



REPORT

23-2455 S

April 10, 2024

Explorations and Geotechnical Engineering Services

Proposed Police Station
Fort Street
Caribou, Maine

Prepared For:

City of Caribou, Maine
Attention: Penny Thompson
25 High Street
Caribou, Maine 04736

Prepared By:

S. W. Cole Engineering, Inc.
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23-2455 S

April 10, 2024

City of Caribou, Maine
Attention: Penny Thompson
25 High Street
Caribou, Maine 04736

Subject: Explorations and Geotechnical Engineering Services
Proposed Police Station
Fort Street
Caribou, Maine

Dear Penny:

In accordance with our Proposal, dated December 18, 2023, we have performed subsurface explorations for the subject project. This report summarizes our findings and geotechnical recommendations, and its contents are subject to the limitations set forth in Appendix A.

1.0 INTRODUCTION

1.1 Scope and Purpose

The purpose of our services was to obtain subsurface information at the site in order to develop geotechnical recommendations relative to foundations and earthwork associated with the proposed construction. Our scope of services included twenty-one test boring explorations, soils laboratory testing, a geotechnical analysis of the subsurface findings and preparation of this report.

1.2 Site and Proposed Construction

The site is located at the southwest parcel at the intersection of Fort Street and U.S. Route 1 in Caribou, Maine. We understand portions of the site were previously developed for operations associated with the former Maine Frozen Foods operations. The overall site includes relic truck scales and building foundations and sporadic paved areas with the remainder of the site consisting of open grassed surfaced areas.

Additionally, we understand abandoned underground sewer and water infrastructure exist at the site. Based on the provided Test Boring Location Plan (Plan) from Artifex Architects-Engineers (Artifex), dated December 5, 2023, we understand the overall site generally slopes downward from southwest to northeast from about elevation 463 to 429 feet (project datum).

Based on our conversations and the provided Plan, we understand development plans call for the construction of a new police station, occupying a footprint of about 9,000 square feet. We understand the building will be two-stories, including a full, walk-out, basement. We anticipate the building will be wood- or steel-framed with basement floor slabs and spread footing foundations. Based on the Plan, we understand the basement level is proposed at a Finish Floor Elevation (FFE) of 448.0 feet and the first floor is proposed at a FFE of 462.0 feet. Based on the existing grading shown on the Plan, we anticipate tapered cuts up to about 12 feet will be required to achieve the proposed basement FFE. We understand the eastern portion of the basement area will be walk-out to a lower-level parking area near the basement FFE. Based on the proposed site grades, we understand the building will include a ground level entrance to the first floor along the western side of the building. Details regarding proposed structural loading are unknown at this time.

We understand the eastern portion of the site will include new lower level parking areas, including about 16 parking spots, and stormwater management areas. Additionally, we understand a new retaining wall is proposed along the southern extents of the lower-level parking area for grade separation between the upper and lower parking areas. We understand the retaining wall is proposed over a linear distance of about 80 feet and up to 13 feet in height. We understand the southern and western portions of the site will include new parking areas, access drives and stormwater management areas.

Existing and proposed site features are shown on the "Exploration Location Plan" attached in Appendix B.

2.0 EXPLORATION AND TESTING

2.1 Explorations

Twenty-one test borings (B-101 through B-121) were made at the site on March 19, 20 and 26, 2024, by Seaboard Drilling, LLC. The exploration locations were selected by Artifex and established in the field by S. W. Cole Engineering, Inc. (S.W.COLE) at accessible locations using GPS methods. The approximate exploration locations are shown on the “Exploration Location Plan” attached in Appendix B. Logs of the explorations and a key to the notes and symbols used on the logs are attached in Appendix C. The elevations shown on the logs were estimated based on topographic information shown on the “Exploration Location Plan.”

2.2 Field Testing

The test borings were drilled using hollow-stem augers techniques. The soils were sampled at 2-to-5-foot intervals using a split-spoon sampler and Standard Penetration Testing (SPT) methods. SPT blow counts are shown on the logs.

2.3 Laboratory Testing

Soil samples obtained from the explorations were returned to our laboratory for further classification and testing. Moisture content test results are noted on the logs in Appendix C. The results of three gradation test results are attached in Appendix D.

3.0 SUBSURFACE CONDITIONS

3.1 Soil and Bedrock

The test borings encountered a subsurface profile generally consisting of surficial topsoil or bituminous pavement overlying uncontrolled fill overlying native granular soils overlying glacial till. Several test borings encountered refusal surfaces (probable boulder, cobbles or bedrock). The principal strata encountered are summarized below. Not all the strata were encountered at each exploration; refer to the attached logs for more detailed subsurface information.

Uncontrolled Fill: Underlying surficial topsoil or pavement, the test borings encountered uncontrolled fill generally consisting of loose to medium dense silty sand with vary portions of gravel, cobbles and organics. Several test borings within the western portion of the site

encountered black layers within the uncontrolled fill. The uncontrolled fill was encountered to depths ranging from about 1.5 to 12 feet, with the deeper depths likely attributed to existing underground utility trenches.

Granular Soils: Underlying the fill, the test borings generally encountered native granular soils consisting of a 2- to 5-foot-thick layer of medium dense gravelly sand with varying portions of silt.

Glacial Till and Refusal Surfaces: Underlying the native granular soils, the test borings encountered glacial till generally consisting of medium dense to dense gravelly silt and sand that transitioned to very dense silty gravelly sand with cobbles below depths of about 15 to 20 feet. Test borings B-107, B-109, B-112, B-113, B-116, B-118, B-120 and B-121 were terminated in glacial till at depths of about 12 feet. Test borings B-106, B-110 and B-115 were terminated on refusal surfaces (probable boulders or cobbles, or bedrock) at depths ranging from about 16.7 to 27.1 feet. The remaining test borings were terminated in glacial till at depths ranging from about 30.4 to 32 feet.

3.2 Groundwater

The soils in test borings B-106 and B-115 were observed wet below depths of about 15 to 16 feet. The soils in test borings B-101, B-102 and B-107 were observed wet from depths of about 5 to 7 feet, which is likely indicative of perched groundwater. Groundwater likely becomes perched on the relatively impervious glacial till encountered at the site. Long term groundwater information is not available. It should be anticipated that groundwater levels will fluctuate, particularly in response to periods of snowmelt and precipitation, as well as changes in site use.

4.0 EVALUATION AND RECOMMENDATIONS

4.1 General Findings

Based on the subsurface findings, the proposed construction appears feasible from a geotechnical standpoint. The principal geotechnical considerations include:

- The site has been previously developed and the proposed building area is underlain by uncontrolled fill extending to depths varying from about 2 to 10 feet and may extend deeper in areas not explored. We recommend uncontrolled fill,

relic foundations and abandoned utilities be completely removed below the proposed building area and retaining walls. The over-excavated area should be backfilled with compacted Structural Fill.

- Following removal of uncontrolled fill, relic foundations and abandoned utilities, and replacement with compacted Structural Fill, spread footing foundations and slab-on-grade floors bearing on properly prepared subgrades appear suitable for the proposed building. Footings should bear on at least 3 inches of compacted Crushed Stone overlying compacted Structural Fill or undisturbed native non-organic soils. Basement floor slabs should be underlain with at least 12-inches of compacted Crushed Stone overlying properly prepared subgrades.
- The site soils are sensitive to moisture and frost. We recommend earthwork, grading and foundation construction activities occur during drier, non-freezing weather of Spring, Summer or Fall.
- Imported Granular Borrow, Structural Fill and Crushed Stone will be needed for construction. The native soils are unsuitable for reuse below the proposed building or as backfill for foundations but may be reused as Common Borrow in paved and landscape areas, provided they are at a compactable moisture content at the time of reuse. Similarly, the non-organic uncontrolled fills may also be suitable for reuse as Common Borrow.

4.2 Site and Subgrade Preparation

We recommend site preparation begin with the construction of an erosion control system to protect adjacent drainage ways and areas outside the construction limits. Surficial organics, roots and topsoil should be completely removed from areas of proposed fill and construction. As much vegetation as possible should remain outside the construction areas to lessen the potential for erosion and site disturbance.

Building Pad and Footings: As discussed, the site was previously filled and uncontrolled fill, relic foundations and abandoned utilities exist at the site. Uncontrolled fill, relic foundations and abandoned utilities must be completely removed from beneath the proposed building footprint. The extent of removal should extend 1 foot laterally outward from the outside edge of perimeter footings for every 1-foot of excavation depth (1H:1V bearing splay). The over-excavated area should be backfilled with compacted Structural

Fill. Similarly, we recommend uncontrolled fills, relic foundations and relic utilities be removed beneath the 1H:1V bearing splay of site retaining walls and backfilled with compacted Granular Borrow.

We recommend that excavation to subgrade be completed with a smooth-edged bucket to lessen disturbance of subgrade soils. We recommend that footings be underlain by at least 3 inches of compacted Crushed Stone overlying compacted Structural Fill or undisturbed native non-organic soils. We recommend basement floor slabs be underlain by at least 12 inches of compacted Crushed Stone overlying compacted Structural Fill or undisturbed native non-organic soils.

Paved Areas: Uncontrolled fills encountered beneath proposed paved areas should be proof-rolled and densified with at least 3 passes of a 10-ton vibratory roller compactor. Areas that become soft or continue to yield after densification should be removed and replaced with compacted Granular Borrow. Organics encountered at subgrade elevation should be completely removed and replaced with compacted Common Borrow or Granular Borrow.

4.3 Excavation and Dewatering

Excavations will generally encounter surficial topsoil and pavement, uncontrolled fills, relic foundations, abandoned utilities, native granular soils and glacial till. Care must be exercised during construction to limit disturbance of the bearing soils. Earthwork and grading activities should ideally occur during drier, non-freezing weather of Spring, Summer and Fall. Rubber tired construction equipment should not operate directly on the native soils, when wet. Final cuts to soil subgrades should be performed with a smooth-edged bucket to help reduce strength loss from soil disturbance. Based on the observed black soil layers within the uncontrolled fills, the fills may need to be further evaluated by an environmental consultant to address proper handling.

Sumping and pumping dewatering techniques should be adequate to control groundwater in excavations. Controlling the water levels to at least one foot below planned excavation depths will help stabilize subgrades during construction. Excavations must be properly shored or sloped in accordance with OSHA Regulations to prevent sloughing and caving of the sidewalls during construction. Care must be taken to preclude undermining

adjacent utilities and roadways. The design and planning of excavations, excavation support systems, and dewatering is the responsibility of the contractor.

4.4 Foundations

Based on the subsurface findings and our understanding of the proposed construction, spread footing foundations bearing on properly prepared subgrades appear suitable for the proposed building. For foundations bearing on properly prepared subgrades, we recommend the following geotechnical parameters for design consideration:

Geotechnical Parameters for Spread Footings and Foundation Walls	
Design Frost Depth (100-year AFI)	6.5 feet
Net Allowable Soil/Bedrock Bearing Pressure	3.0 ksf
Base Friction Factor	0.35
Total Unit Weight of Backfill	125 pcf
At-Rest Lateral Earth Pressure Coefficient (restrained)	0.5
At-Rest Equivalent Fluid Earth Pressure (restrained)	62.5 psf/ft
Internal Friction Angle of Backfill	30°
Seismic Soil Site Class	C (IBC 2015)
Total Settlement	1-inch
Differential Settlement	½-inch over 40 feet

4.5 Foundation Drainage

We recommend an underdrain system be installed on the outside edge of perimeter footings. The underdrain pipe should consist of 4-inch diameter, perforated SDR-35 foundation drainpipe bedded in Crushed Stone and wrapped in non-woven geotextile fabric, Mirafi 160N or equal. The underdrain pipe must have a positive gravity outlet protected from freezing, clogging and backflow. Surface grades should be sloped away from the building for positive surface water drainage. Basement walls should be covered with moisture proofing and rigid insulation. General underdrain details are illustrated on the “Foundation Detail Sketch” attached in Appendix B.

4.6 Slab-On-Grade

We recommend on-grade basement floor slabs in heated areas be underlain with at least 12-inches of compacted Crushed Stone placed over properly prepared subgrades. On-grade basement floor slabs may be designed considering the structural properties of rigid insulation or a subgrade reaction modulus of 100 pci (pounds per cubic inch), whichever is less stiff. The structural engineer or concrete consultant must design steel

reinforcing and joint spacing appropriate to slab thickness and function, as well as prevention of slab cracking and curling.

We recommend a sub-slab vapor retarder particularly in areas of the building where the concrete slab will be covered with an impermeable surface treatment or floor covering that may be sensitive to moisture vapors. The vapor retarder must have a permeance that is less than the floor cover or surface treatment that is applied to the slab. The vapor retarder must have sufficient durability to withstand direct contact with the sub-slab base material and construction activity. The vapor retarder material should be placed according to the manufacturer's recommended method, including the taping and lapping of all joints and wall connections. The architect and/or flooring consultant should select the vapor retarder products compatible with flooring and adhesive materials.

The floor slab should be appropriately cured using moisture retention methods after casting. Typical floor slab curing methods should be used for at least 7 days. The architect or flooring consultant should assign curing methods consistent with current applicable American Concrete Institute (ACI) procedures with consideration of curing method compatibility to proposed surface treatments, flooring and adhesive materials.

4.7 Entrance Slabs and Sidewalks

Entrance slabs and sidewalks adjacent to the building must be designed to reduce the effects of differential frost action between adjacent pavement, doorways, and entrances. We recommend that non-frost susceptible Structural Fill be provided to a depth of at least 6.5 feet below the top of entrance slabs. This thickness of Structural Fill should extend the full width of the entrance slab and outward at least 6.5 feet, thereafter, transitioning up to the bottom of the adjacent sidewalk or pavement gravels at a 3H:1V or flatter slope. General details of this frost transition zone are shown on the "Foundation Detail Sketch" attached in Appendix B.

4.8 Fill, Backfill and Compaction

We recommend the following fill and backfill materials: recycled products must also be tested in accordance with applicable environmental regulations and approved by a qualified environmental consultant.

Common Borrow: Fill to raise grades in paved and landscape areas should be non-organic compactable earth meeting the requirements of 2020 MaineDOT Standard Specification 703.18 Common Borrow. Where used beneath paved areas, Common Borrow fills shall be capped with a 12-inch layer of Granular Borrow prior to installing Pavement Subbase materials.

Granular Borrow: Fill to raise grades in paved areas, including over-excavated areas, as well as to repair soft areas, should be sand or silty sand meeting the requirements of 2020 MaineDOT Standard Specification 703.19 Granular Borrow.

Structural Fill: Fill to raise grades in building areas, including over-excavated areas, backfill for foundations, and material below exterior entrances slabs and sidewalks should be clean, non-frost susceptible sand and gravel meeting the gradation requirements for Structural Fill as given below:

Structural Fill	
Sieve Size	Percent Finer by Weight
4 inch	100
3 inch	90 to 100
¾ inch	25 to 90
No. 40	0 to 30
No. 200	0 to 6

Crushed Stone: Crushed Stone, used below footings and basement slabs, and for underdrain aggregate should be washed ¾-inch crushed stone meeting the requirements of 2020 MaineDOT Standard Specification 703.13 Crushed Stone ¾-Inch.

Reuse of Site Soils: The non-organic on-site soils are unsuitable for reuse in building areas but may be suitable for reuse as Common Borrow in paved and landscape areas, provided they are at a compactable moisture content at the time of reuse.

Placement and Compaction: Fill should be placed in horizontal lifts and compacted such that the desired density is achieved throughout the lift thickness with 3 to 5 passes of the compaction equipment. Loose lift thicknesses for grading, fill and backfill activities should not exceed 12 inches. We recommend that fill and backfill in building and paved areas be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557. We recommend basement wall backfill be compacted

from 92 to 95 percent of its maximum dry density, as determined by ASTM D-1557, in order to reduce lateral stresses on the structure walls. Crushed Stone should be compacted with 3 to 5 passes of a vibratory plate compactor having a static weight of at least 500 pounds.

4.9 Weather Considerations

Construction activity should be limited during wet and freezing weather and the site soils may require drying or thawing before construction activities may continue. The contractor should anticipate the need for water to temper fills in order to facilitate compaction during dry weather. If construction takes place during cold weather, subgrades, foundations and floor slabs must be protected during freezing conditions. Concrete and fill must not be placed on frozen soil; and once placed, the concrete and soil beneath the structure must be protected from freezing.

4.10 Design Review and Construction Testing

S.W.COLE should be retained to review the construction documents prior to bidding to determine that our earthwork and foundation recommendations have been properly interpreted and implemented.

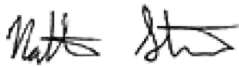
A construction material testing, and quality assurance program should be implemented during construction to observe compliance with the design concepts, plans, and specifications. S.W.COLE is available to observe earthwork activities, including the preparation of foundation bearing surfaces and pavement subgrades, as well as to provide testing and IBC Special Inspection services for soils, concrete, steel, spray-applied fireproofing, structural masonry, and asphalt construction materials.

5.0 CLOSURE

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the construction phase of the project.

Sincerely,

S. W. Cole Engineering, Inc.



Nathan D. Strout, P.E.
Senior Geotechnical Engineer

NDS:tjb



APPENDIX A

Limitations

This report has been prepared for the exclusive use of the City of Caribou, Maine for specific application to the proposed Police Station on Fort Street in Caribou, Maine. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

APPENDIX B

Figures

Fort Street

U.S. Route One

EXISTING PERIMETER FENCE

EDGE OF GRAVEL (OLD ROAD 2011)

FLAG POLES

AREA RESERVED FOR STORMWATER TREATMENT

EDGE OF PAVEMENT (2011)

PUBLIC PARKING

POLICE STATION
BASEMENT=448.0'
FIRST FLOOR=462.0'

LOWER LEVEL ACCESS

RETAINING WALL

STORMWATER TREATMENT

3

2" ROUND
elev=457.69

2" SQUARE
elev=460.05

2" ROUND

EXISTING EDGE.
CONCRETE PAD

METAL TRAP DOOR

elev=453.36

elev=453.15

12" CMP
elev=438.11

elev=437.44

LEGEND:

APPROXIMATE BORING LOCATION

NOTES:

- EXPLORATION LOCATION PLAN WAS PREPARED FROM A 1"=40' SCALE PLAN OF THE SITE TITLED "BORING LAYOUT WITH EXISTING UTILITY UNDERLAY," PREPARED BY ARTIFEX ARCHITECTS-ENGINEERS (ARTIFEX), DATED 12/18/2023.
- THE LOCATIONS OF BORINGS B-101 THROUGH B-121 WERE SELECTED BY ARTIFEX AND PROVIDED ON THE ABOVE REFERENCED PLAN AND SUBSEQUENTLY ESTABLISHED IN THE FIELD BY S. W. COLE ENGINEERING, INC. USING A MAPPING GRADE GNSS RECEIVER.
- THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
- THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.

0 20 40 Feet

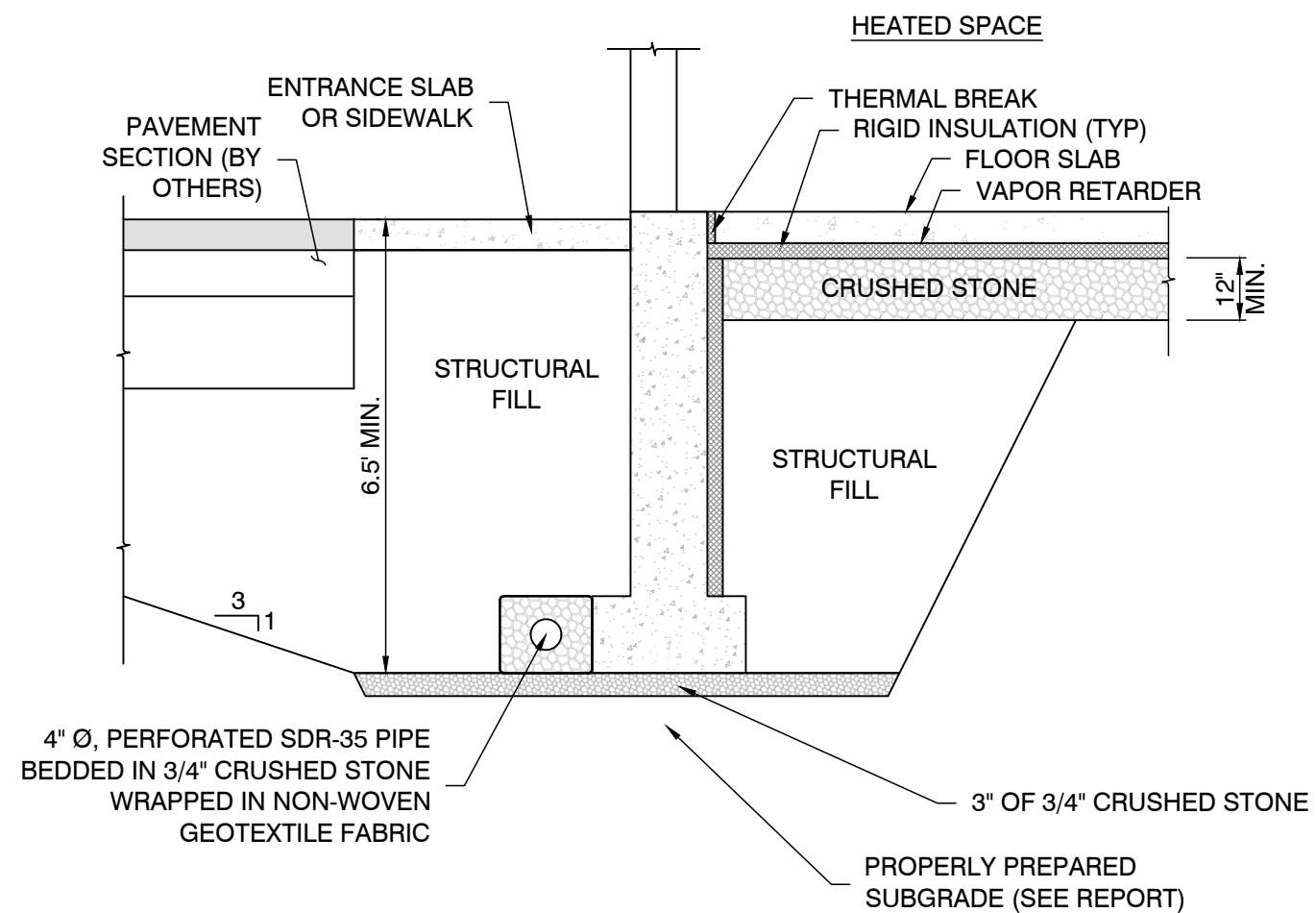
S.W.COLE
ENGINEERING, INC.

CITY OF CARIBOU, MAINE
EXPLORATION LOCATION PLAN
PROPOSED POLICE STATION
FORT STREET
CARIBOU, MAINE

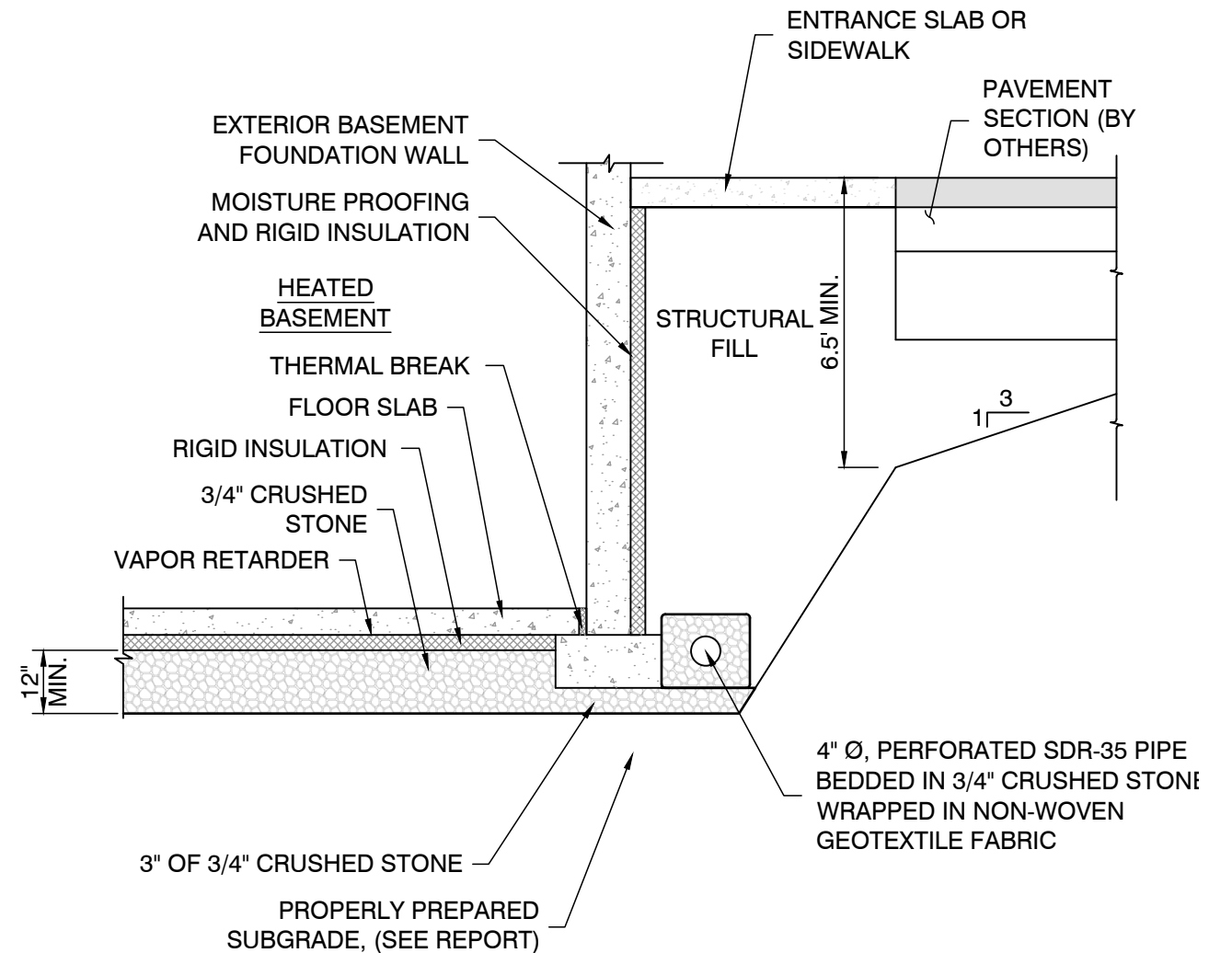
Job No.: 23-2455 Scale: 1" = 20'
Date: 04/10/2024 Sheet: 1

LP gas tanks

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DAYLIGHT BASEMENT PORTION



BASEMENT AREA PORTION

NOTE:

1. UNDERDRAIN INSTALLATION AND MATERIAL GRADATION RECOMMENDATIONS ARE CONTAINED WITHIN THIS REPORT.
2. DETAIL IS PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY, NOT FOR CONSTRUCTION.



S.W. COLE
ENGINEERING, INC.

CITY OF CARIBOU, MAINE

FOUNDATION DETAIL SKETCH

PROPOSED POLICE STATION
FORT STREET
CARIBOU, MAINE

Job No.: 23-2455
Date : 04/10/2024

Scale: Not to Scale
Sheet: 2

APPENDIX C

Exploration Logs and Key

BORING NO.: B-102



BORING LOG

BORING NO.: B-103**SHEET:** 1 of 1**PROJECT NO.:** 23-2455**DATE START:** 3/19/2024**DATE FINISH:** 3/19/2024**CLIENT:** City of Caribou, Maine**PROJECT:** Proposed Police Station**LOCATION:** Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan **ELEVATION (FT):** 456' +/- **TOTAL DEPTH (FT):** 32.0 **LOGGED BY:** Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC **DRILLER:** Ryan Hackett **DRILLING METHOD:** Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 **AUGER ID/OD:** 2 1/4 in / 5 5/8 in **SAMPLER:** Standard Split-Spoon
HAMMER TYPE: Automatic **HAMMER WEIGHT (lbs):** 140 **CASING ID/OD:** N/A / N/A **CORE BARREL:** N/A
HAMMER CORRECTION FACTOR: 1.47 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling
▼ At Completion of Drilling
▽ After Drilling
D = Split Spoon Sample
U = Thin Walled Tube Sample
R = Rock Core Sample
V = Field Vane Shear
Pen. = Penetration Length
Rec. = Recovery Length
bpf = Blows per Foot
mpf = Minute per Foot
WOR = Weight of Rods
WOH = Weight of Hammer
RQD = Rock Quality Designation
PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.
q_u = Unconfined Compressive Strength, kips/sq.ft.
Ø = Friction Angle (Estimated)
N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data			
455			1D		0-2	24/18	3-7-8-7		0.6 Topsoil		
			2D		2-4	24/17	8-6-5-3		Medium dense, brown gravelly silty SAND with occasional cobbles (Fill)		
5			3D		5-7	24/8	2-2-3-4		5.0 Loose, brown silty gravelly SAND (Fill)		
450			4D		7-9	24/7	3-3-3-3				
10			5D		10-12	24/22	5-7-12-16	ID 30115B w = 12.1 %	10.0 Medium dense, brown gravelly sandy SILT (Glacial Till)		
445			6D		15-17	24/24	12-13-13-24				
15			7D		20-22	24/20	21-30-24-26		20.0 Very dense, brown silty gravelly SAND with occasional cobbles (Glacial Till)		
440			8D		25-27	24/22	23-37-35-43				
20			9D		30-32	24/20	34-60-54-44				
435											
25											
430											
30											
425											

Bottom of Exploration at 32.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: B-103

BORING / WELL 10-12-2022 23-2455.GPJ SWCE TEMPLATE.GDT 4/5/24



BORING LOG

BORING NO.: **B-104**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 451' +/- TOTAL DEPTH (FT): 31.5 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
450			1D	×	0-2	24/18	4-5-7-9		0.5 Topsoil		
			2D	×	2-4	24/17	9-10-9-8		1.5 Medium dense, brown gravelly silty SAND (Fill)		
	5		3D	×	5-7	24/15	8-8-9-8	ID 30116B w = 7.2 %			
445			4D	×	7-9	24/24	8-5-9-14		7.5 Medium dense to dense, brown gravelly SILT and SAND (Glacial Till)		
	10		5D	×	10-12	24/24	10-16-22-23				
440											
	15		6D	×	15-15.8	9/8	25-50/3"		15.0 Very dense, brown silty gravelly SAND with occasional cobbles (Glacial Till)		
435											
	20		7D	×	20-21	12/12	36-63				
430											
	25		8D	×	25-26.3	15/15	32-42-50/3"				
425											
	30		9D	×	30-31.5	18/18	30-44-68				
420											

Bottom of Exploration at 31.5 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-104**



BORING LOG

BORING NO.: **B-106**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 446' +/- TOTAL DEPTH (FT): 27.1 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): Soils wet below 16 feet +/-

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
At time of Drilling
At Completion of Drilling
After Drilling
D = Split Spoon Sample
U = Thin Walled Tube Sample
R = Rock Core Sample
V = Field Vane Shear
Pen. = Penetration Length
Rec. = Recovery Length
bpf = Blows per Foot
mpf = Minute per Foot
WOR = Weight of Rods
WOH = Weight of Hammer
RQD = Rock Quality Designation
PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.
q_u = Unconfined Compressive Strength, kips/sq.ft.
Ø = Friction Angle (Estimated)
N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
445			1D		0-2	24/19	2-6-7-4		0.5 Topsoil		
			2D		2-4	24/17	6-10-11-11		1.7 Medium dense, brown gravelly SAND and SILT (Fill)		
	5								2.3 Medium dense, red-brown silty SAND		
			3D		5-7	24/17	9-9-9-9		Medium dense, brown gravelly SAND, some silt		
440			4D		7-9	24/20	6-6-6-6		5.0 Medium dense, brown silty gravelly SAND		
									7.0 Medium dense, brown SILT and SAND, some gravel (Glacial Till)		
435	10		5D		10-12	24/22	4-5-10-7				
			6D		15-17	24/17	5-6-5-5				
430	15										
			7D		20-22	24/10	6-8-10-12				
425	20										
			8D		25-25.9	11/3	27-50/5"		25.0 Very dense, brown silty gravelly SAND with occasional cobbles (Glacial Till)		
420	25										

Auger Refusal at 27.1 feet
(Probable Bedrock)

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-106**



BORING LOG

BORING NO.: **B-109**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 448' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▼ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
445 440	5 10		1D	×	0-2	24/17	3-3-3-6		0.5	Topsoil	
			2D	×	2-4	24/16	12-8-8-10			Loose to medium dense, brown SAND and SILT, some gravel, trace organics (Fill)	
			3D	×	5-7	24/18	8-9-10-12		5.0	Medium dense, brown silty gravelly SAND	
			4D	×	7-9	24/22	8-7-7-8		6.5	Medium dense, brown gravelly SILT and SAND (Glacial Till)	
			5D	×	10-12	24/24	7-8-11-13				

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-109**



BORING LOG

BORING NO.: **B-110**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 451' +/- TOTAL DEPTH (FT): 17.3 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data			
450			1D		0-2	24/15	3-4-7-7		0.6 Topsoil		
			2D		2-4	24/17	8-9-8-7		2.0 Medium dense, brown gravelly silty SAND (Fill)		
	5		3D		5-7	24/22	8-8-12-11				
445			4D		7-9	24/24	10-9-9-13		6.0 Medium dense, brown gravelly SILT and SAND (Glacial Till)		
	10		5D		10-12	24/24	12-46-21-20		... becoming dense, with occasional cobbles		
440											
	15		6D		15-17	24/22	8-12-31-53				
435									16.0 Dense, brown silty gravelly SAND with occasional cobbles (Glacial Till)		

Auger Refusal at 17.3 feet
(Probable Boulder or Cobbles)

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-110**



BORING LOG

BORING NO.: **B-111**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/26/2024
DATE FINISH: 3/26/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 451' +/- TOTAL DEPTH (FT): 30.4 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
450			1D	×	0-2	24/19	3-7-7-8	0.4	Topsoil		
			2D	×	2-4	24/22	8-8-10-10	1.7	Medium dense, brown gravelly SAND and SILT (Fill)		
	5		3D	×	5-7	24/21	9-8-7-9		Medium dense, brown silty gravelly SAND		
445			4D	×	7-9	24/20	17-15-12-13	6.0	Medium dense to dense, brown gravelly SILT and SAND (Glacial Till)		
440	10		5D	×	10-12	24/7	12-16-24-18				
435	15		6D	×	15-17	24/20	15-31-23-37	15.0	Very dense, brown silty gravelly SAND with occasional cobbles (Glacial Till)		
430	20		7D	×	20-20.9	11/8	34-50/5"				
425	25		8D	×	25-26.1	13/13	35-38-50/1"				
	30		9D	×	30-30.4	5/5	50/5"				

Bottom of Exploration at 30.4 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-111**



BORING LOG

BORING NO.: **B-112**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 450' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
445	5		1D		0-2	24/19	6-10-9-8		0.5 Topsoil		
			2D		2-4	24/21	6-5-5-6		Medium dense, brown gravelly SAND and SILT (Fill) ... with trace organics		
									3.5 Medium dense, red-brown silty SAND		
			3D		5-7	24/22	13-16-17-16		4.5 Dense, brown silty gravelly SAND		
			4D		7-9	24/23	13-8-9-11				
440	10		5D		10-12	24/24	7-8-10-10		7.5 Medium dense, brown SILT and SAND, some gravel (Glacial Till)		

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-112**



BORING LOG

BORING NO.: **B-113**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/26/2024
DATE FINISH: 3/26/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 454' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD	Field / Lab Test Data			
450 445	5 10		1D	×	0-2	24/17	10-10- 8-7		Medium dense, brown silty gravelly SAND (Fill)		
			2D	×	2-4	24/20	3-6-9- 10		1.8 Loose, red-brown silty SAND, some gravel		
			3D	×	5-7	24/21	15-12- 9-7		2.5 Medium dense, brown gravelly SAND, some silt		
			4D	×	7-9	24/19	8-14- 16-19		6.5 Dense, brown gravelly SILT and SAND (Glacial Till)		
			5D	×	10-12	24/24	9-12- 19-20				

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-113**



BORING LOG

BORING NO.: **B-116**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 460' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES: Water Level
AND SYMBOLS: At time of Drilling
 At Completion of Drilling
 After Drilling
D = Split Spoon Sample
U = Thin Walled Tube Sample
R = Rock Core Sample
V = Field Vane Shear
Pen. = Penetration Length
Rec. = Recovery Length
bpf = Blows per Foot
mpf = Minute per Foot
WOR = Weight of Rods
WOH = Weight of Hammer
RQD = Rock Quality Designation
PID = Photoionization Detector
S_v = Field Vane Shear Strength, kips/sq.ft.
q_u = Unconfined Compressive Strength, kips/sq.ft.
Ø = Friction Angle (Estimated)
N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
455	5		1D		0.2-2.2	24/18	8-11- 13-11		0.1 Bituminous Pavement (1")		
			2D		2.2-4.2	24/19	10-9-6- 3		Medium dense, brown silty gravelly SAND with occasional cobbles (Fill)		
			3D		5-7	24/17	10-10- 12-12		3.5 Loose, brown SILT and SAND, some gravel (Fill)		
			4D		7-9	24/16	12-12- 12-13		5.0 Medium dense, brown gravelly SAND, some silt		
			5D		10-12	24/24	8-8-17- 19		10.0 Medium dense, brown gravelly SILT and SAND (Glacial Till)		

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-116**



BORING LOG

BORING NO.: **B-120**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024

CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 455' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
450	5		1D		0-2	24/16	5-7-10-10		0.5	Topsoil	
			2D		2-4	24/18	7-8-6-10			Medium dense, brown gravelly SAND and SILT (Fill)	
			3D		5-7	24/15	19-14-14-12			... with trace organics	
			4D		7-9	24/18	10-8-8-10			Medium dense, brown silty gravelly SAND	
			5D		10-12	24/20	4-6-6-10			Medium dense, brown gravelly SILT and SAND (Glacial Till)	
445	10								10.0		

Bottom of Exploration at 12.0 feet

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-120**



BORING LOG

BORING NO.: **B-121**
SHEET: 1 of 1
PROJECT NO. 23-2455
DATE START: 3/20/2024
DATE FINISH: 3/20/2024







CLIENT: City of Caribou, Maine
PROJECT: Proposed Police Station
LOCATION: Fort Street, Caribou, Maine

Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 459' +/- TOTAL DEPTH (FT): 12.0 LOGGED BY: Nate Strout
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Ryan Hackett DRILLING METHOD: Hollow Stem Auger
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A
HAMMER CORRECTION FACTOR: 1.47 HAMMER DROP (inch): 30
WATER LEVEL DEPTHS (ft): No free water observed

GENERAL NOTES:

KEY TO NOTES: Water Level
AND SYMBOLS: At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods S_v = Field Vane Shear Strength, kips/sq.ft.
 At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer q_u = Unconfined Compressive Strength, kips/sq.ft.
 After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation Ø = Friction Angle (Estimated)
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H ₂ O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
455 450	5 10		1D		0-2	24/16	7-6-7-7		0.3 Topsoil		
			2D		2-4	24/20	10-7-5-5		Medium dense, brown silty gravelly SAND with occasional cobbles (Fill)		
			3D		5-7	24/19	9-12-13-13		3.0 Medium dense, brown SILT and SAND, some gravel (Fill)		
			4D		7-9	24/17	10-11-12-12		5.0 Medium dense, brown silty gravelly SAND		
			5D		10-12	24/24	8-9-8-7		7.0 Medium dense, brown gravelly SAND, some silt		
									11.3 Medium dense, brown gravelly SILT and SAND (Glacial Till)		
Bottom of Exploration at 12.0 feet											

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: **B-121**

KEY TO THE NOTES & SYMBOLS

Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

w	-	water content, percent (dry weight basis)
q _u	-	unconfined compressive strength, kips/sq. ft. - laboratory test
S _v	-	field vane shear strength, kips/sq. ft.
L _v	-	lab vane shear strength, kips/sq. ft.
q _p	-	unconfined compressive strength, kips/sq. ft. – pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W _L	-	liquid limit - Atterberg test
W _P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass.
γ _T	-	total soil weight
γ _B	-	buoyant soil weight

Description of Proportions:

Trace:	0 to 5%
Some:	5 to 12%
"Y"	12 to 35%
And	35+%
With	Undifferentiated

Description of Stratified Soils

Parting:	0 to 1/16" thickness
Seam:	1/16" to 1/2" thickness
Layer:	½" to 12" thickness
Varved:	Alternating seams or layers
Occasional:	one or less per foot of thickness
Frequent:	more than one per foot of thickness

REFUSAL: Test Boring Explorations - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: Test Pit Explorations - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

APPENDIX D

Laboratory Test Results



Report of Gradation

ASTM C-117 & C-136

Project Name CARIBOU ME - PROPOSED POLICE STATION - EXPLORATIONS
AND GEOTECHNICAL ENGINEERING SERVICES
Client CITY OF CARIBOU, MAINE
Exploration 7D
Material Source B-101, 15-17 FEET

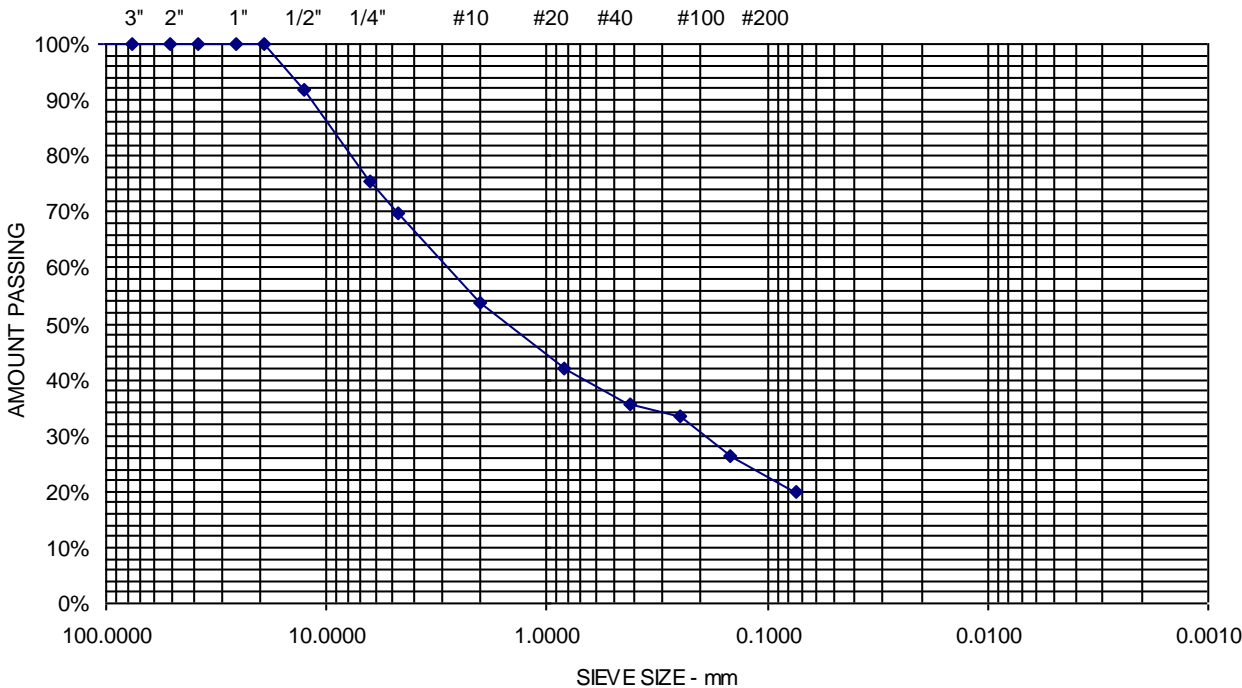
Project Number 23-2455
Lab ID 30114B
Date Received 3/28/2024
Date Completed 3/28/2024
Tested By MICHAEL WHITE

<u>STANDARD</u> <u>DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>
150	6"	100
125	5"	100
100	4"	100
75	3"	100
50	2"	100
38.1	1-1/2"	100
25.0	1"	100
19.0	3/4"	100
12.5	1/2"	92
6.3	1/4"	75
4.75	No. 4	70
2.00	No. 10	54
850	No. 20	42
425	No. 40	36
250	No. 60	34
150	No. 100	26
75	No. 200	20.1

30.3% Gravel

49.6% Sand

20.1% Fines



Comments:



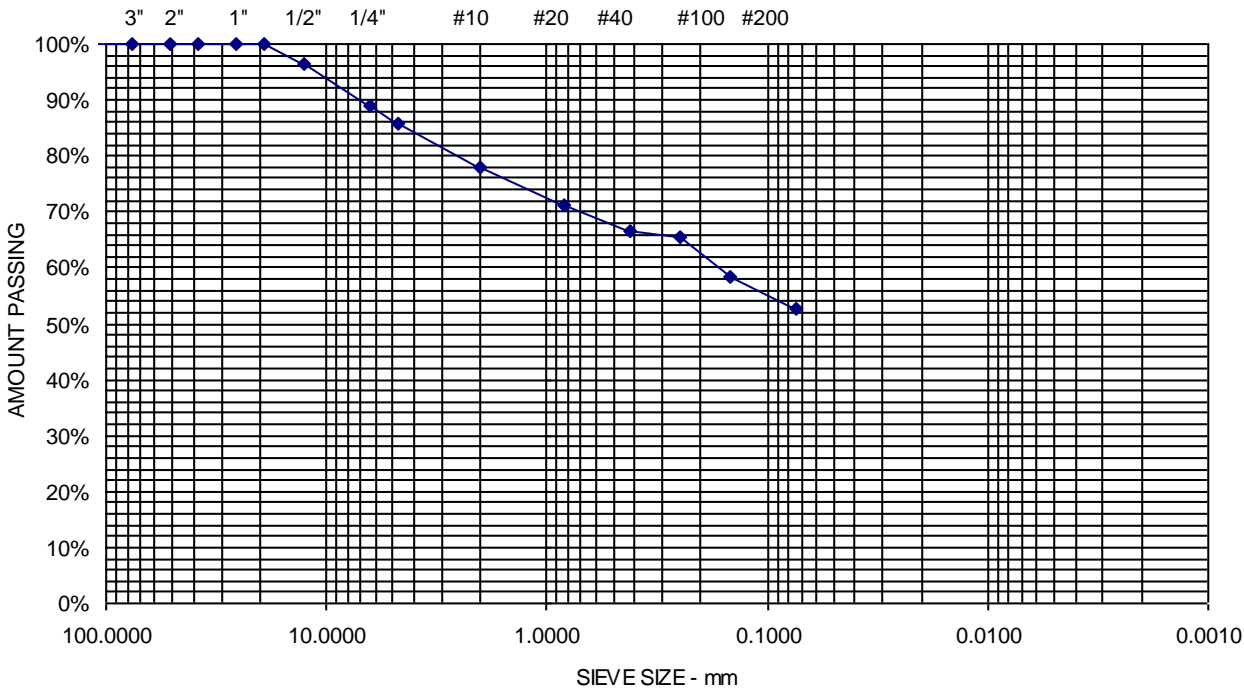
Report of Gradation

ASTM C-117 & C-136

Project Name CARIBOU ME - PROPOSED POLICE STATION - EXPLORATIONS
AND GEOTECHNICAL ENGINEERING SERVICES
Client CITY OF CARIBOU, MAINE
Exploration 5D
Material Source B-103, 10-12 FEET

Project Number 23-2455
Lab ID 30115B
Date Received 3/28/2024
Date Completed 3/28/2024
Tested By MICHAEL WHITE

<u>STANDARD</u> <u>DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
150	6"	100	
125	5"	100	
100	4"	100	
75	3"	100	
50	2"	100	
38.1	1-1/2"	100	
25.0	1"	100	
19.0	3/4"	100	
12.5	1/2"	96	
6.3	1/4"	89	
4.75	No. 4	86	14.2% Gravel
2.00	No. 10	78	
850	No. 20	71	
425	No. 40	67	33.3% Sand
250	No. 60	66	
150	No. 100	58	
75	No. 200	52.5	52.5% Fines



Comments:



Report of Gradation

ASTM C-117 & C-136

Project Name CARIBOU ME - PROPOSED POLICE STATION - EXPLORATIONS
AND GEOTECHNICAL ENGINEERING SERVICES
Client CITY OF CARIBOU, MAINE
Exploration 3D
Material Source B-104, 5-7 FEET

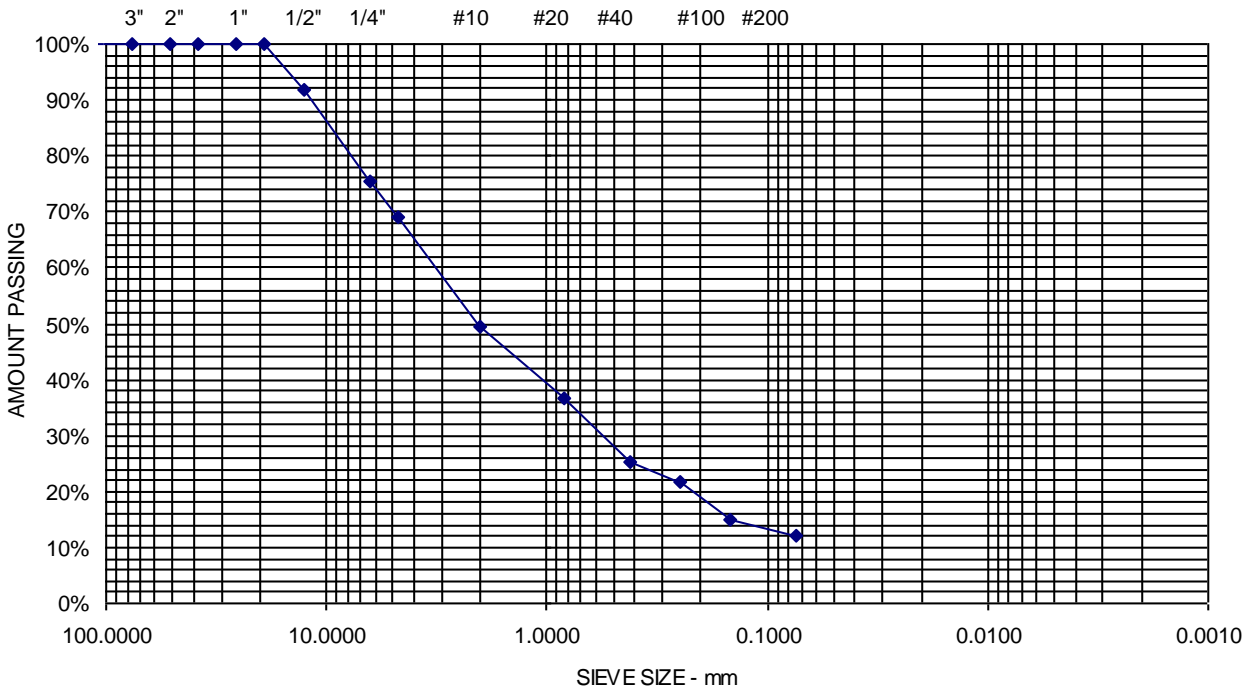
Project Number 23-2455
Lab ID 30116B
Date Received 3/28/2024
Date Completed 3/28/2024
Tested By MICHAEL WHITE

STANDARD DESIGNATION (mm/μm)	SIEVE SIZE	AMOUNT PASSING (%)
150	6"	100
125	5"	100
100	4"	100
75	3"	100
50	2"	100
38.1	1-1/2"	100
25.0	1"	100
19.0	3/4"	100
12.5	1/2"	92
6.3	1/4"	75
4.75	No. 4	69
2.00	No. 10	49
850	No. 20	37
425	No. 40	25
250	No. 60	22
150	No. 100	15
75	No. 200	11.9

31% Gravel

57.1% Sand

11.9% Fines



Comments: