7/15/2020 NGE-TFT Project # 5731-20

Southcentral Foundation
4501 Diplomacy Drive
Anchorage, AK 99508

Attn: Ed Zernia

RE: SUMMARY OF FILL PAD CONSTRUCTION MONITORING ACTIVITIES FOR THE PLANNED TAKOTNA HEALTH CLINIC – TAKOTNA, ALASKA

Ed,

We (Northern Geotechnical Engineering, Inc. *d.b.a.* Terra Firma Testing) have completed construction monitoring for the fill pad at the Takotna Health Clinic site.

One of our project geologists, Erik Anderson, provided onsite engineering guidance and monitoring of the construction of the fill pad for the planned Takotna Health Clinic building, from June 26-29, 2020. This phase of construction included excavation of organic overburden soils, the installation of geogrid material, and the placement of the initial lifts of structural fill. In addition to our construction monitoring, we also conducted a preliminary assessment of local material borrow sources to evaluate their potential for the production of filter sand to be used for septic system construction at the project site. We summarize our construction monitoring and material evaluation efforts in the following letter.

1.0 Monitoring of Fill Pad Construction

A recent excavation was found to be partially within the footprint of the northern side of the pad (Appendix A, Photo 1). As per our recommendation, the organic soils were completely removed from all areas within 10 feet of the footprint of the clinic structure (Appendix A, Photo 2). Following the removal of the organic materials. We inspected the bottom of the excavation to ensure that all organic soils were completely removed to both their lateral and vertical extents, and confirm that the subgrade mineral soils are as we anticipated. Following our inspection, the bottom of the excavation was graded level with a minimal amount of imported structural fill and a layer of Geogrid material was installed across the bottom of the excavation and the first lift of structural fill was placed (Appendix A, Photos 3 and 4) above it and track-rolled using the available excavation equipment. Fill compaction efforts for the first lift were hampered by excessive moisture in the excavation which tended to accumulate at the lower areas of the excavation. As such, to avoid damage to underlying geogrid due to the displacement of fill under equipment, the compaction efforts for the first lift were halted before uniform compaction could be achieved (Appendix A, Photo 5). Following compaction, the surface of the fill was inspected and two areas

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were found to have exposed geogrid which appeared to have migrated to the surface of the fill and potentially sustained minor damages, likely from contact with equipment. To repair these potentially damaged areas of the geogrid we instructed the contractor to apply a supplemental layer of geogrid across the damaged geogrid sections (Appendix A, Photos 6 and 7). These repairs (i.e., patches) consisted of full width strips of geogrid cut to 30 foot long to provide ample overlap given the uncertainty with respect to inferred potential extent of damage to the original layer of geogrid. Next, a two to three foot thick lift of fill was placed across the entire excavation foot print. We monitored the placement of additional fill to ensure adequate thickness of fill protect the Geogrid and avoid damage during compaction efforts (Appendix A, Photo 8). At this point we concluded our construction monitoring efforts. Our daily field reports are provided in Appendix B of this letter.

2.0 Preliminary Borrow Source Evaluation for Filter Sand Material

To aid in the sourcing of suitable filter material for construction of the on-site septic system, we collected soil samples from the existing borrow pit site located at the northeast end of the Takotna airport. We have detailed the borrow pit site and sampling locations in Figure 1 of this letter. We collected three representative samples from prospective areas in the borrow pit (Attachment A, Photos 9 through 11). The sampling locations included a windrow of reworked borrow material which appears to have the most favorable gradation for filter sand production. We submitted our borrow source samples to our Anchorage laboratory for gradational analysis. We have included the results of our laboratory analysis in Appendix C of this letter.

We greatly appreciate the opportunity to provide you with our professional service. Please contact us directly with any questions or comments you may have regarding the information that we present in this letter, or if you have any other questions, comments, and/or requests.

Sincerely,
Northern Geotechnical Engineering, Inc. *d.b.a.* Terra Firma Testing

Erik Anderson
Project Geologist

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FIGURES

N

NORTHERN GEOTECHNICAL ENGINEERING, INC.
TERRA FIRMA TESTING

FIGURE TITLE: BORROW PIT SITE AND SAMPLING LOCATIONS		
PROJECT NAME: TAKOTNA HEALTH CLINIC		PROJECT ID: 5731-20
PROJECT LOCATION: TAKOTNA, ALASKA		FIGURE NUMBER: 1

APPENDIX A

PHOTOGRAPHS

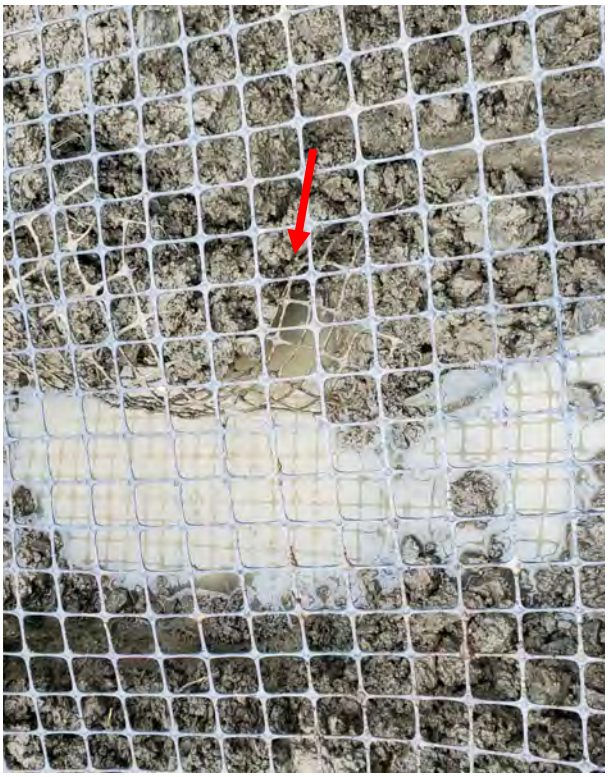
Photograph 1: Proposed pad footprint (orange paint) looking south, northwest corner in foreground with existing excavation partially within footprint (red arrow).

Photograph 2: Completed excavation. Looking east from west side of pad footprint.

Photograph 3: Photograph of Geogrid laid over leveling course.

Photograph 4: Photograph of fill placement over Geogrid (first lift).

Photograph 5: Fill pad after compaction of first lift.



Photograph 6: Photograph of exposed, potentially damaged Geogrid (arrow), with repair patch overlaid.

Photograph 7: Photograph of a repair strip of Geogrid placed over first lift at south side of pad.

Photograph 8: Photograph of fill placement over Geogrid repair patches. View is looking west, location of repairs indicated with red arrows.

Photograph 9: Photograph of Test Pit #2 sampling location at Borrow pit site.

Photograph 10: Photograph of Test Pit #3 sampling location, windrow of reworked material.

Photograph 11: Photograph of Test Pit #4 sampling location at Borrow pit site.

APPENDIX B

DAILY INSPECTION REPORTS

NORTHERN GEOTECHNICAL ENGINEERING, INC. TERRA FIRMA TESTING

Project: Takotna Health Clinic

NGE-TFT Job No.: 5731-20

Inspection Date: 6/26/20

NGE-TFT

- Special Inspection
- Geotechnical Engineering
- Laboratory Testing
- Construction Monitoring

Client: SCF **MOA Permit No.:**

Contractor: Takotna Community Assoc. **Weather:** cloudy 65 °F

Time Start: 9:30 **Time End:** 17:30 **Page** _____ **of** _____

- ☐ Concrete Reinforcement
- ☐ Concrete Placement
- ☐ Post/Pre – Tensioned Concrete
- ☐ Epoxy Bolts/Anchors
- ☐ Masonry Reinforcement
- ☐ Masonry Grout Placement
- ☐ High Strength Grout
- ☒ Earthwork Inspection
- ☐ Structural Steel
- ☐ Welding
- ☐ High Strength Bolt
- ☐ Wood Framing
- ☐ Spray-applied Fireproofing
- ☐ Environmental Assessment
- ☐ Other

Inspection Items/Location/Comments

Excavate footprint of fill pad for proposed clinic structure.
Organic soils removed, down to silt.
80% completed by end of work day.

Deficiencies: Yes (No)

To the best of my knowledge this inspection was performed in accordance with the Plans and Specifications for this project and the Governing Codes

Inspector Signature: CL Certification # _____

A copy of this report given to: _____ Date 6/26/20

Northern Geotechnical Engineering, Inc. – Terra Firma Testing
INSPECTION REPORT

Project: Takotna Health Clinic
NGE-TFT Job No.: 5731-20
Inspection Date: 6/27/20

NGE-TFT
- Special Inspection
- Geotechnical Engineering
- Laboratory Testing
- Construction Monitoring

Client:	SCF	**MOA Permit No.:**	
Contractor:	TCA	**Weather:**	Cloudy 55 — 55 °F
Time Start:	8:00	**Time End:** 17:30	**Page** _____ **of** _____

- ☐ Concrete Reinforcement
- ☐ Concrete Placement
- ☐ Post/Pre – Tensioned Concrete
- ☐ Epoxy Bolts/Anchors
- ☐ Masonry Reinforcement
- ☐ Masonry Grout Placement
- ☐ High Strength Grout
- ☒ Earthwork Inspection
- ☐ Structural Steel
- ☐ Welding
- ☐ High Strength Bolt
- ☐ Wood Framing
- ☐ Spray-applied Fireproofing
- ☐ Environmental Assessment
- ☐ Other

Inspection Items/Location/Comments

Continue excavation activities for proposed clinic building in eastern 1/4 of pad.

Begin placement of a minimally thick lift of fill to even up and smooth out the uneven surface of the excavation.

Complete excavation of organic soils from pad footprint.

Complete placement of "levelling" course of fill.

Layout geogrid with 3 foot overlap oriented to require minimum cutting of geogrid

Rocks were used to hold geogrid in place staples refused on coarse gravel in fill and frozen silt

Deficiencies: Yes (No)

To the best of my knowledge this inspection was performed in accordance with the Plans and Specifications for this project and the Governing Codes

Inspector Signature: AC Certification #_____

A copy of this report given to: Date 6/27/20

Northern Geotechnical Engineering, Inc. – Terra Firma Testing

INSPECTION REPORT

NGE-TFT

- Special Inspection
- Geotechnical Engineering
- Laboratory Testing
- Construction Monitoring

Project: Takotna Health Clinic

NGE-TFT Job No.: S731-20

Inspection Date: 6/28/20

Client:	SCF	**MOA Permit No.:**	
Contractor:	TCA	**Weather:**	Cloudy 55 °F
Time Start:	8:30	**Time End:**	**Page** _____ **of** _____

- ☐ Concrete Reinforcement
- ☐ Concrete Placement
- ☐ Post/Pre – Tensioned Concrete
- ☐ Epoxy Bolts/Anchors
- ☐ Masonry Reinforcement
- ☐ Masonry Grout Placement
- ☐ High Strength Grout
- ☒ Earthwork Inspection
- ☐ Structural Steel
- ☐ Welding
- ☐ High Strength Bolt
- ☐ Wood Framing
- ☐ Spray-applied Fireproofing
- ☐ Environmental Assessment
- ☐ Other

Inspection Items/Location/Comments

Place an approximate 2 foot lift over geogrid.

Attempt to compact with front end loader

Some areas at the south of the excavation were soft and additional fill was added in these areas.

Soft areas remained and were too soft to allow for compaction. Approx 50% of the lift area was compacted.

Two 2'x2' sections of geogrid were exposed migrated to surface during compaction activities

Some damage to geogrid was ~~found~~ at exposed sec

Deficiencies: (Yes) No

Two locations had geogrid exposed which migrated to surface and had been sliced though it did not appear that the geogrid strip had been completely cut through. Likely just a wrinkle from edge of strip at overlap.

To the best of my knowledge this inspection was performed in accordance with the Plans and Specifications for this project and the Governing Codes

Inspector Signature: EC Certification # _____

A copy of this report given to: _____ Date 6/28/20

Northern Geotechnical Engineering, Inc. – Terra Firma Testing

INSPECTION REPORT

Project: Takotna Health Clinic

NGE-TFT Job No.: 5731-20

Inspection Date: 6/29/20

NGE-TFT

- Special Inspection
- Geotechnical Engineering
- Laboratory Testing
- Construction Monitoring

Client: SCF

Contractor: TCA

Time Start: 8:00 **Time End:** 14:00

MOA Permit No.:

Weather: partly cloudy 65 °F

Page _____ **of** _____

- ☐ Concrete Reinforcement
- ☐ Concrete Placement
- ☐ Post/Pre – Tensioned Concrete
- ☐ Epoxy Bolts/Anchors
- ☐ Masonry Reinforcement
- ☐ Masonry Grout Placement
- ☐ High Strength Grout
- ☒ Earthwork Inspection
- ☐ Structural Steel
- ☐ Welding
- ☐ High Strength Bolt
- ☐ Wood Framing
- ☐ Spray-applied Fireproofing
- ☐ Environmental Assessment
- ☐ Other

Inspection Items/Location/Comments

~~install~~ placed (2) "patches" of geogrid to span areas which had possibly been damaged.

The "patches" were 30' long strips of geogrid

Another lift: 3rd lift including "leveling coarse" was placed with a 2-3 foot thickness, to avoid pumping action of the material under weight of dozer.

The remaining geogrid patches were covered with the second lift.

Inspector departed site around 14:00

Deficiencies: Yes (No)

To the best of my knowledge this inspection was performed in accordance with the Plans and Specifications for this project and the Governing Codes

Inspector Signature: _____ Certification # _____

A copy of this report given to: _____ Date 6/29/20

APPENDIX C

LABORATORY TEST RESULTS

Summary of Laboratory Test Results

Takotna Clinic

NGE-TFT Project #:5731-20

Exploration ID	Sample Number	Depth Interval (ft) Top	Depth Interval (ft) Bottom	Particle Size Analysis ASTM C136/D7928/D6913 (% By Mass) Gravel	Sand	Silt/Clay	Unified Soil Classification ASTM D2487
TP2	S1	0.0	1.0	59.3	24.9	15.8	(GM) Silty gravel w/ sand
TP3	S1	0.0	1.0	46.5	47.4	6.1	(SW-SM) Well-graded sand w/ silt and gravel
TP4	S1	1.0	2.0	60.6	31.2	8.2	(GW-GM) Well-graded gravel w/ silt and sand

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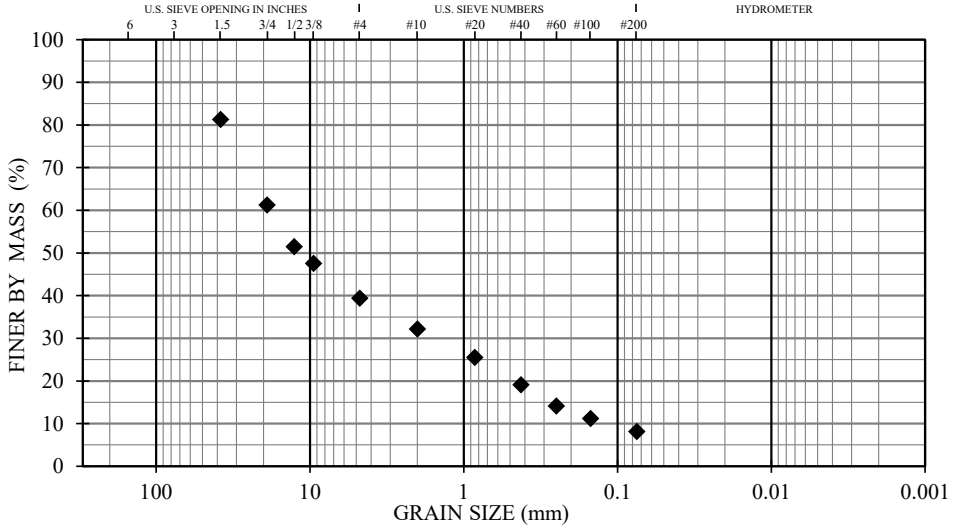
PROJECT CLIENT:	**SCF**
PROJECT NAME:	**Takotna Clinic**
PROJECT NO.:	**5731-20**
SAMPLE LOC.:	**TP4**
NUMBER/ DEPTH:	**S1 / 1 - 2'**
DESCRIPTION:	**Well-graded gravel w/ silt and sand**
DATE RECEIVED:	**7/2/2020**
TESTED BY:	
REVIEWED BY:	**Erik Anderson**

% GRAVEL	**60.6**	USCS	**GW-GM**
% SAND	**31.2**	USACOE FC	**N/A**
% SILT/CLAY	**8.2**	% PASS. 0.02 mm	**N/A**
% MOIST. CONTENT	**5.2**	% PASS. 0.002 mm	**N/A**

UNIFORMITY COEFFICIENT (C_u)	**150.5**
COEFFICIENT OF GRADATION (C_c)	**1.2**
ASTM D1557 (uncorrected)	**N/A**
ASTM D4718 (corrected)	**N/A**
OPTIMUM MOIST. CONTENT. (corrected)	**N/A**

PARTICLE SIZE ANALYSIS ASTM D422 / C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

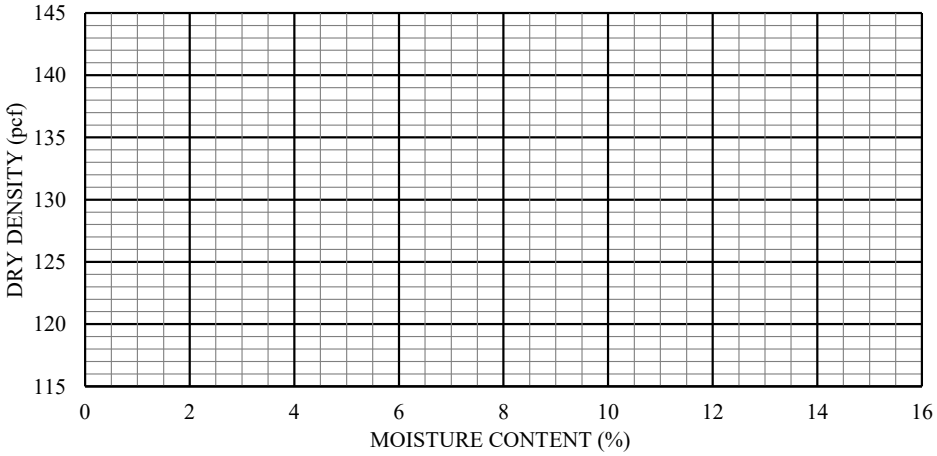
SIEVE ANALYSIS RESULT

SIEVE SIZE (mm)	SIEVE SIZE (U.S.)	TOTAL % PASSING	SPECIFICATION (% PASSING)
152.40	6"		
76.20	3"		
38.10	1.5"	**81**	
19.00	3/4"	**61**	
12.70	1/2"	**51**	
9.50	3/8"	**48**	
4.75	#4	**39**	
2.00	#10	**32**	
0.85	#20	**26**	
0.43	#40	**19**	
0.25	#60	**14**	
0.15	#100	**11**	
0.075	#200	**8.2**	

HYDROMETER RESULT

ELAPSED TIME (MIN)	DIAMETER (mm)	TOTAL % PASSING
0		
1		
2		
5		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP ASTM D1557



HYDRAULIC COND. (ASTM D2434)	**N/A**
DEGRADATION (ATM T-313)	**N/A**
PLASTICITY INDEX ASTM 4318	**N/A**

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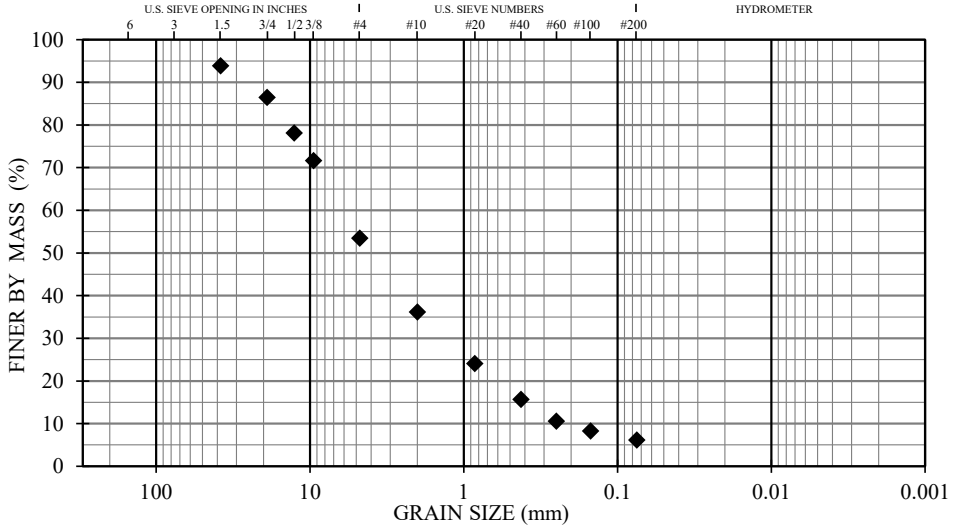
PROJECT CLIENT:	**SCF**
PROJECT NAME:	**Takotna Clinic**
PROJECT NO.:	**5731-20**
SAMPLE LOC.:	**TP3**
NUMBER/ DEPTH:	**S1 / 0 - 1'**
DESCRIPTION:	**Well-graded sand w/ silt and gravel**
DATE RECEIVED:	**7/2/2020**
TESTED BY:	
REVIEWED BY:	**Erik Anderson**

% GRAVEL	**46.5**	USCS	**SW-SM**
% SAND	**47.4**	USACOE FC	**N/A**
% SILT/CLAY	**6.1**	% PASS. 0.02 mm	**N/A**
% MOIST. CONTENT	**6.5**	% PASS. 0.002 mm	**N/A**

UNIFORMITY COEFFICIENT (C_u)	**28.7**
COEFFICIENT OF GRADATION (C_c)	**1.4**
ASTM D1557 (uncorrected)	**N/A**
ASTM D4718 (corrected)	**N/A**
OPTIMUM MOIST. CONTENT. (corrected)	**N/A**

PARTICLE SIZE ANALYSIS ASTM D422 / C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

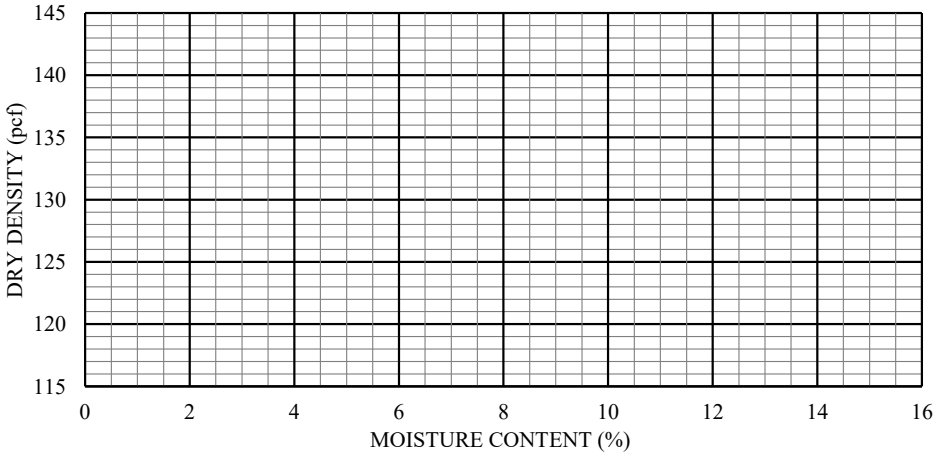
SIEVE ANALYSIS RESULT

SIEVE SIZE (mm)	SIEVE SIZE (U.S.)	TOTAL % PASSING	SPECIFICATION (% PASSING)
152.40	6"		
76.20	3"		
38.10	1.5"	**94**	
19.00	3/4"	**86**	
12.70	1/2"	**78**	
9.50	3/8"	**72**	
4.75	#4	**53**	
2.00	#10	**36**	
0.85	#20	**24**	
0.43	#40	**16**	
0.25	#60	**11**	
0.15	#100	**8**	
0.075	#200	**6.1**	

HYDROMETER RESULT

ELAPSED TIME (MIN)	DIAMETER (mm)	TOTAL % PASSING
0		
1		
2		
5		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP ASTM D1557



HYDRAULIC COND. (ASTM D2434)	**N/A**
DEGRADATION (ATM T-313)	**N/A**
PLASTICITY INDEX ASTM 4318	**N/A**

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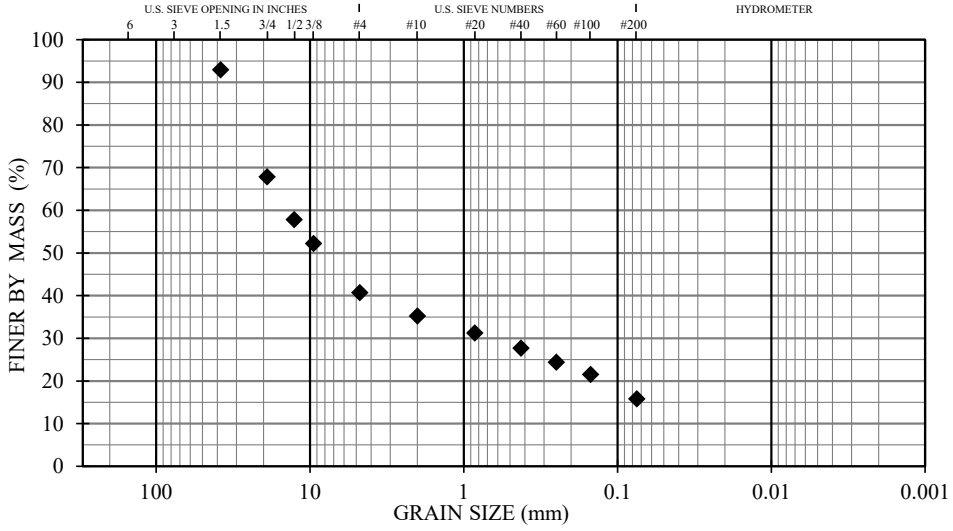
PROJECT CLIENT:	**SCF**
PROJECT NAME:	**Takotna Clinic**
PROJECT NO.:	**5731-20**
SAMPLE LOC.:	**TP2**
NUMBER/ DEPTH:	**S1 / 0 - 1'**
DESCRIPTION:	**Silty gravel w/ sand**
DATE RECEIVED:	**7/2/2020**
TESTED BY:	
REVIEWED BY:	**Erik Anderson**

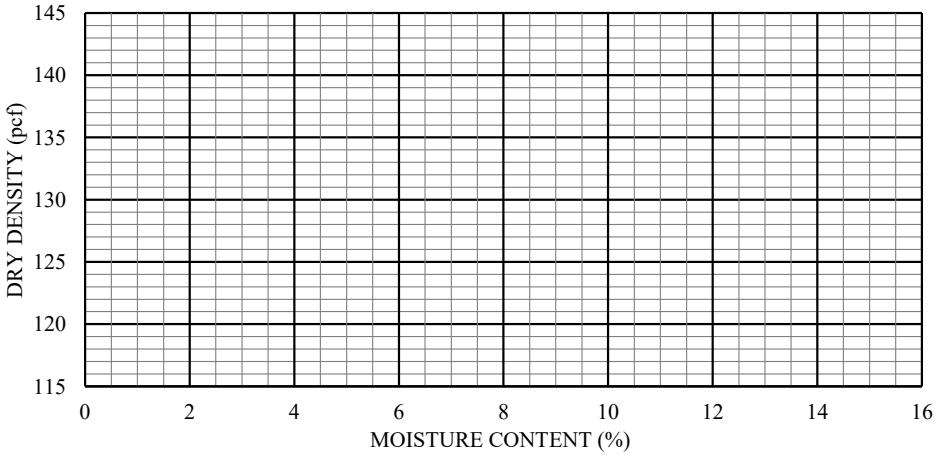
% GRAVEL	**59.3**	USCS	**GM**
% SAND	**24.9**	USACOE FC	**N/A**
% SILT/CLAY	**15.8**	% PASS. 0.02 mm	**N/A**
% MOIST. CONTENT	**3.9**	% PASS. 0.002 mm	**N/A**
UNIFORMITY COEFFICIENT (C_u)			**UNKNOWN**
COEFFICIENT OF GRADATION (C_c)			**UNKNOWN**
ASTM D1557 (uncorrected)			**N/A**
ASTM D4718 (corrected)			**N/A**
OPTIMUM MOIST. CONTENT. (corrected)			**N/A**

PARTICLE SIZE ANALYSIS ASTM D422 / C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

MOISTURE-DENSITY RELATIONSHIP ASTM D1557



SIEVE ANALYSIS RESULT

SIEVE SIZE (mm)	SIEVE SIZE (U.S.)	TOTAL % PASSING	SPECIFICATION (% PASSING)
152.40	6"		
76.20	3"		
38.10	1.5"	**93**	
19.00	3/4"	**68**	
12.70	1/2"	**58**	
9.50	3/8"	**52**	
4.75	#4	**41**	
2.00	#10	**35**	
0.85	#20	**31**	
0.43	#40	**28**	
0.25	#60	**24**	
0.15	#100	**22**	
0.075	#200	**15.8**	

HYDROMETER RESULT

ELAPSED TIME (MIN)	DIAMETER (mm)	TOTAL % PASSING
0		
1		
2		
5		
8		
15		
30		
60		
250		
1440		

HYDRAULIC COND. (ASTM D2434)	**N/A**
DEGRADATION (ATM T-313)	**N/A**
PLASTICITY INDEX ASTM 4318	**N/A**

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