Renovations to Nonnewaug High School
5 Minortown Road
Woodbury, Connecticut

<u>Report on Geotechnical Engineering Investigation</u>

September 7, 2017

<u>Prepared By:</u>
GNCB Consulting Engineers, P.C.
Old Saybrook, Connecticut

<u>Prepared For:</u>
Regional School District 14
Woodbury, Connecticut

GNCB
Consulting Engineers, P.C.

Structural Engineering
Geotechnical Engineering
Historic Preservation
Construction Support

September 7, 2017

Regional School District #14
c/o Colliers International
35 New Road, Madison, Connecticut 06443

Attention: Mr. Scott Pellman

Re: Report on Geotechnical Engineering Investigation
Renovations to Nonnewaug High School
5 Minortown Road, Woodbury, Connecticut
State Project #214-0093 EA

Principals:
Kenneth Gibble, P.E.
James F. Norden, P.E.
Charles C. Brown, P.E.

Geotechnical Associate
David L. Freed, P.E.

Structural Associate
Richard A. Cortola, P.E.

Dear Mr. Pellman:

We are transmitting to you an electronic copy of our geotechnical engineering report that summarizes the results of test borings and foundation design recommendations for the Renovations to Nonnewaug High School in Woodbury, Connecticut. Our work was undertaken in accordance with our September 26, 2016 proposal and contract agreement dated September 29, 2016, as authorized; this agreement was revised to include a Pavement Evaluation Report that is attached herein as Appendix D.

In summary, the results of 14 test borings (refer to Drawing 2 for locations) indicate that subsurface conditions typically consist of a man-placed fill underlain by a deep deposit of outwash sand. At the building location, groundwater is over 30 ft. below ground surface and does not appear to be a site factor. We recommend that the proposed building modifications, consisting of entrance areas, stairways, and loading dock extensions, be supported on conventional spread footing foundations with an earth supported slab-on-grade concrete ground floor bearing on the naturally-deposited outwash or on compacted structural fill placed on the suitable bearing materials after removing the surface fill. The multipurpose bleachers should also be founded on spread footing foundations bearing on the natural outwash deposit.

We appreciate the opportunity to work with you on this aspect of the project. If you have any questions, or need additional information, please call.

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Sincerely yours,

David L. Freed, PE
Geotechnical Associate

Table of Contents

I. PURPOSE AND SCOPE:

The purpose of this study was to investigate soil, rock and groundwater conditions at the site, and to develop geotechnical engineering recommendations for construction of building renovations and associated site work at Nonnewaug High School in Woodbury, Connecticut. Comments on geotechnical engineering aspects of site development and construction are also provided.

To achieve these objectives, GNCB Consulting Engineers, P.C., (GNCB) completed the following scope of work:

- Developed and monitored a program of 14 test borings (B-1 to B-8 and B-101 to B-106) to investigate existing subsurface conditions. Completed an additional 11 hand excavations within pavement areas for the separate pavement evaluations study.

- Conducted engineering analyses for final design regarding foundations for building renovations, including soil bearing capacity, settlement, seismic requirements, and other aspects of project site design, such as retaining walls and pavement design.

- Prepared an engineering report that summarizes the work completed.

The project design team includes the following members:

Owner's Rep: Colliers International, Madison, Connecticut
Architect: The S/L/A/M Collaborative, Glastonbury, Connecticut
Structural Engineer: The S/L/A/M Collaborative, Glastonbury, Connecticut

II. SITE LOCATION AND SURFACE CONDITIONS:

The approximately 65-acre regional high school complex is located on the west side of Minortown Road, at its intersection with Middle Road Turnpike, in Woodbury, Connecticut, as approximately shown on Drawing 1, “Project Locus.” In addition to Minortown Road, the site is bounded by the Nonnewaug River to the west and residential properties to the north and south. The existing rectangular shaped school, which is approximately parallel to Minortown Road, is comprised of three parts, the southern 3-story academic building (built in 1970), the center attached 2-story student services (built in 2000), and the detached 1-story northern agriscience building (built in 1970). Paved parking exists between the school building and Minortown Road and as a loop road around the building; an athletic complex exists west of the school building.

The site is located on two plateaus; the upper school building site ranging from about El. 330 at Minortown Road grading down to the west to about El. 320 around the school building, while the lower athletic fields to the west are between about EL. 285 and El. 290. (Note: Elevations are in feet and refer to NAVD 1988 Datum). The existing building has a finish ground floor level at El. 322.6; the center student services building, however, has a (lower) basement level at about El. 311. Outside the school building, the site is generally an open paved and grass area, except moderate wooded areas exist to the north and south as well as within the down slope area between the school building and athletic fields. We understand that a majority of the off-site utilities (i.e. electric, gas, communications) enter the site from Minortown Road.

The existing site topography, as well as locations of site features/utilities, is shown on August 26, 2016 “Boundary/Topographic Survey”, Drawing sheets 1 through 5, prepared by BL Companies of Meriden, Connecticut. These plans have been used as a base plan for the attached Drawing 2, “Test Boring Plan.”

III. PROPOSED CONSTRUCTION:

The significant new building renovations/additions and site construction are shown on Schematic Design Drawings (dated September 30, 2016). This new construction, for which geotechnical recommendations are contained herein, includes the following:

Building:

- Enclosed elevator egress at the south end of the academic building.
- A new connector and building entrance between the academic and student services building.
- Enlarged exterior loading dock along the east side of the academic building.
- Canopy Entrance between the student services and agriscience buildings.

Site:

- Revised paved access area from Minortown Road including a new bus drop.
- Paved parking area south of the new entrance and east of the academic building.
- New tennis courts to replace the existing tennis courts located north of the agriscience building.
- Re-grading of the existing large parking area between the agriscience building and Minortown Road.
- Enlarged paved access/parking areas around the building.
- Revised multipurpose field and addition of two bleacher areas within the north end of the athletic fields.

The new building construction will range from reinforced concrete to masonry block wall. We estimate that new building dead plus live column loads will be less than 50 kips and 1 to 3 kips per lin. ft. along the building perimeter walls. We understand that there will be no significant changes to site grades.

Locations of the proposed building construction are shown by shading on the attached Drawing 2, "Test Boring Plan."

IV. SUBSURFACE AND LABORATORY INVESTIGATIONS:

A. Test Borings

We are not aware of any previous test borings completed within the areas of new construction.

For current building and site design, GNCB concurred with the recommended program of 14 test borings (B-1 to B-8 and B-101 to B-106) prepared by others. These explorations were drilled on November 8, 2016 at the approximate locations shown on Drawing 2. GNCB monitored the field work, located explorations in the field by taping from existing site features shown on the base plan, and estimated ground surface elevations at each exploration by interpolating the contours shown on the base plan. The attached Table I summarize the soil conditions encountered at each test boring; detailed soil descriptions are contained in the following report section. Logs of the test borings, prepared by the contractor and reviewed by GNCB, are included as Appendix A.

General Borings, Inc. of Prospect, Connecticut, under contract to GNCB, drilled the test borings in one day using two standard Model B-53 truck rigs and a special drill rig mounted on a rubber-tired backhoe to advance 3-1/4 inside diameter hollow stem augers (HSAs). Near continuous soil samples (ASTM D 1586) were obtained within the upper 12 ft. The test borings, which ranged in depth from 7.5 to 32.0 ft., all terminated within naturally-deposited outwash soils. Several of the test borings (B-1, B-6, B-101, and B-104) terminated at refusal; except at B-101 which we believe terminated on bedrock, we believe that the remaining borings terminated on boulders within the outwash soils.

B. Grain Size Analysis Tests

At test borings B-101, B-102, B-104, and B-106, soil samples recovered directly below the existing pavement were submitted to a laboratory, Angus McDonald Gary Sharpe Associates, for gradation testing by ASTM D422. The results of four washed grain size analysis tests are included as Appendix B.

C. Hand Dug Excavations at Existing Pavement Areas

On July 17, 2017, GNCB hand dug shallow excavations below the existing pavement in order to determine pavement thickness and subgrade conditions. Refer to a separate GNCB Pavement Evaluation Report contained in the attached Appendix D for results of field and laboratory (grain size analysis) tests, and recommendations for pavement reclamation.

V. SUBSURFACE AND GROUNDWATER CONDITIONS:

A. Subsurface Conditions

The subsurface explorations indicated at least three subsurface deposits, a near surface man-placed fill and at some locations a subsoil, all underlain by a significant depth of outwash sand and gravel grading to sand. The subsurface strata encountered in the explorations, which are consistent with locally-available surficial geology maps of the area, are described below, progressing downward from ground surface:

Man-Placed Fill: At most test borings, a man-placed fill was encountered below the surface pavement or topsoil materials. The fill, which we suspect is due to previous site grading, is generally a brown to dark brown medium to fine SAND, little to trace silt, and gravel with trace roots. The fill is typically less than 5 ft. thick, but was as much as 7.5 ft. thick at B-4 and B-105. Outside the building areas, the site is blanketed by 2 to 5 in.

of asphalt to upwards of 10 in. of topsoil; at B-2, the concrete sidewalk was about 7 in. thick.

Subsoil: At a few test borings (B-6, B-7, B-103, and B-106), the fill was underlain by a naturally-deposited subsoil that was typically 1 to 3 ft. thick. The subsoil generally consists of a brown to dark brown or rust-brown silty fine SAND to fine sandy SILT, trace roots. At most locations, the subsoil did not exist; we suspect it was removed during previous construction. The combined thickness of surface organic soils/asphalt materials, man-placed fill, and subsoil is typical from 3.0 to 5.0 ft. in thickness, but they were as little as 1.0 ft. at B-1 and as much as 10.0 ft. at B-106.

Outwash Deposit: The dominant soil type at the site is a thick deposit of outwash, which ranged from a surface sand and gravel grading finer with depth to sand. The upper sand and gravel typically consist of a brown gravelly coarse to fine SAND, little to trace silt to a gray coarse to fine SAND. The lower finer grained outwash deposit was typically a brown medium to fine SAND, trace silt and gravel to fine SAND, little silt. The elevation top of naturally-deposited outwash is summarized on Table 1 for each test boring; in generally, the top of outwash rises towards the north, from El. 307 at B-5 to El. 329 at B-101 and B-104.

Bedrock: The test borings did not encounter bedrock, however an outcropping of bedrock was observed at the southwest corner of the new tennis court area. (Note: Documentation by school officials indicated that bedrock was needed to be removed from the existing paved roadway south of the observed outcropping.) Based on observed outcroppings and mapping completed by others, bedrock at the site is believed to be a sound gray GNEISS.

B. Groundwater Conditions

The test borings within the upper school building area did not encounter groundwater, and only two test borings at the lower athletic field (at B-7 and B-8) encountered groundwater. We suspect that groundwater is fairly level at the site and is typically between El. 273 and El. 279; this elevation is approximately at the water level of the adjacent Nonnewaug River. In any event, water levels vary with precipitation, season, and other factors. As a result, water levels encountered during and after construction may differ from those observed in the test borings.

VI. FOUNDATION AND SITE DESIGN CRITERIA:

A. Building Foundations and Ground Floor Slab

In our opinion, surface topsoil, asphalt, man-placed fill, and subsoil are not suitable to support the foundations required for the building additions. The outwash deposit is a suitable bearing material. Accordingly, we recommend that the building walls and columns be supported on reinforced concrete spread footings bearing on the naturally-deposited outwash deposit or on compacted structural fill placed on the suitable bearing soils. Ground floor slabs may be earth supported. Except for the subsoil, we recommend that the unsuitable soils noted above be removed from earth supported slabs.

The test borings suggest that the top of naturally-deposited outwash soil occurs at the following building addition locations:

Building Addition	Elevation Top Outwash (ft.)
Canopy	322.5 at B-1
Entrance	316.0 at B-2
Connector	315.0 at B-3
Extended Loading Dock	311.5 at B-4
Elevator Enclosed Egress	307.0 at B-5

Based on current design information, we recommend the following criteria for foundation design:

1. Design in accordance with the current State of Connecticut Building Code.
2. For frost protection, locate bottoms of footings at least 3.5 ft. below exterior ground surface exposed to freezing.
3. Proportion footings for a net allowable soil bearing pressure equal to 1.7 times the least footing dimension as measured in feet, up to a maximum of 5 kips per sq. ft. (ksf). The minimum footing width shall be 18 in.
4. The design allowable soil bearing pressure may be increased by 1/3 for transient loads.
5. Where compacted structural fill is used to support building footings and slabs, carry the foundation preparation and new fill to lateral limits extending a distance beyond the edge of the footing equal to the depth of fill below footing plus two feet, as shown on Drawing 3, "Limits of Compacted Structural Fill Below Footings."
6. We expect that total footing settlement will range from ½ to ¾ in. Footing settlement is expected to occur as the load is applied. We do not expect that differential settlement between footings will exceed ½ in., for footings typically spaced about 30 ft. apart.
7. Remove all topsoil, asphalt, man-placed fill, and subsoil from the new building foundation footings, and to the lateral limits required for placement of compacted structural fill. Prior to placing any

structural fill within the building, recompact the prepared subgrade with at least 6 passes of a vibratory roller that weighs at least 10 tons. Replace any soils that are visually unstable with compacted structural fill. Provide a minimum 9 in. thickness of compacted structural fill below building ground floor slabs.

B. Foundation Drainage

Due to the over 30 ft. depth of the groundwater below the building slab areas, we do not recommend an underslab drainage system at the building additions. However, for any below grade foundation walls, we recommend a perimeter drain along the outside of the wall and at an invert grade about 12 in. below the finish lowest slab grade. The perimeter drain should consist of a minimum 6 in. diameter perforated drain that is surrounded by successive 6 in. thick layers of ¾ in. crushed stone and compacted granular fill; the perforated drain must be connected to a suitable gravity outlet. In addition, the foundation wall should be damp proofed and the 3 ft. of material adjacent to the wall should consist of compacted structural fill.

C. Lateral Earth Pressures

Any exterior basement walls should be designed for soil, surcharge, and seismic loadings. Hydrostatic pressures are not considered since foundation drainage at lowest floor level is recommended. The recommended design values, assuming a fixed top of wall situation (i.e. non-cantilever walls) follows; these recommendations are described below.

- retained soil: use an equivalent fluid weight of 55 pcf, plus
- surcharge load: use 0.5 times the vertical load, distributed uniformly over the height of wall.

- seismic load: use 9.9 times the wall height, distributed uniformly over the height of the wall.

The following additional criteria apply for foundation walls:

- coefficient of friction: use 0.50 for concrete on the natural sand or compacted structural fill.
- factors of safety: 2.0 for overturning and 1.5 for sliding.

D. Seismic Criteria

Based on the test boring information, we recommend a site soil classification of Class D for seismic design. The mapped MCE spectral response acceleration values for Woodbury, Connecticut are S_1=0.065 for one second period and S_s = 0.257 or short period. The natural inorganic outwash or compacted structural fill to be placed are all not susceptible to liquefaction.

E. Compacted Fills

a. Compacted Structural Fill

Fill for use as compacted structural fill below within the building footprint, both below the footings and ground floor slab, should consist of sandy gravel or gravelly sand, free of organic material, snow, ice or other unsuitable materials, and should be well graded within the following limits:

Sieve Size	Percent Finer By Weight
4 in.	100
No. 4	20 - 80
No. 40	5 - 50
No. 200	0 – 10

Compacted structural fill should be placed in horizontal layers having a maximum loose lift thickness of 10 in. (open areas) or 6 in. (confined areas). Each layer should be compacted to a dry density at least 95 percent of the maximum dry density as determined in accordance with ASTM Test Designation D1557.

The existing on-site soils are, in general, not suitable for use as compacted structural fill. The naturally-deposited outwash soils may be a suitable material for compacted structural fill. We suggest that as excavation proceeds, the soils suspected of being a suitable compacted structural fill should be separated and tested to confirm their suitability. Appendix C includes recommended technical provisions of specifications for compacted structural fill to be placed within building limits.

b. Compacted Common Fill

Beyond the limits of compacted structural fill placed for structures, compacted common fill may be used for site grading within paved and landscape areas. The requirements for compacted structural fill shall apply for common fill, with the following exceptions:

- The maximum stone size shall be 8 in.
- The range of percent passing the No. 200 sieve shall be 0 to 25 percent.
- The fill may be placed in maximum loose lifts of 12 in., when compacted by heavy equipment.
- Fill should be systematically compacted to a dry density that is at least 93 percent of the maximum dry density as determined in accordance with ASTM D1557.
- With regard to subgrade preparation for common fill areas, remove the surface topsoil and organic soil prior to placing common fill; the existing man-placed fill may be left in place. The subgrade should be re-compacted, as described above.

- We anticipated a majority of the on-site non-organic soils to be excavated will be suitable for use as common fill, however their successful placement and compaction will be difficult due to their high silt content and susceptibility to remain saturated.

F. Site Perimeter Slopes and Retaining Walls

We are not aware of any significant cuts or fills for site design/construction. However, any permanent soil cuts within the naturally-deposited outwash soil, such as between the elevated school building and athletic fields should be no steeper than 2 hor: 1 ver. Furthermore, the slopes within any existing man-placed fill should be no steeper than 3.0 hor: 1 ver. All permanent slopes should be covered with a loam and seed. We do not anticipate that toe drains will be needed at the base of slopes.

We are also not aware of any new retaining walls. If needed, we suggest the following wall types be considered:

- Conventional reinforced concrete.
- Segmented modular blocks (such as Versa-Lok) with horizontal reinforced geogrids.
- Dry laid stone walls.

Walls should be designed for static cantilever soil loads. In addition, the backside of the walls should be lined with a pervious free draining material; the gradation for compacted structural fill contained herein is appropriate except the maximum percent finer by weight should not exceed 8 percent. We can provide specific design criteria if needed.

G. Site Pavement and Concrete Areas

Site construction includes new bituminous concrete and rigid concrete sidewalk and vehicle access/parking areas for both standard and heavy duty traffic. In addition, design may include reclaiming and/or overlay construction at existing pavement areas. We understand, however, that finish grading will be approximately similar to existing site grades.

We understand that most of the bituminous concrete and rigid concrete will be placed as a new design section. However some pavement reclamation and overlay construction are being considered. Regarding new paved areas, any existing pavement and topsoil should be removed. We anticipate that the exposed subgrade will consist of the previously placed gravel base, existing man-placed fill, and/or the natural outwash sand and gravel. In our opinion, these non-organic subgrade soils are suitable to support new bituminous or rigid concrete design sections. In small areas, such as at sidewalks, recompact the subgrade with at least four (4) passes of a small plate compactor. However, at larger vehicle areas, proof roll the exposed subgrade with at least four (4) passes of a fully loaded 10-wheel dump truck. Any visibly soft areas revealed by the recompaction or proof rolling, should be removed and replaced with compacted structural fill. Subgrades should be sloped with a minimum 0.5 percent slope to provide drainage.

We recommend the following design section for vehicle and heavy truck traffic and sidewalk areas, for bituminous and rigid concrete:

1. <u>Vehicle Traffic Areas</u> — Recommended Thickness (in.)

	PAVED AREAS		CONCRETE
	Vehicle Areas	Heavy Traffic	Heavy Duty
Bituminous Concrete (2 lifts)	3	4.5	-
Concrete	-		8
Processed Stone	-	6	6
Gravel Base (CTDOT Form 816/Sec M.02.06 Grading A)	12	8	12

2. Sidewalks/Concrete Paver Units — Recommended Thickness (in.)

	PAVED SIDEWALKS	CONCRETE SIDEWALKS	CONCRETE UNIT PAVERS
Bituminous Concrete (2 lifts)	2	-	-
Concrete	-	4	2 1/2
Processed Stone (CTDOT Form 816/Sec M.05.01)	-	4	-
Gravel Base (CTDOT Form 816/Sec M.02.06 Grading A)	6	8	6

Refer to the GNCB "Pavement Evaluation Report" (Appendix D) for further discussion and recommendations regarding overlay (at the Vo/Ag north student parking area and loop road) and reclamation (at 1971 staff parking area north of the entrance road) of existing pavement areas.

H. Tennis Court Area

Six new abutting tennis courts (orientated in the north-south direction) will be constructed within the area of the existing courts and extending to the west within an existing gravel parking area (refer to Drawing 2). We believe that the new tennis court grade will be similar to that within the existing courts (about El. 331). The existing grade, however, to the west of the existing courts requires fill placement within the north end of the gravel parking area and a cut of a few feet south of the gravel parking area (i.e. at the area of exposed rock outcropping).

Within the fill area, remove any surface organic material and raise the grade to underside of tennis court design section (per others) utilizing compacted structural fill. Within the cut area remove, soil and rock as needed to underside of tennis court design section; overexcavate any rock at the design subgrade by 12 in. and replace with compacted structural fill.

Prior to placing any of the design tennis court design section, recompact the existing soil subgrade as described above for pavement subgrade areas.

VII. CONSTRUCTION CONSIDERATIONS:

A. General

This report section provides comments related to foundation construction, earthwork, and other geotechnical aspects of the project. It will aid those responsible for preparation of contract plans and specifications and those involved with construction monitoring. The contractor must evaluate potential construction problems on the basis of their own knowledge and experience in the area and on the basis of similar projects in other localities, taking into account their own proposed construction equipment and procedures.

B. Excavation

Minimal excavation will be required within the new building addition, to remove unsuitable bearing materials. Based on the test borings, it appears that the majority of excavated soils will consist of topsoil, and existing man-placed fill within the building addition. We expect that normal construction equipment will be adequate for soil removal. Excavation geometry should conform to OSHA excavation regulations contained in 29 CFR Part 1926 dated October 31, 1989. Temporary slopes of 1.5 hor: 1 ver should be stable.

At the southwest corner of the new tennis courts, rock will need to be removed to subgrade. The rock is sound and would normally require drill and blast methods to remove. However, in view of the minimal volume (i.e. depth and footprint) of rock to be removed, we suggest that non blasting methods, such as backhoes equipped with ripping blades, impact hammers, or expansive chemicals, be used to remove rock.

Soil excavation should not be made below a 2 hor:1 ver line drawn from the outside bottom of an existing footing that remains. Excavation made below this line may require underpinning, such as conventional concrete pits with mud packing, of the existing foundation that remains.

C. Dewatering

We do not anticipate that groundwater will be a site issue. In addition, we expect that the site will drain water easily.

D. Preparation of Bearing Surfaces

Following footing excavation, we recommend that the soil bearing surfaces be recompacted with hand-guided vibratory equipment prior to forming and concreting.

E. Construction Monitoring

The recommendations contained in this report are based on the known and predictable behavior of properly engineered and constructed foundations and other facilities. During construction, it will be necessary that experienced personnel be engaged to observe the excavation of unsuitable materials, placement of compacted structural/common fill, and preparation of footing and slab bearing surfaces. As part of GNCB contracted work, we plan to visit the site several times during foundation excavation to observe prepared bearing surfaces.

VIII. LIMITATIONS OF RECOMMENDATIONS:

This report has been prepared for specific application to the Renovations to Nonnewaug High School project in Woodbury, Connecticut, in accordance with generally accepted geotechnical engineering practice. No other warranty, express of implied, is made. In the event that different subsurface soil conditions are encountered during construction, the conclusions and recommendations contained in the report must be reviewed for continued applicability to the project, and verification be documented in writing.The analyses and recommendations in this report are based in part upon data obtained from the referenced test borings. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the preliminary recommendations contained herein.

As part of our contracted scope of work, GNCB plans to review the structural foundation drawings and site drawings and specifications to confirm that our geotechnical engineering recommendations have been followed.

TABLES

I – SUMMARY OF TEST BORINGS

GNCB Consulting Engineers, P.C.

TABLE 1
SUMMARY OF TEST BORINGS

RENOVATIONS TO NONNEWAUG HIGH SCHOOL
5 MINORTOWN ROAD, WOODBURY, CONNECTICUT

TEST BORING NO.	TOTAL DEPTH (FT.)	APPROX. ELEV. GROUND SURFACE (FT.)	ELEVATION WATER (FT.)	THICKNESS SOIL (FT.)				ELEVATION TOP SAND AND GRAVEL (FT.)
				FILL	SUBSOIL	SAND AND GRAVEL	SAND	
B-1 (R)	15.5	323.5	NE	1.0	-	14.5+	-	322.5
B-2	12.0	321.0	NE	5.0	-	2.0	5.0+	316.0
B-3	32.0	318.0	NE	3.0	-	22.0	7.0+	315.0
B-4	18.0	319.0	NE	7.5	-	10.5+	-	311.5
B-5	21.0	311.0	NE	4.0	-	15.0	2.0+	307.0
B-6 (R)	11.0	288.0	NE	0.8	2.2	8.0+	-	284.5
B-7	25.5	287.0	273.0	3.5	2.0	9.5	10.5+	281.5
B-8	29.0	287.0	279.0	5.0	-	10.0	14.0+	282.0
B-101 (R)	7.5	330.5	NE	1.0	-	6.5+	-	329.5
B-102	10.5	321.0	NE	4.8	-	5.7+	-	316.2
B-103	10.5	328.0	NE	1.5	1.0	8.0+	-	325.5
B-104 (R)	8.9	329.5	NE	0.5	-	8.4+	-	329.0
B-105	10.4	325.5	NE	2.0	-	8.4+	-	323.5
B-106	11.0	318.5	NE	7.0	3.0	1.0+	-	311.5

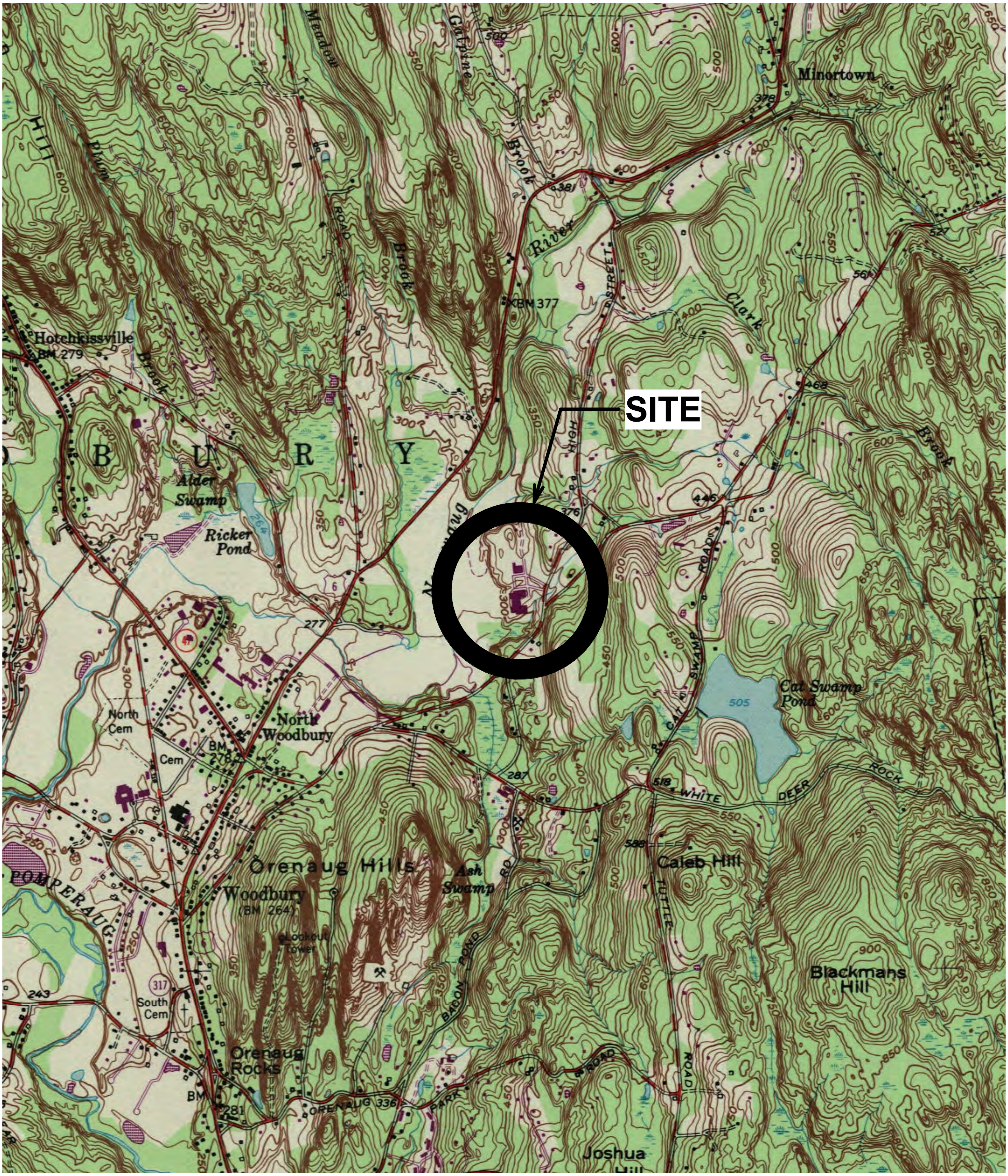
(R) Test boring refusal on Hollow Stem Augers

Notes:

1. Refer to Drawing 2 for locations of test borings
2. Elevations are in feet and refer to NAVD 88 Dorum

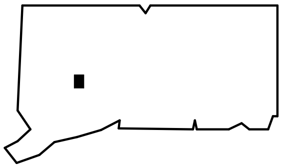
DRAWINGS

1 – PROJECT LOCUS
2 – TEST BORING PLAN
3 - LIMITS OF COMPACTED STRUCTURAL FILL BELOW FOOTINGS



N
W E
S

SITE COORDINATES: 41° 33' 26.1" N 73° 11' 22.9" W



U.S.G.S QUADRANGLE: WOODBURY, CT

GNCB
Consulting Engineers, P.C.

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GNCBENGINEERS.COM

NONNEWAUG HIGH SCHOOL RENOVATIONS
5 MINORTOWN ROAD, WOODBURY, CT

PROJECT LOCUS

1" = 2,000 FT.

AUGUST 2017

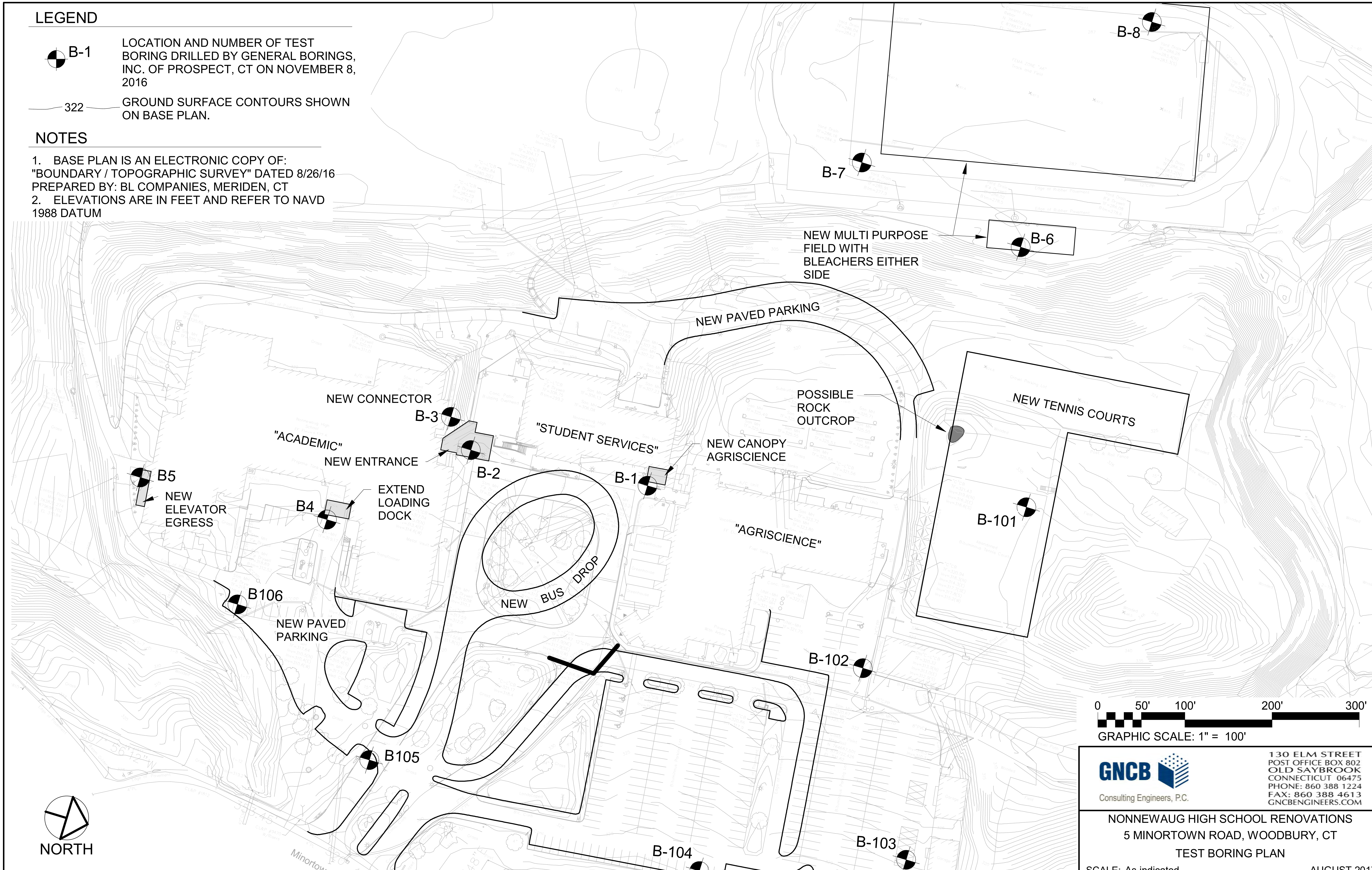
LEGEND

B-1 — LOCATION AND NUMBER OF TEST BORING DRILLED BY GENERAL BORINGS, INC. OF PROSPECT, CT ON NOVEMBER 8, 2016

322 — GROUND SURFACE CONTOURS SHOWN ON BASE PLAN.

NOTES

1. BASE PLAN IS AN ELECTRONIC COPY OF: "BOUNDARY / TOPOGRAPHIC SURVEY" DATED 8/26/16 PREPARED BY: BL COMPANIES, MERIDEN, CT
2. ELEVATIONS ARE IN FEET AND REFER TO NAVD 1988 DATUM



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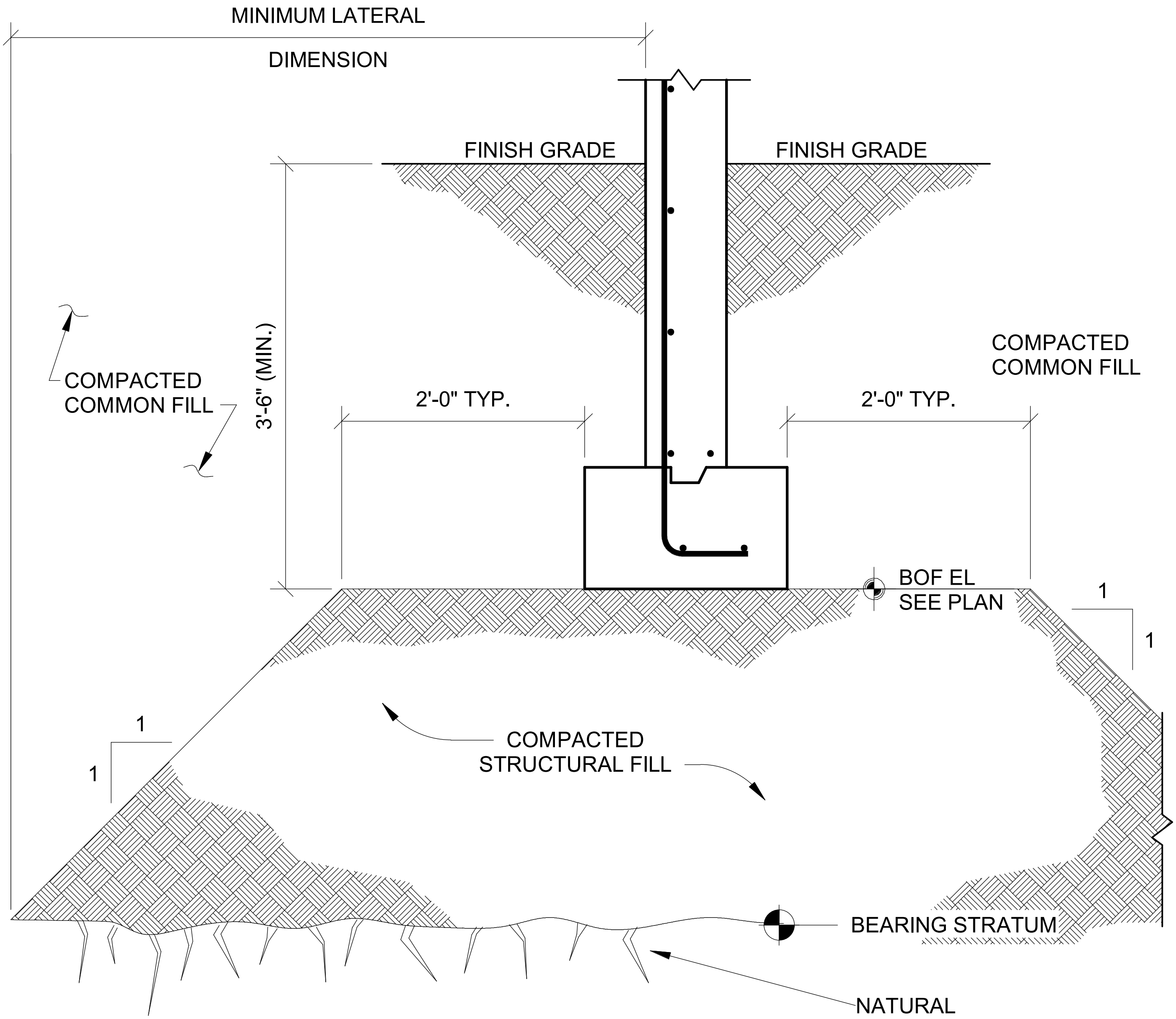
NONNEWAUG HIGH SCHOOL RENOVATIONS
5 MINORTOWN ROAD, WOODBURY, CT
TEST BORING PLAN

SCALE: As indicated — AUGUST 2017

-DRAWING 2

C:\Users\JimSchmittberger\Documents\Local Revit\16154.09 Nonnewaug High School Renovations\16154.09 S17 Nonnewaug High School Renovations- LOCAL.rvt



TYPICAL EXTERIOR WALL

GNCB
Consulting Engineers, P.C.
130 ELM STREET
POST OFFICE BOX 802
OLD SAYBROOK
CONNECTICUT 06475
PHONE: 860 388 1224
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NONNEWAUG HIGH SCHOOL RENOVATIONS
5 MINORTOWN ROAD, WOODBURY, CT

LIMITS OF COMPACTED STRUCTURAL FILL
BELOW FOOTINGS

SCALE: 3/4" = 1'-0"

AUGUST 2017

APPENDIX A

TEST BORING LOGS (B-1 TO B-8 AND B-101 TO B-106)

General Borings, Inc.

P. O. BOX 7135 PROSPECT, CT 06712

CLIENT: GNCB Consulting Engineers, P.C.			
FOREMAN/DRILLER: John Wyant	PROJECT NAME: Renovations to Nonnewaug High School		SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT		DESIGN ENGINEER
Surface Elevation: 323.5 (approx.)	GBI JOB NO. 258-16		

		TYPE			Casing	Sampler	Core Bar		
Date Started:	11/8/16		S Auger					Hole No.	B-1
Date Finished:	11/8/16		H Auger		HA	S . S.		Line & Station	
Groundwater Observations		Size I. D.			3-1/4"	1-3/8"		Offset L R	
AT None AFTER 0.0 HRS		Hammer				140 LBS.	Bit	N Coordinate	
AT AFTER HRS		Fall				30"		E. Coordinate	

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-1.1	1	13	10	SS	2	4	50/1		1.0'	3" Topsoil 1) Very loose-Dark brown loamy fine-medium SAND, some silt,. (FILL)
		3.0-3.1	2	1	0	SS	50/1					2) No recovery
5												
		5.0-7.0	3	24	16	SS	10	15	19	17	SAND AND GRAVEL	3) Medium-Brown gravelly fine-medium SAND, little silt.
		7.0-9.0	4	24	12	SS	10	21	24	24		4) Very dense-Same as S-3 (augered through cobbles 5 to 10 ft)
10												
		10.0-12.0	5	24	12	SS	13	38	27	27		5) Very dense-Same as S-3
												Augered very hard and steady14 to 15.5'
15											15.5'	Hollow auger refused at 15.5'
											EOB	END OF BORING 15.5'
20												
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet

Feet in Earth 15.5 Feet in Rock 0 No. of Samples 5 **Hole No.** B-1

SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

General Borings, Inc.

P. O. BOX 7135 PROSPECT, CT 06712

CLIENT: GNCB Consulting Engineers, P.C.		SHEET 1 OF 1	
FOREMAN/DRILLER: John Wyant	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER	
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT	DESIGN ENGINEER	
Surface Elevation: 321 (approx.)	GBI JOB NO. 258-16		

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16	S Auger		Casing	Sampler	Core Bar	Hole No. B-2
Date Finished: 11/8/16	H Auger		HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT None AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.6'	7" Concrete
		1.0-3.0	1	24	10	SS	6	6	4	4	FILL	1) Medium-Brown fine-medium SAND, some fine-medium gravel, some silt.
		3.0-5.0	2	24	33	SS	6	9	11	11		2) Medium-Same as S-1
5											5.0'	
		5.0-7.0	3	24		SS	13	13	8	6	SAND/GRAVEL 7.0'	3) Medium-Layered brown light brown fine SAND, trace silt with gravelly fine-coarse sand.
		7.0-9.0	4	24		SS	7	11	16	19		4) Medium-Brown fine-coarse SAND, trace silt.
10											SAND	
		10.0-12.0	5	24	24	SS	11	13	10	10	12.0'	5) Medium-Brown fine-medium SAND, trace silt, trace fine-medium sand.
											EOB	END OF BORING 12.0'
15												Note: Augers hit boulder from 8 to 10 ft. and became severally out of plumb. attempted to pull auger to straighten but boulders shifted and unable to auger below 8 ft. utilities in area prevented relocating the test boring.
20												
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet

Feet in Earth 12 Feet in Rock 0 No. of Samples 5 **Hole No.** B-2

SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		
FOREMAN/DRILLER: Robert Poynton	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 318 (approx.)	GBI JOB NO. 258-16	

Date Started: 11/8/16	TYPE	S Auger	Casing	Sampler	Core Bar	**Hole No.** B-3
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT None AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-2.0	1	24	10	SS	3	5	4	2	FILL	1) Medium-Dark brown fine-medium SAND and fine-medium GRAVEL, little sitl.
		2.0-3.7	2	20	8	SS	3	3	21	50/2	3.0'	2) Dense-Gray fine-coarse SAND and fine-medium GRAVEL, some medium-coarse gravel, trace silt.
5		5.0-5.3	3	5	5	SS	50/5					3) Very dense-Light gray gravelly fine coarse SAND, some meidum-coarse gravel, trace silt.
10		10.0-12.0	4	24	14	SS	30	28	31	33	SAND AND GRAVEL	4) Medium-Brown fine-coarse SAND, and coarse GRAVEL, some gray fine sand, trace silt.
15		15.0-17.0	5	24	10	SS	11	10	10	18		5) Medium-Same as S-4
20		20.0-21.5'	6	18	6	SS	40	28	35			6) Very dense-Gray fine-coarse sandy GRAVEL, (cobble in tip)
25		25.0-27.0	7	24	12	SS	25	11	10	10	25.0' SAND	7) Medium-Gray fine SAND.
30		30.0-32.0	8	18	10	SS	45	40	41		32.0'	8) Very dense-Brown fine SAND, some fine gravel.
											EOB	END OF BORING 32.0'
35												Note: Augered through numerous cobbles from 3 to 20 ft.
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet

Feet in Earth 32 Feet in Rock 0 No. of Samples 8 **Hole No.** B-3

SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		
FOREMAN/DRILLER: John Wyant	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 319 (approx.)	GBI JOB NO. 258-16	

Date Started: 11/8/16	TYPE	S Auger		Casing	Sampler	Core Bar	**Hole No.** B-4
Date Finished: 11/8/16		H Auger		HA	S . S.		Line & Station
Groundwater Observations	Size I. D.			3-1/4"	1-3/8"		Offset L R
AT Dry AFTER 0.0 HRS	Hammer				140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall				30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.3'	3" Asphalt
		1.0-3.0	1	24	10	SS	5	5	4	4		1) Loose-Brown fine-medium SAND, some fine-medium gravel, little silt.
		3.0-5.0	2	24	7	SS	4	4	2	3	FILL	2) Loose-Same as S-1, trace asphalt.
5												
		5.0-7.0	3	24	6	SS	4	3	4	3		3) Loose-Brown fine-medium SAND, little silt.
											7.5'	
		7.0-9.0	4	24	12	SS	4	8	12	14		4) Medium-Light brown fine-medium SAND, trace silt to gravelly fine-coarse sand.
10											SAND AND GRAVEL	
		10.0-12.0	5	24	16	SS	11	21	18	16		5) Dense-Brown gravelly fine-medium SAND, little silt.
15												
		15..0-17.0	6	24	18	SS	10	28	32	19		6) Very dense-Same as S-5, with weathered boulder.
											18.0'	
											EOB	END OF BORING 18.0'
20												
25												
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For		Feet
Feet in Earth	18	Feet in Rock	0	No. of Samples	6	**Hole No.** B-4
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON		
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%		

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712		SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.			
FOREMAN/DRILLER: Robert Poynton	PROJECT NAME: Renovations to Nonnewaug High School		SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT		DESIGN ENGINEER
Surface Elevation: 311 (approx.)	GBI JOB NO. 258-16		

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger				**Hole No.** B-5
Date Finished: 11/8/16		H Auger	HA	S . S.	NQ	Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"	2-1/8"	Offset L R
AT None AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"	Diamond	E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-2.0	1	24	8	SS	2	2	10	13	.3'	4" Topsoil
												1) Medium-Brown fine-medium SAND
		2.0-4.0	2	24	10	SS	13	7	7	6	FILL	and medium-coarse GRAVEL, trace
											4.0'	silt.
5												2) Medium-Same as S-1
		5.0-7.0	3	24	12	SS	10	21	18	23		3) Dense-Brown fine-medium SAND and
												(augered numerous cobbles 5 to 10 ft.)
											SAND	
											AND	
10											GRAVEL	
		10.0-12.0	4	24	12	SS	23	30	36	40		4) Very dense-Brown gravelly fine-
												coarse SAND, trace silt.
15												
		14.0-17.0	1	36	14	C						Cored Boulders 14.0'-17.0'
											19.0'	
20		19.0-21.0	5	24	12	SS	10	9	10	30	SAND	5) Medium-Stratified gray fine SAND,
											21.0'	little silt to gravelly fine-coarse sand,
											EOB	little silt.
												END OF BORING 21.0'
25												
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 18		Feet in Rock 3		No. of Samples 5	**Hole No.** B-5
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

SHEET 1 OF 1

General Borings, Inc.

P. O. BOX 7135 PROSPECT, CT 06712

CLIENT: GNCB Consulting Engineers, P.C.								SOIL ENGINEER	
FOREMAN/DRILLER: Thomas McGovern	PROJECT NAME: Renovations to Nonnewaug High School								
INSPECTOR: David Freed	LOCATION: Woodbury, CT							DESIGN ENGINEER	
Surface Elevation: 288 (approx.)	GBI JOB NO. 258-16								
Date Started: 11/8/16	TYPE	S Auger		Casing	Sampler	Core Bar		Hole No.	B-6
Date Finished: 11/8/16		H Auger		HA	S . S.			Line & Station	
Groundwater Observations	Size I. D.			3-1/4"	1-3/8"			Offset L R	
AT Dry at Completion	Hammer				140 LBS.	Bit		N Coordinate	
AT AFTER HRS	Fall				30"			E. Coordinate	

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-2.0	1	24	17	SS	2	3	5	5	.8'	10" Topsoil
											SUBSOIL	1) Loose-Medium-Dark brown loamy
		2.0-4.0	2	24	12	SS	4	4	10	25	3.0'	fine SAND with roots.
												Bottom 6" Rust brown fine sandy SILT,
5												trace roots.
		5.0-6.3	3	17	4	SS	5	42	70/5		SAND	2) Medium-Top 6" Brown silty fine
											GRAVEL	SAND, trace root.
												Bottom 6" Brown gravelly coarse-fine
												SAND, trace silt.
10												3) Very dense-Brown gravelly coarse-
		10.0-10.1	4	1	0	SS	80/1				11.0'	fine SAND, trace silt with cobbles and
											EOB	boulders at 6.0'
												4) No recovery
												Augered very hard 10.0.-11.0' on
15												boulders
												END OF BORING 11.0'
												Moved 8.0' to the North
												Hollow Auger refused at 9.0'
20												Terminated hole
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet

Feet in Earth 20 Feet in Rock 0 No. of Samples 4 **Hole No.** B-6

SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

	General Borings, Inc.	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.	P. O. BOX 7135 PROSPECT, CT 06712	
FOREMAN/DRILLER: Thomas McGovern	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: David Freed	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 287 (approx.)	GBI JOB NO. 258-16	

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger	Casing	Sampler	Core Bar	Hole No. B-7
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT 14.0 at Completion	Hammer			140 LBS.	Bit	N Coordinate
6.5' Augers in place	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-2.0	1	24	17	SS	11	21	13	7	.3'	3" Topsoil
											FILL	1) Dense-Dark brown medium-fine
		2.0-4.0	2	24	17	SS	6	6	7	13	3.5'	SAND, little silt, trace gravel.
											SUBSOIL	2) Medium-Top 13" Dark brown silty fine
5											5.5'	SAND, FILL
		5.0-7.0	3	24	10	SS	17	30	34	26		Bottom 4" Brown fine SAND.
												3) Very dense-Gray-brown gravelly
											SAND	coarse-fine SAND.
											AND	
10											GRAVEL	
		10.0-11.5	4	18	8	SS	39	43	41			4) Very dense-Brown gravelly coarse
												fine SAND, trace silt.
15												
		15.0-16.5	5	18	12	SS	10	25	22			5) Dense-Brown gravelly coarse-fine
												SAND, little silt.
20												
		20.0-21.5	6	18	15	SS	25	25	26			6) Very dense-Same as S-5
25											25.5'	
		25.0-25.5	7	6	0	SS	86/6				EOB	7) No recovery
												END OF BORING 25.5'
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 25.5		Feet in Rock 0	No. of Samples 7	Hole No. B-7	
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

CLIENT: GNCB Consulting Engineers, P.C.	**General Borings, Inc.** P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
FOREMAN/DRILLER: Thomas McGovern	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: David Freed	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 287 (approx.)	GBI JOB NO. 258-16	

Date Started:	11/8/16	TYPE	S Auger	Casing	Sampler	Core Bar	**Hole No.** B-8
Date Finished:	11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations		Size I. D.		3-1/4"	1-3/8"		Offset L R
AT 6.0 AFTER 10.0 MIN		Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS		Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0-2.0	1	24	14	SS	3	8	8	7	.3'	4" Topsoil
											FILL	1) Medium-Dark brown medium-fine
		2.0-4.0	2	24	6	SS	6	5	8	8		SAND, little silt, trace roots.
												2) Medium-Brown medium-fine SAND.
5		4.0-6.0	3	24	10	SS	4	11	26	20	5.0'	3) Dense-Top 4" Brown coarse-fine
												SAND, little silt.
		6.0-8.0	4	24	14	SS	27	27	28	29	SAND	3) Bottom 6" Brown gravelly coarse-
											AND	fine SAND, trace silt.
											GRAVEL	4) Very dense-Brown gravel coarse-
10												fine SAND, trace silt.
		10.0-12.0	5	24	14	SS	28	22	17	30		5) Dense-Brown to rust brown gravelly
												coarse-fine SAND, trace silt.
15											15.0'	
		15.0-16.5	6	18	14	SS	12	9	14		SAND	6) Medium-Brown coarse-fine SAND,
												trace silt.
20												
		20.0-21.8	7	21	14	SS	18	21	41	60/4		7) Very dense-Brown medium-fine
												SAND, trace silt.
25												
		25.0-27.0	8	24	15	SS	7	5	7	10		8) Medium-Same as S-7
											28.0'	
		27.0-29.0	9	24	21	SS					29.0'	9) Medium-Top 10" Same as S-7
30											EOB	Bottom 11" Brown fine SAND, little silt.
												END OF BORING 29.0'
												Note: Encountered running sand at and below 20 ft.. Stabilized borehole by maintaining borehole full of water.
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 29		Feet in Rock	0	No. of Samples 9	**Hole No.** B-8
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

		General Borings, Inc.			SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		P. O. BOX 7135 PROSPECT, CT 06712			
FOREMAN/DRILLER: Robert Poynton		PROJECT NAME: Renovations to Nonnewaug High School			SOIL ENGINEER
INSPECTOR: Garry Jacobson		LOCATION: Woodbury, CT			DESIGN ENGINEER
Surface Elevation: 330.5 (approx.)		GBI JOB NO. 258-16			

		TYPE		Casing	Sampler	Core Bar	
Date Started:	11/8/16	S Auger					**Hole No.** B-101
Date Finished:	11/8/16	H Auger		HA	S . S.		Line & Station
Groundwater Observations		Size I. D.		3-1/4"	1-3/8"		Offset L R
AT AFTER HRS		Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS		Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											1.0'	4" Asphalt/Tennis Court with processed crushed stone subbase (fill).
		1.0-3.0	1	24	12	SS	11	24	21	17	SAND GRAVEL	1) Dense-Light brown fine-coarse SAND, some medium-coarse gravel. (augered cobbles 1 to 5 ft.)
		3.0-3.8	2	10	8	SS	21	50/4				
5												
		5.0-6.5	3	18	12	SS	35	49	50			
											7.5' EOB	3) Very dense-Light brown fine-medium SAND, little silt. Note: Augered very hard 7 to 7.5 ft. Auger refused
10												END OF BORING 7.5' ON POSSIBLE RO
15												
20												
25												
30												
35												
40												

From Ground Surface to	Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 7.5	Feet in Rock 0	No. of Samples 3	**Hole No.** B-101	
SAMPLE TYPE CODING: SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED: TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		
FOREMAN/DRILLER: Thomas McGovern	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: David Freed	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 321 (approx.)	GBI JOB NO. 258-16	

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger	Casing	Sampler	Core Bar	**Hole No.** B-102
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT Dry AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
			1	6		A						3.5" Asphalt
		1.0-1.8	1	8	5	SS	13	502				A1) Brown medium-fine SAND, little silt.
											FILL	1) Very dense-Brown coarse-fine
		3.0-5.0	2	24	12	SS	6	3	11	31	4.8'	SAND, little gravel.
5												2) Medium-Brown coarse-fine SAND,
		5.0-5.4	3	5	3	SS	92/5				SAND	little gravel.
											GRAVEL	3) Very dense-Brown medium-fine
												SAND, little gravel.
		8.0-10.0	4	24	10	SS	13	18	25	42		4) Dense-Brown gravelly coarse-fine
10											10.5'	SAND.
		5.0-5.5	5	6		SS	97				EOB	5) Very dense-Same as S-4
												END OF BORING 10.5'
15												
20												
25												
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth	10.5	Feet in Rock	0	No. of Samples 5	**Hole No.** B-102
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		
FOREMAN/DRILLER: Thomas McGovern	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: David Freed	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 328 (approx.)	GBI JOB NO. 258-16	

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger	Casing	Sampler	Core Bar	**Hole No.** B-103
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT Dry AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.5-1.0	1	6		A					1.5'	3-1/2" Asphalt
		1.0-3.0	1	24	14	SS	9	30	27	32	2.5'	A1) Brown coarse-fine SAND, little gravel, trace silt (FILL)
		3.0-4.7	2	19	16	SS	30	27	21	20/1	SAND AND GRAVEL	1) Dense-Brown medium-fine SAND.
5												Middle 6" Brown silty fine SAND, (subsoil)
		5.0-6.1	3	12	10	SS	29	62	50/.5			Bottom 4" Brown gravelly coarse-fine SAND.
												2) Vey dense-Brown gravelly coarse-fine SAND, trace silt.
10		9.0-10.5	4	18	10	SS	19	32	31		10.5'	
											EOB	3) Very dense-Same as S-2
												4)
												END OF BORING 10.5'
15												
20												
25												
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 10.5		Feet in Rock 0	No. of Samples 4	**Hole No.** B-103	
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712		SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.			
FOREMAN/DRILLER: Robert Poynton	PROJECT NAME: Renovations to Nonnewaug High School		SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION:	Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 329.5 (approx.)	GBI JOB NO.	258-16	

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger				**Hole No.** B-104
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT None AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.5-1.0	1			A					1.0'	3" Asphalt
		1.0-3.0	1	24	18	SS	9	13	19	32		A1) Brown gravelly fine-medium SAND.
		3.0-3.4	2	5	5	SS	50/5				SAND	1) Dense-Brown gravelly fine-medium SAND, little silt.
5											AND	
		5.0-6.8	3	21	16	SS	17	33	35	50/3	GRAVEL	2) Very dense-Light brown fine-coarse SAND and fine-medium GRAVEL.
											8.9'	
		8.0-8.9	4	11	6	SS	31	50/5			EOB	3) Very dense-Brown fine-coarse SAND and fine-medium GRAVEL, some light gray fine-medium gravel, trace silt.
10												4) Very dense-Same as S-3
												END OF BORING 8.9'
15												
20												
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet

Feet in Earth 8.9 Feet in Rock 0 No. of Samples 4 **Hole No.** B-104

SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

		SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.	**General Borings, Inc.** P. O. BOX 7135 PROSPECT, CT 06712	
FOREMAN/DRILLER: John Wyant		SOIL ENGINEER
	PROJECT NAME: Renovations to Nonnewaug High School	
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 325.5 (approx.)	GBI JOB NO. 258-16	

	TYPE		Casing	Sampler	Core Bar	
Date Started: 11/8/16		S Auger	Casing	Sampler	Core Bar	**Hole No.** B-105
Date Finished: 11/8/16		H Auger	HA	S . S.		Line & Station
Groundwater Observations	Size I. D.		3-1/4"	1-3/8"		Offset L R
AT None AFTER 0.0 HRS	Hammer			140 LBS.	Bit	N Coordinate
AT AFTER HRS	Fall			30"		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.2'	2" Asphalt
		1.0-3.0	1	24	14	SS	11	27	16	15	2.0'	1) Medium-Brown fine-medium SAND, and GRAVEL, little silt, with asphalt fragments.
		3.0-5.0.	2	24	8	SS	10	8	5	5		
5												2) Medium-Brown gravelly fine-coarse SAND.
		5.0-7.0	3	24	14	SS	7	15	17	16		3) Dense-Brown fine-medium SAND, trace fine-medium gravel, trace silt.
		7.0-9.0	4	24		SS	12	10	41	48		4) Very dense-Brown fine-medium SAND, some silt, little fine-medium gravel, layer of dark brown sand and silt.
10											10.4'	
		10.0-10.4	5	5	5	SS	100/5				EOB	5) Very dense-Brown fine SAND, with gray weatehred cobble and rock in tip
15												END OF BORING 10.4'
20												
25												
30												
35												
40												

From Ground Surface to	Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth 10.4	Feet in Rock 0		No. of Samples 5	**Hole No.** B-105
SAMPLE TYPE CODING: SS = DRIVEN	C = CORE		A = AUGER	U = UNDISTURBED PISTON
PROPORTIONS USED: TRACE = 1-10%	LITTLE = 10-20%		SOME = 20-35%	AND = 35-50%

	General Borings, Inc. P. O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1
CLIENT: GNCB Consulting Engineers, P.C.		
FOREMAN/DRILLER: John Wyant	PROJECT NAME: Renovations to Nonnewaug High School	SOIL ENGINEER
INSPECTOR: Garry Jacobson	LOCATION: Woodbury, CT	DESIGN ENGINEER
Surface Elevation: 318.5 (approx.)	GBI JOB NO. 258-16	

		TYPE		Casing	Sampler	Core Bar		
Date Started:	11/8/16		S Auger	Casing	Sampler	Core Bar	**Hole No.**	B-106
Date Finished:	11/8/16		H Auger	HA	S . S.		Line & Station	
Groundwater Observations		Size I. D.		3-1/4"	1-3/8"		Offset L R	
AT None AFTER 0.0 HRS		Hammer			140 LBS.	Bit	N Coordinate	
AT AFTER HRS		Fall			30"		E. Coordinate	

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. IN	REC. IN	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0-6	6-12	12 18	18 24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.3'	4" Asphalt
		1.0-3.0	1	24	18	SS	8	10	16	29		1) Medium-Brown fine-medium SAND, some silt, some fine-medium gravel.
		3.0-5.0	2	24	7	SS	19	15	7	10	FILL	2) Medium-Same as S-1
5												
		5.0-7.0	3	24	6	SS	7	6	5	8	7.0'	3) Medium-Light brown fine SAND, some silt, some fine-medium gravel.
		7.0-9.0	4	24	10	SS	4	4	4	6	SUBSOIL	4) Loose-Light brown orange-brown fine SAND, some silt, little fine-medium gravel.
10		9.0-11.0	5	24	20	SS	4	3	15	29	10.0'	
											11.0'	5) Medium-Gray-brown fine SAND, little silt, little fine-medium gravel.
											EOB	END OF BORING 11.0'
15												
20												
25												
30												
35												
40												

From Ground Surface to		Feet Used	in. Casing Then	in. Casing For	Feet
Feet in Earth	11	Feet in Rock	0	No. of Samples 5	**Hole No.** B-106
SAMPLE TYPE CODING:	SS = DRIVEN	C = CORE	A = AUGER	U = UNDISTURBED PISTON	
PROPORTIONS USED:	TRACE = 1-10%	LITTLE = 10-20%	SOME = 20-35%	AND = 35-50%	

APPENDIX B

GRAIN SIZE DISTRIBUTION TESTS

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WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 11/10/2016
SAMPLE: B101

MOIST WEIGHT	=	0.234 Kg
TOTAL DRY WEIGHT	=	0.224 Kg
DRY WEIGHT AFTER WASH	=	0.204 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.030	13.4%	86.6%
3/4"	19.0	0.000	0.0%	86.6%
1/2"	12.5	0.026	11.6%	75.0%
#4	4.75	0.038	17.0%	58.0%
#10	2.00	0.022	9.8%	48.2%
#20	0.850	0.020	8.9%	39.3%
#40	0.425	0.018	8.0%	31.3%
#60	0.250	0.016	7.1%	24.1%
#80	0.180	0.010	4.5%	19.6%
#100	0.150	0.004	1.8%	17.9%
#140	0.106	0.010	4.5%	13.4%
#200	0.075	0.010	4.5%	8.9%
Passing #200		0.020	8.9%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content 4.46%

Unified Soil Classification System
Grain Size Comparison

Cobbles	0.0%
Coarse Gravel	13.4%
Fine Gravel	28.6%
Coarse Sand	9.8%
Medium Sand	17.0%
Fine Sand	22.3%
Silt & Clay	8.9%

Uniformity Coeff. 68.50

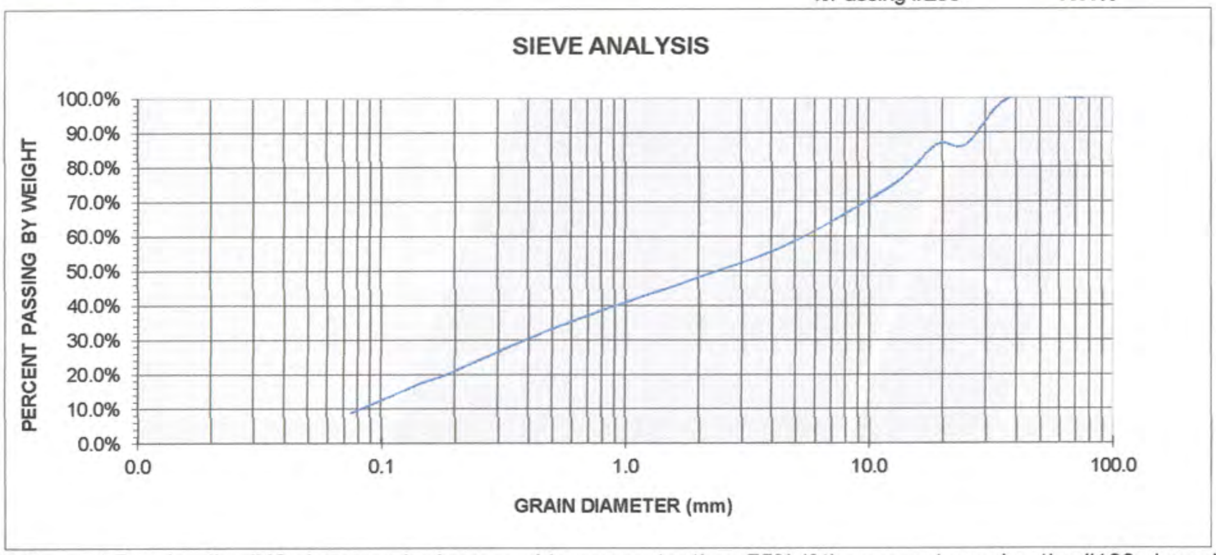
Permeability Range **

Dense	8 ft/day
Loose	23 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4 42.0%

% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	83.1%	70%-100%
%Passing #40	53.8%	*10%-50%
%Passing #100	30.8%	0%-20%
%Passing #200	15.4%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size. Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day. Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

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WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 11/10/2016
SAMPLE: B102

MOIST WEIGHT	=	0.248 Kg
TOTAL DRY WEIGHT	=	0.23 Kg
DRY WEIGHT AFTER WASH	=	0.190 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.000	0.0%	100.0%
3/4"	19.0	0.000	0.0%	100.0%
1/2"	12.5	0.010	4.3%	95.7%
#4	4.75	0.044	19.1%	76.5%
#10	2.00	0.026	11.3%	65.2%
#20	0.850	0.024	10.4%	54.8%
#40	0.425	0.020	8.7%	46.1%
#60	0.250	0.018	7.8%	38.3%
#80	0.180	0.014	6.1%	32.2%
#100	0.150	0.008	3.5%	28.7%
#140	0.106	0.014	6.1%	22.6%
#200	0.075	0.012	5.2%	17.4%
Passing #200		0.040	17.4%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	7.83%

Unified Soil Classification System

Grain Size Comparison

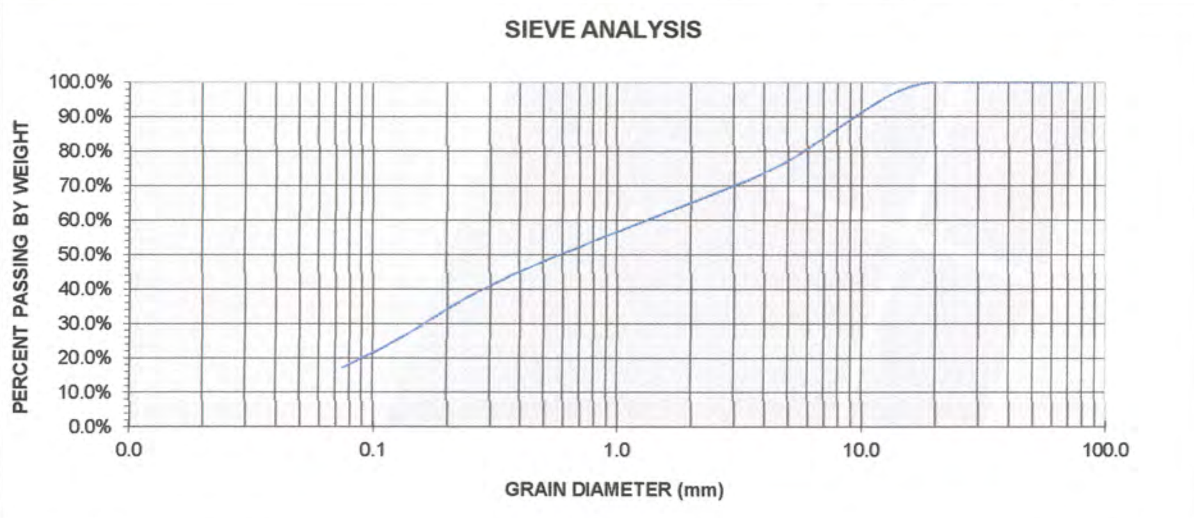
Cobbles	0.0%
Coarse Gravel	0.0%
Fine Gravel	23.5%
Coarse Sand	11.3%
Medium Sand	19.1%
Fine Sand	28.7%
Silt & Clay	17.4%
Uniformity Coeff.	33.04

Permeability Range **

Dense	2 ft/day
Loose	6 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	23.5%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	85.2%	70%-100%
%Passing #40	60.2%	*10%-50%
%Passing #100	37.5%	0%-20%
%Passing #200	22.7%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when $D_{10} < .1$mm or $D_{10} > 3$mm

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SINCE 1966

WASHED SIEVE ANALYSIS

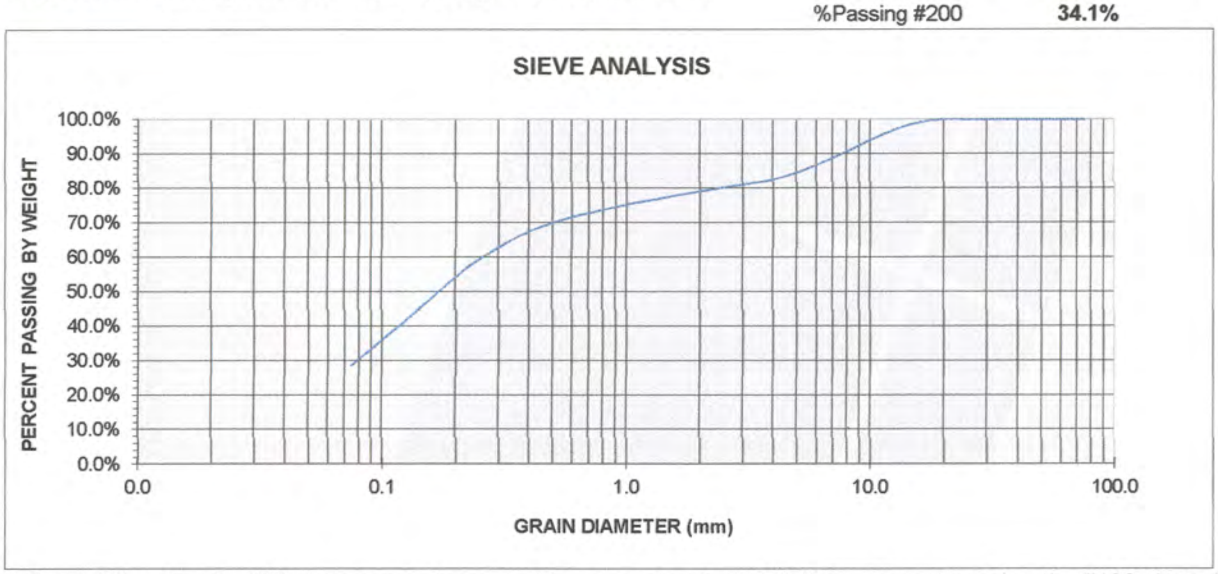
CLIENT: GNCB CONSULTING ENGINEERS
DATE: 11/10/2016
SAMPLE: B104

MOIST WEIGHT	=	0.218 Kg
TOTAL DRY WEIGHT	=	0.202 Kg
DRY WEIGHT AFTER WASH	=	0.144 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.000	0.0%	100.0%
3/4"	19.0	0.000	0.0%	100.0%
1/2"	12.5	0.006	3.0%	97.0%
#4	4.75	0.026	12.9%	84.2%
#10	2.00	0.010	5.0%	79.2%
#20	0.850	0.010	5.0%	74.3%
#40	0.425	0.012	5.9%	68.3%
#60	0.250	0.018	8.9%	59.4%
#80	0.180	0.016	7.9%	51.5%
#100	0.150	0.010	5.0%	46.5%
#140	0.106	0.018	8.9%	37.6%
#200	0.075	0.018	8.9%	28.7%
Passing #200		0.058	28.7%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	7.92%	
Unified Soil Classification System		
Grain Size Comparison		
Cobbles	0.0%	
Coarse Gravel	0.0%	
Fine Gravel	15.8%	
Coarse Sand	5.0%	
Medium Sand	10.9%	
Fine Sand	39.6%	
Silt & Clay	28.7%	
Uniformity Coeff.	10.02	
Permeability Range **		
Dense	1 ft/day	
Loose	2 ft/day	
2000 CT. Health Code Septic Fill Specs		
%Retained on #4	15.8%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	94.1%	70%-100%
%Passing #40	81.2%	*10%-50%
%Passing #100	55.3%	0%-20%
%Passing #200	34.1%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

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WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 11/10/2016
SAMPLE: B106

MOIST WEIGHT	=	**0.31 Kg**
TOTAL DRY WEIGHT	=	**0.292 Kg**
DRY WEIGHT AFTER WASH	=	**0.240 Kg**

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	**75.0**	0.000	0.0%	100.0%
1 1/2"	**37.5**	0.000	0.0%	100.0%
1"	**25.0**	0.000	0.0%	100.0%
3/4"	**19.0**	0.000	0.0%	100.0%
1/2"	**12.5**	0.010	3.4%	96.6%
#4	**4.75**	0.058	19.9%	76.7%
#10	**2.00**	0.042	14.4%	62.3%
#20	**0.850**	0.034	11.6%	50.7%
#40	**0.425**	0.024	8.2%	42.5%
#60	**0.250**	0.022	7.5%	34.9%
#80	**0.180**	0.016	5.5%	29.5%
#100	**0.150**	0.008	2.7%	26.7%
#140	**0.106**	0.014	4.8%	21.9%
#200	**0.075**	0.012	4.1%	17.8%
Passing #200		0.052	17.8%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	**6.16%**

Unified Soil Classification System
Grain Size Comparison

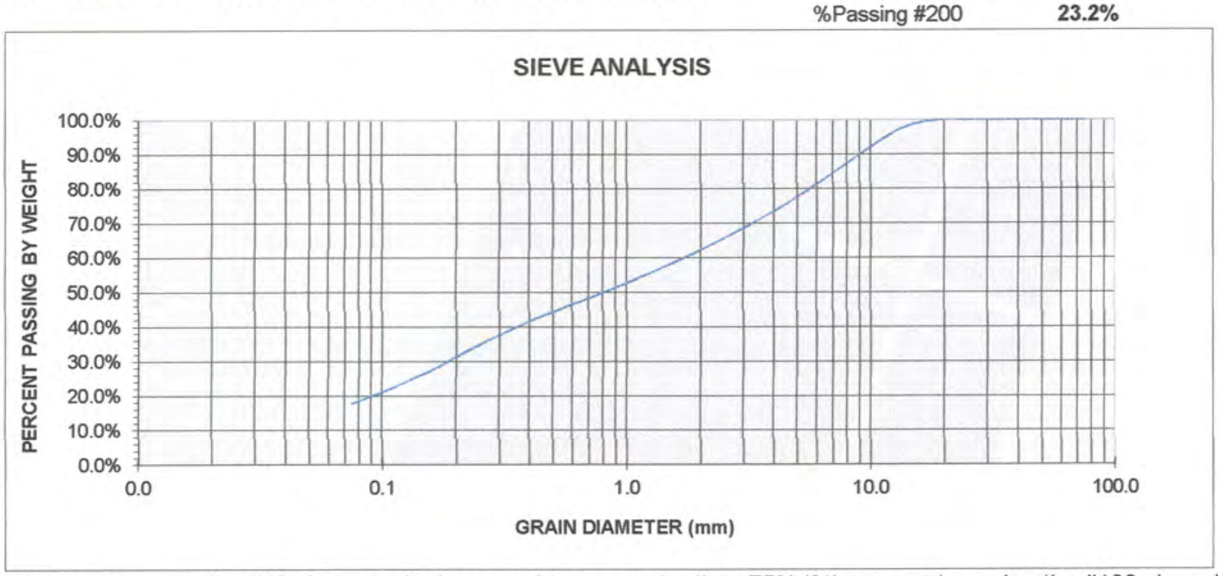
Cobbles	**0.0%**
Coarse Gravel	**0.0%**
Fine Gravel	**23.3%**
Coarse Sand	**14.4%**
Medium Sand	**19.9%**
Fine Sand	**24.7%**
Silt & Clay	**17.8%**
Uniformity Coeff.	**42.03**

Permeability Range **

Dense	2 ft/day
Loose	6 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	**23.3%**	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	**100.0%**	**100%**
%Passing #10	**81.3%**	**70%-100%**
%Passing #40	**55.4%**	***10%-50%**
%Passing #100	**34.8%**	**0%-20%**
%Passing #200	**23.2%**	**0%-5%**



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

233 Boston Post Rd. • P.O. Box 608 • Old Saybrook, CT 06475 • Tel: 860-388-4671 • Fax: 860-388-3962

APPENDIX C

TECHNICAL SPECIFICATION FOR COMPACTED STRUCTURAL FILL

TECHNICAL PROVISIONS OF SPECIFICATIONS
FOR COMPACTED STRUCTURAL FILL

PART 1 – GENERAL:

1.01 DESCRIPTION OF WORK

The work covered by this specification consists of furnishing all plant, labor, equipment and materials and performing all operations in connection with excavation, preparation of subgrade, and providing, placing and compacting Structural Fill within the building.

1.02 QUALITY ASSURANCE

Monitoring of earthwork operations will be provided by the Owner. Suitable test methods for the Owner's testing laboratory to determine the in-place dry density of the compacted lifts include: ASTM D6938-10 (Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods, ASTM D1556-07 (Standard Test Method for Density and Unit Weight of Soil In Place by the Sand Cone Method), or other methods approved by the Engineer.

The Contractor shall not place a layer of fill until the Owner has observed the underlying materials.

PART 2 – PRODUCTS:

2.01 STRUCTURAL FILL

Structural fill shall be suitable gravel, sandy gravel, or gravelly sand, free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material and shall be well-graded within the following limits:

Sieve Size	Percent Finer by Weight
4 inches	100
No. 4	20 – 80
No. 40	5 – 50
No. 200	0 – 10

Excavated material is not suitable for use as Structural Fill. The inorganic excavated materials may be used as common fill outside the building limits or may be disposed of in accordance with arrangements previously made with the Owner. Organic soil and surplus excavated soil shall be legally disposed of.

All material is subject to approval by the Owner's representative.

PART 3 – EXECUTION:

3.01 SUBGRADE PREPARATION

Remove all topsoil and other unsuitable materials from the area of the building and to lateral limits extended beyond the footings a distance equal to the depth of fill required below the footing plus two feet. Upon completion of the excavation, the soil subgrade shall be compacted by at least six coverages with the treads of a crawler type tractor weighing at least 30,000 pounds, with the rear wheels of a fully loaded ten-wheel dump truck, or by a suitable 10-ton vibratory roller as approved by the Owner. Where, in the opinion of the Owner, compaction of the subgrade is not desirable, the above compaction requirements will be waived.

3.02 PLACEMENT OF COMPACTED SRUCTURAL FILL

Structural fill shall be placed in layers not to exceed ten inches in thickness as measured before compaction. Each layer shall be compacted by a minimum of four coverages with the equipment described below to a dry density at least 95 percent of maximum dry density as determined by ASTM Test D1557. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum four coverages.

Compaction equipment in open areas shall consist of vibratory rollers, fully loaded ten-wheel dump trucks, or other compaction equipment approved by the Owner. Compaction equipment in confined areas (in trenches and adjacent to walls, piers and footings) shall consist of hand-guided vibratory equipment or mechanical tampers as approved by the Owner. Layer thickness prior to compaction, shall not exceed nine inches or 6 inches when using hand guided vibratory compactors..

All fill material shall be placed and compacted "in-the-dry". The Contractor shall dewater excavated areas as required to perform the work and in such a manner as to preserve the undisturbed state of the existing soil subgrade.

The Contractor shall not place a layer of compacted structural fill on snow, ice or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory materials will be required as directed by the Owner.

In freezing weather, a layer of fill shall not be left in an uncompacted state at the close of a day's operations. Prior to terminating operations for the day, the final layer of fill, after compaction, shall be rolled with a smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks and compaction equipment.

Compacted fill shall not be placed when temperatures are below freezing.

APPENDIX D

PAVEMENT EVALUATION REPORT PREPARED BY GNCB

GNCB
Consulting Engineers, P.C.
Structural Engineering
Geotechnical Engineering
Historic Preservation
Construction Support

August 16, 2017

Regional School District #14
c/o Colliers International
35 New Road
Madison, Connecticut 06443

Attention: Mr. Scott Pellman

Re: Pavement Evaluation at Nonnewaug High School
5 Minortown Road, Woodbury, Connecticut
State Project #214-0093 EA

Dear Mr. Pellman:

The letter summarizes our field and laboratory testing and conclusions regarding new paved areas associated with Renovations to the Nonnewaug High School project in Woodbury, Connecticut. Specifically, we have been requested to comment on new paved areas within areas already paved (refer to the shaded areas identified on the attached Drawing 1) to determine if cold reclamation or overlay procedures are a viable alternate to total replaced with a new design pavement section. Our work was undertaken in accordance with our revised contract agreement for additional services dated July 7, 2017, as authorized.

In summary, GNCB with the assistance of a general contractor, hand excavated 11 explorations (numbered P-1 to P-5, P-7, P-11, and P-13 to P-16) to depths about 12 in., at the approximate locations shown on Drawing 1, “Pavement Evaluation – Key Plan”. Table I summarizes the pertinent information observed at each exploration and Appendix A includes the Laboratory Grain Size Distribution Tests completed for each soil sample recovered within a depth of about 6 in. directly below the pavement. Despite the varied times of the original pavement construction dating back to 1971, the field and laboratory work revealed somewhat similar conditions at the paved areas, namely a surface 2 to 4 in. thick pavement, up to 10 in. of a granular “base” fill, which is further underlain by naturally deposited sand and gravel; both these soils are free draining material. In view of the favorable granular “base” fill at the site and underlying natural sand and gravel, we believe that most of the existing pavement areas are suitable for reclamation or overlay; please see the end of the report for specific recommendations. Our comments follow:

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lastname@gncbengineers.com
gncbengineers.com

GNCB Consulting Engineers, P.C.

INTRODUCTION AND SCOPE OF WORK

The upcoming renovations to Nonnewaug High School include bituminous paving within both existing paved areas and within new unpaved areas. The following are the main areas of paving within existing paved areas (i.e. shaded areas shown on Drawing 1):

1. Existing 1971 Parking Area north of existing Entrance Area.
2. Existing 1997 Vo/Ag Expansion Parking Area
3. Loop Road around existing building but south of rear loading dock.
4. Rear Loading Dock.
5. Loop Road south of the Existing/New Tennis Area
6. South Road to Athletic Fields.

The GNCB August 16, 2017 geotechnical engineering report provides recommendations for design pavement section, for both vehicle and heavy traffic areas. This letter report addresses the existing paved areas noted above and recommends for either total replacement (per GNCB report), or alternate pavement cold reclamation or overlay treatment.

The project architect (S.L.A.M.) has compiled the historic understanding of the pavement areas with respect to when various areas were paved and or last corrected. The attached Drawing 1 summarizes this historic perspective.

In order to evaluate the existing paved areas and to develop recommendations for alternate treatment, GNCB completed the following scope of work:

1. Documented existing pavement conditions with respect to crack, crack widths, and other pavement deformities.
2. Removed pavement and hand excavated 11 explorations to determine the thickness of pavement and identify subgrade conditions.
3. Submit soil samples recovered from the hand dug explorations to a soils laboratory for grain size analysis and water content determination.
4. Complete engineering analysis of the field and laboratory information, and developed recommendations for treatment of existing paved areas.

FIELD AND LABORATORY WORK

Field Work: On July 17, 2017, GNCB hand excavated at 11 locations (P-1 to P-5, P-7, P-11 and P-13 to P-16) to determine the thickness of pavement and to observe the soils directly below the pavement. At each location, Verdi Construction, under contract to GNCB, dry saw cut an approximately 12 in. square opening and sealed the opening with concrete once GNCB completed its examination. As instructed, GNCB marked and stored the pavement cuts in the existing tennis courts. The hand excavated holes were typically from 9.5 to 12 in. deep, however a 2.5 ft. deep excavation was made at P-16 where shallow bedrock was suspected. The attached Table I summarizes the pertinent information obtained at each hand excavation.

At each excavation, an approximately one-gallon bag sample of soil, from directly under the pavement for a depth of about 6 in., was obtained. In nearly all cases, the soil directly below the pavement was a man-placed "gravel base" fill.

In addition to the hand dug excavations, GNCB also documented the surface pavement conditions on July 17 and 18, 2017, with respect to the location and size of cracks and noting other pavement deformities, such as alligator cracks, placement seams, patched and/or sealed areas. The GNCB observations at the two large parking areas between the building and Minortown Road (Area A) and along the access way into the site (Area B) are shown on the attached Drawing 2.

Laboratory Soil Testing: In order to quantify the gradation of the soil materials encountered below the pavement, Angus McDonald Gary Sharpe & Associates of Old Saybrook, Connecticut, under contract to GNCB, completed a (washed) grain size distribution test (ASTM D422) and water content (ASTM D2216) on each recovered sample. These test results are summarized in the attached Appendix A.

DISCUSSION

The field and laboratory testing revealed the following conditions at existing paved areas to be repaved (refer to Table I):

Range in Thickness (in.)	Description
2 to 5	Bituminous Pavement separated into an upper and lower coarse
0 to 10	Brown gravelly coarse to fine SAND, trace silt (GRAVEL BASE).
Up to 10	Light brown coarse to fine SAND, little to trace silt (NATURAL OUTWASH)

The attached Drawing 2, "Pavement Documentation" summarizes GNCB documented pavement conditions within the parking area (Area A) and the adjacent south access way to the new entrance road (Area B). This drawing depicts the approximate orientation and width of pavement cracks and other observed deformities in the pavement surface. We note that the south parking area (i.e. 1971 vintage pavement) contains a significantly wider and more frequent crack pattern than the northern parking area (1997 Vo/Ag expansion area).

The loop road around the building and rear loading dock areas were also documented; the information is in our files. In summary, the loop road contains series of fine, 1/8 in. to ½ in. wide cracks, spaced about 10 to 20 ft. apart that are orientated perpendicular to the paved surface. In addition, a few 1/8 in. wide

GNCB
Consulting Engineers, P.C.

cracks were noted parallel to the outside edge of the paved surface. The rear loading dock area is somewhat free but not absent of a few cracks that range from 1/8 to ¾ in. wide; in addition, the northeast corner of the dock has a small pavement patch that is slightly depressed.

As indicated, a laboratory grain size analysis was completed on all the soil samples recovered within the 6 in. depth the underside of pavement (see Appendix A). Of note is the similarity of the test results, indicating that the pavement courses were placed on a free draining sand and gravel, believed to be obtained from on site. As summarized on Table I, the percent finer by weight for the 11 tested samples was typically from 3 to 8 percent with one sample at 11 percent (at P7).

A reclamation procedure would normally crush the existing pavement and top few inches of the soil subgrade. To quantify the probably gradation for a pavement-soil reclamation of the existing pavement, GNCB prepared the graphic plots shown in Appendix B. These plots show the potential gradation for the pavement (crushed down to a well graded minus ¾ in. material) and a few inches of the underlying soil; we assumed the total amount of crushed (pavement and soil) material would penetrate to a depth about 8 in. below the pavement surface. As noted, the combined crushed material has a percent finer by weight that ranges from 2 to 6 percent; again a well graded free draining material that would satisfy the CT DOT processed stone and gravel base gradation specifications.

RECOMMENDATIONS

In our opinion, the favorable soils encountered below the existing pavement are suitable for reclamation or overlay procedures. Specifically, we recommend the following:

1. The entire loop road, downhill south road to the athletic fields, and 1997 vintage Vo/Ag parking areas be overlayed. We suggest a minimum 1 in. thickness of overlay pavement which provide a minimum 3 in. and up to 5 in. of total pavement thickness.

2. The 1971 vintage parking area should be reclaimed, and not simply overlayed. Of concern is the age of the pavement surface, the somewhat reduced (2 to 3 in.) thickness of the existing pavement, and frequency and size of existing cracks many of which have been previously sealed and many cracks have exposed grass and vegetation. Once the existing surface has been reclaimed, to a depth of about 8 in., we suggest that 3 in. of pavement be placed in two layers on the prepared reclaimed surface.

3. Regarding the rear loading dock area, we suggest that the heavy truck use of this area and frequent turning, would demand a total replacement of the pavement design section, per GNCB previous recommendations.

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Consulting Engineers, P.C.

4. As demonstrated by the theoretical pavement-soil reclamation material contained in Appendix B of this letter report, the reclaimed-soil mixture may be used as gravel base for new design pavement sections, provided the reclaimed material satisfies project specifications. For environmental concerns, the soil-reclaimed material may not be used as fill or compacted structural fill at building or site areas.

We appreciate the opportunity to work with you on this aspect of the project. If you have any questions, or need additional information, please call.

Sincerely yours,

David L. Freed, PE
Geotechnical Associate

Enclosures:

Table I – Summary of Pavement Excavations
Drawing 1 – Pavement Evaluation – Key Plan
Drawing 2 – Pavement Conditions – Area A and B
Appendix A – Graphic Plots of Grain Size Distribution Tests
Appendix B – Graphic Plots of Reclaimed Pavement

TABLES

TABLE I

SUMMARY OF PAVEMENT EXPLORATIONS

NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

PAVEMENT EXPLORATION NUMBER	TOTAL DEPTH (FT./IN.)	THICKNESS PAVEMENT (FT./IN.)			FILL BELOW PAVEMENT [1]			THICKNESS NATURAL SAND AND GRAVEL BELOW FILL (FT./IN.)
		TOP	BOTTOM	TOTAL	THICKNESS (FT./IN.)	WATER CONTENT (%)	% FINER BY WEIGHT	
P1	0.9/11.0	0.15/1.5	0.20/2.5	0.35/4	0.25/3	3.6	3.0	0.3/4
P2	1.0/12.0	0.22/2.5	0.18/2	0.4/4.5	0.6/7	5.2	6.4	N.E.
P3	1.0/12.0	0.15/1.5	0.13/1.5	0.28/3	0.32/4	3.5	3.3	0.4/5
P4	1.0/12.0	0.09/1	0.17/2	0.26/3	N.E.	2.8	6.0	0.74/9
P5	1.0/12.0	0.08/1	0.08/1	0.16/2	N.E.	3.7	7.7	0.84/10
P7	0.8/9.5	0.10/1	0.20/2.5	0.3/3.5	0.5/6	5.1	11.1	N.E.
P11	1.0/12.0	0.15/2	0.10/1	0.25/3	0.75/9	5.2	8.6	N.E.
P13	1.0/12.0	- [2]	- [2]	0.17/2	0.33/4	4.3	6.6	0.5/6
P14	1.0/12.0	0.13/1.5	0.20/2.5	0.33/4	0.67/8	3.8	7.3	N.E.
P15	1.0/12.0	0.06/0.5	0.12/1.5	0.18/2	0.82/10	4.3	7.1	N.E.
P16	2.5/30.0	0.12/1.5	0.16/2	0.28/3.5	0.52/6	4.5	7.6	1.7/20.5

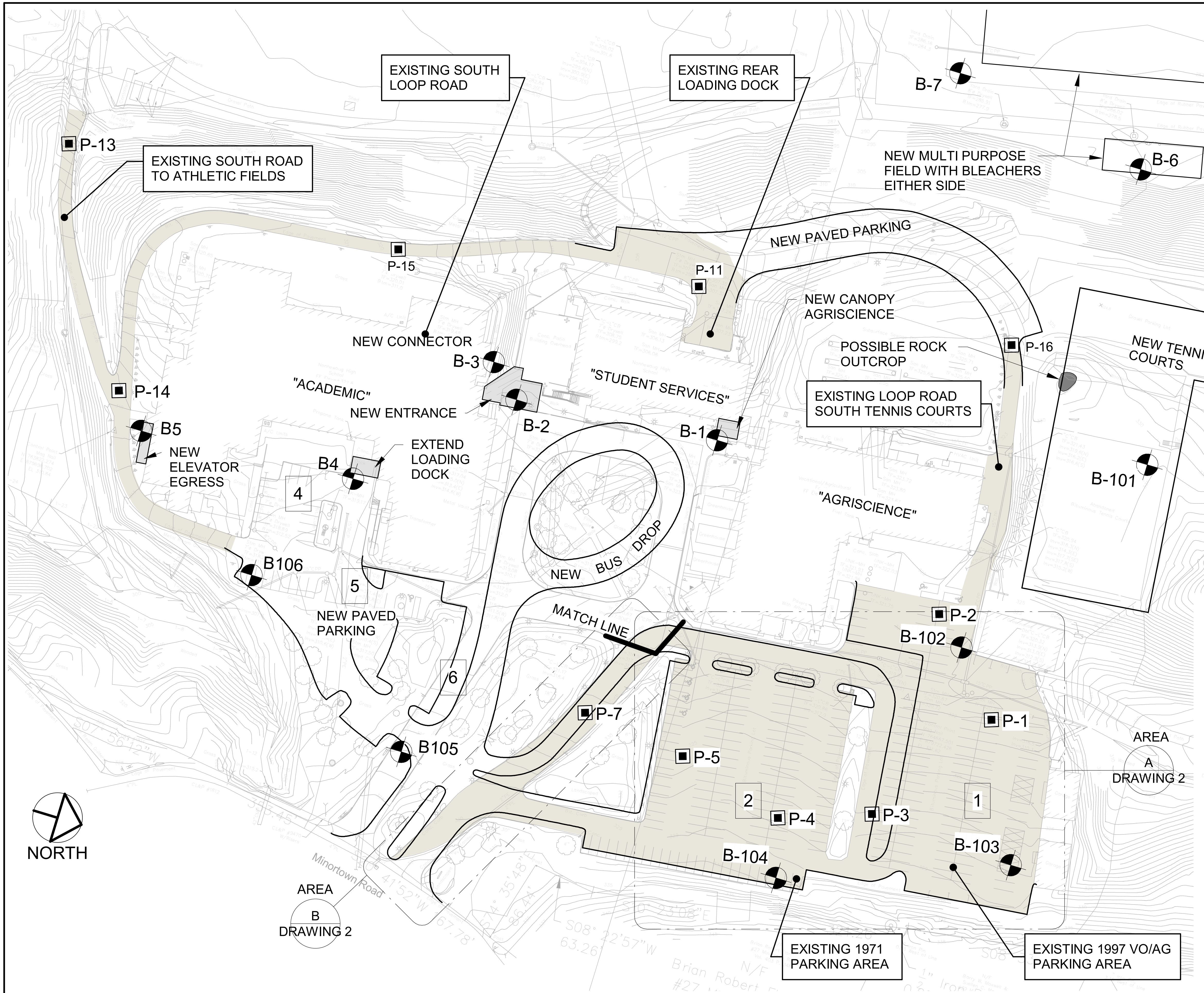
N.E. Not encountered

[1] Refer to Appendix A for results of Grain Size Analysis and Water Content
[2] Not possible to differentiate between a pavement top and bottom layer.

NOTES:

1. Refer to Drawing 1 for locations of Pavement Explorations.

DRAWINGS



LEGEND-

B-1	DESIGN PHASE TEST BORING DRILLED IN 2016
P-1	APPROXIMATE LOCATION OF PAVEMENT EXPLORATION HAND DUG BY GNCB ON JULY, 17 2017
(shaded)	SHADED AREA CONSIDERED FOR ALTERNATE TREATMENT BY RECLAMATION OVERLAY

PAVEMENT LEGEND

1	PAVEMENT INDICATED AS DETERIORATED ON 1998 SURVEY (PROBABLY UPDATED DURING ~1997 Vo/Ag EXPANSION)
2	PAVEMENT ORIGINALLY INSTALLED IN 1971
3	PAVEMENT PROBABLY NEW FOR ~1997 Vo/Ag EXPANSION
4	PAVEMENT ORIGINALLY INSTALLED IN 1998
5	PAVEMENT RESURFACED IN 1998
6	EXISTING PAVEMENT ON 1998 SURVEY (INSTALLED BETWEEN 1971 AND 1998)

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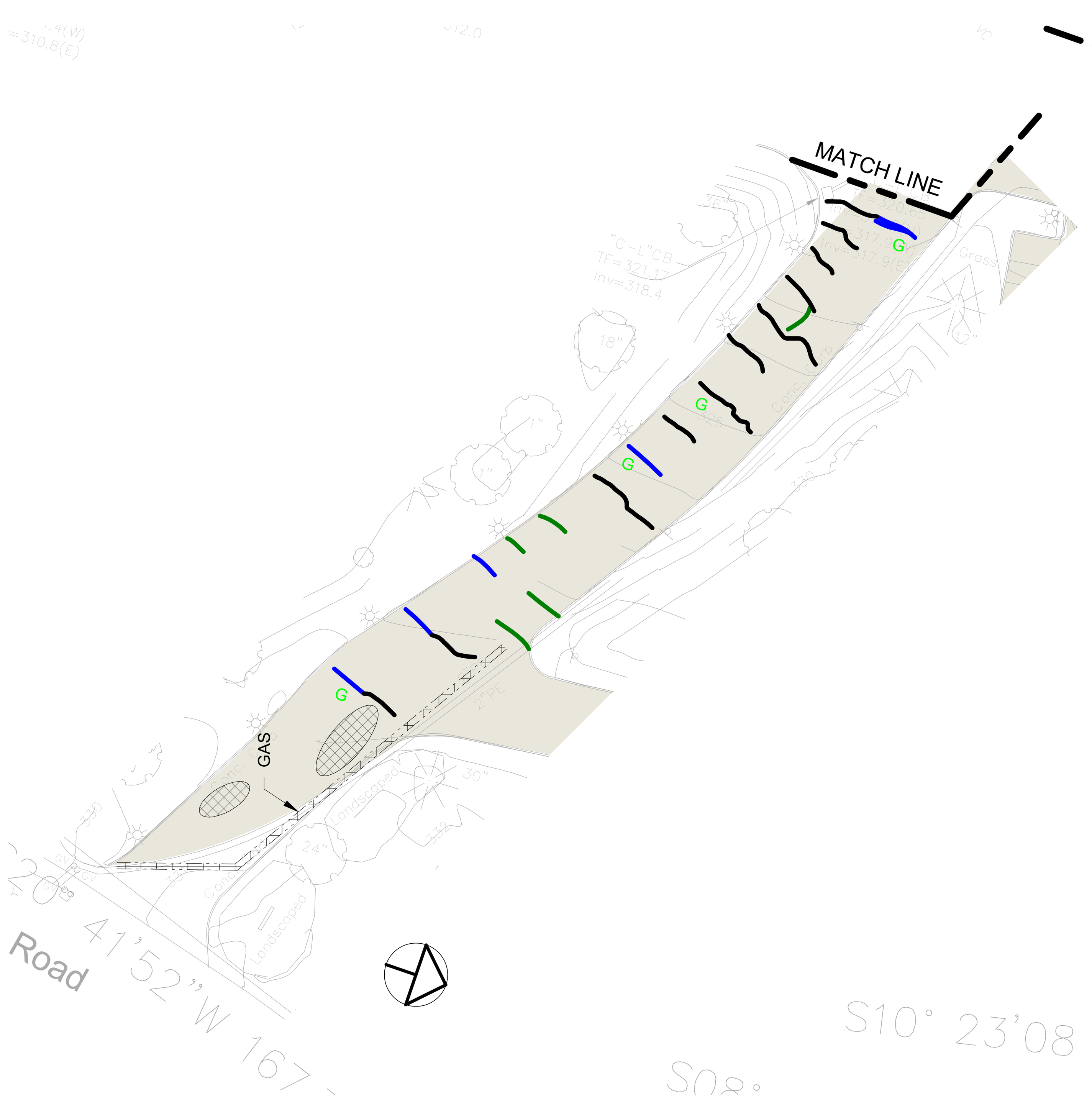
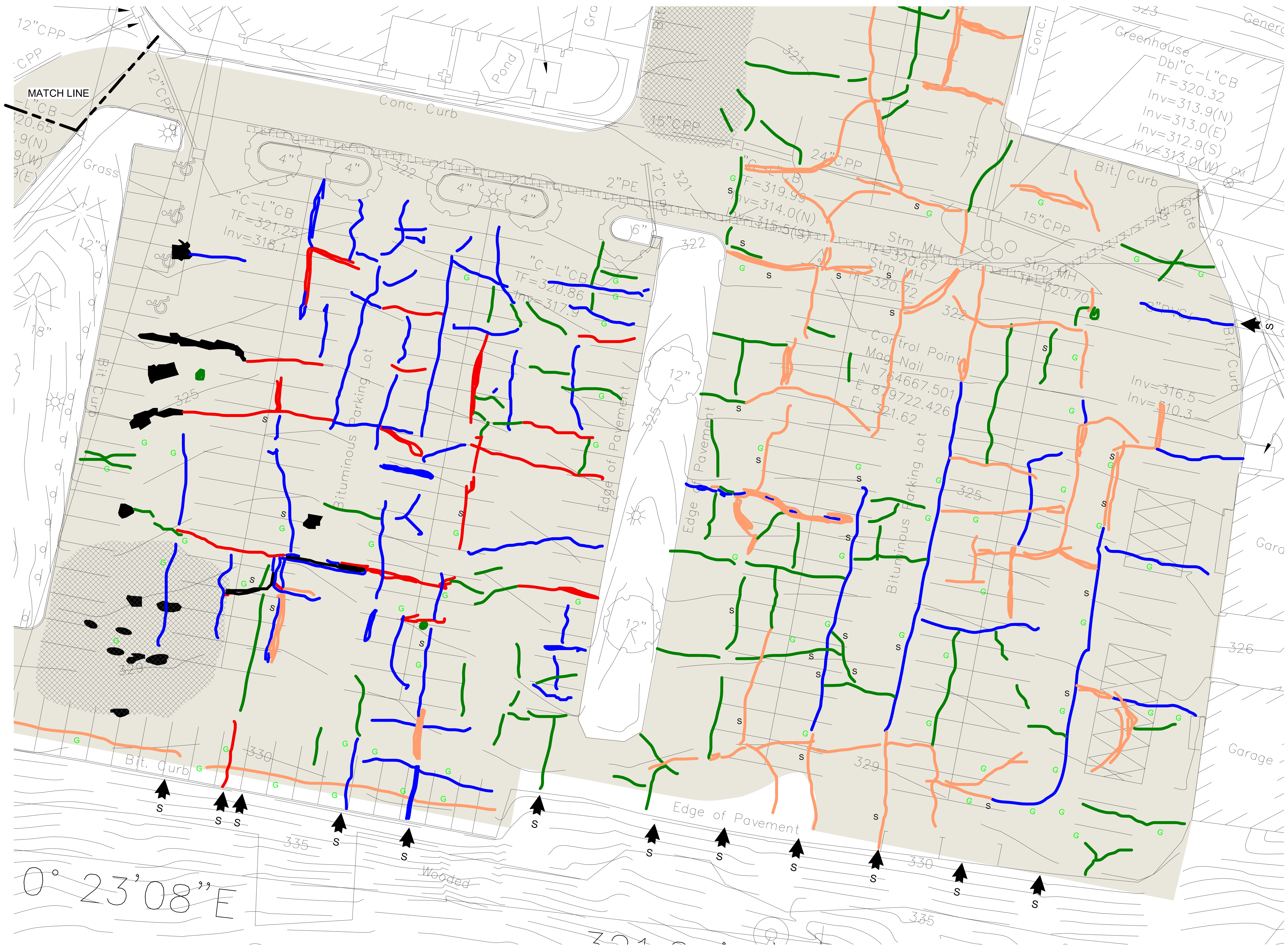
NONNEWAUG HIGH SCHOOL RENOVATIONS
5 MINORTOWN ROAD, WOODBURY, CT
PAVEMENT EVALUATION - KEY PLAN

SCALE: As indicated
AUGUST 2017



(B) PAVEMENT DOCUMENTATION - AREA B - PARKING ACCESS WAY
1" = 40'-0"



(A) PAVEMENT DOCUMENTATION - PARKING AREA A
1" = 20'-0"

LEGEND.

DRAWING 1-3

- < 2 IN.
- 1 > 2 IN.
- 1/2 > 1 IN.
- > 1/2 IN.
- G = GRASS IN CRACK
- S = CRACK SEALED
- ALLIGATOR CRACK PATTERN
- PAVEMENT PATCH
- SEAM - PLACEMENT SEAM VISIBLE
- B-1 DESIGN PHASE TEST BORING DRILLED IN 2016
- P-1 APPROXIMATE LOCATION OF PAVEMENT EXPLORATION HAND DUG BY GNCB ON JULY, 17 2017
- SHADED AREA CONSIDERED FOR ALTERNATE TREATMENT BY RECLAMATION OVERLAY

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NONNEWAUG HIGH SCHOOL RENOVATIONS

5 MINORTOWN ROAD, WOODBURY, CT

PAVEMENT DOCUMENTATION - AREA A AND B

SCALE: AS SHOWN

AUGUST 2017

DRAWING 2

C:\Users\JimSchmittberger\Documents\Local Revit\16154.09 Nonnewaug High School Renovations\16154.09 S17 Nonnewaug High School Renovations- LOCAL.rvt

APPENDIX A

GRAIN SIZE DISTRIBUTION TESTS

WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/21/2017
SAMPLE: P1

MOIST WEIGHT = 1.044 Kg
TOTAL DRY WEIGHT = 1.008 Kg
DRY WEIGHT AFTER WASH = 0.978 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.148	14.7%	85.3%
1"	25.0	0.200	19.8%	65.5%
3/4"	19.0	0.138	13.7%	51.8%
1/2"	12.5	0.102	10.1%	41.7%
#4	4.75	0.108	10.7%	31.0%
#10	2.00	0.060	6.0%	25.0%
#20	0.850	0.066	6.5%	18.5%
#40	0.425	0.052	5.2%	13.3%
#60	0.250	0.042	4.2%	9.1%
#80	0.180	0.024	2.4%	6.7%
#100	0.150	0.010	1.0%	5.8%
#140	0.106	0.016	1.6%	4.2%
#200	0.075	0.012	1.2%	3.0%
Passing #200		0.030	3.0%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	3.57%

Unified Soil Classification System
Grain Size Comparison

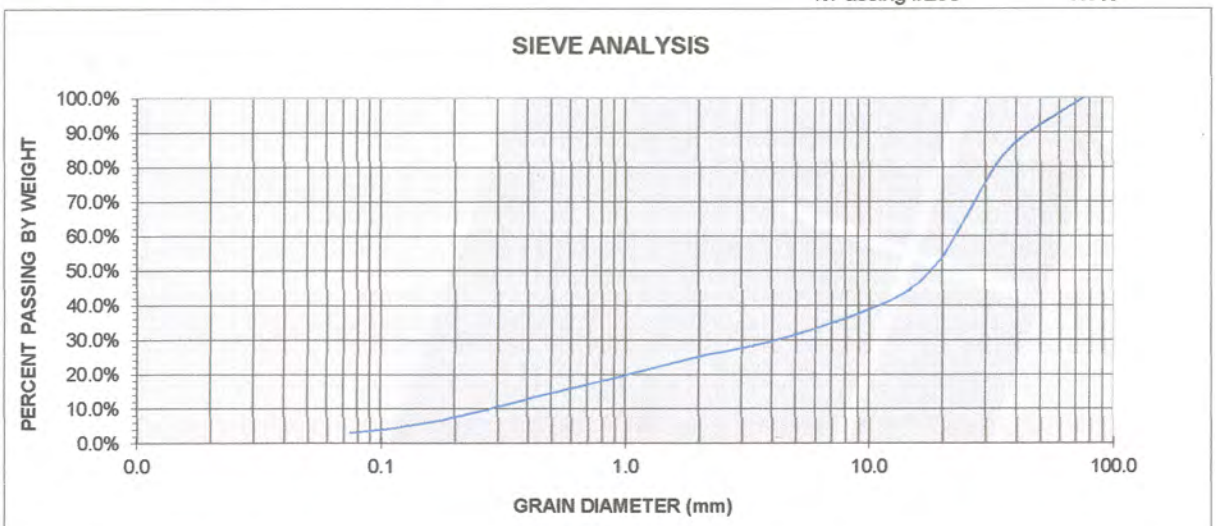
Cobbles	0.0%
Coarse Gravel	48.2%
Fine Gravel	20.8%
Coarse Sand	6.0%
Medium Sand	11.7%
Fine Sand	10.3%
Silt & Clay	3.0%
Uniformity Coeff.	78.84

Permeability Range **

Dense	93 ft/day
Loose	280 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	69.0%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	80.8%	70%-100%
%Passing #40	42.9%	*10%-50%
%Passing #100	18.6%	0%-20%
%Passing #200	9.6%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

LAND & MARINE
ENGINEERING
SURVEYING
PLANNING
ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/21/2017
SAMPLE: P2

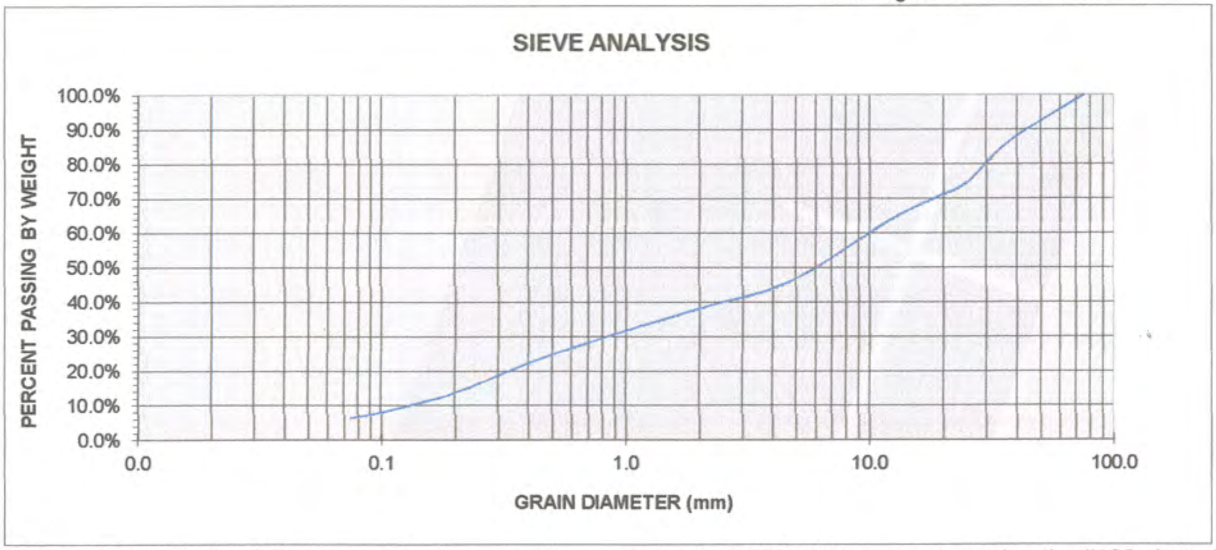
MOIST WEIGHT	=	1.014 Kg
TOTAL DRY WEIGHT	=	0.964 Kg
DRY WEIGHT AFTER WASH	=	0.902 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.128	13.3%	86.7%
1"	25.0	0.116	12.0%	74.7%
3/4"	19.0	0.040	4.1%	70.5%
1/2"	12.5	0.060	6.2%	64.3%
#4	4.75	0.176	18.3%	46.1%
#10	2.00	0.076	7.9%	38.2%
#20	0.850	0.078	8.1%	30.1%
#40	0.425	0.068	7.1%	23.0%
#60	0.250	0.064	6.6%	16.4%
#80	0.180	0.036	3.7%	12.7%
#100	0.150	0.014	1.5%	11.2%
#140	0.106	0.026	2.7%	8.5%
#200	0.075	0.020	2.1%	6.4%
Passing #200		0.062	6.4%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	5.19%
Unified Soil Classification System	
Grain Size Comparison	
Cobbles	0.0%
Coarse Gravel	29.5%
Fine Gravel	24.5%
Coarse Sand	7.9%
Medium Sand	15.1%
Fine Sand	16.6%
Silt & Clay	6.4%
Uniformity Coeff.	81.83
Permeability Range **	
Dense	19 ft/day
Loose	58 ft/day

2000 CT. Health Code Septic Fill Specs		
%Retained on #4	53.9%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	82.9%	70%-100%
%Passing #40	50.0%	*10%-50%
%Passing #100	24.3%	0%-20%
%Passing #200	14.0%	0%-5%



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** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
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WASHED SIEVE ANALYSIS

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CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/21/2017
SAMPLE: P3

MOIST WEIGHT	=	**1.006 Kg**
TOTAL DRY WEIGHT	=	**0.972 Kg**
DRY WEIGHT AFTER WASH	=	**0.940 Kg**

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.174	17.9%	82.1%
1"	25.0	0.136	14.0%	68.1%
3/4"	19.0	0.014	1.4%	66.7%
1/2"	12.5	0.096	9.9%	56.8%
#4	4.75	0.176	18.1%	38.7%
#10	2.00	0.090	9.3%	29.4%
#20	0.850	0.078	8.0%	21.4%
#40	0.425	0.058	6.0%	15.4%
#60	0.250	0.046	4.7%	10.7%
#80	0.180	0.026	2.7%	8.0%
#100	0.150	0.012	1.2%	6.8%
#140	0.106	0.020	2.1%	4.7%
#200	0.075	0.014	1.4%	3.3%
Passing #200		0.032	3.3%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	3.50%

Unified Soil Classification System

Grain Size Comparison

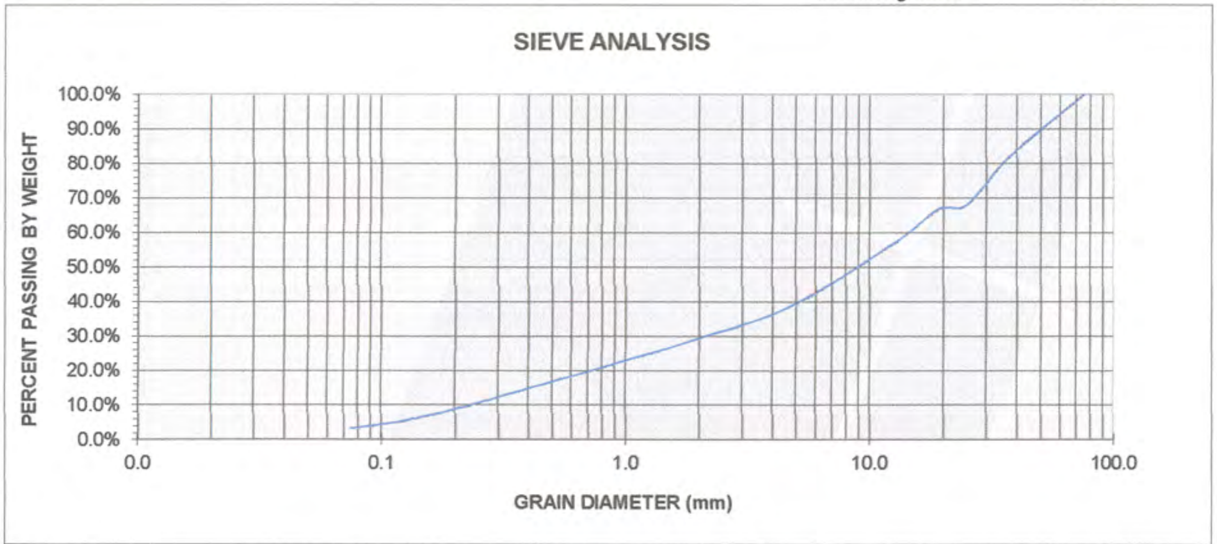
Cobbles	0.0%
Coarse Gravel	33.3%
Fine Gravel	28.0%
Coarse Sand	9.3%
Medium Sand	14.0%
Fine Sand	12.1%
Silt & Clay	3.3%
Uniformity Coeff.	63.07

Permeability Range **

Dense	61 ft/day
Loose	183 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	61.3%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	76.1%	70%-100%
%Passing #40	39.9%	*10%-50%
%Passing #100	17.6%	0%-20%
%Passing #200	8.5%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

LAND & MARINE
ENGINEERING SURVEYING PLANNING
ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/21/2017
SAMPLE: P4

MOIST WEIGHT	=	**1.09**	**Kg**
TOTAL DRY WEIGHT	=	**1.06**	**Kg**
DRY WEIGHT AFTER WASH	=	**0.996**	**Kg**

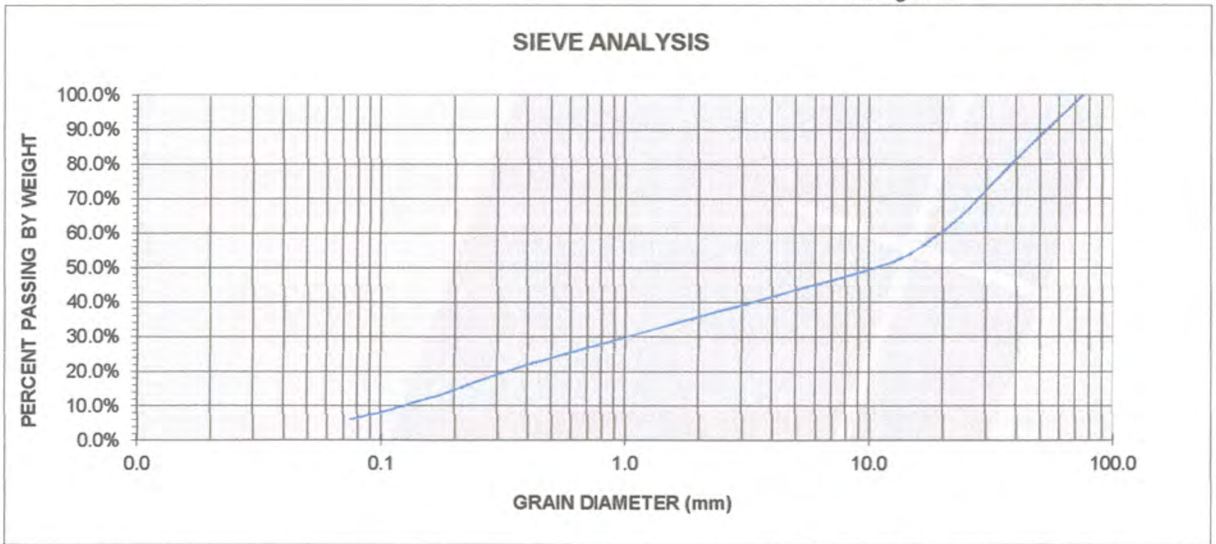
Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	**75.0**	0.000	0.0%	100.0%
1 1/2"	**37.5**	0.218	20.6%	79.4%
1"	**25.0**	0.138	13.0%	66.4%
3/4"	**19.0**	0.074	7.0%	59.4%
1/2"	**12.5**	0.082	7.7%	51.7%
#4	**4.75**	0.092	8.7%	43.0%
#10	**2.00**	0.078	7.4%	35.7%
#20	**0.850**	0.078	7.4%	28.3%
#40	**0.425**	0.062	5.8%	22.5%
#60	**0.250**	0.056	5.3%	17.2%
#80	**0.180**	0.040	3.8%	13.4%
#100	**0.150**	0.016	1.5%	11.9%
#140	**0.106**	0.034	3.2%	8.7%
#200	**0.075**	0.028	2.6%	6.0%
Passing #200		0.064	6.0%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	**2.83%**
Unified Soil Classification System	
Grain Size Comparison	
Cobbles	**0.0%**
Coarse Gravel	**40.6%**
Fine Gravel	**16.4%**
Coarse Sand	**7.4%**
Medium Sand	**13.2%**
Fine Sand	**16.4%**
Silt & Clay	**6.0%**
Uniformity Coeff.	**157.00**
Permeability Range **	
Dense	17 ft/day
Loose	52 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	**57.0%**	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	**100.0%**	**100%**
%Passing #10	**82.9%**	**70%-100%**
%Passing #40	**52.2%**	***10%-50%**
%Passing #100	**27.6%**	**0%-20%**
%Passing #200	**14.0%**	**0%-5%**



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

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WASHED SIEVE ANALYSIS

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P5

MOIST WEIGHT	=	1.132 Kg
TOTAL DRY WEIGHT	=	1.092 Kg
DRY WEIGHT AFTER WASH	=	1.008 Kg

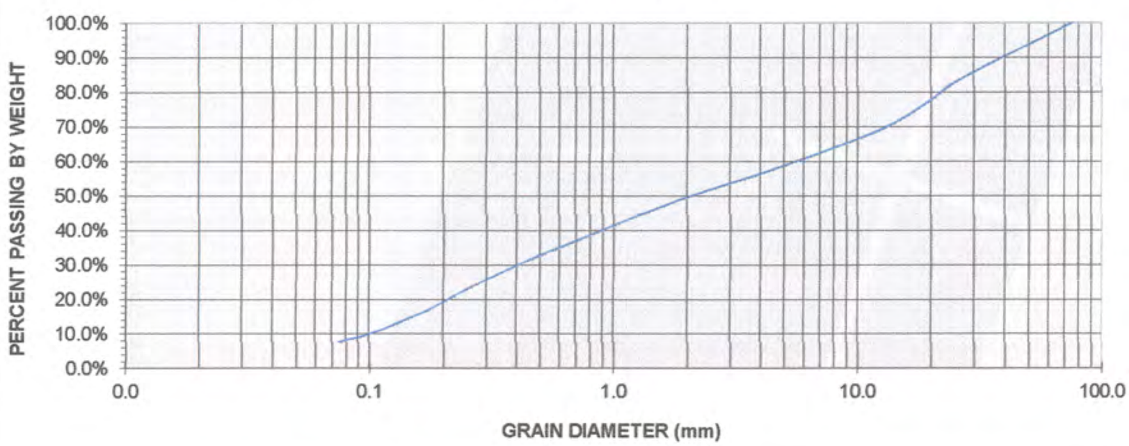
Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.116	10.6%	89.4%
1"	25.0	0.072	6.6%	82.8%
3/4"	19.0	0.066	6.0%	76.7%
1/2"	12.5	0.082	7.5%	69.2%
#4	4.75	0.120	11.0%	58.2%
#10	2.00	0.094	8.6%	49.6%
#20	0.850	0.112	10.3%	39.4%
#40	0.425	0.096	8.8%	30.6%
#60	0.250	0.084	7.7%	22.9%
#80	0.180	0.060	5.5%	17.4%
#100	0.150	0.026	2.4%	15.0%
#140	0.106	0.048	4.4%	10.6%
#200	0.075	0.032	2.9%	7.7%
Passing #200		0.084	7.7%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	3.66%
Unified Soil Classification System	
Grain Size Comparison	
Cobbles	0.0%
Coarse Gravel	23.3%
Fine Gravel	18.5%
Coarse Sand	8.6%
Medium Sand	19.0%
Fine Sand	22.9%
Silt & Clay	7.7%
Uniformity Coeff.	60.25
Permeability Range **	
Dense	11 ft/day
Loose	34 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	41.8%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	85.2%	70%-100%
%Passing #40	52.5%	*10%-50%
%Passing #100	25.8%	0%-20%
%Passing #200	13.2%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

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CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P7

MOIST WEIGHT	=	1.076 Kg
TOTAL DRY WEIGHT	=	1.024 Kg
DRY WEIGHT AFTER WASH	=	0.910 Kg

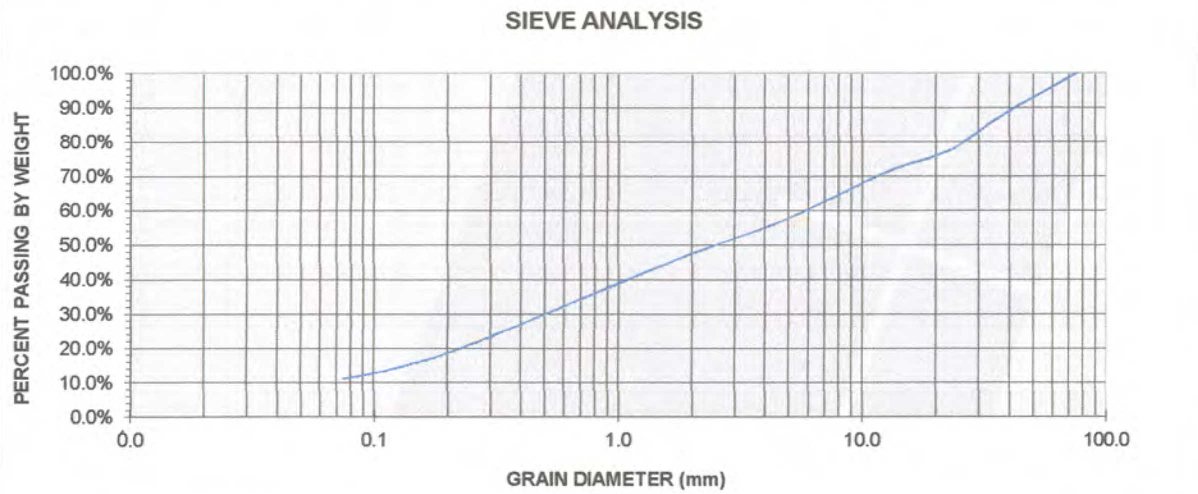
Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.124	12.1%	87.9%
1"	25.0	0.090	8.8%	79.1%
3/4"	19.0	0.038	3.7%	75.4%
1/2"	12.5	0.044	4.3%	71.1%
#4	4.75	0.144	14.1%	57.0%
#10	2.00	0.098	9.6%	47.5%
#20	0.850	0.110	10.7%	36.7%
#40	0.425	0.092	9.0%	27.7%
#60	0.250	0.068	6.6%	21.1%
#80	0.180	0.038	3.7%	17.4%
#100	0.150	0.016	1.6%	15.8%
#140	0.106	0.028	2.7%	13.1%
#200	0.075	0.020	2.0%	11.1%
Passing #200		0.114	11.1%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	5.08%
Unified Soil Classification System	
Grain Size Comparison	
Cobbles	0.0%
Coarse Gravel	24.6%
Fine Gravel	18.4%
Coarse Sand	9.6%
Medium Sand	19.7%
Fine Sand	16.6%
Silt & Clay	11.1%
Uniformity Coeff.	94.79
Permeability Range **	
Dense	5 ft/day
Loose	15 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	43.0%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	83.2%	70%-100%
%Passing #40	48.6%	*10%-50%
%Passing #100	27.7%	0%-20%
%Passing #200	19.5%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

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GARY SHARPE
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SINCE 1966

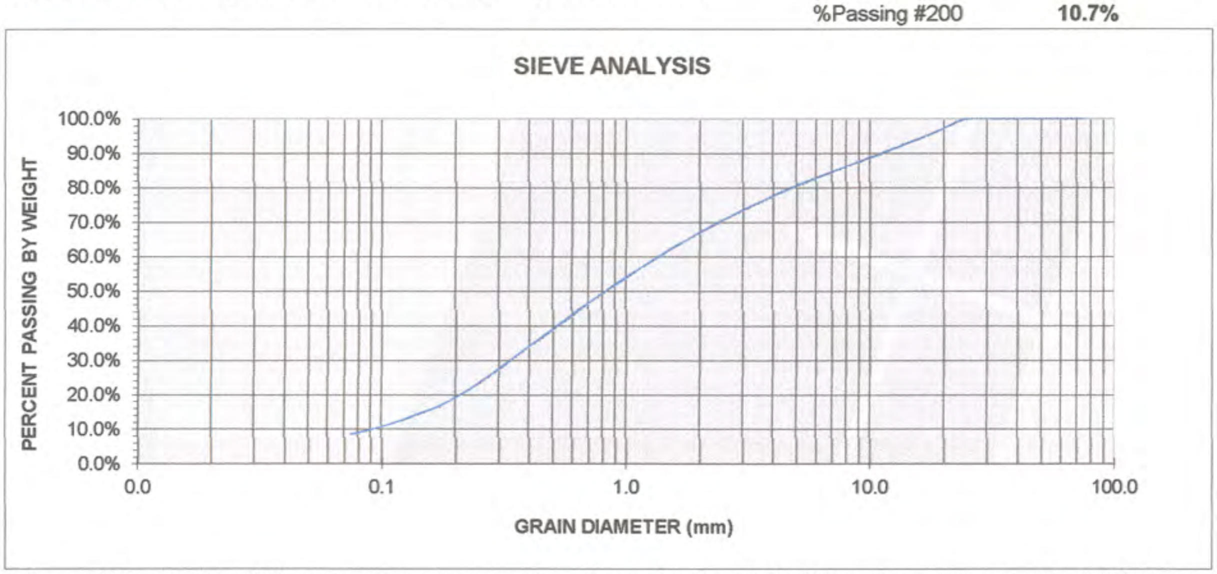
CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P11

MOIST WEIGHT	=	0.934 Kg
TOTAL DRY WEIGHT	=	0.888 Kg
DRY WEIGHT AFTER WASH	=	0.812 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.000	0.0%	100.0%
3/4"	19.0	0.030	3.4%	96.6%
1/2"	12.5	0.046	5.2%	91.4%
#4	4.75	0.102	11.5%	80.0%
#10	2.00	0.114	12.8%	67.1%
#20	0.850	0.146	16.4%	50.7%
#40	0.425	0.136	15.3%	35.4%
#60	0.250	0.106	11.9%	23.4%
#80	0.180	0.054	6.1%	17.3%
#100	0.150	0.020	2.3%	15.1%
#140	0.106	0.034	3.8%	11.3%
#200	0.075	0.024	2.7%	8.6%
Passing #200		0.076	8.6%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	5.18%	
Unified Soil Classification System		
Grain Size Comparison		
Cobbles	0.0%	
Coarse Gravel	3.4%	
Fine Gravel	16.7%	
Coarse Sand	12.8%	
Medium Sand	31.8%	
Fine Sand	26.8%	
Silt & Clay	8.6%	
Uniformity Coeff.	16.41	
Permeability Range **		
Dense	10 ft/day	
Loose	29 ft/day	
2000 CT. Health Code Septic Fill Specs		
%Retained on #4	20.0%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	83.9%	70%-100%
%Passing #40	44.2%	*10%-50%
%Passing #100	18.9%	0%-20%
%Passing #200	10.7%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size. Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day. Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P13

MOIST WEIGHT	=	1.176 Kg
TOTAL DRY WEIGHT	=	1.128 Kg
DRY WEIGHT AFTER WASH	=	1.054 Kg

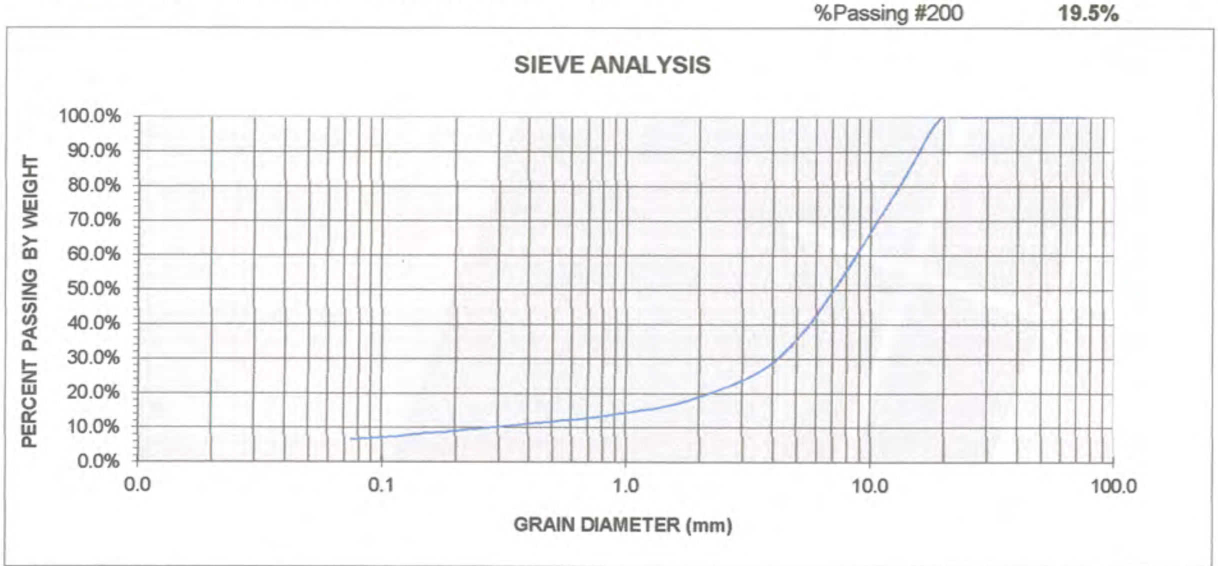
Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.000	0.0%	100.0%
3/4"	19.0	0.010	0.9%	99.1%
1/2"	12.5	0.242	21.5%	77.7%
#4	4.75	0.496	44.0%	33.7%
#10	2.00	0.166	14.7%	19.0%
#20	0.850	0.060	5.3%	13.7%
#40	0.425	0.026	2.3%	11.3%
#60	0.250	0.018	1.6%	9.8%
#80	0.180	0.012	1.1%	8.7%
#100	0.150	0.004	0.4%	8.3%
#140	0.106	0.012	1.1%	7.3%
#200	0.075	0.008	0.7%	6.6%
Passing #200		0.074	6.6%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	4.26%
Unified Soil Classification System	
Grain Size Comparison	
Cobbles	0.0%
Coarse Gravel	0.9%
Fine Gravel	65.4%
Coarse Sand	14.7%
Medium Sand	7.6%
Fine Sand	4.8%
Silt & Clay	6.6%
Uniformity Coeff.	33.86
Permeability Range **	
Dense	87 ft/day
Loose	261 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	66.3%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	56.3%	70%-100%
%Passing #40	33.7%	*10%-50%
%Passing #100	24.7%	0%-20%
%Passing #200	19.5%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size. Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day. Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

ANGUS McDONALD
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SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P14

MOIST WEIGHT	=	1.102 Kg
TOTAL DRY WEIGHT	=	1.062 Kg
DRY WEIGHT AFTER WASH	=	0.984 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.150	14.1%	85.9%
1"	25.0	0.056	5.3%	80.6%
3/4"	19.0	0.036	3.4%	77.2%
1/2"	12.5	0.060	5.6%	71.6%
#4	4.75	0.136	12.8%	58.8%
#10	2.00	0.088	8.3%	50.5%
#20	0.850	0.114	10.7%	39.7%
#40	0.425	0.110	10.4%	29.4%
#60	0.250	0.096	9.0%	20.3%
#80	0.180	0.054	5.1%	15.3%
#100	0.150	0.022	2.1%	13.2%
#140	0.106	0.036	3.4%	9.8%
#200	0.075	0.026	2.4%	7.3%
Passing #200		0.078	7.3%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	3.77%

Unified Soil Classification System
Grain Size Comparison

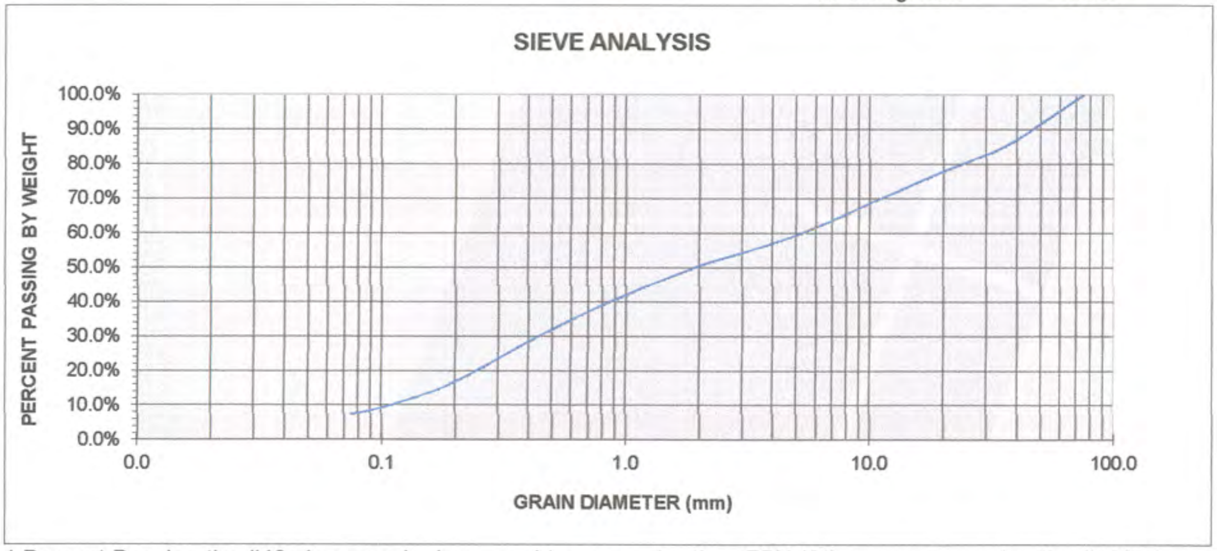
Cobbles	0.0%
Coarse Gravel	22.8%
Fine Gravel	18.5%
Coarse Sand	8.3%
Medium Sand	21.1%
Fine Sand	22.0%
Silt & Clay	7.3%
Uniformity Coeff.	50.62

Permeability Range **

Dense	13 ft/day
Loose	40 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	41.2%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	85.9%	70%-100%
%Passing #40	50.0%	*10%-50%
%Passing #100	22.4%	0%-20%
%Passing #200	12.5%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

JAMES McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P15

MOIST WEIGHT	=	1.038 Kg
TOTAL DRY WEIGHT	=	0.992 Kg
DRY WEIGHT AFTER WASH	=	0.922 Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.000	0.0%	100.0%
1"	25.0	0.024	2.4%	97.6%
3/4"	19.0	0.000	0.0%	97.6%
1/2"	12.5	0.050	5.0%	92.5%
#4	4.75	0.160	16.1%	76.4%
#10	2.00	0.124	12.5%	63.9%
#20	0.850	0.158	15.9%	48.0%
#40	0.425	0.142	14.3%	33.7%
#60	0.250	0.116	11.7%	22.0%
#80	0.180	0.058	5.8%	16.1%
#100	0.150	0.022	2.2%	13.9%
#140	0.106	0.040	4.0%	9.9%
#200	0.075	0.028	2.8%	7.1%
Passing #200		0.070	7.1%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	4.64%

Unified Soil Classification System

Grain Size Comparison

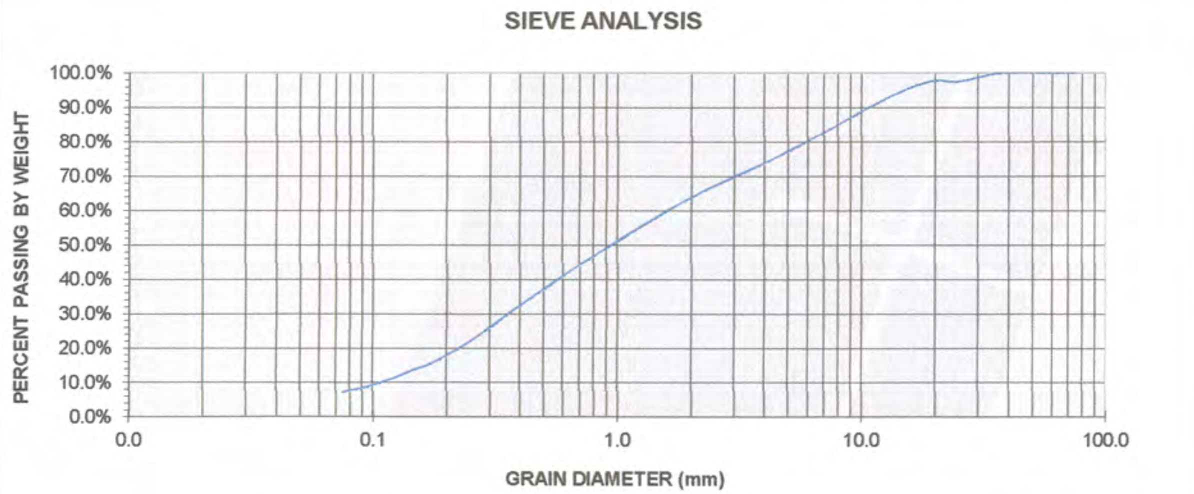
Cobbles	0.0%
Coarse Gravel	2.4%
Fine Gravel	21.2%
Coarse Sand	12.5%
Medium Sand	30.2%
Fine Sand	26.6%
Silt & Clay	7.1%
Uniformity Coeff.	16.00

Permeability Range **

Dense	13 ft/day
Loose	39 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	23.6%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	83.6%	70%-100%
%Passing #40	44.1%	*10%-50%
%Passing #100	18.2%	0%-20%
%Passing #200	9.2%	0%-5%



* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when D_{10} < .1mm or D_{10} > 3mm

WASHED SIEVE ANALYSIS

ANGUS McDONALD
GARY SHARPE
& ASSOCIATES, INC.
SINCE 1966

CLIENT: GNCB CONSULTING ENGINEERS
DATE: 7/24/2017
SAMPLE: P16

MOIST WEIGHT	=	1.21	Kg
TOTAL DRY WEIGHT	=	1.158	Kg
DRY WEIGHT AFTER WASH	=	1.070	Kg

Sieve Size	(mm)	Weight Retained	% Retained	% Passing
3"	75.0	0.000	0.0%	100.0%
1 1/2"	37.5	0.096	8.3%	91.7%
1"	25.0	0.028	2.4%	89.3%
3/4"	19.0	0.036	3.1%	86.2%
1/2"	12.5	0.070	6.0%	80.1%
#4	4.75	0.198	17.1%	63.0%
#10	2.00	0.122	10.5%	52.5%
#20	0.850	0.140	12.1%	40.4%
#40	0.425	0.124	10.7%	29.7%
#60	0.250	0.104	9.0%	20.7%
#80	0.180	0.058	5.0%	15.7%
#100	0.150	0.022	1.9%	13.8%
#140	0.106	0.042	3.6%	10.2%
#200	0.075	0.030	2.6%	7.6%
Passing #200		0.088	7.6%	

Weight of Material Passing #200 Sieve = Total Dry Weight - Dry Weight After Wash

Water Content	4.49%

Unified Soil Classification System

Grain Size Comparison

Cobbles	0.0%
Coarse Gravel	13.8%
Fine Gravel	23.1%
Coarse Sand	10.5%
Medium Sand	22.8%
Fine Sand	22.1%
Silt & Clay	7.6%
Uniformity Coeff.	38.14

Permeability Range **

Dense	12 ft/day
Loose	37 ft/day

2000 CT. Health Code Septic Fill Specs

%Retained on #4	37.0%	
% Passing #4-#200 (Fill less Gravel)		Permitted
%Passing #4	100.0%	100%
%Passing #10	83.3%	70%-100%
%Passing #40	47.1%	*10%-50%
%Passing #100	21.9%	0%-20%
%Passing #200	12.1%	0%-5%

* Percent Passing the #40 sieve can be increased to no greater than 75% if the percent passing the #100 sieve does not exceed 10% and the #200 does not exceed 5%.

** Based on empirical relationship by Hazen (1911) relating permeability to the D_{10} grain size.
Accuracy diminishes with >5% passing the #200 Sieve or permeability values <.3 ft/day.
Relationship invalid when $D_{10} < .1$mm or $D_{10} > 3$mm

APPENDIX B

RESULTS OF RECLAIMED PAVEMENT

SUMMARY OF RECLAIMED PAVEMENT

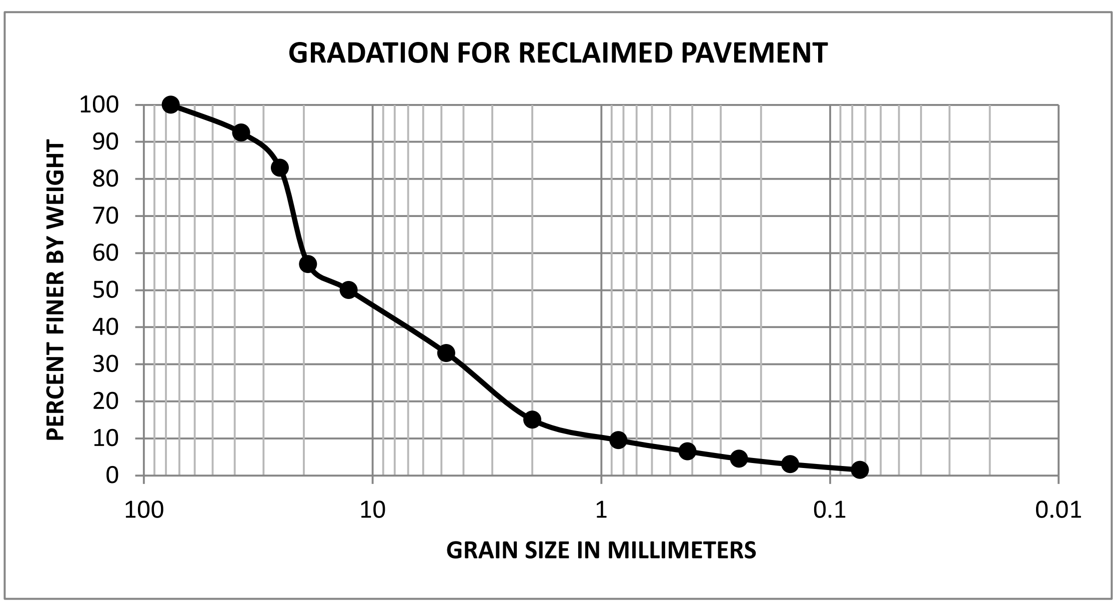
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-1

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	4	400	100	4	400	100
1.5 IN.	100	4	400	85	4	340	93
1 IN.	100	4	400	66	4	264	83
3/4 IN.	100	4	400	14	4	56	57
1/2 IN.	90	4	360	10	4	40	50
No. 4	35	4	140	31	4	124	33
No. 10	5	4	20	25	4	100	15
No. 20	0	4	0	19	4	76	10
No. 40	0	4	0	13	4	52	7
No. 60	0	4	0	9	4	36	5
No. 100	0	4	0	6	4	24	3
No. 200	0	4	0	3	4	12	2

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



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SUMMARY OF RECLAIMED PAVEMENT

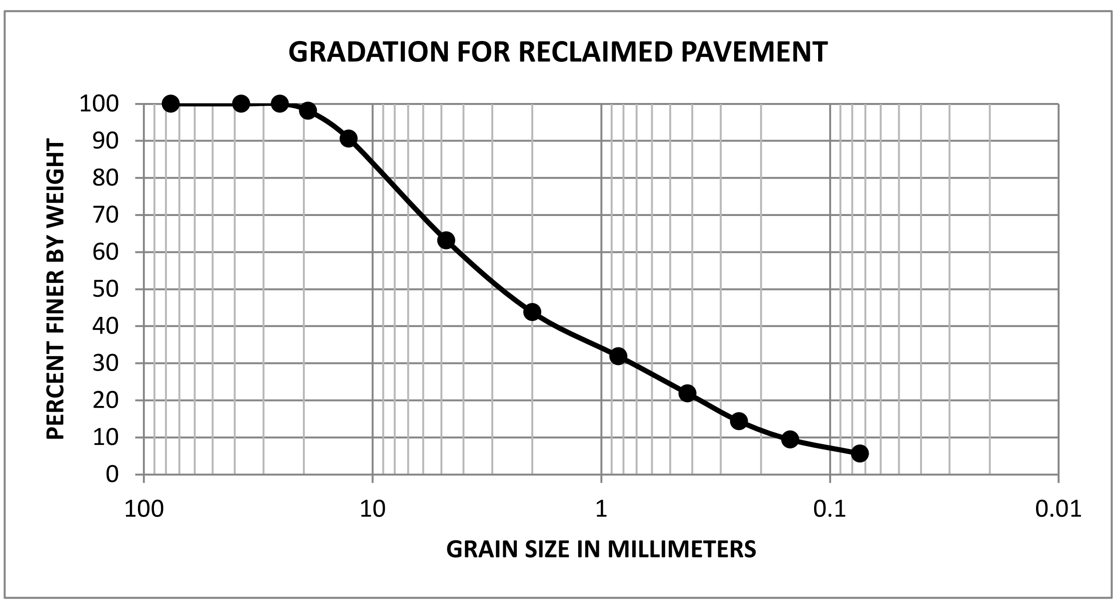
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-11

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	3	300	100	5	500	100
1.5 IN.	100	3	300	100	5	500	100
1 IN.	100	3	300	100	5	500	100
3/4 IN.	100	3	300	97	5	485	98
1/2 IN.	90	3	270	91	5	455	91
No. 4	35	3	105	80	5	400	63
No. 10	5	3	15	67	5	335	44
No. 20	0	3	0	51	5	255	32
No. 40	0	3	0	35	5	175	22
No. 60	0	3	0	23	5	115	14
No. 100	0	3	0	15	5	75	9
No. 200	0	3	0	9	5	45	6

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

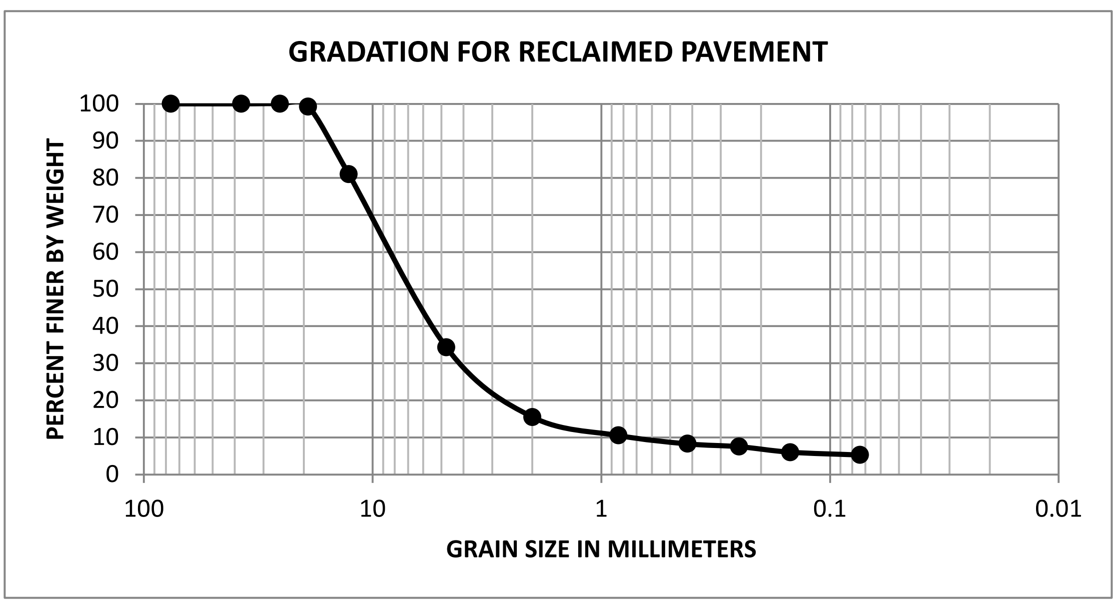
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-13

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	2	200	100	6	600	100
1.5 IN.	100	2	200	100	6	600	100
1 IN.	100	2	200	100	6	600	100
3/4 IN.	100	2	200	99	6	594	99
1/2 IN.	90	2	180	78	6	468	81
No. 4	35	2	70	34	6	204	34
No. 10	5	2	10	19	6	114	16
No. 20	0	2	0	14	6	84	11
No. 40	0	2	0	11	6	66	8
No. 60	0	2	0	10	6	60	8
No. 100	0	2	0	8	6	48	6
No. 200	0	2	0	7	6	42	5

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

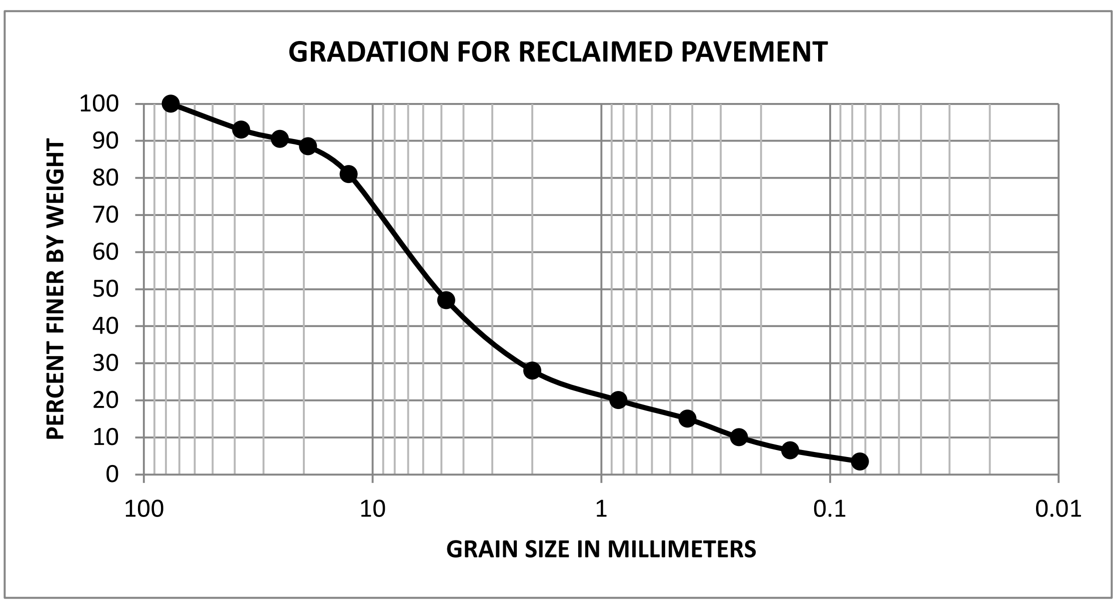
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-14

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK (IN.)	CONTRIBUTION	
3 IN.	100	4	400	100	4	400	100
1.5 IN.	100	4	400	86	4	344	93
1 IN.	100	4	400	81	4	324	91
3/4 IN.	100	4	400	77	4	308	89
1/2 IN.	90	4	360	72	4	288	81
No. 4	35	4	140	59	4	236	47
No. 10	5	4	20	51	4	204	28
No. 20	0	4	0	40	4	160	20
No. 40	0	4	0	30	4	120	15
No. 60	0	4	0	20	4	80	10
No. 100	0	4	0	13	4	52	7
No. 200	0	4	0	7	4	28	4

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

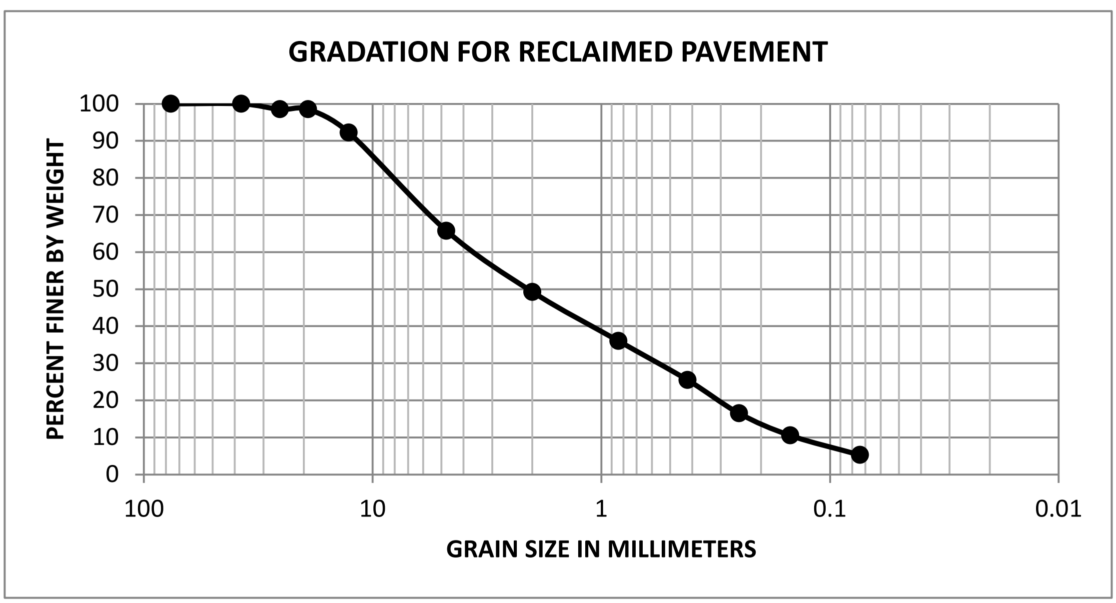
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-15

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	2	200	100	6	600	100
1.5 IN.	100	2	200	100	6	600	100
1 IN.	100	2	200	98	6	588	99
3/4 IN.	100	2	200	98	6	588	99
1/2 IN.	90	2	180	93	6	558	92
No. 4	35	2	70	76	6	456	66
No. 10	5	2	10	64	6	384	49
No. 20	0	2	0	48	6	288	36
No. 40	0	2	0	34	6	204	26
No. 60	0	2	0	22	6	132	17
No. 100	0	2	0	14	6	84	11
No. 200	0	2	0	7	6	42	5

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

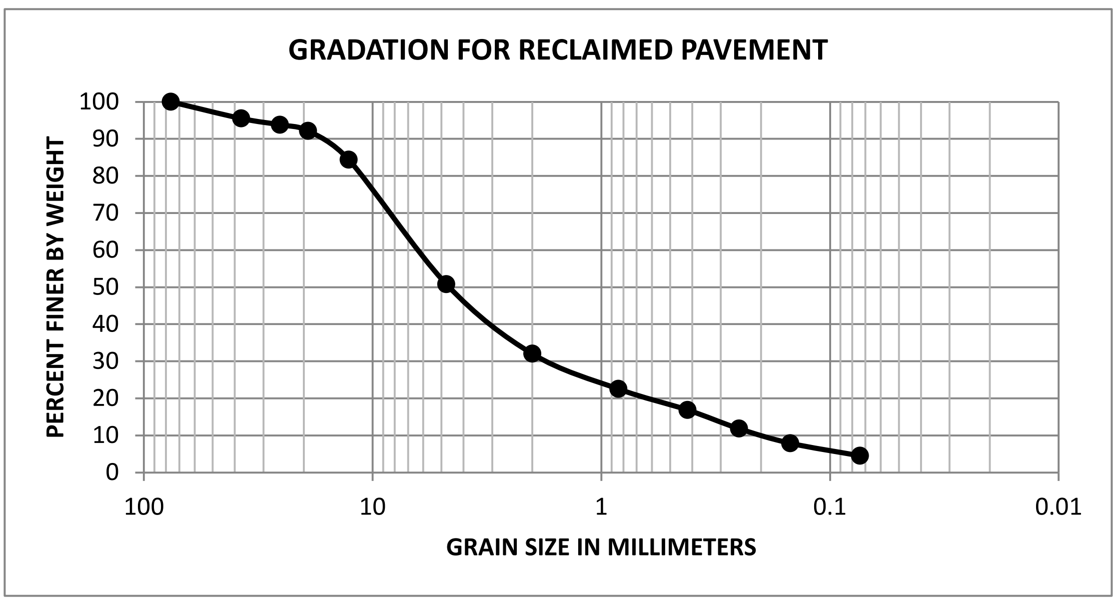
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-16

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	3.5	350	100	4.5	450	100
1.5 IN.	100	3.5	350	92	4.5	414	96
1 IN.	100	3.5	350	89	4.5	400.5	94
3/4 IN.	100	3.5	350	86	4.5	387	92
1/2 IN.	90	3.5	315	80	4.5	360	84
No. 4	35	3.5	123	63	4.5	283.5	51
No. 10	5	3.5	18	53	4.5	238.5	32
No. 20	0	3.5	0	40	4.5	180	23
No. 40	0	3.5	0	30	4.5	135	17
No. 60	0	3.5	0	21	4.5	94.5	12
No. 100	0	3.5	0	14	4.5	63	8
No. 200	0	3.5	0	8	4.5	36	5

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

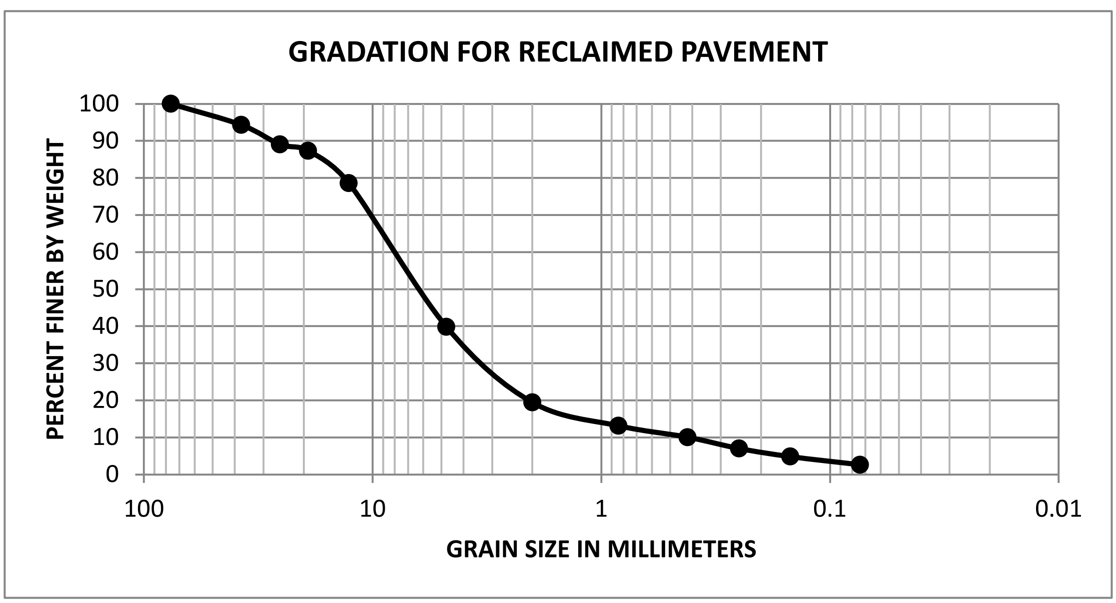
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-2

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	4.5	450	100	3.5	350	100
1.5 IN.	100	4.5	450	87	3.5	304.5	94
1 IN.	100	4.5	450	75	3.5	262.5	89
3/4 IN.	100	4.5	450	71	3.5	248.5	87
1/2 IN.	90	4.5	405	64	3.5	224	79
No. 4	35	4.5	158	46	3.5	161	40
No. 10	5	4.5	23	38	3.5	133	19
No. 20	0	4.5	0	30	3.5	105	13
No. 40	0	4.5	0	23	3.5	80.5	10
No. 60	0	4.5	0	16	3.5	56	7
No. 100	0	4.5	0	11	3.5	38.5	5
No. 200	0	4.5	0	6	3.5	21	3

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

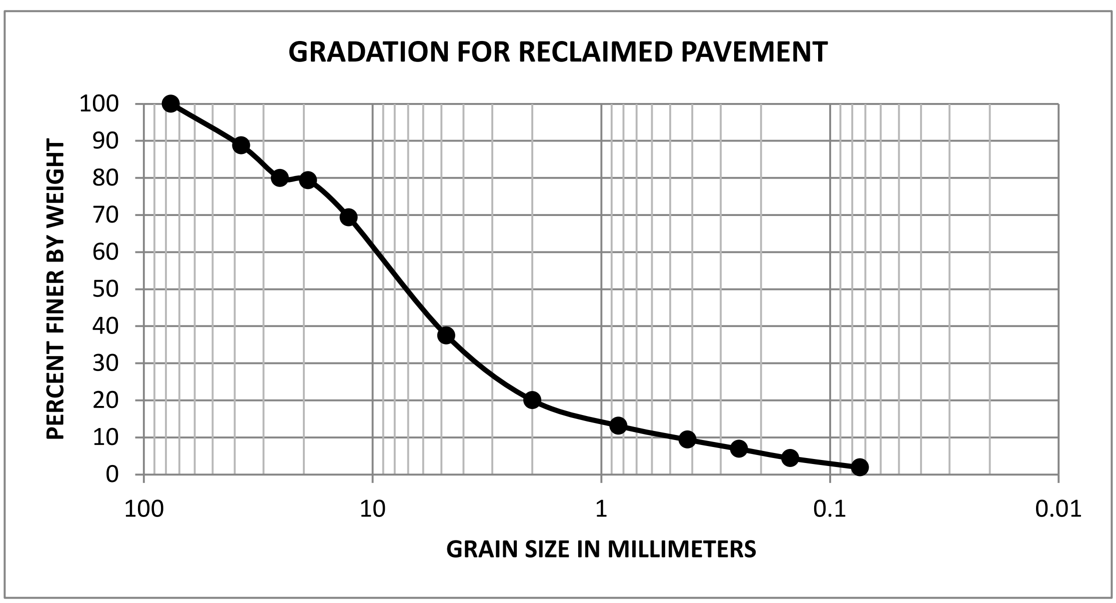
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-3

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	3	300	100	5	500	100
1.5 IN.	100	3	300	82	5	410	89
1 IN.	100	3	300	68	5	340	80
3/4 IN.	100	3	300	67	5	335	79
1/2 IN.	90	3	270	57	5	285	69
No. 4	35	3	105	39	5	195	38
No. 10	5	3	15	29	5	145	20
No. 20	0	3	0	21	5	105	13
No. 40	0	3	0	15	5	75	9
No. 60	0	3	0	11	5	55	7
No. 100	0	3	0	7	5	35	4
No. 200	0	3	0	3	5	15	2

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

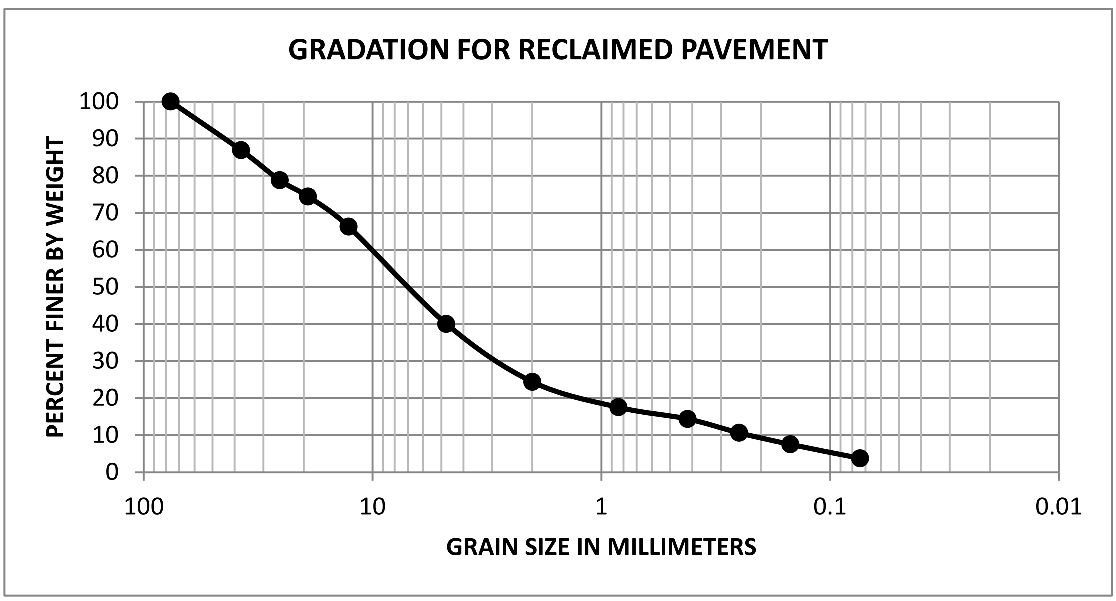
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-4

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	3	300	100	5	500	100
1.5 IN.	100	3	300	79	5	395	87
1 IN.	100	3	300	66	5	330	79
3/4 IN.	100	3	300	59	5	295	74
1/2 IN.	90	3	270	52	5	260	66
No. 4	35	3	105	43	5	215	40
No. 10	5	3	15	36	5	180	24
No. 20	0	3	0	28	5	140	18
No. 40	0	3	0	23	5	115	14
No. 60	0	3	0	17	5	85	11
No. 100	0	3	0	12	5	60	8
No. 200	0	3	0	6	5	30	4

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



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SUMMARY OF RECLAIMED PAVEMENT

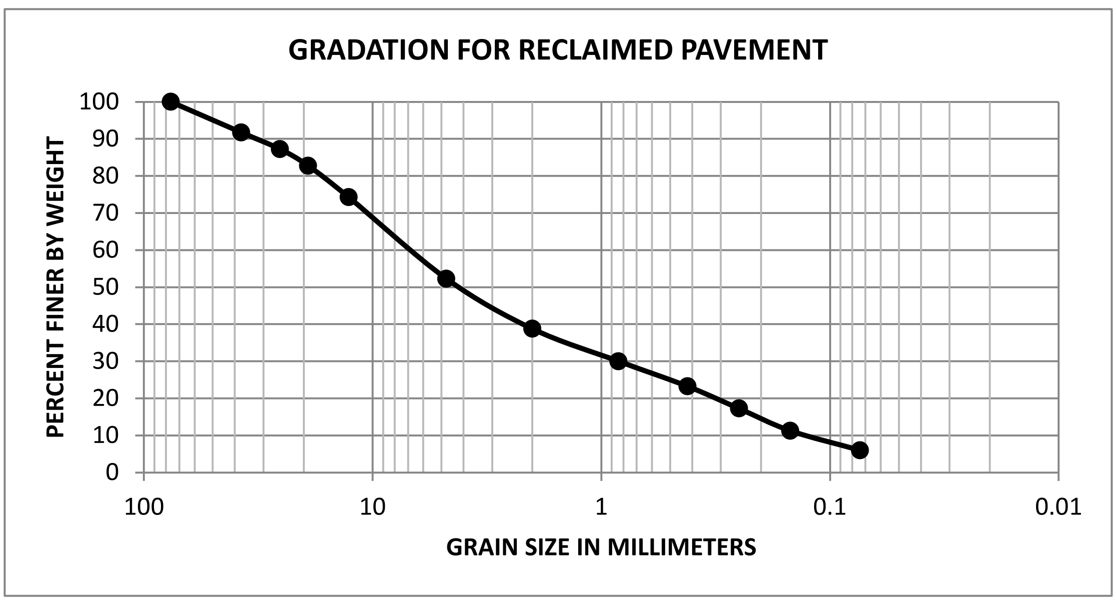
NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-5

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	2	200	100	6	600	100
1.5 IN.	100	2	200	89	6	534	92
1 IN.	100	2	200	83	6	498	87
3/4 IN.	100	2	200	77	6	462	83
1/2 IN.	90	2	180	69	6	414	74
No. 4	35	2	70	58	6	348	52
No. 10	5	2	10	50	6	300	39
No. 20	0	2	0	40	6	240	30
No. 40	0	2	0	31	6	186	23
No. 60	0	2	0	23	6	138	17
No. 100	0	2	0	15	6	90	11
No. 200	0	2	0	8	6	48	6

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.



SUMMARY OF RECLAIMED PAVEMENT

NONNEWAUG HIGH SCHOOL
WOODBURY, CONNECTICUT

LOCATION P-7

SIEVE SIZE	CRUSHED PAVEMENT			SOIL SUBGRADE			COMBINED % PASSING
	% PASSING	THICK. (IN.)	CONTRIBUTION	% PASSING	THICK. (IN.)	CONTRIBUTION	
3 IN.	100	3.5	350	100	4.5	450	100
1.5 IN.	100	3.5	350	88	4.5	396	93
1 IN.	100	3.5	350	79	4.5	355.5	88
3/4 IN.	100	3.5	350	75	4.5	337.5	86
1/2 IN.	90	3.5	315	71	4.5	319.5	79
No. 4	35	3.5	123	57	4.5	256.5	47
No. 10	5	3.5	18	48	4.5	216	29
No. 20	0	3.5	0	37	4.5	166.5	21
No. 40	0	3.5	0	28	4.5	126	16
No. 60	0	3.5	0	21	4.5	94.5	12
No. 100	0	3.5	0	16	4.5	72	9
No. 200	0	3.5	0	11	4.5	49.5	6

NOTES

1. REFER TO DRAWING A FOR LOCATIONS OF PAVEMENT EXPLORATIONS.
2. APPENDIX A CONTAINS LABORATORY GRAIN SIZE ANALYSIS FOR EACH EXPLORATION.
3. GNCB OBTAINED SOIL SUBGRADE SAMPLES DURING THE PERIOD JULY 17-18, 2017.