GEOTECHNICAL SUMMARY REPORT FOR:
PROPOSED POLICE STATION
JUDD AVENUE
BETHEL, CONNECTICUT

TO:
HAWLEY CONSTRUCTION
30 GERMANTOWN ROAD
DANBURY, CT 06810

JTC PROJECT NO: 14-15-036

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Geotechnical Summary Report

GEOTECHNICAL SUMMARY REPORT

Prepared by:

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TO: Hawley Construction
30 Germantown Road
Danbury, CT 06810

FROM: Judson Zachar, P.E., Staff Engineer; Kevin Martin, P.E., Geotechnical Engineer

DATE: June 16, 2014

RE: **GEOTECHNICAL SUMMARY REPORT**
PROPOSED POLICE STATION
JUDD AVENUE
BETHEL, CONNECTICUT
Project No. 14-15-036

This memorandum serves as a geotechnical report for the referenced project. The contents of this report are subject to the attached ***Limitations***.

SITE & PROJECT DESCRIPTION

The site includes open, wooded and overgrown property. JTC has limited knowledge of past use, development and/construction on the property. Some small, abandoned foundations are shown on the *Site Plan*. Based on the *Site Plan*, grades across the site vary from elevation ≈460-475 ft possessing a gradual downward slope to the east.

The project includes a new Police Station with associated pavement areas. The station is to include a two-story structure to be cut into the shallow slope. It is intended to support the building on a partial basement foundation using a conventional spread footing foundation with a concrete floor slab. The upper floor and lower floor elevation are shown to be 476.67 ft & 464.00 ft respectively. As such, the building pad will require some deep cuts about ≈2-8 ft to accommodate the foundation construction. The surrounding pavement and landscape areas will require both cuts and fills to achieve final grade.

The purpose of this study is to review the subgrade conditions and provide a geotechnical evaluation related to foundation design and construction as required by the *State Building Code*. This report does not include an environmental assessment relative to oil, gasoline, solid waste and/or other hazardous materials. The environmental conditions of the property should be addressed by others as necessary. This study also does not include review of infiltration systems, detention ponds, retaining walls, underground utilities, excavation support systems, protection of surrounding buildings/utilities or other site design unless specifically addressed herein.

SUBSURFACE EXPLORATIONS & LABORATORY TESTING

Test Borings

The subgrade conditions were reviewed with the completion of ten (10) test borings and one (1) auger probe completed throughout the property. The test borings (B1 to B10) were advanced to depths of about ≈20-30 ft utilizing 2¼ inch hollow stem auger. Soil samples were typically retrieved at no greater than 5 ft intervals with a 2-inch diameter split-spoon sampler. Standard Penetration Tests (SPTs) were performed at the sampling intervals in general accordance with ASTM-D1586 (*Standard Method for Penetration Test and Split-Barrel Sampling of Soils*). Field descriptions and penetration resistance of the soils encountered, observed depth to groundwater and other pertinent data are contained on the attached *Test Boring Logs*. The auger probe (AP1) was drilled to 20 ft (w/o sampling) to review potential ledge. The test borings were surveyed by others with ground elevation as shown on the *Test Boring Location Plan*.

Laboratory Testing

Fourteen (14) selected split-spoon samples obtained from the test borings were submitted to our laboratory for sieve analyses and in-situ moisture per ASTM Standards. The purpose of the testing was to assess engineering characteristics for design and to assess the suitability of the site soils for re-use as structural fill on the project. The test results are attached for review.

SUBGRADE CONDITIONS

The subgrade conditions below shallow Fill generally include glacial soils of varying density and composition.

The majority of the site is blanketed with a Topsoil about ≈5-6 inches in thickness.

Shallow Fill was encountered to depths of ≈1-5 ft. The Fill appears granular in composition. There were no areas of deep, unsuitable and/or expansive Fill.

The parent site soils vary in composition and density. The site soils generally include silty Sand and/or sandy Silt with variable gravel. Gradation tests indicate the percentage of fines (Silt) to vary from ≈12-51% with most samples having ≈26-45% fines. This suggests the majority of the soils to be silty Sand and/or sandy Silt. The fine-grained composition of these soils renders them moisture sensitive, poor-draining and frost susceptible. These soils were generally loose in the

upper ≈5-10 ft becoming dense to very dense with depth. The deeper soils are reflective of a consolidated Glacial Till.

Bedrock was not encountered to 20-30 ft and should therefore not impact the project.

Groundwater was encountered in the test bores at depths of ≈20-26 ft below grade. Test bore B2 was left open for ≈24 hours with stabilized groundwater about ≈25 ft below grade. It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, utilities and other factors differing from the time of the measurements. This study was completed at a time of seasonally high to normal groundwater.

FOUNDATION SUBGRADE RECOMMENDATIONS

The subgrade conditions are favorable for supporting the proposed building on a conventional spread footing foundation. The existing Topsoil and Fill, however, are **not** suitable for structural support. As such, these soils as well as intersecting utilities, abandoned foundations and other questionable matter should be fully removed from the building pad including the *Footing Zone of Influence (FZOI)* to expose the parent subgrade. The *FZOI* is defined as that area extending laterally outward and downward at a 1H:1V splay from the edge of foundation (up to ≈4 ft laterally beyond the edge of foundation). The site should initially be stripped and grubbed of the surface organic laden soils. It is expected that most of the fill will be penetrated during the basement level excavation. Structural Fill necessary to achieve foundation grade should conform to the *Specifications* (Table 1).

The parent subgrade soils should be exposed in the foundation areas prior to casting the footings or placing structural fill. It is recommended that the parent soils be proof-rolled with vibratory densification and exhibit stable and compact conditions. The purpose of the proof-rolling is to densify the site soils and identify potential loose or unstable areas which should be removed as necessary. Proof-rolling is also necessary to densify some of the loose soils identified at shallow depth. Recommended proof-rolling should involve at least 4-5 passes with a vibratory compactor (minimum 950 pound static weight) operating at peak energy. During the proof rolling process, the subgrade should be observed by an Engineer to identify areas exhibiting weaving or instability. It will be necessary to remove weakened or unstable soils and replace with a Structural Fill. Proof-rolling should not be used when the subgrade is wet (ie: groundwater, storm water, perched water, etc) as this may result in soil pumping and instability. The contractor should exercise extra precaution to minimize subgrade disturbance in wet areas. The groundwater table should be continuously maintained at least one foot below construction grade until the backfilling is complete. A base of ¾-inch minus crushed stone (encased in a geotextile filter fabric such as Mirafi 140N or equal) should be placed atop the earthen subgrade if wet conditions are present. Final excavations shall be completed with smooth bladed equipment to mitigate disturbance. The stone should be *immediately* placed atop the undisturbed subgrade then tamped with a plate compactor exhibiting stable conditions. The purpose of the stone base is to protect the wet subgrade, facilitate necessary dewatering and provide a dry/stable base upon which to progress foundation construction. Proper groundwater control and storm water management are also necessary to maintain site stability. Groundwater is typically more

problematic if construction occurs during the wetter winter or spring season. The depressed groundwater is not expected to impact construction. The drier summer months are more favorable for groundwater control.

The subgrade should ultimately be stable, dewatered, compact and protected from frost throughout construction. Bearing subgrades that become weakened or disturbed due to wet conditions or other cause will be rendered unsuitable for structural support. The Contractor shall ultimately be responsible for the means and methods of temporary groundwater control, subgrade protection and site stability during construction. An Engineer from JTC should be scheduled to review the foundation subgrade conditions and preparation during construction.

FOUNDATION DESIGN RECOMMENDATIONS

The footings are expected to gain bearing support atop the parent glacial soils and/or compacted structural fill. Footings may be designed using an allowable bearing capacity of 4 ksf (FS=3). The allowable bearing capacity may be increased a third (⅓) when considering transient loads such as wind or seismic. The bearing capacity is contingent upon the perimeter strip footings and isolated column footings being no less than 2 ft and 3 ft in width respectively. For footings less than 3 ft in lateral dimension, the allowable bearing capacity should be reduced to one-third and multiplied by the least lateral footing dimension in feet. Foundation settlement should be less than 1 inch with differential settlement less than ½ inch. The settlement should be elastic and occur during construction. Exterior footings shall be provided with at least 3½ ft of frost protection. Proper frost protection should be necessary during winter construction. The site soils are considered frost susceptible and proper protection is necessary during construction.

Recommendations for the lateral earth pressure against the unbalanced walls and drainage control are outlined on Table 2. Proper drainage behind the unbalanced foundation walls will also be necessary as summarized on Table 2.

The subsurface conditions were reviewed with respect to seismic criteria set forth in the *International Building Code (2012)*. Based on the relative density of the site soils, the site is not susceptible to liquefaction (complete loss of shear resistance) in the event of an earthquake. Based on interpretation of the *Building Code* together with the project and site conditions, the *Site Classification* is "D" (Stable Soil Profile).

It is recommended that a minimum 8-inch base of *Clean Granular Fill* (Table 1) be placed below the concrete floor slab for moisture and frost control. The gravel base shall be increased to no less than 12 inches for exterior concrete slabs exposed to frost (≈24 inches at ramps and entrances). A subgrade modulus of 175 pci may be used for design of the floor slab. The subgrade modulus may be increased 25 pci for every 2 inch increase in additional gravel base thickness (225 pci @ 12 inch gravel base) as necessary. A vapor retarder should be used below the floor slab dependent upon the floor treatment. A vapor barrier should be specified by others per ACI Standards. A vapor retarder appears necessary given the public building, embedded basement level and moisture retentive soils. A typical vapor retarder includes 10-mil polyethylene or StegoWrap™ with joints lapped 10 inches.

Structural fill necessary within and below the foundation should also conform to the attached *Specifications* (Table 1). The site soils are **not** suitable for re-use as Structural Fill. These fine-grained soils may be used for Common Fill outside the building.

FOUNDATION DRAINAGE

Due to the proposed basement level, a foundation drainage system will be required to permanently control the high groundwater as required by Code. The purpose of the drainage system is to prevent uplift (buoyant) and lateral hydrostatic forces against the foundation walls and protect the basement level from groundwater intrusion. Given the depressed groundwater, a perimeter drain should be adequate for the building.

A perimeter foundation drain should be located at least ≈2-4 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the *Footing Zone of Influence* defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. Furthermore, the invert elevation of the drain should be at least 10-12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4 inch diameter, perforated PVC-SDR35 drain pipe encased within 12 inches of ¾-inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. To provide drainage along the basement wall, an 18 inch vertical lift of *Structural Fill* (Table 1) should be placed directly behind the foundation wall to within 18 inches of finish grade. A prefabricated wall drain such as MiraDrain (Mirafi G100N drainage composite) may also be used for this purpose. The ground surface immediately adjacent to the foundation should be sloped away from the building to allow for positive drainage. It is also recommended that the surficial materials adjacent to the building be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface. Such impermeable materials include cement concrete, bituminous concrete or a vegetated silty topsoil.

The foundation drains will need to discharge into the storm drain system not subject to surcharge or daylight if grading permits. The Site Engineer should review the discharge of the foundation drains in this regard. It is recommended that a backflow preventer be installed at the outlet of the drains to reduce the impact of surcharges and to impede rodent activity that may clog the drain. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Clean-outs should be located at bends and no greater than 150 ft on-center. Roof gutters and other storm collection should not be discharged to the foundation drains. Recharge systems, infiltrators and/or dry wells shall be kept away from the basement level to prevent hydrostatic surcharge. This should also be reviewed by the Site Engineer.

The basement slab and walls should be waterproofed or, at a minimum, damproofed to protect against moisture damage. The basement floor should be damproofed with minimum ten-mil polyethylene or StegoWrap™ with joints lapped 10 inches below the floor slab or with application of bituminous or other approved material to the surface. Damproofing of below grade foundation walls should include the application of a bituminous or other approved material from the top of footing to above ground level.

CONSTRUCTION CONCERNS

The contractor should be required to maintain stable-dewatered subgrades for foundations, pavements and other concerned areas during construction. Subgrade disturbance may be influenced by excavation methods, moisture, precipitation, groundwater control and construction activities. It should be understood that the site soils are considered inherently moisture sensitive and may be become weakened or softened if exposed to wet conditions and construction activities. The moisture concerns are associated with the high percentage of fines (silt) which inhibits drainage. The contractor should understand these concerns and take precautions to reduce subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, limiting the extent of exposed subgrade especially if inclement weather is forecast, backfilling footings as soon as practicable and maintaining an effective dewatering program. Proper protection of the bearing subgrade is necessary during construction. The moisture concerns are generally more problematic if construction takes place during the winter/spring season or other periods of inclement weather. A protective base of ¾-inch minus crushed stone may be placed at least ≈6 inches below and laterally beyond the footing limits. The stone base is to protect the site soils, facilitate any necessary dewatering and provide a dry/stable base upon which to progress foundation construction. The protective base should be considered elective and dependent upon the site conditions. The stone base should be necessary if wet conditions or the groundwater is encountered during construction.

The groundwater table or puddled storm water will need to be temporarily controlled during construction to complete work in dry conditions and protect the competency of the subgrade. Wet conditions should be continuously maintained at least one foot below construction grade until backfilling is complete. The groundwater is expected to be controlled with conventional sumps and pumps. The temporary sumps should be filtered with stone and fabric and extend at least ≈18 inches below construction grade. A ≈6 inch lift of ¾-inch minus crushed stone (protected with geotextile fabric such as Mirafi 140N or equal) should be placed atop the wet subgrade to protect its competency and facilitate dewatering. The stone base should have positive slope to the sump. Adequate dewatering and storm water management are necessary for maintaining the competency of the site soils.

The subgrade should ultimately be stable, dewatered, compact and protected from frost throughout construction. Bearing subgrades that become weakened or disturbed due to wet conditions or other cause will be rendered unsuitable for structural support. The Contractor shall ultimately be responsible for the means and methods of temporary groundwater control, subgrade protection and site stability during construction. An Engineer from JTC should be scheduled to review the foundation subgrade conditions and preparation during construction.

CONSTRUCTION MONITORING

It is recommended that a qualified engineer or representative be retained to review earthwork activities such as the preparation of the foundation bearing subgrade and the

placement/compaction of Structural Fill. It is recommended that JTC be retained to provide construction monitoring services. This is to observe compliance with the design concepts presented herein.

We trust the contents of this memorandum report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.

kmm50/jtc14/BethelPoliceStation.wpd

LIMITATIONS

Explorations

1. The analyses, recommendations and designs submitted in this report are based in part upon the data obtained from preliminary subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.

3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that this firm be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the recommendations provided herein.

5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

Construction

6. It is recommended that this firm be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of the Town of Bethel & Hawley Construction in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.

TABLE 1

(Sheet 1 of 2)

Police Station
Bethel, CT

Recommended Soil Gradation & Compaction Specifications

Clean Granular Fill
(Select Gravel Fill)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3 inch	100
3/4 inch	60-90
No. 4	20-70
No. 200	2-8

NOTE: For minimum 8-inch base below Concrete Floor Slabs
For minimum 12-inch base for exterior concrete slabs exposed to frost
For minimum 20-inch base at exterior ramps and entrances
Shall have less than 12% fines (No. 200 sieve) based on the Sand fraction
Compact to 95% relative compaction per ASTM D1557

Structural Fill
(Gravelly SAND, little Silt)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5 inch	100
3/4 inch	60-100
No. 4	20-80
No. 200	0-12

NOTE: For use as structural load support below the foundations
For use as backfill behind unbalanced foundation/retaining walls
A ¾-inch crushed stone may be used in wet conditions
Shall have less than 25% fines (No. 200 sieve) based on the Sand fraction
Compact to 95% relative compaction per ASTM D1557

TABLE 1

(Sheet 2 of 2)

Police Station
Bethel, CT

Recommended Soil Gradation & Compaction Specifications

Common Fill
(Silty SAND, little Gravel)

SIEVE SIZE	PERCENT PASSING BY WEIGHT
6-8 inch	100
3/4 inch	60-100
No. 4	20-85
No. 200	0-30

NOTE: For use as roadway embankment fill in pavement areas
Maximum stone size should be ⅔ lift thickness
Compact to at least 93% relative compaction per ASTM D1557

Structural Fill placed beneath the foundation should include the *Footing Zone of Influence* which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1H:1V splay. Structural Fill should be placed in loose lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors. All Structural Fill should be compacted to at least 95 percent of maximum dry density as determined by the Modified Proctor Test (ASTM-D1557). The Clean Granular Fill and Structural Fill should be compacted within ±3% of optimum moisture content. The adequacy of the compaction efforts should be verified by field density testing which is also a requirement of the *State Building Code*.

TABLE 2

Police Station
Bethel, CT

Recommended Lateral Earth Pressures & Drainage for Unbalanced Walls

Lateral earth pressures for the structural design and stability analysis of unbalanced foundation walls (basement walls, retaining walls, elevator pit, etc) are provided herein. The following table outlines the recommended lateral earth pressure coefficients and equivalent fluid weights:

WALL CONDITION	LATERAL TRANSLATION (Δ/H)	EARTH PRESSURE COEFFICIENT (K)	EQUIVALENT FLUID WEIGHT (γ_{EFW})
restrained	0	K_o	60 pcf
no restraint	0.002	K_a	35 pcf
no restraint	0.02	K_p (FS=3)	125 pcf

where: Δ = movement at top of wall by tilting or lateral translation
H = height of wall

The above lateral earth pressures are based upon:

1. Rankine earth pressure theory;
2. Retaining wall backfilled with Structural Fill (Table 1)
3. Unit weight of backfill less than 125 pcf
4. No hydrostatic pressures
5. No surcharge loading;
6. A level backfill in front and behind of wall;
7. Seismic loads distributed per the IBC
8. Dynamic/compaction stresses accounted for with seismic pressures;
9. Soil backfill densified with plate compactors within 3 ft lateral distance of wall;
10. Top 2 ft should not be considered for passive resistance.

The lateral resistance of retaining walls should also accommodate surcharge loads. Uniformly distributed loads should be superimposed along the face of the wall at a magnitude equal to the surcharge pressure multiplied by the appropriate earth pressure coefficient. Surcharge loads should be considered where they are located within a horizontal distance equivalent to 1.0 times the height of the wall. Anticipated point or line loads situated behind the wall should be evaluated in accordance with linear elastic theory.

For frost and drainage concerns, it is recommended that *Structural Fill* (Table 1) be placed directly behind the unbalanced walls. The ground surface immediately adjacent to the unbalanced foundation should be sloped away from the building to allow for positive drainage. It is also recommended that the surficial materials adjacent to the building be relatively impermeable to reduce the volume of precipitation infiltrating into the subgrade. Such impermeable materials include Portland cement concrete, bituminous concrete, or a vegetated silty topsoil.

Unbalanced foundation walls (basement level) should be provided with adequate footing drains. The drains should be located along the periphery of the footprint. The perimeter foundation drain should be located at least ≈2-4 inches above the bottom of footing elevation and six inches outward from the edge of footing. The drains should not encroach within the *Footing Zone of Influence* defined as that area extending laterally one foot from the edge of footing then outward and downward at a 1H:1V splay. Furthermore, the invert elevation of the drain should be at least ≈10-12 inches below the underside of the adjacent floor slab. The drains should consist of minimum 4 inch diameter, perforated PVC-SDR 35 drain pipe encased within 12 inches of ¾-inch stone and wrapped with a filter fabric such as Mirafi 140N or equal. The drains may discharge via gravity to a storm drain line not subject to surcharge or daylight if permissible. The Site Engineer should review the discharge of the drains. The drains should be provided with permanent clean-outs at convenient locations to facilitate access to all sections of the system. Clean-outs should be located at bends and no greater than 150 ft on-center. Roof gutters and other storm collection should not be discharged to the foundation drains. Recharge systems, infiltrators and/or dry wells shall be kept away from the basement level to prevent hydrostatic surcharge. This should also be reviewed by the Site Engineer.

If the unbalanced foundation walls cannot be drained to alleviate hydrostatic forces, then the lateral earth pressure equivalent fluid weight should be increased to 90 pcf. Such earth pressures should be used for elevator pits, if necessary.

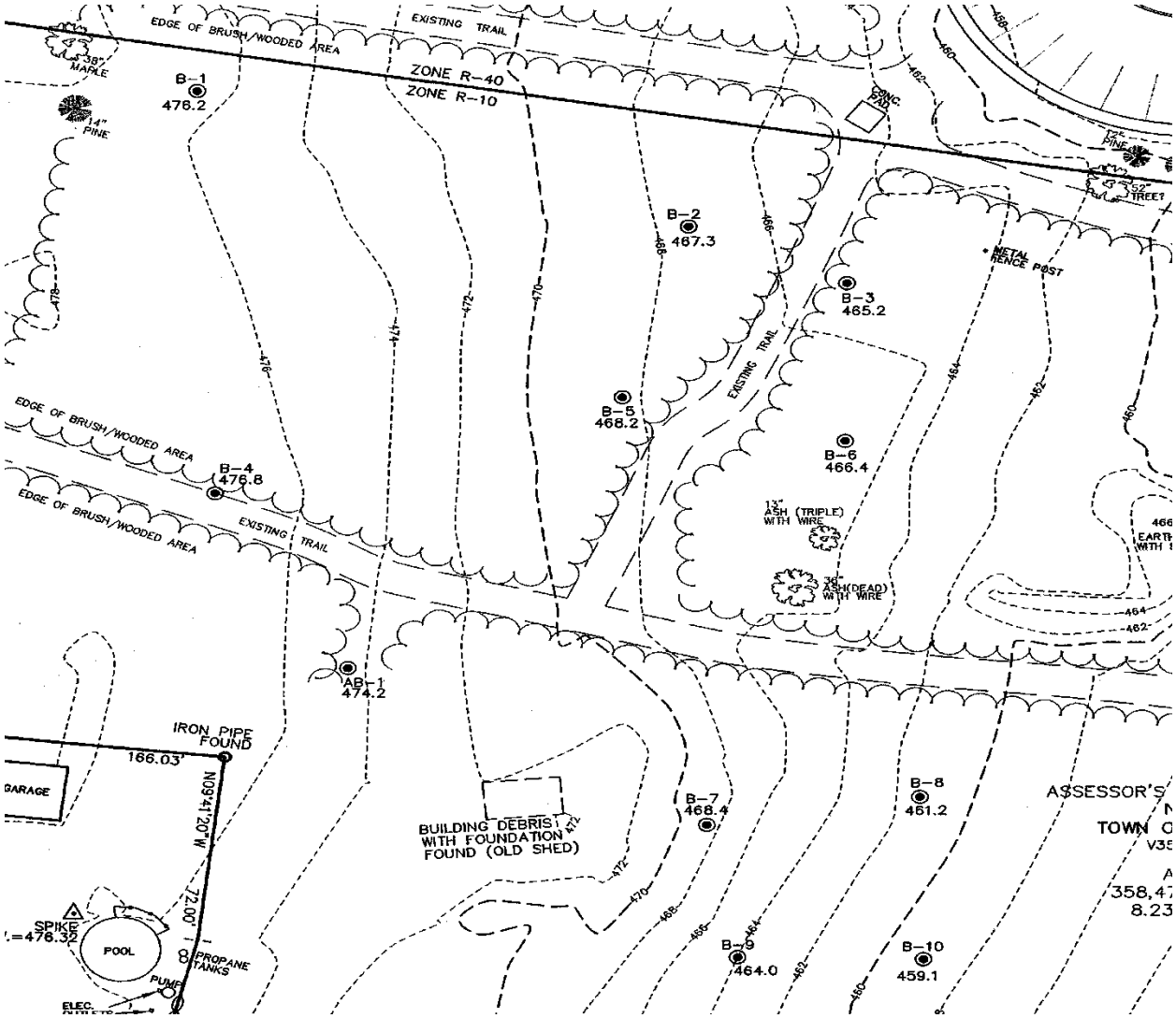
The recommended friction factors to be used for retaining wall design are as follows:

Recommended Friction Factor (f)
f= tan(δ), where δ is the interface friction angle

- Concrete against the following soils

Structural Fill (Table 1)	0.50
Glacial Soils	0.45

Boring Location Plan & Boring Logs



Notes:

1. Borings were performed on May 28th & 29th, 2014 under the direction of JTC.
2. Boring locations should be considered approximate.
3. Refer to the individual test boring logs for subsurface conditions at each location.

Hawley Construction **30 Germantown Road** **Danbury, CT 06810**	**Proposed Bethel Police Department** **Bethel, CT**
JTC	**TEST BORING LOCATION PLAN**

TEST BORING LOG

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

BORING No:	B-1
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 476.2

TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	25'0"	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	16	6" Topsoil	6"	2-2-2-2	4
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)			
2-3	S-2	2-4	13	Brown, Moist, F-C SAND, some Gravel, Tr. Silt		3-2-3-3	5
3-4							
4-5					5'		
5-6	S-3	5-7	11	Brown, Moist, F-C SAND, some Silt, tr. Gravel (SILTY SANDS)		3-3-3-4	6
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	16	Brown, Moist, F-C SAND, some Silt, tr. Gravel		6-5-6-6	11
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	20	Gray/Brown, Moist F-M SAND and Silt		15-21-30-34	51
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	12	Brown,Stratified, Moist, F-C SAND, some Silt		28-50/2"	78+
21-22							
22-23							
23-24							
24-25					25'		
25-26	S-7	25-27	16	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		38-40-50/3"	90+
26-27							
27-28							
28-29							
29-30							
30-31	S-8	30-32	1	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		50/2"	50+
31-32				Boring Terminated @ 30'2"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-2
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 467.3
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	25'4"	24 hrs. after completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	16	6" Topsoil	6"	2-3-5-5	8
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)	2'		
2-3	S-2	2-4	14	Brown, Moist, F-M SAND, some Silt, l.Gravel (SILTY SANDS)		4-4-4-3	8
3-4							
4-5							
5-6	S-3	5-7	13			2-2-3-2	5
6-7				Brown, Moist, F-C SAND, some Silt, tr. Gravel			
7-8							
8-9							
9-10							
10-11	S-4	10-12	17	Brown, Moist, SANDand Silt, trace fine Gravel		17-7-8-8	15
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	6	Gray/Brown, Moist F-M SAND and Silt		25-50/4"	75+
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	14	Brown,Stratified, Moist, F-C SAND, some Silt		14-20-22-32	42
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	7	Gray/Brown, Moist F-M SAND and Silt		39-50/4"	89+
26-27							
27-28							
28-29							
29-30				(Cobbles/Difficult augering)	29'6"		
30-31	S-8	30-32	3	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		50/5"	50+
31-32				Boring Terminated @ 30'5"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-3
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 465.2
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	26'	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	15	5" Topsoil	5"	2-2-3-2	5
1-2				Brown, Moist, F-C SAND and Gravel, l. Silt (FILL)	2'		
2-3	S-2	2-4	20	Brown, Moist, F-M SAND, some Silt, tr. Gravel (SILTY SANDS)		3-3-3-2	6
3-4							
4-5							
5-6	S-3	5-7	13	Brown, Moist, F-C SAND, some Silt, tr. Gravel		3-3-4-7	7
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	11	Brown, Moist, F-C SAND, some Silt, tr. Gravel		5-6-11-27	17
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	7	Gray, Stratified, Moist, SAND & Silt, l. Gravel		50/5"	50+
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	8	Brown,Stratified, Moist, F-C SAND, some Silt		25-50/4"	72+
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	6	Gray, Stratified, Saturated, SAND & Silt, l. Gravel		32-50/5"	82+
26-27							
27-28							
28-29							
29-30					30'		
30-31	S-8	30-32	3	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		50/5"	50+
31-32				Boring Terminated @ 30'5"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-4
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 476.8
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	25'6"	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	10	6" Topsoil	6"	1-2-3-4	5
1-2				Brown, Moist, F-C SAND, little Gravel, Tr. Silt (FILL)			
2-3	S-2	2-4	16	Brown, Moist, F-C SAND, little Gravel, Tr. Silt		4-5-4-4	9
3-4							
4-5					4'6"		
5-6	S-3	5-7	15	Brown, Moist, F-M SAND & Silt, l. Gravel (SILTY SANDS)		4-4-5-4	9
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	20	Brown, Moist, F-M SAND & Silt, tr. Gravel		5-5-6-5	11
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	22	Gray/Brown, Moist F-M SAND & Silt		7-11-15-26	26
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	10	Brown,Stratified, Moist, F-C SAND, some Silt		24-31-50/4"	81+
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	6	Gray, Saturated, F-M SAND & Silt		32-50/2"	82+
26-27				Boring Terminated @ 25'8" per Charlie VanZanten			
27-28							
28-29							
29-30							
30-31							
31-32							

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

BORING No:	B-5
DATE:	5/29/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 468.2

TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/29/2014	**25'6"**	**Upon completion**

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	10	5" Topsoil	5"	9-9-7-9	16
1-2				Brown, Moist, F-C SAND, s, Gravel, Tr. Silt (FILL)	2'4"		
2-3	S-2	2-4	9	Brown, Moist, F-M SAND, s. Silt, s. Gravel (SILTY SANDS)		7-6-6-8	12
3-4							
4-5							
5-6	S-3	5-7	13	Brown, Moist, F-C SAND, some Silt, tr. Gravel		4-4-10-11	14
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	14	Brown, Moist, F-M SAND, some Silt, litttle Gravel		30-35-36-27	71
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	16	Lt. Brown, Moist, F-C SAND & Gravel		20-32-50/5"	82+
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	12	Brown,Stratified, Moist, F-C SAND, some Silt		33-35-50/5"	85+
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	10	Brown, Stratified, V. Moist, SILT & F-M Sand, tr. F Gravel		20-38-50/4"	88+
26-27							
27-28							
28-29				(Cobbbles/Difficult Augering)			
29-30					29'6"		
30-31	S-8	30-32	2	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		50/5"	50+
31-32				Boring Terminated @ 30'5"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

BORING No:	B-6
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 466.4

TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	**21'6"**	**Upon completion**

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	8	6" Topsoil	6"	1-2-2-3	4
1-2				Brown, Moist, F-C SAND, some Silt, tr. Gravel (FILL)	2'6"		
2-3	S-2	2-4	7	Brown, Moist, F-C SAND, some Silt, l. Gravel (SILTY SANDS)		2-2-2-2	4
3-4							
4-5							
5-6	S-3	5-7	11	Brown, Moist, F-M SAND, some Silt, tr. Gravel		5-5-7-8	12
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	14	Brown, Moist, F-C SAND, little Silt, tr. Gravel		4-3-3-3	
11-12							
12-13							
13-14							
14-15							
15-16	S-5	15-17	16	Gray,Stratified, Moist, F-C SAND, some Silt, tr. Gravel		21-34-50/4"	
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	7	Brown,Stratified, Moist, F-C SAND, some Silt		50/3"	
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	6	Brown, V. Moist, F-M SAND & Silt, tr. F Gravel		25-50/4"	
26-27							
27-28							
28-29				(Cobbles/Difficult Augering)			
29-30					29'0"		
30-31	S-8	30-32	2	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		50/3"	
31-32				Boring Terminated @ 30'3"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-7
DATE:	5/29/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 468.4
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	25'	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	13	5" Topsoil	5"	1-2-5-6	7
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)			
2-3	S-2	2-4	11	Brown, Moist, F-C SAND, some Silt, tr. Gravel (SILTY SANDS)	2'	7-12-50/4"	62+
3-4							
4-5							
5-6	S-3	5-7	14	Brown, Moist, F-C SAND, some Silt, tr. Gravel		8-11-7-14	18
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	14	Brown, Moist, F-C SAND, some Silt, tr. Gravel		5-6-4-5	10
11-12							
12-13					12'0"		
13-14				(SANDS & SILTS)			
14-15							
15-16	S-5	15-17	21	Gray/Brown, Moist F-M SAND, some Silt, tr. F Gravel		10-19-15-16	34
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	13	Brown,Stratified, Moist, F-C SAND, some Silt		22-28-28-30	56
21-22							
22-23							
23-24							
24-25					25'6"		
25-26	S-7	25-27	7	Gray, Stratified, Moist, F-C SAND & Gravel, l. Silt (TILL)		27-50/4"	77+
26-27							
27-28							
28-29							
29-30							
30-31	S-8	30-32	6	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		38-41-50/4"	91+
31-32				Boring Terminated @ 31'4"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-8
DATE:	5/29/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 461.2
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	20'	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	10	6" Topsoil	5"	1-3-6-12	9
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)	2'		
2-3	S-2	2-4	13	Brown, Moist, F-C SAND, some Silt, tr. Gravel (SILTY SANDS)		6-7-9-10	16
3-4							
4-5							
5-6	S-3	5-7	12	Brown, Moist, F-C SAND, little Silt. l. Gravel		3-16-29-12	45
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	10	Brown, Moist, F-C SAND, little Silt, tr. Gravel	11'6"	2-8-6-6	14
11-12				Brown, Moist, SANDS & Silt, tr. Gravel (SANDS & SILTS)			
12-13							
13-14							
14-15							
15-16	S-5	15-17	11	Brown, Moist, SANDS & Silt, tr. Gravel		9-22-27-50/4"	49
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	13	Brown,Stratified, Moist, SANDS & Silt, tr. Gravel		21-38-39-38	77
21-22							
22-23							
23-24							
24-25							
25-26	S-7	25-27	12	Brown, Moist, SANDS & Silt, tr.fine Gravel		31-38-38-40	76
26-27							
27-28							
28-29							
29-30					29'6"		
30-31	S-8	30-32	4	Gray, Stratified, Saturated, F-C SAND & Gravel, l. Silt (TILL)		44-50/2"	94+
31-32				Boring Terminated @ 30'8"			

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

BORING No:	B-9
DATE:	5/29/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 464.0

TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	26'	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	11	5" Topsoil	5"	1-3-5-6	8
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)			
2-3	S-2	2-4	15	Brown, Moist, F-C SAND, some Silt, tr. Gravel (SILTY SANDS)		7-8-6-6	14
3-4							
4-5							
5-6	S-3	5-7	15	Brown, Moist, F-C SAND, little Silt, tr. Gravel	6'	6-8-6-7	14
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	17	Brown, Moist, F-C SAND, little Silt, tr. Gravel	11'	4-6-10-10	16
11-12				Brown, Moist, F-M SAND, some fines, little Gravel (SANDS)			
12-13							
13-14							
14-15							
15-16	S-5	15-17	14	Brown, Moist, F-C SAND & Gravel, l. Silt		11-18-21-25	39
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	13	Brown,Stratified, Moist, F-C SAND, some Silt		14-31-50/3"	81+
21-22				Boring Terminated @ 21'3" per Charlie VanZanten (VP of			
22-23				Construction) in lieu of Auger Probe (AP-1) and this being			
23-24				a parking lot boring location.			
24-25							
25-26							
26-27							
27-28							
28-29							
29-30							
30-31							
31-32							

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	B-10
DATE:	5/28/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 459.1
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:
5/28/2014	21'	Upon completion

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1	S-1	0-2	12	6" Topsoil	6"	2-6-3-4	
1-2				Brown, Moist, F-C SAND, some Gravel, Tr. Silt (FILL)	2'		
2-3	S-2	2-4	13	Brown, Moist, F-C SAND, some Silt, tr. Gravel (SILTY SANDS)		7-3-5-4	
3-4							
4-5							
5-6	S-3	5-7	17	Brown, Moist, F-C SAND, some Silt, tr. Gravel		12-11-9-9	
6-7							
7-8							
8-9							
9-10							
10-11	S-4	10-12	7	Brown, Moist, F-C SAND, little Silt, tr. Gravel	11'	27-50/2"	
11-12				Brown, Moist, F-M SAND, some fines, l. Gravel			
12-13				(SANDS & SILTS)			
13-14							
14-15							
15-16	S-5	15-17	10	Brown,Stratified, Moist, F-C SAND, some Silt		41-40-38-50/2"	
16-17							
17-18							
18-19							
19-20							
20-21	S-6	20-22	6	Brown,Stratified, Moist, F-C SAND, some Silt		38-50/5"	
21-22				Boring Terminated @ 20'11" per Charlie VanZanten (VP of			
22-23				Construction) in lieu of Auger Probe (AP-1) and this being			
23-24				a parking lot boring location.			
24-25							
25-26							
26-27							
27-28							
28-29							
29-30							
30-31							
31-32							

REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

TEST BORING LOG

JOHN TURNER CONSULTING, INC.
19 DOVER STREET
DOVER, NH 03820
(603) 749-1841 www.consultjtc.com

CLIENT:	Hawley Construction
PROJECT:	Bethel Police Department
LOCATION:	Judd Avenue, Bethel, CT
PROJECT No:	14-15-00036
BORING No:	AP-1
DATE:	5/29/2014
LOCATION:	See Attached Plan
SURFACE EL:	el. 474.2
TYPE OF BORING:	2 1/4" Hollow Stem Augers
DRILLING Co:	Greatworks Test Boring
RIG:	Rubber Track Drill Rig
DRILLER:	Jeff Lee
JTC REP.:	Judson Zachar

GROUNDWATER OBSERVATIONS

DATE:	DEPTH:	TIME:

FT	NO.	SAMPLE DEPTH (FT.)	REC. (IN.)	SOIL & ROCK CLASSIFICATION-DESCRIPTION BURMEISTER SYSTEM (SOIL) U.S. CORPS OF ENGINEERS SYSTEM (ROCK)	STRATUM CHANGE (FT.)	BLOWS PER 6 INCHES	SPT (N)
0-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							
10-11							
11-12							
12-13							
13-14							
14-15							
15-16							
16-17							
17-18							
18-19							
19-20							
20-21				Auger Probe (AP-1) Terminated @ 20' per Charlie			
21-22				VanZanten (VP of Construction) to nullify any possible			
22-23				ledge between 0 to 20'.			
23-24							
24-25							
25-26							
26-27							
27-28							
28-29							
29-30							
30-31							
31-32							

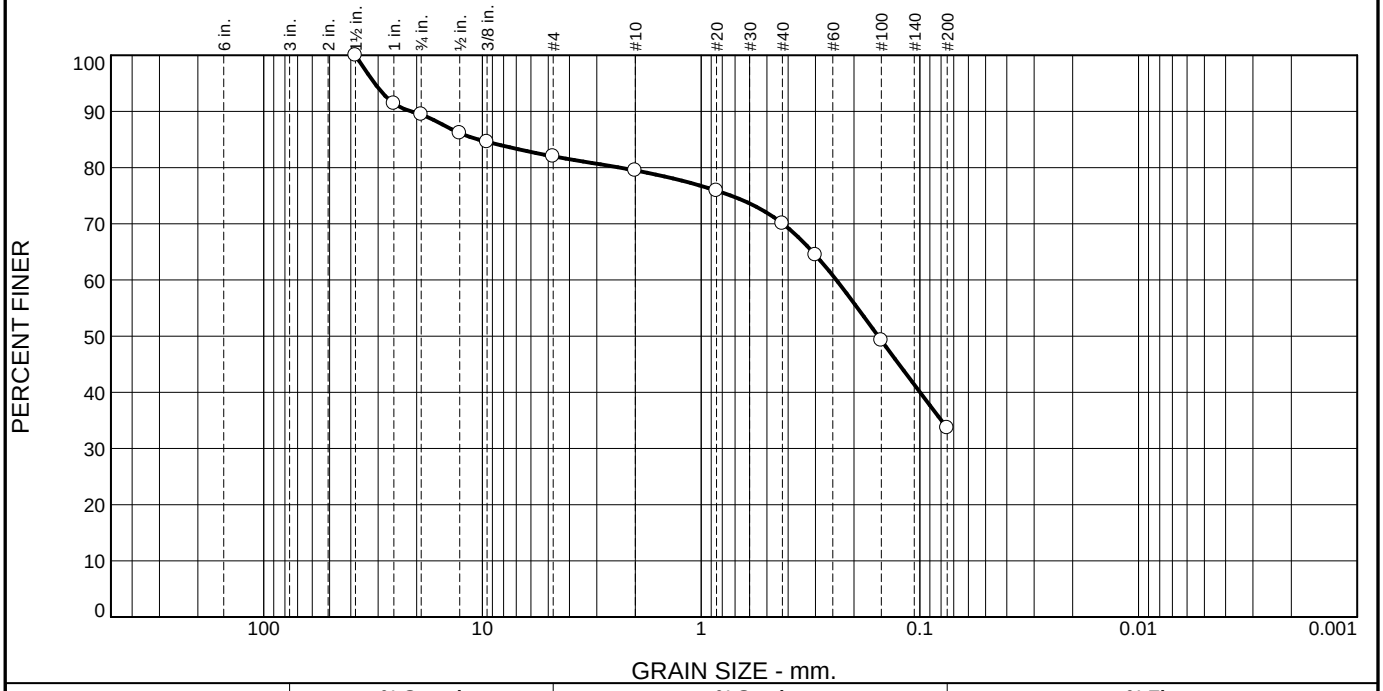
REMARKS:

Standard Penetration Tests (SPT) = 140# hammer falling 30" (ASTM D1586)
Blows are per 6 inches with a 24" long by 2" O.D. by 1 3/8" I.D. split spoon sampler unless otherwise noted
S = split-spoon sample; C = rock core sample; U = undisturbed

REMARKS: *The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Water level readings have been made in the test borings at times and under conditions stated in the test boring logs. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time measurements were made.*
Proportions used: trace (0-10%), little (10-20%), some (20-35%), and (35-50%)

Soil Laboratory Reports

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.6	7.4	2.5	9.4	36.4	33.7	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2	100.0		
1	91.4		
3/4	89.4		
1/2	86.1		
3/8	84.6		
#4	82.0		
#10	79.5		
#20	75.9		
#40	70.1		
#50	64.4		
#100	49.2		
#200	33.7		

* (no specification provided)

Material Description

Fine-Medium Sand, some Fines, little Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 21.1622 D_{85}= 10.4362 D_{60}= 0.2410
D_{50}= 0.1550 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 8.5%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-10(S-5) **Date Sampled:** 5-29-14

Sample Number: 14-460 **Depth:** 10'-12'

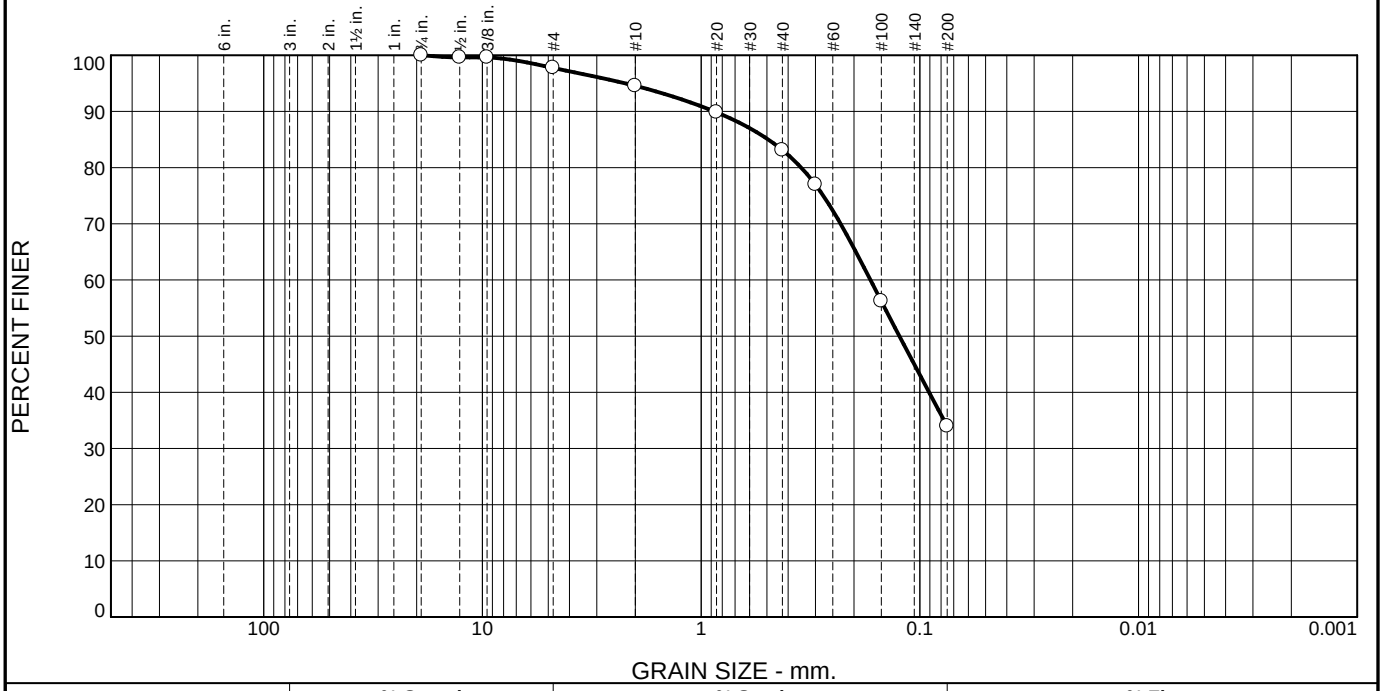
JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction

Project: Bethel PD

Project No: 14-15-036 **Figure** 001

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.3	3.1	11.5	49.1	34.0	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	99.6		
3/8	99.6		
#4	97.7		
#10	94.6		
#20	89.8		
#40	83.1		
#50	77.0		
#100	56.2		
#200	34.0		

* (no specification provided)

Material Description

FINE-MEDIUM SAND, some Silt, trace Fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.8715 D_{85}= 0.4933 D_{60}= 0.1682
D_{50}= 0.1240 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 8.4%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By:

Title:

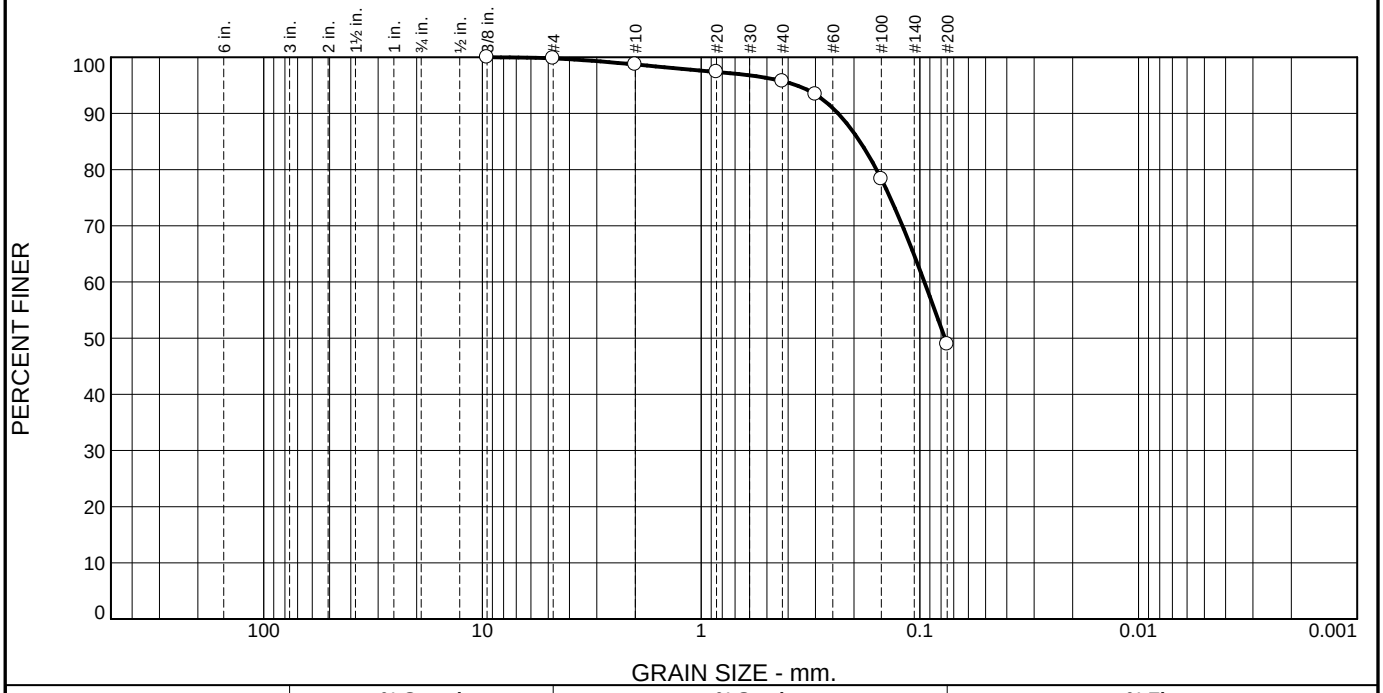
Location: B-7(S-5)
Sample Number: 14-461 **Depth:** 15'-17'

Date Sampled: 5-29-14

Client: Hawley Construction
Project: Bethel PD

Project No: 14-15-036 **Figure** 002

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.1	3.0	46.8	48.9	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8	100.0		
#4	99.8		
#10	98.7		
#20	97.4		
#40	95.7		
#50	93.4		
#100	78.3		
#200	48.9		

* (no specification provided)

Material Description

SAND and Silt, trace Fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.2364 D_{85}= 0.1878 D_{60}= 0.0953
D_{50}= 0.0767 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 16.6%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-8(S-7)
Sample Number: 14-462 **Depth:** 25'-27'

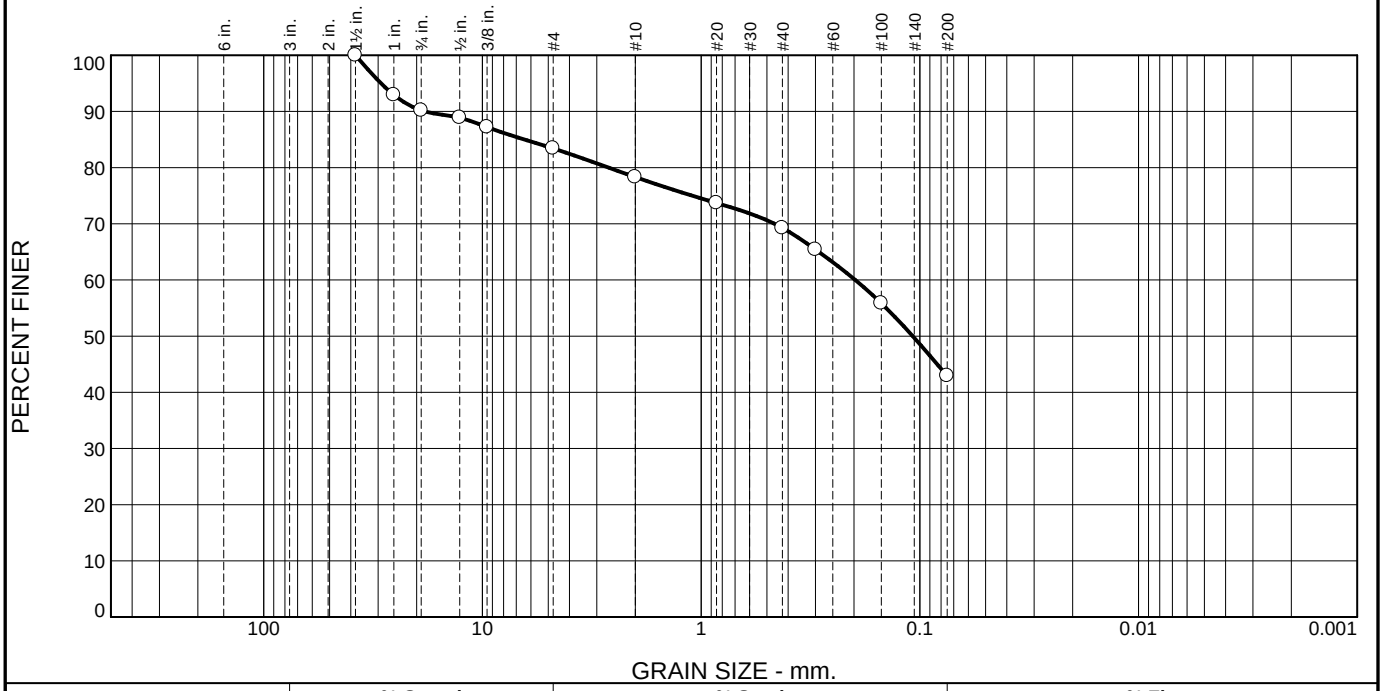
Date Sampled: 5-29-14

JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction
Project: Bethel PD

Project No: 14-15-036 **Figure** 003

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	9.8	6.8	5.1	9.0	26.4	42.9	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2	100.0		
1	92.9		
3/4	90.2		
1/2	88.9		
3/8	87.2		
#4	83.4		
#10	78.3		
#20	73.7		
#40	69.3		
#50	65.4		
#100	55.9		
#200	42.9		

* (no specification provided)

Material Description

Sand and Silt, little Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 18.3472 D_{85}= 6.4306 D_{60}= 0.1973
D_{50}= 0.1078 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 8.9%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-3(S-7) **Date Sampled:** 5-29-14

Sample Number: 14-463 **Depth:** 25'-27'

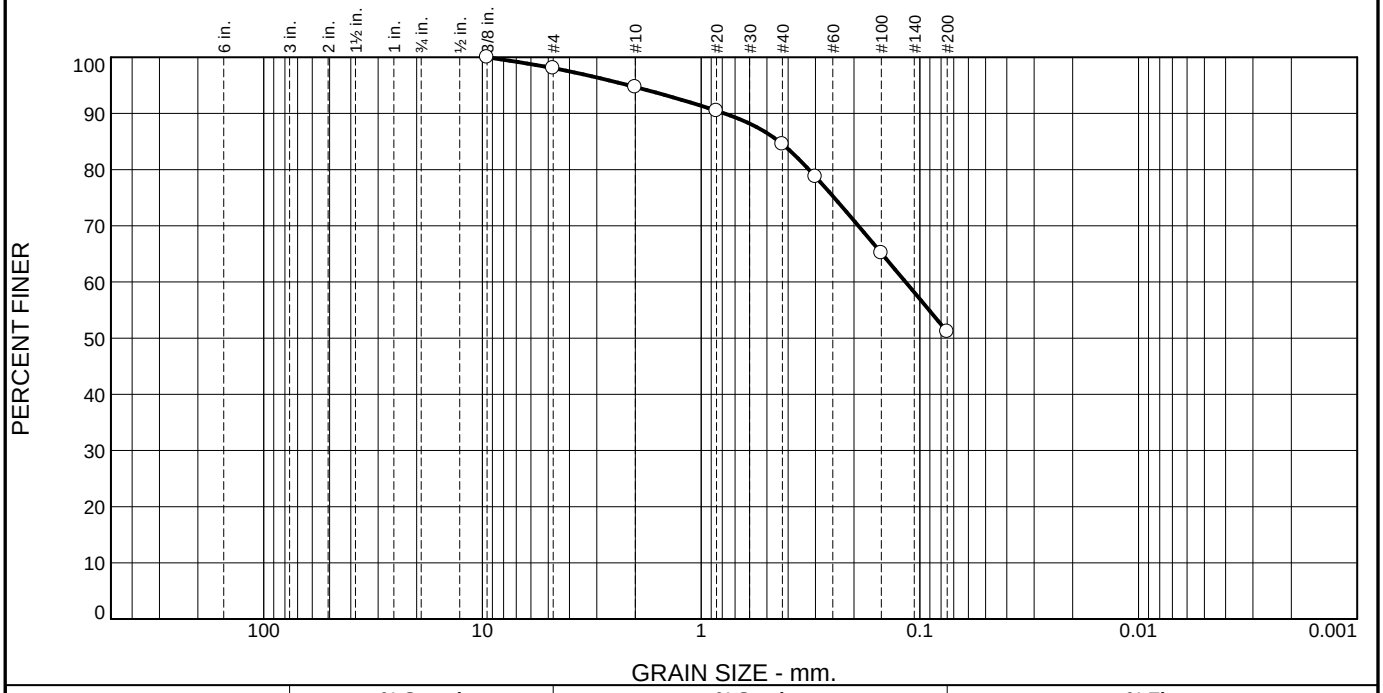
JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction

Project: Bethel PD

Project No: 14-15-036 **Figure** 004

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	3.4	10.2	33.4	51.1	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8	100.0		
#4	98.1		
#10	94.7		
#20	90.5		
#40	84.5		
#50	78.7		
#100	65.2		
#200	51.1		

* (no specification provided)

Material Description

SILT and Fine-Medium Sand, trace Fine Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.7826 D_{85}= 0.4402 D_{60}= 0.1162
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 14.2%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-5(S-7) **Date Sampled:** 5-29-14

Sample Number: 14-464 **Depth:** 25'-27'

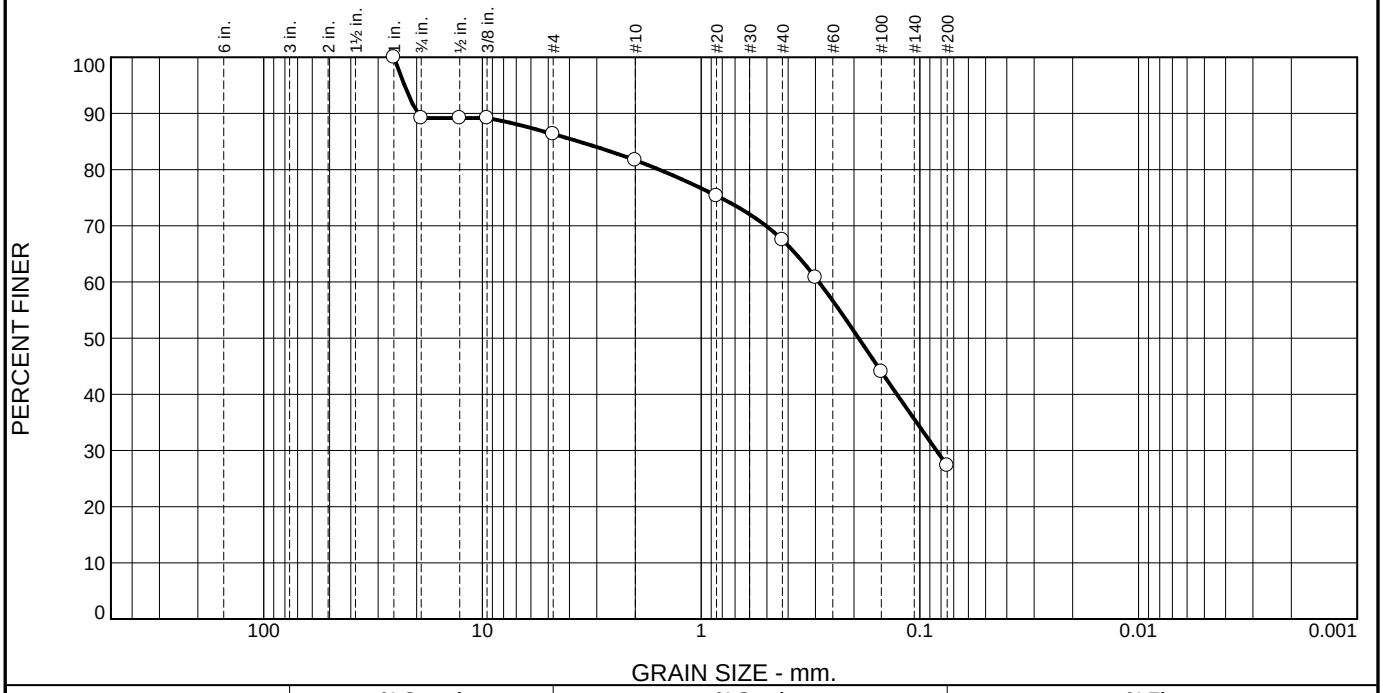
JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction

Project: Bethel PD

Project No: 14-15-036 **Figure** 005

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.8	2.9	4.6	14.2	40.2	27.3	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
3/4	89.2		
1/2	89.2		
3/8	89.2		
#4	86.3		
#10	81.7		
#20	75.3		
#40	67.5		
#50	60.8		
#100	44.0		
#200	27.3		

* (no specification provided)

Material Description

FINE-MEDIUM SAND, some Silt, little Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 19.7254 D_{85}= 3.6241 D_{60}= 0.2894
D_{50}= 0.1904 D_{30}= 0.0839 D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture:

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-5(S-4)
Sample Number: 14-465 **Depth:** 10'-12'

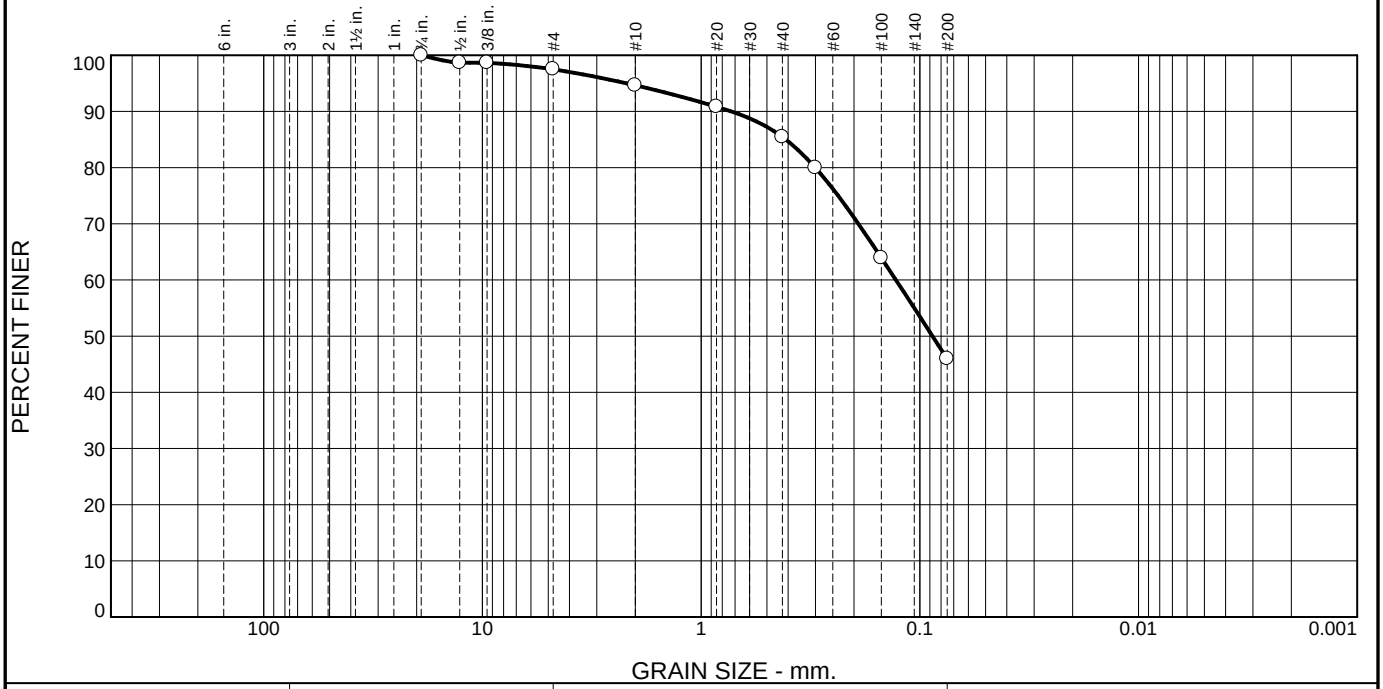
Date Sampled: 5-29-14

CONSULTING TESTING INSPECTION JTC inc. GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction
Project: Bethel PD

Project No: 14-15-036 **Figure** 006

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.5	2.8	9.2	39.5	46.0	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	98.7		
3/8	98.7		
#4	97.5		
#10	94.7		
#20	90.8		
#40	85.5		
#50	80.0		
#100	63.9		
#200	46.0		

* (no specification provided)

Material Description

SAND and Silt, trace Fine Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.7276 D_{85}= 0.4103 D_{60}= 0.1286
D_{50}= 0.0875 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 13.1%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-2(S-4)
Sample Number: 14-466 **Depth:** 10'-12'

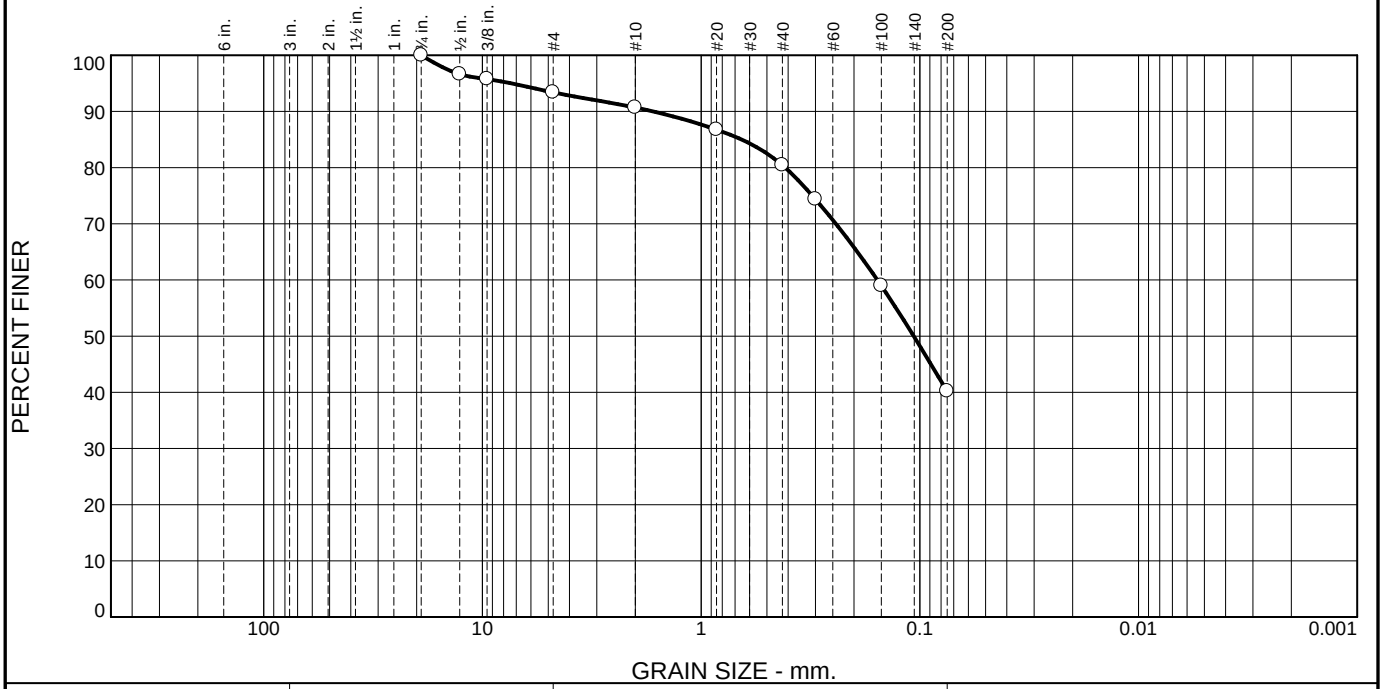
Date Sampled: 5-29-14

JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction
Project: Bethel PD

Project No: 14-15-036 **Figure** 007

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.6	2.7	10.3	40.2	40.2	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	96.6		
3/8	95.8		
#4	93.4		
#10	90.7		
#20	86.7		
#40	80.4		
#50	74.3		
#100	59.0		
#200	40.2		

* (no specification provided)

Material Description

FINE-MEDIUM SAND and Silt, trace Fine Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 1.6550 D_{85}= 0.6526 D_{60}= 0.1563
D_{50}= 0.1066 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 9.8%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-6(S-6) **Date Sampled:** 5-29-14

Sample Number: 14-467 **Depth:** 20'-22'

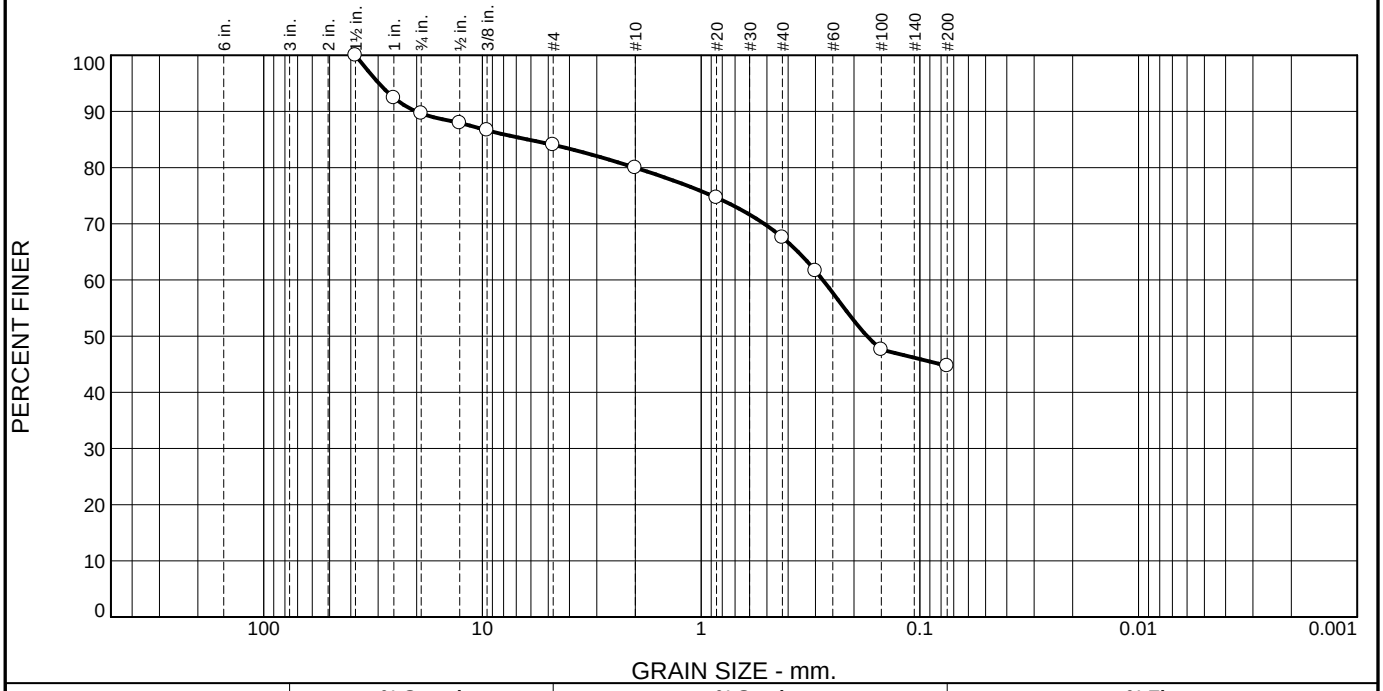
JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction

Project: Bethel PD

Project No: 14-15-036 **Figure** 008

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.4	5.6	4.0	12.4	22.9	44.7	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2	100.0		
1	92.4		
3/4	89.6		
1/2	88.0		
3/8	86.6		
#4	84.0		
#10	80.0		
#20	74.6		
#40	67.6		
#50	61.6		
#100	47.6		
#200	44.7		

* (no specification provided)

Material Description

Silt and Fine-Medium Sand, little Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 20.1003 D_{85}= 6.2023 D_{60}= 0.2776
D_{50}= 0.1742 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 9.2%

Date Received: 5-30-14 **Date Tested:** 6-2-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-4(S-3)
Sample Number: 14-468 **Depth:** 5'-7'

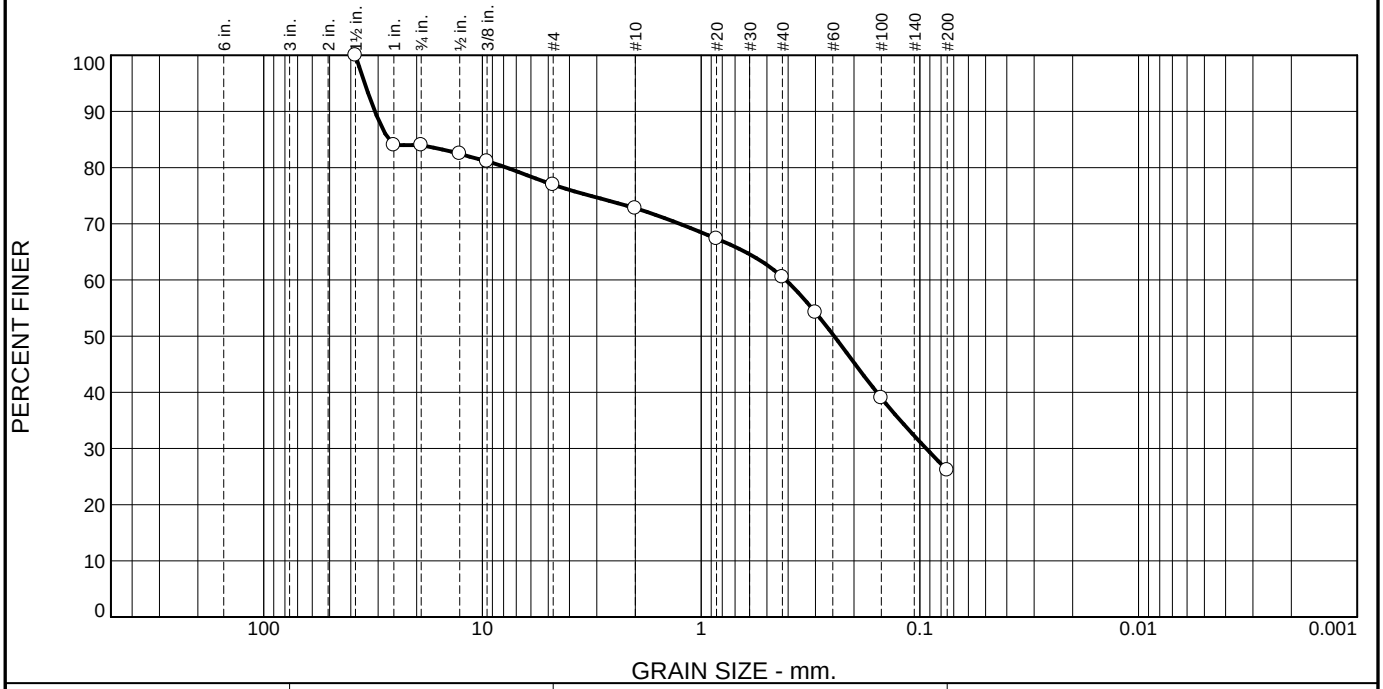
Date Sampled: 5-29-14

JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction
Project: Bethel PD

Project No: 14-15-036 **Figure** 009

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	16.0	7.0	4.2	12.3	34.4	26.1	

Test Results (ASTM C 136 & ASTM C 117)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1 1/2	100.0		
1	84.0		
3/4	84.0		
1/2	82.5		
3/8	81.1		
#4	77.0		
#10	72.8		
#20	67.3		
#40	60.5		
#50	54.2		
#100	39.0		
#200	26.1		

* (no specification provided)

Material Description

FINE-MEDIUM SAND, some Silt, some Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 31.0224 D_{85}= 26.7574 D_{60}= 0.4109
D_{50}= 0.2465 D_{30}= 0.0935 D_{15}=
D_{10}= C_u= C_c=

Remarks

In-Situ Moisture: 8.7%

Date Received: 6-9-14 **Date Tested:** 6-9-14

Tested By: Justin Sigouin

Checked By: Jim Corti

Title: Supervisor

Location: B-5(S-2) **Date Sampled:** 6-6-14

Sample Number: 14-507 **Depth:** 2'-4'

JTC inc. CONSULTING TESTING INSPECTION GEOTECHNICAL • CONSTRUCTION

Client: Hawley Construction

Project: Bethel PD
Bethel, CT

Project No: 14-15-036 **Figure** 010

Site Photographs

SITE PHOTOGRAPHS
PROPOSED POLICE STATION
BETHEL, CT