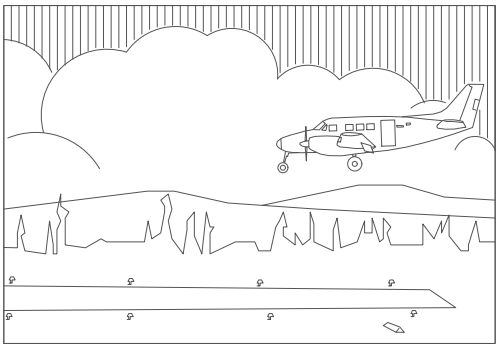
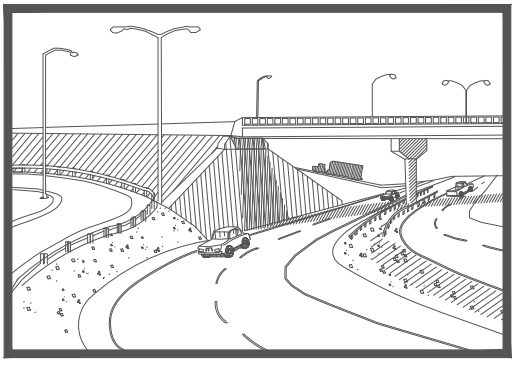
GEOTECHNICAL INVESTIGATION REPORT

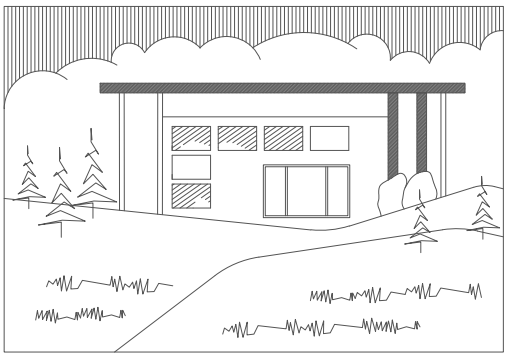
PARKS HIGHWAY MP 305-325 RECONSTRUCTION
REX PIT MS 37-2-069-2 MATERIAL SITE INVESTIGATION

STATE PROJECT: Z606570000

FEDERAL PROJECT: 0A45028

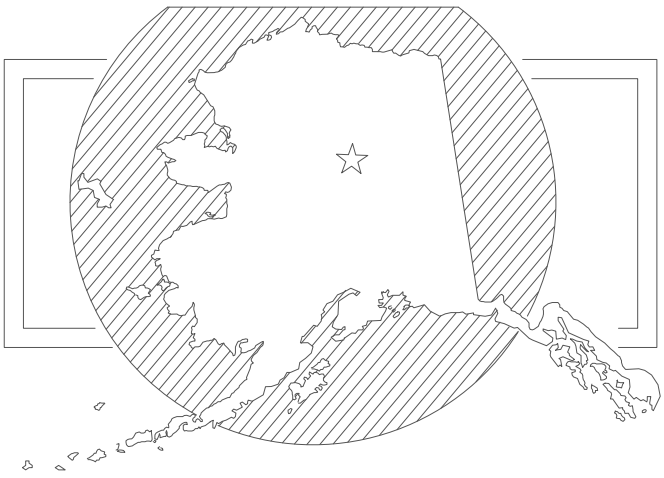






STATE OF ALASKA

Department of Transportation
and Public Facilities



NORTHERN REGION

APRIL, 2022

GEOTECHNICAL REPORT

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PROJECT NO: Z606570000

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April, 2022

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Materials Engineer

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Introduction

The Alaska Department of Transportation and Public Facilities (DOT&PF) is proposing the Parks Highway MP 305-325 Reconstruction project. As part of this project, the Northern Region Material Sections (NRMS) was tasked with locating a suitable source for the material required for the embankment rehabilitation. This investigation was performed by NRMS and involved exploring the developed and undeveloped areas of Rex Pit Material Site, MS 37-2-069-2 (Figure 1). Previous investigations were accomplished predominately with test trenches and auger drilling. The most recent findings are documented in Supplemental Material Site Investigation Parks Hwy M.S. 37-2-069-2, 2004. The majority of the area investigated in 2004 has subsequently been developed. Data from test trenches excavated in 2004 that are located in the undeveloped portion of the material site is included in this evaluation. Areas of the current undeveloped portion of this site that have not been previously evaluated were targeted during this geotechnical investigation. This material site investigation included:

- Drilling 3 test holes and excavating one test trench in the developed portion of the material site;
- Drilling 16 test holes and excavating two test trenches in the undeveloped portion of the material site;
- Submitting 26 samples to MAPPA Test Lab for Moisture content and Organic content analysis;
- Submitting 29 samples to MAPPA Test Lab for USCS classification;
- Submitting 3 samples to MAPPA Labs for L.A. Abrasion and Degradation of Aggregate testing.

Summary

A geotechnical investigation of the developed and undeveloped portions of MS 37-2-069-2 (Rex Pit) was completed to verify the quantity and quality of usable construction material (Figure 2). An area of approximately 80-acres was explored using geotechnical drilling with a test hole spacing of 270 to 500-feet. In addition, three test trenches were excavated and twelve samples were collected for quality index testing.

In the developed portion of the site there is no overburden. The resource layer is poorly-graded gravel with cobbles and boulders, poorly-graded gravel with sand with cobbles and boulders, poorly-graded gravel with silt and sand with cobbles and boulders, well-graded gravel with sand with cobbles and boulders, and well-graded gravel with silt and sand with cobbles and boulder which is present from the surface to the maximum depth of trenching and drilling. Trenches were excavated to depths ranging from 9.5 to 14-feet below ground surface (bgs) and test holes were drilled to depths ranging from 18 to 46.5-feet bgs. Deposit geometry allows for the presence of approximately 1.3-million yard^3 of material using an average thickness of 30-feet and an area of 29-acres.

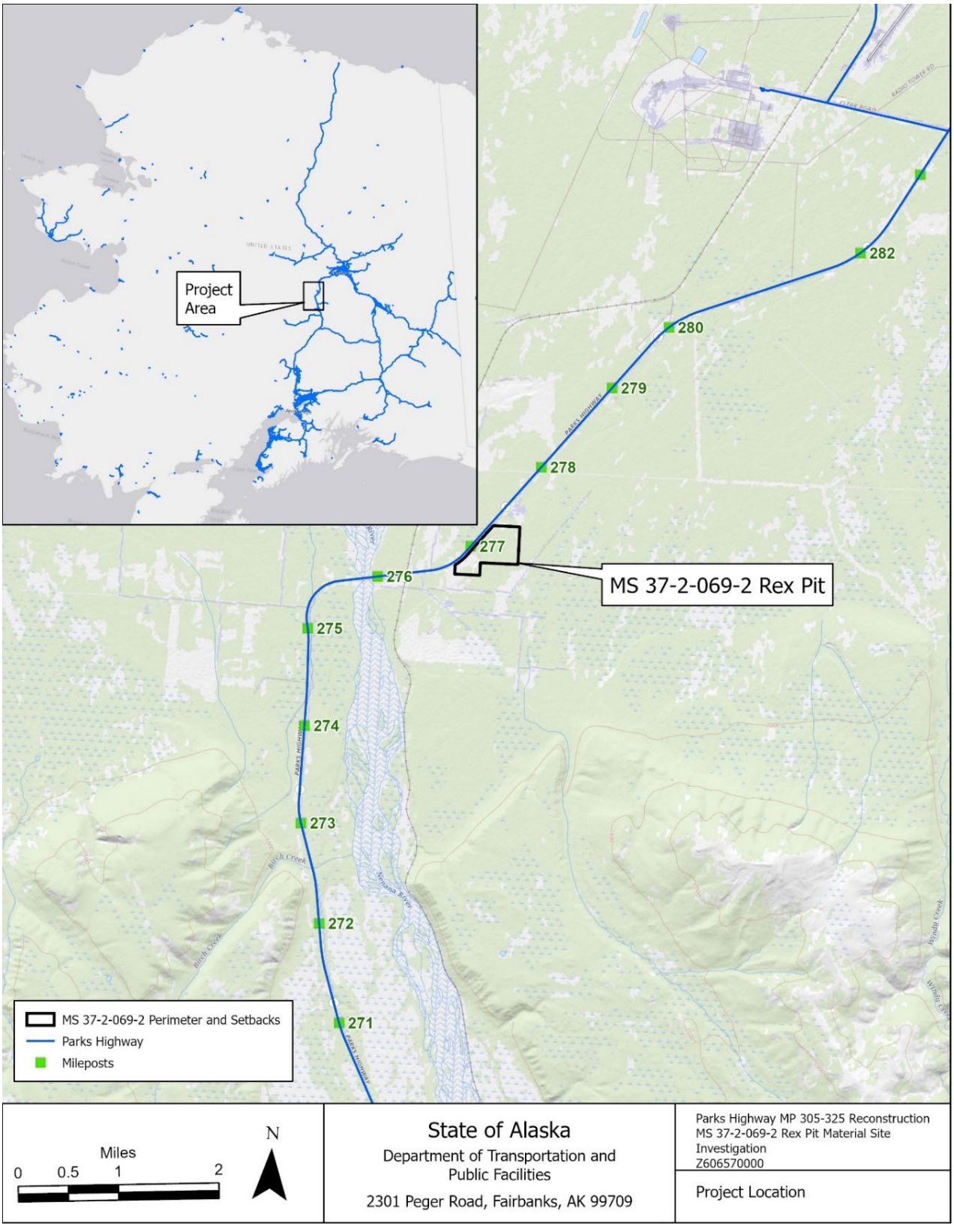

Figure 1. Project location

In the undeveloped portion of the site the average overburden depth is 2.75-feet. The resource layer is poorly-graded gravel with cobbles and boulders, poorly-graded gravel with sand with cobbles and boulders, poorly-graded gravel with silt and sand with cobbles and boulders, well-graded gravel with sand with cobbles and boulders, well-graded gravel with silt and sand with cobbles and boulder, silty sand with gravel, and poorly-graded sand with silt and gravel which is present from the surface to the maximum depth of trenching and drilling. The only exception to this was observed in TH21-1024 where poorly-graded sand with silt and gravel was encountered below the resource layer at 23.5-feet bgs. Test trenches were excavated to depths ranging from 9.5 to 13-feet bgs and test holes were drilled to depths ranging from 11 to 27-feet bgs. Deposit geometry allows for the presence of approximately 2.2-million yards^3 of material using an average resource thickness of 15.75-feet and area of 48-acres.

Ground water was not encountered in any test holes or test trenches. Frozen ground to a depth of 9-feet bgs was encountered in the developed portion of the site. Frozen ground was encountered in the undeveloped portion of the site at depths ranging from 0.5-2.0-feet bgs.

Physical Setting

Location

The Rex Pit material site is located on the southeast side of the Parks Highway at MP 277 in Section 13, Township 008 South, Range 009 West of the Fairbanks Meridian. Geographic coordinates of the Rex Pit are 149.2456921°W 64.2214924°N (Map Datum WGS 84).

Climate

The project site is located within the continental climatic zone of Alaska (Hartman and Johnson, 1984), characterized by mild summers, long cold winters, and relatively low precipitation and humidity. Mean annual temperatures range from summer time highs of 74°f to winter time lows of -12°f. Climate data for the project area was collected at the Nenana Alaska, Municipal Airport and is summarized in Table 1.

Table 1. Climate data for Nenana, Alaska.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (f)	5.3	14.8	24.4	45.2	62.5	72.4	73.2	66.8	55.4	34.5	15.2	8.2	39.8
Average Min. Temperature (f)	-11.6	-5.5	0.6	22.7	38.5	49.2	52.8	48.0	37.4	20.8	0.5	-8.7	20.4
Average Total Precipication (in	0.6	0.4	0.4	0.3	0.6	1.8	2.3	2.3	1.4	0.9	0.8	0.6	12.4

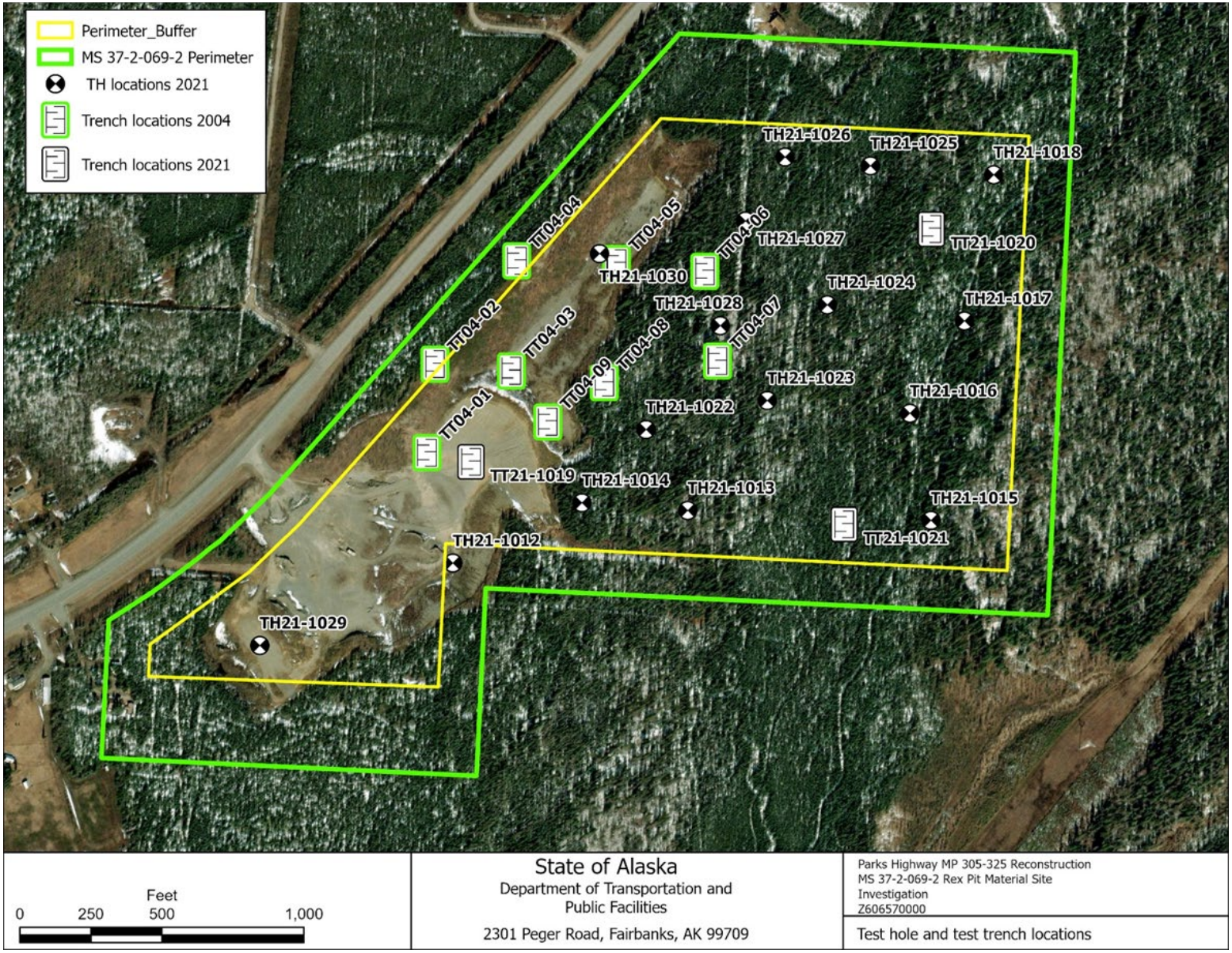

Figure 2. Test hole and trench locations.

Thermal Indices

The following freeze/thaw indices (Table 2) are based on climate data collected at Nenana, Alaska. The thawing index, or degree-days above freezing, is a measure of thawing that occurs during the year. The air thawing index listed below is the average of the annual thawing-degree-days (TDD) for the last thirty years. The design thawing index is the average of the three warmest (highest) TDD values over the same period. Likewise, the air freezing index, or degree-days below freezing, can be used to calculate the depth of ground freezing during winter. The air freezing index listed below is the average of the annual freezing-degree-days (FDD) for the last thirty years. The design freezing index coldest is the average three coldest (highest) FDD values for the same period.

Table 2. Freezing degree days/Thawing degree days for Nenana, Alaska.

Index	Value
Air Thawing Index	3776 Fahrenheit Degree-days[1]
Air Freezing Index	4418 Fahrenheit Degree-days[1]
Design Thawing Index	3926 Fahrenheit Degree-days[2]
Design Freezing Index	6230 Fahrenheit Degree-days[2]
1) Calculated from 1991 through 2020 daily average temperatures	2) Calculated from monthly average temperatures from 1991 through 2020

Geology

According to Physiographic Divisions of Alaska (Wahrhaftig, 1965), the project is located in the Tanana-Kuskokwim Lowlands, a broad depression bordering the Alaska Range on the north. Coalescing outwash fans extending northward from the Alaska Range slope 20 to 50-feet per mile to flood plains in the lowlands. The project area drains to the Nenana River flowing northward to the Tanana River. Discontinuous permafrost in found throughout the area. The project area was mapped as glacial outwash gravel (Figure 3) deposited during Pleistocene aged glaciation (Wahrhaftig, 1970).

Seismicity

The project area is located in the Interior Alaska seismic source region of Kohler and Carver (2018) south of the north-northeast trending Minto, Fairbanks, and Salcha seismic zones. According to the United States Geological Survey (USGS) online earthquake catalog, since 1900 111 earthquakes of magnitude 5.0 or greater have occurred within 100-miles of the project area (Figure 4), including four earthquakes magnitude 7.0 or higher. The most prominent recorded earthquake in interior Alaska was the M 7.9 November 3, 2002, Denali fault earthquake.

The project area is located approximately 60-miles north of the main trace of the Denali Fault system which crosses the Parks Highway at MP 215.

The USGS online deaggregation calculator indicates there is a 10% probability of the peak horizontal ground acceleration exceeding 0.199g in 50-years with a mean return period of 475-years. This calculation was made using a 2007 database and used a velocity of 760 m/s assigned to the boundary between National Earthquake Hazard Reduction Program (NEHRP) site classifications B and C (FEMA 450 provisions, 2003).

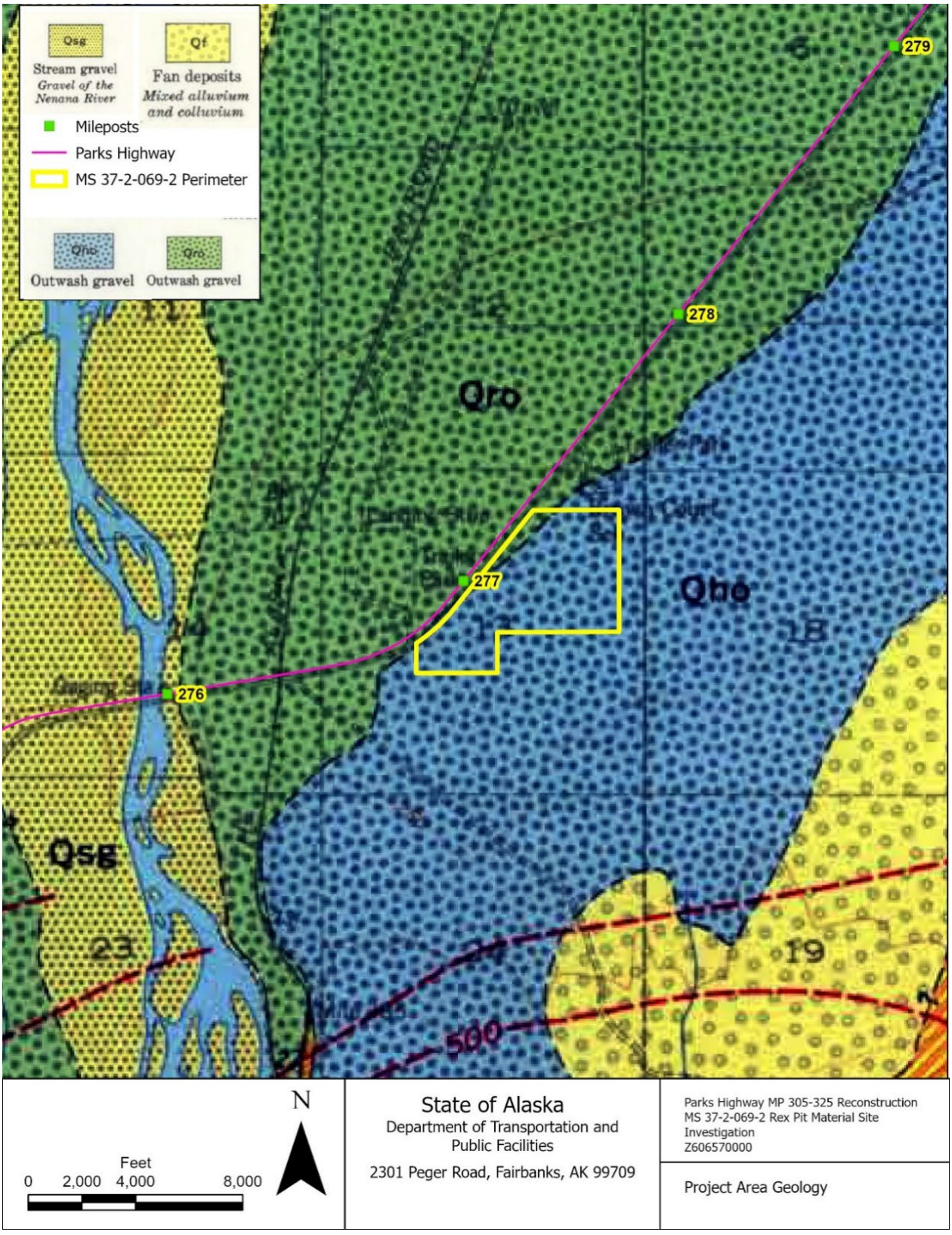

Figure 3. Project Area Geology

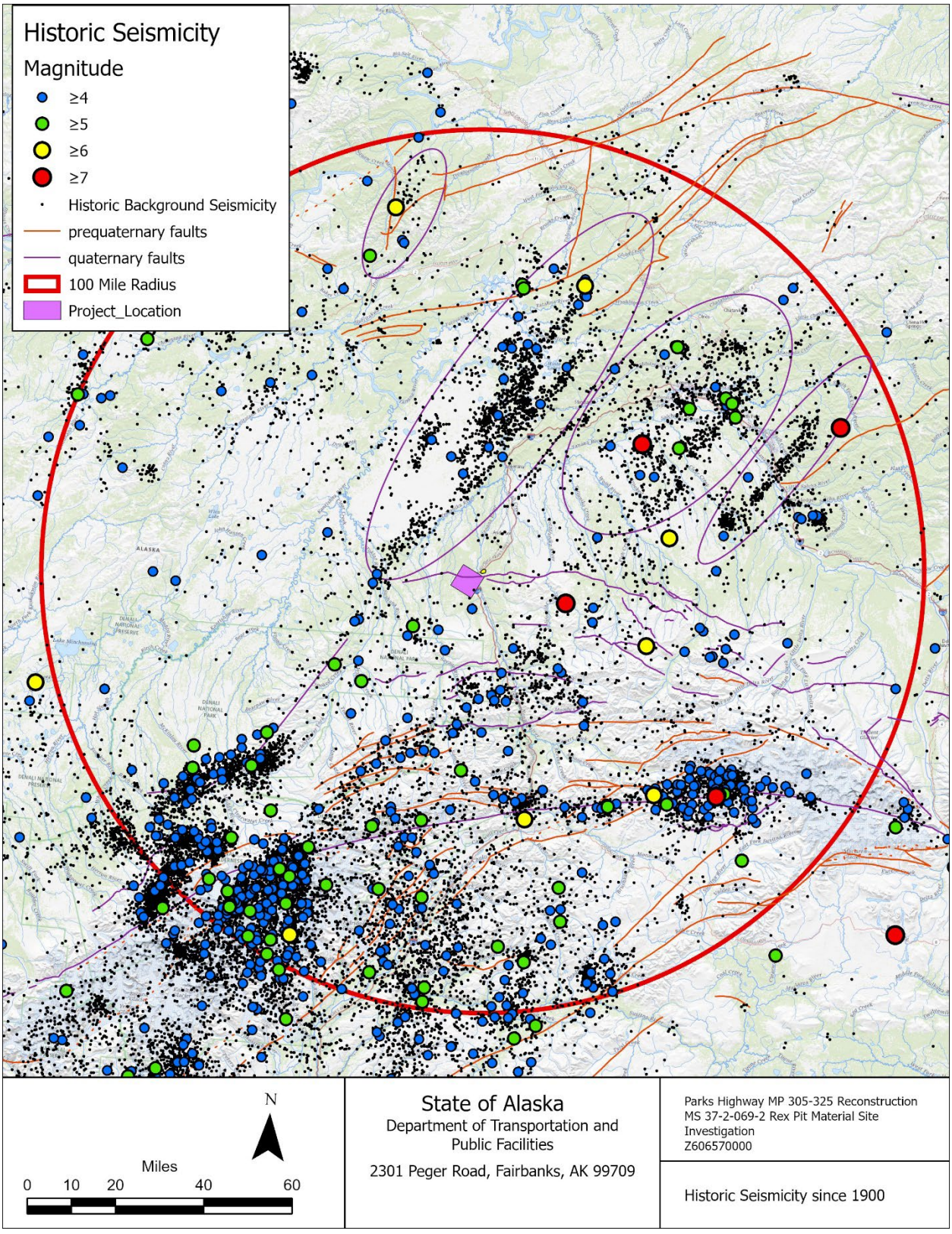

Figure 4. Regional historic seismicity since 1900

Field Investigation

Drilling, Trenching, and Sampling

A total of 19 test holes were drilled and 3 test trenches excavated to assess the potential of developing the expansion area of this materials site (Figure 2). Field investigations were carried out by NRMS Engineering Geologist A. Jemison, and NRMS drillers M. Sousa, T. Hartford, T. Babin, and P. Lanigan on December 2nd-10th, 2021 and January 19th- February 5th, 2022. A track mounted CME 850 drill rig equipped with 6-inch outside diameter (O.D.) solid-stem augers and 8-inch O.D. hollow-stem augers was used for this investigation. Test trenches were excavated using a John Deere 225D excavator operated by NRMS driller P. Lanigan. A total of 12 samples from a potential resource horizon were collected from test trenches from which 3 composite samples were submitted for index testing which included Los Angeles Abrasion and Degradation of Aggregate. A total of 26 samples from a potential resource horizon were collected from test holes and submitted for index testing of moisture content, organic content, and USCS classification. Test hole and test trench logs are presented in Appendix A.

Locations of test holes in the field were determined using a Garmin GPSmap 62s hand held GPS (datum WGS 84) with an accuracy of +/- 50-feet. Elevation of test holes was obtained by plotting test holes on a LIDAR digital elevation model surface in ArcPro GIS and using a geoprocessing tool to extract the elevation at that location. Test holes were backfilled with cuttings or bentonite hole plug.

Samples were collected from auger cuttings during solid-stem auger drilling or split-spoons during standard penetration tests conducted during this drilling. Samples were collected from excavated material from test trenches. Samples were placed in double-layered Ziploc® brand bags or woven poly bags labeled with permanent marker for storage and transported to the MAPPA Test Lab in North Pole Alaska. Index testing results are presented in Appendix B.

Laboratory data

Soil samples and test hole conditions were logged in the field following the criteria in the *Alaska Geotechnical Procedures Manual* (2007) and using the Unified Soil Classification System. In addition the Alaska Guide to Description and Classification of Peat and Organic Soil and the Description and Classification of Frozen Soils were used to describe organic rich or frozen subsurface conditions (see keys in Appendix D). Selected samples were tested in accordance with ASTM/AASHTO methods for a determination of any one or a combination of the following properties:

- Classification (particle size distribution)
- Moisture content
- Atterberg Limits
- Organic content
- Los Angeles Abrasion
- Degradation of Aggregate

Table 3. Index test reference numbers

Test Method	AASHTO	ASTM
Index Tests		
Gradation	T27	C136
Liquid Limit	T89	D4318
Plastic Limit	T90	D4318
Moisture Content – Aggregate Soil	T255 T265	C566 D2216
Organic Content (Burn)	T267	
Los Angeles Abrasion	T96	C131
Degradation	ATM T313	
USCS Classification	D2487	

Material Site Investigation

Location and Access

The Rex Pit material site is located on the southeast side of the Parks Highway at MP 277 in Section 13, Township 008 South, Range 009 West of the Fairbanks Meridian. Geographic coordinates of the Rex Pit are 149.2456921°W 64.2214924°N (Map Datum WGS 84). Access to the undeveloped portion of the material site is through the existing pit. The site is located on an 8 to 10-foot high terrace of sand and gravel that contains cobbles and boulders. The terrace is a depositional / erosional feature of past glacial outwash activities. The mined area extends for approximately 2500-feet parallel to the Parks Highway and is up to 650-feet wide. In 2004, the average depth of excavation is 10-feet, with the deepest part 60-feet below the original ground surface.

Land Status

The material site is located on land managed by State of Alaska, Department of Natural Resources, operating under Material Sale Contract ADL 419468, expiring February 20, 2025.

Clearing and Stripping

Clearing will not be necessary in the existing excavation. The undisturbed portions of the site have a moderately dense stand of 1 to 4-inch diameter black spruce with scattered 2 to 6-inch diameter aspen and a thin moss cover. These areas are mantled with up to 5.0-feet of brown silt overburden. Clearing and stripping debris from the existing excavation was placed on the northeast side of the pit. Designated waste areas 100-ft wide encompass the site along the property lines.

Water table

Ground water was not encountered in any test holes or test trenches.

Frozen Ground

Frozen ground was encountered in the developed portion of the site to a depth of 9-feet bgs. Frozen ground was encountered in the undeveloped portion of the site to depths ranging from 0.5 to 2.0-feet bgs in some test holes. In other test holes, no frozen ground was observed.

Available Material

This investigation explored an area of approximately 80-acres within the DNR material site to depths up to 46.5-feet (bgs). A volume of material on the order of 3.5 million-cubic yards is estimated to be present at this site. This site is capable of producing Select Material Type A, B, and C (Figure 5).

In the developed portion of the site there is no overburden. The resource layer is poorly-graded gravel with cobbles and boulders, poorly-graded gravel with sand with cobbles and boulders, poorly-graded gravel with silt and sand with cobbles and boulders, well-graded gravel with sand with cobbles and boulders, and well-graded gravel with silt and sand with cobbles and boulder which is present from the surface to the maximum depth of trenching and drilling. Trenches were excavated to depths ranging from 9.5 to 14-feet below ground surface (bgs) and test holes were drilled to depths ranging from 18 to 46.5-feet bgs. Deposit geometry allows for the presence of approximately 1,325,000-yard^3 of Select Material Type A, B, and C. The results of laboratory gradation tests show that none of the samples analyzed failed to meet the Standard Highway Material Specifications for Type A or B.

The developed portion of the site is estimated as capable of producing:

- 820,000-yards^3 Select Type A
- 505,000-yards^3 Select Type B

In the undeveloped portion of the site the average overburden depth is 2.75-feet. The resource layer is poorly-graded gravel with cobbles and boulders, poorly-graded gravel with sand with cobbles and boulders, poorly-graded gravel with silt and sand with cobbles and boulders, well-graded gravel with sand with cobbles and boulders, well-graded gravel with silt and sand with cobbles and boulder, and silty sand with gravel which is present from the surface to the maximum depth of trenching and drilling. The only exception to this was observed in TH21-1024 where poorly-graded sand with silt and gravel was encountered below the resource layer at 23.5-feet bgs. Test trenches were excavated to depths ranging from 9.5 to 13-feet bgs and test holes were drilled to depths ranging from 11 to 27-feet bgs. Deposit geometry allows for the presence of approximately 2,186,750-yards^3 of Select Material Type A, B, and C.

The results of laboratory gradation test show that 3 of the 21 samples analyzed failed to meet the Standard Highway Material Specifications for Type A or B.

The undeveloped portion of the site is estimated as capable of producing:

- 1,735,000-yards^3 Select Type A
- 86,750-yards^3 Select Type B
- 365,000-yards^3 Select Type C

Three samples collected from test trenches were submitted to MAPPA Test labs for L.A. Abrasion and Degradation of Aggregate index testing. All three samples submitted meet specifications for all crushed products (Table 4). Cobbles and boulders were found in all test holes and test trenches. Field cobble counts were conducted on material excavated from test

trenches and the results are summarized in Table 5. Complete cobble count logs with lithology percentages are reported in Appendix C.

Table 4. L.A. Abrasion and Degradation of Aggregate summary.

Sample	Soil Classification	P200	LA Abrasion %	Degradation Loss %
Sand and Gravel	GP (3)	2.1-17 (3)	17-23 (3)	79-84 (3)

Table 5. Cobble count summary

Test Trench	Depth (feet)	Corresponding Lab Sample	Total Weight (lb.)	+3" Weight (lb.)	+3" Weight %
TT21-1019	3		360	150	42%
	6		415	50	12%
	9	21-2064	400	80	20%
	13		430	97	23%
TT21-1020	3	21-2066	395	30	8%
	6		410	50	12%
	9		410	60	15%
	12		430	40	9%
TT21-1021	4		380	75	20%
	6	21-2071	425	100	24%
	9		410	60	15%
	12		430	0	0%

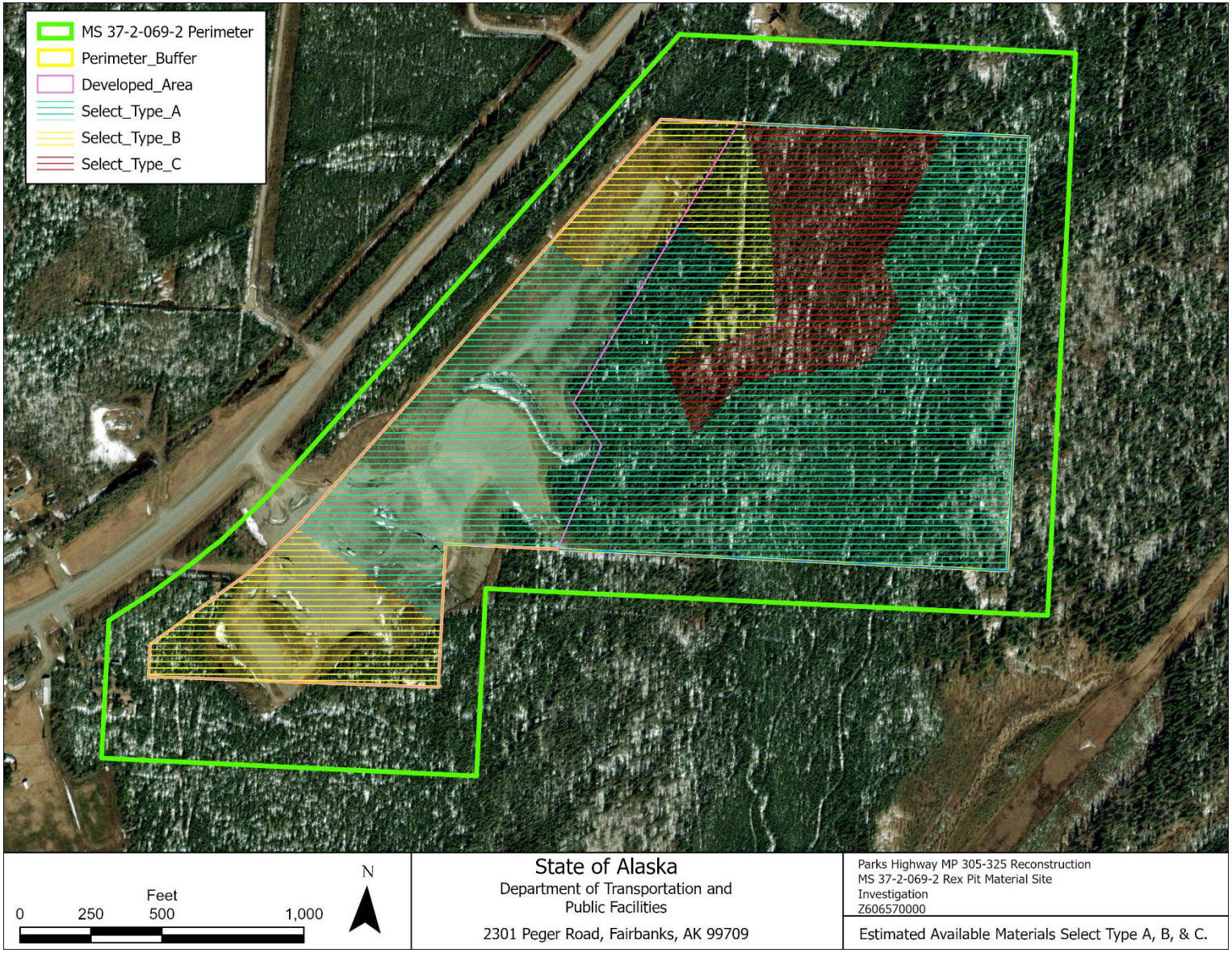

Figure 5. Estimated Available Material Select Type A , B, & C.

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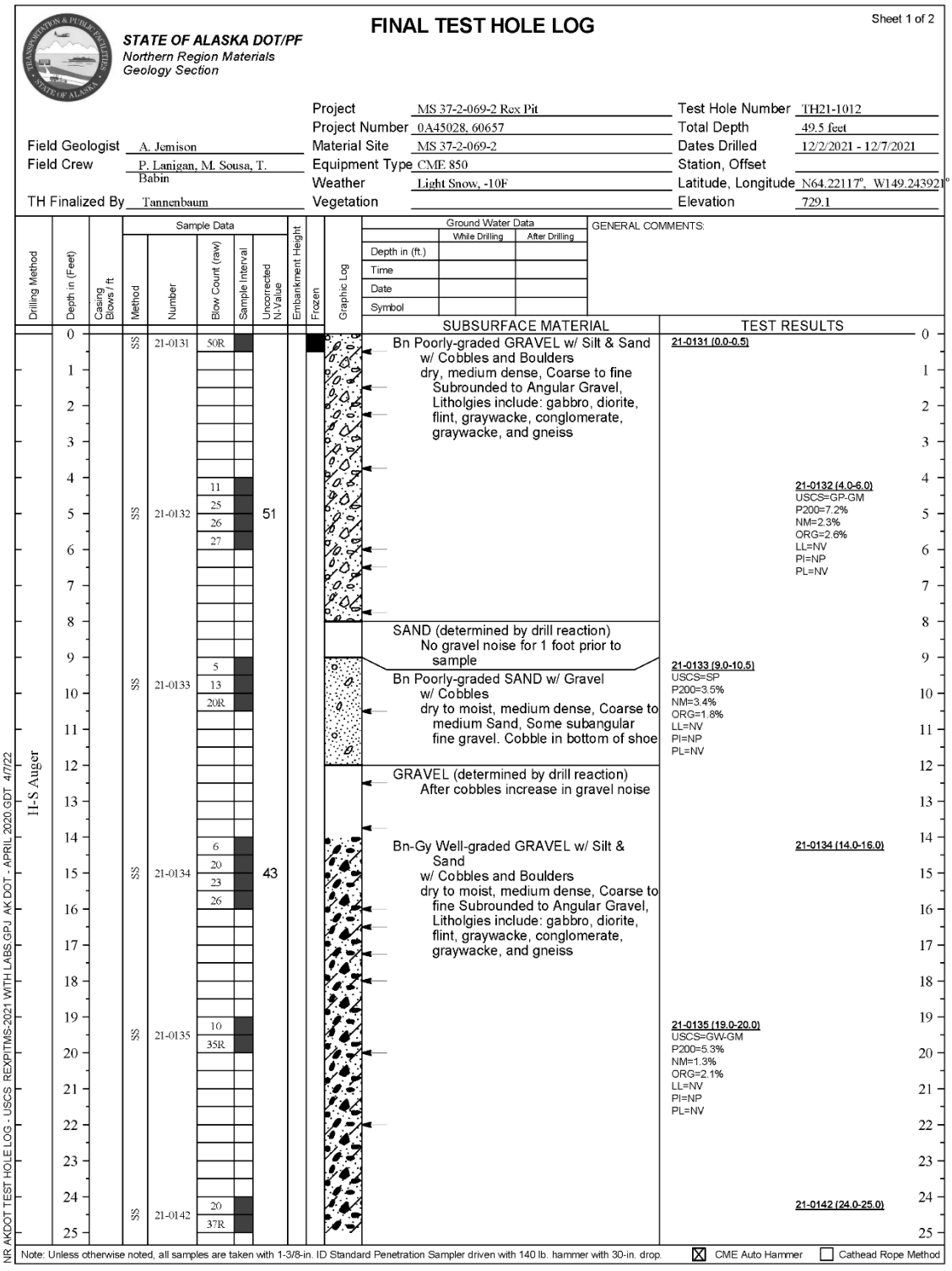
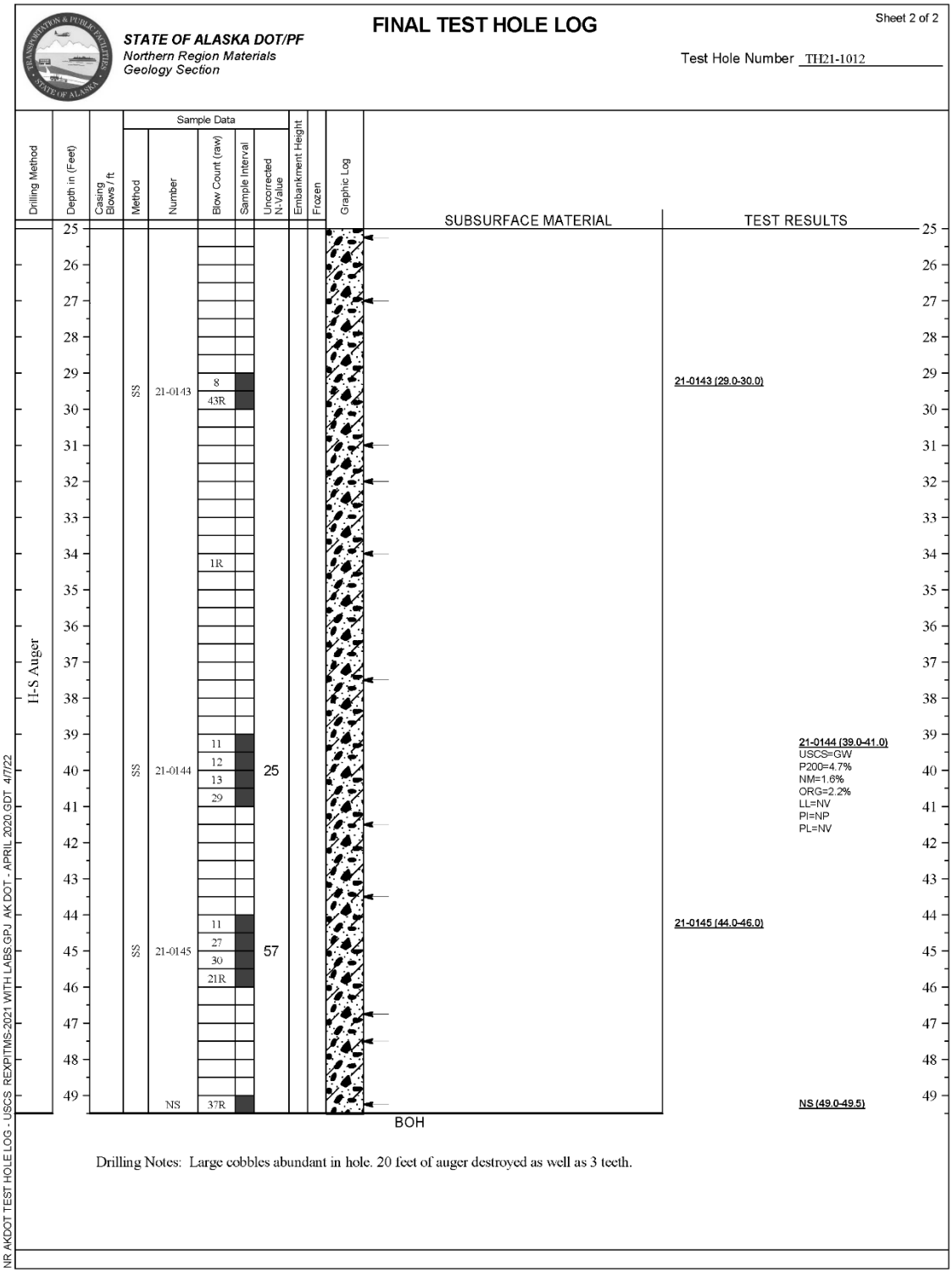
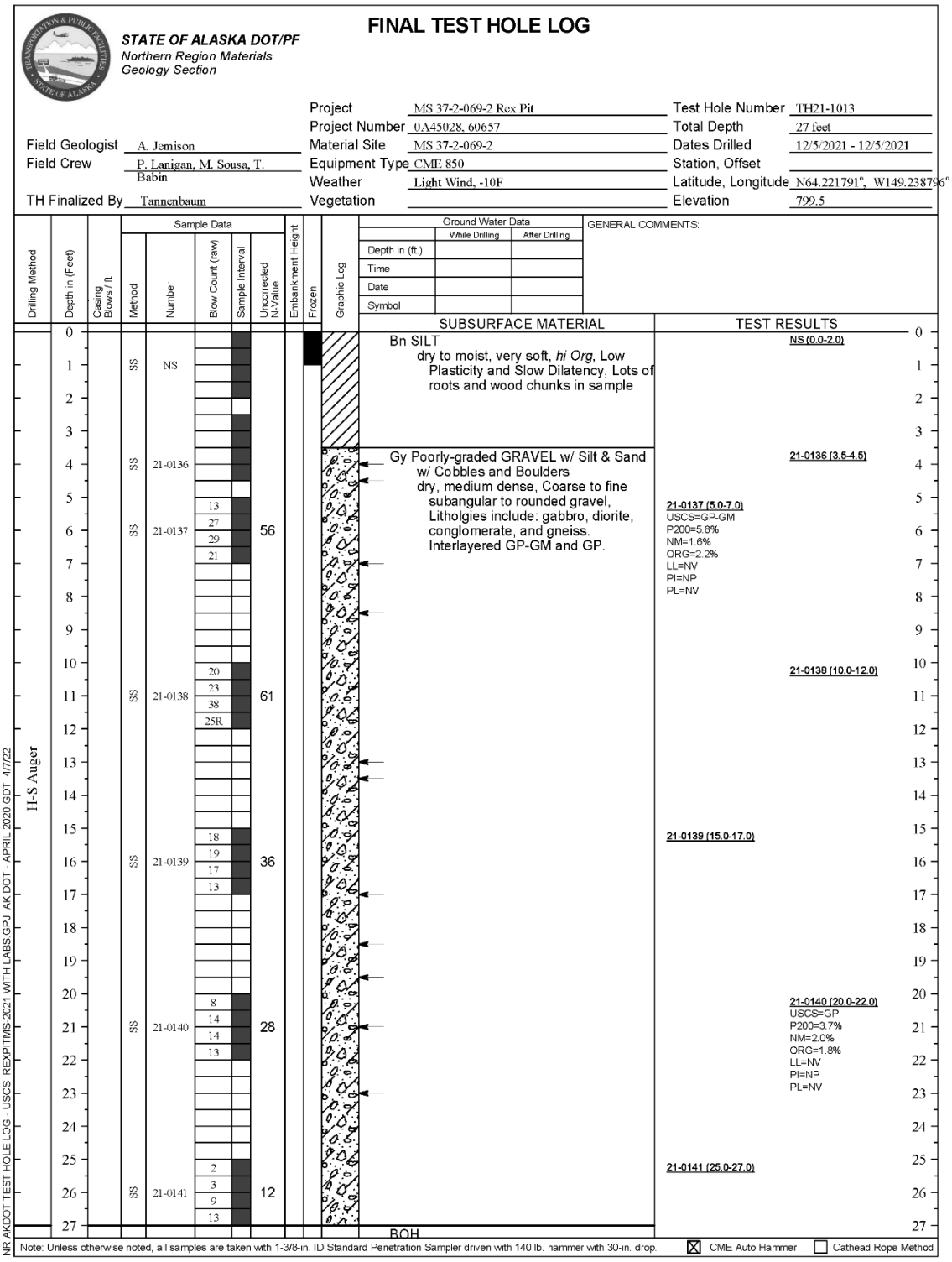
Appendix A: Final Test Hole and Test Trench logs.

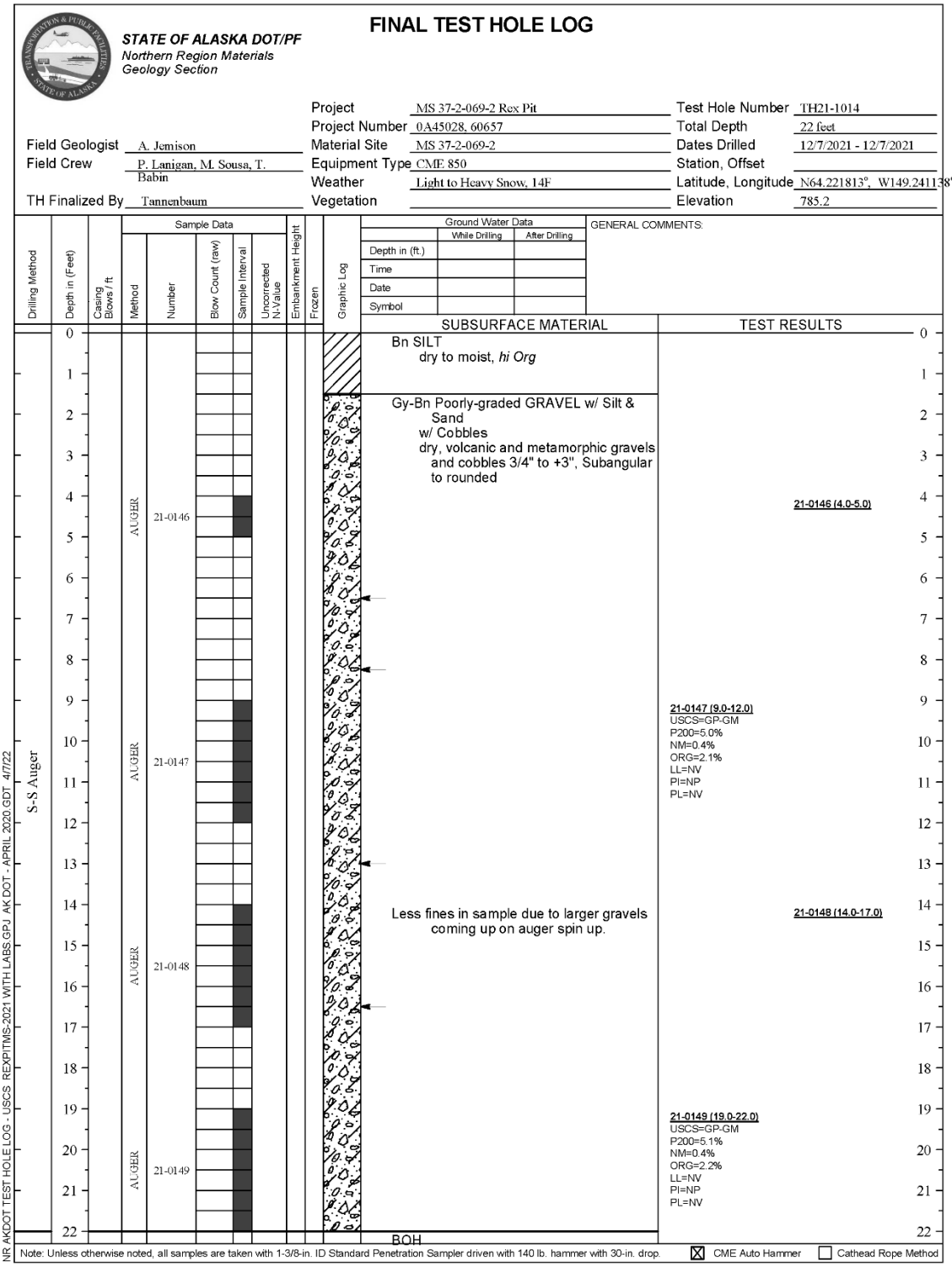
TH ID	Latitude	Longitude	Elevation (ft)
TH21-1012	64.22117	-149.243921	729.1
TH21-1013	64.221791	-149.238796	799.5
TH21-1014	64.221813	-149.241138	785.2
TH21-1015	64.221814	-149.233418	794.5
TH21-1016	64.222832	-149.234	790.2
TH21-1017	64.223745	-149.232899	783.0
TH21-1018	64.225163	-149.232418	766.4
TH21-1022	64.222548	-149.239805	782.3
TH21-1023	64.222885	-149.237162	802.0
TH21-1024	64.223833	-149.235944	783.9
TH21-1025	64.225189	-149.235149	772.8
TH21-1026	64.225231	-149.237042	774.5
TH21-1027	64.224597	-149.237847	781.8
TH21-1028	64.223581	-149.238286	799.8
TH21-1029	64.220285	-149.248089	760.5
TH21-1030	64.224212	-149.241032	719.1
TT21-1019	64.222149	-149.243609	755.2
TT21-1020	64.224609	-149.233707	796.7
TT21-1021	64.221732	-149.235301	784.4
TT04-01	64.22222	-149.24462	-
TT04-02	64.22307	-149.24454	764.3
TT04-03	64.22304	-149.24285	-
TT04-04	64.2241	-149.24285	758.9
TT04-05	64.22413	-149.24065	-
TT04-06	64.22409	-149.23869	798.1
TT04-07	64.22324	-149.23831	803.1
TT04-08	64.22298	-149.24078	785.1
TT04-09	64.22257	-149.24199	-


FINAL TEST HOLE LOG
Sheet 1 of 2
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Light Snow, -10F
Vegetation
Test Hole Number TH21-1012
Total Depth 49.5 feet
Dates Drilled 12/2/2021 - 12/7/2021
Station, Offset
Latitude, Longitude N64.22117°, W149.24392°
Elevation 729.1
Field Geologist A. Jemison
Field Crew P. Lanigan, M. Sousa, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
11-S Auger
SS
21-0131
50R
21-0131 (0.0-0.5)
Bn Poorly-graded GRAVEL w/ Silt & Sand
w/ Cobbles and Boulders
dry, medium dense, Coarse to fine
Subrounded to Angular Gravel,
Litholgies include: gabbro, diorite,
flint, graywacke, conglomerate,
graywacke, and gneiss
11
25
26
27
SS
21-0132
51
21-0132 (4.0-6.0)
USCS=GP-GM
P200=7.2%
NM=2.3%
ORG=2.6%
LL=NV
PI=NP
PL=NV
SAND (determined by drill reaction)
No gravel noise for 1 foot prior to
sample
5
13
20R
SS
21-0133
21-0133 (9.0-10.5)
USCS=SP
P200=3.5%
NM=3.4%
ORG=1.8%
LL=NV
PI=NP
PL=NV
Bn Poorly-graded SAND w/ Gravel
w/ Cobbles
dry to moist, medium dense, Coarse to
medium Sand, Some subangular
fine gravel. Cobble in bottom of shoe
GRAVEL (determined by drill reaction)
After cobbles increase in gravel noise
6
20
23
26
SS
21-0134
43
21-0134 (14.0-16.0)
Bn-Gy Well-graded GRAVEL w/ Silt &
Sand
w/ Cobbles and Boulders
dry to moist, medium dense, Coarse to
fine Subrounded to Angular Gravel,
Litholgies include: gabbro, diorite,
flint, graywacke, conglomerate,
graywacke, and gneiss
10
35R
SS
21-0135
21-0135 (19.0-20.0)
USCS=GW-GM
P200=5.3%
NM=1.3%
ORG=2.1%
LL=NV
PI=NP
PL=NV
20
37R
SS
21-0142
21-0142 (24.0-25.0)
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22



Drilling Notes: Large cobbles abundant in hole. 20 feet of auger destroyed as well as 3 teeth.


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Light Wind, -10F
Vegetation
Test Hole Number TH21-1013
Total Depth 27 feet
Dates Drilled 12/5/2021 - 12/5/2021
Station, Offset
Latitude, Longitude N64.221791°, W149.238796°
Elevation 799.5
Field Geologist A. Jemison
Field Crew P. Lanigan, M. Sousa, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
11-S Auger
Bn SILT
dry to moist, very soft, hi Org, Low Plasticity and Slow Dilatency, Lots of roots and wood chunks in sample
NS
NS (0.0-2.0)
Gy Poorly-graded GRAVEL w/ Silt & Sand w/ Cobbles and Boulders
dry, medium dense, Coarse to fine subangular to rounded gravel, Litholgies include: gabbro, diorite, conglomerate, and gneiss. Interlayered GP-GM and GP.
21-0136
21-0136 (3.5-4.5)
13
27
29
21
21-0137
56
21-0137 (5.0-7.0)
USCS=GP-GM
P200=5.8%
NM=1.6%
ORG=2.2%
LL=NV
PI=NP
PL=NV
20
23
38
25R
21-0138
61
21-0138 (10.0-12.0)
18
19
17
13
21-0139
36
21-0139 (15.0-17.0)
8
14
14
13
21-0140
28
21-0140 (20.0-22.0)
USCS=GP
P200=3.7%
NM=2.0%
ORG=1.8%
LL=NV
PI=NP
PL=NV
2
3
9
13
21-0141
12
21-0141 (25.0-27.0)
BOH
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22



FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1014
Project Number	0A45028, 60657	Total Depth	22 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	12/7/2021 - 12/7/2021
Field Crew: P. Lanigan, M. Sousa, T. Babin	Equipment Type	CME 850	Station, Offset	
	Weather	Light to Heavy Snow, 14F	Latitude, Longitude	N64.221813°, W149.241138°
TH Finalized By: Tannenbaum	Vegetation		Elevation	785.2

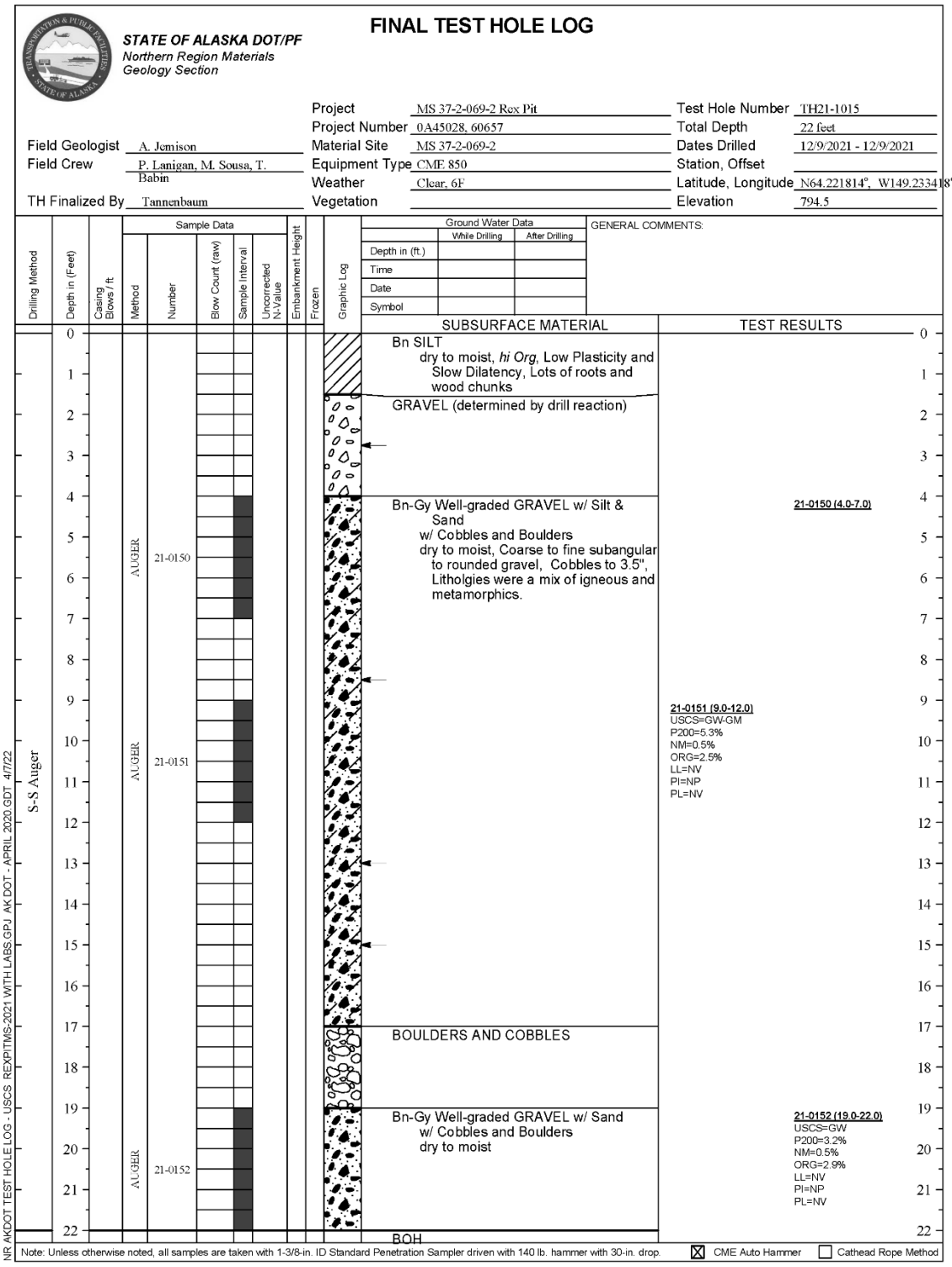
Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Number	Blow Count (raw)	Sample Interval	Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
S-S Auger	0										Bn SILT dry to moist, *hi Org*	
	1											
	2										Gy-Bn Poorly-graded GRAVEL w/ Silt & Sand w/ Cobbles dry, volcanic and metamorphic gravels and cobbles 3/4" to +3", Subangular to rounded	
	3											
	4		AUGER	21-0146								21-0146 (4.0-5.0)
	5											
	6											
	7											
	8											
	9											21-0147 (9.0-12.0) USCS=GP-GM P200=5.0% NM=0.4% ORG=2.1% LL=NV PI=NP PL=NV
	10		AUGER	21-0147								
	11											
	12											
	13											
	14										Less fines in sample due to larger gravels coming up on auger spin up.	21-0148 (14.0-17.0)
	15		AUGER	21-0148								
	16											
	17											
	18											
	19											21-0149 (19.0-22.0) USCS=GP-GM P200=5.1% NM=0.4% ORG=2.2% LL=NV PI=NP PL=NV
	20		AUGER	21-0149								
	21											
	22										BOH	

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Clear, 6F
Vegetation
Test Hole Number TH21-1015
Total Depth 22 feet
Dates Drilled 12/9/2021 - 12/9/2021
Station, Offset
Latitude, Longitude N64.221814°, W149.233418°
Elevation 794.5
Field Geologist A. Jemison
Field Crew P. Lanigan, M. Sousa, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
S-S Auger
AUGER
21-0150
21-0151
21-0152
Bn SILT
dry to moist, hi Org, Low Plasticity and Slow Dilatency, Lots of roots and wood chunks
GRAVEL (determined by drill reaction)
Bn-Gy Well-graded GRAVEL w/ Silt & Sand
w/ Cobbles and Boulders
dry to moist, Coarse to fine subangular to rounded gravel, Cobbles to 3.5", Litholgies were a mix of igneous and metamorphics.
21-0150 (4.0-7.0)
21-0151 (9.0-12.0)
USCS=GW-GM
P200=5.3%
NM=0.5%
ORG=2.5%
LL=NV
PI=NP
PL=NV
BOULDERS AND COBBLES
Bn-Gy Well-graded GRAVEL w/ Sand
w/ Cobbles and Boulders
dry to moist
21-0152 (19.0-22.0)
USCS=GW
P200=3.2%
NM=0.5%
ORG=2.9%
LL=NV
PI=NP
PL=NV
BOH
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1016
Project Number	0A45028, 60657	Total Depth	11 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	12/9/2021 - 12/9/2021
Field Crew: P. Lanigan, M. Sousa, T. Babin	Equipment Type	CME 850	Station, Offset	
	Weather	Clear, 6F	Latitude, Longitude	N64.222832°, W149.234°
TH Finalized By: Tannenbaum	Vegetation		Elevation	790.2

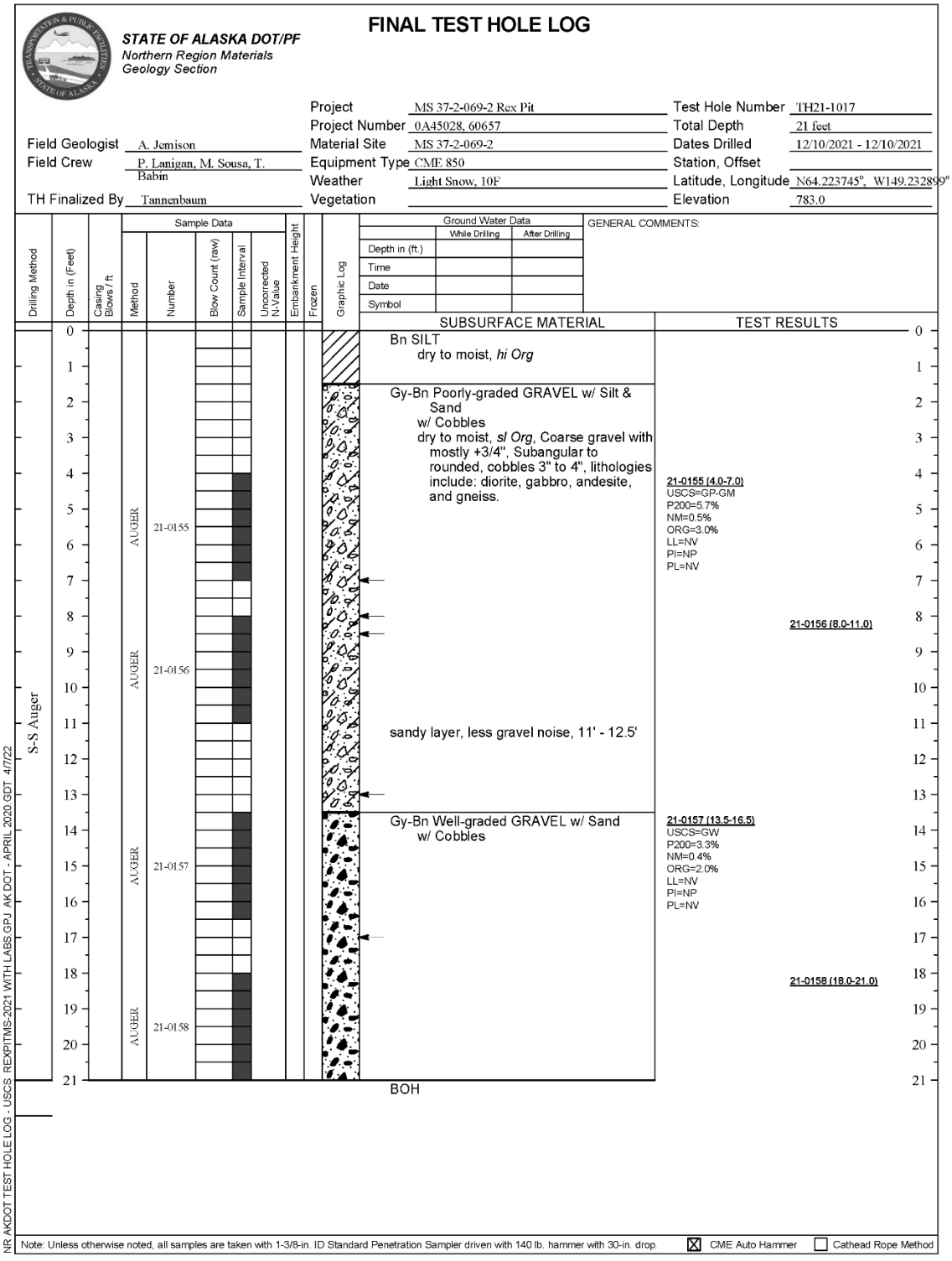
Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

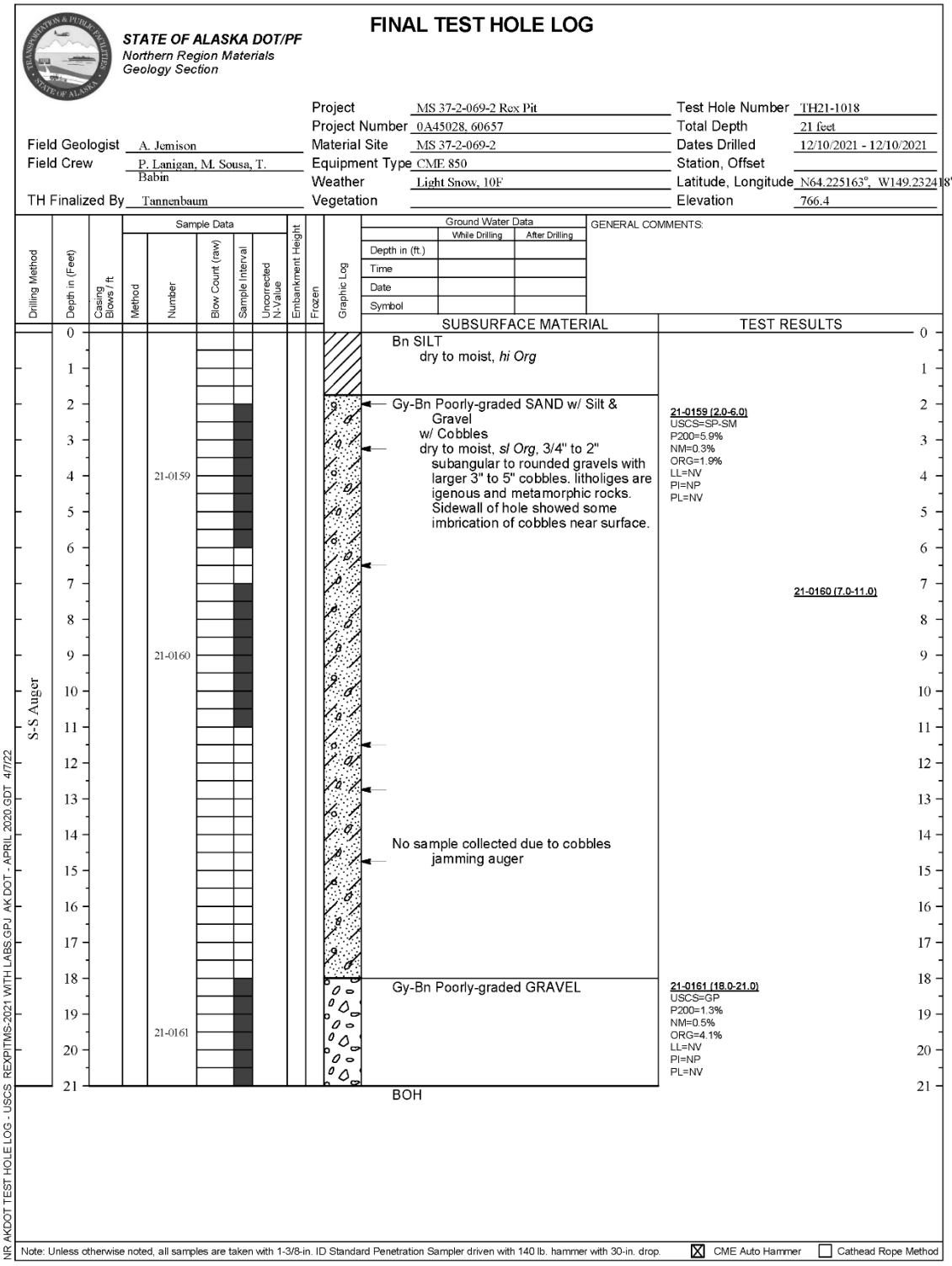
GENERAL COMMENTS:

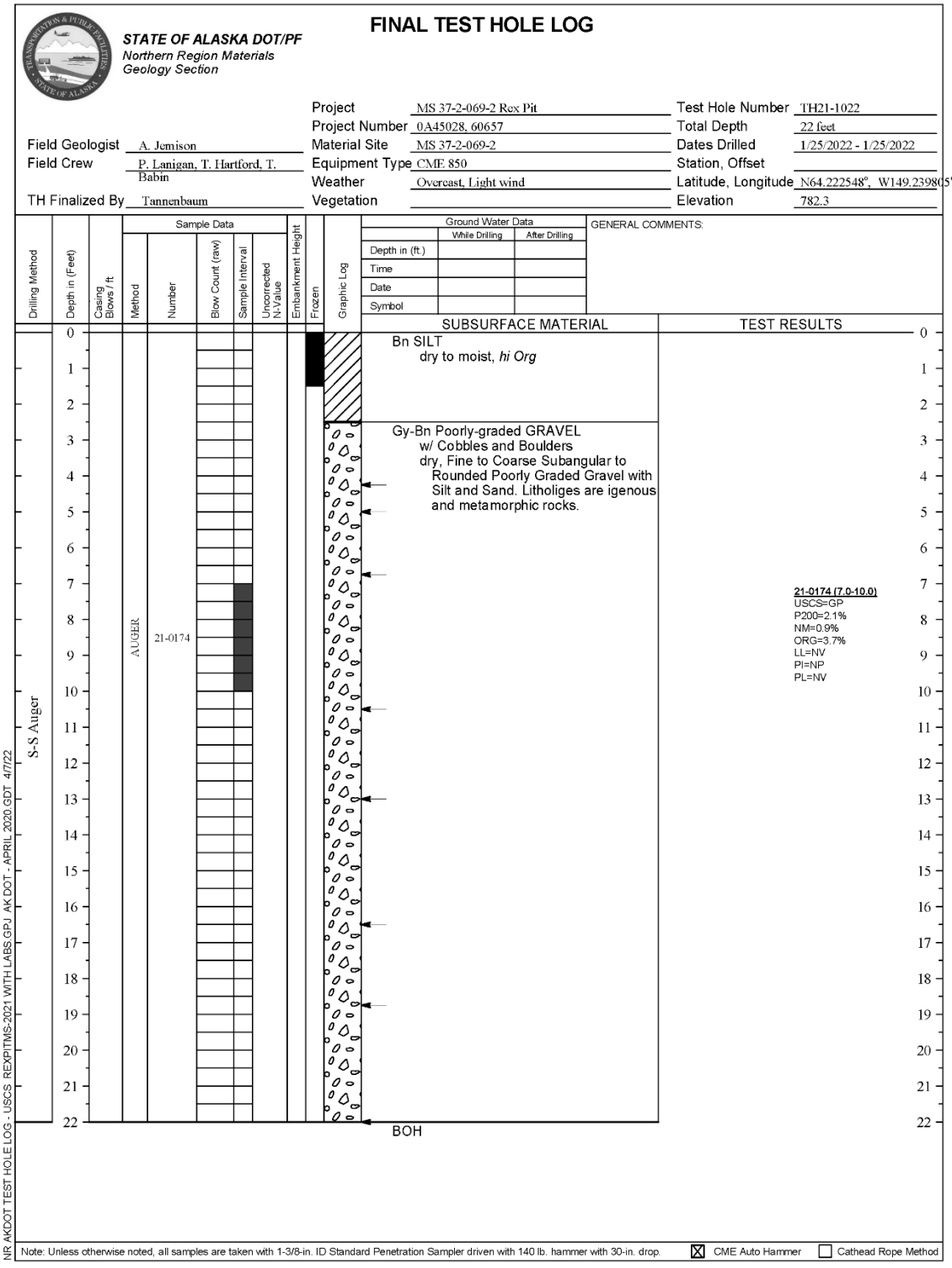
Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
	0										Rd-Bn SILT dry to moist, *hi Org*, Low Plasticity and Slow Dilatency, Lots of roots and wood chunks	
	1											
	2										GRAVEL (determined by drill reaction)	
	3											
	4				8						Bn-Gy Poorly-graded GRAVEL w/ Sand w/ Cobbles and Boulders dry, medium dense, Coarse to find gravel with a high content of coarse sand also present. This differs from other sites. cobbles ranging from 3" to 6", gravels are subangular to rounded and mostly igneous.	21-0153 (4.0-6.0) USCS=GP P200=4.7% NM=1.7% ORG=1.6% LL=NV PI=NP PL=NV
11-S Auger	5		SS	21-0153	15 26		41					
	6				10							
	7											
	8										BOULDERS AND COBBLES Large diorite boulder.	
	9				9							21-0154 (9.0-11.0)
	10		SS	21-0154	20 13		33				Bn-Gy Poorly-graded GRAVEL w/ Silt & Sand w/ Cobbles and Boulders dry	
	11				16						BOH	

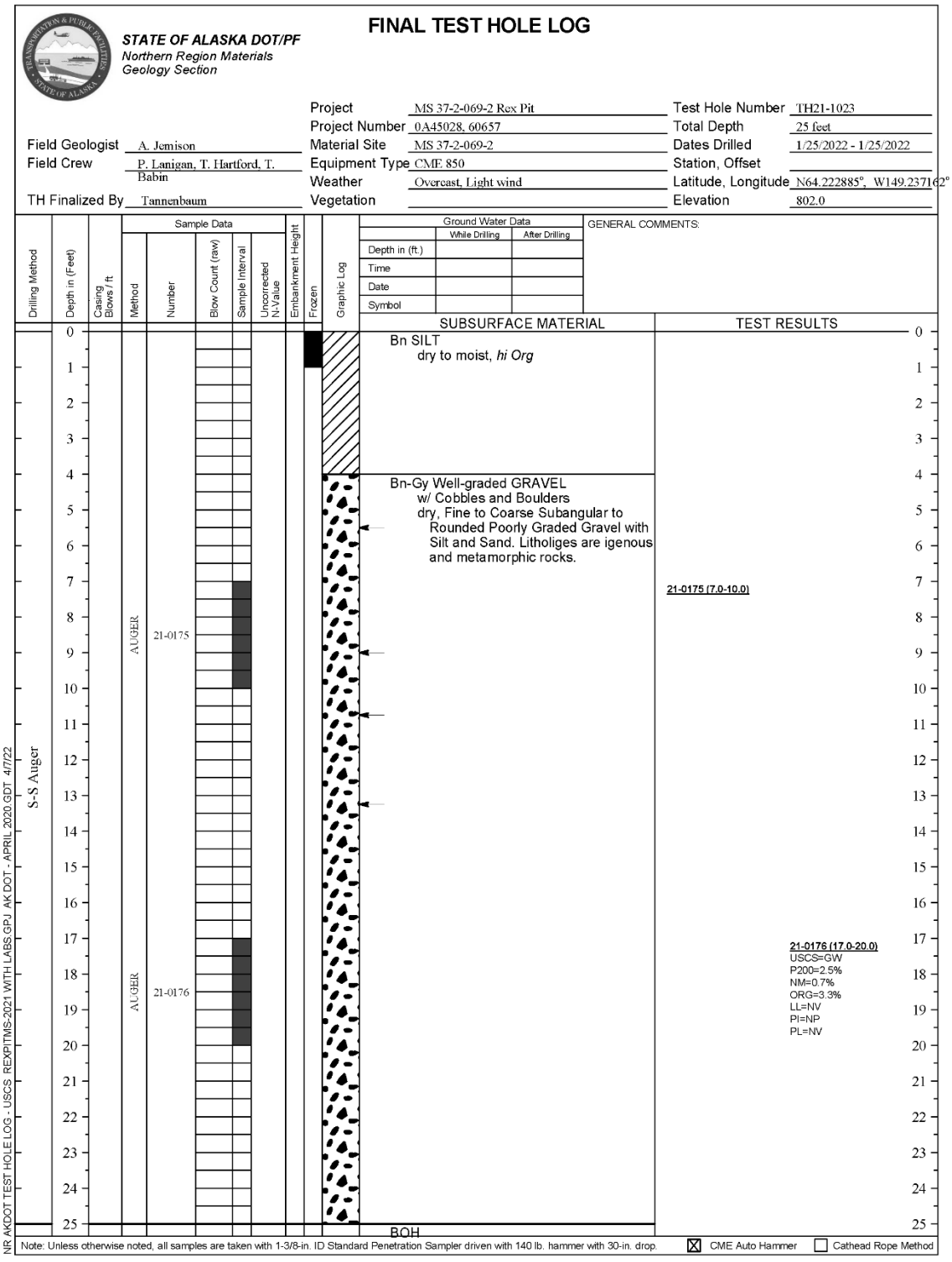
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Light Snow, 10F
Vegetation
Test Hole Number TH21-1017
Total Depth 21 feet
Dates Drilled 12/10/2021 - 12/10/2021
Station, Offset
Latitude, Longitude N64.223745°, W149.232899°
Elevation 783.0
Field Geologist A. Jemison
Field Crew P. Lanigan, M. Sousa, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
S-S Auger
AUGER
21-0155
21-0156
21-0157
21-0158
Bn SILT
dry to moist, hi Org
Gy-Bn Poorly-graded GRAVEL w/ Silt & Sand
w/ Cobbles
dry to moist, sl Org, Coarse gravel with mostly +3/4", Subangular to rounded, cobbles 3" to 4", lithologies include: diorite, gabbro, andesite, and gneiss.
21-0155 (4.0-7.0)
USCS=GP-GM
P200=5.7%
NM=0.5%
ORG=3.0%
LL=NV
PI=NP
PL=NV
21-0156 (8.0-11.0)
sandy layer, less gravel noise, 11' - 12.5'
Gy-Bn Well-graded GRAVEL w/ Sand
w/ Cobbles
21-0157 (13.5-16.5)
USCS=GW
P200=3.3%
NM=0.4%
ORG=2.0%
LL=NV
PI=NP
PL=NV
21-0158 (18.0-21.0)
BOH
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Light Snow, 10F
Vegetation
Test Hole Number TH21-1018
Total Depth 21 feet
Dates Drilled 12/10/2021 - 12/10/2021
Station, Offset
Latitude, Longitude N64.225163°, W149.232418°
Elevation 766.4
Field Geologist A. Jemison
Field Crew P. Lanigan, M. Sousa, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
S-S Auger
Bn SILT
dry to moist, hi Org
Gy-Bn Poorly-graded SAND w/ Silt & Gravel
w/ Cobbles
dry to moist, sl Org, 3/4" to 2" subangular to rounded gravels with larger 3" to 5" cobbles. litholiges are igenous and metamorphic rocks. Sidewall of hole showed some imbrication of cobbles near surface.
21-0159
21-0160
21-0161
21-0159 (2.0-6.0)
USCS=SP-SM
P200=5.9%
NM=0.3%
ORG=1.9%
LL=NV
PI=NP
PL=NV
21-0160 (7.0-11.0)
No sample collected due to cobbles jamming auger
Gy-Bn Poorly-graded GRAVEL
21-0161 (18.0-21.0)
USCS=GP
P200=1.3%
NM=0.5%
ORG=4.1%
LL=NV
PI=NP
PL=NV
BOH
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Overcast, Light wind
Vegetation
Test Hole Number TH21-1022
Total Depth 22 feet
Dates Drilled 1/25/2022 - 1/25/2022
Station, Offset
Latitude, Longitude N64.222548°, W149.239805°
Elevation 782.3
Field Geologist A. Jemison
Field Crew P. Lanigan, T. Hartford, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
S-S Auger
AUGER
21-0174
Bn SILT
dry to moist, hi Org
Gy-Bn Poorly-graded GRAVEL
w/ Cobbles and Boulders
dry, Fine to Coarse Subangular to Rounded Poorly Graded Gravel with Silt and Sand. Litholiges are igenous and metamorphic rocks.
21-0174 (7.0-10.0)
USCS=GP
P200=2.1%
NM=0.9%
ORG=3.7%
LL=NV
PI=NP
PL=NV
BOH
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22



FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1023
Project Number	0A45028, 60657	Total Depth	25 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/25/2022 - 1/25/2022
Field Crew: P. Lanigan, T. Hartford, T. Babin	Equipment Type	CME 850	Station, Offset	
	Weather	Overcast, Light wind	Latitude, Longitude	N64.222885°, W149.237162°
TH Finalized By: Tannenbaum	Vegetation		Elevation	802.0

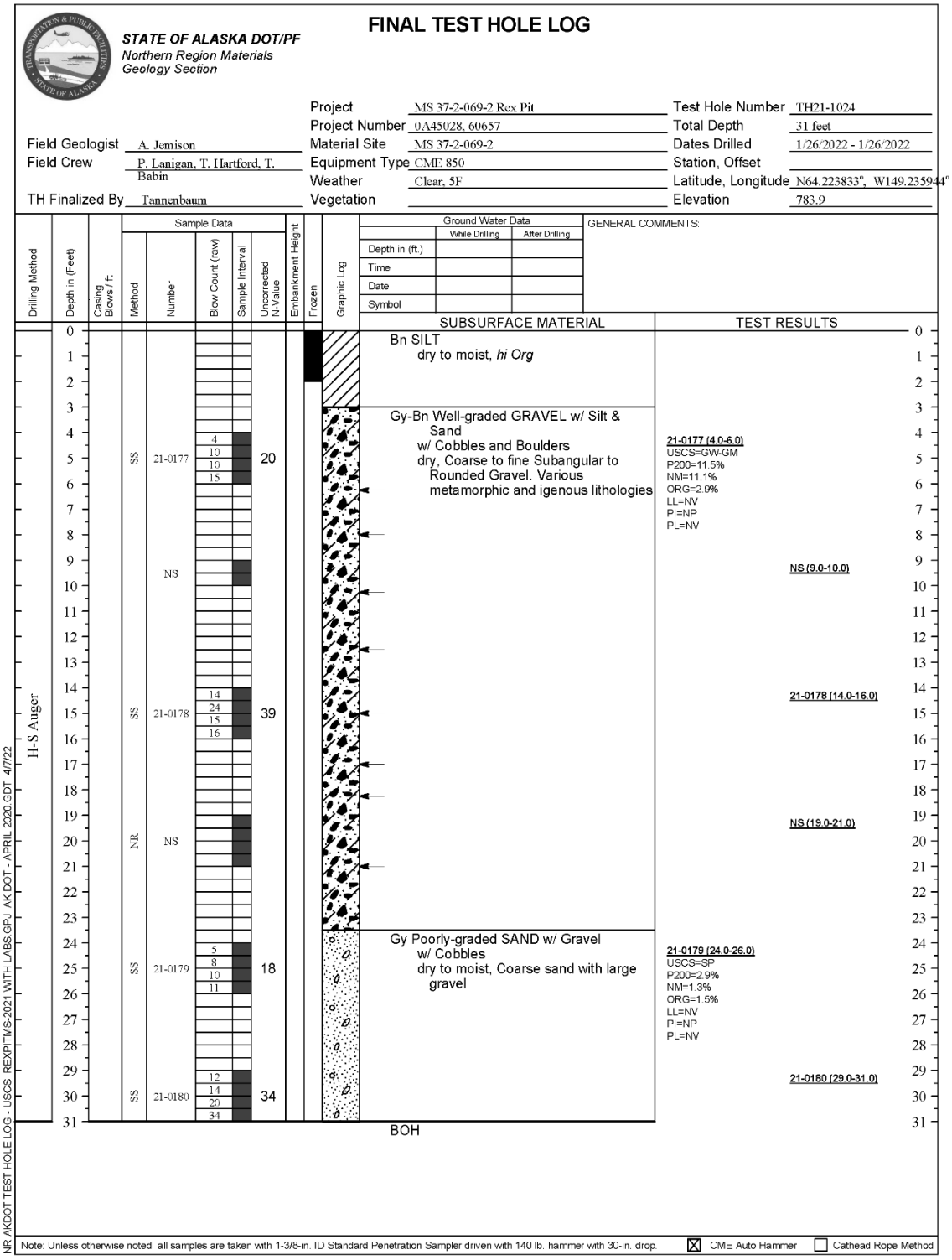
Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
S-S Auger	0										Bn SILT dry to moist, *hi Org*	
	4										Bn-Gy Well-graded GRAVEL w/ Cobbles and Boulders dry, Fine to Coarse Subangular to Rounded Poorly Graded Gravel with Silt and Sand. Litholiges are igenous and metamorphic rocks.	
	7		AUGER	21-0175								21-0175 (7.0-10.0)
	17		AUGER	21-0176								21-0176 (17.0-20.0) USCS=GW P200=2.5% NM=0.7% ORG=3.3% LL=NV PI=NP PL=NV
	25										BOH	

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Clear, 5F
Vegetation
Test Hole Number TH21-1024
Total Depth 31 feet
Dates Drilled 1/26/2022 - 1/26/2022
Station, Offset
Latitude, Longitude N64.223833°, W149.235944°
Elevation 783.9
Field Geologist A. Jemison
Field Crew P. Lanigan, T. Hartford, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
11-S Auger
Bn SILT
dry to moist, hi Org
Gy-Bn Well-graded GRAVEL w/ Silt & Sand
w/ Cobbles and Boulders
dry, Coarse to fine Subangular to Rounded Gravel. Various metamorphic and igenous lithologies
21-0177 (4.0-6.0)
USCS=GW-GM
P200=11.5%
NM=11.1%
ORG=2.9%
LL=NV
PI=NP
PL=NV
NS (9.0-10.0)
21-0178 (14.0-16.0)
NS (19.0-21.0)
Gy Poorly-graded SAND w/ Gravel
w/ Cobbles
dry to moist, Coarse sand with large gravel
21-0179 (24.0-26.0)
USCS=SP
P200=2.9%
NM=1.3%
ORG=1.5%
LL=NV
PI=NP
PL=NV
21-0180 (29.0-31.0)
BOH
SS 21-0177 4 10 10 15 20
NS 9
SS 21-0178 14 24 15 16 39
NR NS 19
SS 21-0179 5 8 10 11 18
SS 21-0180 12 14 20 34 34
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1025
Project Number	0A45028, 60657	Total Depth	19 feet
Field Geologist	A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/27/2022 - 1/27/2022
Field Crew	T. Hartford, T. Babin	Equipment Type	CME 850	Station, Offset	
		Weather	Overcast, Light wind	Latitude, Longitude	N64.225189°, W149.235149°
TH Finalized By	Tannenbaum	Vegetation		Elevation	772.8

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
S-S Auger	0										Bn SILT dry to moist, *hi Org*	
	5										Gy-Bn Silty SAND w/ Gravel w/ Cobbles and Boulders dry, Very cobble rich and dense material. Most gravel was coarse and subrounded to rounded. Lithologies were predominantly igneous. Gradation results 35.8% sand / 34.1% gravel	
	8		AUGER	21-0181								**21-0181 (8.0-10.0)** USCS=SM P200=30.1% NM=0.6% ORG=2.9% LL=NV PI=NP PL=NV
	19										BOH	

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

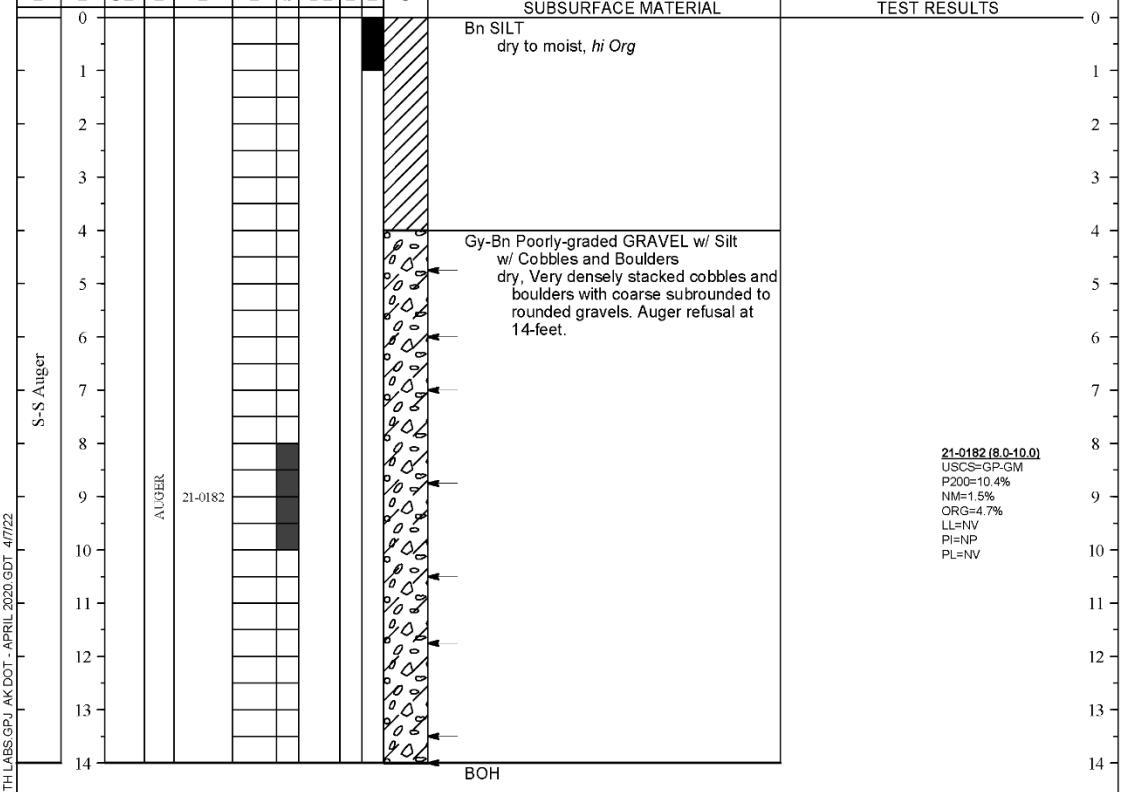
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1026
Project Number	0A45028, 60657	Total Depth	14 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/28/2022 - 1/28/2022
Field Crew: P. Lanigan, T. Babin	Equipment Type	CME 850	Station, Offset	
	Weather	Light Snow, -5F	Latitude, Longitude	N64.225231°, W149.237042°
TH Finalized By: Tannenbaum	Vegetation		Elevation	774.5

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:



Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

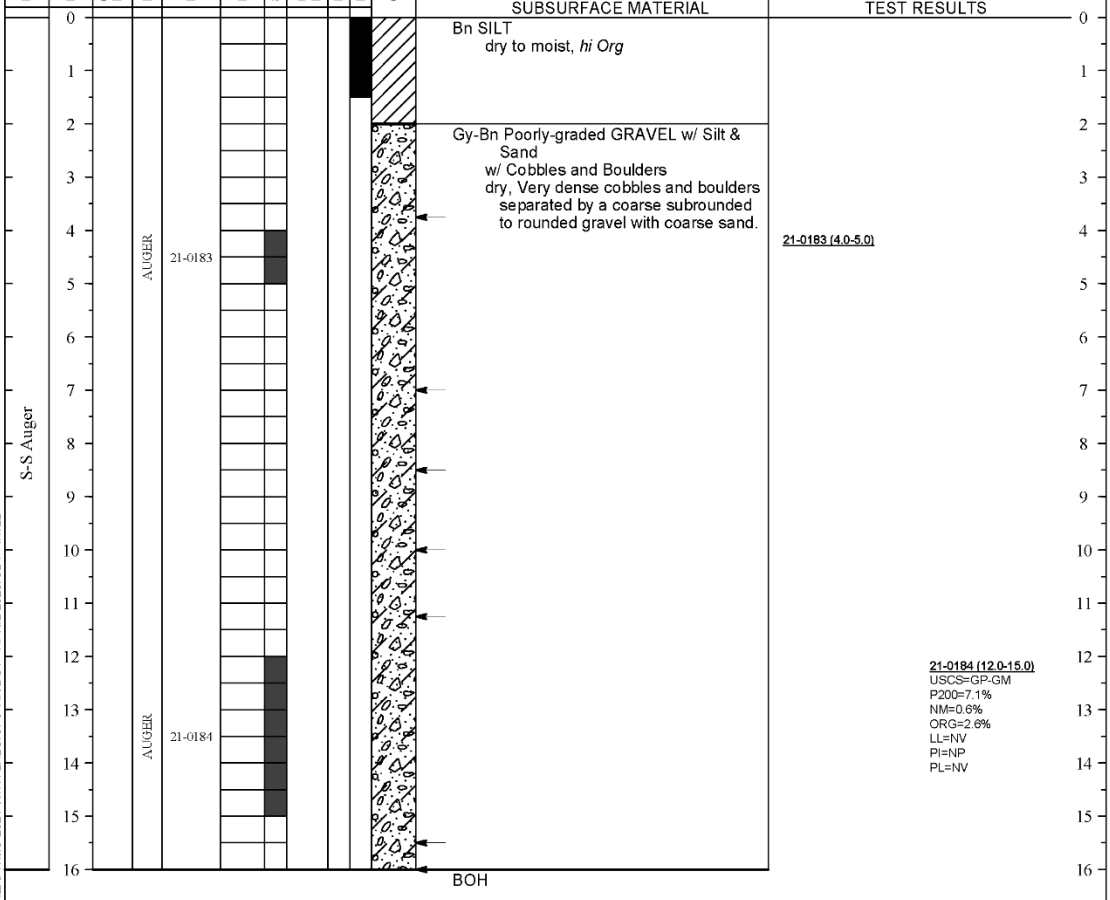
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1027
Project Number	0A45028, 60657	Total Depth	16 feet
Field Geologist	A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/28/2022 - 1/28/2022
Field Crew	P. Lanigan, T. Babin	Equipment Type	CME 850	Station, Offset	
		Weather	Light Snow, -5F	Latitude, Longitude	N64.224597°, W149.237847°
TH Finalized By	Tannenbaum	Vegetation		Elevation	781.8

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:



Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

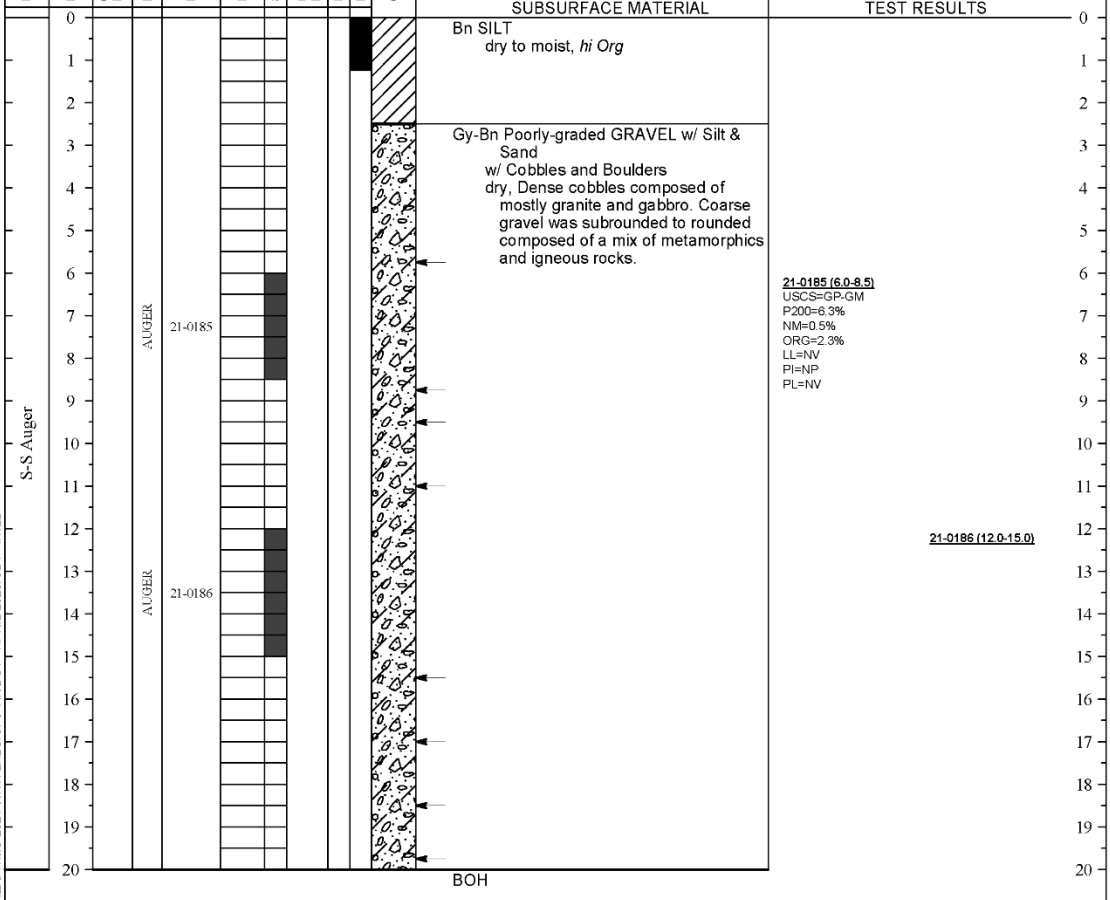
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TH21-1028
Project Number	0A45028, 60657	Total Depth	20 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/29/2022 - 1/29/2022
Field Crew: P. Lanigan, T. Hartford, T. Babin	Equipment Type	CME 850	Station, Offset	
	Weather	Overcast, -10F	Latitude, Longitude	N64.223581°, W149.238286°
TH Finalized By: Tannenbaum	Vegetation		Elevation	799.8

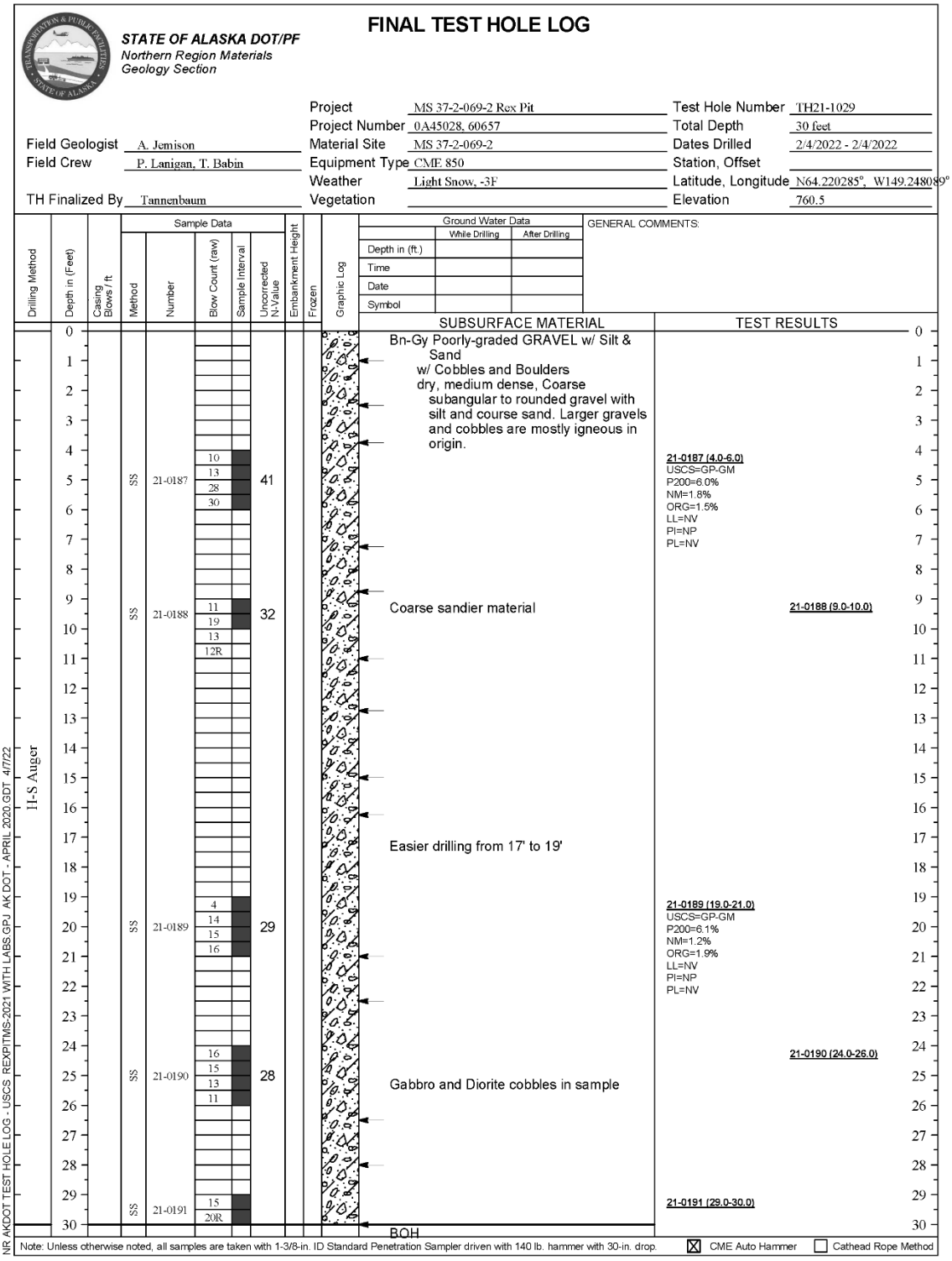
Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

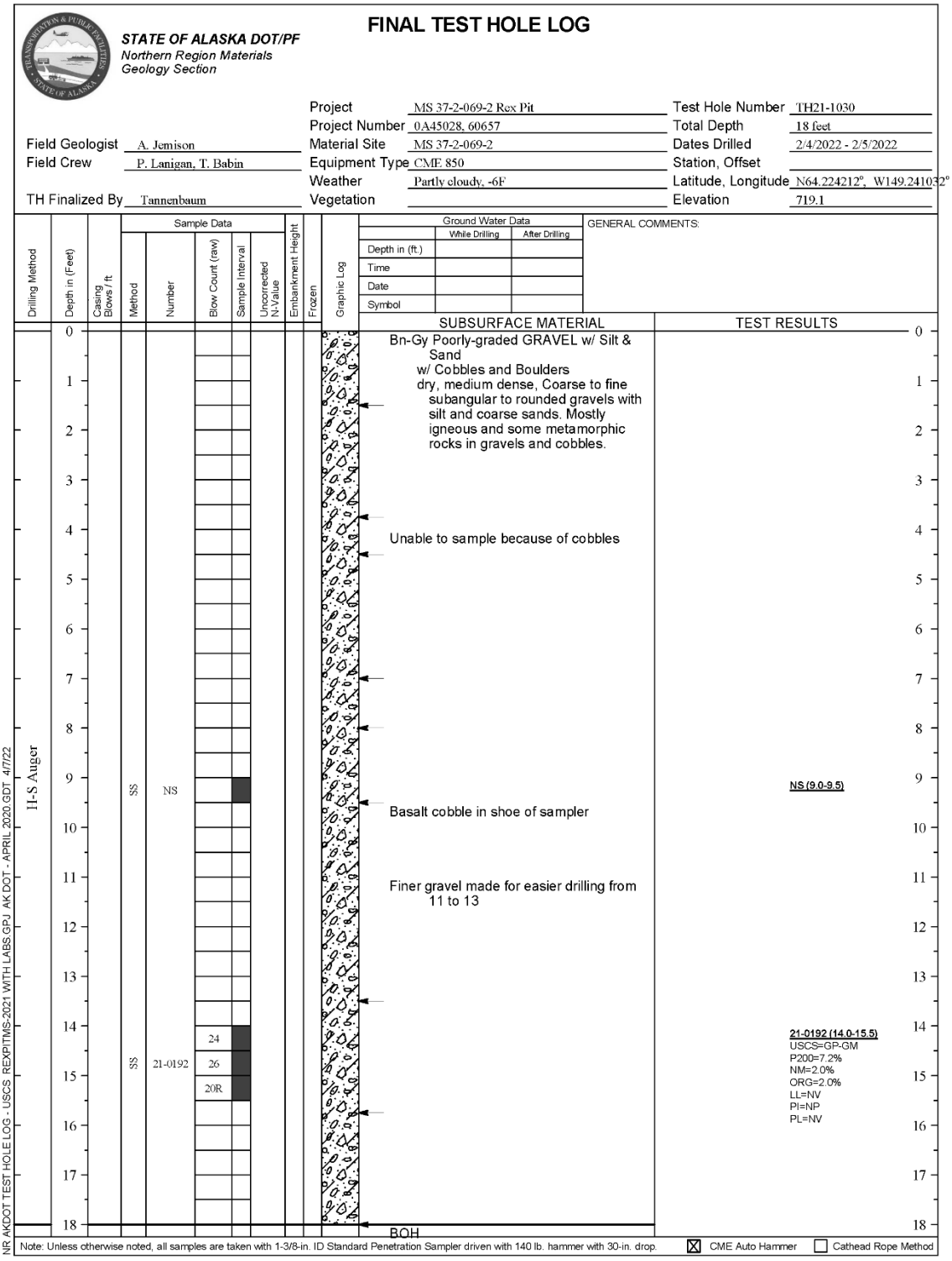
GENERAL COMMENTS:



Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☒ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Light Snow, -3F
Vegetation
Test Hole Number TH21-1029
Total Depth 30 feet
Dates Drilled 2/4/2022 - 2/4/2022
Station, Offset
Latitude, Longitude N64.220285°, W149.248089°
Elevation 760.5
Field Geologist A. Jemison
Field Crew P. Lanigan, T. Babin
TH Finalized By Tannenbaum
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
SUBSURFACE MATERIAL
TEST RESULTS
11-S Auger
Bn-Gy Poorly-graded GRAVEL w/ Silt & Sand
w/ Cobbles and Boulders
dry, medium dense, Coarse subangular to rounded gravel with silt and course sand. Larger gravels and cobbles are mostly igneous in origin.
SS 21-0187 10 13 28 30 41
21-0187 (4.0-6.0)
USCS=GP-GM
P200=6.0%
NM=1.8%
ORG=1.5%
LL=NV
PI=NP
PL=NV
Coarse sandier material
SS 21-0188 11 19 13 12R 32
21-0188 (9.0-10.0)
Easier drilling from 17' to 19'
SS 21-0189 4 14 15 16 29
21-0189 (19.0-21.0)
USCS=GP-GM
P200=6.1%
NM=1.2%
ORG=1.9%
LL=NV
PI=NP
PL=NV
SS 21-0190 16 15 13 11 28
21-0190 (24.0-26.0)
Gabbro and Diorite cobbles in sample
SS 21-0191 15 20R
21-0191 (29.0-30.0)
BOH
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type CME 850
Weather Partly cloudy, -6F
Vegetation
Test Hole Number TH21-1030
Total Depth 18 feet
Dates Drilled 2/4/2022 - 2/5/2022
Station, Offset
Latitude, Longitude N64.224212°, W149.241032°
Elevation 719.1
Field Geologist A. Jemison
Field Crew P. Lanigan, T. Babin
TH Finalized By Tannenbaum
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
SUBSURFACE MATERIAL
TEST RESULTS
11-S Auger
Bn-Gy Poorly-graded GRAVEL w/ Silt & Sand
w/ Cobbles and Boulders
dry, medium dense, Coarse to fine subangular to rounded gravels with silt and coarse sands. Mostly igneous and some metamorphic rocks in gravels and cobbles.
Unable to sample because of cobbles
SS
NS
Basalt cobble in shoe of sampler
Finer gravel made for easier drilling from 11 to 13
24
SS
21-0192
26
20R
BOH
NS (9.0-9.5)
21-0192 (14.0-15.5)
USCS=GP-GM
P200=7.2%
NM=2.0%
ORG=2.0%
LL=NV
PI=NP
PL=NV
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	MS 37-2-069-2 Rex Pit	Test Hole Number	TT21-1019
Project Number	0A45028, 60657	Total Depth	14 feet
Field Geologist: A. Jemison	Material Site	MS 37-2-069-2	Dates Drilled	1/23/2022 - 1/23/2022
Field Crew: P. Lanigan, T. Babin	Equipment Type	Excavator	Station, Offset	
	Weather		Latitude, Longitude	N64.222149°, W149.243609°
TH Finalized By: Tannenbaum	Vegetation		Elevation	755.2

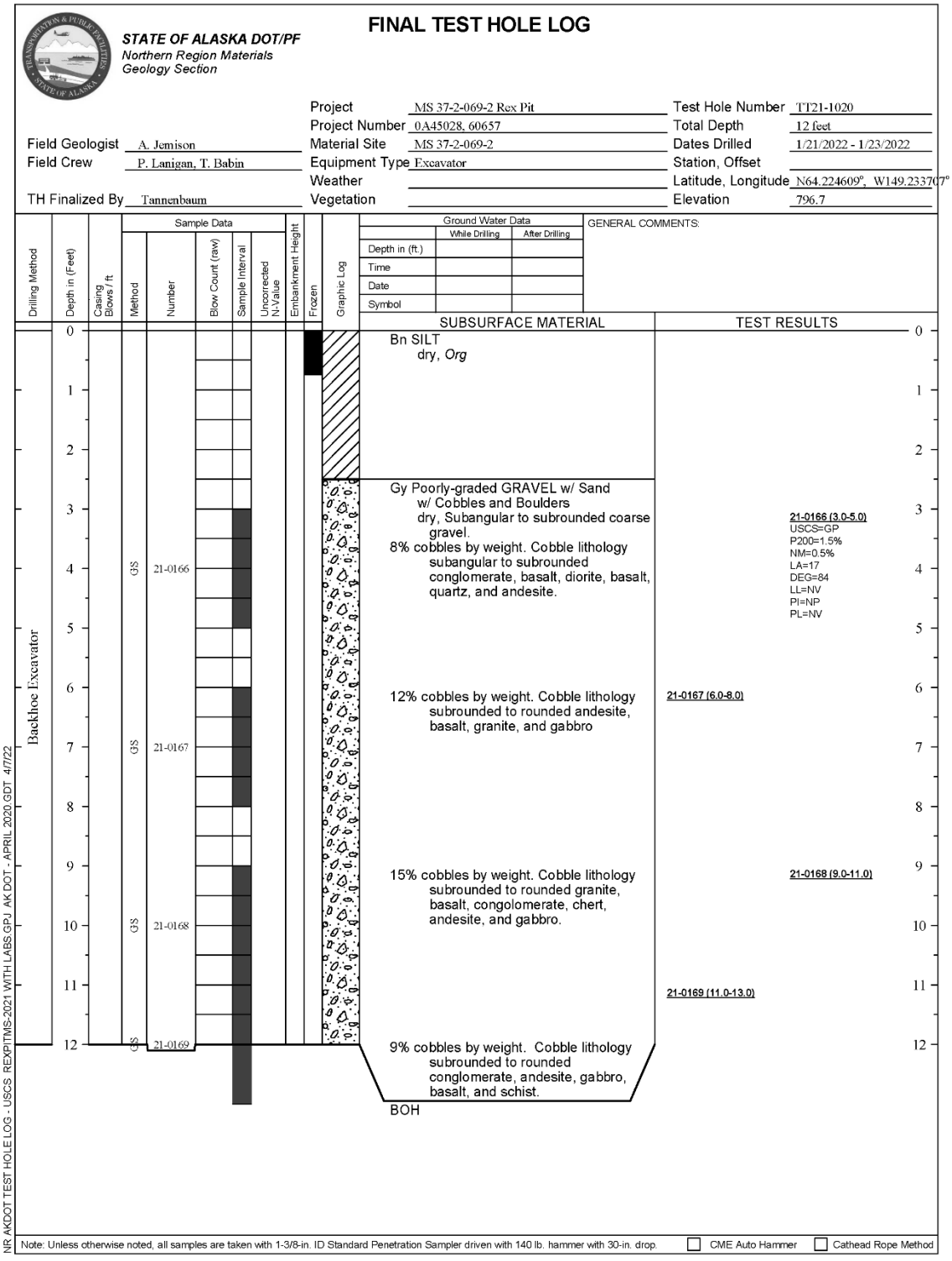
Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

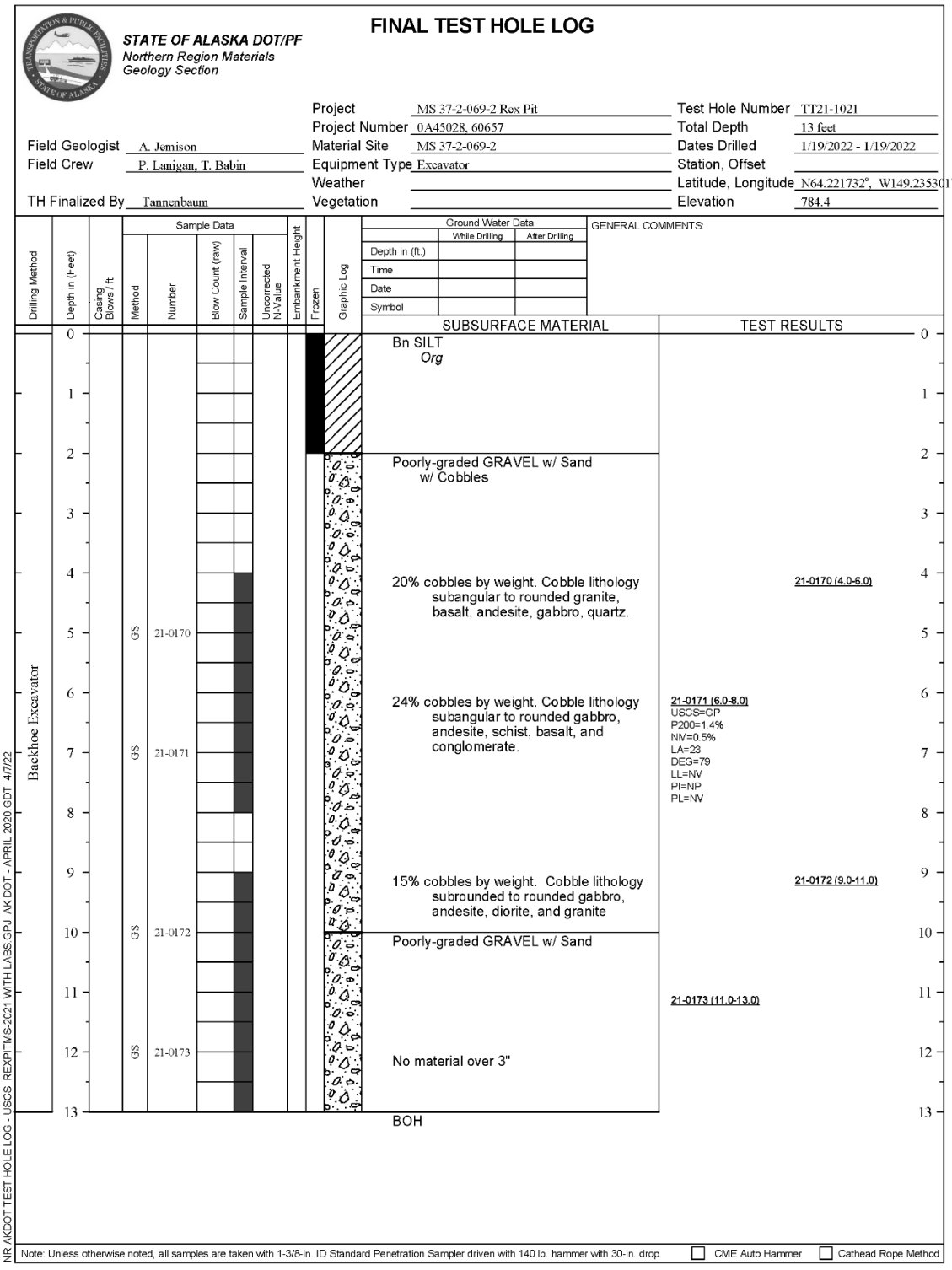
GENERAL COMMENTS:

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
Backhoe Excavator	0										Poorly-graded GRAVEL w/ Sand w/ Cobbles subangular to subrounded coarse gravel.	
	3										Poorly-graded GRAVEL w/ Sand w/ Cobbles subangular to rounded fine gravel. 42% cobbles by weight. Dominant cobble lithology is subrounded to rounded andesite and basalt, secondary cobble lithology subrounded to rounded diorite and schist	21-0162 (4.0-6.0)
	5		GS	21-0162							Poorly-graded GRAVEL w/ Sand w/ Cobbles subangular to rounded very coarse gravel.	21-0163 (6.0-8.0)
	7		GS	21-1063							Poorly-graded GRAVEL w/ Sand w/ Cobbles subangular to rounded fine to coarse gravel. 12% cobbles by weight. Cobble lithology is subrounded to rounded basalt, rhyolite, andesite, conglomerate with less common granite, diorite, and quartz.	
	9										Poorly-graded GRAVEL w/ Sand w/ Cobbles 20% cobbles by weight. Cobble lithology is subrounded to rounded basalt with less common diorite, schist, gabbro, and andesite	21-0164 (9.0-11.0) USCS=GP P200=1.6% NM=0.4% LA=22 DEG=82 LL=NV PI=NP PL=NV
	10		GS	21-1064								
	12											21-0165 (12.0-14.0)
	13		GS	21-1065							23% cobbles by weight. Cobble lithology is subrounded to rounded basalt, andesite, diorite, gabbro, and granite.	
	14										BOH	

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22


FINAL TEST HOLE LOG
STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section
Project MS 37-2-069-2 Rex Pit
Project Number 0A45028, 60657
Material Site MS 37-2-069-2
Equipment Type Excavator
Weather
Vegetation
Test Hole Number TT21-1020
Total Depth 12 feet
Dates Drilled 1/21/2022 - 1/23/2022
Station, Offset
Latitude, Longitude N64.224609°, W149.233707°
Elevation 796.7
Field Geologist A. Jemison
Field Crew P. Lanigan, T. Babin
TH Finalized By Tannenbaum
Drilling Method
Depth in (Feet)
Casing Blows / ft
Sample Data
Method
Number
Blow Count (raw)
Sample Interval
Uncorrected N-Value
Embankment Height
Frozen
Graphic Log
Ground Water Data
While Drilling
After Drilling
Depth in (ft.)
Time
Date
Symbol
GENERAL COMMENTS:
SUBSURFACE MATERIAL
TEST RESULTS
Backhoe Excavator
Bn SILT
dry, Org
Gy Poorly-graded GRAVEL w/ Sand w/ Cobbles and Boulders
dry, Subangular to subrounded coarse gravel.
8% cobbles by weight. Cobble lithology subangular to subrounded conglomerate, basalt, diorite, basalt, quartz, and andesite.
GS 21-0166
21-0166 (3.0-5.0)
USCS=GP
P200=1.5%
NM=0.5%
LA=17
DEG=84
LL=NV
PI=NP
PL=NV
12% cobbles by weight. Cobble lithology subrounded to rounded andesite, basalt, granite, and gabbro
21-0167 (6.0-8.0)
GS 21-0167
15% cobbles by weight. Cobble lithology subrounded to rounded granite, basalt, congolomerate, chert, andesite, and gabbro.
21-0168 (9.0-11.0)
GS 21-0168
21-0169 (11.0-13.0)
GS 21-0169
9% cobbles by weight. Cobble lithology subrounded to rounded conglomerate, andesite, gabbro, basalt, and schist.
BOH
0
1
2
3
4
5
6
7
8
9
10
11
12
NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22
Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop.
CME Auto Hammer
Cathead Rope Method



FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project: MS 37-2-069-2 Rex Pit
Project Number: 0A45028, 60657
Material Site: MS 37-2-069-2
Equipment Type: Excavator
Weather:
Vegetation:

Test Hole Number: TT21-1021
Total Depth: 13 feet
Dates Drilled: 1/19/2022 - 1/19/2022
Station, Offset:
Latitude, Longitude: N64.221732°, W149.235301°
Elevation: 784.4

Field Geologist: A. Jemison
Field Crew: P. Lanigan, T. Babin
TH Finalized By: Tannenbaum

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:

Drilling Method: Backhoe Excavator
Casing Blows / ft:
Sample Data: Method; Number; Blow Count (raw); Sample Interval; Uncorrected N-Value
Embankment Height
Frozen
Graphic Log

Depth (ft)	SUBSURFACE MATERIAL	TEST RESULTS
0	Bn SILT *Org*	
2	Poorly-graded GRAVEL w/ Sand w/ Cobbles	
4	20% cobbles by weight. Cobble lithology subangular to rounded granite, basalt, andesite, gabbro, quartz.	21-0170 (4.0-6.0)
6	24% cobbles by weight. Cobble lithology subangular to rounded gabbro, andesite, schist, basalt, and conglomerate.	21-0171 (6.0-8.0) USCS=GP P200=1.4% NM=0.5% LA=23 DEG=79 LL=NV PI=NP PL=NV
9	15% cobbles by weight. Cobble lithology subrounded to rounded gabbro, andesite, diorite, and granite	21-0172 (9.0-11.0)
10	Poorly-graded GRAVEL w/ Sand	
11		21-0173 (11.0-13.0)
12	No material over 3"	
13	BOH	

Sample	Method	Number
5	GS	21-0170
7	GS	21-0171
10	GS	21-0172
12	GS	21-0173

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS REXPITMS-2021 WITH LABS.GPJ AK DOT - APRIL 2020.GDT 4/7/22

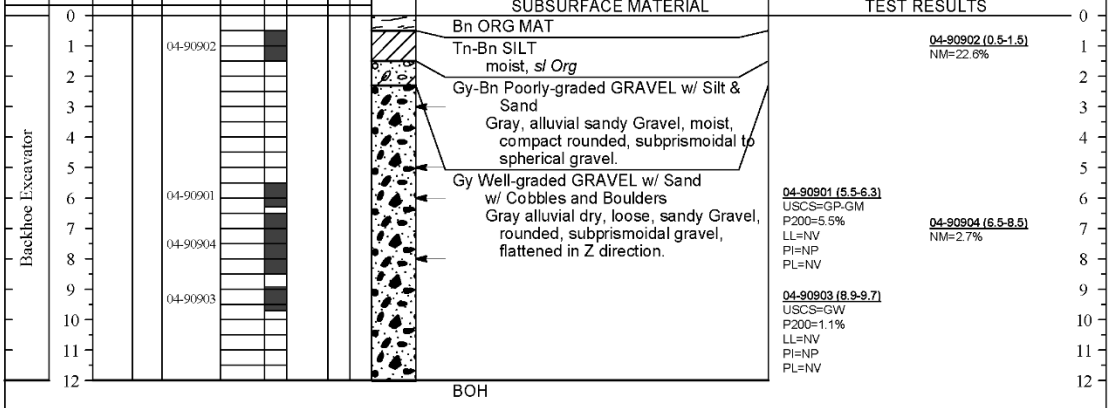
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-01
Project Number	57260	Total Depth	12 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/9/2004 - 9/9/2004
Field Crew	T. Johnson, S. Parker	Equipment Type	Backhoe
Station, Offset		Weather	slightly overcast
Latitude, Longitude	N64.22222°, W149.24462°	TH Finalized By	TANNENBAUM
Vegetation	Trees up to 20' high	Elevation	

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).



Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and 13" Wt%
@ 3.8' = 6.3%
@ 6.3' = 6.4%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project: ALL
Project Number: 57260
Field Geologist: J. REINIKAINEN
Field Crew: T. Johnson, S. Parker
TH Finalized By: TANNENBAUM
Equipment Type: Backhoe
Weather: slightly overcast
Vegetation: Trees up to 20' black spruce w/ some aspen

Test Hole Number: TT04-02
Total Depth: 9.7 feet
Dates Drilled: 9/9/2004 - 9/9/2004
Station, Offset:
Latitude, Longitude: N64.22307°, W149.24454°
Elevation:

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
Backhoe Excavator	0										ORG MAT Lichen w/caribou moss, low bush cranberries	
	1											
	2										Tn-Bn SILT w/ Gravel *sl Org*, Gravel in silt layer rounded, poorly graded	
	3			04-90905								04-90905 (2.3-3.3) USCS=SP P200=1.8% NM=3.7% LL=NV PI=NP PL=NV
	4										Poorly-graded GRAVEL w/ Silt & Sand Mostly minus 3" gravel. Measured ground temperature at 42.1° F.	
	5											
	6										Poorly-graded SAND Sand lens with uniform grains	
	7											
	8			04-90906							Gy Poorly-graded GRAVEL w/ Sand w/ Cobbles Material consists of minus 4" well rounded spherical to sub prismoidal gravel with cobbles and boulders. Gravel has uniform sand w/ v. little fine fraction.	04-90906 (7.8-8.8) USCS=GP P200=1.2% LL=NV PI=NP PL=NV
	9											
											BOH	

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 5' = 2.8%
@ 8' = 4.1%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-03
Project Number	57260	Total Depth	9.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/9/2004 - 9/9/2004
Field Crew	T. Johnson, S. Parker	Station, Offset	
Equipment Type	Backhoe	Latitude, Longitude	N64.22304°, W149.24285°
Weather	slightly overcast	Elevation	
TH Finalized By	TANNENBAUM	Vegetation	Thick spruce 1-5"D some aspen 4-6"D

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Number	Blow Count (raw)	Sample Interval	Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
Backhoe Excavator	0										Bn ORG MAT	
	1										Rd-Bn SILT moist, *hi Org*	
	2										Yw-Tn Sandy SILT w/ Gravel	
	3										Gy-Bn Poorly-graded SAND w/ Silt & Gravel Sand lens	
	4											
	5			04-90907							Bn Poorly-graded SAND Measured temperature is 32.5°	04-90907 (4.5-5.0) NM=9.1%
	6											
	7			04-90908							Bn Poorly-graded GRAVEL w/ Sand w/ Cobbles Minus 3", rounded spherical gravel. Smaller fraction appears more angular. V.clean gravel w/ no visible fines. Origin of larger gravel is magmatic intermediate/felsic with normal to high specific gravity.	04-90908 (6.5-7.5) USCS=GP P200=1.2% LL=NV PI=NP PL=NV
	8											
	9										BOH	

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

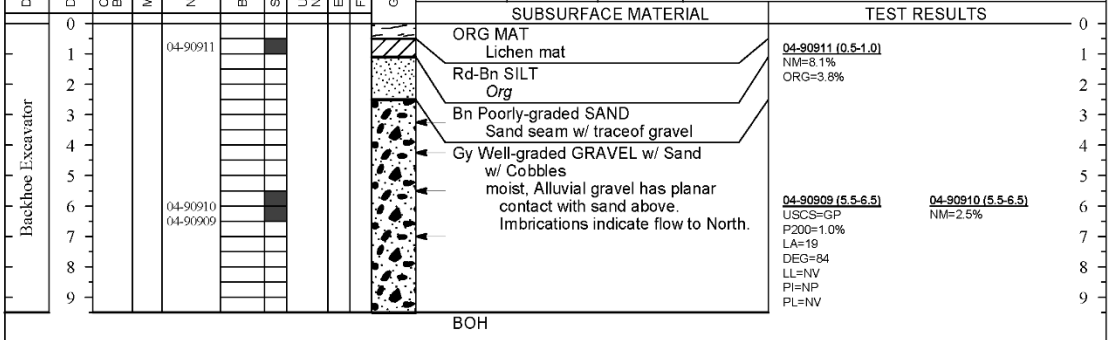
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-04
Project Number	57260	Total Depth	9.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/9/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Station, Offset	
Equipment Type	Backhoe	Latitude, Longitude	N64.2241°, W149.24285°
Weather	slightly overcast	Elevation	
TH Finalized By	TANNENBAUM	Vegetation	V. thick spruce forest 1-4"D 15-25' tall

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).



Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 5' = 0.3%
@ 7' = 3.2%

Caving prevented excavating deeper

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-05
Project Number	57260	Total Depth	11 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/10/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Station, Offset	
Equipment Type	Backhoe	Latitude, Longitude	N64.22413°, W149.24065°
Weather	slightly overcast	Elevation	
TH Finalized By	TANNENBAUM	Vegetation	Larger 4-16"D spruce w/ aspen, and poplar

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).

Drilling Method	Depth in (Feet)	Sample Data: Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
Backhoe Excavator	0										ORG MAT Lichen mat	
	1										Rd-Bn Sandy SILT w/ Gravel *Org*	
	2										Well-graded GRAVEL w/ Silt & Sand w/ Cobbles Cobbles up to 6"	
	3											
	4											
	5			04-90912 04-90913							Poorly-graded SAND w/ Gravel Sands are dark brown (hornblende, plagioclase > quartz)	04-90913 (4.5-5.5) USCS=SP P200=0.4% LL=NV PI=NP PL=NV 04-90912 (4.5-5.5) NM=3.3%
	6											
	7											
	8										Poorly-graded GRAVEL w/ Sand w/ Cobbles and Boulders loose, coarse gravel. Largest boulder is flat 16" x 14" x 6"	
	9			04-90914								04-90914 (8.5-10.5) USCS=GP P200=0.9% LL=NV PI=NP PL=NV
	10											
	11										BOH	

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 3.8' = 1.7%
@ 7.5' = 12.9%
@ 10' = 17.9%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

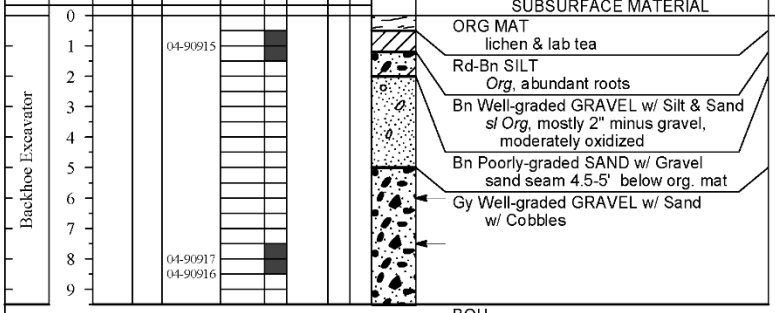
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-06
Project Number	57260	Total Depth	9.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/10/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Equipment Type	Backhoe
Station, Offset		Weather	slightly overcast
Latitude, Longitude	N64.22409°, W149.23869°	TH Finalized By	TANNENBAUM
Vegetation	Tightly spaced spruce 1-16"D w/alder brush	Elevation	

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).



SUBSURFACE MATERIAL

ORG MAT
lichen & lab tea

Rd-Bn SILT
Org, abundant roots

Bn Well-graded GRAVEL w/ Silt & Sand
sl Org, mostly 2" minus gravel,
moderately oxidized

Bn Poorly-graded SAND w/ Gravel
sand seam 4.5-5' below org. mat

Gy Well-graded GRAVEL w/ Sand
w/ Cobbles

BOH

TEST RESULTS

04-90915 (0.5-1.5)
NM=11.8%
ORG=5.9%

04-90917 (7.5-8.5)
NM=3.7%

04-90916 (7.5-8.5)
USCS=GW
P200=1.8%
LA=19
DEG=60
LL=NV
PI=NP
PL=NV

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 6' = 13.3%
@ 7.5' = 13.0%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-07
Project Number	57260	Total Depth	11.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/10/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Equipment Type	Backhoe
Station, Offset		Weather	slightly overcast
Latitude, Longitude	N64.22324°, W149.23831°	TH Finalized By	TANNENBAUM
Vegetation	Spruce 10-16"D w/mature birch, aspen 10-20"D	Elevation	

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).

Drilling Method: Backhoe Excavator
Sample Data: Method; Number; Blow Count (raw); Sample Interval; Uncorrected N-Value
Casing Blows / ft
Embankment Height
Frozen
Graphic Log

Depth in (Feet)	SUBSURFACE MATERIAL	Sample Number	TEST RESULTS
0	ORG MAT high bush cranberries, rose bush, and lab tea		
1			
2	Tn SILT w/roots, irregular contact		
3	Bn-Yw Poorly-graded SAND w/ Silt w/trace of gravel		04-90918 (3.0-5.0) P200=5.1%
4		04-90918	
5			
6	Gy Poorly-graded GRAVEL w/ Sand w/ Cobbles Coarse gravel +3" common, largest boulder 14" x 10" x 4"		
7			
8			04-90919 (7.5-9.5) USCS=GP P200=16.6% LL=NV PI=NP PL=NV 04-90920 (7.5-9.5) NM=4.1%
9		04-90920 04-90919	
10			
11	BOH		

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 5.3' = 27.8%
@ 9' = 12.9%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-08
Project Number	57260	Total Depth	9.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/10/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Equipment Type	Backhoe
		Station, Offset	
Weather	slightly overcast	Latitude, Longitude	N64.22298°, W149.24078°
TH Finalized By	TANNENBAUM	Vegetation	spruce & aspen trees
		Elevation	

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).

Drilling Method	Depth in (Feet)	Casing Blows / ft	Sample Data: Method	Sample Data: Number	Sample Data: Blow Count (raw)	Sample Data: Sample Interval	Sample Data: Uncorrected N-Value	Embankment Height	Frozen	Graphic Log	SUBSURFACE MATERIAL	TEST RESULTS
Backhoe Excavator	0										ORG MAT low bush cranberries	
	1										Bn Poorly-graded GRAVEL w/ Silt & Sand *sl Org*, silty Gravel underneath organic mat. Soil moderately oxidized to 2 ft.	
	2											
	3			04-90922 04-90921							Gy Well-graded GRAVEL w/ Sand w/ Cobbles and Boulders Largest boulder 16" x 6" x 6"	04-90921 (3.0-3.5) USCS=GW P200=1.0% LL=NV PI=NP PL=NV 04-90922 (3.0-3.5) NM=3.3%
	4											
	5											
	6											
	7											
	8											
	9										BOH	

Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@3' = 11.8%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

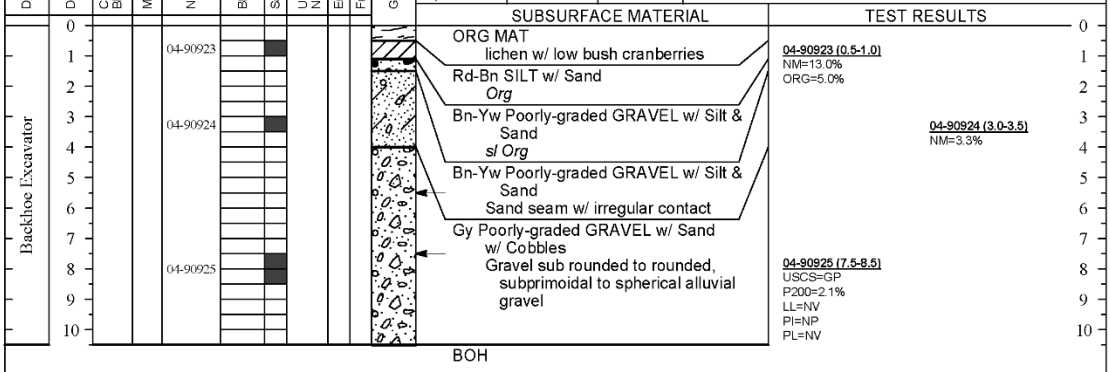
FINAL TEST HOLE LOG

STATE OF ALASKA DOT/PF
Northern Region Materials
Geology Section

Project	ALL	Test Hole Number	TT04-09
Project Number	57260	Total Depth	10.5 feet
Field Geologist	J. REINIKAINEN	Dates Drilled	9/10/2004 - 9/10/2004
Field Crew	T. Johnson, S. Parker	Equipment Type	Backhoe
Station, Offset		Weather	slightly overcast
Latitude, Longitude	N64.22257°, W149.24199°	TH Finalized By	TANNENBAUM
Vegetation	25-30' tall 4-6"D spruce & dwarf spruce	Elevation	

Ground Water Data	While Drilling	After Drilling
Depth in (ft.)		
Time		
Date		
Symbol		

GENERAL COMMENTS:
Coordinates Based on Datum WGS 84 UTM, Zone 6 (metric).



Drilling Notes: Test Trench dug with a Case 1150 C Backhoe. Trench dimensions were 16' long x 2.5' wide

Cobble/Boulder Counts
Depth and +3" Wt%
@ 5.3' = 7.3%

Note: Unless otherwise noted, all samples are taken with 1-3/8-in. ID Standard Penetration Sampler driven with 140 lb. hammer with 30-in. drop. ☐ CME Auto Hammer ☐ Cathead Rope Method

NR AKDOT TEST HOLE LOG - USCS ALL NORTHERN REGION DOT.GPJ AK DOT - APRIL 2020.GDT 4/7/22

Appendix B: Lab Results.

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION
NORTHERN REGION
LABORATORY TESTING REPORT

PROJECT NAME: ALL
PROJECT NUMBER:
AKSAS NUMBER: 57260
SAMPLED BY: G. SPEETER
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER								
DEPTH (feet)		5.5-6.3	0.5-1.5	8.9-9.7	6.5-8.5	2.3-3.3	7.8-8.8	4.5-5.0
LATITUDE		N64.22222°	N64.22222°	N64.22222°	N64.22222°	N64.22307°	N64.22307°	N64.22304°
LONGITUDE								
LAB NUMBER		**04-90901**	**04-90902**	**04-90903**	**04-90904**	**04-90905**	**04-90906**	**04-90907**
DATE SAMPLED								
% Passing	**3"**	100		100			100	
	2"	93		88			88	
	1.5"	86		81			79	
Gravel	**1.0"**	74		72			68	
	0.75"	67		65		100	61	
	0.5"	58		56		99	51	
	0.375"	53		51		99	46	
	#4	45		38		99	38	
	#8	43		25		99	32	
	#10	42		23		99	32	
	#16	37		17		98	18	
	#30	25		11		97	4	
Sand	**#40**	16		7		88	3	
	#50	9		5		51	2	
	#60	8		4		32	2	
	#80	6		3		11	2	
	#100	6		2		5	1	
Silt/Clay	**#200**	5.5		1.1		1.8	1.2	
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV		NV		NV	NV	
PLASTIC LIMIT		NV		NV		NV	NV	
PLASTIC INDEX		NP		NP		NP	NP	
USCS CLASSIFICATION		GP-GM		GW		SP	GP	
USCS SOIL DESCRIPTION								
NATURAL MOISTURE			22.6		2.7	3.7		9.1
ORGANICS								
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
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: ALL
PROJECT NUMBER:
AKSAS NUMBER: 57260
SAMPLED BY: G. SPEETER
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER								
DEPTH (feet)		6.5-7.5	5.5-6.5	5.5-6.5	0.5-1.0	4.5-5.5	4.5-5.5	8.5-10.5
LATITUDE		N64.22304°	N64.2241°	N64.2241°	N64.2241°	N64.22413°	N64.22413°	N64.22413°
LONGITUDE								
LAB NUMBER		**04-90908**	**04-90909**	**04-90910**	**04-90911**	**04-90912**	**04-90913**	**04-90914**
DATE SAMPLED								
% Passing	**3"**	100	100				100	100
	2"	90	91				92	81
	1.5"	82	83				88	72
Gravel	**1.0"**	72	74				79	64
	0.75"	64	66				73	57
	0.5"	54	56				64	48
	0.375"	48	50				59	43
	#4	36	41				50	34
	#8	29	37				45	28
	#10	27	36				44	26
	#16	20	32				40	21
	#30	10	26				30	15
Sand	**#40**	5	19				16	9
	#50	3	12				6	5
	#60	2	9				3	3
	#80	2	5				1	2
	#100	2	3				1	2
Silt/Clay	**#200**	1.2	1.0				0.4	0.9
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV				NV	NV
PLASTIC LIMIT		NV	NV				NV	NV
PLASTIC INDEX		NP	NP				NP	NP
USCS CLASSIFICATION		GP	GP				SP	GP
USCS SOIL DESCRIPTION								
NATURAL MOISTURE				2.5	8.1	3.3		
ORGANICS					3.8			
SP. GR. (FINE)			2.72					
SP. GR. (COARSE)			2.75					
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION			19					
DEGRAD. VALUE			84					
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: ALL
PROJECT NUMBER:
AKSAS NUMBER: 57260
SAMPLED BY: G. SPEETER
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER								
DEPTH (feet)		0.5-1.5	7.5-8.5	7.5-8.5	3.0-5.0	7.5-9.5	7.5-9.5	3.0-3.5
LATITUDE		N64.22409°	N64.22409°	N64.22409°	N64.22324°	N64.22324°	N64.22324°	N64.22298°
LONGITUDE								
LAB NUMBER		**04-90915**	**04-90916**	**04-90917**	**04-90918**	**04-90919**	**04-90920**	**04-90921**
DATE SAMPLED								
% Passing	**3"**		100			100		100
	2"		84			89		90
	1.5"		77			82		79
Gravel	**1.0"**		65			71		67
	0.75"		58			65		59
	0.5"		46			55		49
	0.375"		41		100	49		43
	#4		32		98	39		34
	#8		28		98	34		30
	#10		27		97	33		28
	#16		25		94	29		25
	#30		22		83	23		19
Sand	**#40**		18		66	18		14
	#50		13		45	14		9
	#60		11		32	11		6
	#80		7		15	7		3
	#100		5		11	6		2
Silt/Clay	**#200**		1.8		5.1	2.6		1.0
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT			NV			NV		NV
PLASTIC LIMIT			NV			NV		NV
PLASTIC INDEX			NP			NP		NP
USCS CLASSIFICATION			GW			GP		GW
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		11.8		3.7			4.1	
ORGANICS		5.9						
SP. GR. (FINE)			2.69					
SP. GR. (COARSE)			2.80					
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION			19					
DEGRAD. VALUE			60					
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS		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: ALL
PROJECT NUMBER:
AKSAS NUMBER: 57260
SAMPLED BY: G. SPEETER
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER								
DEPTH (feet)		3.0-3.5	0.5-1.0	3.0-3.5	7.5-8.5			
LATITUDE		N64.22298°	N64.22257°	N64.22257°	N64.22257°			
LONGITUDE								
LAB NUMBER		**04-90922**	**04-90923**	**04-90924**	**04-90925**			
DATE SAMPLED								
% Passing	**3"**				100			
	2"				84			
	1.5"				74			
Gravel	**1.0"**				62			
	0.75"				57			
	0.5"				50			
	0.375"				46			
	#4				38			
	#8				34			
	#10				33			
	#16				28			
	#30				20			
Sand	**#40**				14			
	#50				9			
	#60				7			
	#80				5			
	#100				4			
Silt/Clay	**#200**				2.1			
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT					NV			
PLASTIC LIMIT					NV			
PLASTIC INDEX					NP			
USCS CLASSIFICATION					GP			
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		3.3	13.0	3.3				
ORGANICS			5.0					
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS			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: MS 37-2-069-2 Rex Pit
PROJECT NUMBER: 0A45028
AKSAS NUMBER: 60657
SAMPLED BY: TANNENBAUM
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER		TH21-1012	TH21-1012	TH21-1012	TH21-1013	TH21-1013	TH21-1012	TH21-1014
DEPTH (feet)		4.0-6.0	9.0-10.5	19.0-20.0	5.0-7.0	20.0-22.0	39.0-41.0	9.0-12.0
LATITUDE		N64.22117°	N64.22117°	N64.22117°	N64.22179°	N64.22179°	N64.22117°	N64.22181°
LONGITUDE		W149.24392°	W149.24392°	W149.24392°	W149.2388°	W149.2388°	W149.24392°	W149.24114°
LAB NUMBER		**21-0132**	**21-0133**	**21-0135**	**21-0137**	**21-0140**	**21-0144**	**21-0147**
DATE SAMPLED		2-Dec-21	2-Dec-21	2-Dec-21	5-Dec-21	5-Dec-21	2-Dec-21	7-Dec-21
% Passing	**3"**	100						
	2"	91				100	100	100
	1.5"	86	100	100	100	91	86	97
Gravel	**1.0"**	78	91	92	83	73	73	89
	0.75"	68	82	73	71	64	69	81
	0.5"	55	76	60	61	53	57	60
	0.375"	49	69	53	55	47	51	50
	#4	35	56	42	42	37	36	33
	#8	28	49	32	35	31	27	26
	#10	27	47	31	34	29	25	25
	#16	23	41	25	29	23	21	22
	#30	19	29	18	23	14	16	19
Sand	**#40**	16	20	15	19	11	14	17
	#50	13	10	12	15	8	11	12
	#60	12	8	11	13	7	10	10
	#80	10	5	9	10	6	8	8
	#100	9	5	8	9	5	7	7
Silt/Clay	**#200**	7.2	3.5	5.3	5.8	3.7	4.7	5.0
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION		GP-GM	SP	GW-GM	GP-GM	GP	GW	GP-GM
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		2.3	3.4	1.3	1.6	2.0	1.6	0.4
ORGANICS		2.6	1.8	2.1	2.2	1.8	2.2	2.1
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS		sl Org[1]		sl Org[1]	sl Org[1]		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: MS 37-2-069-2 Rex Pit
PROJECT NUMBER: 0A45028
AKSAS NUMBER: 60657
SAMPLED BY: TANNENBAUM
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER		TH21-1014	TH21-1015	TH21-1015	TH21-1016	TH21-1017	TH21-1017	TH21-1018
DEPTH (feet)		19.0-22.0	9.0-12.0	19.0-22.0	4.0-6.0	4.0-7.0	13.5-16.5	2.0-6.0
LATITUDE		N64.22181°	N64.22181°	N64.22181°	N64.22283°	N64.22375°	N64.22375°	N64.22516°
LONGITUDE		W149.24114°	W149.23342°	W149.23342°	W149.234°	W149.2329°	W149.2329°	W149.23242°
LAB NUMBER		**21-0149**	**21-0151**	**21-0152**	**21-0153**	**21-0155**	**21-0157**	**21-0159**
DATE SAMPLED		7-Dec-21	9-Dec-21	9-Dec-21	9-Dec-21	10-Dec-21	10-Dec-21	10-Dec-21
% Passing	**3"**							
	2"	100			100	100	100	100
	1.5"	94	88	95	89	90	93	92
Gravel	**1.0"**	87	75	81	85	77	77	85
	0.75"	82	66	70	75	69	66	80
	0.5"	63	53	48	62	57	52	69
	0.375"	52	46	35	58	53	45	65
	#4	28	32	13	45	46	32	57
	#8	20	24	9	35	44	28	52
	#10	19	23	9	34	43	27	51
	#16	17	19	8	28	40	24	47
	#30	14	14	7	22	35	17	39
Sand	**#40**	13	11	6	18	31	10	32
	#50	10	9	5	13	24	9	21
	#60	9	9	5	11	20	8	17
	#80	8	7	4	8	13	6	12
	#100	7	7	4	8	11	5	10
Silt/Clay	**#200**	5.1	5.3	3.2	4.7	5.7	3.3	5.9
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION		GP-GM	GW-GM	GW	GP	GP-GM	GW	SP-SM
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		0.4	0.5	0.5	1.7	0.5	0.4	0.3
ORGANICS		2.2	2.5	2.9	1.6	3.0	2.0	1.9
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS		sl Org[1]	sl Org[1]	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: MS 37-2-069-2 Rex Pit
PROJECT NUMBER: 0A45028
AKSAS NUMBER: 60657
SAMPLED BY: TANNENBAUM
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER		TH21-1018	TT21-1019	TT21-1020	TT21-1021	TH21-1022	TH21-1023	TH21-1024
DEPTH (feet)		18.0-21.0	9.0-11.0	3.0-5.0	6.0-8.0	7.0-10.0	17.0-20.0	4.0-6.0
LATITUDE		N64.22516°	N64.22215°	N64.22461°	N64.22173°	N64.22255°	N64.22289°	N64.22383°
LONGITUDE		W149.23242°	W149.24361°	W149.23371°	W149.2353°	W149.23981°	W149.23716°	W149.23594°
LAB NUMBER		**21-0161**	**21-0164**	**21-0166**	**21-0171**	**21-0174**	**21-0176**	**21-0177**
DATE SAMPLED		10-Dec-21	23-Jan-22	21-Jan-22	19-Jan-22	25-Jan-22	25-Jan-22	26-Jan-22
% Passing	**3"**		93					
	2"	100	90					
	1.5"	78	83	81	81	87	92	100
Gravel	**1.0"**	95	77	67	68	64	81	76
	0.75"	32	69	57	61	45	69	71
	0.5"	11	60	41	48	24	48	62
	0.375"	6	56	35	43	15	39	57
	#4	4	48	25	33	7	19	46
	#8	4	46	20	30	6	11	42
	#10	4	46	19	29	6	10	40
	#16	4	44	16	25	5	8	31
	#30	4	39	13	16	5	7	25
Sand	**#40**	3	32	10	10	4	6	27
	#50	3	19	7	6	4	5	22
	#60	3	12	5	4	3	5	20
	#80	2	5	3	3	3	4	16
	#100	2	3	3	2	3	4	15
Silt/Clay	**#200**	1.3	1.6	1.5	1.4	2.1	2.5	11.5
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION		GP	GP	GP	GP	GP	GW	GW-GM
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		0.5	0.4	0.5	0.5	0.9	0.7	11.1
ORGANICS		4.1				3.7	3.3	2.9
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION			22	17	23			
DEGRAD. VALUE			82	84	79			
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS		sl Org[1]				sl Org[1]	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: MS 37-2-069-2 Rex Pit
PROJECT NUMBER: 0A45028
AKSAS NUMBER: 60657
SAMPLED BY: TANNENBAUM
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER		TH21-1024	TH21-1025	TH21-1026	TH21-1027	TH21-1028	TH21-1029	TH21-1029
DEPTH (feet)		24.0-26.0	8.0-10.0	8.0-10.0	12.0-15.0	6.0-8.5	4.0-6.0	19.0-21.0
LATITUDE		N64.22383°	N64.22519°	N64.22523°	N64.2246°	N64.22358°	N64.22029°	N64.22029°
LONGITUDE		W149.23594°	W149.23515°	W149.23704°	W149.23785°	W149.23829°	W149.24809°	W149.24809°
LAB NUMBER		**21-0179**	**21-0181**	**21-0182**	**21-0184**	**21-0185**	**21-0187**	**21-0189**
DATE SAMPLED		26-Jan-22	27-Jan-22	28-Jan-22	28-Jan-22	29-Jan-22	4-Feb-22	4-Feb-22
% Passing	**3"**							
	2"	100						100
	1.5"	95		91	94	97	100	95
Gravel	**1.0"**	83	100	81	85	89	87	79
	0.75"	82	98	73	61	81	79	72
	0.5"	73	89	48	49	69	67	63
	0.375"	67	82	38	41	62	30	58
	#4	54	66	23	24	51	45	49
	#8	44	57	19	18	46	36	42
	#10	42	56	19	17	45	36	40
	#16	33	52	17	16	42	29	32
	#30	21	47	16	14	37	24	23
Sand	**#40**	14	44	15	13	30	20	18
	#50	9	40	14	12	21	15	13
	#60	7	39	14	11	36	13	12
	#80	5	36	13	10	11	10	10
	#100	4	35	12	9	9	9	9
Silt/Clay	**#200**	2.9	30.1	10.4	7.1	6.3	6.0	6.1
Hydro	**0.02**							
	0.005							
	0.002							
	0.001							
LIQUID LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC LIMIT		NV	NV	NV	NV	NV	NV	NV
PLASTIC INDEX		NP	NP	NP	NP	NP	NP	NP
USCS CLASSIFICATION		SP	SM	GP-GM	GP-GM	GP-GM	GP-GM	GP-GM
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		1.3	0.6	1.5	0.6	0.5	1.8	1.2
ORGANICS		1.5	2.9	4.7	2.6	2.3	1.5	1.9
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
SODIUM SULF. (CRSE)								
SODIUM SULF. (FINE)								
NORDIC ABRASION								
REMARKS			sl Org[1]	sl Org[1]	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: MS 37-2-069-2 Rex Pit
PROJECT NUMBER: 0A45028
AKSAS NUMBER: 60657
SAMPLED BY: TANNENBAUM
MATERIAL SOURCE: CENTERLINE

TEST HOLE NUMBER		TH21-1030						
DEPTH (feet)		14.0-15.5						
LATITUDE		N64.22421°						
LONGITUDE		W149.24103°						
LAB NUMBER		**21-0192**						
DATE SAMPLED		4-Feb-22						
% Passing	**3"**							
	2"	100						
	1.5"	88						
Gravel	**1.0"**	79						
	0.75"	72						
	0.5"	65						
	0.375"	62						
	#4	50						
	#8	43						
	#10	41						
	#16	36						
	#30	28						
Sand	**#40**	23						
	#50	17						
	#60	15						
	#80	12						
	#100	11						
Silt/Clay	**#200**	7.2						
	0.02							
Hydro	**0.005**							
	0.002							
	0.001							
LIQUID LIMIT		NV						
PLASTIC LIMIT		NV						
PLASTIC INDEX		NP						
USCS CLASSIFICATION		GP-GM						
USCS SOIL DESCRIPTION								
NATURAL MOISTURE		2.0						
ORGANICS		2.0						
SP. GR. (FINE)								
SP. GR. (COARSE)								
MAX. DRY DENSITY								
OPTIMUM MOISTURE								
L.A. ABRASION								
DEGRAD. VALUE								
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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Appendix C: Cobble Count Data.

TT 21-1019 Summary

First sampling 4-Feet BGS

Item	Weight (lbs)	Adjusted Weight (lbs)
Empty Bucket	50	
Full Bucket of Soil	410	360
Cobbles	200	150
	% of Cobbles	41.67%
Cobbles		
Lithology	**Count**	**Percent Total**
Andesite	12	44.44%
Diorite	1	3.70%
Breccia	2	7.41%
Basalt	11	40.74%
Schist	1	3.70%
Total	**27**	

Cobbles were subangular to rounded

~100lbs of material collected as Sample 21-0162

Second sampling 6-Feet BGS

Item	Weight (lbs)	Adjusted Weight (lbs)
Empty Bucket	50	
Full Bucket of Soil	465	415
Cobbles	100	50
	% of Cobbles	12.05%
Cobbles		
Lithology	**Count**	**Percent Total**
Granite	1	5.26%
Diorite	1	5.26%
Mass. Quartz	2	10.53%
Andesite	3	15.79%
Conglomerate	3	15.79%
Basalt	5	26.32%
Rhyolite	4	21.05%
Total	**19**	

Cobbles were subrounded to rounded

~100lbs of material collected as Sample 21-0163

Third sampling 9-Feet BGS

Item	Weight (lbs)	Adjusted Weight (lbs)
Empty Bucket	50	
Full Bucket of Soil	450	400
Cobbles	130	80
	% of Cobbles	20.00%
Cobbles		
Lithology	**Count**	**Percent Total**
Diorite	2	14.29%
Schist	1	7.14%
Gabbro	2	14.29%
Basalt	6	42.86%
Andesite	3	21.43%
Total	**14**	

Cobbles were subrounded to rounded

~100lbs of material collected as Sample 21-0164

Fourth sampling 13-Feet BGS

Item	Weight (lbs)	Adjusted Weight (lbs)
Empty Bucket	50	
Full Bucket of Soil	480	430
Cobbles	147	97
	% of Cobbles	22.56%
Cobbles		
Lithology	**Count**	**Percent Total**
Andesite	5	22.73%
Diorite	4	18.18%
Gabbro	4	18.18%
Basalt	6	27.27%
Granite	3	13.64%
Total	**22**	

Cobbles were subrounded to rounded

~100lbs of material collected as Sample 21-0165

TT 21-1020 Summary

First sampling 3-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	445	395
Cobbles	80	30
	% of Cobbles	7.59%
Cobbles		
Lithology	**Count**	**Percent Total**
Conglomerate	3	33.33%
Diorite	2	22.22%
Mass. Quartz	1	11.11%
Basalt	2	22.22%
Andesite	1	11.11%
Total	**9**	
Cobbles were subangular to rounded		
~100lbs of material collected as Sample 21-0166		

Second sampling 6-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	460	410
Cobbles	100	50
	% of Cobbles	12.20%
Cobbles		
Lithology	**Count**	**Percent Total**
Granite	2	28.57%
Gabbro	1	14.29%
Basalt	2	28.57%
Andesite	2	28.57%
Total	**7**	
Cobbles were subrounded to rounded		
~100lbs of material collected as Sample 21-0167		

Third sampling 9-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	460	410
Cobbles	110	60
	% of Cobbles	14.63%
Cobbles		
Lithology	**Count**	**Percent Total**
Conglomerate	1	12.50%
Granite	2	25.00%
Chert	1	12.50%
Basalt	2	25.00%
Andesite	1	12.50%
Gabbro	1	12.50%
Total	**8**	
Cobbles were subrounded to rounded		
~100lbs of material collected as Sample 21-0168		

Fourth sampling 12-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	480	430
Cobbles	90	40
	% of Cobbles	9.30%
Cobbles		
Lithology	**Count**	**Percent Total**
Basalt	1	4.76%
Conglomerate	9	42.86%
Gabbro	2	9.52%
Schist	1	4.76%
Andesite	8	38.10%
Total	**21**	
Cobbles were subrounded to rounded		
~100lbs of material collected as Sample 21-0169		

TT 21-1021 Summary

First sampling 4-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	430	380
Cobbles	125	75
	% of Cobbles	19.74%
Cobbles		
Lithology	**Count**	**Percent Total**
Granite	3	33.33%
Basalt	2	22.22%
Gabbro	1	11.11%
Mass. Quartz	1	11.11%
Andesite	2	22.22%
Total	**9**	
Cobbles were subangular to rounded		
~100lbs of material collected as Sample 21-0170		

Second sampling 6-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	475	425
Cobbles	150	100
	% of Cobbles	23.53%
Cobbles		
Lithology	**Count**	**Percent Total**
Conglomerate	1	7.14%
Basalt	2	14.29%
Breccia	2	14.29%
Schist	2	14.29%
Andesite	3	21.43%
Gabbro	4	28.57%
Total	**14**	
Cobbles were subrounded to rounded		
~100lbs of material collected as Sample 21-0171		

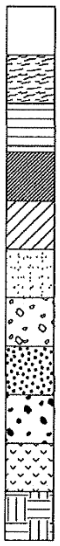
Third sampling 9-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	460	410
Cobbles	110	60
	% of Cobbles	14.63%
Cobbles		
Lithology	**Count**	**Percent Total**
Gabbro	3	42.86%
Diorite	1	14.29%
Andesite	2	28.57%
Basalt	1	14.29%
Total	**7**	
Cobbles were subrounded to rounded		
~100lbs of material collected as Sample 21-0172		

Fourth sampling 12-Feet BGS		
Item	**Weight (lbs)**	**Adjusted Weight (lbs)**
Empty Bucket	50	
Full Bucket of Soil	480	430
Cobbles	N/A	N/A
	% of Cobbles	0.00%
Cobbles		
Lithology	**Count**	**Percent Total**
Total	**0**	
No material over 3"		
~100lbs of material collected as Sample 21-0173		

Appendix D: Symbols and Definitions, Unified Soil Classification System.

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

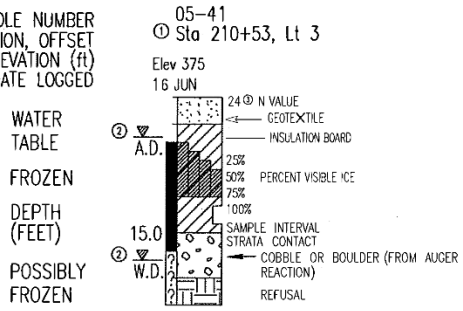
TEST RESULTS

_._%-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

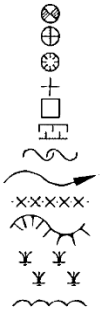


① Station value may also be on centerline e.g. Sta 210+53, CL or lat-long format e.g. N64.56789°, W145.67890°

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

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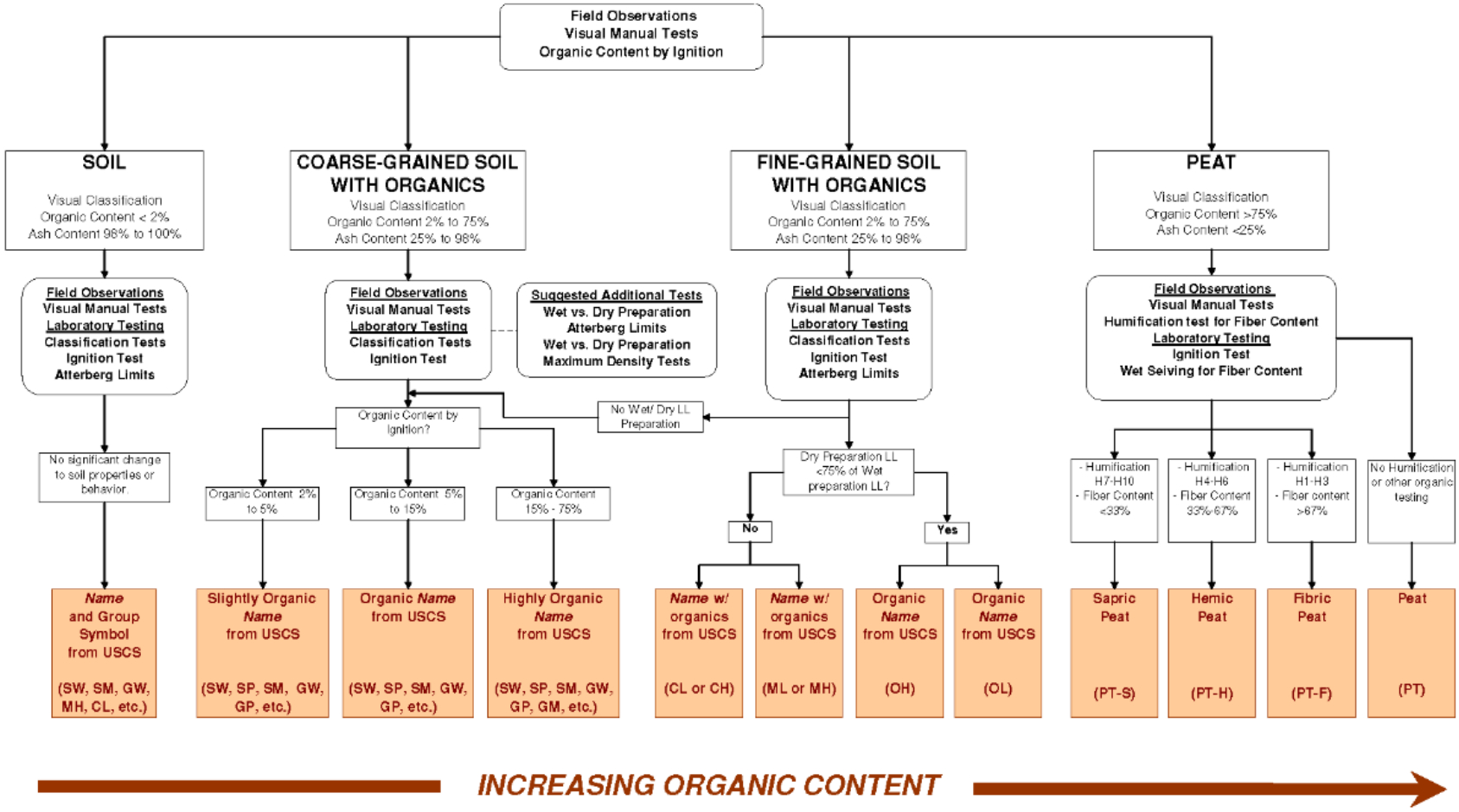
Peat and Organic Soil Classification System



DESCRIPTION AND CLASSIFICATION OF FROZEN SOILS

Part I Description of Soil Phase **(a)** (Independent of Frozen State)	Major Group		Sub-Group		Field Identification (6)	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.
			No excess ice Well Bonded Excess ice	**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		Usually Thaw-Unstable	
			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	Same as Part II above, as applicable, with special emphasis on Ice Crystal Structure.		
			Ice without soil inclusions	**Ice**				

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.

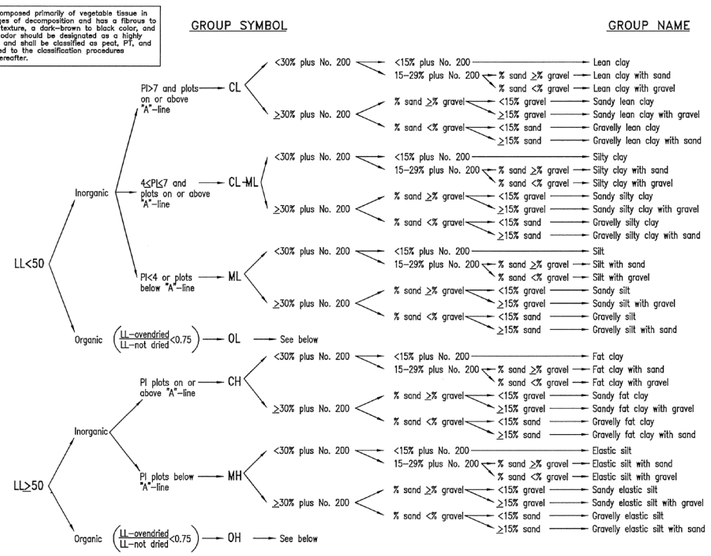
(c) When visual methods may be inadequate, a simple field test to aid evaluation of volume of excess ice can be made by placing some frozen soil in a small jar, allowing it to melt and observing the quantity of supernatant water as a percent of total volume.

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

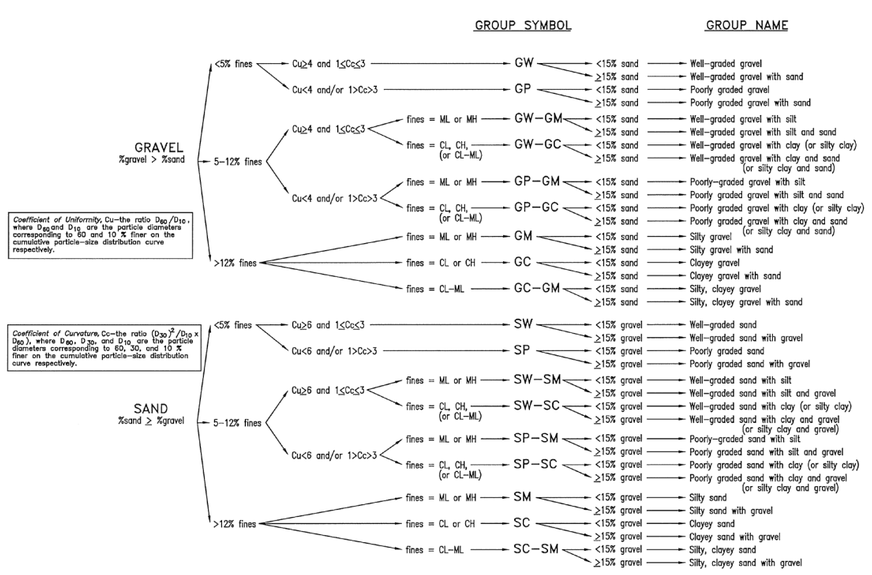
(e) Observer should be careful to avoid being misled by surface scratches or frost coating on the ice.

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)

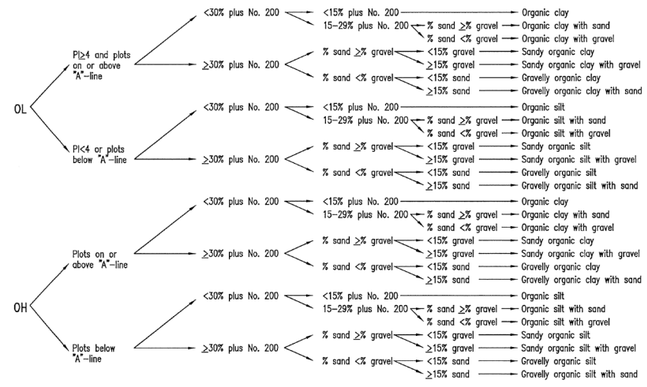


Coefficient of Uniformity, Cu–the ratio D_{60}/D_{10}, where D_{60} and D_{10} are the particle diameters corresponding to 60 and 10 % finer on the cumulative particle-size distribution curve respectively.

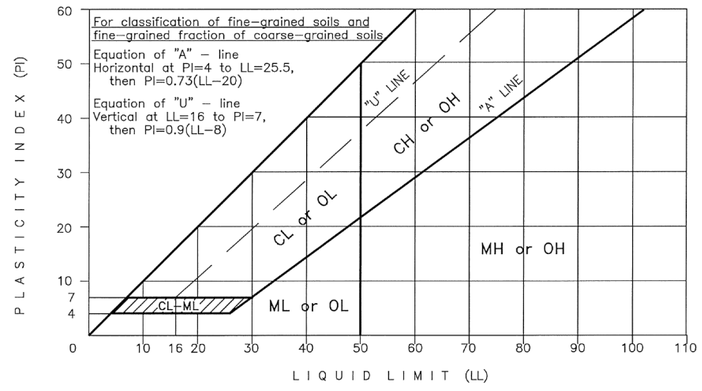
Coefficient of Curvature, Cc–the ratio $(D_{30})^2/(D_{10} \times D_{60})$, where D_{30}, D_{30}, and D_{10} are the particle diameters corresponding to 60, 30, and 10 % finer on the cumulative particle-size distribution curve respectively.

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

GROUP SYMBOL GROUP NAME



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



Plasticity Chart