Surface Option

- Remove organic mat and organic silts where encountered, stockpile for growth media. Estimate this at two (2) feet for volume calculations.
- Spread existing embankment.
- Sub-excavate soft or saturated foundation soils when encountered.
- Construct the embankment with materials meeting Select Material, Type C to within forty-two (42) inches of the paved surface.
- Construct to the base course layer with non-frost susceptible (NFS) material.
- Install a separation geotextile at the base of the NFS material.
- Provide positive drainage along the embankment and construct culvert crossings where appropriate.

Gravel Surface Option

- Remove organic mat and organic silts where encountered, stockpile for growth media. Estimate this at two (2) feet for volume calculations.
- Maintain the existing road embankment material.
- Sub-excavate soft or saturated foundation soils when encountered.
- Construct the embankment with materials meeting Select Material, Type C to within two (2) feet of the base course layer.
- Place a minimum of two feet of NFS material.
- Install a separation geotextile at the base of the NFS material.
- We recommend a minimum surface course of eight (8) inches.

Material Sources

Materials source information is not included in this report. A separate report dated April 2013 under project number AKSAS 60851 and titled Ambler Airport Rehabilitation Material Site Report contains information related to all potential material sources for the project.

References

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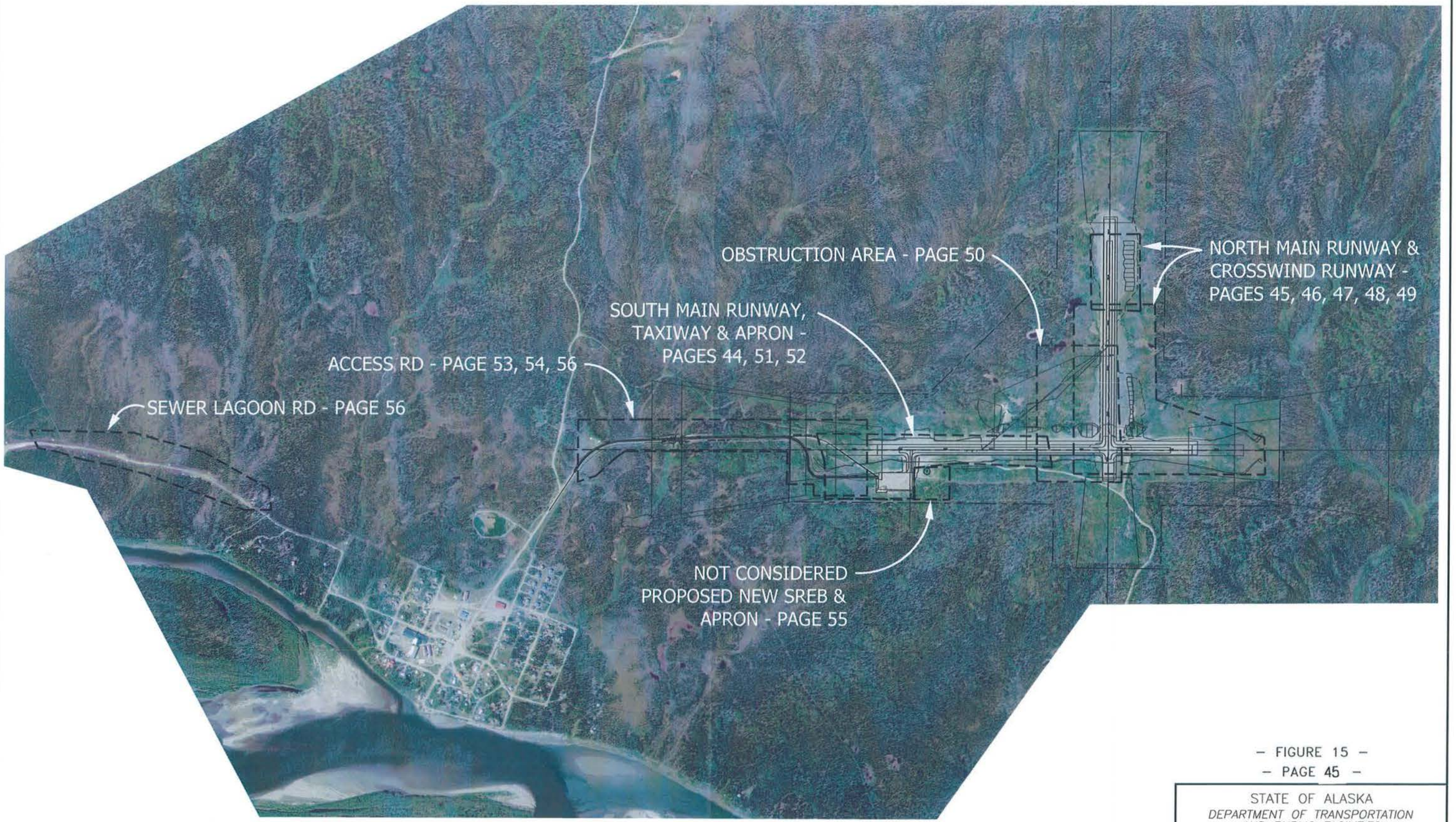
APPENDIX A: TEST HOLE LOCATION MAPS, LOGS AND ORIGINAL GROUND PROFILES:



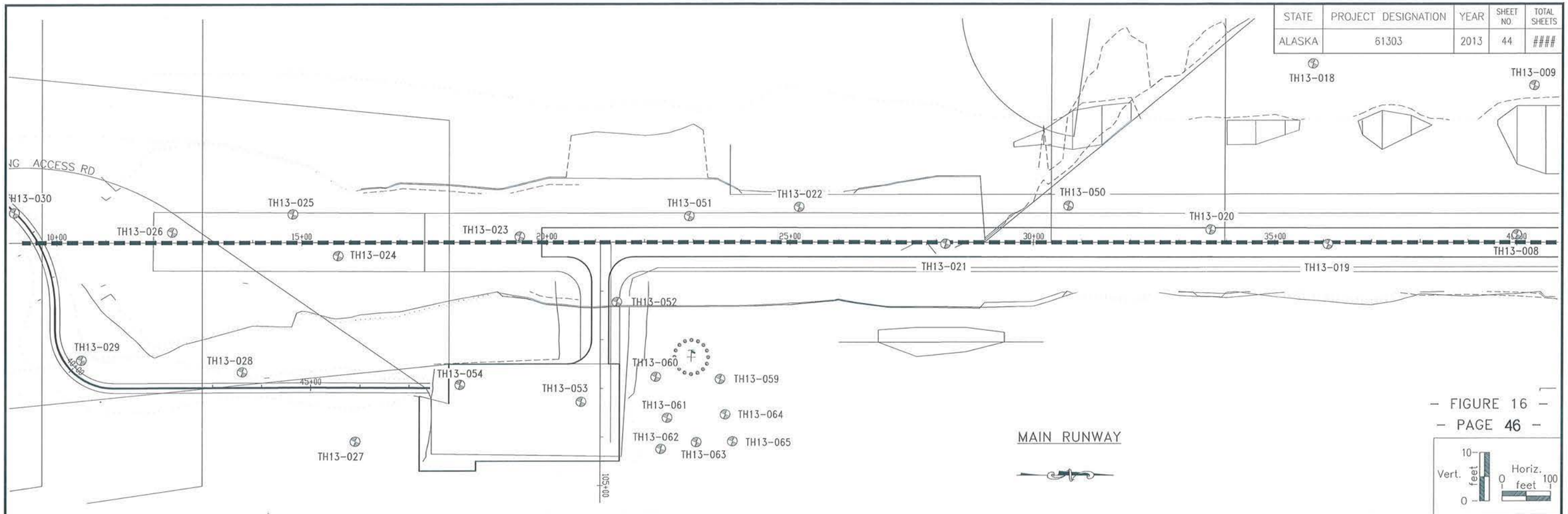
– FIGURE 15 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	AMBLER VICINITY MAP

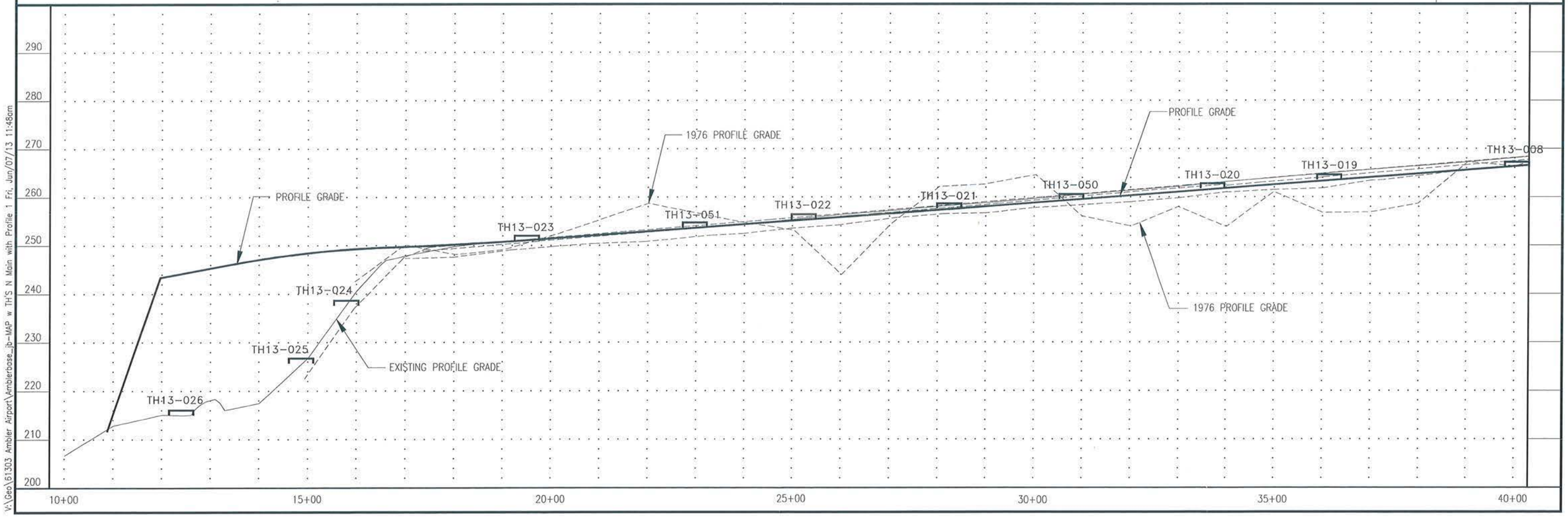
V:\Geo\61303 Ambler Airport\Amblerbase_jb-VIC MAP Fri, Jun/07/13 11:49am

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	61303	2013	44	####



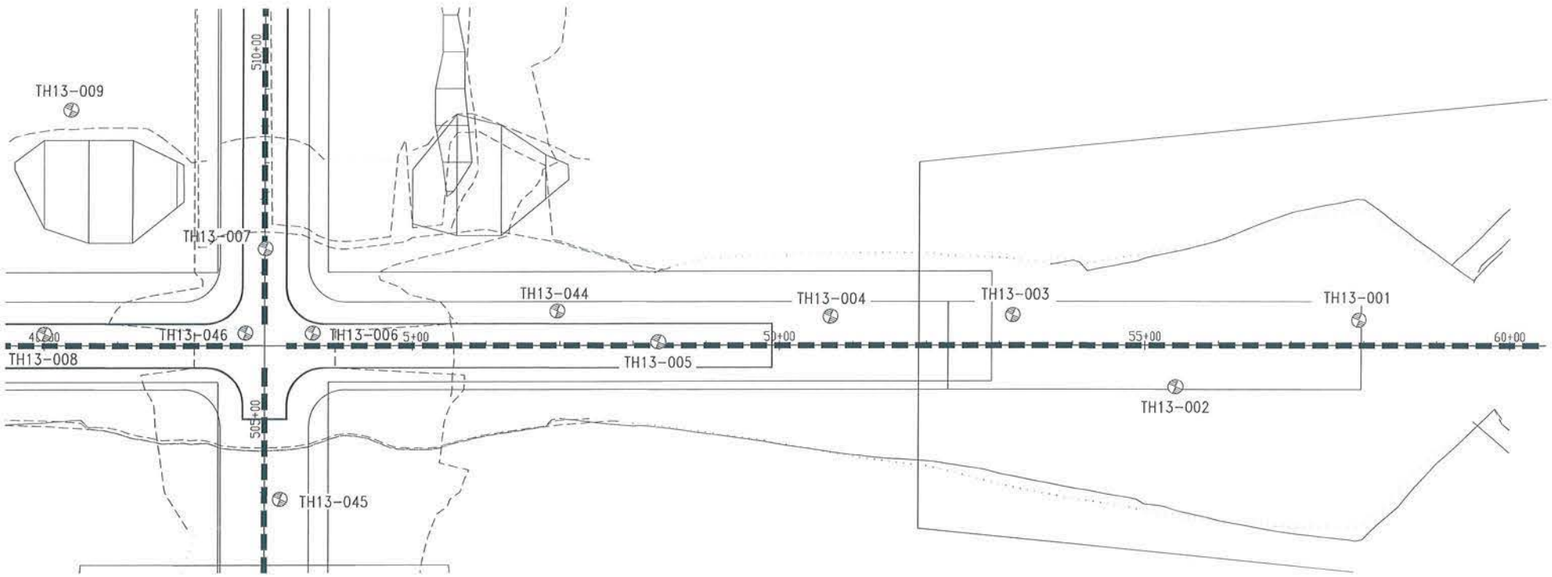
– FIGURE 16 –

– PAGE 46 –



V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S N Main with Profile 1 Fri, Jun/07/13 11:48am

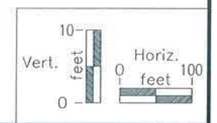
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	61303	2013	45	####

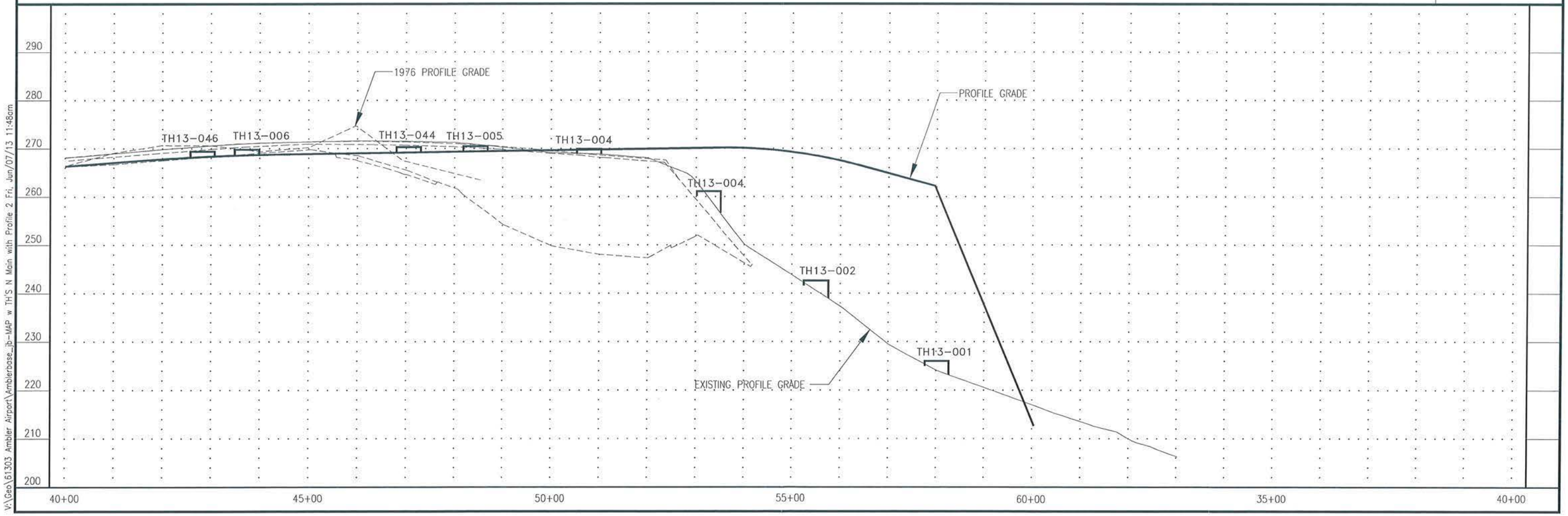


MAIN RUNWAY

– FIGURE 17 –

– PAGE 47 –





V:\Geo\61303 Ambler Airport\Amblerpase_jb-MAP w TH'S N Main with Profile 2 Fri, Jun/07/13 11:48am

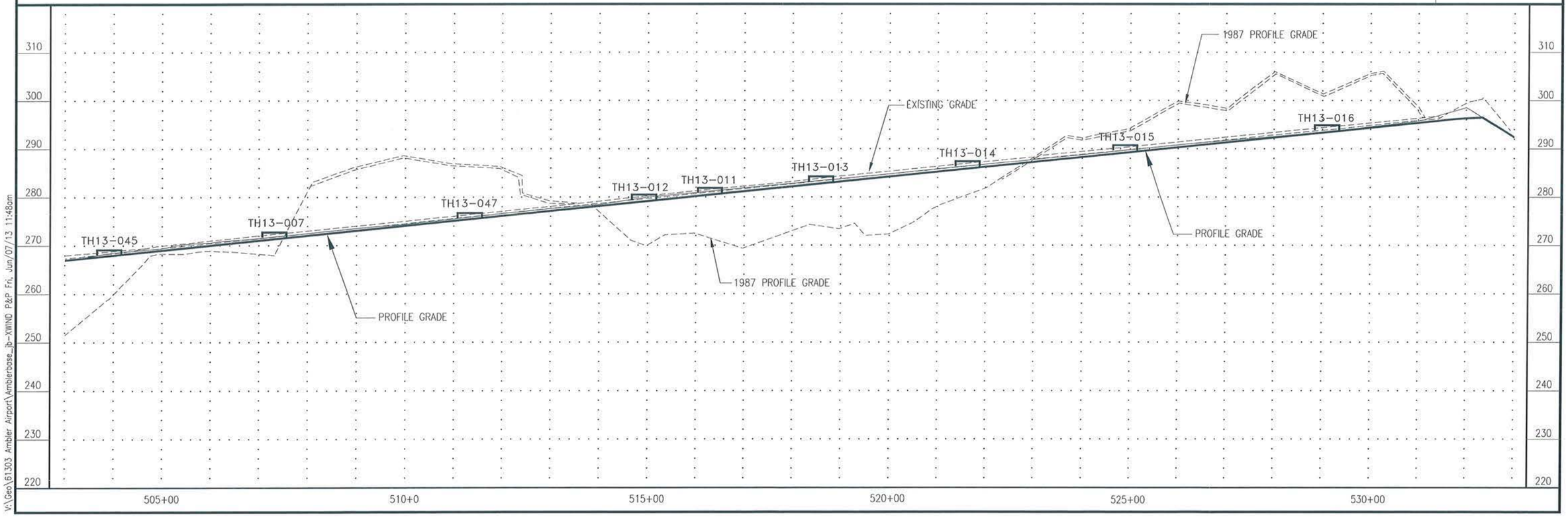
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	61303	2013	46	####

TH13-008
TH13-009
TH13-010
TH13-011
TH13-014
TH13-046
TH13-007
505+00
510+00
515+00
520+00
525+00
530+00
TH13-045
TH13-006
TH13-047
TH13-012
TH13-013
TH13-015
TH13-016
TH13-044
TH13-

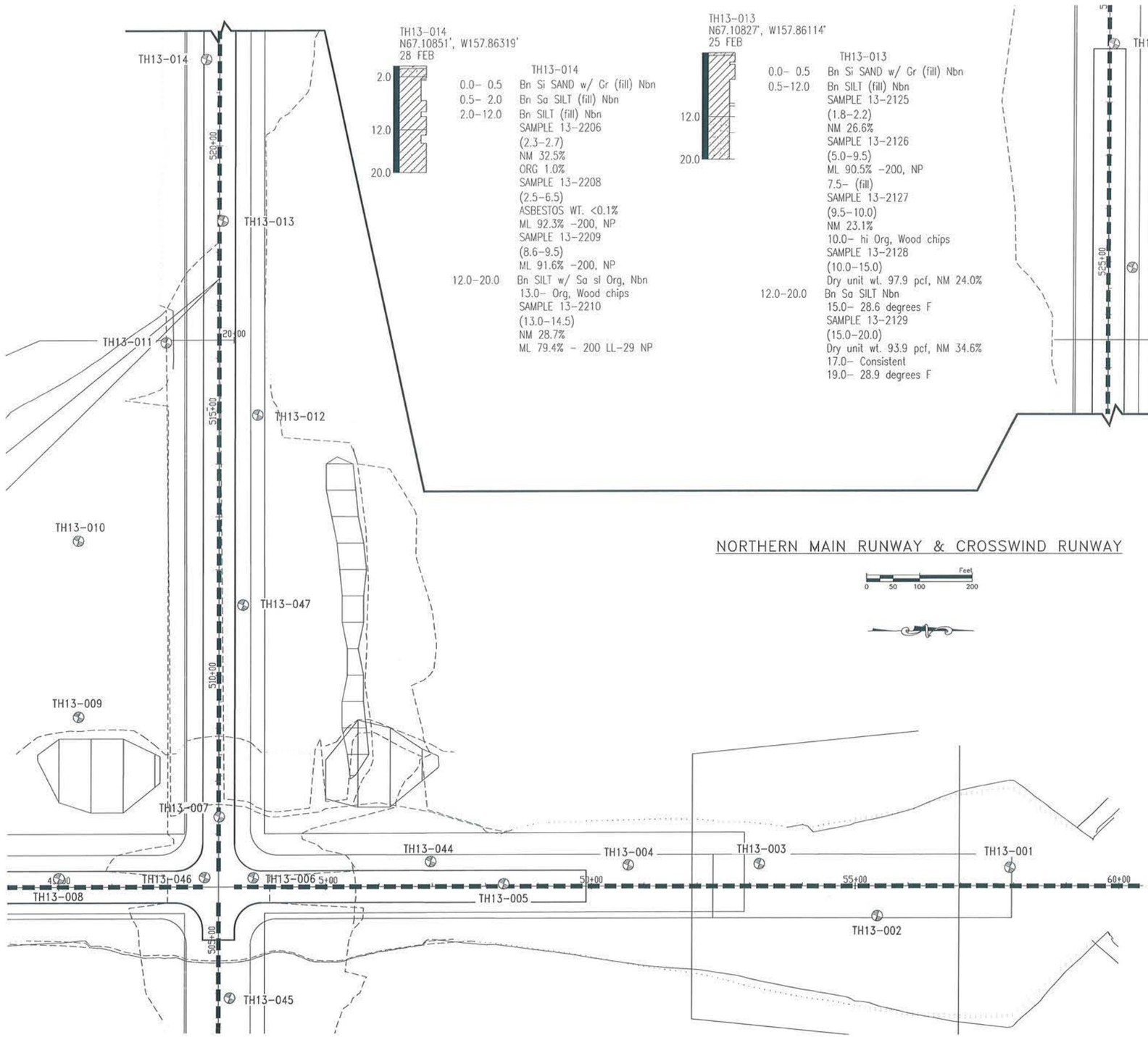
CROSSWIND RUNWAY

– FIGURE 18 –
– PAGE 48 –

Vert. 10 0 feet
Horiz. 0 100 feet



V:\Geo\61303 Ambler Airport\Amblerpose_jb-XWIND P&P Fri, Jun/07/13 11:48am



TH13-014
N67.10851', W157.86319'
28 FEB

TH13-014

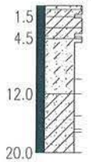
0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 2.0 Bn Sa SILT (fill) Nbn
2.0–12.0 Bn SILT (fill) Nbn
SAMPLE 13-2206
(2.3–2.7)
NM 32.5%
ORG 1.0%
SAMPLE 13-2208
(2.5–6.5)
ASBESTOS WT. <0.1%
ML 92.3% –200, NP
SAMPLE 13-2209
(8.6–9.5)
ML 91.6% –200, NP
12.0–20.0 Bn SILT w/ Sa sl Org, Nbn
13.0– Org, Wood chips
SAMPLE 13-2210
(13.0–14.5)
NM 28.7%
ML 79.4% – 200 LL-29 NP

TH13-013
N67.10827', W157.86114'
25 FEB

TH13-013

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5–12.0 Bn SILT (fill) Nbn
SAMPLE 13-2125
(1.8–2.2)
NM 26.6%
SAMPLE 13-2126
(5.0–9.5)
ML 90.5% –200, NP
7.5– (fill)
SAMPLE 13-2127
(9.5–10.0)
NM 23.1%
10.0– hi Org, Wood chips
SAMPLE 13-2128
(10.0–15.0)
Dry unit wt. 97.9 pcf, NM 24.0%
12.0–20.0 Bn Sa SILT Nbn
15.0– 28.6 degrees F
SAMPLE 13-2129
(15.0–20.0)
Dry unit wt. 93.9 pcf, NM 34.6%
17.0– Consistent
19.0– 28.9 degrees F

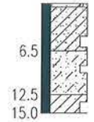
TH13-016
N67.10938', W157.86794'
24 FEB



TH13-016

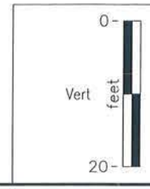
0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 1.5 Gy Sa SILT (fill) Nbn
SAMPLE 13-2104
(1.2–1.7)
ASBESTOS WT. 0.1%
1.5– 3.0 Bn–Bk SILT w/ Sa (fill) Nbn
3.0– 4.5 Bn Sa SILT (fill?) Nbn
SAMPLE 13-2105
(3.8–4.2)
NM 15.4%
4.5–12.0 Tn Si SAND Nf,
31.7 degrees F
SAMPLE 13-2106
(5.0–10.0)
NM 12.7%, ORG 0.3%
8.0– 31.7 degrees F
(10.0–15.0)
NO SAMPLE RECOVERY
12.0– 30.7 degrees F
12.0–20.0 Tn Sa SILT, Nf
cuttings at 31.8 degrees F
SAMPLE 13-2108
(15.0–20.0)
ML 66.5% – 200 NP
SAMPLE 13-2107
(16.8–17.2)
NM 10.8%
19.0– 31.5 degrees F

TH13-015
N67.10903', W157.86512'
28 FEB



TH13-015

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 6.5 Bn Sa SILT (fill) Nbn
2.5–(FILL?)
SAMPLE 13-2211
(4.5–6.0)
NM 17.5%
ASBESTOS WT. <0.1%
6.5–12.5 Tn Si SAND Nbn
SAMPLE 13-2212
(8.5–9.5)
ASBESTOS WT. <0.1%
SM 45.1%–200 LL-24 NP
NM 22.0%
12.5–15.0 Bn SILT w/ Sa Nbn
SAMPLE 13-2213
(13.5–15.0)
ML 93.0% –200, LL-25 NP
NM 25.2%
14.5– Auger Refusal in tightly frozen silts



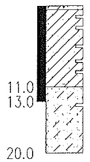
– FIGURE 19 –
– PAGE 49 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	NORTH MAIN RUNWAY & CROSSWIND RUNWAY

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S N Main & Xwind 1 Fri, Jun/07/13 11:48am

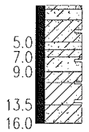
TH13-012
N67.10805', W157.85859'
28 FEB



TH13-012

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5-11.0 Bn SILT w/ So (fill) Nbn
SAMPLE 13-2200
(1.3-1.7)
ASBESTOS WT <0.1%
SAMPLE 13-2201
(2.8-3.2)
NM 23.5%, ORG 0.8%
SAMPLE 13-2202
(5.3-5.7)
ASBESTOS WT <0.1%
SAMPLE 13-2203
(7.3-7.7)
NM 14.2%, ORG 0.9%
SAMPLE 13-2204
(8.8-9.2)
NM 15.0%
11.0-20.0 Tn Si SAND Nbn
12.5- Nf
SAMPLE 13.2205
(13.3-13.7)
NM 6.5%
14.0- 32.2 degrees F, dry to moist
19.0- 42.3 degrees F ?

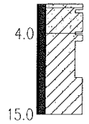
TH13-008
N67.10620', W157.85425'
13 FEB



TH13-008

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 2.0 Tn Si SAND (fill) Nbn
2.0- 5.0 Tn Sa SILT Nbn
SAMPLE 13-2036
(3.3-3.7)
NM 25.1%
SAMPLE 13-2036B
(4.8-5.2)
ASBESTOS WT. <0.1%
5.0- 6.0 Tn Si SAND, Nbn
6.0- 7.0 Bn Sa SILT, Nbn
7.0- 9.0 Tn Si SAND, Nf
SAMPLE 13-2037
(7.3-7.7)
ASBESTOS WT. <0.1%
9.0-10.5 Bn Sa SILT Nbn
SAMPLE 13-2038
(10.3-10.7)
NM 24.6%, ORG 0.3%
10.5-13.5 Bn SILT w/ Sa Nbn
SAMPLE 13-2039
(12.8-13.2)
NM 28.0%
13.5-16.0 Bn Sa SILT Nbn

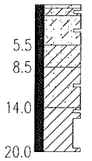
TH13-046
N67.10688', W157.85319'
23 FEB



TH13-046

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 4.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2101
(0.8-1.2)
NM 4.9%, ORG 0.8%
3.0- Org
SAMPLE 13-2102
(3.8-4.2)
NM 19.4%
4.0-15.0 Bn SILT w/ Sa Nbn
SAMPLE 13-2103
(5.0-10.0)
Dry unit wt. 93.0 pcf, NM 28.7%
9.0- Sample mostly melted
10.0- 32.1 degrees F
13.0- 45 min. to drill 5 feet
14.0- Sample melted with no recovery
14.5- cuttings at 31.8 degrees F
15.0- Refusal in tightly frozen silts

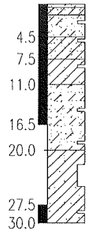
TH13-007
N67.10707', W157.85386'
27 FEB



TH13-007

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 1.5 Bn Sa SILT (fill) Nbn
SAMPLE 13-2148
(0.8-1.2)
ASBESTOS WT <0.1%
1.5- 5.5 Tn Si SAND (fill) Nbn
SAMPLE 13-2149
(3.3-3.7)
NM 15.5%, ORG 0.9%
4.5- w/ Gr
5.5- 8.5 Bn Sa SILT Nbn
8.5-14.0 Bn SILT w/ Sa Nbn
SAMPLE 13-2150
(10.8-11.2)
NM 22.7%
12.0- consistent
14.0-20.0 Bn SILT, Nbn
SAMPLE 13-2151
(14.3-14.7)
NM 25.6%
SAMPLE 13-2152
(15.5-19.5)
ORG 0.7%
ML 91.0 %-200 LL-22, NP

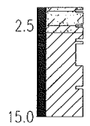
TH13-045
N67.10676', W157.85159'
27 FEB



TH13-045

0.0- 0.5 Bn Si SAND w/ Sa (fill) Nbn
0.5- 1.5 Bn Sa SILT (fill) Nbn
1.5- 4.5 Bn Si SAND (fill) Nbn
SAMPLE 13-2141
(2.3-2.7)
NM 12.2%, ORG 0.7%
3.5- Nf
4.5- 7.5 Bn Sa SILT (FILL) Nbn
SAMPLE 13-2142
(4.8-5.2)
ASBESTOS WT <0.1%
7.5-11.0 Bn SILT w/ Sa (FILL) Nbn
SAMPLE 13-2143
(8.3-8.7)
NM 20.2%
11.0-20.0 Bn Si SAND Nf
11.5- 31.7 degrees F
SAMPLE 13-2144
(14.3-14.7)
NM 13.4%
16.5- Gy, 35.2 degrees F, moist
SAMPLE 13-2145
(18.8-19.2)
NM 17.3%, ORG 0.2%
20.0-30.0 Bn SILT w/ Sa, moist to wet
SAMPLE 13-2146
(22.0-25.0)
ML 82.8%-200 NP
24.5- 35.2 degrees F
28.0- 31.6 degrees F, Nbn
SAMPLE 13-2147
(28.3-28.7)
NM 19.3%

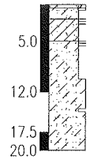
TH13-006
N67.10711', W157.85294'
13 FEB



TH13-006

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn,
1/2 inch crushed gravel
SAMPLE 13-2031
(0.3-0.7)
ASBESTOS WT 0.2%
0.5- 2.5 Bn Si SAND (fill) Nbn
SAMPLE 13-2032
(2.3-2.7)
ASBESTOS WT <0.1%
2.5- 3.5 Bn-Bk Sa SILT (fill?) Nbn
3.5-15.0 Bn SILT Nbn,
SAMPLE 13-2033
(4.3-4.7)
NM 22.6%, ORG 1.3%
4.5- Bn-Rd sl Org,
Iron staining
SAMPLE 13-2034
(5.0-8.0)
ML 85.6%-200 LL-23 NP
ORG 1.3%
SAMPLE 13-2035
(10.8-11.2)
NM 25.3%
14.5- Refusal in tightly frozen silts

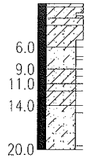
TH13-044
N67.10802', W157.85249'
13 FEB



TH13-044

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 2.0 Bn-Tn Si SAND (fill) Nbn
2.0- 5.0 Tn Sa SILT (fill?) Nbn
SAMPLE 13-2027
(2.3-2.7)
NM 16.8%
5.0-20.0 Tn Si SAND Nf
SAMPLE 13-2028
(5.3-5.7)
ASBESTOS WT. <0.1%
7.0- Tn-Bn
29 degrees F
8.5- Bn
SAMPLE 13-2029
(9.8-10.2)
NM 9.4%
12.0- 34 degrees F, moist
SAMPLE 13-2030
(14.3-14.7)
NM 11.6%, ORG 0.5%
17.5- Nf, 31.6 degrees F

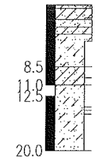
TH13-047
N67.1077', W157.8567'
19 FEB



TH13-047

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 2.0 Bn-Bk Sa SILT (fill) Nbn
SAMPLE 13-2082
(1.3-1.7)
NM 21.2%
2.0- 3.0 Tn Si SAND (fill) Nf
3.0- 6.0 Bn Sa SILT (fill?) Nbn
SAMPLE 13-2084
(5.0-10.0)
Dry unit wt. 101.9 pcf, NM 25.3%
6.0- 9.0 Tn Si SAND Nf,
31.3 degrees F
SAMPLE 13-2083
(7.3-7.7)
NM 11.1%, ORG 0.3%
9.0-11.0 Bn Sa SILT, Nbn
10.0- 31.4 degrees F,
SAMPLE 13-2085
(14.0-15.0)
NM 6.2%, ORG 0.2%
11.0-12.0 Tn Si SAND Nf
12.0-14.0 Bn Sa SILT Nbn
14.0-20.0 Tn Si SAND Nbn
SAMPLE 13-2086
(15.0-19.5)
Dry unit wt. 91.1 pcf, NM 29.9%
18.0- 31.3 degrees F,
SAMPLE 13-2087
(19.5-20.0)
NM 24.2%

TH13-019
N67.10518', W157.85485'
19 FEB



TH13-019

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 2.0 Bn-Bk Sa SILT (fill) Nbn
SAMPLE 13-2077
(0.8-1.2)
ASBESTOS WT. <0.1%
2.0- 3.0 Tn Si SAND (fill) Nf
3.0- 4.0 Bn Sa SILT (fill) Nf
4.0- 8.5 Tn Si SAND (fill) Nf
SAMPLE 13-2078
(5.0-10.0)
NM 13.0%, ORG 0.5%
8.5-11.0 Bn Sa SILT Nbn
10.0- 23.5 degrees F
SAMPLE 13-2079
(10.0-14.5)
NM 6.5%, ORG 0.5%
11.0-20.0 Bn Si SAND, moist
35.3 degrees F
14.0- Nbn, 31.5 degrees F,
sand and silt interlayering,
SAMPLE 13-2080
(14.5-15.0)
NM 9.4%
SAMPLE 13-2081
(15.0-20.0)
Dry unit wt. 90.7 pcf, NM 12.1%
18.0- 31.2 degrees F

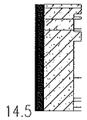
Vert 0- feet 20-

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	NORTH MAIN RUNWAY & CROSSWIND RUNWAY

V:\Geo\61303 Ambler Airport\Amblerbase_jb-TH'S N Main & Xwind 2 Fri, Jun/07/13 11:48am

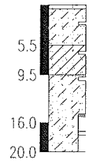
TH13-005
N67.10828', W157.85159'
20 FEB



TH13-005

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 2.0 Bn-Bk Sa SILT (fill) Nbn
SAMPLE 13-2088
(1.3-1.7)
NM 20.4%
2.0- 3.0 Tn Si SAND (fill) Nbn
SAMPLE 13-2090
(2.0-6.5)
ASBESTOS WT. <0.1%
ML 76.4%-200 LL-20 NP
SAMPLE 13-2089
(3.3-3.7)
ASBESTOS WT. <0.1%
3.0-14.5 Bn SILT w/ Sa (fill) Nbn
SAMPLE 13-2091
(5.0-10.0)
ORG 3.0%
ML 75.5%-200 NP
8.5- (fill?)
10.0- 30.4 degrees F,
SAMPLE 13-2093
(10.0-14.0)
ML 72.7%-200 NP
SAMPLE 13-2092
(12.8-13.2)
NM 21.0%, ORG 0.7%
SAMPLE 13-2094
(14.0-14.5)
NM 22.0%
14.5- Refusal in tightly frozen silts,

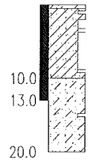
TH13-004
N67.10890', W157.85118'
13 FEB



TH13-004

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn,
1/2 inch crushed gravel
0.5- 5.5 Bn Si SAND (fill) Nbn
2.0- w/ Gr to 4 feet
SAMPLE 13-2021
(2.3-2.7)
ASBESTOS WT. <0.1%
3.0- NF
5.5- 9.5 Bn Sa SILT (fill) Nbn
SAMPLE 13-2022
(6.3-6.7)
NM 12.8%, ORG 0.8%
9.5-20.0 Tn Si SAND (fill?) Org, Nf
SAMPLE 13-2023
(9.8-10.3)
NM 11.4%
11.0- Thawed,
34 degrees F
14.5- Org
SAMPLE 13-2024
(14.8-15.2)
NM 17.5%, ORG 0.6%
SAMPLE 13-2025
(15.0-20.0)
NM 20.9%
SM 46.6%-200 NP
16.0- 31.7 degrees F, Nbn
SAMPLE 13-2026
(17.2-17.7)
ORG 1.3%

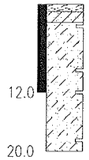
TH13-003
N67.10890', W157.85118'
13 FEB



TH13-003

0.0- 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5- 10.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2195
(0.8-1.2)
ASBESTOS WT. <0.1%
10.0- Tn (fill) Nbn
Interlayered silt
SAMPLE 13-2197
(2.0-7.0)
ASBESTOS WT. <0.1%
NP ML 69.1%-200, NP
SAMPLE 13-2196
(3.2-3.7)
NM 8.3%, ORG 0.6%
SAMPLE 13-2198
(8.8-9.2)
NM 8.4%
10.0-20.0 Tn Si SAND (fill?) Nbn,
13.0- Bn-Rd
36.1 degrees F, moist
SAMPLE 13-2199
(14.8-15.2)
NM 14.1%, ORG 1.7%
15.0- mottled color

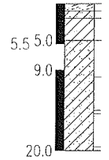
TH13-002
N67.11000', W157.84928'
28 FEB



TH13-002

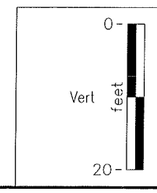
0.0- 1.0 Bn ORG MAT hi Org
1.0- 2.5 Bn Sa SILT sl Org, Nbn
2.5-20.0 Tn Si SAND Nbn
SAMPLE 13-2191
(2.8-3.2)
NM 11.5%
6.0- Nbn, Interlayered silt
7.0- 31.6 degrees F
8.5- Nf
SAMPLE 13-2192
(8.8-9.2)
NM 6.8%
11.5- 32.2 degrees F
SAMPLE 13-2193
(11.8-12.2)
NM 9.3%
12.5- Consistent and Similar
18.0- 38.2 degrees F
SAMPLE 13-2194
(18.3-18.7)
NM 11.5%

TH13-001
N67.11073', W157.84919'
20 FEB



TH13-001

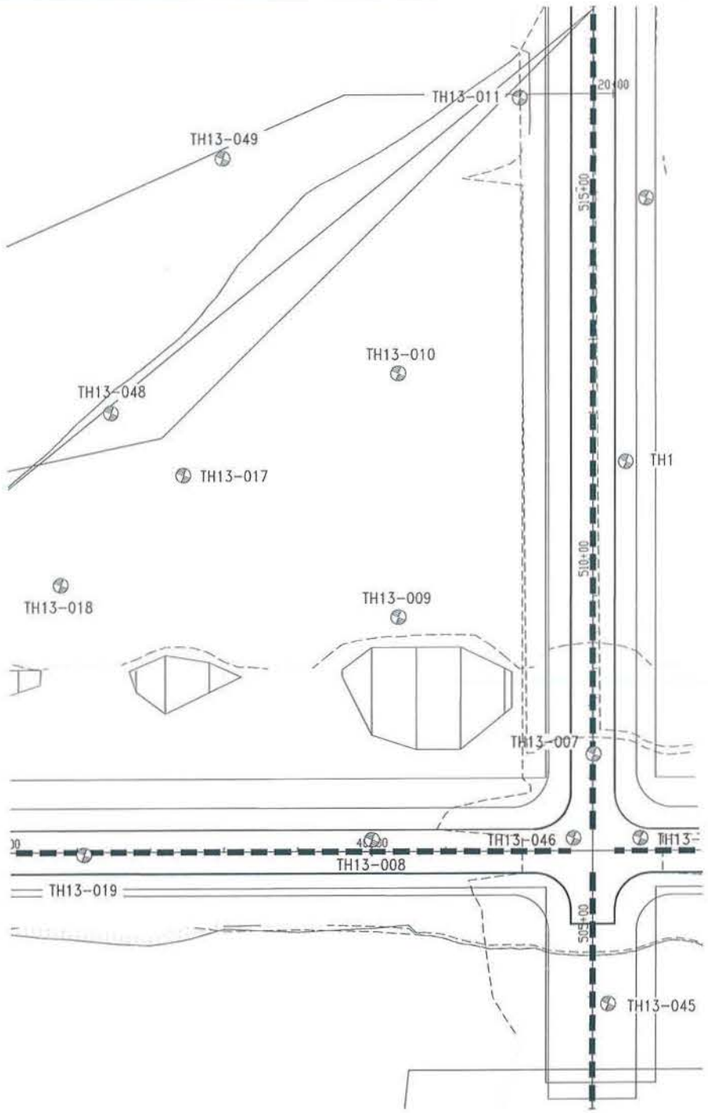
0.0- 1.0 Bn ORG MAT hi Org
SAMPLE 13-2095
(0.0-5.0)
Dry unit wt. 76.9 pcf, NM 47.5%
1.0- 2.0 Bn Sa SILT Org, Nbn
2.0- 5.0 Gy SILT w/ Sa Nbn
4.5- 31.7 degrees F
5.0-20.0 Bn Sa SILT
SAMPLE 13-2096
(5.0-10.0)
NM 29.7%, ORG 0.9%
5.5- moist to wet
9.0- Gy Nbe,
30.9 degrees F
SAMPLE 13-2097
(10.0-14.5)
Dry unit wt. 87.3 pcf, NM 37.0%
SAMPLE 13-2098
(14.5-15.0)
NM 38.3%, ORG 1.0%
SAMPLE 13-2099
(15.0-19.5)
Dry unit wt. 86.5 pcf, NM 36.2%
SAMPLE 13-2100
(19.5-20.0)
NM 31.4%



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	NORTH MAIN RUNWAY & CROSSWIND RUNWAY

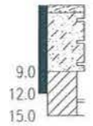
V:\Geo\61303 Ambler Airport\Amblerbase_jb-TH'S N Main & Xwind 3 Fri, Jun/07/13 11:48am



OBSTRUCTION AREA

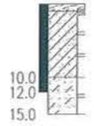
Feet
0 50 100 200

TH13-009
N67.10660', W157.85580'
01 MAR



TH13-009
0.0– 1.0 Bn ORG MAT hi Org
1.0– 9.0 Tn Si SAND Nbn
SAMPLE 13–2214
(1.8–2.2)
ASBESTOS WT. <0.1%
3.5– Nf
SAMPLE 13–2215
(4.8–5.2)
NM 11.7%, ORG 1.0%
5.0– Nbn, Interlayered Silt
7.0– Nf
SAMPLE 13–2216
(7.8–8.2)
ASBESTOS WT. <0.1%
8.0– 31.8 degrees F
9.0–15.0 Tn Silt, Nf
SAMPLE 13–2217
(9.0–15.0)
ML 85.0%–200 NP
12.0– 33.5 degrees F, moist and loose
SAMPLE 13–2218
(12.8–13.2)
NM 8.9

TH13-010
N67.10695', W157.85796'
01 MAR



TH13-010
0.0– 1.0 Bn ORG MAT hi Org
SAMPLE 13–2219
(0.8–1.2)
ASBESTOS WT. <0.1%
1.0–10.0 Tn Sa Silt sl Org, Nbn
SAMPLE 13–2221
(1.5–10.0)
ML 50.2%–200 NP
3.5– Interlayered silt
SAMPLE 13–2220
(3.8–4.2)
ASBESTOS WT. <0.1%
6.0– Nf
SAMPLE 13–2222
(6.8–7.2)
NM 7.5%
8.0– 31.7 degrees F
10.0–15.0 Tn Si Sand, Nf
SAMPLE 13–2223
(10.0–15.0)
ASBESTOS WT. <0.1%,
SM 45.3%–200 NP
11.0– 33.2 degrees F
SAMPLE 13–2224
(12.3–12.7)
ASBESTOS WT. <0.1%
13.0– 33.6 degrees F, dry to moist

TH13-011
N67.10776', W157.85994'
01 MAR

TH13-011
0.0– 1.0 Bn ORG MAT hi Org
1.0–20.0 Tn–Bn Si SAND sl Org, Nbn
SAMPLE 13–2225
(2.3–2.7)
ASBESTOS WT. <0.1%
3.0– Tn Nf
SAMPLE 13–2226
(4.8–5.2)
ASBESTOS WT. <0.1%
8.5– 30.8 degrees F
SAMPLE 13–2227
(9.8–10.2)
NM 16.7%
12.5– moist to wet
SAMPLE 13–2228
(13.2–13.7)
NM 25.5%
15.0– 36.1 degrees F
SAMPLE 13–2229
(18.8–19.2)
NM 29.1%

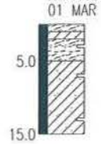
TH13-017
N67.10607', W157.85785'
01 MAR

TH13-017
0.0– 1.0 Bn ORG MAT hi Org
1.0–15.0 Bn Si SAND sl Org, Nbn
SAMPLE 13–2237
(2.3–2.7)
ASBESTOS WT. <0.1%
3.0– Tn Nf,
30.2 degrees F
SAMPLE 13–2238
(4.8–5.2)
NM 10.9%, ORG 0.2%
SAMPLE 13–2239
(7.8–8.2)
ASBESTOS WT. <0.1%
9.0– 31.7 degrees F
12.0– dry to moist,
33.1 degrees F
SAMPLE 13–2240
(12.8–13.2)
NM 14.9%

TH13-018
N67.10549', W157.85733'
01 MAR

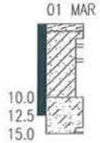
TH13-018
0.0– 1.0 Bn ORG MAT hi Org
1.0– 9.0 Bn Sa Silt sl Org, Nf
SAMPLE 13–2242
(1.0–7.0) ORG 1.1%
ML 62.9%–200 NP
SAMPLE 13–2241
(1.8–2.2)
ASBESTOS WT. <0.1%
2.0– Tn
7.0– 30.8 degrees F
9.0–15.0 Tn Si Sand, Np
12.0– 33.6 degrees F, dry to moist
SAMPLE 13–2244
(13.8–14.2)
ASBESTOS WT. <0.1%

TH13-048
N67.10591', W157.85867'
01 MAR

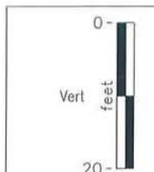


TH13-048
0.0– 1.0 Bn ORG MAT hi Org
1.0– 2.0 Bn SILT w/ Sa hi Org, Nbn
2.0– 5.0 Bn PEAT hi Org
SAMPLE 13–2234
(2.8–3.2)
NM 115.5%, ORG 44.0%
5.0–15.0 Gy SILT w/ Sa Nbe
SAMPLE 13–2235
(6.8–7.2)
NM 31.8%
SAMPLE 13–2236
(12.8–13.2)
NM 28.4%

TH13-049
N67.10666', W157.86050'
01 MAR



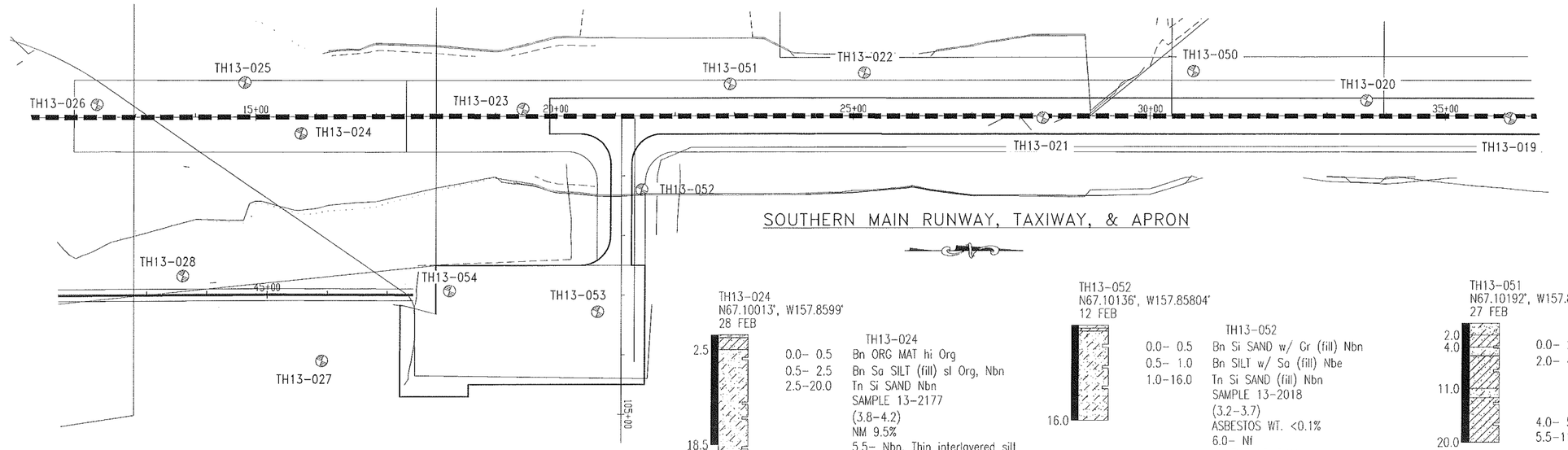
TH13-049
0.0– 1.0 Bn ORG MAT hi Org
1.0–10.0 Bn–Tn Sa Silt sl Org, Nbn
SAMPLE 13–2232
(2.0–10.0)
ORG 0.8%
ML 51.4%–200, NP
SAMPLE 13–2230
(2.8–3.2)
ASBESTOS WT. 0.1%
3.0– Tn Nf
SAMPLE 13–2231
(4.8–5.2)
ASBESTOS WT. <0.1%
5.5– Consistent
8.0– 31.2 degrees F
10.0–15.0 Tn Si Sand, NF
13.0– 34.2 degrees F, moist
SAMPLE 13–2233
(14.2–14.8)
NM 9.4%



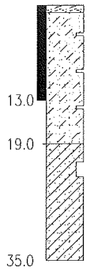
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	OBSTRUCTION AREA

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S Obstruction Area Fri, Jun/07/13 11:47am



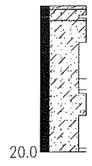
TH13-026
N67.09922', W157.86143'
27 FEB



TH13-026

0.0– 1.0 Bn ORG MAT hi Org
1.0–19.0 Bn Si Sa Nbn
2.5– Nf
SAMPLE 13-2168
(3.8–4.2)
ASBESTOS <0.1%
6.5– 31.4 degrees F
SAMPLE 13-2169
(8.8–9.2)
NM 5.4%
11.5– 31.7 degrees F
13.0– dry to moist,
34.7 degrees F,
Thawed material similar to frozen
SAMPLE 13-2170
(13.8–14.2)
NM 7.0%
18.0– 35.7 degrees F
19.0–35.0 Bn Sa SILT, moist
SAMPLE 13-2171
(21.5–23.5)
ML 69.0%–200 NP
22.5– moist,
23.5– 36.2 degrees
26.0– Similar and consistent
28.0– 41.2 degrees F
33.0– 39.2 degrees F

TH13-025
N67.099988', W157.86100'
16 FEB



TH13-025

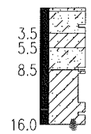
0.0– 0.5 Bn ORG MAT hi Org
0.5– 2.0 Bn–Bk Sa SILT Org, Nbn
SAMPLE 13-2063
(1.3–1.7)
NM 10.2%
2.0–20.0 Tn Si SAND Nf
SAMPLE 13-2064
(5.0–10.0)
NM 10.4%, ORG 0.5%
9.0– 32.2 degrees F
SAMPLE 13-2065
(10.0–11.5)
Dry unit wt. 110.3 pcf, NM 8.3%
11.5– Bn 31.4 degrees F
SAMPLE 13-2066
(11.5–12.0)
NM 7.5%, ORG 0.6%
SAMPLE 13-2067
(15.0–19.5)
Dry unit wt. 99.6 pcf, NM 24.2%
16.0– Consistent
17.5– 31.9 degrees F
19.0– 31.4 degrees F
SAMPLE 13-2068
(19.5–20.0)
NM 27.9%

TH13-024
N67.10013', W157.8599'
28 FEB

TH13-024

0.0– 0.5 Bn ORG MAT hi Org
0.5– 2.5 Bn Sa SILT (fill) sl Org, Nbn
2.5–20.0 Tn Si SAND Nbn
SAMPLE 13-2177
(3.8–4.2)
NM 9.5%
5.5– Nbn, Thin interlayered silt
8.0– 28.7 degrees F
SAMPLE 13-2178
(11.3–11.7)
NM 8.1%, ORG 0.5%
SAMPLE 13-2179
(13.8–14.2)
NM 5.4%
14.5– 31.7 degrees F
16.5– Similar and consistent
18.5– moist, 35.4 degrees F
SAMPLE 13-2180
(18.8–19.2)
NM 8.0%

TH13-054
N67.10037', W157.85781'
12 FEB



TH13-054

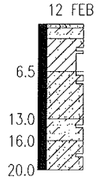
0.0– 0.5 Bn Si SAND w/ Gr (fill)
0.5– 3.5 Bn Si SAND Nf
SAMPLE 13-2000
(2.3–2.7)
ASBESTOS WT. <0.1%
3.5– 5.5 Bn SILT w/ Sa Nbn
5.5– 8.5 Tn Si SAND Nf
SAMPLE 13-2001
(8.2–8.7)
NM 26.1%
8.5–16.0 Bn SILT w/ Sa Nbn
SAMPLE 13-2002
(9.0–13.0)
ML 77.8%–200, NP
12.5– Consistent
SAMPLE 13-2003
(14.3–14.7)
NM 20.4%

TH13-052
N67.10136', W157.85804'
12 FEB

TH13-052

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 1.0 Bn SILT w/ Sa (fill) Nbe
1.0–16.0 Tn Si SAND (fill) Nbn
SAMPLE 13-2018
(3.2–3.7)
ASBESTOS WT. <0.1%
6.0– Nf
SAMPLE 13-2019
(6.8–7.2)
NM 10.0%, ORG 0.5%
9.0– Bn
SAMPLE 13-2020
(10.2–10.7)
NM 9.1%

TH13-053
N67.10096', W157.85691'
12 FEB



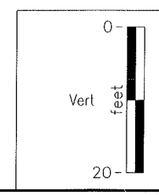
TH13-053

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 2.0 Bn Si SAND Nbn
2.0– 6.5 Bn SILT w/ Sa Nbn
SAMPLE 13-2004
(3.2–3.7)
NM 24.9%, ORG 0.6%
SAMPLE 13-2005
(4.0–7.0)
ML 75.7%–200, NP,
asbestos wt. < 0.1%
6.5–13.0 Bn Sa SILT Nbn
SAMPLE 13-2006
(7.8–8.2)
NM 24.7%
13.0–16.0 Bn Si SAND Nbn
SAMPLE 13-2007
(13.8–14.2)
NM 12.8%
16.0–20.0 Bn–Rd Sa SILT Nbn,
Iron Staining
SAMPLE 13-2008
(17.8–18.2)
NM 14.2%

TH13-051
N67.10192', W157.85878'
27 FEB

TH13-051

0.0– 2.0 Bn Si SAND w/ Gr (fill) Nbn
2.0– 4.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2164
(3.8–4.2)
ASBESTOS WT. <0.1%
4.0– 5.5 Tn Si SAND Nbn
5.5–11.0 Bn Sa SILT Nbn
SAMPLE 13-2165
(7.8–8.2)
NM 17.8%
11.0–12.5 Tn Si SAND Nbn
12.5–20.0 Bn Sa SILT Nbn
SAMPLE 13-2166
(13.3–13.7)
NM 20.0%
SAMPLE 13-2167
(16.8–17.2)
NM 22.9%



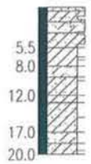
– FIGURE 23 –
– PAGE 53 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	SOUTH MAIN RUNWAY, TAXIWAY & APRON

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S S MAIN 1 Fri, Jun/07/13 11:47am

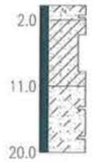
TH13-022
N67.10251', W157.85829'
25 FEB



TH13-022

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 2.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2117
(1.2–1.7)
NM 6.0%
2.0– 3.5 Bn Si SAND w/ Gr (fill) Nbn
SAMPLE 13-2118
(3.3–3.7)
ASBESTOS WT. <0.1%
3.5– 5.5 Bn Sa SILT (fill?) Nbn
SAMPLE 13-2120
(5.0–9.5)
NM 41.1%
5.5– 8.0 Bn–Bk SILT w/ Sa Nbn
SAMPLE 13-2119
(6.8–7.2)
NM 19.7%, ORG 1.9%
8.0– 9.5 Bn–Tn Si SAND Nf
8.5– Silt and organic zones
9.5–12.0 Bn Sa SILT Nbn,
30.7 degrees F
SAMPLE 13-2121
(9.5–10.0)
NM 26.9%, ORG 0.8%
SAMPLE 13-2122
(10.0–15.0)
Dry unit wt. 105.8 pcf, NM 23.5%
12.0–13.0 Bn–Bk SILT w/ Sa Nbn
13.0–17.0 Bn Sa SILT Nbn
14.5– 30.6 degrees F, Iron Staining
SAMPLE 13-2123
(15.0–19.5)
Dry unit wt. 93.7 pcf, NM 27.0%
17.0–18.5 Bn Si SAND Nbn
18.5–20.0 Bn Sa SILT Nbn
19.5– 30.4 degrees F
SAMPLE 13-2124
(19.5–20.0)
NM 14.2%

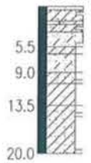
TH13-021
N67.10319', W157.85699'
27 FEB



TH13-021

0.0– 2.0 Bn Si SAND w/ Gr (fill) Nbn
SAMPLE 13-2160
(1.3–1.7)
ASBESTOS WT. <0.1%
2.0–11.0 Tn Sa SILT (fill?) Nbn
SAMPLE 13-2161
(4.0–9.0)
ASBESTOS WT. <0.1%
ML 57.6%-200 NP
5.0– Nf
7.5– 31.6 degrees F
9.5– Similar
11.0– 20.0 Tn Si SAND Nf 31.4 degrees F
SAMPLE 13-2162
(13.8–14.2)
NM 6.0%
16.0– 31.6 degrees F
SAMPLE 13-2163
(17.8–18.2)
NM 6.4%

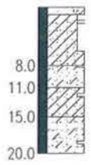
TH13-050
N67.10391', W157.85681'
25 FEB



TH13-050

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 2.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2109
(0.8–1.2)
NM 7.1%
2.0– 2.5 Bn Si SAND w/ Gr (fill) Nbn
2.5– 3.5 Bn Sa SILT sl Org, Nbn
SAMPLE 13-2110
(2.8–3.2)
ASBESTOS WT. <0.1%
3.5– 5.5 Tn Si SAND Nf
5.0– 31.8 degrees F
SAMPLE 13-2111
(5.0–9.5)
NM 18.6%
5.5– 6.5 Bn Sa SILT Nbn
6.5– 9.0 Tn Si SAND Nbn
8.0– Nf
9.0–10.5 Bn Sa SILT Nbn
SAMPLE 13-2112
(9.5–10.0)
NM 18.2%
SAMPLE 13-2113
(10.0–14.5)
Dry unit wt. 92.5 pcf, NM 30.7%
10.5–13.5 Bn–Bk SILT w/ Sa Nbn
13.5–20.0 Bn Sa SILT Nbn
SAMPLE 13-2114
(14.5–15.0)
NM 22.5%, ORG 0.5%
15.0– 31.6 degrees F
SAMPLE 13-2115
(15.0–19.5)
Dry unit wt. 95.3 pcf, NM 29.8%
19.0– 31.4 degrees F
SAMPLE 13-2116
(19.5–20.0)
NM 28.2%

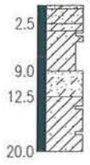
TH13-023
N67.10100', W157.85945'
28 FEB



TH13-023

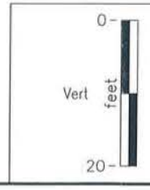
0.0– 1.0 Bn Si SAND w/ Gr (fill) Nbn
1.0– 8.0 Sa SILT, (fill) Nbn
SAMPLE 13-2173
(1.0–6.0)
ORG 1.1%
ML 67.5%-200 NP
SAMPLE 13-2172
(1.8–2.2)
ASBESTOS WT. <0.1%
8.0–11.0 Tn Si SAND Nf
SAMPLE 13-2174
(7.8–8.2)
ASBESTOS WT. <0.1%
8.0– 30.7 degrees F, Consistent
11.0–15.0 Bn–Tn Sa SILT sl Org, Nbn
SAMPLE 13-2175
(11.8–12.2)
NM 25.0%
15.0–20.0 Tn Si SAND Nf
16.5– 31.7 degrees F
SAMPLE 13-2176
(18.3–18.7)
NM 12.5%
19.0– 31.9 degrees F

TH13-020
N67.10460', W157.85570'
27 FEB



TH13-020

0.0– 0.5 Bn Si SAND w/ Gr (fil) Nbn
0.5– 2.5 Bn–Bk Sa SILT (fill) Nbn
2.5– 3.5 Tn Si SAND (fill) Nbn
3.5– 9.0 Bn SILT w/ Sa (fill?) Nbn
SAMPLE 13-2156
(3.8–4.2)
NM 19.2%, ORG 1.3%
SAMPLE 13-2157
(5.0–9.0)
ORG 2.0%,
ASBESTOS WT. <0.1%
ML 78.9%-200 LL-22 NP
6.5– Consistent
8.5– Org, Wood Chips
9.0–12.5 Tn Si SAND Nbn
10.5– Bn
12.5–20.0 Bn–Gr SILT w/Sa Nbn
SAMPLE 13-2158
(13.8–14.2)
NM 27.8%
SAMPLE 13-2159
(17.3–17.7)
NM 27.5%



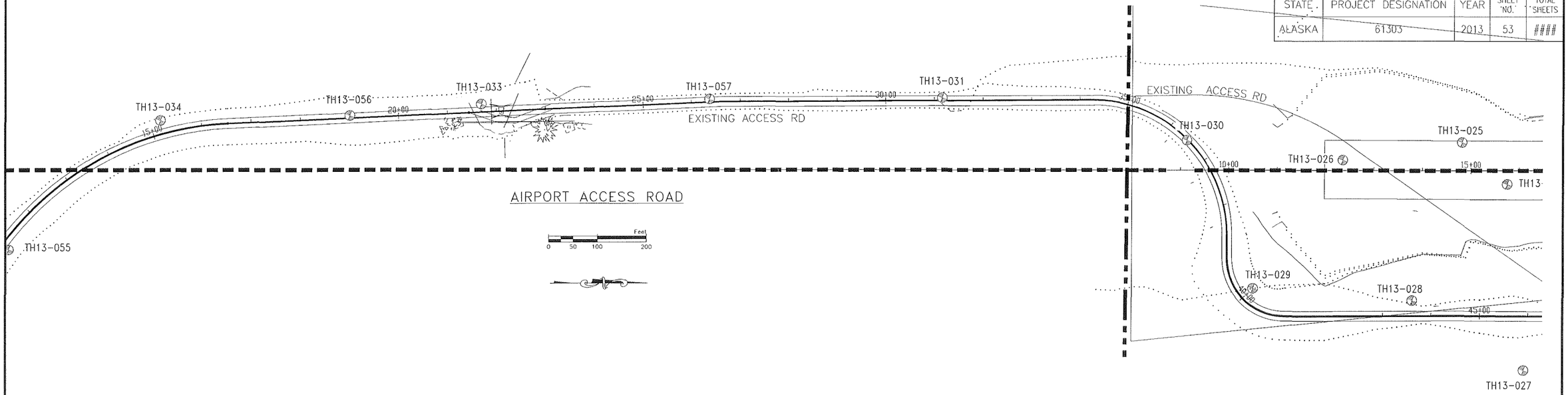
– FIGURE 24 –
– PAGE 54 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

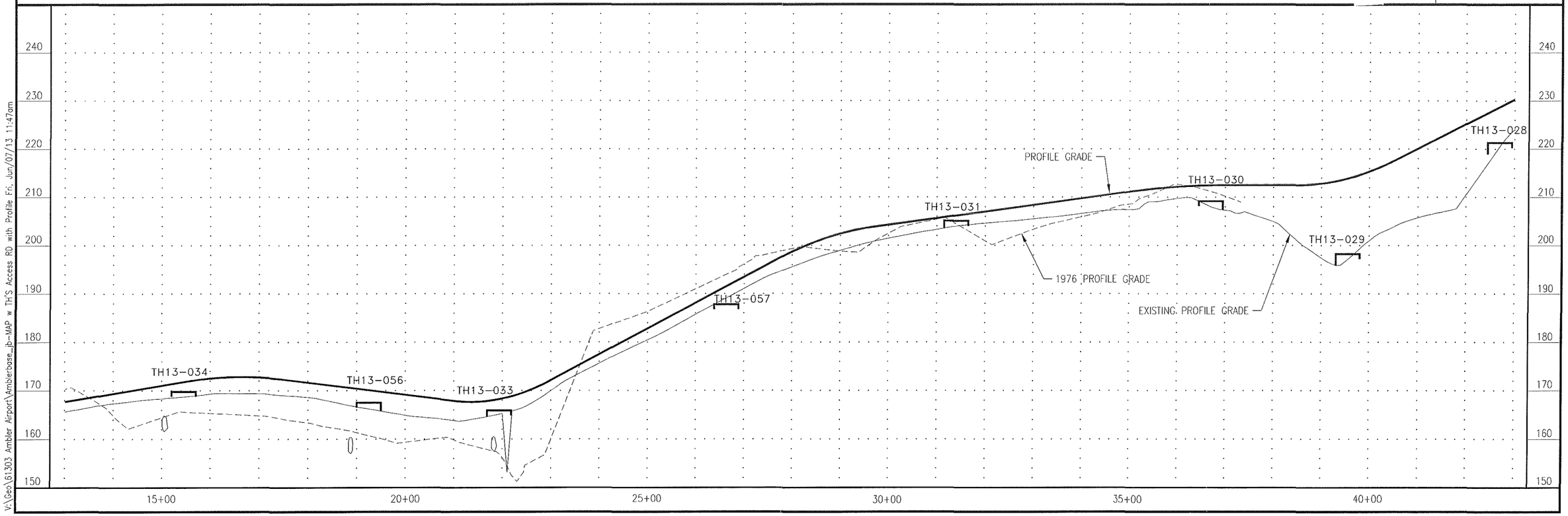
DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	SOUTH MAIN RUNWAY, TAXIWAY & APRON

V:\Geo\61303 Ambler Airport\Amblerbase_jb-TH'S S MAIN 2 Fri, Jun/07/13 11:47am

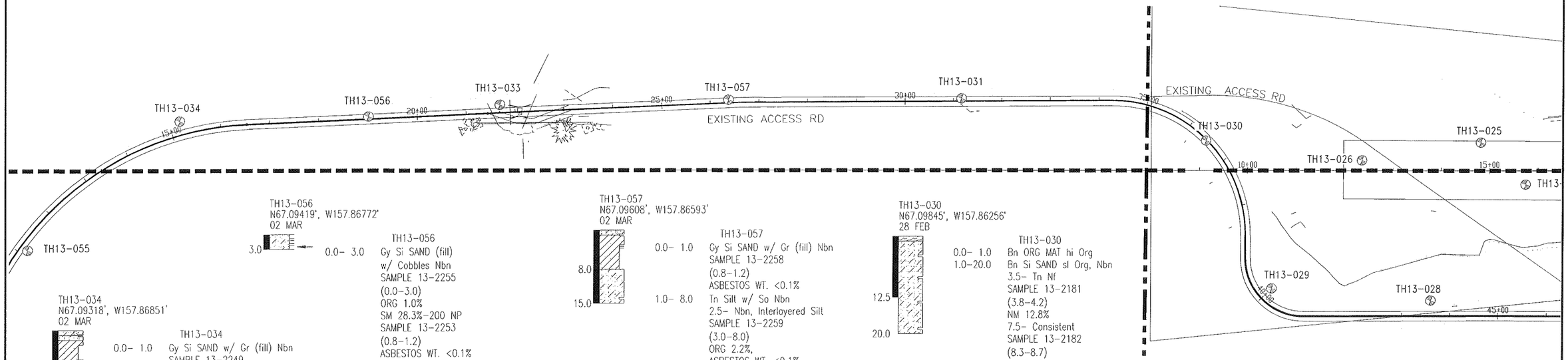
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	61303	2013	53	####



Vert. 10 feet 0 Horiz. 0 feet 100



V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S Access RD with Profile Fri. Jun/07/13 11:47am



TH13-056
N67.09419', W157.86772'
02 MAR

3.0

TH13-056

0.0– 3.0 Gy Si SAND (fill)
w/ Cobbles Nbn
SAMPLE 13-2255
(0.0–3.0)
ORG 1.0%
SM 28.3%–200 NP
SAMPLE 13-2253
(0.8–1.2)
ASBESTOS WT. <0.1%
SAMPLE 13-2254
(1.8–2.2)
ASBESTOS WT. 0.1%
2.5– Auger Refusal in frozen gravel

TH13-057
N67.09608', W157.86593'
02 MAR

8.0
15.0

TH13-057

0.0– 1.0 Gy Si SAND w/ Gr (fill) Nbn
SAMPLE 13-2258
(0.8–1.2)
ASBESTOS WT. <0.1%

1.0– 8.0 Tn Silt w/ So Nbn
2.5– Nbn, Interlayered Silt
SAMPLE 13-2259
(3.0–8.0)
ORG 2.2%,
ASBESTOS WT. <0.1%
ML 72.1%–200, NP
SAMPLE 13-2260
(3.3–3.7)
NM 6.9%
3.5– Nf
7.5– 31.7 degrees F

8.0–15.0 Tn Si SAND
13.5– 27.4 degrees F
SAMPLE 13-2261
(13.8–14.2)
NM 9.2%

TH13-030
N67.09845', W157.86256'
28 FEB

12.5
20.0

TH13-030

0.0– 1.0 Bn ORG MAT hi Org
1.0–20.0 Bn Si SAND sl Org, Nbn
3.5– Tn Nf
SAMPLE 13-2181
(3.8–4.2)
NM 12.8%
7.5– Consistent
SAMPLE 13-2182
(8.3–8.7)
NM 5.1%
9.5– 31.1 degrees F
13.0– dry to moist,
32.4 degrees F
SAMPLE 13-2183
(13.3–13.7)
NM 7.5%
18.5– 34.1 degrees F
SAMPLE 13-2184
(18.8–19.2)
NM 8.2%

TH13-034
N67.09318', W157.86851'
02 MAR

9.5
15.0

TH13-034

0.0– 1.0 Gy Si SAND w/ Gr (fill) Nbn
SAMPLE 13-2249
(0.8–1.2)
NM 21.8%, ORG 0.5%

1.0– 2.0 Gy Si SAND (fill) Nbn

2.0– 9.5 Bn SILT w/ Sa (fill) Nbn
SAMPLE 13-2250
(3.0–6.0)
NM 20.6%, ORG 0.6%,
ASBESTOS WT. <0.1%
ML 71.6%–200 LL–18 NP
3.5– (fill?)

9.5–10.5 Bn PEAT hi Org

10.5–15.0 Bn–Bk SILT w/ Sa sl Org, Nbn
SAMPLE 13-2251B
(10.8–11.2)
NM 49.0%, ORG 4.2%
12.5– Thin sandy zones
SAMPLE 13-2252
(13.8–14.2)
NM 58.4%

TH13-033
N67.09486', W157.86696'
02 MAR

4.0

TH13-033

0.0– 4.0 Gy Si SAND w/ Gr (fill)
w/ Cobbles Nbn
SAMPLE 13-2256
(0.8–1.2)
ASBESTOS WT. 0.2%
SAMPLE 13-2257
(2.8–3.2)
ASBESTOS WT. <0.1%
3.5– Refusal in frozen gravel

TH13-028
N67.09928', W157.85918'
18 FEB

20.0

TH13-028

0.0– 1.0 Bn ORG MAT hi Org
1.0– 2.5 Bn Sa SILT Org, Nbn
SAMPLE 13-2069
(2.3–2.7)
NM 11.4%

2.5–20.0 Tn Si SAND Nf
SAMPLE 13-2070
(3.5–8.0)
ORG 0.4%
SM 29.3%–200 NP
SAMPLE 13-2071
(5.0–9.5)
NM 3.6%
8.0– 21.4 degrees F,
frozen does not bond together
SAMPLE 13-2072
(9.5–10.0)
NM 5.1%, ORG 0.5%
SAMPLE 13-2073
(10.0–14.5)
Dry unit wt. 87.9 pcf, NM 7.5%
12.0– Bn
14.0– 31.4 degrees F,
Core mostly intact
SAMPLE 13-2074
(14.5–15.0)
NM 8.2%, ORG 0.3%
SAMPLE 13-2075
(15.0–19.5)
Dry unit wt. 88.4 pcf, NM 8.3%
18.5– 31.5 degrees F
SAMPLE 13-2076
(19.5–20.0)
NM 3.2%

TH13-027
N67.09971', W157.85763'
27 FEB

13.0
20.0

TH13-027

0.0– 1.0 Bn ORG MAT hi Org
1.0–20.0 Tn Si SAND sl Org, Nbn
3.5– Nf
SAMPLE 13-2153
(3.8–4.2)
NM 18.0%

SAMPLE 13-2154
(7.3–7.7)
NM 6.2%

8.0– 28.8 degrees F
10.0– Consistent
13.0– dry to moist, 33.3 degrees F,
similar to frozen material
SAMPLE 13-2155
(15.8–16.2)
NM 9.9%

TH13-031
N67.09730', W157.86471'
02 MAR

13.0
15.0

TH13-031

0.0– 0.5 Gy Si SAND w/ Gr (fill) Nbn
0.5– 1.5 Bn Sa SILT (fill) Nbn
1.5–15.0 Tn Si SAND Nbn
SAMPLE 13-2262
(1.8–2.2)
ASBESTOS WT <0.1%
3.5– Nf
SAMPLE 13-2263
(4.8–5.2)
NM 8.9%
5.5– 30.4 degrees F
6.0– Nbn, Interlayered silt
SAMPLE 13-2264
(6.8–7.2)
NM 8.6%, ORG 0.4%
SAMPLE 13-2265
(9.8–10.2)
NM 9.4%
10.0– Nf
SAMPLE 13-2266
(13.3–13.7)
NM 6.7%
14.0– dry to moist
32.1 degrees F

TH13-029
N67.09860', W157.86046'
28 FEB

14.5
30.0

TH13-029

0.0– 1.0 Bn ORG MAT hi Org
1.0– 2.0 Bn Sa SILT sl Org, Nbn
2.0–30.0 Tn Si SAND Nbn
SAMPLE 13-2185
(2.3–2.7)
ASBESTOS WT. <0.1%
SAMPLE 13-2186
(3.0–8.0)
ASBESTOS WT. <0.1%
SM 49.4%–200, NP
3.5– Nf
5.5– Nbn, Interlayered silt
SAMPLE 13-2187
(6.8–7.2)
NM 6.8%, ORG 0.4%
7.0– Nf
8.0– 31.3 degrees F
12.0– 31.8 degrees F
14.5– 34.8 degrees F
SAMPLE 13-2188
(14.8–15.2)
NM 22.6%
17.0– moist
SAMPLE 13-2189
(19.8–20.2)
NM 26.8%
20.0– moist to wet,
35.4 degrees F
25.0– wet
SAMPLE 13-2190
(28.8–29.2)
NM 22.2%
29.0– 38.3 degrees F

TH13-055
N67.09212', W157.86764'
02 MAR

4.0
15.0

TH13-055

0.0– 1.5 Bn Si SAND w/ Gr (fill) Nbn
1.5– 4.0 Bn Sa SILT (fill) Nbn
SAMPLE 13-2245
(2.3–2.7)
ASBESTOS WT. 0.2%

4.0–15.0 Gy SILT w/ Sa (fill?) Nbn
SAMPLE 13-2246
(4.8–5.2)
NM 21.7%, ORG 0.6%
7.5– Consistent
SAMPLE 13-2247
(8.3–8.7)
NM 22.8%
12.0– Bn–Bk sl Org
SAMPLE 13-2248
(12.3–12.7)
NM 32.7%, ORG 3.9%
14.5– Auger refusal in tightly frozen silt

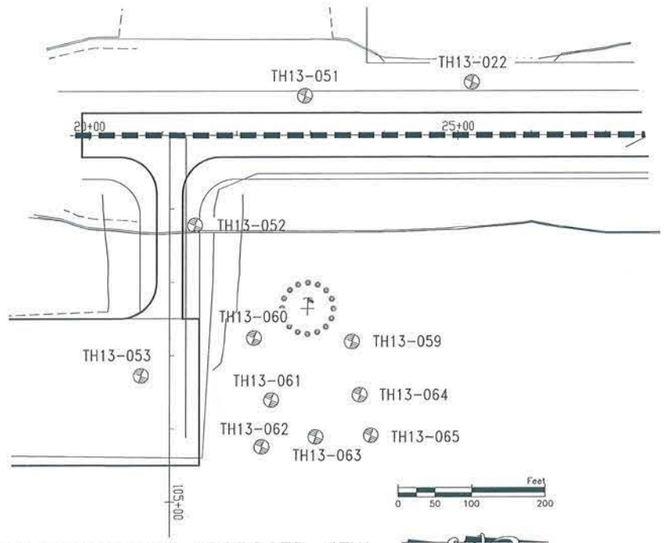
Vert
0-
feet
20-

– FIGURE 26 –
– PAGE 56 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	ACCESS ROAD

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S Access RD Fri, Jun/07/13 11:45am



NOT CONSIDERED PROPOSED NEW SREB AREA

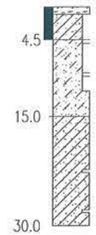
TH13-062
N67.10127', W157.85584'
26 FEB

TH13-062

0.0– 1.0 Bn ORG MAT hi Org
1.0– 2.5 Bn Sa SILT sl Org, Nbn
2.5– 3.5 Tn Si SAND Nbn
3.5– 4.5 Bn Sa SILT Nbn
4.5–28.0 Tn Si SAND Nbn
SAMPLE 13–2130
(5.0–10.0)
NM 7.6%
5.5– Nf, 30.4 degrees F
8.0– dry to moist
10.0– 36.3 degrees F
SAMPLE 13–2131
(10.0–12.0) BLOW COUNTS: 3, 3, 4, 5
Dry unit wt. 91.6 pcf, NM 9.5%
10.5– loose
11.0– 31.6 degrees F, NF
SAMPLE 13–2132
(15.0–17.0) BLOW COUNTS: 3, 7, 8, 7
Dry unit wt. 102.2 pcf, NM 4.3%
17.0– 31.4 degrees F
18.0– Interlayered silt
SAMPLE 13–2133
(20.0–25.0)
Dry unit wt. 89.3 pcf, NM 4.6%
21.0– Consistent
25.0– 31.2 degrees F
SAMPLE 13–2135
(25.0–30.0)
NM 28.8%, ML 64.5%–200, NP

28.0–30.0 Bn–Bk Sa SILT sl Org, Nbn,
SAMPLE 13–2134
(28.8–29.2)
NM 18.6%
29.5– 32.2 degrees F

TH13-063
N67.10147', W157.85573'
14 FEB



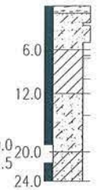
TH13-063

0.0– 1.0 Bn ORG MAT hi Org
1.0– 4.5 Tn–Rd Sa Silt sl Org, Nbn,
Iron Staining
SAMPLE 13–2040
(1.0–4.5)
ORG 2.2%
ML 67.5%–200, NP
3.5– Tn

4.5–15.0 Bn Si Sand, moist
33.4degrees F
SAMPLE 13–2041
(4.5–5.0)
NM 6.9%
SAMPLE 13–2042
(5.0–9.0)
SM 48.0%–200 NP
SAMPLE 13–2043
(9.0–9.5)
NM 5.5% ORG 0.4%
SAMPLE 13–2044
(9.5–11.5) BLOW COUNT: 5, 10, 9, 10
NM 7.0%
11.5– moist, medium dense,
36.2 degrees F
14.0– 34.3 degrees F

15.0–30.0 Bn–Bk Sa SILT moist to wet
19.0– Low Drill resistance
21.0– wet
SAMPLE 13–2045
(22.3–22.7)
NM 25.2%
SAMPLE 13–2046
(27.8–28.2)
NM 25.5%

TH13-064
N67.10168', W157.85594'
26 FEB



TH13-064

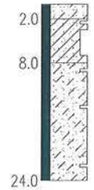
0.0– 1.0 Bn ORG MAT hi Org
1.0– 6.0 Bn Si SAND sl Org, Nbn
2.0– Tn
SAMPLE 13–2136
(2.3–2.7)
NM 8.8%
4.0– Nf
SAMPLE 13–2138
(5.0–10.0)
NM 12.3%
ML 91.2%–200 NP

6.0–12.0 Bn SILT Nbn
SAMPLE 13–2137
(6.8–7.2)
NM 10.9%
9.0– 31.9 degrees F
SAMPLE 13–2139
(10.0–15.0)
Dry unit wt. 94.4 pcf, NM 8.4%

12.0–20.0 Tn Si SAND Nbn
14.0– 30.8 degrees F
SAMPLE 13–2140
(15.0–20.0)
Dry unit wt. 72.2 pcf, NM 11.8%
16.0– Nf
19.0– Thawed? 34.6 degrees F, moist

20.0–24.0 Bn Sa SILT Nbn
23.0– Sample melted due to high drill resistance
SAMPLE 13–2141A
(20.0–24.0)
NM 12.4%
ML 67.8%–200, NP
24.0– Refusal in tightly frozen silts

TH13-059
N67.10173', W157.85644'
12 FEB



TH13-059

0.0– 2.0 Bn Si SAND (fill) Nbn
2.0– 8.0 Tn Sa SILT Nf
SAMPLE 13–2009
(2.3–2.7)
ASBESTOS WT. <0.1%
SAMPLE 13–2010
(3.5–7.0)
ORG 0.6%
ML 51.3%–200 NP
5.0– 27.3 degrees F

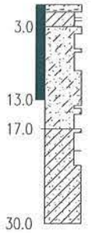
8.0–24.0 Tn Si SAND Nf
SAMPLE 13–2011
(8.8–9.2)
NM 7.1%
12.5– Consistent
SAMPLE 13–2012
(13.8–14.2)
NM 9.5%
SAMPLE 13–2013
(21.8–22.2)
NM 10.1%

TH13-060
N67.10140', W157.85683'
12 FEB

TH13-060

0.0– 0.5 Bn Si SAND w/ Gr (fill) Nbn
0.5– 1.0 Bn SILT Org, Nbe
1.0–16.0 Tn Si SAND Nbn
SAMPLE 13–2014
(2.8–3.2)
NM 6.6%
6.0– Nf
SAMPLE 13–2015
(7.3–7.8)
NM 8.6%
9.0– Bn
SAMPLE 13–2016
(10.3–10.7)
NM 8.6%
12.0–
SAMPLE 13–2017
(14.3–14.7)
NM 9.5%

TH13-065
N67.10166', W157.85554'
15 FEB



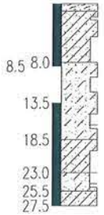
TH13-065

0.0– 1.0 Bn ORG MAT hi Org
1.0– 3.0 Bn SILT w/Sa Org, Nbn
SAMPLE 13–2048
(1.0–3.0)
ML 81.4%–200 LL–20 NP, ORG 0.5%
SAMPLE 13–2047
(1.8–2.2)
ASBESTOS WT. <0.1%

3.0–17.0 Tn Si SAND Nbn, 28.5 degrees F
SAMPLE 13–2049
(4.0–6.0) BLOW COUNT: 10, 13, 11, 8
NM 3.6%
5.0– 6.0– Nf
SAMPLE 13–2050
(6.5–9.0)
Dry unit wt. 101.7 pcf, NM 5.8%
8.5– 31.2 degrees F
11.5– 31.7 degrees F
13.0– 33.0 degrees F, moist
SAMPLE 13–2052
(13.8–14.2)
NM 10.0%
SAMPLE 13–2053
(15.0–17.0) BLOW COUNTS: 3, 5, 6, 6
ORG 0.7%

17.0–30.0 Bn Sa SILT moist, medium dense
SAMPLE 13–2054
(17.5–20.0)
ML 59.2%–200 LL–26 NP
SAMPLE 13–2055
(20.0–22.0) BLOW COUNTS: 3, 4, 4, 4
NM 13.0%
22.0– loose
(25.0–27.0) BLOW COUNTS: 3, 4, 4, 7

TH13-061
N67.10137', W157.85622'
16 FEB



TH13-061

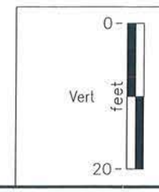
0.0– 1.0 Bn ORG MAT hi Org
1.0– 8.0 Bn Sa SILT Org, Nbn
SAMPLE 13–2056
(1.8–2.2)
NM 18.3%, ORG 0.7%
SAMPLE 13–2057
(4.5–8.0)
ORG 1.2%
ML 67.9%–200 NP

8.0–18.5 Tn Si Sand, Nbn
8.5– Sampler plugged off, moist
SAMPLE 13–2058
(10.0–12.0) BLOW COUNTS: 3, 5, 4, 4
NM 15.7%
12.0– 32.4 degrees F
SAMPLE 13–2059
(15.0–16.5) BLOW COUNTS: 3, 5, 6, 5
Dry unit wt. 100.0 pcf, NM 6.3%
16.0– 31.3 degrees F, NF
SAMPLE 13–2060
(16.5–17.0)
NM 6.8%

18.5–23.0 Bn Sa SILT Nf
SAMPLE 13–2061
(20.0–24.5)
Dry unit wt. 96.4 pcf, NM 29.2%
21.0– Interlayered silt and sand
22.0– 32.2 degrees F
22.5– 31.8 degrees F

23.0–25.5 Bn Si SAND Nf
SAMPLE 13–2062
(24.5–25.0)
NM 22.7%

25.5–27.5 Bn Sa SILT Nbn
27.0– Refusal in tightly frozen silts

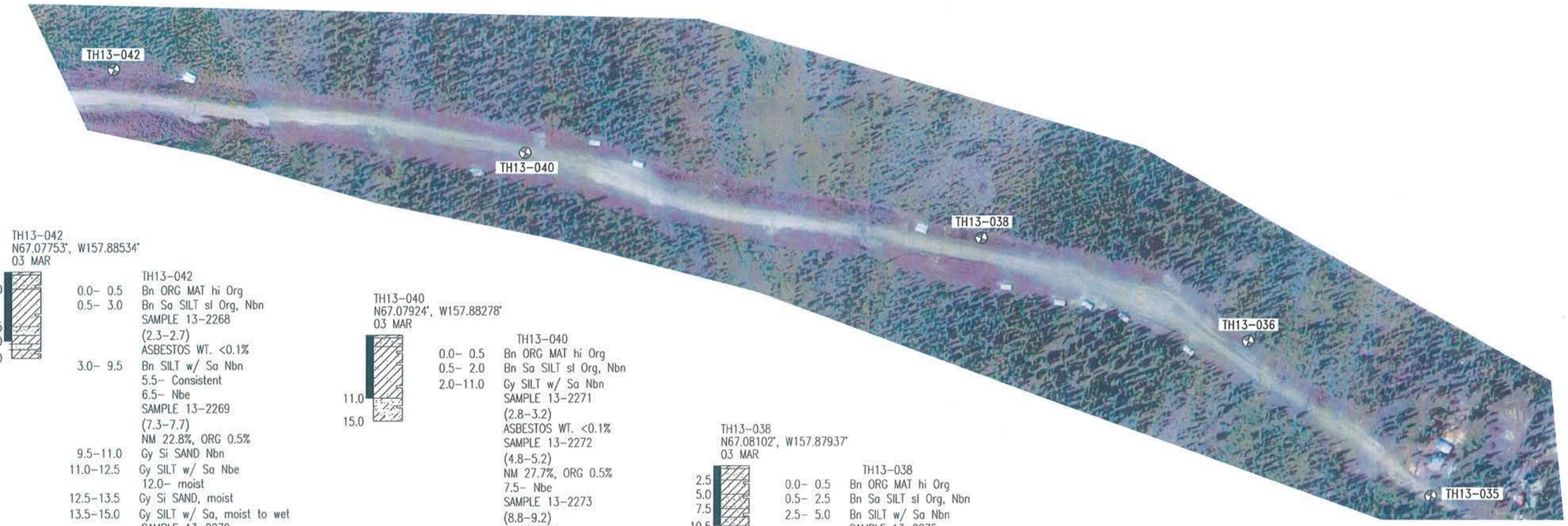


– FIGURE 27 –
– PAGE 57 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER AIRPORT REHABILITATION
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61303
DATE: MAY 2013	NOT CONSIDERED PROPOSED NEW SREB & APRON

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S Proposed New SREB & Apron Fri, Jun/07/13 11:45am



TH13-042
N67.07753', W157.88534'
03 MAR

3.0
9.5
12.0
15.0

TH13-042

0.0– 0.5 Bn ORG MAT hi Org
0.5– 3.0 Bn Sa SILT sl Org, Nbn
SAMPLE 13–2268
(2.3–2.7)
ASBESTOS WT. <0.1%
3.0– 9.5 Bn SILT w/ Sa Nbn
5.5– Consistent
6.5– Nbe
SAMPLE 13–2269
(7.3–7.7)
NM 22.8%, ORG 0.5%
9.5–11.0 Gy Si SAND Nbn
11.0–12.5 Gy SILT w/ Sa Nbe
12.0– moist
12.5–13.5 Gy Si SAND, moist
13.5–15.0 Gy SILT w/ Sa, moist to wet
SAMPLE 13–2270
(13.8–14.2)
NM 16.0%

TH13-040
N67.07924', W157.88278'
03 MAR

11.0
15.0

TH13-040

0.0– 0.5 Bn ORG MAT hi Org
0.5– 2.0 Bn Sa SILT sl Org, Nbn
2.0–11.0 Gy SILT w/ Sa Nbn
SAMPLE 13–2271
(2.8–3.2)
ASBESTOS WT. <0.1%
SAMPLE 13–2272
(4.8–5.2)
NM 27.7%, ORG 0.5%
7.5– Nbe
SAMPLE 13–2273
(8.8–9.2)
NM 23.8%
11.0–15.0 Bn Si SAND moist
12.0– w/ Gr
SAMPLE 13–2274
(12.3–12.7)
NM 15.0%
13.0– moist to wet, Silty zones

TH13-038
N67.08102', W157.87937'
03 MAR

2.5
5.0
7.5
10.5

TH13-038

0.0– 0.5 Bn ORG MAT hi Org
0.5– 2.5 Bn Sa SILT sl Org, Nbn
2.5– 5.0 Bn SILT w/ Sa Nbn
SAMPLE 13–2275
(2.8–3.2)
ASBESTOS WT. 0.1%
5.0– 7.5 Bn Sa SILT sl Org,
Nbn, Mottled color
SAMPLE 13–2276
(5.3–5.7)
NM 23.6%, ORG 0.7%
6.5– Nbe, Sandy zones
7.5– 9.0 Gy SILT w/ Sa Nbn
SAMPLE 13–2277
(8.3–8.8)
NM 16.2%
9.0–10.5 Gy Sa SILT w/ Gr Nbn
10.0– Auger Refusal in frozen gravel

TH13-036
N67.08201', W157.87695'
03 MAR

4.5
9.0
10.5
15.0

TH13-036

0.0– 1.5 Gy Si SAND w/ Gr (fill) Nbn
1.5– 4.5 Gy Sa SILT Nbn
SAMPLE 13–2278
(2.8–3.2)
ASBESTOS WT. <0.1%
4.0– hi Org
SAMPLE 13–2279
(4.3–4.7)
NM 39.5%, ORG 4.7%
4.5– 5.5 Bn PEAT hi Org, Wood chips
5.5–10.5 Gy Sa SILT Nbe
8.0– Org
9.0– Vx
10.5–15.0 Gy Si SAND w/ Gr moist to wet,
33.2 degrees F
SAMPLE 13–2280
(10.5–13.0)
NM 24.3%
11.5– SM 39.1%–200 NP
moist to wet

TH13-035
N67.08265', W157.87454'
03 MAR

4.0
13.0
15.0

TH13-035

0.0– 1.0 Bn Si SAND w/ Gr (fill) Nbn
1.0– 4.0 Gy SILT w/Sa Nbn
SAMPLE 13–2281
(1.5–4.5)
ASBESTOS WT. <0.1%
ML 84.2%–200 LL–20 NP
4.0–15.0 Bn Sa SILT Nbn
6.0 Nf
SAMPLE 13–2282
(6.0–9.0)
ML 53.0%–200 NP
7.5– 31.7 degrees F
9.0– Consistent
13.0– 32.6 degrees F, moist

AMBLER SEWAGE LAGOON ROAD

Feet
0 50 100 200

Vert 0– feet 20–

– FIGURE 28 –
– PAGE 58 –

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: TW	AMBLER SEWAGE LAGOON ROAD
DRAWN: JB	
APPROVED: SM	PROJECT NO. 61056
DATE: MAY 2013	SEWER LAGOON ROAD

V:\Geo\61303 Ambler Airport\Amblerbase_jb-MAP w TH'S Sewer Lagoon Rd Fri, Jun/07/13 11:44am

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APPENDIX B: LABORTORY TEST RESULTS:

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NORTHERN MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-001	TH13-001	TH13-001	TH13-002	TH13-002	TH13-002	TH13-002
DEPTH (feet)		5.0-10.0	14.5-15.0	19.5-20.0	2.8-3.2	8.8-9.2	11.8-12.2	18.3-18.7
STATION		58+00	58+00	58+00	55+50	55+50	55+50	55+50
OFFSET		15L	15L	15L	45R	45R	45R	45R
LAB NUMBER		**13-2096**	**13-2098**	**13-2100**	**13-2191**	**13-2192**	**13-2193**	**13-2194**
DATE SAMPLED		20-Feb-13	20-Feb-13	20-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SaSi)	(SaSi)	(SaSi)	(SiSa)	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		29.7	38.4	31.4	11.5	6.8	9.3	11.5
ORGANICS		0.9	1.0					
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NORTHERN MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-004	TH13-004	TH13-004	TH13-003	TH13-003	TH13-003	TH13-003
DEPTH (feet)		6.3-6.7	9.8-10.3	14.8-15.2	3.2-3.7	2.0-7.0	8.8-9.2	14.8-15.2
STATION		50+50	50+50	50+50	52+50	52+50	52+50	52+50
OFFSET		25L	25L	25L	15L	15L	15L	15L
LAB NUMBER		**13-2022**	**13-2023**	**13-2024**	**13-2196**	**13-2197**	**13-2198**	**13-2199**
DATE SAMPLED		13-Feb-13	13-Feb-13	13-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8					100		
	#10					99		
	#16					98		
	#30					97		
Sand	**#40**					95		
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**					69.1		
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT						NV		
PLASTIC INDEX						NP		
USCS CLASSIFICATION						ML		
USCS SOIL DESCRIPTION		(SaSi)	(SiSa)	(SiSa)	SaSi	SaSi	(SiSa)	(SiSa)
NATURAL MOISTURE		12.8	11.4	17.5	8.3		8.4	14.1
ORGANICS		0.8		0.6	0.6			1.7
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER: T. Weiss
SAMPLED BY: CENTERLINE, NORTHERN MAIN RUNWAY
MATERIAL SOURCE:

TEST HOLE NUMBER		TH13-004	TH13-004	TH13-005	TH13-005	TH13-005	TH13-005	TH13-005
DEPTH (feet)		15.0-20.0	17.2-17.7	1.3-1.7	2.0-6.5	5.0-10.0	12.8-13.2	10.0-14.0
STATION		50+50	50+50	48+00	48+00	48+00	48+00	48+00
OFFSET		25L	25L	5R	5R	5R	5R	5R
LAB NUMBER		**13-2025**	**13-2026**	**13-2088**	**13-2090**	**13-2091**	**13-2092**	**13-2093**
DATE SAMPLED		13-Feb-13	13-Feb-13	20-Feb-13	20-Feb-13	20-Feb-13	20-Feb-13	20-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8					99		
	#10				100	99		
	#16				99	98		
	#30	100			99	97		
Sand	**#40**	99			99	97		100
	#50	99			98	96		99
	#60	96			98	96		99
	#80	96			97	94		98
	#100	93			96	93		96
Silt/Clay	**#200**	46.6			76.4	75.5		72.7
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV			20	NV		NV
PLASTIC INDEX		NP			NP	NP		NP
USCS CLASSIFICATION		SM			ML	ML		ML
USCS SOIL DESCRIPTION		SiSa	SiSa	(SaSi)	Si w/Sa	Si w/Sa	Si w/Sa	Si w/Sa
NATURAL MOISTURE			20.9	20.4			21.0	
ORGANICS			1.3			3.0	0.7	
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS						sl Org[1]		

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, NORTHERN MAIN RUNWAY and CROSSWIND RUNWAY

TEST HOLE NUMBER		TH13-006	TH13-006	TH13-006	TH13-005	TH13-007	TH13-007	TH13-007
DEPTH (feet)		4.3-4.7	5.0-8.0	10.8-11.2	14.0-14.5	3.3-3.7	10.8-11.2	14.3-14.7
STATION		43+50	43+50	43+50	48+00	507+00	507+00	507+00
OFFSET		12R	12R	12R	5R	15R	15R	15R
LAB NUMBER		**13-2033**	**13-2034**	**13-2035**	**13-2094**	**13-2149**	**13-2150**	**13-2151**
DATE SAMPLED		13-Feb-13	13-Feb-13	13-Feb-13	20-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8		100					
	#10		99					
	#16		99					
Sand	**#30**		98					
	#40		98					
	#50		97					
	#60		97					
	#80							
	#100							
Silt/Clay	**#200**		85.6					
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			23	17				
PLASTIC INDEX			NP	NP				
USCS CLASSIFICATION			ML					
USCS SOIL DESCRIPTION		(Si w/Sa)	Si	(Si w/Sa)	(SaSi)	(SiSa)	(Si w/Sa)	(Si w/Sa)
NATURAL MOISTURE		22.6		25.3	22.0	15.5	22.7	25.6
ORGANICS		1.3	1.3			0.9		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, NORTHERN MAIN RUNWAY and CROSSWIND RUNWAY and OBSTRUCTION AREA

TEST HOLE NUMBER		TH13-008	TH13-008	TH13-008	TH13-007	TH13-009	TH13-009	TH13-009
DEPTH (feet)		3.3-3.7	10.3-10.7	12.8-13.2	15.5-19.5	4.8-5.2	9.0-15.0	12.8-13.2
STATION		40+00	40+00	40+00	507+00	40+50	40+50	40+50
OFFSET		10L	10L	10L	15R	310L	310L	310L
LAB NUMBER		**13-2036**	**13-2038**	**13-2039**	**13-2152**	**13-2215**	**13-2217**	**13-2218**
DATE SAMPLED		13-Feb-13	13-Feb-13	13-Feb-13	27-Feb-13	1-Mar-13	1-Mar-13	1-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50						100	
	#60						99	
	#80						99	
	#100				100		98	
Silt/Clay	**#200**				91.0		85.0	
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT					22		NV	
PLASTIC INDEX					NP		NP	
USCS CLASSIFICATION					ML		ML	
USCS SOIL DESCRIPTION		(SaSi)	(SaSi)	(Si w/Sa)	Si	(SiSa)	Si	(SiSa)
NATURAL MOISTURE		25.1	24.6	28.0		11.7		8.9
ORGANICS			0.3		0.7	1.0		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, OBSTRUCTION AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-012	TH13-010	TH13-010	TH13-010	TH13-011	TH13-011	TH13-011
DEPTH (feet)		2.8-3.2	1.5-10.0	6.8-7.2	10.0-15.0	9.8-10.2	13.2-13.7	18.8-19.2
STATION		515+00	512+50	512+50	512+50	516+00	516+00	516+00
OFFSET		55R	310L	310L	310L	80L	80L	80L
LAB NUMBER		**13-2201**	**13-2221**	**13-2222**	**13-2223**	**13-2227**	**13-2228**	**13-2229**
DATE SAMPLED		28-Feb-13	1-Mar-13	1-Mar-13	1-Mar-13	1-Mar-13	1-Mar-13	1-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**		100		100			
	#50		99		99			
	#60		99		99			
	#80		98		96			
	#100		97		94			
Silt/Clay	**#200**		50.2		45.3			
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			NV		NV			
PLASTIC INDEX			NP		NP			
USCS CLASSIFICATION			ML		SM			
USCS SOIL DESCRIPTION		(Si w/Sa)	SaSi	SaSi	SiSa	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		23.5		7.5		16.7	25.5	29.1
ORGANICS		0.8						
SP. GR. (FINE)			2.66		2.71			
SP. GR. (COARSE)								
MAX. DRY DENSITY					102.0			
OPTIMUM MOISTURE					8.5			
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS			T-99 was used		T-99 was used			

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

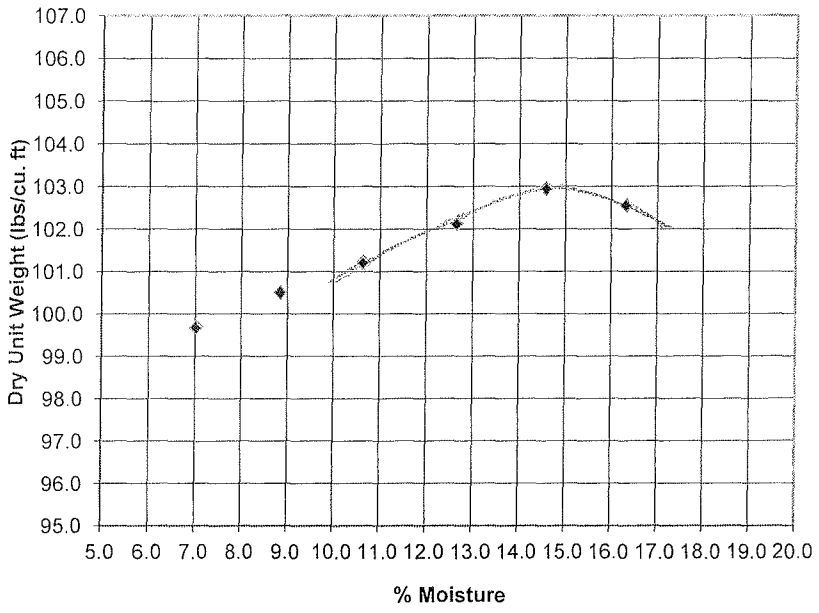
USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

State of Alaska Department of Transportation Northern Region Materials

COMPACTION REPORT

Project: Ambler Airport Rehabilitation *Lab Number:* 13-2221

MOISTURE - DENSITY RELATION



Dry Unit Wt	1	2	3	4	5	6	ZAV	ZAV
lbs/ft³	99.7	100.5	101.2	102.1	103.0	102.6	97.3	105.3
kg/m³	1597	1610	1622	1636	1649	1642.98	1559	1687
% Moisture:	7.0	8.8	10.6	12.6	14.6	16.3	26.6	21.7
Free Moist:								

ASTM D-1557 / AASHTO T-180D*	NRML	Field
**Max. Density	103.0	
Opt. Moist	14.6	

Signature: Heidi Schaefer 4/22/13

Heidi Shaefer Date

Regional Laboratory Supervisor

*Sector face rammer used

**Without 3/4" Correction

QA Review Comments: *Signature:* _____ *Date:* _____

Acceptance/Assurance Comparison

Material Engineer/Designee Date

Accept. Unaccept

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, CROSSWIND RUNWAY and OBSTRUCTION AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-013	TH13-013	TH13-013	TH13-012	TH13-012	TH13-012	TH13-014
DEPTH (feet)		1.8-2.2	5.0-9.5	9.5-10.0	7.3-7.7	8.8-9.2	13.3-13.7	2.3-2.7
STATION		518+50	518+50	518+50	515+00	515+00	515+00	521+50
OFFSET		15L	15L	15L	55R	55R	55R	52L
LAB NUMBER		**13-2125**	**13-2126**	**13-2127**	**13-2203**	**13-2204**	**13-2205**	**13-2206**
DATE SAMPLED		25-Feb-13	25-Feb-13	25-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60		100					
	#80		99					
	#100		99					
Silt/Clay	**#200**		90.5					
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			NV					
PLASTIC INDEX			NP					
USCS CLASSIFICATION			ML					
USCS SOIL DESCRIPTION		(Si w/Sa)	(Si w/Sa)	(Si w/Sa)	(Si w/Sa)	(Si w/Sa)	(SiSa)	(Si w/Sa)
NATURAL MOISTURE		26.6		23.1	14.2	15.0	6.5	32.5
ORGANICS			0.7	0.6	0.9			1.0
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, CROSSWIND RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-015	TH13-016	TH13-014	TH13-014	TH13-014	TH13-015	TH13-015
DEPTH (feet)		4.5-6.0	3.8-4.2	2.5-6.5	8.6-9.5	13.0-14.5	8.5-9.5	13.5-15.0
STATION		525+50	529+00	521+50	521+50	521+50	525+50	525+50
OFFSET		34R	CL	52L	52L	52L	34R	34R
LAB NUMBER		**12-2211**	**13-2105**	**13-2208**	**13-2209**	**13-2210**	**13-2212**	**13-2213**
DATE SAMPLED		28-Feb-13	24-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							99
	#30					100		99
Sand	**#40**					99	100	99
	#50					99	89	99
	#60			100	100	99	84	99
	#80			99	99	98	73	99
	#100			99	99	97	68	99
Silt/Clay	**#200**			92.3	91.6	79.4	45.1	93.0
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT				NV	NV	29	24	25
PLASTIC INDEX				NP	NP	NP	NP	NP
USCS CLASSIFICATION				ML	ML	ML	SM	ML
USCS SOIL DESCRIPTION		(SaSi)	(SaSi)	Si	Si	Si w/Sa	SiSa	Si
NATURAL MOISTURE		17.5	15.4		17.6	28.7	22.0	25.3
ORGANICS				1.2	0.9	4.9		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS						sl Org[1]		

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, MAIN AND CROSSWIND RUNWAY, OBSTRUCTION AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-019	TH13-016	TH13-016	TH13-016	TH13-017	TH13-017	TH13-018
DEPTH (feet)		5.0-10.0	5.0-10.0	16.8-17.2	15.0-20.0	4.8-5.2	12.8-13.2	1.0-7.0
STATION		36+00	529+00	529+00	529+00	38+00	38+00	35+50
OFFSET		52R	CL	CL	CL	550L	550L	300L
LAB NUMBER		**13-2078**	**13-2106**	**13-2107**	**13-2108**	**13-2238**	**13-2240**	**13-2242**
DATE SAMPLED		19-Feb-13	24-Feb-13	24-Feb-13	24-Feb-13	1-Mar-13	1-Mar-13	1-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							100
	#50							99
	#60				100			99
	#80				99			97
	#100				97			96
Silt/Clay	**#200**				66.5			62.9
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT					NV			NV
PLASTIC INDEX					NP			NP
USCS CLASSIFICATION					ML			ML
USCS SOIL DESCRIPTION		(SaSi)		SaSi	SaSi	(SiSa)	(SiSa)	SaSi
NATURAL MOISTURE		13.0	12.7	10.8		10.9	14.9	
ORGANICS		0.5	0.3			0.2		1.1
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-019	TH13-019	TH13-020	TH13-020	TH13-020	TH13-020	TH13-021
DEPTH (feet)		10.0-14.5	14.5-15.0	3.8-4.2	5.0-9.0	13.8-14.2	17.3-17.7	4.0-9.0
STATION		36+00	36+00	33+50	33+50	33+50	33+50	28+00
OFFSET		52R	52R	8R	8R	8R	8R	15R
LAB NUMBER		**13-2079**	**13-2080**	**13-2156**	**13-2157**	**13-2158**	**13-2159**	**13-2161**
DATE SAMPLED		19-Feb-13	19-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							99
	#10				100			99
	#16				99			99
	#30				98			98
Sand	**#40**				98			98
	#50				97			97
	#60				97			97
	#80				95			95
	#100				94			93
Silt/Clay	**#200**				78.9			57.0
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT					22			NV
PLASTIC INDEX					NP			NP
USCS CLASSIFICATION					ML			ML
USCS SOIL DESCRIPTION		(SiSa)	(SiSa)	(SaSi)	Si w/Sa	(Si w/Sa)	(Si w/Sa)	SaSi
NATURAL MOISTURE		6.5	9.4	19.2		27.8	27.5	
ORGANICS		0.5		1.3	2.0			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

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(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-022	TH13-022	TH13-022	TH13-022	TH13-022	TH13-021	TH13-021
DEPTH (feet)		1.2-1.7	6.8-7.2	5.0-9.5	9.5-10.0	19.5-20.0	13.8-14.2	17.8-18.2
STATION		25+00	25+00	25+00	25+00	25+00	28+00	28+00
OFFSET		30L	30L	30L	30L	30L	15R	15R
LAB NUMBER		**13-2117**	**13-2119**	**13-2120**	**13-2121**	**13-2124**	**13-2162**	**13-2163**
DATE SAMPLED		25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SaSi)	(Si w/Sa)	(SiSa)	(SaSi)	(SaSi)	(SiSa)	(SiSa)
NATURAL MOISTURE		6.0	19.7	41.1	26.9	14.2	6.0	6.4
ORGANICS			1.9		0.8			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-023	TH13-023	TH13-023	TH13-024	TH13-024	TH13-024	TH13-024
DEPTH (feet)		1.0-6.0	11.8-12.2	18.3-18.7	3.8-4.2	11.3-11.7	13.8-14.2	18.8-19.2
STATION		19+50	19+50	19+50	18+00	18+00	18+00	18+00
OFFSET		CL	CL	CL	20R	20R	20R	20R
LAB NUMBER		**13-2173**	**13-2175**	**13-2176**	**13-2177**	**13-2178**	**13-2179**	**13-2180**
DATE SAMPLED		28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"	100						
	0.375"	99						
	#4	99						
	#8	98						
	#10	98						
	#16	97						
	#30	97						
Sand	**#40**	96						
	#50	95						
	#60	95						
	#80	92						
	#100	90						
Silt/Clay	**#200**	67.5						
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		NV						
PLASTIC INDEX		NP						
USCS CLASSIFICATION		ML						
USCS SOIL DESCRIPTION		SaSi	(SaSi)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE			25.0	12.5	9.5	8.1	5.4	8.0
ORGANICS		1.1				0.5		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, MAIN RUNWAY
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-025	TH13-025	TH13-025	TH13-025	TH13-026	TH13-026	TH13-026
DEPTH (feet)		1.3-1.7	5.0-10.0	11.5-12.0	19.5-20.0	8.8-9.2	13.8-14.2	21.5-23.5
STATION		15+00	15+00	15+00	15+00	12+50	12+50	12+50
OFFSET		25L	25L	25L	25L	CL	CL	CL
LAB NUMBER		**13-2063**	**13-2064**	**13-2066**	**13-2068**	**13-2169**	**13-2170**	**13-2171**
DATE SAMPLED		16-Feb-13	16-Feb-13	16-Feb-13	16-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							100
	#10							99
	#16							98
	#30							96
Sand	**#40**							94
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							69.0
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								NV
PLASTIC INDEX								NP
USCS CLASSIFICATION								ML
USCS SOIL DESCRIPTION		(SaSi)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	SaSi
NATURAL MOISTURE		10.2	10.4	7.5	27.9	5.4	7.0	
ORGANICS			0.5	0.6				
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NEW ACCESS ROAD REALIGNMENT
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-028	TH13-028	TH13-028	TH13-028	TH13-027	TH13-027	TH13-027
DEPTH (feet)		2.3-2.7	3.5-8.0	5.0-9.5	9.5-10.0	3.8-4.2	7.3-7.7	15.8-16.2
STATION		1032+00	1032+00	1032+00	1032+00	46+00	46+00	46+00
OFFSET		10R	10R	10R	10R	150R	150R	150R
LAB NUMBER		**13-2069**	**13-2070**	**13-2071**	**13-2072**	**13-2153**	**13-2154**	**13-2155**
DATE SAMPLED		18-Feb-13	18-Feb-13	18-Feb-13	18-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30		100					
Sand	**#40**		99					
	#50		96					
	#60		92					
	#80		80					
	#100		73					
Silt/Clay	**#200**		29.3					
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			NV					
PLASTIC INDEX			NP					
USCS CLASSIFICATION			SM					
USCS SOIL DESCRIPTION		(SaSi)	SiSa	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		11.4		3.6	5.1	18.0	6.2	9.9
ORGANICS			0.4		0.5			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NEW ACCESS ROAD REALIGNMENT
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-028	TH13-028	TH13-029	TH13-029	TH13-029	TH13-029	TH13-029
DEPTH (feet)		14.5-15.0	19.5-20.0	3.0-8.0	6.8-7.2	14.8-15.2	19.8-20.2	28.8-29.2
STATION		1032+00	1032+00	1030+50	1030+50	1030+50	1030+50	1030+50
OFFSET		10R	10R	20R	20R	20R	20R	20R
LAB NUMBER		**13-2074**	**13-2076**	**13-2186**	**13-2187**	**13-2188**	**13-2189**	**13-2190**
DATE SAMPLED		18-Feb-13	18-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8			100				
	#10			99				
	#16			97				
Sand	**#30**			94				
	#40			86				
	#50			81				
	#60							
	#80							
	#100							
Silt/Clay	**#200**			49.4				
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT				NV				
PLASTIC INDEX				NP				
USCS CLASSIFICATION				SM				
USCS SOIL DESCRIPTION		(SiSa)	(SiSa)	SiSa	SiSa	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		8.2	3.2		6.8	22.6	26.5	22.2
ORGANICS		0.3			0.4			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NEW ACCESS ROAD REALIGNMENT
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-030	TH13-030	TH13-030	TH13-030	TH13-031	TH13-031	TH13-031
DEPTH (feet)		3.8-4.2	8.3-8.7	13.3-13.7	18.8-19.2	4.8-5.2	6.8-7.2	9.8-10.2
STATION		1026+00	1026+00	1026+00	1026+00	1022+00	1022+00	1022+00
OFFSET		10R	10R	10R	10R	5L	5L	5L
LAB NUMBER		**13-2181**	**13-2182**	**13-2183**	**13-2184**	**13-2263**	**13-2264**	**13-2265**
DATE SAMPLED		28-Feb-13	28-Feb-13	28-Feb-13	28-Feb-13	2-Mar-13	2-Mar-13	2-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		12.8	5.1	7.5	8.3	8.9	8.6	9.4
ORGANICS							0.4	
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, EXISTING ACCESS ROAD and LAGOON ROAD
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-034	TH13-034	TH13-034	TH13-034	TH13-031	TH13-035	TH13-035
DEPTH (feet)		0.8-1.2	3.0-6.0	10.8-11.2	13.8-14.2	13.3-13.7	1.5-4.5	6.0-9.0
STATION		1005+00	1005+00	1005+00	1005+00	1022+00	N67.08265°	N67.08265°
OFFSET		CL	CL	CL	CL	5L	W157.87454°	W157.87454°
LAB NUMBER		**13-2249**	**13-2250**	**13-2251B**	**13-2252**	**13-2266**	**13-2281**	**13-2282**
DATE SAMPLED		2-Mar-13	2-Mar-13	2-Mar-13	2-Mar-13	2-Mar-13	3-Mar-13	3-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**		95					
	0.75"		93					
	0.5"		93					
	0.375"		93					
	#4		93					
	#8		93					
	#10		93					
	#16		93					
	#30		93					
Sand	**#40**		93				100	99
	#50		93				99	98
	#60		92				99	96
	#80		90				97	92
	#100		88				96	89
Silt/Clay	**#200**		71.6				84.2	53.0
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT			18				20	NV
PLASTIC INDEX			NP				NP	NP
USCS CLASSIFICATION			ML				ML	ML
USCS SOIL DESCRIPTION		(SiSa)	Si w/Sa	(Si w/Sa)	(Si w/Sa)	(SiSa)	Si w/Sa	SaSi
NATURAL MOISTURE		21.8	20.6	49.0	58.4	6.7		
ORGANICS		0.5	0.6	4.2				
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS				sl Org[1]				

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, LAGOON ROAD

TEST HOLE NUMBER		TH13-040	TH13-040	TH13-040	TH13-038	TH13-038	TH13-036	TH13-036
DEPTH (feet)		4.8-5.2	8.8-9.2	12.3-12.7	5.3-5.7	8.3-8.8	4.3-4.7	10.5-13.0
STATION		N67.07924°	N67.07924°	N67.07924°	N67.08102°	N67.08102°	N67.08201°	N67.08201°
OFFSET		W157.88278°	W157.88278°	W157.88278°	W157.87937°	W157.87937°	W157.87695°	W157.87695°
LAB NUMBER		**13-2272**	**13-2273**	**13-2274**	**13-2276**	**13-2277**	**13-2279**	**13-2280**
DATE SAMPLED		3-Mar-13	3-Mar-13	3-Mar-13	3-Mar-13	3-Mar-13	3-Mar-13	3-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							99
	#10							99
	#16							98
	#30							96
Sand	**#40**							94
	#50							88
	#60							82
	#80							69
	#100							63
Silt/Clay	**#200**							39.1
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								NV
PLASTIC INDEX								NP
USCS CLASSIFICATION								SM
USCS SOIL DESCRIPTION		(Si w/Sa)	(Si w/Sa)	(SiSa w/Gr)	(SaSi)	(Si w/Sa)	(SaSi)	SiSa
NATURAL MOISTURE		27.7	23.8	15.0	23.6	16.2	39.5	24.3
ORGANICS		0.5			0.7		4.7	
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS							sl Org[1]	

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, LAGOON ROAD, MAIN AND CROSSWIND RUNWAYS

TEST HOLE NUMBER		TH13-044	TH13-044	TH13-044	TH13-045	TH13-045	TH13-042	TH13-042
DEPTH (feet)		2.3-2.7	0.8-10.2	14.3-14.7	2.3-2.7	8.3-8.7	7.3-7.7	13.8-14.2
STATION		46+50	46+50	46+50	504+00	504+00	N67.07753°	N67.07753°
OFFSET		52L	52L	52L	CL	CL	W157.88534°	W157.88534°
LAB NUMBER		**13-2027**	**13-2029**	**13-2030**	**13-2141**	**13-2143**	**13-2269**	**13-2270**
DATE SAMPLED		13-Feb-13	13-Feb-13	13-Feb-13	27-Feb-13	27-Feb-13	3-Mar-13	3-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SaSi)	(SiSa)	(SiSa)	(SiSa)	(Si w/Sa)	(Si w/Sa)	(Si w/Sa)
NATURAL MOISTURE		16.8	9.4	11.6	12.2	20.2	22.8	16.0
ORGANICS				0.5	0.7		0.5	
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, MAIN AND CROSSWIND RUNWAYS

TEST HOLE NUMBER		TH13-047	TH13-046	TH13-046	TH13-045	TH13-045	TH13-045	TH13-045
DEPTH (feet)		1.3-1.7	0.8-1.2	3.8-4.2	14.3-14.7	18.8-19.2	22.0-25.0	28.3-28.7
STATION		511+50	42+00	42+00	504+00	504+00	504+00	504+00
OFFSET		20R	CL	CL	CL	CL	CL	CL
LAB NUMBER		**13-2082**	**13-2101**	**13-2102**	**13-2144**	**13-2145**	**13-2146**	**13-2147**
DATE SAMPLED		19-Feb-13	23-Feb-13	23-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50						100	
	#60						99	
	#80						98	
	#100						98	
Silt/Clay	**#200**						82.8	
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT							NV	
PLASTIC INDEX							NP	
USCS CLASSIFICATION							ML	
USCS SOIL DESCRIPTION		(SiSa)	(SaSi)	(Si w/Sa)	(SiSa)	(SiSa)	Si w/Sa	(SaSi)
NATURAL MOISTURE		21.2	4.9	19.4	13.4	17.3		19.3
ORGANICS			0.8			0.2		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, CROSSWIND RUNWAYS and OBSTRUCTION
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-047	TH13-047	TH13-047	TH13-049	TH13-048	TH13-048	TH13-048
DEPTH (feet)		7.3-7.7	10.0-15.0	19.5-20.0	2.0-10.0	2.8-3.2	6.8-7.2	12.8-13.2
STATION		511+50	511+50	511+50	515+00	36+50	36+50	36+50
OFFSET		20R	20R	20R	850L	600L	600L	600L
LAB NUMBER		**13-2083**	**13-2085**	**13-2087**	**13-2232**	**13-2234**	**13-2235**	**13-2236**
DATE SAMPLED		19-Feb-13	19-Feb-13	19-Feb-13	1-Mar-13	1-Mar-13	1-Mar-13	1-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8				100			
	#10				98			
	#16				96			
	#30				89			
Sand	**#40**				83			
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**				51.4			
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT					NV		NV	
PLASTIC INDEX					NP		NP	
USCS CLASSIFICATION					ML			
USCS SOIL DESCRIPTION		(SiSa)	(SiSa)	(SiSa)	SaSi	(Pt)	(Si w/Sa)	(Si w/Sa)
NATURAL MOISTURE		11.1	6.2	24.2		115.5	31.8	28.4
ORGANICS		0.3	0.2		0.8	44.0		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS						hi Org[1]		

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

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STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER: T. Weiss
SAMPLED BY: CENTERLINE, MAIN RUNWAY and OBSTRUCTION
MATERIAL SOURCE:

TEST HOLE NUMBER		TH13-050	TH13-050	TH13-050	TH13-050	TH13-050	TH13-051	TH13-049
DEPTH (feet)		0.8-1.2	5.0-9.5	9.5-10.0	14.5-15.0	19.5-20.0	7.8-8.2	14.2-14.8
STATION		30+50	30+50	30+50	30+50	30+50	23+00	515+00
OFFSET		25L	25L	25L	25L	25L	18L	850L
LAB NUMBER		**13-2109**	**13-2111**	**13-2112**	**13-2114**	**13-2116**	**13-2165**	**13-2233**
DATE SAMPLED		25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	25-Feb-13	27-Feb-13	1-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SaSi)	(SaSi)	(SaSi)	(SaSi)	(SaSi)	(SaSi)	(SiSa)
NATURAL MOISTURE		7.1	18.6	18.2	22.5	28.2	17.8	9.4
ORGANICS					0.5			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T. Weiss
MATERIAL SOURCE: CENTERLINE, MAIN RUNWAY, PARKING APRON AND TAXIWAY

TEST HOLE NUMBER		TH13-053	TH13-053	TH13-053	TH13-052	TH13-052	TH13-051	TH13-051
DEPTH (feet)		3.2-3.7	4.0-7.0	7.8-8.2	6.8-7.2	10.2-10.7	13.3-13.7	16.8-17.2
STATION		103+50	103+50	103+50	101+00	101+00	23+00	23+00
OFFSET		100R	100R	100R	30L	30L	18L	18L
LAB NUMBER		**13-2004**	**13-2005**	**13-2006**	**13-2019**	**13-2020**	**13-2166**	**13-2167**
DATE SAMPLED		12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	27-Feb-13	27-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**		100					
	#50		99					
	#60		99					
	#80		96					
	#100		95					
Silt/Clay	**#200**		75.7					
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV				NV	
PLASTIC INDEX		NP	NP				NP	
USCS CLASSIFICATION			ML					
USCS SOIL DESCRIPTION		(Si w/Sa)	Si w/Sa	(SaSi)	(SiSa)	(SiSa)	(SaSi)	(SaSi)
NATURAL MOISTURE		24.9		24.7	10.0	9.1	20.0	22.9
ORGANICS		0.6			0.5			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER:
SAMPLED BY: T, Weiss
MATERIAL SOURCE: CENTERLINE, PARKING APRON AND ACCESS ROAD

TEST HOLE NUMBER		TH13-054	TH13-054	TH13-054	TH13-053	TH13-053	TH13-055	TH13-055
DEPTH (feet)		8.2-8.7	9.0-13.0	14.3-14.7	13.8-14.2	17.8-18.2	4.8-5.2	8.3-8.7
STATION		103+00	103+00	103+00	103+50	103+50	1001+00	1001+00
OFFSET		300R	300R	300R	100R	100R	5L	5L
LAB NUMBER		**13-2001**	**13-2002**	**13-2003**	**13-2007**	**13-2008**	**13-2246**	**13-2247**
DATE SAMPLED		12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	2-Mar-13	2-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50		100					
	#60		99					
	#80		98					
	#100		97					
Silt/Clay	**#200**		77.8					
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			NV					
PLASTIC INDEX			NP					
USCS CLASSIFICATION			ML					
USCS SOIL DESCRIPTION		(Si w/Sa)	Si w/Sa	(Si w/Sa)	(SiSa)	(SaSi)	(Si w/Sa)	(Si w/Sa)
NATURAL MOISTURE		26.1		20.4	12.8	14.2	21.7	22.8
ORGANICS							0.6	
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: Ambler Airport Rehibilation
PROJECT NUMBER: 61303
AKSAS NUMBER: T. Weiss
SAMPLED BY:
MATERIAL SOURCE: CENTERLINE, ACCESS ROAD AND NOT CONSIDERED PARKING APRON

TEST HOLE NUMBER		TH13-059	TH13-059	TH13-055	TH13-056	TH13-057	TH13-057	TH13-057
DEPTH (feet)		3.5-7.0	8.8-9.2	12.3-12.7	0.0-3.0	3.0-8.0	3.3-3.7	13.8-14.2
STATION		102+50	102+50	1001+00	1009+00	1017+50	1017+50	1017+50
OFFSET		200L	200L	5L	5L	5L	5L	5L
LAB NUMBER		**13-2010**	**13-2011**	**13-2248**	**13-2255**	**13-2259**	**13-2260**	**13-2261**
DATE SAMPLED		12-Feb-13	12-Feb-13	2-Mar-13	2-Mar-13	2-Mar-13	2-Mar-13	2-Mar-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"				99			
	0.375"				97			
	#4				91			
	#8				86			
	#10				84			
	#16				77			
	#30				67	100		
Sand	**#40**	100			62	99		
	#50	98			56	99		
	#60	97			53	98		
	#80	94			46	96		
	#100	91			42	95		
Silt/Clay	**#200**	51.3			28.3	72.1		
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		NV				NV		
PLASTIC INDEX		NP				NP		
USCS CLASSIFICATION		ML				ML		
USCS SOIL DESCRIPTION		SaSi	(SiSa)	(Si w/Sa)	SiSa	Si w/Sa	Si w/Sa	(SiSa)
NATURAL MOISTURE			7.1	32.7			6.9	9.2
ORGANICS		0.6		3.9	1.0	2.2		
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS				sl Org[1]		sl Org[1]		

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NOT CONSIDERED PARKING APRON AND SREB AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-059	TH13-059	TH13-060	TH13-060	TH13-060	TH13-060	TH13-061
DEPTH (feet)		13.8-14.2	21.8-22.2	2.8-3.2	7.3-7.8	10.3-10.7	14.3-14.7	1.8-2.2
STATION		102+50	102+50	102+50	102+50	102+50	102+50	102+50
OFFSET		200L	200L	50L	50L	50L	50L	200L
LAB NUMBER		**13-2012**	**13-2013**	**13-2014**	**13-2015**	**13-2016**	**13-2017**	**13-2056**
DATE SAMPLED		12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	12-Feb-13	16-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**							
	#50							
	#60							
	#80							
	#100							
Silt/Clay	**#200**							
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SiSa)
NATURAL MOISTURE		9.5	10.1	6.6	8.6	8.6	9.5	18.3
ORGANICS								0.7
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NOT CONSIDERED SREB AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-061	TH13-061	TH13-061	TH13-061	TH13-062	TH13-062	TH13-062
DEPTH (feet)		4.5-8.0	10.0-12.0	16.5-17.0	24.5-25.0	5.0-10.0	28.8-29.2	25.0-30.0
STATION		102+50	102+50	102+50	102+50	N67.10127°	N67.10127°	N67.10127°
OFFSET		200L	200L	200L	200L	W157.85584°	W157.85584°	W157.85584°
LAB NUMBER		**13-2057**	**13-2058**	**13-2060**	**13-2062**	**13-2130**	**13-2134**	**13-2135**
DATE SAMPLED		16-Feb-13	16-Feb-13	16-Feb-13	16-Feb-13	26-Feb-13	26-Feb-13	26-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30	100						
Sand	**#40**	99						100
	#50	98						98
	#60	97						95
	#80	92						87
	#100	92						82
Silt/Clay	**#200**	67.6						64.5
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV						NV
PLASTIC INDEX		NP						NP
USCS CLASSIFICATION		ML						ML
USCS SOIL DESCRIPTION		SaSi	(SiSa)	(SiSa)	(SiSa)	(SiSa)	(SaSi)	SaSi
NATURAL MOISTURE			15.7	6.8	22.7	7.6	18.6	28.8
ORGANICS		1.2						
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NOT CONSIDERED SREB AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-063	TH13-063	TH13-063	TH13-063	TH13-063	TH13-063	TH13-063
DEPTH (feet)		1.0-4.5	4.5-5.0	5.0-9.0	9.0-9.5	9.5-11.5	22.3-22.7	27.8-28.2
STATION		N67.10147°	N67.10147°	N67.10147°	N67.10147°	N67.10147°	N67.10147°	N67.10147°
OFFSET		W157.85573°	W157.85573°	W157.85573°	W157.85573°	W157.85573°	W157.85573°	W157.85573°
LAB NUMBER		**13-2040**	**13-2041**	**13-2042**	**13-2043**	**13-2044**	**13-2045**	**13-2046**
DATE SAMPLED		14-Feb-13	14-Feb-13	14-Feb-13	14-Feb-13	14-Feb-13	14-Feb-13	14-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8	99						
	#10	99						
	#16	98						
	#30	96		100				
Sand	**#40**	95		99				
	#50	93		97				
	#60	92		95				
	#80	88		88				
	#100	86		83				
Silt/Clay	**#200**	67.5		48.0				
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT								
PLASTIC INDEX								
USCS CLASSIFICATION								
USCS SOIL DESCRIPTION		SaSi	(SiSa)	SiSa	(SiSa)	(SiSa)	(SaSi)	(SaSi)
NATURAL MOISTURE			6.9		5.5	7.0	25.2	25.5
ORGANICS		2.2			0.4			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS		sl Org[1]						

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NOT CONSIDERED SREB AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-065	TH13-065	TH13-065	TH13-065	TH13-064	TH13-064	TH13-064
DEPTH (feet)		1.0-3.0	4.0-6.0	13.8-14.2	15.0-17.0	2.3-2.7	6.8-7.2	5.0-10.0
STATION		N67.10166°	N67.10166°	N67.10166°	N67.10166°	N67.10168°	N67.10168°	N67.10168°
OFFSET		W157.85554°	W157.85554°	W157.85554°	W157.85554°	W157.85594°	W157.85594°	W157.85594°
LAB NUMBER		**13-2048**	**13-2049**	**13-2052**	**13-2053**	**13-2136**	**13-2137**	**13-2138**
DATE SAMPLED		15-Feb-13	15-Feb-13	15-Feb-13	15-Feb-13	26-Feb-13	26-Feb-13	26-Feb-13
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16	100						
	#30	99						
Sand	**#40**	98						
	#50	97						
	#60	96						
	#80	95						
	#100	94						100
Silt/Clay	**#200**	81.4						91.2
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		20						NV
PLASTIC INDEX		NP						NP
USCS CLASSIFICATION		ML						ML
USCS SOIL DESCRIPTION		Si w/Sa	(SiSa)	(SiSa)	(SiSa)	(SiSa)	Si	Si
NATURAL MOISTURE			3.6	10.0		8.8	10.9	12.3
ORGANICS		0.5			0.7			
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME:	Ambler Airport Rehibilation
PROJECT NUMBER:	61303
AKSAS NUMBER:	T. Weiss
SAMPLED BY:	CENTERLINE, NOT CONSIDERED SREB AREA
MATERIAL SOURCE:	

TEST HOLE NUMBER		TH13-065	TH13-065					
DEPTH (feet)		17.5-20.0	20.0-22.0					
STATION		N67.10166°	N67.10166°					
OFFSET		W157.85554°	W157.85554°					
LAB NUMBER		**13-2054**	**13-2055**					
DATE SAMPLED		15-Feb-13	15-Feb-13					
% Passing	**3"**							
	2"							
	1.5"							
Gravel	**1.0"**							
	0.75"							
	0.5"							
	0.375"							
	#4							
	#8							
	#10							
	#16							
	#30							
Sand	**#40**	100						
	#50	98						
	#60	97						
	#80	91						
	#100	88						
Silt/Clay	**#200**	59.2						
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		26						
PLASTIC INDEX		NP						
USCS CLASSIFICATION		ML						
USCS SOIL DESCRIPTION		SaSi	(SiSa)					
NATURAL MOISTURE			13.0					
ORGANICS								
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. FACTOR								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS								

GENERAL COMMENTS

Gradation is based on material passing the 3" sieve, according to Alaska Test Method T-7.

[1] Organic content determination is based on the results of the ATM T-6 test method.

(Soil descriptions shown in parentheses are based on field determinations.)

USCS Soil Description Abbreviations: WG = Well-graded; PG = Poorly-graded; E = Elastic; L = Lean; F = Fat

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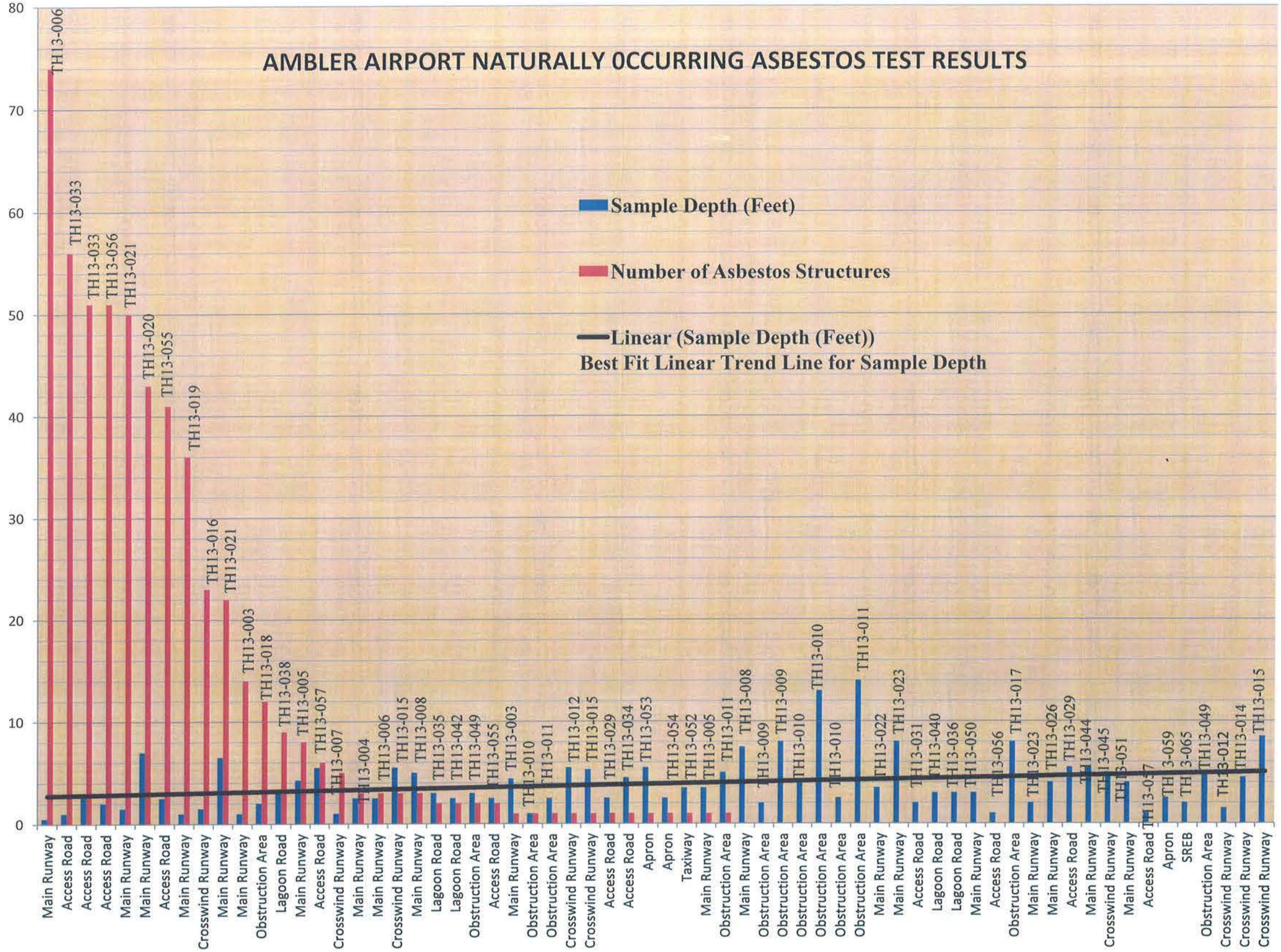
APPENDIX C: NATURALLY OCCURRING ASBESTOS LABORTORY TEST RESULTS:


AMBLER AIRPORT NATURALLY 0CCURRING ASBESTOS TEST RESULTS
Sample Depth (Feet)
Number of Asbestos Structures
Linear (Sample Depth (Feet))
Best Fit Linear Trend Line for Sample Depth
80
70
60
50
40
30
20
10
0
TH13-006
TH13-033
TH13-033
TH13-056
TH13-021
TH13-020
TH13-055
TH13-019
TH13-016
TH13-021
TH13-003
TH13-018
TH13-038
TH13-005
TH13-057
TH13-007
TH13-004
TH13-006
TH13-015
TH13-008
TH13-035
TH13-042
TH13-049
TH13-055
TH13-003
TH13-010
TH13-011
TH13-012
TH13-015
TH13-029
TH13-034
TH13-053
TH13-054
TH13-052
TH13-005
TH13-011
TH13-008
TH13-009
TH13-009
TH13-010
TH13-010
TH13-010
TH13-011
TH13-022
TH13-023
TH13-031
TH13-040
TH13-036
TH13-050
TH13-056
TH13-017
TH13-023
TH13-026
TH13-029
TH13-044
TH13-045
TH13-051
TH13-037
TH13-059
TH13-065
TH13-049
TH13-012
TH13-014
TH13-015
Main Runway
Access Road
Access Road
Access Road
Main Runway
Main Runway
Access Road
Main Runway
Crosswind Runway
Main Runway
Main Runway
Obstruction Area
Lagoon Road
Main Runway
Access Road
Crosswind Runway
Main Runway
Main Runway
Crosswind Runway
Main Runway
Lagoon Road
Lagoon Road
Obstruction Area
Access Road
Main Runway
Obstruction Area
Obstruction Area
Crosswind Runway
Crosswind Runway
Access Road
Access Road
Apron
Apron
Taxiway
Main Runway
Obstruction Area
Main Runway
Obstruction Area
Obstruction Area
Obstruction Area
Obstruction Area
Obstruction Area
Main Runway
Main Runway
Access Road
Lagoon Road
Lagoon Road
Main Runway
Access Road
Obstruction Area
Main Runway
Main Runway
Access Road
Main Runway
Crosswind Runway
Main Runway
Access Road
Apron
SREB
Obstruction Area
Crosswind Runway
Crosswind Runway
Crosswind Runway

EMSL Analytical, Inc.

2235 Polvorosa Drive, Suite 230, San Leandro, CA 94577 • (510) 895-3675 • sanleandrolab@emsl.com

Client: Alaska Dept. of Transportation
2301 Peger Rd.
Fairbanks, AK 99709
Attention: Timothy Weiss
Fax: (907) 451-2353 Phone: (907) 458-6883
Project: AMBLEC AIRPORT / # 61303

EMSL Reference: 091303718

Date Received: 03/12/13
Date Analyzed: 03/18/13
Date Reported: 03/19/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2089	091303718-0001	Chrysotile	1	0.1	<0.1	
13-2037	091303718-0002	None Detected	None Detected	0.1	<0.1	
13-2214	091303718-0003	None Detected	None Detected	0.1	<0.1	
13-2216	091303718-0004	None Detected	None Detected	0.1	<0.1	
13-2220	091303718-0005	None Detected	None Detected	0.1	<0.1	
13-2224	091303718-0006	None Detected	None Detected	0.1	<0.1	
13-2226	091303718-0007	Chrysotile	1	0.1	<0.1	
13-2237	091303718-0008	None Detected	None Detected	0.1	<0.1	
13-2239	091303718-0009	None Detected	None Detected	0.1	<0.1	
13-2244	091303718-0010	None Detected	None Detected	0.1	<0.1	
13-2118	091303718-0011	None Detected	None Detected	0.1	<0.1	
13-2174	091303718-0012	None Detected	None Detected	0.1	<0.1	
13-2262	091303718-0013	None Detected	None Detected	0.1	<0.1	
13-2271	091303718-0014	None Detected	None Detected	0.1	<0.1	
13-2278	091303718-0015	None Detected	None Detected	0.1	<0.1	

EMSL Analytical, Inc.

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Client:
Alaska Dept. of Transportation
2301 Peger Rd.
Fairbanks, AK 99709
Attention: Timothy Weiss
Fax: (907) 451-2353 Phone: (907) 458-6883
Project: AMBLEC AIRPORT / # 61303

EMSL Reference: 091303718

Date Received: 03/12/13
Date Analyzed: 03/18/13
Date Reported: 03/19/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2230	091303718-0016	Chrysotile	2	0.1	0.1	
13-2110	091303718-0017	None Detected	None Detected	0.1	<0.1	
13-2245	091303718-0018	Chrysotile	2	0.1	<0.1	
13-2253	091303718-0019	None Detected	None Detected	0.1	<0.1	

Analysts

Ken Dunbar (19)

Approved EMSL Signatory

EMSL maintains liability limited to cost of analysis. This method requires the laboratory to analyze the sample until the first fiber found compromises 5% of the total mass. Due to the size and mass of different asbestos fibers, the analytical sensitivity will vary between samples and may prevent the laboratory from achieving the target sensitivity on all samples. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client.

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Attention: Timothy Weiss
Fax: (907) 451-2353 Phone: (907) 458-6883
Project: AMBLER AIRPORT / # 61303

EMSL Reference: 091304456
Date Received: 03/23/13
Date Analyzed: 03/29/13
Date Reported: 03/30/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2195	091304456-0001	Chrysotile	14	0.1	<0.1	
13-2197	091304456-0002	Chrysotile	1	0.1	<0.1	
13-2021	091445618-0003	Chrysotile	3	0.1	<0.1	
13-2090	091304456-0004	Chrysotile	8	0.1	<0.1	
13-2031	091304456-0005	Chrysotile	74	0.1	0.2	
13-2032	091304456-0006	Chrysotile	3	0.1	<0.1	
13-2148	091304456-0007	Chrysotile	5	0.1	<0.1	
13-2219	091304456-0008	Chrysotile	1	0.1	<0.1	
13-2225	091304456-0009	Chrysotile	1	0.1	<0.1	
13-2200	091304456-0010	None Detected	None Detected	0.1	<0.1	
13-2202	091304456-0011	Chrysotile	1	0.1	<0.1	
13-2208	091304456-0012	None Detected	None Detected	0.1	<0.1	
13-2207	091304456-0013	Chrysotile	1	0.1	<0.1	
13-2211	091304456-0014	Chrysotile	3	0.1	<0.1	
13-2243	091304456-0015	None Detected	None Detected	0.1	<0.1	

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Project: AMBLER AIRPORT / # 61303

EMSL Reference: 091304456

Date Received: 03/23/13
Date Analyzed: 03/29/13
Date Reported: 03/30/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2104	091304456-0016	Chrysotile	23	0.1	0.1	
13-2244	091304456-0017	Chrysotile	12	0.1	<0.1	
13-2077	091304456-0018	Chrysotile	36	0.1	<0.1	
13-2157	091304456-0019	Chrysotile	43	0.1	<0.1	
13-2160	091304456-0020	Chrysotile	50	0.1	<0.1	
13-2161	091304456-0021	Chrysotile	22	0.1	<0.1	

Analysts
Rui Cindy Geng (12)
Ken Dunbar (9)

Approved EMSL Signatory

EMSL maintains liability limited to cost of analysis. This method requires the laboratory to analyze the sample until the first fiber found compromises 5% of the total mass. Due to the size and mass of different asbestos fibers, the analytical sensitivity will vary between samples and may prevent the laboratory from achieving the target sensitivity on all samples. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client.

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Client: Alaska Dept. of Transportation
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EMSL Reference: 091304916

Attention: Timothy Weiss
Fax: (907) 451-2353 Phone: (907) 458-6883
Project: AMBLER AIRPORT / # 61303

Date Received: 04/02/13
Date Analyzed: 04/08/13
Date Reported: 04/09/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2036B	091304916-0001	CHRYSOTILE	3	0.1	<0.1	
13-2172	091304916-0002	NONE DETECTED	0	0.1	<0.1	
13-2168	091304916-0003	NONE DETECTED	0	0.1	<0.1	
13-2185	091304916-0004	CHRYSOTILE	1	0.1	<0.1	
13-2186	091304916-0005	NONE DETECTED	0	0.1	<0.1	
13-2256	091304916-0006	CHRYSOTILE	56	0.1	0.2	
13-2257	091304916-0007	CHRYSOTILE	51	0.1	0.1	
13-2250	091304916-0008	CHRYSOTILE	1	0.1	<0.1	
13-2281	091304916-0009	CHRYSOTILE	2	0.1	<0.1	
13-2275	091304916-0010	CHRYSOTILE	9	0.1	0.1	
13-2268	091304916-0011	CHRYSOTILE	2	0.1	<0.1	
13-2028	091304916-0012	NONE DETECTED	0	0.1	<0.1	
13-2142	091304916-0013	NONE DETECTED	0	0.1	<0.1	
13-2164	091304916-0014	NONE DETECTED	0	0.1	<0.1	
13-2005	091304916-0015	CHRYSOTILE	1	0.1	<0.1	
13-2000	091304916-0016	CHRYSOTILE	1	0.1	<0.1	
13-2254	091304916-0017	CHRYSOTILE	51	0.1	0.1	

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Project: AMBLER AIRPORT / # 61303

Date Received: 04/02/13
Date Analyzed: 04/08/13
Date Reported: 04/09/13

Asbestos Analysis of Bulk Samples via Modified EPA 600/R-93/116 Method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) Level B for 0.1% Target Analytical Sensitivity

Client Sample ID	*EMSL Sample ID*	*Asbestos Type(s)*	*# of Asbestos Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
13-2258	091304916-0018	NONE DETECTED	0	0.1	<0.1	
13-2259	091304916-0019	CHRYSOTILE	6	0.1	<0.1	
13-2009	091304916-0020	NONE DETECTED	0	0.1	<0.1	
13-2047	091304916-0021	NONE DETECTED	0	0.1	<0.1	
13-2245	091304916-0022	CHRYSOTILE	41	0.1	0.2	
13-2018	091304916-0023	CHRYSOTILE	1	0.1	<0.1	
13-2231	091304916-0024	NONE DETECTED	0	0.1	<0.1	

Analysts
Ken Dunbar (24)

Approved EMSL Signatory

EMSL maintains liability limited to cost of analysis. This method requires the laboratory to analyze the sample until the first fiber found compromises 5% of the total mass. Due to the size and mass of different asbestos fibers, the analytical sensitivity will vary between samples and may prevent the laboratory from achieving the target sensitivity on all samples. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL is not responsible for sample collection activities or analytical method limitations. Interpretation and use of results are the responsibility of the client.

APPENDIX D: THERMISTOR RESULTS

Ambler Airport Rehabilitation-Main Runway at TH13-019

Ground Temperatures (Fahrenheit)

Sensor Number	Depth (feet)	27-Feb.	28-Feb.	1-Mar.	2-Mar.	4-Mar.
1	1.5	7.8	8.0	8.5	8.6	8.7
2	2.5	11.6	11.8	11.8	12.0	12.0
3	4.5	18.7	18.6	18.4	18.3	18.1
4	6.5	24.8	24.6	24.4	24.1	23.8
5	8.5	28.7	28.6	28.5	28.3	28.0
6	13.5	32.1	32.1	32.1	32.1	32.1
7	18.5	32.1	32.2	32.2	32.1	32.2

Notes:

1. TH13-019 drilled February 19, 2013 and cable installed on the same date.
2. Datalogger set to take hourly readings; selected readings are presented here.

Ambler Airport Rehabilitation-Not Considered Proposed SBEB Area at TH13-065

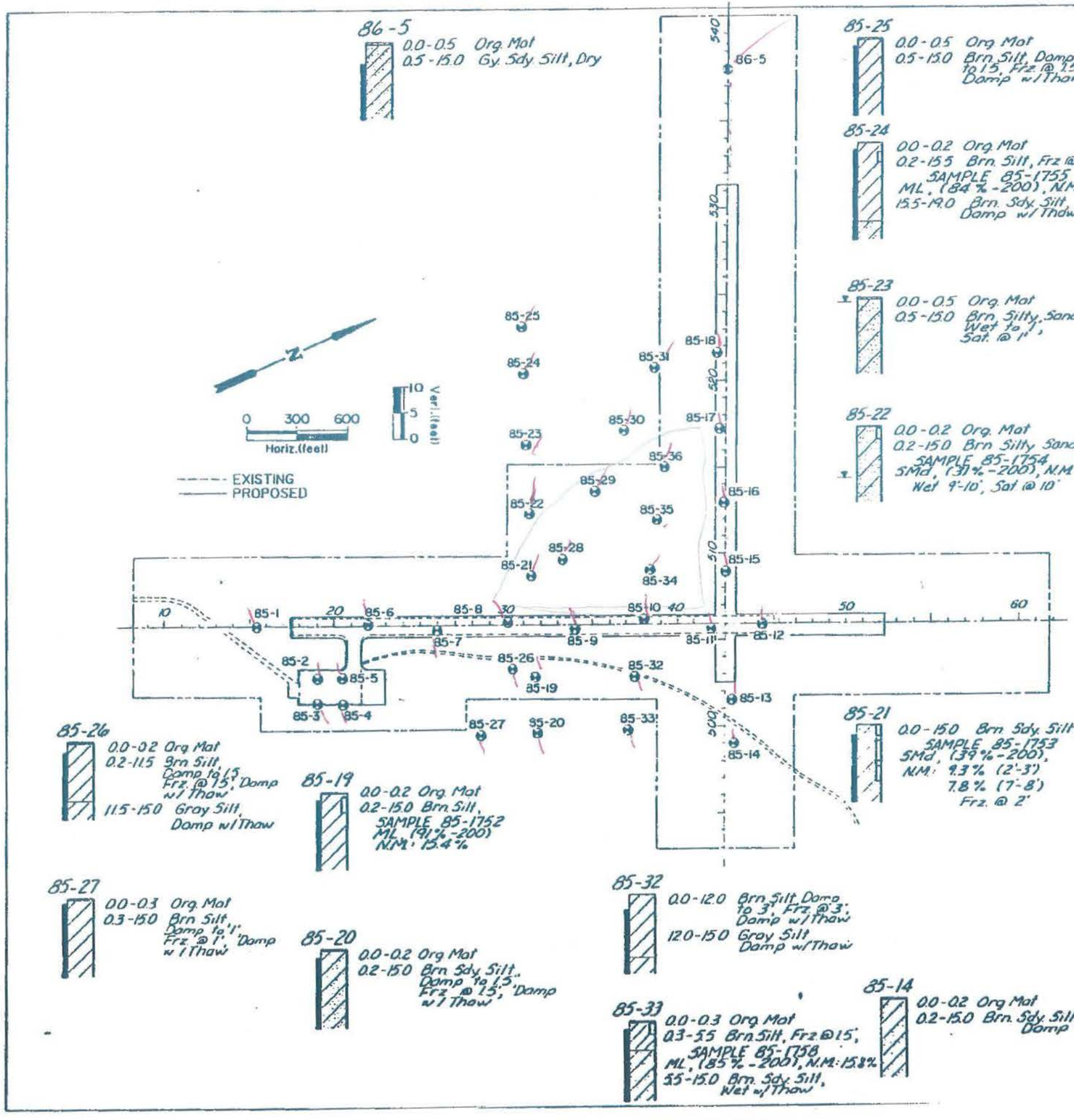
Ground Temperatures (Fahrenheit)

Sensor Number	Depth (feet)	16-Feb.	19-Feb.	22-Feb.	24-Feb.	26-Feb.
1	0.5	17.3	4.0	0.8	0.6	4.2
2	2.5	24.6	18.5	12.9	12.1	11.1
3	4.5	28.7	27.3	24.8	24.2	22.9
4	9.5	32.0	33.0	33.0	33.0	32.9
5	14.5	34.7	34.6	34.4	34.4	34.4
6	19.5	35.6	35.5	35.5	35.4	35.4
7	24.5	35.6	35.5	35.5	35.5	35.5
8	29.5	35.6	35.6	35.6	35.6	35.6

Notes:

1. TH13-065 drilled February 15, 2013 and cable installed the same date.
3. Datalogger set to take twice daily readings; selected readings are presented here.

APPENDIX E: PREVIOUS TEST HOLE LOCATIONS AND RESULTS



86-5
0.0-0.5 Org. Mat
0.5-15.0 Gy. Sdy Silt, Dry

85-25
0.0-0.5 Org. Mat
0.5-15.0 Brn. Silt, Damp to 1.5', Frz @ 1.5', Damp w/ Thaw

85-24
0.0-0.2 Org. Mat
0.2-15.5 Brn. Silt, Frz @ 1.5'. SAMPLE 85-1755 ML, (84%-200), N.M.: 15.6%
15.5-19.0 Brn. Sdy. Silt Damp w/ Thaw

85-23
0.0-0.5 Org. Mat
0.5-15.0 Brn. Silty Sand, Wet to 1', Sat. @ 1'

85-22
0.0-0.2 Org. Mat
0.2-15.0 Brn Silty Sand, SAMPLE 85-1754 SMd, (31%-200), N.M.: 9.4% Wet 9'-10', Sat @ 10'

85-31
0.0-0.5 Org. Mat
0.5-7.5 Brn. Silt, Frz @ 1.5 to 6' SAMPLE 85-1757 ML, (88%-200), N.M.: 24.6% Sat @ 6'
7.5-15.0 Gray Sdy. Silt

85-30
0.0-0.5 Org Mat
0.5-7.0 Brn Silt, Wet to 15', Sat. @ 1.5'
7.0-15.0 Gray Sdy. Silt,

85-36
0.0-0.2 Org. Mat
0.2-19.0 Brn. Sdy. Silt, Damp to 1.5', Frz. @ 1.5' SAMPLE 85-1760 ML, (66%-200), N.M.: 13.0%

85-29
0.0-0.5 Org Mat
0.5-2.0 Brn Silt Damp, Frz. @ 1.5 to 12'
2.0-4.5 Brn Sdy. Silt Damp w/ Thaw
4.5-12.0 Brn Silt Wet w/ Thaw 1.0 6" Sat. w/ Thaw 6 to 12'
12.0-19.0 Orgy Sdy. Silt, Sat.

85-35
0.0-0.5 Org. Mat
0.5-15.0 Brn Sdy Silt, Damp to 1.5', Frz. @ 1.5', Damp w/ Thaw to 6', Wet w/ Thaw 6' to 8.5'

85-28
0.0-0.2 Org Mat
0.2-15.0 Brn Silt, Frz. @ 1.5' SAMPLE 85-1756 ML, (88%-200), N.M.: 19.9% Sat. & Thawed @ 12'

85-34
0.0-0.5 Org Mat
0.5-15.0 Brn Sdy. Silt, ML Damp to 15', SAMPLE 85-1759 N.M.: 29.3%

85-26
0.0-0.2 Org Mat
0.2-11.5 Brn Silt, Damp to 1.5', Frz. @ 1.5', Damp w/ Thaw
11.5-15.0 Gray Silt, Damp w/ Thaw

85-19
0.0-0.2 Org. Mat
0.2-15.0 Brn Silt, SAMPLE 85-1752 ML (91%-200) N.M.: 15.4%

85-21
0.0-15.0 Brn Sdy. Silt, SAMPLE 85-1753 SMd, (39%-200), N.M.: 9.3% (2'-3') 7.8% (7'-8') Frz. @ 2'

85-27
0.0-0.3 Org. Mat
0.3-1.50 Brn Silt, Damp to 1', Frz @ 1', Damp w/ Thaw

85-20
0.0-0.2 Org Mat
0.2-15.0 Brn Sdy Silt, Damp to 1.5', Frz @ 1.5', Damp w/ Thaw

85-32
0.0-12.0 Brn Silt Damp to 3', Frz @ 3', Damp w/ Thaw
12.0-15.0 Gray Silt Damp w/ Thaw

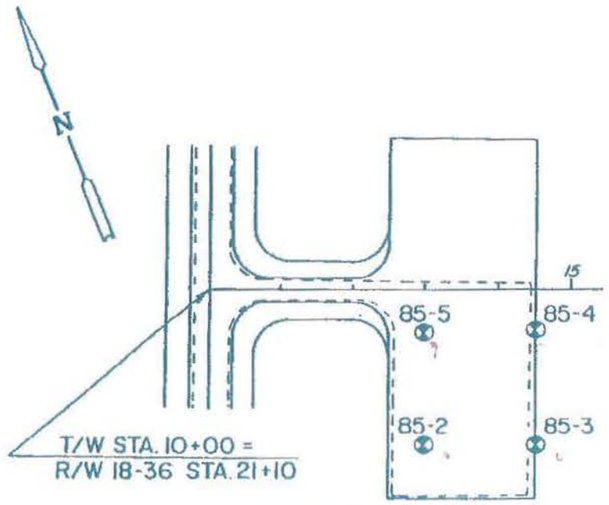
85-33
0.0-0.3 Org Mat
0.3-5.5 Brn Silt, Frz @ 1.5', SAMPLE 85-1758 ML, (85%-200), N.M.: 15.8%
5.5-15.0 Brn. Sdy. Silt, Wet w/ Thaw

85-14
0.0-0.2 Org Mat
0.2-15.0 Brn Sdy. Silt, Damp

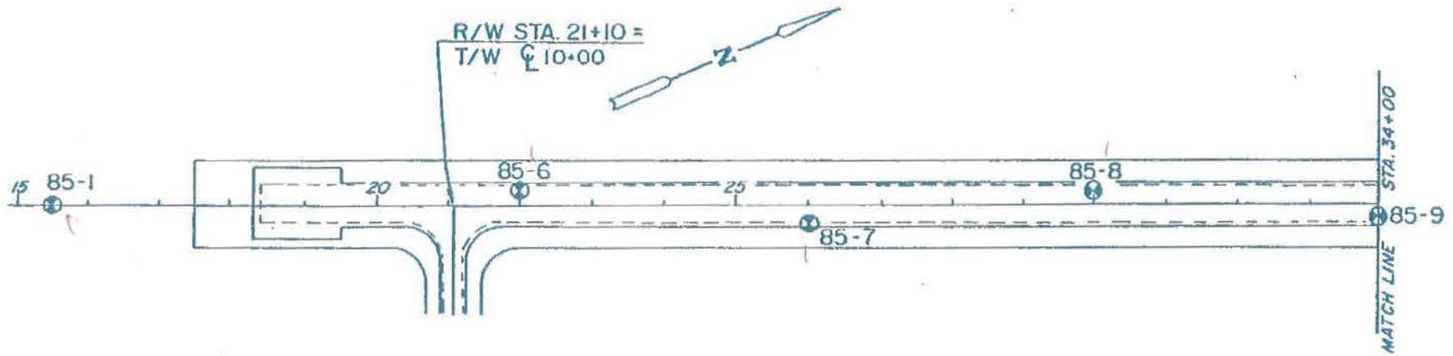
NOTE:
1. TESTHOLES LOGGED SEPT. 1985 & JULY 1986
2. SEE PAGE 11 FOR T.H.'s 85-1 thru 85-9.
3. SEE PAGE 13 FOR T.H.'s 85-10 thru 85-12.
4. SEE PAGE 17 FOR T.H.'s 85-13, 85-15 thru 85-18, & 86-1 thru 86-4

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
ENGINEERING GEOLOGY UNIT

DATA: G.M.B	AMBLER AIRPORT
DRAWN: K.D.B.	
APPROVED: H.R.L.	PROJ. NO.: D-55222
DATE: JULY 1986	SCALE: AS NOTED



PROPOSED
TAXIWAY EXPANSION



PROPOSED
RUNWAY 18-36 EXPANSION

Proj.: AMBLER AIRPORT

Vert. 10 feet 0 — Horiz. 0 feet 100

85-5
0.0-0.5 Brn Sdy Gravel, Damp
0.5-11.0 Brn Sdy Silt, ML
SAMPLE 85-1743
N.M.: 19.1%
Wet 9' to 11'

85-2
0.0-0.5 Brn Sdy Gravel
0.5-15.0 Brn Sdy Silt,
SAMPLE 85-1742 ML
(79%-200) N.M. 13.4%
Wet 7' to 11.5', Frz @ 11.5'

85-4
0.0-11.0 Brn Sdy Silt, Damp to 9', Wet 9' to 11'

85-3
0.0-1.0 Brn Silt Damp
1.0-11.0 Brn Sdy Silt
Damp to 9', Wet 9' to 10'
Frz @ 10'

85-1
0.0-0.3 Org. Mat
0.3-8.5 Brn Sdy Silt, Damp
8.5-11.0 Brn Sand, Wet

85-6
0.0-0.5 Brn Sdy Gravel
0.5-15.0 Brn Sdy Silt,
Damp to 9', Wet 9' to 11.5',
Frz @ 11.5', Damp w/ Thaw

85-7
0.0-0.2 Brn Sdy Gravel
0.2-11.0 Brn Sdy Silt,
SAMPLE 85-1744
ML (66%-200),
N.M. 17.1%
Wet 7' to 8.5',
Frz @ 8.5

85-8
0.0-0.5 Brn Sl. Si Sdy Gravel,
SAMPLE 85-1745
SW-SM d (11%-200)
0.5-11.0 Brn Sdy Silt,
Damp to 8', Wet 8' to 9.5',
Frz @ 9.5', Damp w/ Thaw

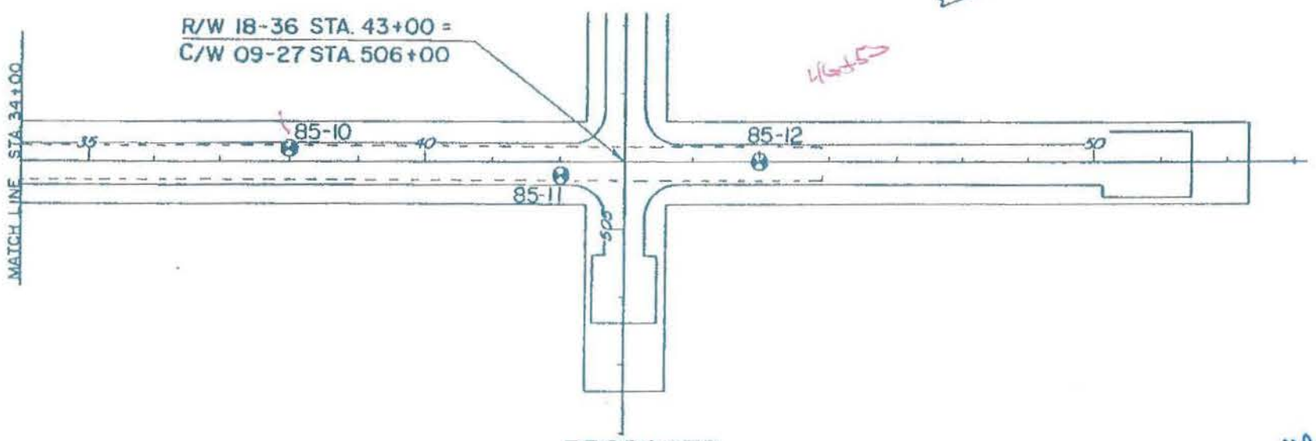
85-9
0.0-0.5 Brn Sdy Gravel,
0.5-11.0 Brn Sdy Silt,
Damp to 8', Wet 8' to 9.5', Frz @ 9.5',
Wet w/ Thaw

PROPOSED FINISHED GRADE

EXISTING R/W GRADE

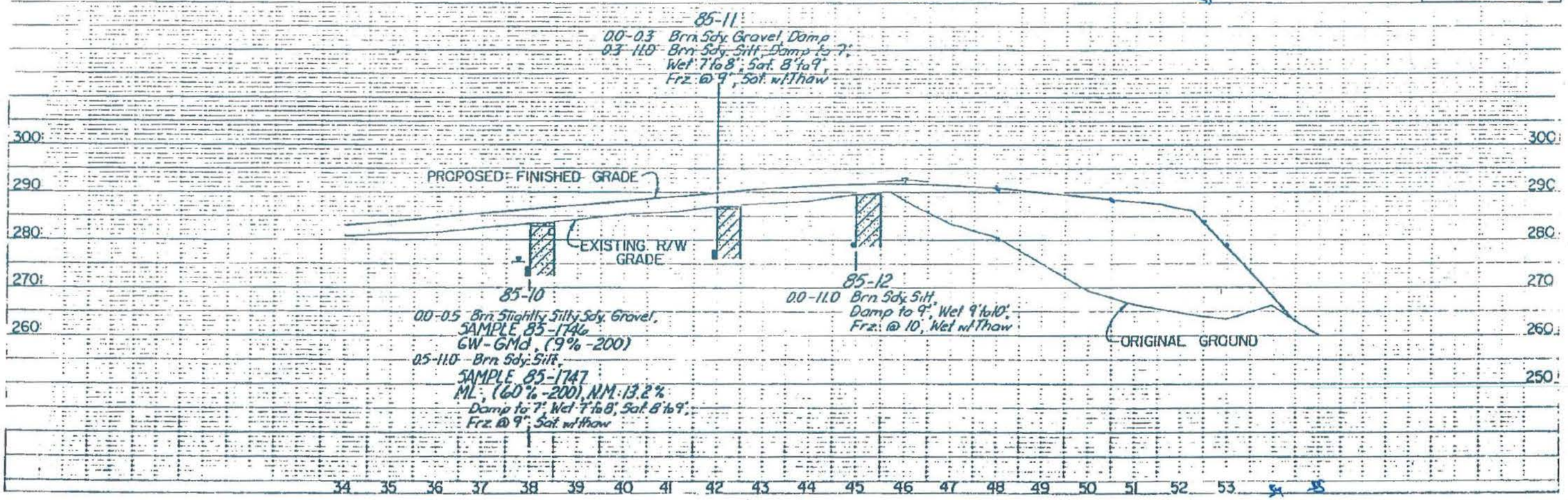
280 270 260 250 240 — 290 280 270 260 250

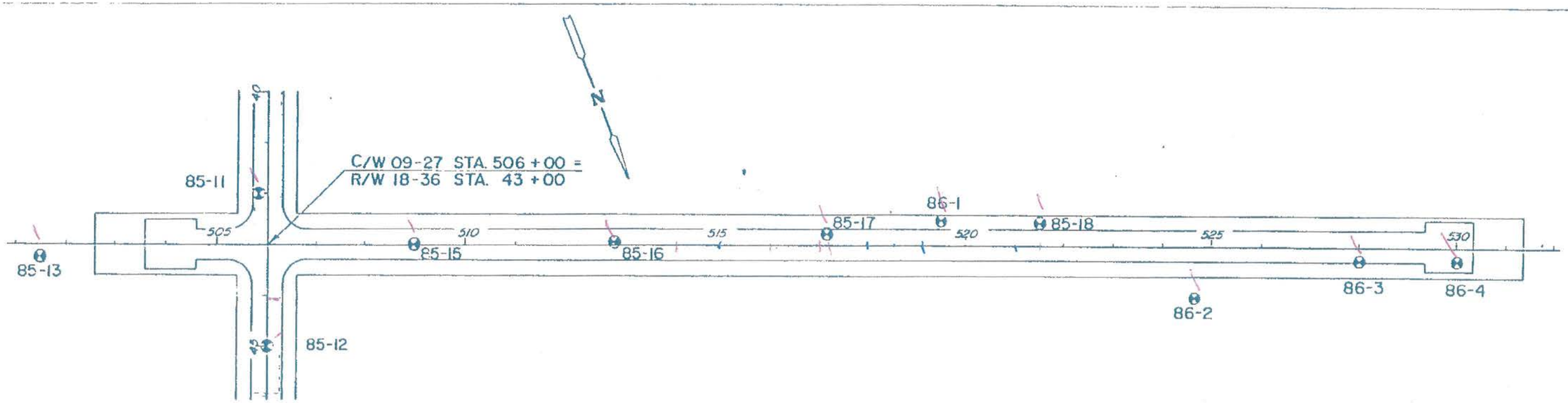
10 11 12 13 14 15 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34



PROPOSED
RUNWAY 18-36 EXPANSION

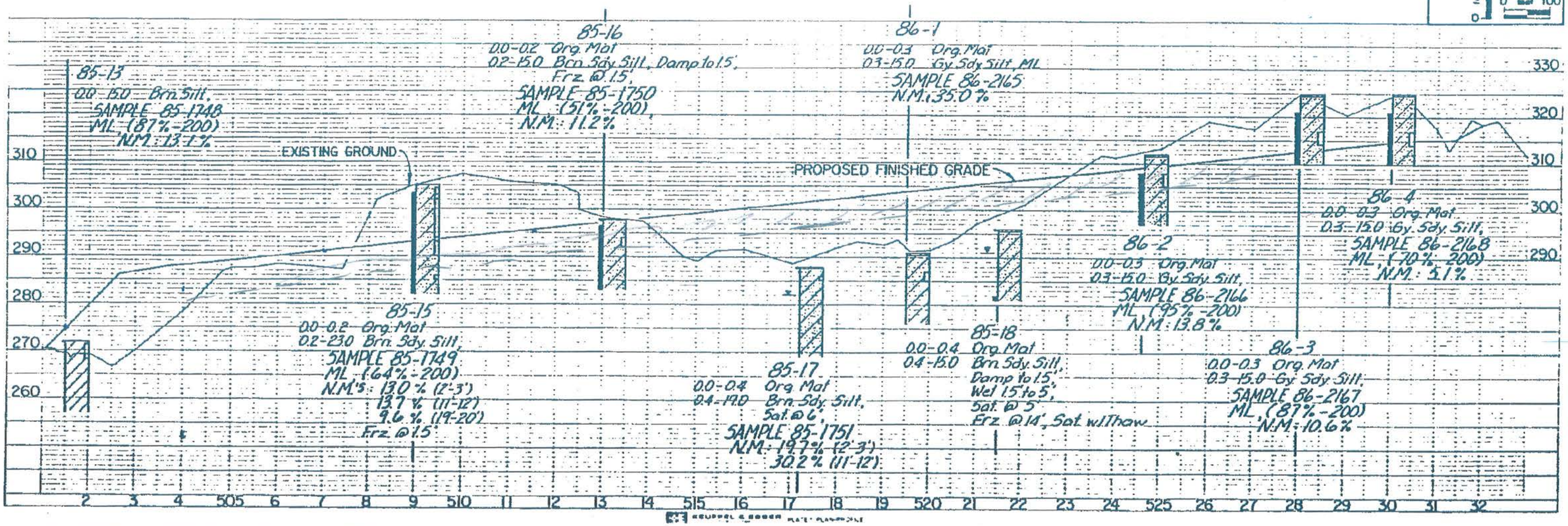
Proj.: AMBLER AIRPORT
Vert. 10 feet 0
Horiz. 0 feet 100





PROPOSED
RUNWAY 09-27

Proj: AMBLER AIRPORT
Vert. 10 feet 0
Horiz. 0 feet 100



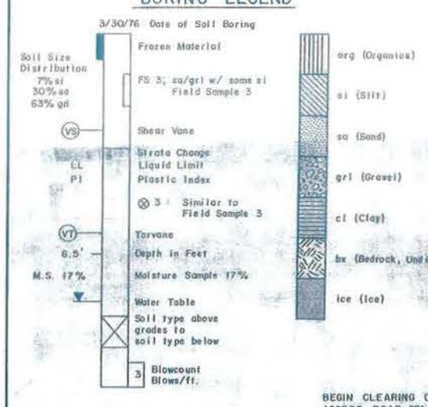
AMBLER 1978 3/10

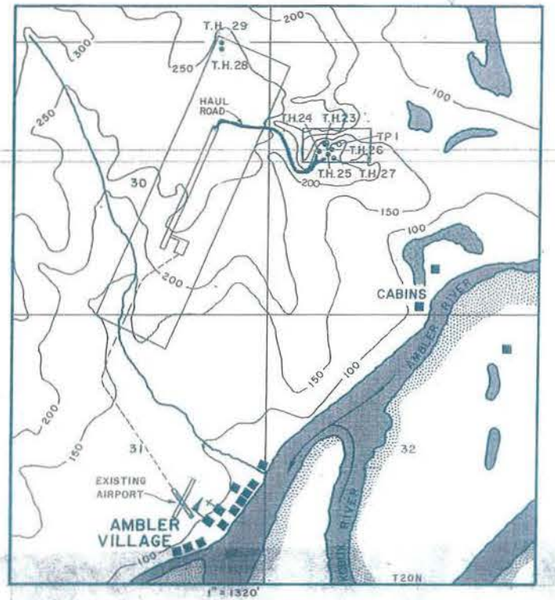
VICINITY MAP

SCALE 1"=1 MILE

PORTIONS OF PROTRACTED SECTIONS
19, 20, 29, 30 & 31, T20N, R5E
KATEEL RIVER MERIDIAN, ALASKA
USGS AMBLER RIVER A-4.

BORING LEGEND





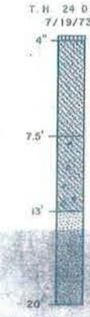
LEGEND

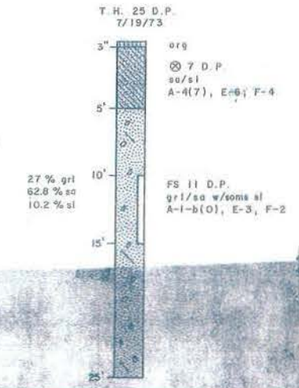
- TREES
- CLEARING LIMITS
- ADA. ALUMINUM SURVEY CAP
- CONTOUR
- EXISTING BUILDINGS
- BUILDINGS CONSTRUCTED THIS CONTRACT
- TEST HOLE
- US SURVEY BRASS CAP
- WIND CONE AND SEGMENTED CIRCLE

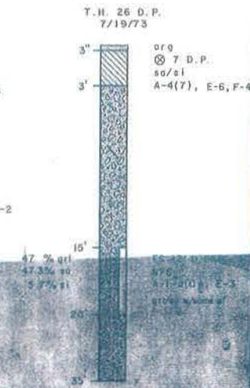
TEST PIT 1- EXISTING BACKHOE PIT WITH GRAVEL EXPOSED.

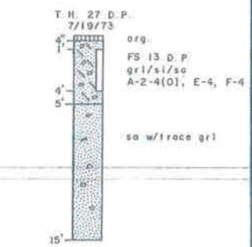
NOTE:

TEST HOLES ARE ORIGINAL GROUND

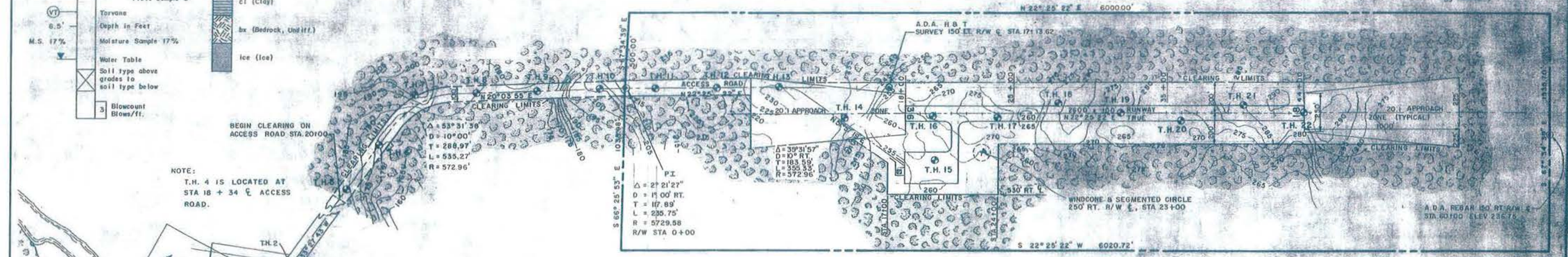


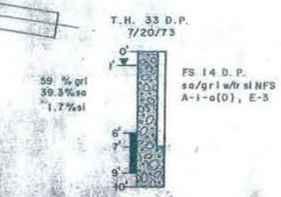


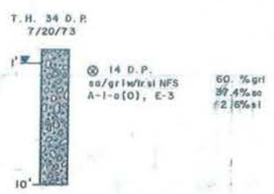


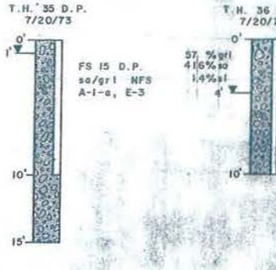


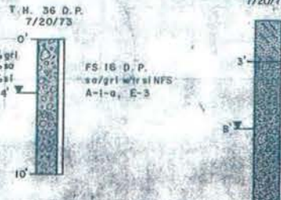
18% grl
46.4 % sa
33.6 % si

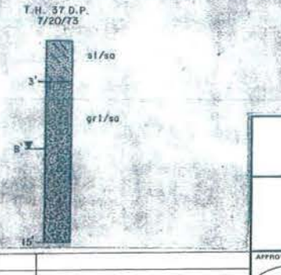












STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

AMBLER AIRPORT
A.D.A.P. NO. 8-02-0354-01
PROJECT LAYOUT, CLEARING AND TEST HOLE LOCATION PLAN

APPROVED James J. Rhode
JAMES J. RHODE, P.E. CHIEF DESIGN ENGINEER
APPROVED William Koester
WILLIAM KOESTER, P.E. SECONDARY AIRPORTS ENGINEER

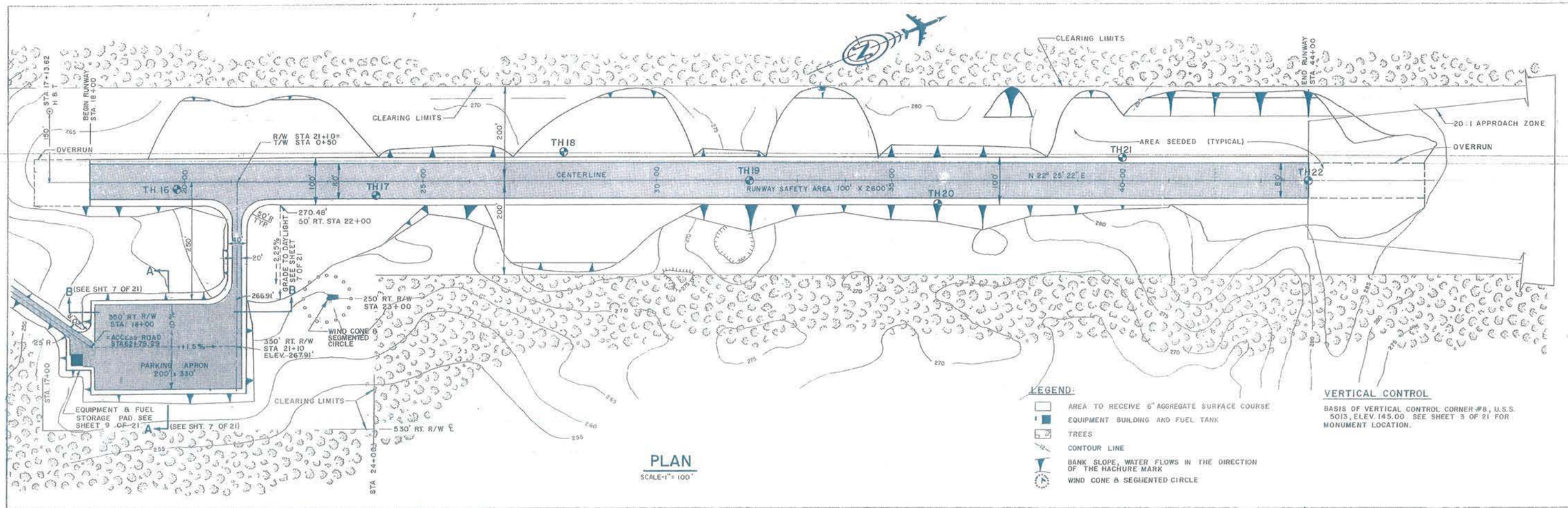
BY	DATE	CHANGE
A	12-8-78	AS-BUILT

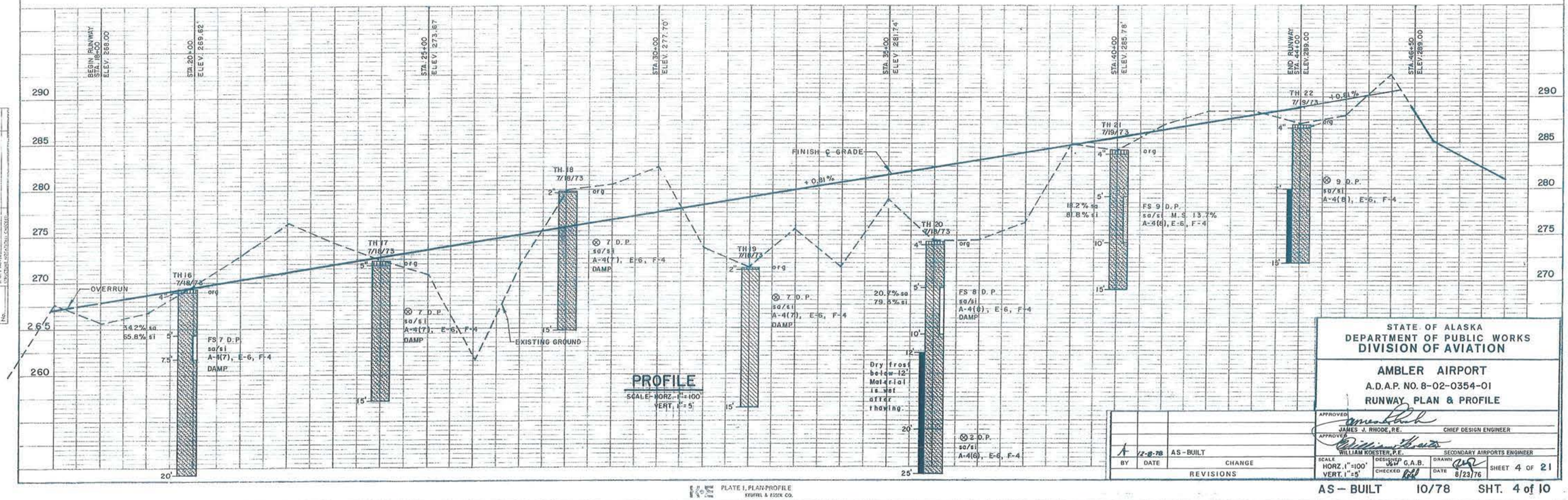
REVISIONS

SCALE 1" = 300' | DESIGNED W.O. G.A.B. | DRAWN | CHECKED | DATE 8/23/76 | SHEET 3 OF 21

AS – BUILT 10/78 SHT 3 of 10

AMBLER 1978 4 of 10





STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

AMBLER AIRPORT
A.D.A.P. NO. 8-02-0354-01
RUNWAY PLAN & PROFILE

APPROVED: JAMES J. RHODE, P.E. — CHIEF DESIGN ENGINEER
APPROVED: WILLIAM KOESTER, P.E. — SECONDARY AIRPORTS ENGINEER

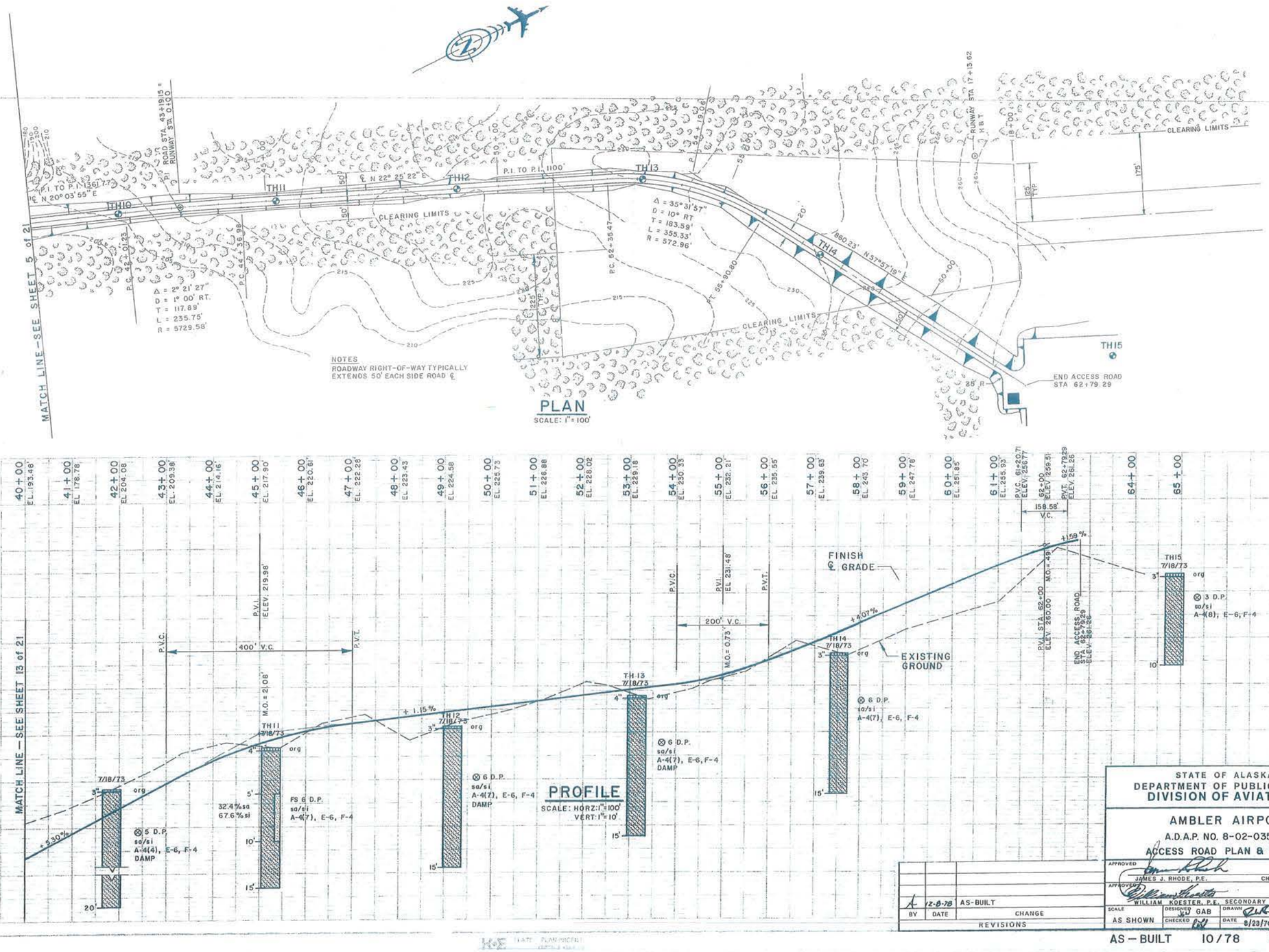
BY	DATE	REVISIONS
A	12-8-78	AS-BUILT

SCALE: HORZ. 1"=100' VERT. 1"=5' | DESIGNED: G.A.B. | DRAWN: | CHECKED: | DATE: 8/23/76 | SHEET 4 OF 21

AS-BUILT 10/78 SHT. 4 of 10

PLATE I, PLAN-PROFILE KEUFFEL & ESSER CO.
48 2024 MADE IN U.S.A.

AMBLER 1978 6 of 10



STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

AMBLER AIRPORT
A.D.A.P. NO. 8-02-0354-01
ACCESS ROAD PLAN & PROFILE

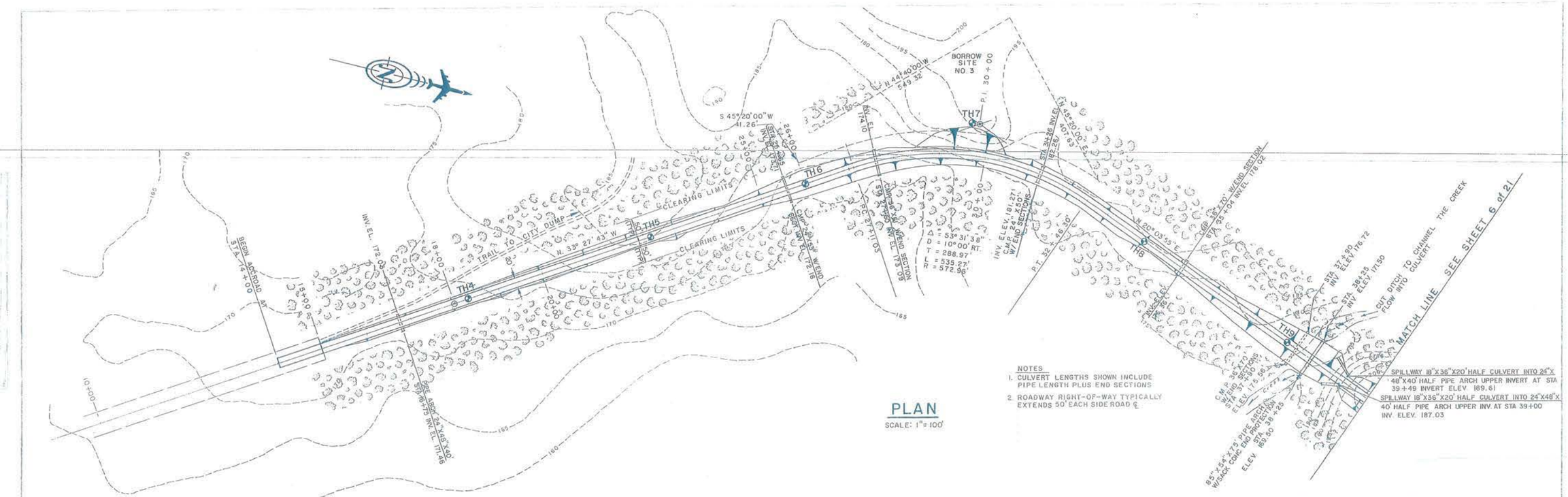
APPROVED
JAMES J. RHODE, P.E. CHIEF DESIGN ENGINEER
APPROVED
WILLIAM KOESTER, P.E. SECONDARY AIRPORTS ENGINEER

BY	DATE	REVISIONS
A	12-8-78	AS-BUILT

SCALE: AS SHOWN | DESIGNED GAB | DRAWN | CHECKED | DATE 8/23/76 | SHEET 6 OF 21

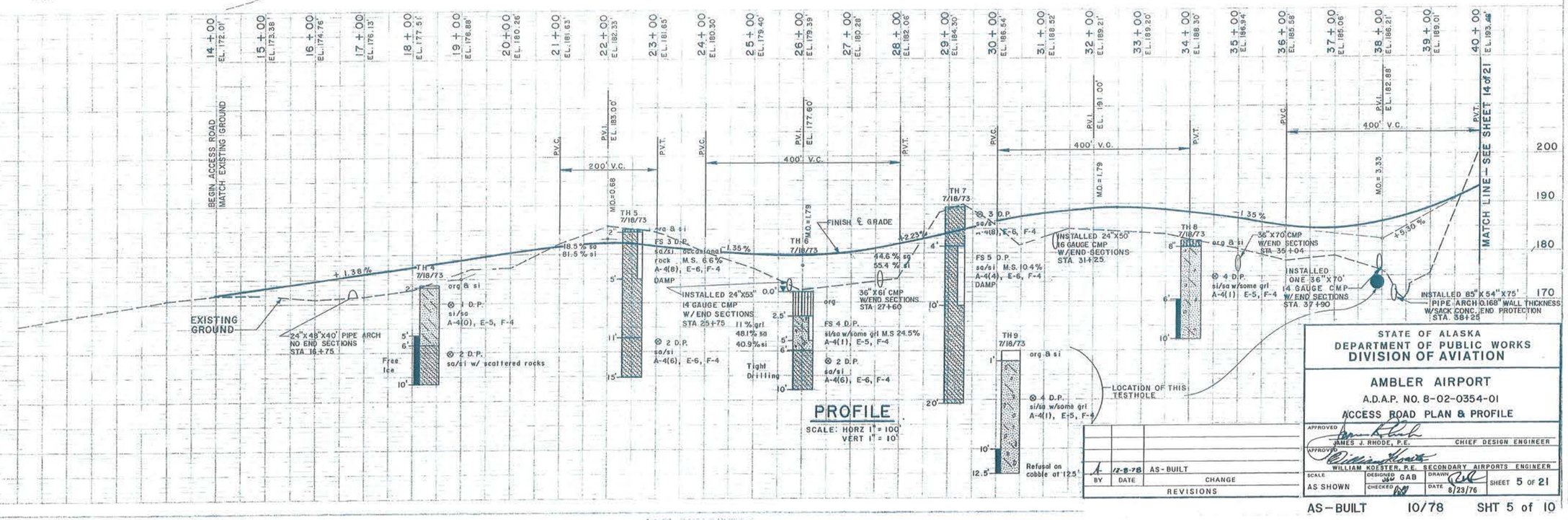
AS – BUILT 10/78 SHT 6 of 10

AMBLER 1978 5/10



NOTES
1. CULVERT LENGTHS SHOWN INCLUDE PIPE LENGTH PLUS END SECTIONS
2. ROADWAY RIGHT-OF-WAY TYPICALLY EXTENDS 50' EACH SIDE ROAD ℄

PLAN
SCALE: 1"= 100'



PROFILE
SCALE: HORZ 1" = 100'
VERT 1" = 10'

BY	DATE	REVISIONS
A	12-8-78	AS-BUILT
		CHANGE

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

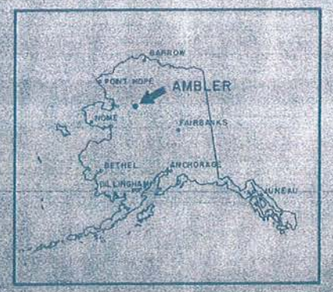
AMBLER AIRPORT
A.D.A.P. NO. 8-02-0354-01
ACCESS ROAD PLAN & PROFILE

APPROVED: JAMES J. RHODE, P.E. — CHIEF DESIGN ENGINEER
APPROVED: WILLIAM KOESTER, P.E. — SECONDARY AIRPORTS ENGINEER

SCALE: AS SHOWN | DESIGNED GAB | DRAWN | CHECKED | DATE 6/23/76 | SHEET 5 OF 21

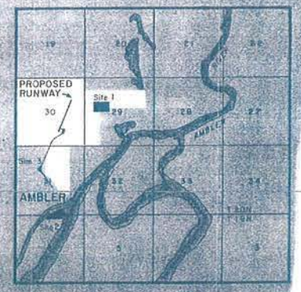
AS-BUILT 10/78 SHT 5 of 10

AMBLER 1978 4C/10



LOCATION MAP

NO SCALE



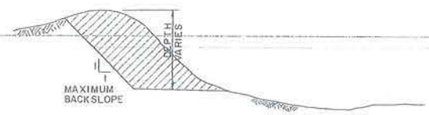
VICINITY MAP

SCALE 1½ I MILE

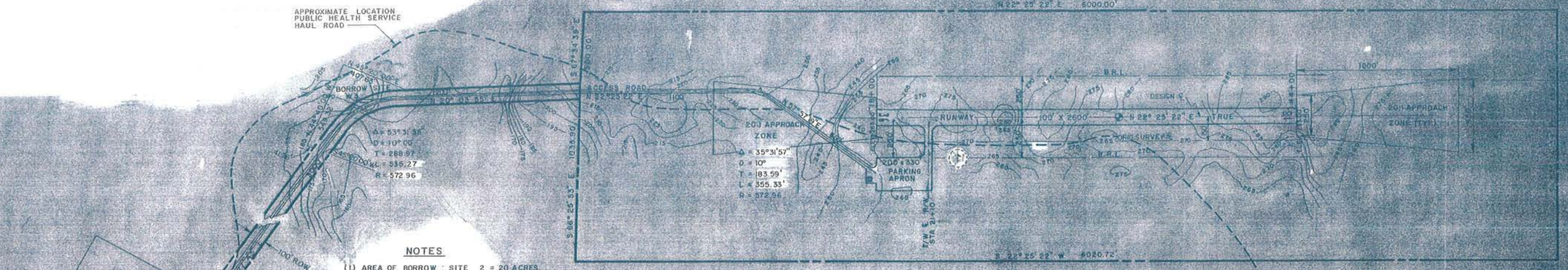
PORTIONS OF PROTRACTED SECTIONS 19, 20, 29, 30, & 31 T20N, R5E KATEEL RIVER MERIDIAN, ALASKA USGS AMBLER RIVER A-4

NOTE

THE BORING LOGS SHOWN ON THIS PAGE ARE FOR INFORMATION PURPOSES ONLY. THE STATE BEARS NO RESPONSIBILITY FOR ANY AND/OR ALL OF CONTRACTOR'S INTERPRETATION OF THESE LOGS.



TYPICAL BORROW PIT SECTION
SITE #1 AND #3
NO SCALE



NOTES

(1.) AREA OF BORROW SITE 2 = 20 ACRES.
AREA OF BORROW SITE 3 = 5.52 ACRES.

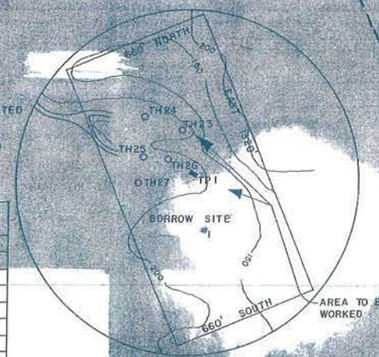
(2.) THE HAUL ROAD TO BORROW SITE No. 1 WAS LEFT IN PLACE

(3.) SURVEY ℄ IS 150 FEET RIGHT OF R/W DESIGN ℄

SCALE IN FEET
100 200 100 0 100 200 300 400 500 600
1" = 300'

NOTE:

THE AREA IN "DETAIL A" IS LOCATED IN THE W 1/2 E 1/2 AND E 1/2 W 1/2 NW 1/4 SEC. 29, T20N, R5E, KATEEL RIVER MERIDIAN, ALASKA



DETAIL A
SCALE 1" = 300'

SOILS ANALYSIS

Test Hole	Depth In Ft	Field No.	Lab No DG-73	Nat Moist	% MECHANICAL ANALYSIS % PASSING 3"	2"	1"	3/4"	1/2"	#4	#10	#40	#200	#.02	L.L.	P.I.	F.I.	Z Class	ASSHO Class	FAA	Frost FSV
1	0 - 2.5	1	489	15.6							100	59.2	36.3	4.8	NV		NP	Si/Sa	A-4(0)	E-5	F4
2	10 - 13	2	490	22.0						100	93	84	67	44.7	NV		NP	Sa/Si	A-4(8)	E-6	F4
5	17-50	3	491	16.6							100	99.9	81.5	6.9			NP	Sa/Si	A-4(8)	E-6	F4
6	2.5-5.0	4	492	24.5				100	97	89	87	84	40.9	6.0	NV		NP	Si/Sa w/Some/Gri	A-4(1)	E-5	F4
7	4.0-10.0	5	493	10.4						100	99.6	99.1	55.4	7.0	NV		NP	Sa/Si	A-4(4)	F-6	F4
11	5.0-10.0	6	494								100	99.7	67.6	10.0	NV		NP	Sa/Si	A-4(7)	E-6	F4
16	5.0-7.5	7	495									100	65.8	9.0	NV		NP	Sa/Si	A-4(7)	E-6	F4
20	5.0-10.0	8	496								100	99.8	79.3	15.0			NP	Sa/Si	A-4(8)	E-6	F4
21	5.0-10.0	9	497	13.7							100	99.1	81.8	12.0			NP	Sa/Si	A-4(8)	E-6	F4
23	3.0-20.0	10	524				100	96	91	82	50	35	17	8.9	4.0	NV		NP	Sa/Gri w/Some/Si	A-1-a(0)	E-3	F1
25	10.0-15.0	11	498				100	95	89	83	73	63	33	10.2	4.0	NV		NP	Gri/Sa w/Some/Si	A-1-b(0)	E-3	F2
26	15.0-20.0	12	499				100	99.5	99	85	47	30	15	5.7	2.0	NV		NP	Gri/Sa w/Some/Si	A-1-a(0)	E-3	NFS
27	1.0 - 4.0	13	500					100	95	92	82	77	66	33.6	6.0	NV		NP	Gri/Si/Sa	A-2-4(0)	E-4	F4
33	0.0 - 7.0	14	525				100	90	82	70	41	25	11	1.7		NV		NP	Sa/Gri w/Tr/Si	A-1-a(0)	E-3	NFS
35	0.0 - 10.0	15	526				100	96	90	75	40	28	16	2.6		NV		NP	Sa/Gri w/Tr/Si	A-1-a(0)	E-3	NFS
36	0.0 - 10.0	16	527				100	94	86	73	43	31	16	1.4		NV		NP	Sa/Gri w/Tr/Si	A-1-a(0)	E-3	NFS
T.P. #1	9'	1	72A1968		100	99	97	95	89	57	23	6	3		NV	NP	NV	Sa/Gri	A-1-a(0)		NFS

STATE OF ALASKA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF AVIATION

AMBLER AIRPORT

A.D.A.P. NO. 8-02-0354-01
MINING & EXCAVATION PLAN

BY	DATE	CHANGE
K	10-8-78	AS-BUILT

REVISIONS

APPROVED: JAMES J. RHODE, P.E.
DIRECTOR OF AVIATION
DESIGNED: AS
DRAWN: AS SHOWN
CHECKED: BS
DATE: 8/23/76
SHEET 2 OF 21

AS – BUILT 10/78 SHT 10 of 10

APPENDIX F: SELECTED PHOTOS

Photo taken at TH13-005 on the main runway looking south.

Photo taken at TH13-006 on the main runway looking west at the crosswind runway.

Photo taken at TH13-013, and soil core sampled from 15 to 20 feet in depth.

Photo taken at TH13-016, and soil core sampled from 15 to 20 feet in depth.

Photo taken at TH13-022, and soil core sampled from 0 to 2.5 feet in depth.

Photo taken at TH13-022, and soil core sampled from 5 to 10 feet in depth.

Photo taken at TH13-022, and soil core sampled from 10 to 15 feet in depth.

Photo taken at TH13-022, and soil core sampled from 15 to 20 feet in depth.

Photo taken at TH13-050, and soil core sampled from 10 to 15 feet in depth.

Photo taken at TH13-050, and soil core sampled from 15 to 20 feet in depth.

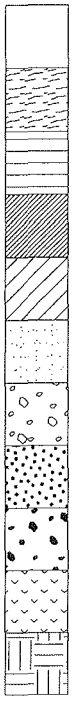
Photo taken at the existing SREB building and looking south toward proposed new airport access road realignment area.

Photo taken at the existing aircraft parking apron and looking north.

APPENDIX G: SYMBOLS AND DEFINITIONS, UNIFIED SOIL CLASSIFICATION SYSTEM, DESCRIPTION AND CLASSIFICATION OF FROZEN SOILS

SYMBOLS AND DEFINITIONS

BASIC MATERIAL SYMBOLS



ASPHALT

PEAT

CLAY (Cl)

ICE

SILT (Si)

POORLY GRADED SAND (Sa)

POORLY GRADED GRAVEL (Gr)

WELL GRADED SAND

WELL GRADED GRAVEL

BEDROCK (Bx), soft(Type)

BEDROCK (Bx), hard(Type)

SOFT OR HARD BEDROCK BASED ON DRILLING RATE

NOTE

MAIN COMPONENT (UPPER CASE ... SOLID LINES)
MINOR COMPONENT (Title Case ... DASHED LINES OR SPARSER PATTERN)

USCS SIZE DEFINITIONS

BOULDERS (Boulders)	12"+
COBBLES (Cobbles)	3" TO 12"
GRAVEL	#4 TO 3"
ANGULAR FRAGMENTS	#10 +
SAND	#200 TO #4
SILT	#200 TO 0.005 mm
CLAY	MINUS 0.005 mm

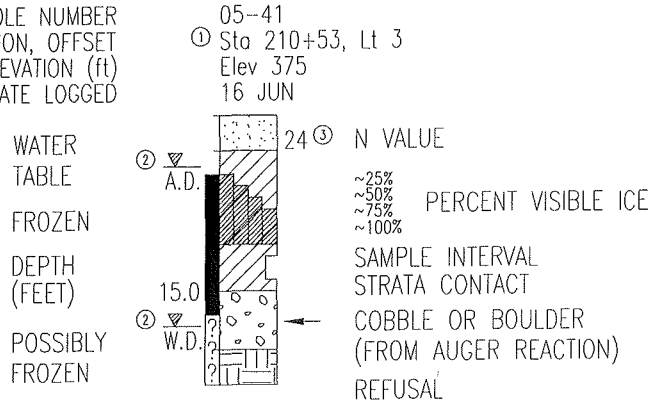
TEST RESULTS

_._%-200	= % PASSING #200 SIEVE
NM _._%	= NATURAL MOISTURE
ORG _._%	= ORGANIC CONTENT
SSc _	= SODIUM SULFATE LOSS(coarse)
SSf _	= SODIUM SULFATE LOSS(fine)
LA _	= LOS ANGELES ABRASION
DEG _	= DEGRADATION
LL _	= LIQUID LIMIT (NV = no value)
PI _	= PLASTIC INDEX (NP = non-plastic)

MISC.

Tr	= TRACE
sl	= SLIGHTLY
hi	= HIGHLY
w/_	= WITH UNSPECIFIED AMOUNT
X'tls	= CRYSTALS
TH	= TEST HOLE
TT	= TEST TRENCH
TP	= TEST PIT

TYPICAL LOG



① Station value may also be on centerline e.g. Sta 210+53, CL or lat-long format e.g. N64.56789°, W145.67890°

② W.D.= WHILE DRILLING, A.D.= AFTER DRILLING

③ "N VALUE" INDICATES STANDARD PENETRATION TEST (1.4" I.D., 2.0" O.D. SAMPLER DRIVEN WITH 140 LB. HAMMER, 30" FREE FALL) AND IS SUM OF 2nd AND 3rd 6" OF PENETRATION.

PLAN VIEW SYMBOLS

⊗	POWER AUGER TEST HOLE (TH)
⊕	HAND AUGER TEST HOLE (TH)
⊘	EXPOSED MATERIAL
+	PROBE
□	HAND DUG TEST PIT (TP)
	DOZER/BACKHOE TEST TRENCH (TT)
	BODY OF WATER
	FLOW DIRECTION
×××××	WASTE BERM
	BANK
	SWAMP
	TREELINE

SOIL DENSITY/CONSISTENCY DESCRIPTORS

NON-COHESIVE		COHESIVE	
RELATIVE DENSITY	BLOWS/FOOT (N) VALUE	CONSISTENCY	BLOWS/FOOT (N) VALUE
VERY LOOSE	< 4	VERY SOFT	< 2
LOOSE	5-10	SOFT	2-4
MEDIUM DENSE	11-30	FIRM	5-8
DENSE	31-50	STIFF	9-15
VERY DENSE	> 50	VERY STIFF	16-30
		HARD	> 30

COLOR

Bk = BLACK	Gy = GRAY	Tn = TAN
Bl = BLUE	Or = ORANGE	Wh = WHITE
Bn = BROWN	Rd = RED	Yw = YELLOW
Gn = GREEN		

MOISTURE

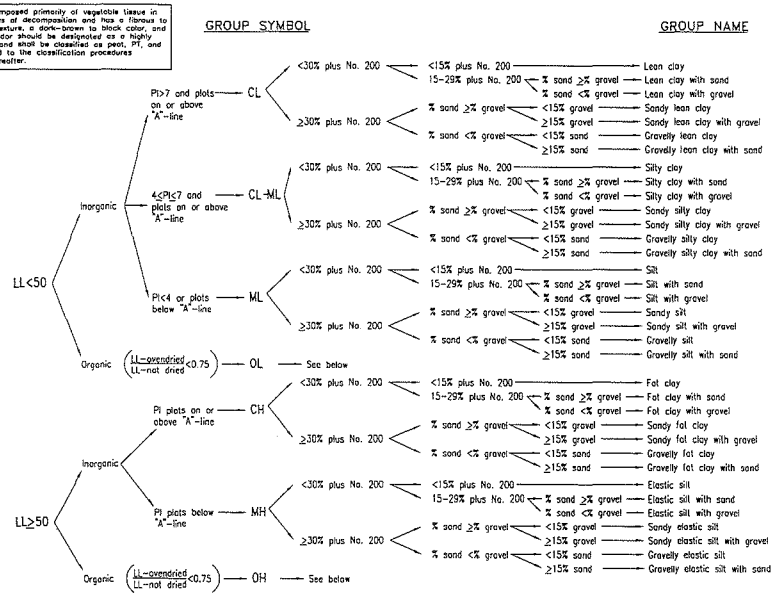
dry	= < OPTIMUM*	DUSTY, DRY TO THE TOUCH
moist	~ OPTIMUM*	DAMP, NO VISIBLE WATER
wet	= > OPTIMUM*	VISIBLE FREE WATER

* OPTIMUM MOISTURE FOR MAXIMUM DENSITY

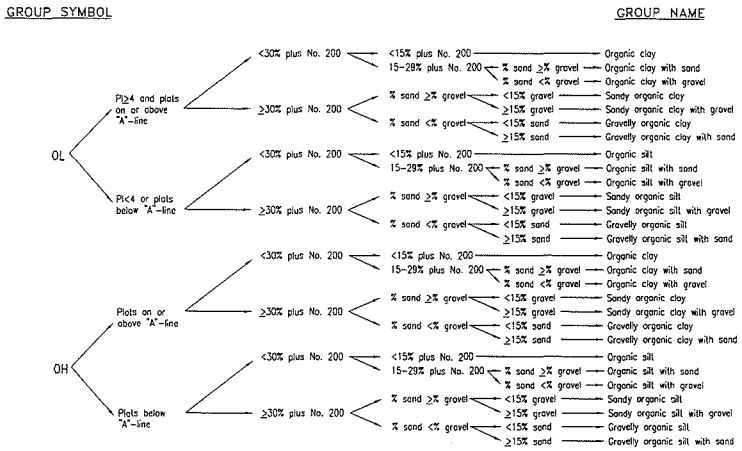
C:\Geo\SMB\GEOLOG-USCS-Geolog rev 2/07

Classification of Soils for Engineering Purposes (Unified Soil Classification System)

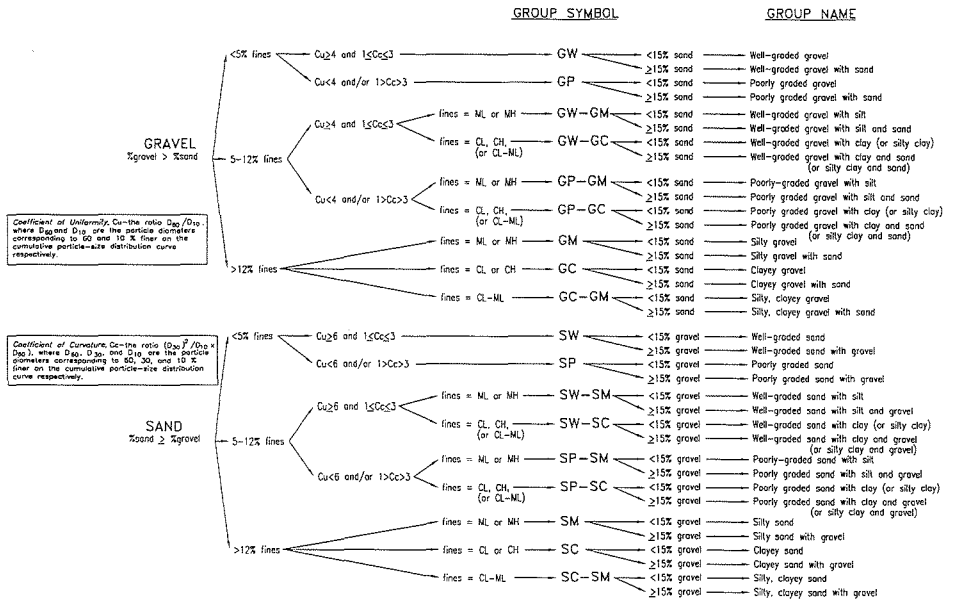
A sample composed primarily of vegetable tissue in various stages of decomposition and has a fibrous to amorphous texture, a dark-brown to black color, and an organic odor should be designated as a highly organic soil and shall be classified as peat, PT, and not subjected to the classification procedures described hereafter.



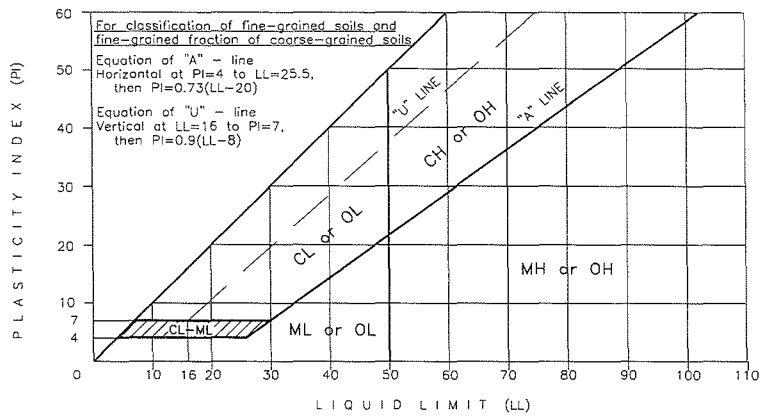
Flow Chart for Classifying Fine-Grained Soil (50% or More Passes No. 200 Sieve)



Flow Chart for Classifying Organic Fine-Grained Soil (50% or More Passes No. 200 Sieve)



Flow Chart for Classifying Coarse-Grained Soil (More Than 50% Retained on No. 200 Sieve)



Plasticity Chart

DESCRIPTION AND CLASSIFICATION OF FROZEN SOILS

Part I Description of Soil Phase (a) (Independent of Frozen State)	Major Group		Sub-Group		Field Identification (5)	Pertinent Properties of Frozen Materials which may be measured by physical tests to supplement field identification. (7)	Guide for Construction on Soils Subject to Freezing and Thawing	
	Description (2)	Designation (3)	Description (4)	Designation (5)			Thaw Characteristics (8)	Criteria (9)
Part II Description of Frozen Soil	Segregated ice is not visible by eye (b)	N	Poorly Bonded or Friable	Nf	Identify by visual examination. To determine presence of excess ice, use procedure under note (c) below and hand magnifying lens as necessary. For soils not fully saturated, estimate degree of ice saturation: Medium, Low. Note presence of crystals, or of ice coatings around larger particles.	In-Place Temperature Density and Void Ratio a) In Frozen State b) After Thawing in Place Water Content (Total H_2O, including ice) a) Average b) Distribution Strength a) Compressive b) Tensile c) Shear d) Adfreeze Elastic Properties Plastic Properties Thermal Properties Ice Crystal Structure (using optional instruments.) a) Orientation of Axes b) Crystal size c) Crystal shape d) Pattern of Arrangement	Usually Thaw-Stable	The potential intensity of ice segregation in a soil is dependent to a large degree on its void sizes and may be expressed as an empirical function of grain size as follows: Most inorganic soils containing 3 percent or more of grains finer than 0.02 mm in diameter by weight are frost-susceptible. Gravels, well-graded sands and silty sands, especially those approaching the theoretical maximum density curve, which contain 1.5 to 3 percent finer than 0.02 mm by weight without being frost-susceptible. However, their tendency to occur interbedded with other soils usually makes it impractical to consider them separately. Soils classed as frost-susceptible under the above criteria are likely to develop significant ice segregation and frost heave if frozen at normal rates with free water readily available. Soils so frozen will fall into the thaw-unstable category. However, they may also be classed as thaw-stable if frozen with insufficient water to permit ice segregation. Soils classed as non-frost-susceptible (*NFS) under the above criteria usually occur without significant ice segregation and are not exact and may be inadequate for some structure applications; exceptions may also result from minor soil variations. In permafrost areas, ice wedges, pockets, veins, or other ice bodies may be found whose mode of origin is different from that described above. Such ice may be the result of long-time surface expansion and contraction phenomena or may be glacial or other ice which has been buried under a protective earth cover.
				Nb				
				n				
				e				
	Segregated ice is visible by eye. (Ice 1 inch or less in thickness) (b)	V	Individual ice crystals or inclusions	Vx	For ice phase, record the following as applicable: Location Size Orientation Shape Thickness Spacing Pattern of arrangement Length Hardness } Structure } per part III Below Color } Estimate volume of visible segregated ice present as percent of total sample volume			
			Ice coatings on particles	Vc				
			Random or irregularly oriented ice formations	Vr				
			Stratified or distinctly oriented ice formations	Vs				
Part III Description of Substantial Ice Strata	Ice (Greater than 1 inch in thickness)	Ice	Ice with soil inclusions	Ice + Soil Type	Designate material as ICE (d) and use descriptive terms as follows, usually one item from each group, as applicable: Hardness: Hard, Soft (mass, not indi-crystals) Structure: Clear, Cloudy, Porous, Candled, Granular, Stratified Color: e.g.: Color-less, Gray, Blue Admixtures: e.g.: Contains Thin Silt Inclus-ions		Usually Thaw-Unstable	
			Ice without soil inclusions	Ice		Same as Part II above, as applicable, with special emphasis on Ice Crystal Structure.		

DEFINITIONS:

Ice Coatings on Particles are discernible layers of ice found on or below the larger soil particles in a frozen soil mass. They are sometimes associated with hoarfrost crystals, which have grown into voids produced by the freezing action.

Ice Crystal is a very small individual ice particle visible in the face of a soil mass. Crystals may be present alone or in a combination with other ice formations.

Clear ice is transparent and contains only a moderate number of air bubbles.(e)

Cloudy Ice is translucent, but essentially sound and non-pervious

Porous Ice contains numerous voids, usually interconnected and usually resulting from melting at air bubbles or along crystal interfaces from presence of salt or other materials in the water, or from the freezing of saturated snow. Though porous, the mass retains its structural unity.

Candled ice is ice which has rotted or otherwise formed into long columnar crystals, very loosely bonded together.

Granular Ice is composed of coarse, more or less equidimensional, ice crystals weakly bonded together.

Ice Lenses are lenticular ice formations in soil occurring essentially parallel to each other, generally normal to the direction of heat loss and commonly in repeated layers.

Ice Segregation is the growth of ice as distinct lenses, layers, veins and masses in soils, commonly but not always oriented normal to direction of heat loss.

Well-bonded signifies that the soil particles are strongly held together by the ice and that the frozen soil possesses relatively high resistance to chipping or breaking.

Poorly-bonded signifies that the soil particles are weakly held together by the ice and that the frozen soil consequently has poor resistance to chipping or breaking.

Friable denotes a condition in which material is easily broken up under light to moderate pressure.

Thaw-Stable frozen soils do not, on thawing, show loss of strength below normal, long-time thawed values nor produce detrimental settlement.

Thaw-Unstable frozen soils show on thawing, significant loss of strength below normal, long-time thawed values and/or significant settlement, as a direct result of the melting of the excess ice in the soil.

Modified from: Linell, K. A. and Kaplar, C. W., 1966, *Description and Classification of Frozen Soils,* Proc. International Conference on Permafrost (1963), Lafayette, IN, U.S. National Academy of Sciences, Publ. 1287, pp 481-487.

NOTES:

(a) When rock is encountered, standard rock classification terminology should be used.

(b) Frozen soils in the N group may on close examination indicate presence of ice within the voids of the material by crystalline reflections or by a sheen on fractured or trimmed surfaces. However, the impression to the unaided eye is that none of the frozen water occupies space in excess of the original voids in the soil. The opposite is true of frozen soils in the V group.

(c) When visual methods may be inadequate, a simple field test to aid evaluation of volume of excess ice can be made by placing some frozen soil in a small jar, allowing it to melt and observing the quantity of supernatant water as a percent of total volume.

(d) Where special forms of ice, such as hoarfrost, can be distinguished, more explicit description should be given.

(e) Observer should be careful to avoid being misled by surface scratches or frost coating on the ice.