Geotechnical Engineering Structure Report
Final Design Submission
Busway Over Park Street
State Project 155-H025
Hartford, Connecticut

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1.0 GENERAL INFORMATION

1.1 General

This report summarizes the final design subsurface exploration program, inferred subsurface conditions, and geotechnical analyses; and provides geotechnical engineering recommendations for foundation design for the proposed bridge structure for the New Britain-Hartford Busway (Busway) alignment, which will carry the Busway over Park Street in Hartford, Connecticut. This bridge was redesigned in July 2010, and recommendations herein reflect this redesign.

The Busway project entails the design and construction of a 9.4-mile roadway connecting downtown New Britain and downtown Hartford. The Busway will be part of a dedicated Bus Rapid Transit System. The Busway will be adjacent to and west of the existing Amtrak railroad tracks.

This section of the Busway begins at the intersection of Oakwood Avenue and the Amtrak railroad (Station 332+00), and ends at the intersection of Sigourney Street and Amtrak Railroad (Station 450+00). The site location and alignment is shown on Figures 1 and 2 (Appendix 1).

URS Corporation is the Prime Designer for this section of the Busway. Geo**Design**, Inc. (Geo**Design**) is the Geotechnical Subconsultant to URS.

1.2 Datum

All elevations referenced in this report are in feet and are based on NGVD 1929. The coordinates are based on Connecticut Coordinate System, NAD 1983.

1.3 Existing Conditions

The Busway will cross over Park Street at an approximate 46-degree skew angle between the intersections of Park Street /Orange Street and Park Street/Bartholomew Avenue.

The existing Amtrak railroad crosses over Park Street on a single-span bridge. Existing grades are highest along the Amtrak Railroad (Elev. 64) and lowest at Park Street (Elev. 46). The present railroad embankment side slopes range from about 3H:1V to 4H:1V near the bridge.

Available plans for existing Park St. Bridge do not include foundation information for the bridge. The existing foundations are approximately five feet from the proposed abutment foundations.

In this vicinity, a 36-inch diameter reinforced concrete pipe exists underneath the centerline of Park Street, and a 30-inch water main exists at the north edge of Park Street.

Figures No. 2 and 3 (Appendix 1) depict existing site conditions.

1.4 Design Criteria

Foundation design recommendations are based on AASHTO Load and Resistance Factor Bridge Design Specifications, 3rd Edition, 2004 (AASHTO LRFD) with Interim Specifications through 2006, and Connecticut Department of Transportation Geotechnical Engineering Manual, 2005 Edition. Seismic design recommendations are based on AASHTO LRFD Specifications, 4th Edition, 2007 with 2008 interims. Recommendations are also based on State of Connecticut Department of Transportation (ConnDOT) Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816 (2004). American Society for Testing and Materials (ASTM) publications were followed as the reference standards for all field and laboratory tests applicable.

1.5 Proposed Structure

A new overpass bridge which will carry the proposed Busway over Park Street, is proposed west of and adjacent to the existing railroad bridge crossing over Park Street. The bridge will be approximately 80 feet wide at the south abutment (Abutment 1), 56 feet wide at the north abutment (Abutment 2), and about 122-feet long. Two stepped stub abutments will support the new single-span bridge. The new abutments will be further setback from the edges of Park Street than the existing abutments. Abutment No. 1 will retain up to 16 feet of fill, and Abutment No. 2 will retain up to 18 feet of fill. Figure No. 3 includes plan and elevation views of the proposed structure, including approximate dimensions and structure type.

1.6 Proposed Approach Embankments

Embankment fill will be placed at both bridge approaches by extending the existing railroad embankment to the west. Fill height will range from about 7 feet to 17 feet.

New retaining walls will extend away from Park Street from the back of each side of each abutment. Retaining Walls are designated 109 through 112 and are addressed in a separate retaining wall report. The embankments will be built with 2H:1V slopes transverse to and parallel to Park Street in front of each abutment.

Construction of the bridge will entail some fill removal in front of each abutment to allow for expansion of the Park Street sidewalk.

2.0 GEOLOGY

Published geologic data for this locale indicate that an Alluvial deposit overlies a Glaciolacustrine deposit, the prevalent surficial material in this area, below fill. A Glaciofluvial deposit and Glacial Till underlie the Glaciolacustrine deposit. These unconsolidated materials overlie bedrock of the Portland Arkose formation. These layers were formed in a bottom to top sequence. Thus, the shallower a layer the younger its geological age.

2.1 Alluvial Deposit

Alluvial deposits consist of sediments deposited by present day streams. This deposit is a non-continuous layer with a varying thickness. It consists of fine to medium grained Sand/Silt, with some Clay and little Gravel.

2.2 Glaciolacustrine Deposit

When the late Pleistocene ice sheet in New England retreated about fifteen thousand (15,000) years ago, the Glaciolacustrine deposit was formed in Glacial Lake Hitchcock. The Glaciolacustrine deposit in this area is distinctively featured by alternating layers of clay and silt. Each pair of clay and silt layers is called a "varve", which corresponds to glacial lake deposit of a year: when the glacier melted, melt water streams brought soil particles into Glacial Lake Hitchcock. During the summer, a larger volume of water formed a more turbulent flow. This flow was capable of carrying silt particles (sometimes even larger particles) and settling them on the lake bottom. During the winter, when the volume of melt water decreased and frozen lake surface calmed the water, clay particles were deposited out of suspension. As a result of many years' deposit, the "varved" structure dominated the Glaciolacustrine deposit in this region. The deposit could contain several hundred or even several thousand varves. The thickness of the varves is variable.

Although this deposit contains significant amount of Silt, the literature typically refers to the Glaciolacustrine deposit in this area as Varved Clay. Conforming to tradition, the term "Varved Clay" will be used in this report.

2.3 Glaciofluvial Deposit

Streams of melt water carried and deposited particles and formed this layer the before Varved Clay layer was deposited. The Glaciofluvial deposit consists of a heterogeneous mixture of sand, gravel, silt and clay in order of decreasing quantity.

2.4 Glacial Till

Glacial Till consists of a heterogeneous mixture of different sized particles. The composition of Till demonstrates a wide range of variation in particle size as well as in percentage of each size. Two extremes of these variations are stony till and clayey till. The former contains more than fifty percent of gravels, pebbles, cobbles and boulders. The latter consists of more than fifty percent of clay size particles.

2.5 Bedrock

The Portland Arkose formation, a sedimentary bedrock unit, is the dominating formation in this locale. Its texture ranges from coarse conglomerate to shale.

3.0 EXISTING GEOTECHNICAL INFORMATION

During the preliminary design phase (in 2003) Baker Engineering N.Y. (Baker) and their subcontractors, performed borings and laboratory tests. Baker also retained NDT Corporation to perform geophysical tests at the existing Park Street Bridge.

3.1 General

Pilot Borings SB-79 through SB-84 were drilled in the general area of the new bridge. Boring SB-84 is close to the proposed north abutment, the other borings are south of the new bridge. The 2003 boring logs are included in Appendix 3.

3.2 Laboratory Test Data

Baker conducted the following laboratory tests on samples retrieved from the borings: Moisture Contents, Atterberg Limits, Sieve Analyses, Hydrometer Analyses, Incremental Load Consolidation Tests, Triaxial Tests, and Torvane Tests. All these tests are summarized in Table 3 (Appendix 2). Details and interpretation of each test are provided in the Appendices and in Section 5.2 of this report, respectively. Results are discussed in Section 5.0.

3.3 Geophysical Testing Data

The purpose of this testing was to determine the extent of substructures or foundations for the existing bridge. Three horizontal lines of coverage were established west of the active track atop existing bridge. Ground penetrating radar (GPR) was also used to acquire bridge abutment data.

GPR and sonic/ultrasonic reflection testing was also performed on the face of existing abutments Geophysical testing results are included in Appendix 3

Data from the geophysical survey indicate that the existing bridge abutments are tapered. They are approximately six feet thick near the top and nine feet thick near ground level.

4.0 SUBSURFACE EXPLORATIONS

Geo**Design** conducted additional subsurface exploration during final design. Details of these explorations are described in this section:

4.1 Test Borings

Geo**Design** coordinated the services of New England Boring Contractors of CT, Inc. (NEBC) to perform Standard Penetration Test (SPT, ASTM D1586) borings at the proposed bridge site. Three structure borings and five retaining wall borings were drilled. Boring locations were initially field located by tape measurement and line of sight. Connecticut Department of Transportation (ConnDOT) survey crews recorded the locations and elevations of the borings by

surveying the as drilled boring locations. Borings locations are shown on Figure No. 2 (Appendix 1) and boring logs are included in Appendix 4.

4.2 Field Vane Shear Testing

One field vane shear test (ASTM D2573) was performed at approximately Elev. 23 in Boring SB-02-3. The resulting uncorrected and corrected ultimate shear strengths are 280 and 250 psf, respectively. This data is included in Table 6 (Appendix 2).

4.3 Observation Wells

An observation well was installed in boring SB-02-3. The well installation information is shown on the boring log (Appendix 4). Observation well readings are summarized in Table 1 (Appendix 2.)

5.0 LABORATORY TESTING RESULTS AND INTERPRETATION

Geo**Design** performed laboratory tests to obtain several important engineering properties of the Varved Clay, to verify field classifications, determine material drainage properties, and identify frost susceptibility. More limited testing was also performed on other materials. Test results are included in Appendices 5 through 10.

5.1 Constant Rate of Strain (CRS) Consolidation Tests

Constant rate of strain (CRS) consolidation testing (ASTM D4186) was developed in the early 1970's and since has gradually become more popular because it generates continuous data instead of isolated data points as increment load (IL) testing. In the past CRS tests were significantly more costly than IL testing because the continuous load steps and constant strain control both require close monitoring. As computers and automation technology have improved and become more common, CRS test have become a more widely accepted as the state of the art methodology for consolidation test. Geo**Design** retained University of Massachusetts at Amherst (UMass) to perform two CRS tests on soil samples taken at this bridge crossing. Results are included in Table 2 (Appendix 2) and in Appendix 5.

5.2 Incremental Load (IL) Consolidation Tests

Increment load (IL) consolidation testing (ASTM D2435) has been used much longer than CRS testing. As a result, the testing equipment for IL testing is more widely available and the IL tests are easier to perform than CRS tests. Three IL tests were performed to provide a comparison to existing test data. Some IL tests were performed by TestCon, Inc. and some by UMass. Results from both labs showed comparable results.

The ability to predict maximum past pressures using IL tests depends in part on the selection of the load increments. Loading increments of 4,000 and 8,00 psf were used and at this site the

predicted maximum past pressures fall between these values. As a result, the predicted maximum past pressures end up converge around 4,000 psf. Thus, the IL tests yield lower bound (conservative) predicted maximum past pressures as compared to CRS tests. Test results are included in Table 2 (Appendix 2) and in Appendix 5.

5.3 Direct Simple Shear (DSS) Tests

Direct Simple Shear (DSS) tests (ASTM D6528) can simulate shear forces acting horizontally on soil. Because of the horizontal-layered structure of Varved Clay, the shear strength along the varves is lower than the shear strength across the varves. Thus, DSS testing on Varved Clay samples often yield the most conservative shear strength values compared to Triaxial Compression (TC) or Triaxial Extension (TE) tests.

Geo**Design** retained UMass to perform the DSS tests on four soil samples taken with Shelby tubes in Boring SB-01-1 and SB-01-4 (at the Flatbush Avenue bridge approximately 1.2 miles south of the Park Street bridge). DSS test results are included in Appendix 6. The tests were performed using the Stress History And Normalized Soil Engineering Properties (SHANSEP) Method recommended by Ladd & DeGroot in their 2003 article "*Recommended Practice for Soft Ground Site Characterization: Arthur Casagrande Lecture*".

A SHANSEP correlation was developed from these test results. The expression, $S_{u,DSS}/\sigma'_{vc} = 0.17(OCR)^{0.75}$, provides a way to estimate shear strength in the Varved Clay layer by correlating S_u as determined by DSS testing with its over consolidation ratio (OCR) as determined by consolidation testing with the effective stress (σ'_{vc}). Plots depicting the shear strength and normalized shear strength ratio developed from the referenced laboratory tests are included as Chart 4 (Appendix 2).

Due to the similarity of the Varved Clay stratum at this crossing and at the Flatbush Avenue and Park Street sites the SHANSEP correlation developed from test results at Flatbush Avenue are applicable to this bridge crossing. A tabulation of the resulting calculated minimum shear strength, (S_u), for each tube sample which was tested for consolidation is included in Table 2 (Appendix 2).

At this bridge, using the above referenced data, we calculated a range of shear strength of 540 to 860 psf, and recommend a design shear strength of 700 psf. This value is conservative as it represents the softer zones of the Varved Clay and not the stiffer partially desiccated zones at the top and bottom of the layer..

5.4 Unconfined Rock Compression Tests

Unconfined Compression Tests (ASTM D2938) provide an indication of intact rock core strength. Geo**Design** retained TestCon to perform these tests. However, based on Rock Quality Designation (RQD), rock cores taken at this site were of very poor quality. As a result, no rock core pieces meeting the ASTM test standard were available. Based on unconfined compression

tests made on nearby rock at Old Park River, (approximately 1,500 feet to the south-southwest of Park Street) compressive strength of the rock ranges from about 4,000 to 6,000 psi. This data is included in Appendix 10.

5.5 Atterberg Limits

Atterberg Limits (ASTM 4318) provide the Liquid Limit (LL), the Plastic Limit (PL) and the Plasticity Index (PI) of cohesive soil samples. These tests can characterize cohesive soils and provide a reference to compare soil properties at different depths and locations.

Eight Atterberg Limit tests were performed. The LL ranges from 37% to 62%, the PL ranges from 23% to 49% and the PI ranges from 4% to 27%. Data is included in Table 4 (Appendix 2) and in Appendix 7. Chart 1 (Appendix 2) depicts Atterberg Limits vs. depth.

Baker performed 20 Atterberg Limits in 2003, in samples taken from Boring SB-79 to SB-84. Liquid Limits (LL) range from 20% to 66%. The Plastic Limit (PL) ranges from 17% to 30%, and the Plasticity Index (PI) range from 4% to 36%. This data is provided in Table 3 (Appendix 2) and in Appendix 7. These results correlate well with the above listed results.

5.6 Moisture Contents

Moisture contents (ASTM 2216), like Atterberg Limits, provides an easy way to characterize and compare cohesive soils. These tests were performed in larger numbers vertically and horizontally throughout the Varved Clay layer to rapidly and economically determine vertical and horizontal trends of property variations.

Twenty moisture content tests were made in samples form borings SB-02-1 and SB-02-3 at approximately 10-foot vertical intervals. Test samples were obtained by cutting split spoon samples vertically to sample several varves. The results indicate a moisture content range of 35% to 66% suggesting a pattern with lower moisture contents (around 30%) at top and bottom of the Varved Clay layer, gradually increasing to higher moisture contents near the middle of the stratum (around 60%) and decreasing to 35% toward the bottom of the layer. The average moisture content is approximately 53%.

In 2003, Baker performed 29 moisture content tests on samples taken from Boring SB-79 to SB-84. The results correlate well with the above described test results with an average moisture content of 40%. However, because in 2003 more tests were made in the upper and lower portions of the Varved Clay layer, the average moisture content is lower, than the 2008 average.
Chart 3 (Appendix 2) depicts moisture content vs. depth. From these data, it is clear that moisture content first increases with depth and then decreases past the middle of Varved Clay layer, forming a horizontally reverse “C” shape curve. This moisture content distribution is consistent with a high degree of consolidation at the top and bottom drainage surfaces of the Varved Clay layer.

5.7 Minus No. 200 Sieve Tests

Minus No. 200 Sieve Test (ASTM D1140) provides a means of determining the percentage of soil particles finer than 75 um (clay and silt particles).

Six SPT jar samples taken from the Fill layer were washed with No. 200 sieve and weighted according to ASTM D1140 Method A. The results indicate a silt/clay content range of 4.2% to 70.2%. The data is included in Appendix 8.

5.8 Sieve Analyses

Sieve Analyses (ASTM C136) provide the gradation of soil particles larger than the No. 200 sieve. The results are useful for evaluating reusability of existing soils and calibrating visual field description of soil samples.

Sieve analyses were performed on four jar samples. In 2003, Baker performed five sieve analyses tests on samples taken in Borings SB-79 to SB-84. Results are included in Appendix 8.

5.9 Hydrometer Analyses

Hydrometer analyses were performed on six jar samples and two tube samples of the Varved Clay layer. The results showed a fairly consistent pattern in gradation. The Sand content varies from 0% to 6%. All the sand particles are categorized as fine sand. The Silt content varies from 13% to 28%. Clay is the major component of Varved Clay layer, ranging from 71% to 87%. Data is included in Table 5 (Appendix 2) and in Appendix 8. Hydrometer test results presenting percent Sand, Silt and Clay vs. depth are summarized on Chart 2 (Appendix2).

In 2003, Baker performed hydrometer tests on 16 samples. Thirteen of these were from the Varved Clay layer. Two were from the Sand/Silt layer. One was from the Glacial Till layer. This data is included in Tables 3 (Appendix 2) and in Appendix 8.

5.10 pH and Sulfides Tests

pH and Sulfides tests were performed to estimate corrosion potential. Three pH tests and three Sulfide tests were performed in samples taken from Borings SB-02-1, SB-02-2 and SB-02-3. No Sulfide was detected in these samples. pH values range from 3.4 to 5.9, with and average value of 5.1. Comparing to neutral pH value of 7, the average pH value indicates slightly acidic soils. Test results are included in Appendix 9.

6.0 SUBSURFACE CONDITIONS

6.1 Subsurface Profile

A subsurface profile is shown on Figure No. 5 (Appendix 1). This profile depicts the generalized subsurface conditions based on the pre-existing and recent subsurface exploration data. The legend for the subsurface profiles is included as Figure No. 4.

The profile depicts a fairly consistent Varved Clay layer, except that the upper portion of this layer exhibits a variable degree of desiccation. Despite small variations in the contents of relatively thin layers above and below the Varved Clay, the soil and rock profile can be summarized as follows:

- **Top Soil/Asphalt -** 0 to 1 foot thick;
- **Fill -** 0 to 23 feet thick;
- **Silt/Fine Sand (Alluvium Deposit)-** 0 to 16.5 feet thick;
- **Varved Clay (Glaciolacustrine Deposit)-** 97 to 134 feet thick;
- **Silt/Fine Sand (Glaciofluvial Deposit) -** 0 to 15 feet thick;
- **Glacial Till-** 0 to 36 feet thick;
- **Bedrock (Siltstone/Shale).**

The **Fill** consists of loose to very dense, poorly graded (fine to medium) Sand, trace to some Silt, and (where present) some fine to coarse Gravel, little Asphalt fragments, trace Ash, trace Cinders, trace Brick/Concrete fragments, and trace Organic Fibers.

The majority of soil samples indicate that the Fill layer is medium dense, poorly graded and widespread. Only one out of sixteen borings (SB-83) showed no indications of Fill in the samples. In Boring RW-25 and R-119, Cinders and Ashes dominate the fill material. However, these borings were approximately 400 feet north of Abutment No. 2.

Two of sixteen borings encountered variable fill materials. Boring R-119 indicates that Fill at this location is locally very loose to loose. In boring SB-02-1, eight feet of concrete was encountered between the Topsoil and the Varved Clay.

The **Silt/Fine Sand** layer is erratic through the area of the new bridge and is generally medium dense. It is present in nine out of sixteen borings. The borings indicate that this layer is absent in SB-02-1, -2 and -3 and also in RW-21, RW-24 and R-119. The layer typically consisted of loose to dense Silt and/or fine Sand. SPT N-values indicate that the majority of the samples have a medium density.

The **Varved Clay** layer was encountered is all the borings. The top and bottom ten feet of the layer consisted of stiff to very stiff Clay and Silt. The stiffness decreases from top and bottom to the middle of the layer. Near the middle of the layer, (about 30 to 110 foot depth), the SPT "N"

values typically range from Weight of Rod (WOR) or Weight of Hammer (WOH) to 2, indicating a very soft consistency within the deposit.

The **Silt/Fine Sand (Glaciofluvial Deposit)** underlies the Varved Clay. In nine out of sixteen borings which fully penetrated the Varved Clay, five encountered the underlying Silt/Sand/Gravel layer. This stratum consists of medium dense to very dense fine Sand and Silt and its thickness varies from 0 to 15 feet.

Glacial Till was encountered in all the borings that fully penetrated the silt/fine sand layer. Its thickness varied from 22 to 36 feet. SPT "N" values indicate the density of this layer ranges from dense to very dense.

Bedrock (Shale) is at approximately 155 feet below the existing ground surface (approximate Elev. -94). Rock cores were taken in two borings near the proposed abutments. Rock Quality Designation (RQD) values were less then 10%, indicating very poor quality, however, it is expected to improve with depth.

6.2 Groundwater

Stabilized readings made in the observation well in Boring SB-02-3, indicate groundwater levels at approximately Elevation (Elev.) 45 (approximately 8.5 feet below the existing ground surface). Groundwater conditions will vary depending on factors such as temperature, season, precipitation, construction activity and other conditions, which may be different from those at the time of these readings.

7.0 EVALUATION AND RECOMMENDATIONS

7.1 Bridge Foundations

Following are design considerations and design recommendations for the bridge foundations.

7.1.1 Foundation Type

As discussed in Section 7.2, significant consolidation (delayed) settlements are predicted near the abutments due to embankment loading of the thick compressible Varved Clay layer. Consideration was given to using shallow foundations to support the bridge abutments in combination with techniques such as use of light-weight fill, pre-loading, surcharging, installing wick-drains or a combination of these to reduce the consolidation settlements. However, a shallow foundation solution is not recommended due to economic and schedule reasons, and due to the added risks this solution would entail as compared to the pile supported solution.

In the area of the bridge abutments, the Varved Clay layer deposit is present at depths of about 7 to 14 feet below the ground surface (Elev. 40 to 55) extending to depths of about 122 to 134 feet (Elevs. -68 to -72). The Varved Clay layer overlies very dense Silt/Sand or Glacial Till, over bedrock. To avoid abutment settlements of up to 2.5 inches, we recommend that both abutments

be supported on deep foundations. The recommended pile type consists of H-piles driven to refusal in bedrock.

7.1.2 Pile Lengths

Top of bedrock is at approximately Elev. -93 to -94 in the area of the abutments. Based on bottom of pile cap Elevations ranging from 46 to 56.5 feet, we estimate piles lengths of 142 to 153 feet at the abutments. Estimated pile lengths include one foot embedment into the pile cap and into the bedrock. Design pile tip elevation is -95.

We recommend an additional 20 feet be added for test pile lengths; and recommend that the contractor use information from the test piles to determine order lengths.

7.1.3 Down-drag Load

Piles which are driven through a compressible stratum (e.g. varved clay) to an end bearing stratum must be evaluated for down-drag. Down-drag occurs when a soil layer is compressed and it moves downward relative to the pile. As little as 0.2 inches of downward movement against the pile is enough to initiate the down-drag load.

The magnitude of down-drag forces depends on the friction coefficient between soil and the pile, and the geometry of the pile cross section. For a fixed cross sectional area and friction coefficient, the larger the pile perimeter the higher the down-drag force. In addition, the greater the thickness of down-drag inducing material (in this case Varved Clay in contact with the pile), the greater the down-drag force.

For example, the settlement down-drag force on a Grade 50 Steel HP14x117 pile which penetrates a 120 foot thick stratum of the Varved Clay is approximately 68 percent of the pile's factored structural capacity. Therefore, the pile is only 32 percent efficient. Smaller piles are even less efficient and are therefore not usable.

7.1.4 Down-drag Load Reduction

Bitumen is very effective as a coating to reduce the friction between the soil and piles. A one millimeter thick bitumen coating is sufficient to significantly reduce the down-drag force. The bitumen coating need not be applied to the section of the pile below the bottom of the Varved Clay stratum (about 135 linear feet per pile). We estimate that the down-drag load of a bitumen coated HP14x117 pile will be 85 percent less than for an uncoated pile. Thus, bitumen coating will reduce the predicted down-drag force to about 10 percent of pile's structural capacity, making a HP 14x117 pile 90 percent efficient.

We estimate that bitumen coating of the piles will add approximately 10 percent to the pile's material cost. Thus, bitumen coating is recommended.

Precautions must be taken to prevent damage the bitumen coating with extreme temperatures and while driving through granular soils. To avoid damage to the coating, we recommend a hole be pre-drilled through the surficial Fill and Silt/Sand layers to the top of the Varved Clay.

7.1.5 Corrosion Protection of Steel Piles

As noted in Section 5.10, pH values of 3.4 to 5.9 and the absence of Sulfide in tested samples (taken in the upper 8 to 15 feet), indicate low to medium corrosive potential. Under these conditions, an allowance for corrosion of 1/16 to 1/32 inch is often used. However, due to the recommendation to use of bitumen coating which will protect the piles from corrosion, we do not recommend using a corrosion allowance for steel piles.

7.1.6 Pile Type Selection

To limit the development of a significant down-drag force, we recommend steel piles because, compared to piles of other materials, steel piles typically provide higher strength, smaller perimeter, and smaller friction coefficients.

ConnDOT has requested that pile tip stresses not exceed 24ksi. We therefore recommend vertical, end-bearing, bitumen coated, Grade 50 steel H-Piles, with a maximum tip stress of 24ksi. We further recommend pile tip reinforcement with integrally cast cutting teeth (or similar) be used. The following table provides nominal compressive resistances, down-drag loads, and nominal lateral capacities for a selection of HP pile sections. The down-drag loads are based on bitumen coated piles and must be added to the abutment load when determining the required number of piles. Nominal lateral pile capacities are based on a predicted lateral deflection of 0.6-inches.

Pile Section	Nominal Compressive Resistance (kips/pile)	Design Down-drag Load (kips/bitumen coated pile)	Nominal Lateral Capacity** (kips/pile)
HP12x74	523	60	20
HP14x117	825	65	25

**Lateral Capacity assumes 0.6-inch deflection

We recommend a resistance factor for compression, ($Ø_c$), of 0.6 (for good driving). Resistance factors for the service limit state shall be taken as 1.0, except for global stability where the resistance factor shall be taken as 0.75. Resistance factors for the extreme limit state shall also be taken as 1.0, except for uplift resistance of piles, where the resistance factor shall be taken as 0.8. Refer to Section 7.1.10 for use of resistance factors during pile testing.

The down-drag load must be added to the abutment load when determining the required capacity and number of piles. However, the live loads need not be considered to act simultaneously with down-drag loads because temporary loads temporarily relieve down-drag loads due to the elastic

compression which acts in the opposite direction as the soil compression which causes the drag loads.

7.1.7 Pile Batter

Batter piles may be used to supplement the recommended lateral pile capacity if needed. We recommend a maximum pile batter of 1H:4V. In addition, if batter piles are used, the lateral capacity of piles (excluding the batter component) must be reduced to a maximum ultimate lateral capacity of 3 kips per pile.

7.1.8 Pile Spacing

In no case should the piles be spaced closer than three pile diameters. Pile group reduction factors, as applicable must be applied in accordance with AASHTO LRFD Section 10.7.2.4, Table 10.7.2.4-1, and Figure 10.7.2.4-1.

7.1.9 Pile Splicing

Due to pile length, shipping, and handling constraints, piles will require at least two splices. Splices shall be made using pre-approved pre-fabricated splice connectors welded to provide the design pile vertical and lateral capacity. Splices shall not be the allowed within 15 feet of the pile cut-off and splices between adjacent piles shall be staggered at least 5 feet vertically.

7.1.10 Pile Load Testing

We recommend the use of PDA testing, which can be completed quickly. We recommend one pile be tested at each abutment (for a total of two tested piles). The pile load testing resistance factor for PDA testing ($Ø_{dyn}$) is 0.65

The test pile selection should be based on a successfully tested indicator pile driving records, considered in relation to the test boring data, as determined by the Geotechnical Engineer.

Preliminary installation criteria for the piles should be based on wave equation analysis employing the characteristics of the pile type, soil conditions, and pile driving hammer and cushions proposed by the Contractor. This installation criteria analysis may be performed by Geo**Design**, or by the Contractor's engineer and submitted for review.

Pile load testing resistance factors are as follows: Static Load Testing = 0.8 and PDA Testing = 0.65. Resistance factors differ based on confidence levels, i.e. there is a greater confidence for Static Load Testing. In the interested in using a larger resistance factor for pile load testing, we recommend static load tests be performed and correlated with PDA Testing. At any particular structure location/area, PDA Testing can then be used with the larger resistance factor (0.8).
At Abutment 1, we recommend a PDA and Static Load Test and at Abutment 2, we recommend only a PDA test.

Production pile installation criteria will be based on the passing of a successfully tested indicator pile.

7.1.11 Abutment Settlement

Settlement of the end-bearing pile-supported structure is expected to be small (on the order of one-quarter inch or less) and should occur largely during bridge construction.

7.1.12 Obstructions

Due to the distance between the new abutments and the existing railroad bridge, we do not expect that the piles will encounter obstructions during driving.

7.1.13 Static Design Parameters

For design of the abutments, we recommend the following static design parameters:

- Unit weight of soil above the water table of 125 pcf
- Unit weight of soil below the water table of 62.6 pcf
- Soil Angle of Internal Friction, phi = 34°
- Coefficient of Friction for Sliding of Footing over Sand or Crushed Stone = 0.55
- Coefficient of Friction for Soil against Wall, tan delta = 0.40
- Coefficient of Passive Earth Pressure, $K_P = 3.5$
- Coefficient of Active Earth Pressure, $K_a = 0.28$

Load Factors for soil loads should be selected based on Table 3.2.1-2 (AASHTO LRFD).

Earth pressure calculations should assume a surface surcharge of 24 inches soil depth or 250 psf.

7.1.14 Liquefaction Potential and Seismic Design

AASHTO LRFD Section 4.7.4.1 states that the bridges in Seismic Zone 1 need not be analyzed for seismic loads, regardless of their importance and geometry; accordingly, recommendations for dynamic lateral earth pressures are not included. However, the minimum requirements, as specified in Section 4.7.4.4 and 3.10.9, shall apply.

7.1.15 Dynamic Lateral Earth Pressures

The abutments should be designed for lateral earth pressures during seismic loading by the pseudo-static Mononobe-Okabe method, in accordance with AASHTO LRFD, 2004 Section 11, Appendix A11.1.1.1. In addition to the soil properties provided in Section 7.3, the following values should be used for seismic design:

- Horizontal Acceleration Coefficient, $k_h = A = 0.14$
- Vertical Acceleration Coefficient, $k_v = 0$
- Assuming the backfill angle, i, and the backwall batter angle, β, are both zero, and

k_h = A = 0.14, Seismic Active Pressure coefficient K_{AE} = 0.35

If this analysis results in an excessively large abutment, per AASHTO no displacement criterion, a tolerable displacement criterion may be used to provide a more economic design. In this case, *provided that allowance is made for an outward displacement of the abutments of up to 1.5 inches*, we recommend using the following values:

- Horizontal Acceleration Coefficient, k_h = A/2 = 0.07
- Vertical Acceleration Coefficient, k_v = 0
- Assuming the backfill angle, i, and the backwall batter angle, β, are both zero, and k_h = 0.07, Seismic Active Pressure coefficient, K_{AE} = 0.30

If the abutments will be cantilever type substructures vs. gravity-type, substructure inertia effects may be neglected for design as recommended by AASHTO.

7.1.16 Abutment Backfill Requirements

Abutments and wing walls should be designed to comply with ConnDOT Manual Standard, Plate Number 3.5.2 – U-Type wing wall or wall drainage and backfill requirements.

7.1.17 Special Provisions

Special provisions will be required to address bitumen coating, pile splicing and pile testing.

7.2 Approach Embankments

7.2.1 Settlements Resulting from Embankment Loads

Laboratory testing of the Varved Clay stratum indicates that this layer is over consolidated. We compared the maximum proposed stress (the sum of the present in-situ stress and the proposed stress increase) to the maximum past pressure and determined all the loading will be consist of reload, e.g. less than the maximum past pressure. This means that the proposed embankment loading will consolidate the Varved Clay layer through a recompression process. Thus, the recompression ratio (RR) was used to estimate consolidation settlement. A RR value of 0.04 was chosen to estimate consolidation settlement and the Roc Science software package SETTLE 3D was used to estimate settlements.

7.2.2 Embankment Settlements

We estimate the following settlements directly behind the abutments due to fill (γ = 125 pcf) and the weight of the wall:

Abutment Number	Consolidation Settlement (in) At Centerline of Abutment	Consolidation Settlement (in) At Edge of Abutment	Total Settlement (in) At Centerline of Abutment	Total Settlement (in) At Edge of Abutment
1	2.2	1.5	2.3	1.6
2	1.7	1.2	1.8	1.3

Predicted settlements at a distance of approximately 60 feet behind each abutment are about 50 percent higher than the above values.

7.2.3 Utility Settlements

The embankments will also cause a stress increase in front of the abutments within the area of Park Street and its sidewalks. Two known subsurface utilities are present within the Park Street right-of-way, a 36-inch RCP pipe (likely a sewer) at the centerline, and a 30-inch diameter water main to the north of the centerline (closer to Abutment 2). We estimated the total settlement of these utilities to be as follows:

Utility	Settlement at Busway Centerline (in)	Settlement 70 feet Offset from Busway Centerline (in)
36-inch RCP	0.47	0.18
30-inch Water Main	0.48	0.19

This indicates slightly less than ½ inch of predicted settlement in a gradual dish-shaped pattern with the maximum at the Busway centerline gradually decreasing with distance away from the embankments. These predicted settlements are expected to be entirely comprised of delayed consolidation settlement.

7.2.4 Existing Park Street Bridge Settlements

Plans of existing bridge carrying Amtrak over Park Street, do not show bridge foundations. Since part of the existing superstructure is going to be demolished, the settlement of the existing bridge will not be very critical. However, the existing railroad tracks are estimated to settle up to about 1.2 inches.

7.2.5 Rate of Settlement

Because of the anisotropic properties of Varved Clay, horizontal drainage will control the dissipation of water in Varved Clay and hence its rate of consolidation. To estimate the rate of consolidation, we used a report on *"Field Consolidation of Varved Clay"*, by Professor Richard P. Long, Professor Kent A. Healy and Mr. Peter J. Carey from University of Connecticut. Based on Figure 13 of the report (reproduced as Chart 1, included in Appendix 2, Vol. I) and using a dimension ration of 1.4 (width of Busway Over Park Street Bridge of approximately 70 feet and the average depth of Varved Clay of approximately 100 feet), the field-measured apparent

coefficient of approximately 6.0 ft^2/day. Conservatively, we recommend using 5 ft^2/day. Based on this value, the clay thickness, and assumed double drainage, we estimate that primary consolidation will be essentially complete after approximately 1.5 to 2 years.

7.2.6 Approach Slabs

The approach fills are expected to undergo slight settlement due to limited elastic settlement of the existing and new fills, and significant consolidation settlement (provided in Section 7.2.2). To mitigate the anticipated differential consolidation settlement between the pile-supported abutments and the abutment backfill, we recommend the use of 20-foot minimum length approach slabs for both approaches. Approach slabs are used to mitigate the settlement between the bridge seat and the abutment backfill to reduce the 'bump' effect felt at high speeds.

7.2.7 Embankment Stability Near Bridge

Slope stability analyses of the proposed embankments were performed using the two-dimensional limit equilibrium. We used the Roc Science software package SLIDE. The assumptions used in slope stability analysis were conservative: the cohesion was assumed to be 700 psf; the friction angle was assumed to be zero. The 700-psf cohesion was estimated from SHANSEP correlations for soil samples taken near the middle of Varved Clay stratum (See Table 2 in Appendix 2). Cohesion of soil on the top and bottom of the Varved Clay layer is expected to be higher due to the partially desiccated conditions indicated by the lower moisture contents. The range of minimum predicted safety factors against 2D global slope failure is 1.25 to 1.3. These values were calculated using the Bishop Simplified Method and the Spencer Method, respectively. These values are acceptable in consideration of the fact that the clay will gain strength as it consolidates under new embankment stresses and the conservative shear strength selected for the analyses.

7.3 Construction Considerations

7.3.1 Protection of Existing Railroad Bridge

Based on drawings and sections provided by URS, it appears that installation of the Abutment 1 pile cap to approximate Elev. 54 feet, will encroach on the protected zone adjacent to live railroad tracks. Specifically, Amtrak requires protection of the existing tracks when construction occurs within two well defined zones. Temporary sheeting is required if excavations extend into "zone 2" below the boundary defined as a 1V:1.5H slope beginning 10 feet outside the centerline of the nearest RR tracks. Temporary sheeting to be left-in-place is required if excavations extend into "zone 3" below the boundary defined as a 1V:1H slope beginning at the closest end of the RR tie. Excavations to install the proposed pile caps will extend into "zone 2" and will therefore require sheeting for protection of the railroad.

The existing railroad bridge will create both horizontal and vertical constraints during construction. Pile driving adjacent to the tracks may fowl the tracks. Appropriate contractor coordination with Amtrak will need to be specified in the contract documents.

7.3.2 Temporary Lateral Support

Temporary lateral support is required at for installation of Abutment 1 pile caps. We recommend the following design parameters, based on soil and groundwater conditions, and depth to bedrock.

- Existing Fill
  Total Unit Weight = 125 pounds per cubic foot (pcf)
  Submerged Unit Weight = 63 pcf
  Phi = 34 degrees
  $K_a = 0.28$
  $K_p = 3.5$
- Varved Clay
  Total Unit Weight = 105 pcf
  Submerged Unit Weight = 43 pcf
  S_u (Undrained Shear Strength) = 800 psf

7.3.3 Vibrations and Construction-Induced Settlements

Vibrations from pile driving may impact the tracks, bridge, and/or nearby utilities. See Section 7.3.4 below for recommendations regarding the utilities. For the other structures, we recommend they be closely monitored with vibration monitoring plans and threshold/action criteria defined and coordinated in advance with Amtrak.

We recommend a structure data monitoring point (DMP) and tilt meter be established on each of the existing bridge abutments which will carry train traffic during construction of the new abutments. The tilt meters will show rotational movement, while the DMPs will show vertical movement. We recommend the tilt meters be remotely monitored, however ConnDOT has requested that the meters instead be field monitored.

Although Geo**Design** recommends the use of inclinometers behind the temporary lateral support to monitor rotational movement of the sheeting, ConnDOT has directed us otherwise. Instead, ConnDOT has requested that Data Monitoring Points (DMPs) be located at the top of the sheets, and monitored by survey.

The railroad tracks should be monitored with monitoring points on the nearest track at 50-foot intervals, extending 100 feet from the end of each abutment.

7.3.4 Monitoring of Utilities

Existing utilities run below Park Street. These utilities include gas, telephone, storm, sewer, water, and electric. Utilities nearest to the proposed bridge include a 36-inch RCP and a 30-inch water main. We recommend that three monitoring points be established on each of these two utilities, using steel rods and steel pipe installed to the crown of the buried utility. The monitoring points can then be monitored at the ground surface using survey equipment during construction.

7.3.5 Dewatering

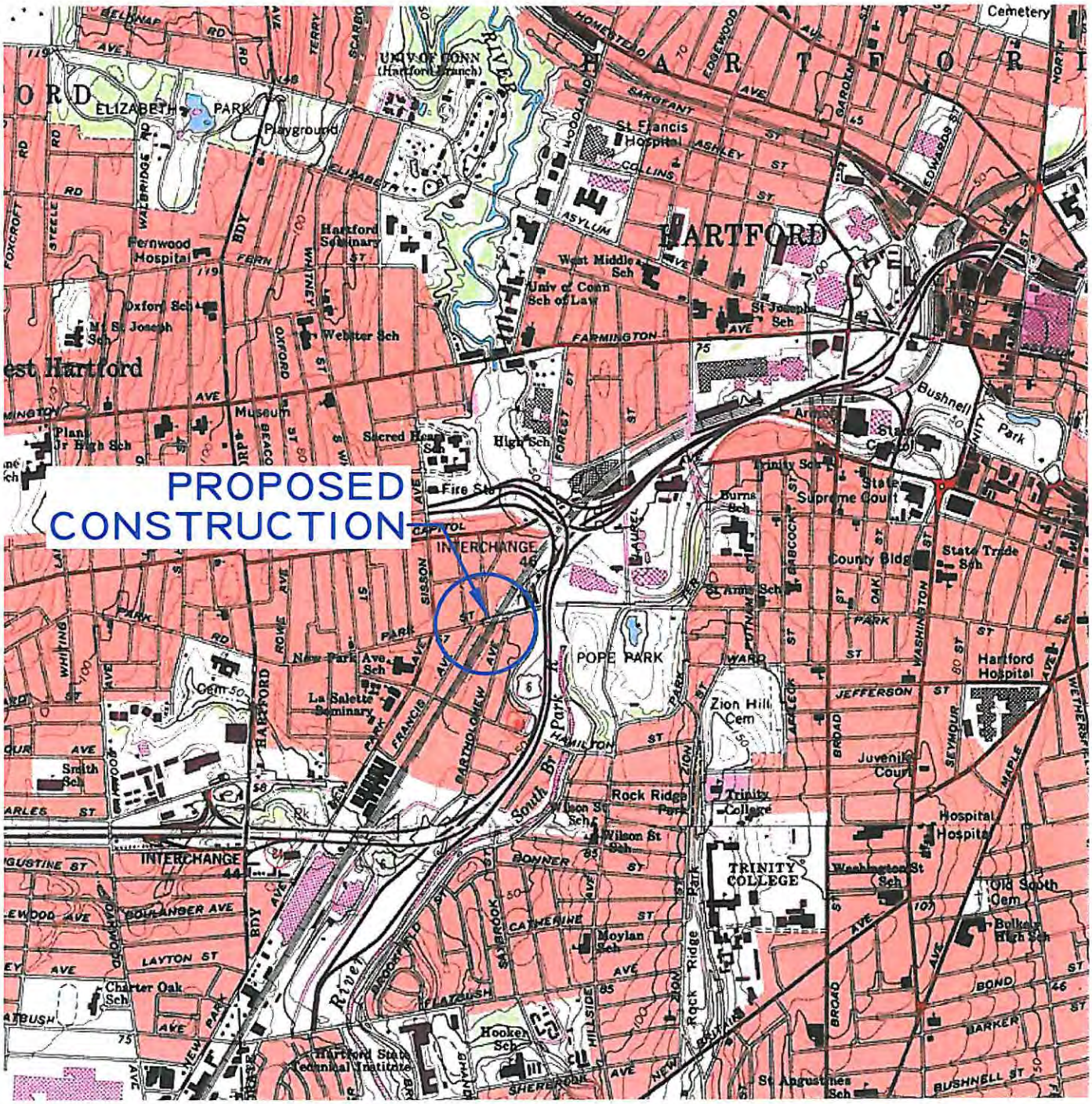
Groundwater is not likely to be encountered during foundation installation, but cannot be ruled out. Therefore, Contractors should be prepared to use sump pump to control groundwater as needed. Contractors should take extra precaution to dewater in areas where bottom of foundation close to the Varved Clay. A layer of crushed stone placed on top of the Varved Clay before dewatering is recommended to reduce disturbance to this stratum if it is reached during excavations. If the Varved Clay stratum is disturbed, the disturbed portions must be removed and replaced by crushed stone.

8.0 LIMITATIONS

This report is subject to the limitations attached in Appendix 11.

Appendix 1

Figures



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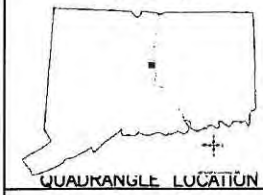
DRAWN BY: SMC | REVIEWED BY: CZ

CONNECTICUT



QUADRANGLE LOCATION

SCALE IN FEET

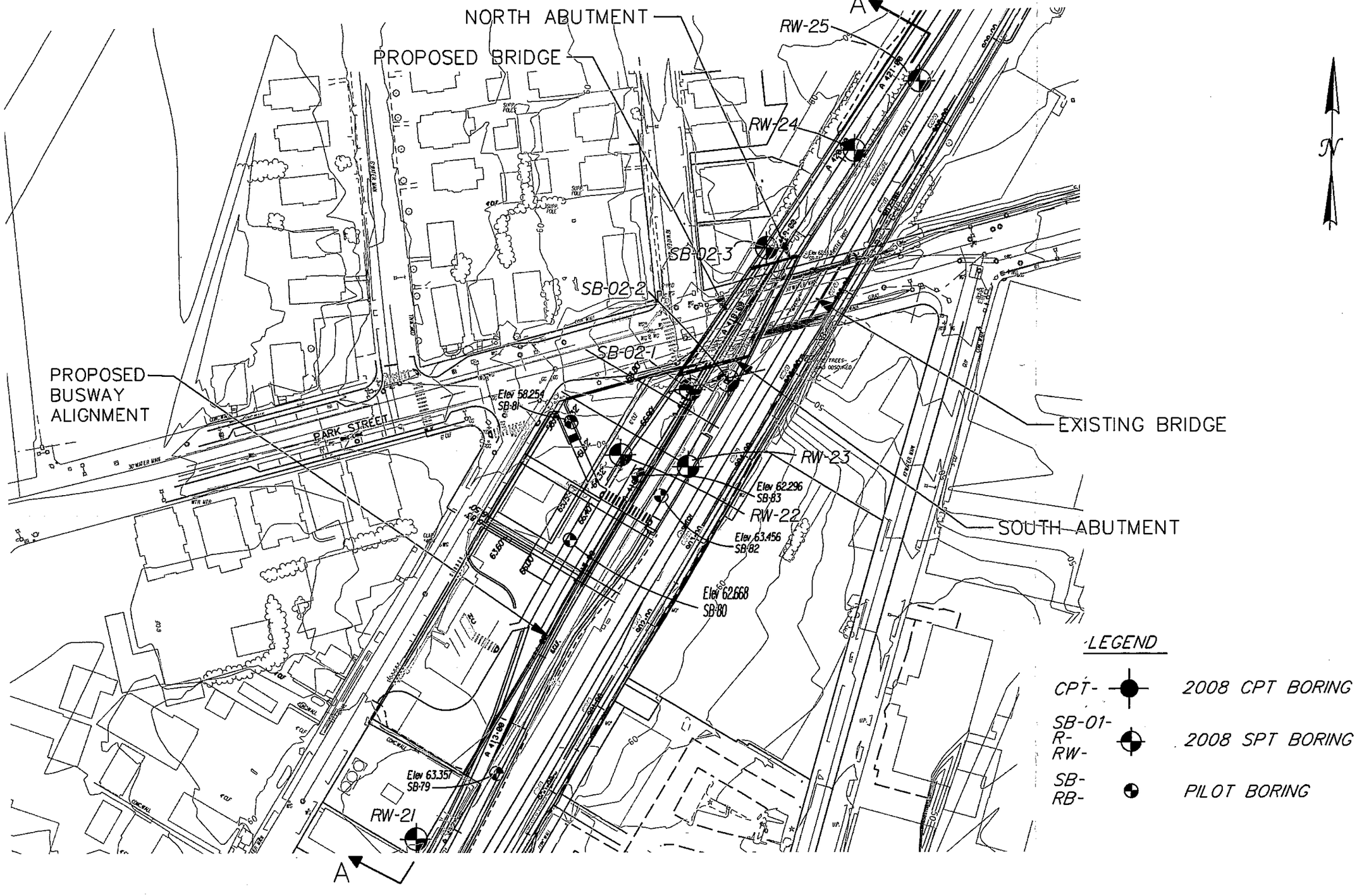
0 1000 2000 4000

PROJECT LOCATION PLAN
BUSWAY OVER PARK STREET
NEW BRITAIN-HARTFORD BUSWAY
STATE PROJECT NO. 155-H025

REFERENCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE: HARTFORD, CT.
Figure was created using TOPO! 2003 software

PROJECT NO. 380-04
DATE: 10-28-08
FIGURE NO. 1

ACAD FILE No. M:\CIL\380\04\F "ORTS\STRUCTURES\STRUCTURE2 - BUSWAY OVER PARK ST\Area Map - Busway over Park St.dwg



DESIGNED BY CZ							
DRAWN BY SMC							
CHECKED BY ULF							
APPROVED BY ULF		NO.	DATE		DRWN.	CHKD	APPVD
		REVISIONS					

BORINGS LOCATED BY CT DOT SURVEY.

PRIME DESIGNER:

URS Corporation
500 Enterprise Drive
Suite 3B
Rocky Hill, CT.

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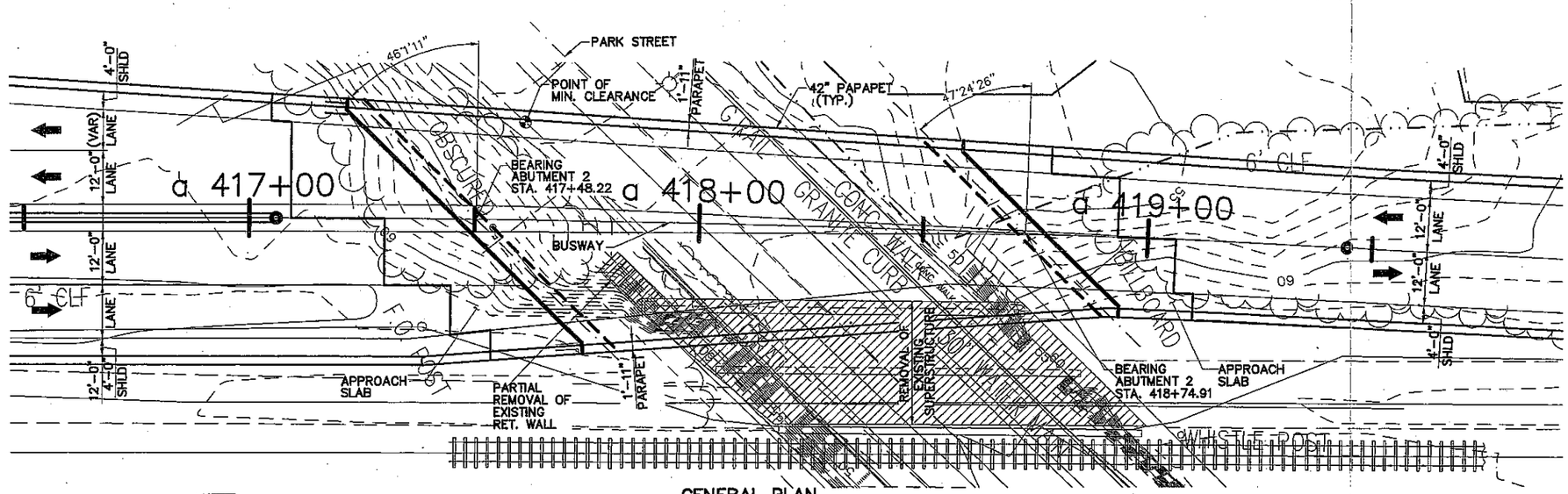
DWG. TITLE
BUSWAY OVER PARK STREET
AS-DRILLED EXPLORATION
LOCATION PLAN

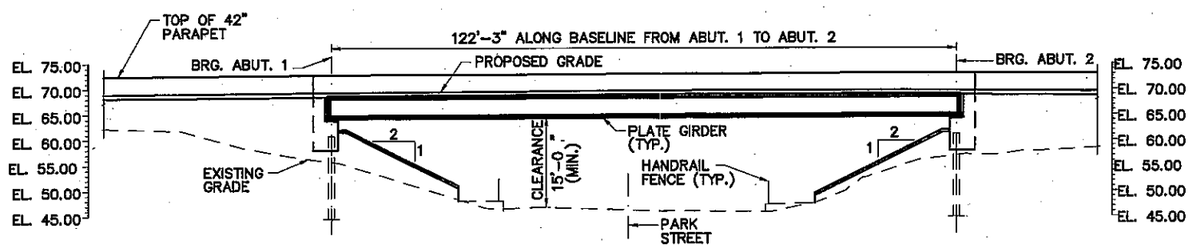
PROJECT
NEW BRITAIN – HARTFORD BUSWAY
STATE PROJECT NO. 155-H025

FILE NO.	380-04
SCALE	1" = 100'
DATE	10-27-08
FIGURE NO.	2



REMOVAL OF EXISTING STRUCTURE

GENERAL PLAN
(SCALE 1" = 30')



ELEVATION
(SCALE 1" = 30')

DESIGNED BY CZ						
DRAWN BY SMC						
CHECKED BY CZ						
APPROVED BY ULF	NO.	DATE		DRWN.	CHKD	APPVD
	REVISIONS					

SCALE 1"=30'
30 0 15 30

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DWG. TITLE
BUSWAY OVER PARK STREET
PLAN AND SECTION OF
PROPOSED STRUCTURE

FILE NO. 380-04
SCALE AS NOTED
DATE 10-20-08

PROJECT
NEW BRITAIN - HARTFORD BUSWAY
STATE PROJECT NO. 155-H025

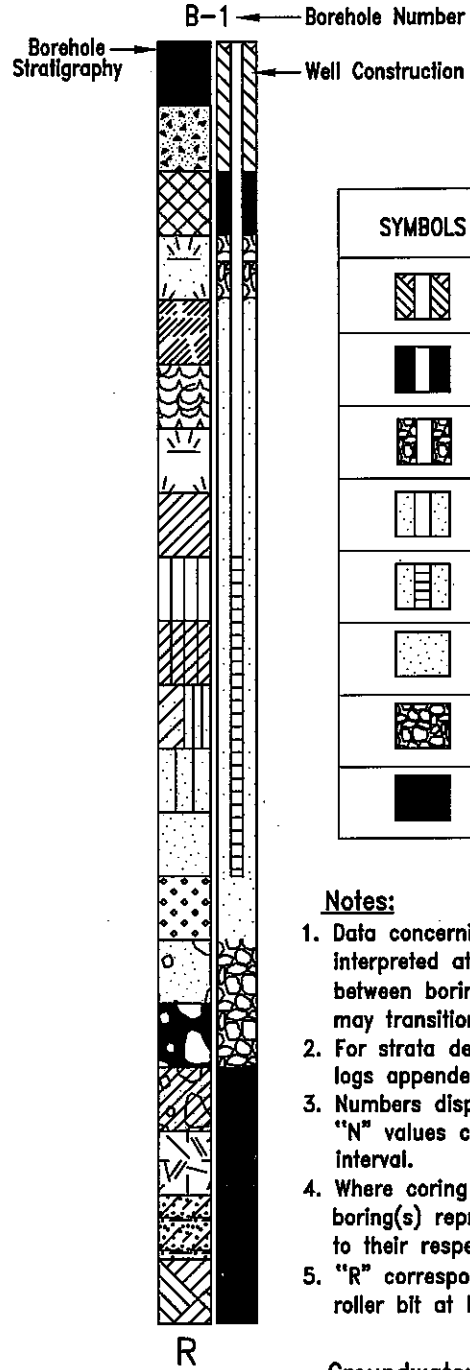
FIGURE NO. 3

M:\CL\380\04\FD REPORTS\STRUCTURES\STRUCTURE 2\Park_Street_Bridge Plan and Section.dwg

STRATIGRAPHY SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS OF PREDOMINENT MATERIAL TYPE
	ASPHALT
	CONCRETE
	FILL
	TOPSOIL
	SUBSOIL
	ORGANIC SILT OR CLAY WITH SHELLS
	PEAT
	CLAY
	SILT
	CLAY/SILT MIXTURE
	CLAY/SILT/SAND MIXTURE
	SILT/SAND MIXTURE
	SAND/SILT MIXTURE
	POORLY-GRADED SAND
	WELL-GRADED SAND
	SAND/GRAVEL MIXTURE
	SAND/GRAVEL/SILT MIXTURE
	BOULDERS AND/OR COBBLES
	GLACIAL TILL
	DECOMPOSED BEDROCK
	SANDSTONE
	BEDROCK

EXPLANATION OF BORING



WELL SYMBOLS

SYMBOLS	TYPICAL DESCRIPTIONS
	CEMENT SEAL: 1 PIPE
	BENTONITE SEAL: 1 PIPE
	SLOUGH BACKFILL: 1 PIPE
	FILTER PACK: 1 PIPE
	SLOTTED PIPE WITH FILTER PACK: 1 PIPE
	FILTER PACK AT BOTTOM OF HOLE
	SLOUGH AT BOTTOM OF HOLE
	BENTONITE AT BOTTOM OF HOLE

Notes:

1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown, and may transition more gradually within borings.
2. For strata details, see Report and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval.
4. Where coring was performed, numbers displayed beside boring(s) represent Recovery and RQD values corresponding to their respective sampling interval.
5. "R" corresponds to refusal of sampler, casing and/or roller bit at bottom of boring.

Groundwater Observations (where applicable)

▽ Water Level Reading at time of drilling.

▼ Water Level Reading after completing drilling.

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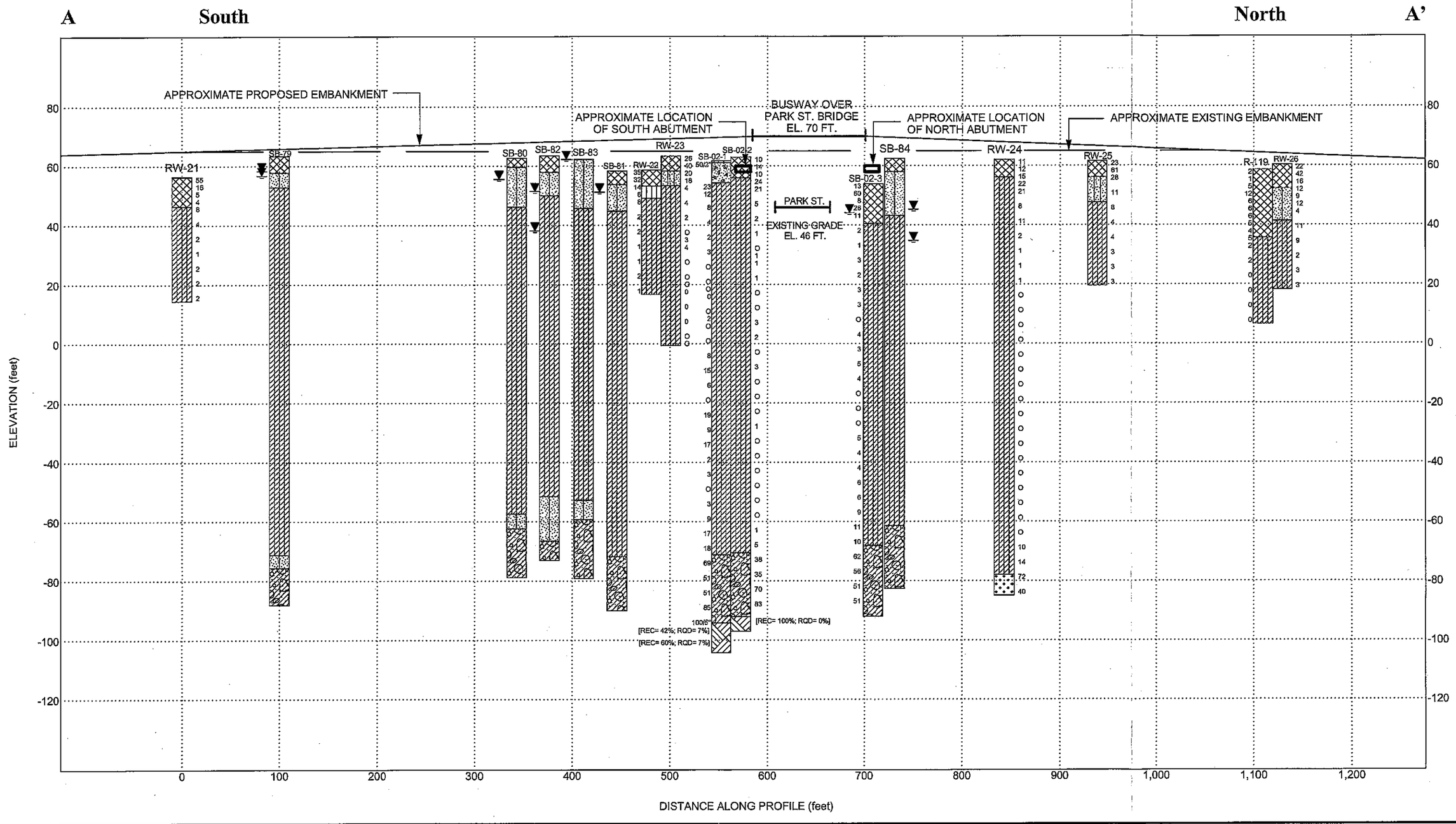
NEW BRITAIN – HARTFORD BUSWAY
STATE PROJECT NO. 155-H025
FILE NO. 380-04
SUBSURFACE PROFILE LEGEND

DRAWN BY:	CHECKED BY:	DATE:	FIGURE NO.
SMC	CZ	10-30-08	4



GEODESIGN INCORPORATED

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0 100
Horizontal Scale (feet)

Vertical Exaggeration: 3x

Notes:
1. Data concerning the various strata have been interpreted at boring locations only. The stratigraphy between borings may vary from that shown.
2. Refer to plan view for subsurface profile location. For strata details and symbol legend, see Subsurface Profile Legend and boring logs appended to this report.
3. Numbers displayed beside boring(s) represent SPT "N" values corresponding to their respective sampling interval. "O" indicates weight of rod or weight of hammer. Where coring was performed, numbers represent Recovery and RQD values.
4. For "N" value in SB-79 to SB-84, refer to boring logs.
5. "S" stands for tube sample; "O" stands for weight of hammer/rod.

Date: 10-23-08 | Drawn By: JPM/DSF | Reviewed By: ULF

SUBSURFACE PROFILE A-A'

Busway over Park Street
New Britain - Hartford Busway

File No.: 0380-004.0 | Figure No.: 5

GEO STANDARD 11 X 17 (2/19/04) BORING LOGS 2008.GPJ FBNWNL01.GDT 10/24/08

Appendix 2

Tables and Charts

Prepared By: MJV
Checked By: RTS

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 1. Observation Well Readings

Well Location	Ground Surface Elevation (ft)	June 10, 2008		June 12, 2008		June 16, 2008		June 18, 2008		June 20, 2008		June 27, 2008		October 24, 2008	
		Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)	Depth (ft.)	Elevation (ft.)
SB-01-3	69.6	-	-	2.30	67.3	2.00	67.6	1.70	67.9	1.70	67.9	1.85	67.7	2.3	67.3
SB-02-3	54.0	8.7	45.3	9.00	45.0	8.70	45.3	8.50	45.5	8.70	45.3	8.40	45.6	8.8	45.2
SB-03-1	41.2	7.0	34.2	7.00	34.2	7.20	34.0	5.30	35.9	5.75	35.5	5.95	35.3	6.3	34.9
SB-03-2	43.6	8.2	35.4	9.70	33.9	8.80	34.8	8.80	34.8	9.00	34.6	9.05	34.5	8.8	34.8
SB-05-1	43.4	9.4	34.0	9.30	34.1	8.80	34.6	9.00	34.4	9.00	34.4	9.05	34.4	9	34.4
SB-06-4	47.9	12.9	35.0	14.50	33.4	14.50	33.4	14.50	33.4	14.50	33.4	14.40	33.5	14	33.9
RW-2	74.7	-	-	-	-	-	-	-	-	2.10	72.6	3.90	70.8	4.2	70.5
RW-7	69.7	-	-	-	-	8.70	61.0	8.50	61.2	8.60	61.1	6.60	63.1	6.5	63.2
RW-16	46.6	12.5	34.1	11.00	35.6	11.00	35.6	11.00	35.6	4.00	42.6	11.00	35.6	11.2	35.4

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 2 - Consolidation Test Results and Calculated Shear Strength

Boring No.	Sample No.	Sample Depth (ft)	Tested By	Lab Test No.	Type of Test[1]	Strain at In-situ Stress	SQD[2]	Estimated In-situ Stress (psf)	RR	C_v[3] (ft2/day)	Wn(%)	σ'_p (psf)	OCR[4]	$S_{u,DSS}$[5] (psf)	E(ksf)	E_{ur}(ksf)	Estimated $C\alpha$[6]	Location
RW-4	UP2	46	GTX	C-1	IL	6.0%	D	2500	0.037	0.24	57.6	4000	1.60	605			0.0017	Flatbush Ave. Over Busway
RW-4	UP2	46	GTX	CRC-1	CRS	8.0%	E	2500	0.036	0.20	57.6	4800	1.92	693			0.0016	Flatbush Ave. Over Busway
RW-4	UP1	36	Test Con		IL	2.6%	C	2000	0.032	0.20	54.3	4000	2.00	572			0.00144	Flatbush Ave. Over Busway
RW-6	UP1	21	GTX	CRC-5	CRS	3.5%	C	1400	0.020	0.30	43.7	6500	4.64	753			0.0009	Flatbush Ave. Over Busway
RW-6	UP2	31	GTX	CRC-6A	CRS	3.2%	C	1800	0.030	0.50	61	5000	2.78	658			0.0014	Flatbush Ave. Over Busway
RW-7	UP1	31	GTX	CRC-2A	CRS	2.1%	C	1700	0.028	1.00	55.2	4000	2.35	549			0.0013	Flatbush Ave. Over Busway
RW-8	UP3	41	GTX	C-2	IL	10.0%	E	2500	0.032	0.42	59.5	4000	1.60	605			0.0014	Flatbush Ave. Over Busway
RW-8	UP2	31	Test Con		IL	2.3%	C	2000	0.030	0.23	50.9	3800	1.90	550			0.00135	Flatbush Ave. Over Busway
RW-8	UP1	21	Test Con		IL	2.5%	C	1650	0.035	0.20	55	2800	1.70	417			0.001575	Flatbush Ave. Over Busway
SB-01-1	UP1	21	Test Con		IL	1.8%	B	1300	0.030	0.28	46.2	4000	3.08	513			0.001368	Flatbush Ave. Over Busway
SB-01-1	UP2	31	UMass	CRS141	CRS	1.5%	B	1750	0.030	1.06	53	4835	2.76	638	120	450	0.0014	Flatbush Ave. Over Busway
SB-01-2	UP1	16	GTX	CRC-3	CRS	2.0%	B	1300	0.013	1.00	67.6	6300	4.85	722			0.0006	Flatbush Ave. Over Busway
SB-01-2	UP2	26	Test Con		IL	2.6%	C	1800	0.030	0.25	51.2	4000	2.22	557			0.00135	Flatbush Ave. Over Busway
SB-01-4	UP1	31	Test Con		IL	2.8%	C	2100	0.034	0.24	53.9	4000	1.90	579			0.00153	Flatbush Ave. Over Busway
SB-01-4	UP2	41	UMass	IL474	IL	2.0%	B	2100	0.031	0.80	54	4100	1.95	590			0.0014	Flatbush Ave. Over Busway
SB-01-4	UP2	41	UMass	CRS139	CRS	3.0%	C	2100	0.038	0.18	59	5159	2.46	700	110	240	0.0017	Flatbush Ave. Over Busway
SB-02-1	UP1	41	UMass	IL475	IL	3.0%	C	2500	0.040	0.20	69	3400	1.36	535			0.0018	Busway Over Park St.
SB-02-1	UP1	41	UMass	CRS143	CRS	2.3%	C	2500	0.048	0.12	69	5480	2.19	766			0.0022	Busway Over Park St.
SB-02-1	UP2	51	UMass	CRS142	CRS	3.2%	C	3000	0.042	0.10	70	6000	2.00	858			0.0019	Busway Over Park St.
RW-23	UP1	26	Test Con		IL	2.5%	C	1600	0.034	0.18	51.4	4400	2.75	581			0.00153	Busway Over Park St.
RW-23	UP2	41	Test Con		IL	3.5%	C	2200	0.033	0.24	57.7	4000	1.82	586			0.001485	Busway Over Park St.
SB-03-1	UP1	36	GTX	CRC-12	CRS	4.0%	D	1900	0.040	0.10	58	5500	2.89	717			0.0018	Busway Over Capitol Ave.
SB-03-1	UP2	46	Test Con		IL	3.0%	C	2400	0.035	0.09	48.5	5600	2.33	770			0.001575	Busway Over Capitol Ave.
SB-03-2	UP2	41	GTX	CRC-13	CRS	6.0%	D	2500	0.014	0.70	57	6800	2.72	900			0.0006	Busway Over Capitol Ave.
RW-28	UP1	16	GTX	CRC-8	CRS	3.2%	C	1000	0.026	0.20		4300	4.30	508			0.001188	Busway Over Capitol Ave.
RW-28	UP2	26	Test Con		IL	2.5%	C	1440	0.041	0.82	51.3	5800	4.03	696			0.001845	Busway Over Capitol Ave.
RW-29	UP3	48	Test Con		IL	3.0%	C	2300	0.039	0.08	50.8	6000	2.61	803			0.0017325	Busway Over Capitol Ave.
RW-30	UP1	16	Test Con		IL	2.0%	B	1680	0.035	0.18	58.8	3400	2.02	485			0.001575	Busway Over Capitol Ave.
SB-06-1A	UP1	46	Test Con		IL	6.0%	D	3000	0.025	0.08	51.1	2800	0.93	484			0.001125	Old Park River
SB-06-3	UP2	71	Test Con		IL	7.8%	E	3850	0.032	0.15	55	3000	0.78	543			0.00144	Old Park River
SB-06-3	UP1	46	UMass	CRS144	CRS	4.8%	D	2784	0.038	0.18	60	3000	1.08	501			0.0017	Old Park River
SB-06-3	UP1	46	UMass	CRS140	CRS	5.6%	D	2784	0.050	0.12	64	3000	1.08	501			0.0023	Old Park River
SB-06-4	UP1	26	GTX	CRC-11	CRS	5.5%	D	2200	0.011	0.10	46	3000	1.36	472			0.0005	Old Park River
SB-06-4	UP2	46	GTX	CRC-14	CRS	6.0%	D	3000	0.030	0.10	59	5200	1.73	770			0.0014	Old Park River
R-125	UP2	36	GTX	CRC-10	CRS	4.8%	D	3100	0.034	0.10	64	6000	1.94	865			0.00153	Old Park River
R-125	UP3	51	GTX	CRC-4	CRS	8.8%	E	3750	0.030	0.05	57.5	6000	1.60	907			0.00135	Old Park River
RW-17	UP1	16	GTX	CRC-7	CRS	2.7%	C	1200	0.025	0.10	43.9	7600	6.33	814			0.0011385	Retaining Wall
RW-31	UP1	16	GTX	CRC-9	CRS	1.5%	B	1250	0.028	0.30		4300	3.44	537			0.001242	Retaining Wall

Notes

1. CRS refers to constant strain consolidation test. IL refers to incremental load consolidation test.
2. SQD refers to sample quality evaluation. Sample quality evaluation method:
Terzaghi et al. (1996) Specimen Quality Designation (SQD). A (best) to E (worst)

ε_v at σ'_{vo}	<1	1-2	2-4	4-8	>8
SQD	A	B	C	D	E

3. Cv values were estimated using the proposed range of stresses (s'vo to s'final) from the maximum anticipated embankment load at mid-point of the varved clay layer.
4. OCR was determined using Casagrande Method.
5. $S_{u,DSS}$ is calculalted with SHANSEP correlation from four Direct Simple Shear tests.
6. $C\alpha$ is estimated based on $C\alpha$=0.45CR

Table 3 - Summary of Test Results By Baker Engineering

							CONSOLIDATION TEST									TRIAXIAL TEST			TORSION VANE	
	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	PISTON DEPTH* (ft)	PHI (deg)	c (psf)	DEPTH (ft)	VALUE (tsf)
RB-34	1.5-3	27.4			SM															
	10-11.5	41.6	39	23	CL															
	25-26.5	60.6																		
RB-35	7.5-9	38.7																		
	13.5-15	36	21		CL															
	25.5-27	55.6																		
RB-36	4.5-6	31	34	24	CL															
	10-11.5	38.7																		
	25-26.5	58.9																		
RB-37	7.5-9	32	26	26	ML															
	13.5-15	40.1																		
	28.5-30	59.7																		
RB-38	1.5-3	5.2	NP	NP	SP-SM															
	13.5-15	35.3	29	22	CL-ML															
	22.5-24	49.6																		
RB-39	4.5-6	31.5	NP	NP	ML															
	16.5-18	35.8																		
RB-40	4.5-6	33																		
	13.5-15	43	49	24	CL															
	25-26.5	46.8																		
RB-41	4.5-6	59.4					*RB-41 NEAR HO25-117*													
	10-11.5	65.7	62	26	CH															
	16.5-18	66.1																		
	25-26.5	50.9																		
RB-42	7.5-9	10.6	NP	NP	SM															
	16.5-18	40.8																		
	22.5-28.5	10.4	25	14	SC															
SB-56	30.1	62.8	(Clay Portion)				31.7-31.8	CH	1.889	66.1	0.16	0.6	0.2	2500	0.72	30-32	20	210	30.1	0.2
	30.1-30.6	60.3																	30.6	0.2
	30.6	44.5	(Silt Portion)																31.1	0.21
	30.6-31.1	60.5																	37.7	0.2
	31.1	53.6	(Silt Portion)																	
	31.1-31.7	62																		
	31.7-31.8	66.1																		
	31-32	60.2	56	27																
	55-56.5	40.2	41	25	CL															
	75-76.5	27.3																		
	105-106.5	15.2	NP	NP	SM															
SB-57	28.5-30	57.1																		
	55-56.5	45.7	42	23	CL															
	90-91.5	22.5																		
SB-58	10-11.5	32.7					80.3-80.4	CH	1.835	67	0.19	0.66	0.22	6200	1.14				80.1	0.22
	35-36.5	59.5																	80.3	0.2
	50-51.5	56.6	53	25	CH		*SB-58 WITHIN FLATBUSH AVE ABUTMENT, FOR ALTERNATE LAYOUT*													
	80.1	65.1	(Clay Portion)			90.3														
	80.3	38.8	(Silt Portion)																	
	80.3-80.4	67																		
	80.4	44.5	(Entire Varve)																	
	80-80.5		53	25																
	90-91.5	34.2	24	24	ML															
	110-111.5	23.1	NP	NP	SM															
SB-59	7.5-9	27.8					*HAVE CORROSIVITY TEST FOR SB-59*													
	50-51.5	55.2					*SB-59 WITHIN FLATBUSH AVE PIER, FOR ALTERNATE LAYOUT*													
	105-11.5	23.7	NP	NP	ML															
SB-60	13.5-15	33.1	25	22	ML															
	35-36.5	55.4	60	27	CH															
	50-51.5	57.8																		
	70-71.5	45.8	48	23	CL															
	90-91.5	43.4																		
	110-111.5	22.7	NP	NP	ML															
	125-126.5	28	33	25	ML															
SB-61	40-41.5	58.1	64	23	CH															
	90-91.5	31.2	25	23	ML															
SB-62	10.-11	28.6					60.8-60.9	CH	2.02	71	0.23	0.83	0.26	5400	.56/1.03*				60.3	0.25
	35-36.5	59.2	60	26	CH															
	60.3	66.4	(Clay Portion)			108.53														
	60.4	40.7	(Silt Portion)																	
	60.5-60.7	49	(Entire Varve)																	
	60.8-60.9	71																		
	61.1	69.8	74	29																
	61.2	34.9	32	31																
	85-86.5	68.3	34	24	ML															
	115-116.5	11.9	16	14	SP-SM															
	120-121.5	21.6	NP	NP	SM															
SB-63	16.5-18	41.9	41	22	CL															
	50-51.5	57.5	56	25	CH															
	90-91.5	35.9	29	24	ML															
	135-136.5	11.7	NP	NP	SM															
SB-64	4.5-6	33																		
	10.5-12	24.8																		
	13.5-15	40.5																		
	16.5-18	47.4																		
	19.5-21	55																		
	22.5-24	58.3																		
	25-27	61.1																		
	28.5-30	55.2	63	27	CH															
	35-36.5	61.7																		
	40-41.5	57																		
	45-46.5	53.5																		
	50-51.5	48.3																		
	55-56.5	41.4																		

Table 3 - Summary of Test Results By Baker Engineering

	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	CONSOLIDATION TEST DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	TRIAXIAL TEST PISTON DEPTH* (ft)	PHI (deg)	c (psf)	TORSION VANE DEPTH (ft)	VALUE (tsf)
	60-61.5	40.1																		
	65-66.5	51.2																		
	70-71.5	41.5	44	23	CL															
	75-76.5	41.8																		
	80-81.5	40.8																		
	85-86.5	42.7																		
	90-91.5	40.8																		
	95-96.5	24.1																		
	100-101.5	40.5																		
	110-111.5	23.5	NP	NP	SM															
	135-135.9	9.6			SM															
SB-65	13.5-15	28.9																		
	95-96.5	29.9	24	24	ML															
	125-126.5	14.6																		
SB-66	35-36.5	61.1	60	28	CH															
	70-71.5	47.8	43	24	CL															
	135-136.5	10.8	21	15	SC-SM															
SB-67	45-46.5	54.6	58	27	CH		71.3-71.4	CH	1.674	64.7	0.18	0.73	0.27	4800	1.06	70-72	30	250	70.4	0.25
	70.4	64.1	(Clay Portion)			110.5													70.9	0.27
	70.5-70.8	48.1																	71.3	0.24
	70.9	66.7	(Clay Portion)																	
	70.9-71.3	47																		
	71.3	76.8	(Clay Portion)																	
	71.3-71.4	64.7																		
	71.5-71.8	43.9																		
	71.8-71.9	43.1	(Entire Varve)																	
	71.9	39	(Silt Portion)																	
	70-72	67.8	70	32																
	95-96.5	46.2																		
	105-112	20.3	NP	NP	SM															
SB-68																				
SB-69	7.5-9	36.7	30	25	SM															
	50-51.5	44	56	26	CH															
	95-96.5	34.3	24	24	ML															
	145-146.5	12.1	18	15	GM															
SB-70	13.5-15	29.2					51.1-51.2	CH	1.681	59.6	.16*	0.62	0.23	4100	0.85	50-52	25	40	50.1	0.28
	28.5-30	54																	50.9	0.3
	50.1	71.5	(Clay Portion)			106.6													51.8	0.3
	50.2-50.5	61.3																		
	50.5-50.9	57.1																		
	50.9	70.4	(Clay Portion)																	
	51.1-51.2	59.6																		
	51.4-51.8	57.6																		
	51.8	71.6																		
	50-52	67.4	63	30																
	60-61.5	48.7	52	23	CH															
	105-106.5	24																		
SB-71	10.5-11	34.8																		
	13.5-15	39.2																		
	16.5-18	34.4																		
	19.5-21	43.5																		
	22.5-24	54.1																		
	25-26.5	53																		
	28.5-30	53.5																		
	35-36.5	51																		
	40-41.5	34.8																		
	45-46.5	54.9	56	26	CH															
	50.51.5	54																		
	55-56.5	46.3																		
	60.-61.5	39.5																		
	65-66.5	40																		
	70-71.5	48																		
	75-76.5	37.1																		
	80-81.5	50																		
	85-86.5	38.9	29	25	ML															
	90-91.5	41.4																		
	95.-96.5	23.7																		
	100-101.5	21.3																		
	115-116.5	12	17	16	SM															
SB-72	16.5-18	39.3																		
	25-26.5	49.6	47	24	CL															
	65-66.5	50.5	55	26	CH															
	105-106.5	24.5	20	20	ML															
	135-136.5	12.8			GP-GM															
SB-73	16.5-18	29.9					30.5-30.6	CL	0.853	31.2	0.035	0.18	0.11	4000	1.19	30-32	23	800	30.3	0.45
	28.5-30	33.1	NP	NP	ML														30.7	0.55
	30.3	30.5				127.6														
	30.3-30.6	29.5																		
	30.6-30.7	31.2																		
	30.7	24.3																		
	30.8-31.1	26.8																		
	31.2	26.9																	31.2	0 6
	31.3	24.3	29	21																
	31.4-31.7	23.1																		
	70-71.5	46.1	48	23	CL															
	115-116.5	21.4	NP	NP	SM															
SB-74	7.5-9	27.6	NP	NP	ML		29.5-29.6	CH	1.78*	65	0.17	0.7	0.23	4200	1.9				28.8	0.25
	25-26.5	63.5																		
	28.8	75.3	(Clay Portion)			110.47														
	28.9	34.8	(Silt Portion)																	
	28.9-29	56.2	(Entire Varve)																	
	29.1	68.1	83	31																

Table 3 - Summary of Test Results By Baker Engineering

	DEPTH (ft)	WATER CONTENT (%)	LL (%)	PL (%)	CLASS	AVE TOT UNIT WGT (pcf)	CONSOLIDATION TEST DEPTH (ft)	CLASS	e0	INITIAL WATER (%)	Cr	Cc	Cce	MAX PAST VERTICAL (psf)	OCR	TRIAXIAL TEST PISTON DEPTH* (ft)	PHI (deg)	c (psf)	TORSION VANE DEPTH (ft)	VALUE (tsf)
	29.5-29.6	65																		
	29.7-29.9	32.8	34	28																
	85-86.5	44.9	58	25	CH															
	120-121.5	12.8	22	17	GC-GM															
SB-75	16.5-18	43.8																		
	50-51.5	53.3	57	25	CH															
	110-111.5	24.8	NP	NP	ML															
SB-76	10.5-12	53																		
	28.5-30	51.6	59	26	CH															
	80-81.5	43.6	41	25	CL															
	130-131.5	19.2	NP	NP	SP-SM															
SB-77	10-11.5	25.8					41.6-41.7	CL	1.71	62.8	0.16	0.57	0.21	4200	1.84	40-42	13	800	40.2	0.32
	25-26.5	44.1	44	26	CL															
	40.2	76.1	(Clay Portion)			103.3													41.1	0.27
	40.2-40.6	61.1					*SB-77 NEAR WALL HO25-107*												41.5	0.25
	40.6-41.1	63.6																		
	41.1	39.5	(Silt Portion)																	
	41.1-41.5	57.5																		
	41.5	58.9	(Entire Varve)																	
	41.6-41.7	62.8																		
	40-42	72.1	74	43																
	85-86.5	42.3	35	25	ML															
	130-131.5	11.3	17	16	SM															
SB-78	13.5-15	32.1																		
	28.5-30	56.7	51	25	CH															
	80-81.5	43.9	38	24	CL															
	130-131.5	9.9	18	16	SM															
SB-79	13.5-15	41.2																		
	60-61.5	50.1	63	27	CH															
	145-146.5	11.5	20	17	SM															
SB-80	10-11.5	37.4	30	27	ML															
	22.5-24	48.8																		
	40-41.5	46.2	50	27	CH															
	70-71.5	51	55	28	CH															
	100-101.5	44.9	42	24	CL															
	130-131.5	19.1	NP	NP	SP-SM															
SB-81	7.5-9	31.9																		
	16.5-18	53.2																		
	28.5-30	45.9																		
	50-51.5	51	59	27	CH															
SB-82	16.5-18	39.1	36	24	CL															
	50-51.5	60.2	59	27	CH	100.4														
	70.3	46.5	(Disturbed)				*SB-82 NEAR SW-3*													
	70.9	56	(Disturbed)																	
	71.5	61.3	(Disturbed)																	
	95-96.5	46.9	42	25	CL															
	125-126.5	11	NP	NP	SW-SM															
SB-83	7.5-9	35.7	NP	NP	ML															
	28.5-30	44.8																		
	70-71.5	52	59	27 32	CH															
	130-131.5	10.6	NP	NP	SW-SM															
SB-84	4.5-6	4.5			SW-SM		31.6-31.7	CL/ML	1.27	47.1	0.09	0.31	0.16	3200	1.24	30-32	22	350	30.5	0.3
	25.5-27	46.8	44	25	CL														31.1	0.25
	30-30.5	45.3				106.2													31.5	0.27
	30.5	68	(Clay Portion)				*SB-84 WITHIN PARK STREET BRIDGE PIER*													
	30.6-31.1	50					*SB-84 NEAR HO25-112*													
	31.1	30.9	(Silt Portion)																	
	31.1-31.7	50.7																		
	31.5-31.6	47.2	(Entire Varve)																	
	31.6-31.7	47.1																		
	30-32	65.4	66	30 36																
	50-51.5	56.5	62	28	CH															
	90-91.5	46.9	58	26	CH															
	130-136.5	11.7	21	17 4	GP-GM															
SB-85	16.5-18	23.3					*SB-85 NEAR CAPITAL AVE BRIDGE ABUT*													
	25-26.5	46.6	59	29	CH															
	75-76.5	53.1	53	23	CH															
	110-11.5	10.8	17	16	ML															
SB-86	13.5-15	35.1	45	25	CL															
	40-41.5	42.9	56	28	CH															
	75-76.5	43.3	43	24	CL															
	110-111.5	11.6	15	14	SM															
SB-87	16.5-18	55.7	54	26	CH		*SB-87 NEAR HO25-116*													
	22.5-24	59.1																		
	55-56.5	57.4	55	26	CH															
SB-105	7.5-9	41.9					*SB-105 WITHIN OLD PARK RIVER AREA*													

* SB-62, e0 NOT GIVING IN LAB SHEET, BAKER CALCS e0=2.19. SHOULD BE 2.02 BY CGE CALC. SEE FB AVE REPORT.
* SB-62, OCR=.56 FROM LAB DATA. BAKER ASSUMES NORMAL CONSOL., ADJUST WATER TABLE, STRESS AND RECALCULATES OCR=1.03. SEE FB AVE REPORT.

* SB-70, BAKER CALCS Cc=.19. APPEARS TO BE MISCALCULATED. SEE FB AVE REPORT.

* SB-74, e0 NOT GIBING IN LAB SHEET, BAKER CALCS e0=2.04. SHOULD BE 1.78 BY CGE CALC. SEE NEW PARK AVE STATION/KANE BROOK CULVERT REPORT.

* THREE TRIAXIAL SAMPLES TESTED PER PISTON DEPTH SAMPLE

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 4 - Summary of Atterberg Limits

Boring No.	Tube No.	Depth From (ft)	Depth To (ft)	Moisture Content (%)	LL (%)	PL (%)	PI (%)	Tested By	Location
RW-4	UP-2	45	47	54	56	33	23	GeoTesting Express	Flatbush Ave. Over Busway
RW-4	UP-1	35	37	58.1	49	23	26	TestCon	Flatbush Ave. Over Busway
RW-6	S-7	22	24		42	25	17	TestCon	Flatbush Ave. Over Busway
RW-6	S-9	32	34		53	35	18	TestCon	Flatbush Ave. Over Busway
RW-7	UP-1	30	32	60	61	30	31	GeoTesting Express	Flatbush Ave. Over Busway
RW-7	S-9	32	34		51	41	10	TestCon	Flatbush Ave. Over Busway
RW-7	S-12	45	47		28	23	5	TestCon	Flatbush Ave. Over Busway
RW-7	S-14	55	57		29	21	8	TestCon	Flatbush Ave. Over Busway
RW-8	UP-2	30	32		49	24	25	TestCon	Flatbush Ave. Over Busway
RW-8	S-7	22	24		48	26	22	TestCon	Flatbush Ave. Over Busway
RW-8	S-11	42	44		62	48	14	TestCon	Flatbush Ave. Over Busway
RW-8	S-14	55	57		41	36	5	TestCon	Flatbush Ave. Over Busway
RW-9	S-5	10	12		29	26	3	TestCon	Flatbush Ave. Over Busway
RW-9	S-10	35	37		58	41	17	TestCon	Flatbush Ave. Over Busway
SB-01-1					49	24	25	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-7	22	24		34	32	2	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-11	40	42		61	50	11	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-13	50	52		56	52	4	TestCon	Flatbush Ave. Over Busway
SB-01-1	UP-1	20	22	56.1	49	24	25	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-7	22	24		32	34	-2	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-11	40	42		61	50	11	TestCon	Flatbush Ave. Over Busway
SB-01-1	S-13	50	52		52	46	6	TestCon	Flatbush Ave. Over Busway
SB-01-2					49	25	24	TestCon	Flatbush Ave. Over Busway
SB-01-2	UP-2	25	27	51.9	49	25	24	TestCon	Flatbush Ave. Over Busway
SB-01-3	S-10	30	32		53	28	25	TestCon	Flatbush Ave. Over Busway
SB-01-3	S-12	40	42		42	28	14	TestCon	Flatbush Ave. Over Busway
SB-01-4					50	24	26	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-6	20	22		50	40	10	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-8	32	34		47	37	10	TestCon	Flatbush Ave. Over Busway
SB-01-4	S-10	42	44		57	44	13	TestCon	Flatbush Ave. Over Busway
SB-01-4	UP-1	30	32	51.7	50	24	26	TestCon	Flatbush Ave. Over Busway
RW-23	UP-2	40	42		44	23	21	TestCon	Busway Over Park St.
RW-23	UP-1	25	27		50	23	27	TestCon	Busway Over Park St.
SB-02-1	S-10	45	47		62	49	13	TestCon	Busway Over Park St.
SB-02-1	S-12	55	57		48	43	5	TestCon	Busway Over Park St.
SB-02-1	S-14	65	67		56	46	10	TestCon	Busway Over Park St.
SB-02-1	S-17	80	82		37	30	7	TestCon	Busway Over Park St.
SB-02-1	UP-1	40	42	67	58	35	23	UMass	Busway Over Park St.
SB-02-1	S-14	65	67		56	46	10	TestCon	Busway Over Park St.
SB-02-2	UP-1	30	32		51	30	21	UMass	Busway Over Park St.
SB-02-3	S-7	20	22		45	31	14	TestCon	Busway Over Park St.
SB-02-3	S-10	35	37		51	30	21	TestCon	Busway Over Park St.
SB-02-3	S-15	60	62		50	46	4	TestCon	Busway Over Park St.
RW-28	UP-2	25	27		48	24	24	TestCon	Busway Over Capitol Ave.
RW-29	UP-3	45	47		49	23	26	TestCon	Busway Over Capitol Ave.
R-123	S-10	30	32		53	36	17	TestCon	Busway Over Capitol Ave.
R-123	S-12	40	42		55	50	5	TestCon	Busway Over Capitol Ave.
R-125	S-8	20	22		49	27	22	TestCon	Busway Over Capitol Ave.
R-125	S-10	30	32		46	37	9	TestCon	Busway Over Capitol Ave.
SB-03-1	UP-2	45	47		45	22	23	TestCon	Busway Over Capitol Ave.
SB-03-1	S-16	70	72		45	36	9	TestCon	Busway Over Capitol Ave.
SB-03-2	UP-2	40	42	57	58	25	33	GeoTesting Express	Busway Over Capitol Ave.
SB-03-3	S-22	90	92		45	36	9	TestCon	Busway Over Capitol Ave.
SB-06-1A	UP-1	45	47		49	22	27	TestCon	Old Park River
SB-06-3	UP-1	45	47	64	58	30	28	UMass	Old Park River
SB-06-3	UP-2	70	72		47	23	24	TestCon	Old Park River
SB-06-4	S-9	20	22		41	33	8	TestCon	Old Park River
SB-06-4	S-14	47	49		46	38	8	TestCon	Old Park River
SB-06-4	S-20	75	77		41	32	9	TestCon	Old Park River
SB-06-4	UP-2	45	47	58	59	28	31	GeoTesting Express	Old Park River

New Britain - Hartford Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 5 - Summary of Hydrometer Tests

Boring No.	Tube No.	Depth From (ft)	Depth To (ft)	% Sand	% Silt	% Clay	Location
R-101	S-3	4	6	0	63.2	36.8	Flatbush Ave. Over Busway
R-112	S-5	10	12	2.7	26.9	70.4	Flatbush Ave. Over Busway
RW-4	UP-1	35	37	0.6	27.5	71.9	Flatbush Ave. Over Busway
RW-8	UP-2	30	32	0.4	19.9	79.7	Flatbush Ave. Over Busway
SB-01-1	UP-1	20	22	0.6	32.2	67.2	Flatbush Ave. Over Busway
SB-01-2	UP-2	25	27	0.6	29.5	69.9	Flatbush Ave. Over Busway
SB-01-4	UP-1	30	32	0.2	21.2	78.6	Flatbush Ave. Over Busway
SB-02-1	S-9	42	44	0.6	13.7	85.7	Busway Over Park St.
SB-02-1	S-11	52	54	0.2	15.7	84.1	Busway Over Park St.
SB-02-2	S-9	32	34	0.2	13.8	86	Busway Over Park St.
SB-02-2	S-13	50	52	0	13.4	86.6	Busway Over Park St.
SB-02-3	S-9	30	32	6	22.4	71.6	Busway Over Park St.
SB-02-3	S-12	45	47	0.8	15.1	84.1	Busway Over Park St.
RW-23	UP-2	40	42	0.3	28.4	71.3	Busway Over Park St.
RW-23	UP-1	25	27	0.6	21.5	77.9	Busway Over Park St.
RW-28	UP-2	25	27	0.4	21.1	78.5	Busway Over Capitol Ave.
RW-29	UP-3	45	47	0.5	22.6	76.9	Busway Over Capitol Ave.
SB-03-1	S-11	47	49	1	9.7	89.3	Busway Over Capitol Ave.
SB-03-1	S-9	37	39	18.6	14.5	66.9	Busway Over Capitol Ave.
SB-03-2	S-9	32	34	0.2	16.1	83.7	Busway Over Capitol Ave.
SB-03-2	S-11	42	44	0.4	11.6	88	Busway Over Capitol Ave.
SB-03-3	S-13	45	47	0.4	13.1	86.5	Busway Over Capitol Ave.
SB-03-3	S-21	85	87	0.6	19.9	79.5	Busway Over Capitol Ave.
R-121	S-3	5	7	75.2	8.1	16.7	Old Park River
R-115	S-2	2	4	13.6	55.5	30	Roadway

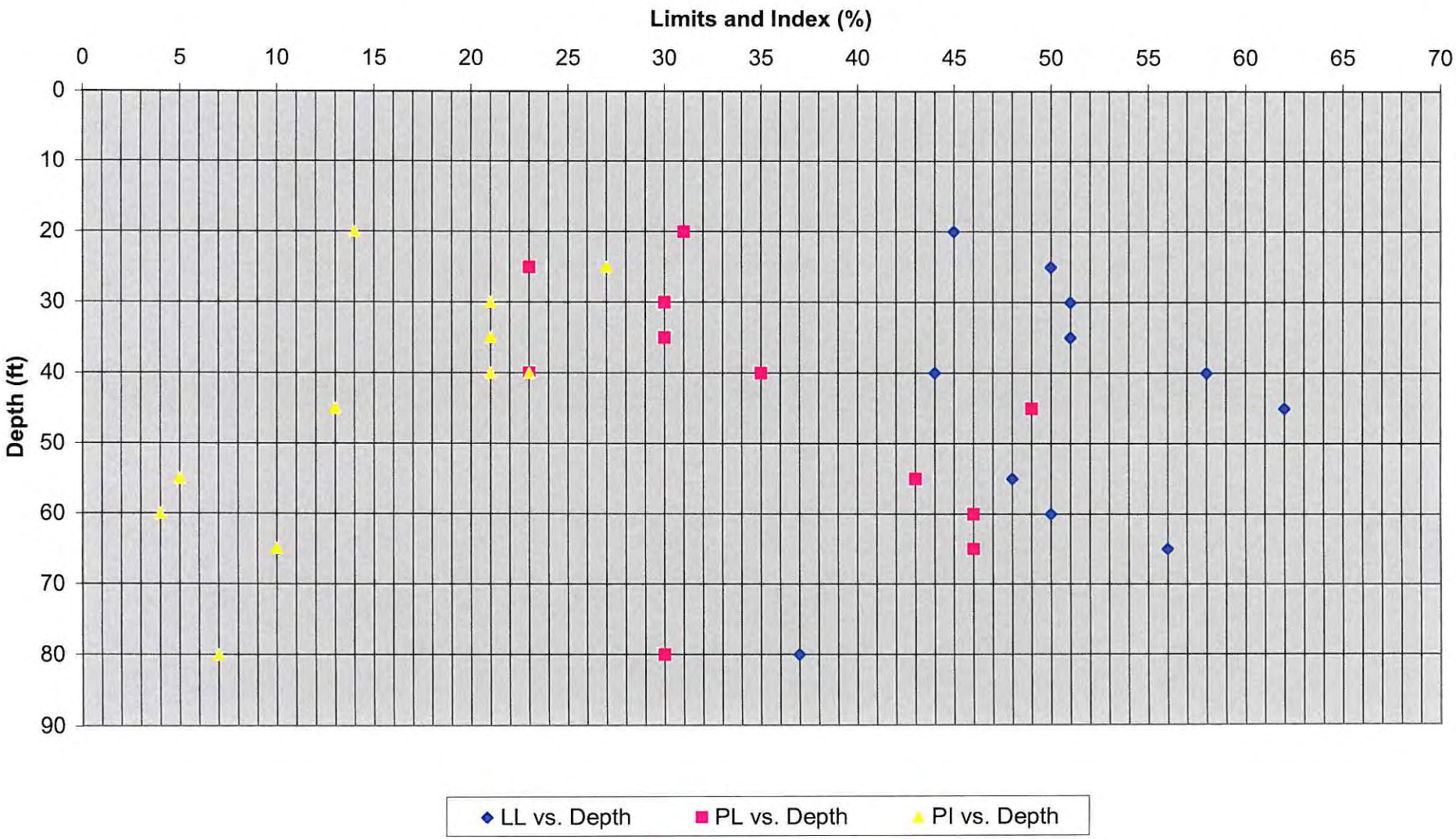
New Britain - Hartford Busway
CT DOT Project Number: 155-H025
West Hartford and Hartford, Connecticut
GeoDesign Project Number: 0380-004.0

Table 6 - Summary of Field Vane Shear Tests

Test Date	Boring No.	Drilled to Depth (ft)	Pushed Vane to Depth (ft)	Surface Elevation (ft)	Pushed to Elevation (ft)	Ultimate Shear Strength (psf)	Correction Factor u	Corrected Shear Strength To (psf)	Remold Shear Strength (psf)	Sensitivity	Sensitivity
6/9/2008	SB-01-3	35	36	70	34	670	0.9	**603**	0	Very Sensitive	Flatbush Ave. Over Busway
5/30/2008	SB-02-3	30	31	54	23	282	0.9	**254**	22	0	Busway Over Park St.
5/23/2008	SB-03-2	25	26.5	44	17	476	0.9	**428**	0	Very Sensitive	Busway Over Capitol Ave.
6/2/2008	SB-06-1	40	41	55	14	454	0.9	**409**	22	0	Old Park River
5/27/2008	SB-06-3	55	56	54	-2	83	0.9	**75**	61	0	Old Park River
5/29/2008	R-126	20	21	47	26	239	0.9	**215**	22	0	Old Park River
6/4/2008	R-112	36	37	60	23	281	0.9	**253**	9	0	Roadway
6/5/2008	RW-31	25	26	64	38	389	0.9	**350**	108	0	Retaining Wall

Busway Over Park St.
New Britain- Hartford Busway, Hartford, CT
CT DOT Project Number: 155-H025 GeoDesign Project Number: 380-04

Chart 1 - Atterberg Limits vs. Depth



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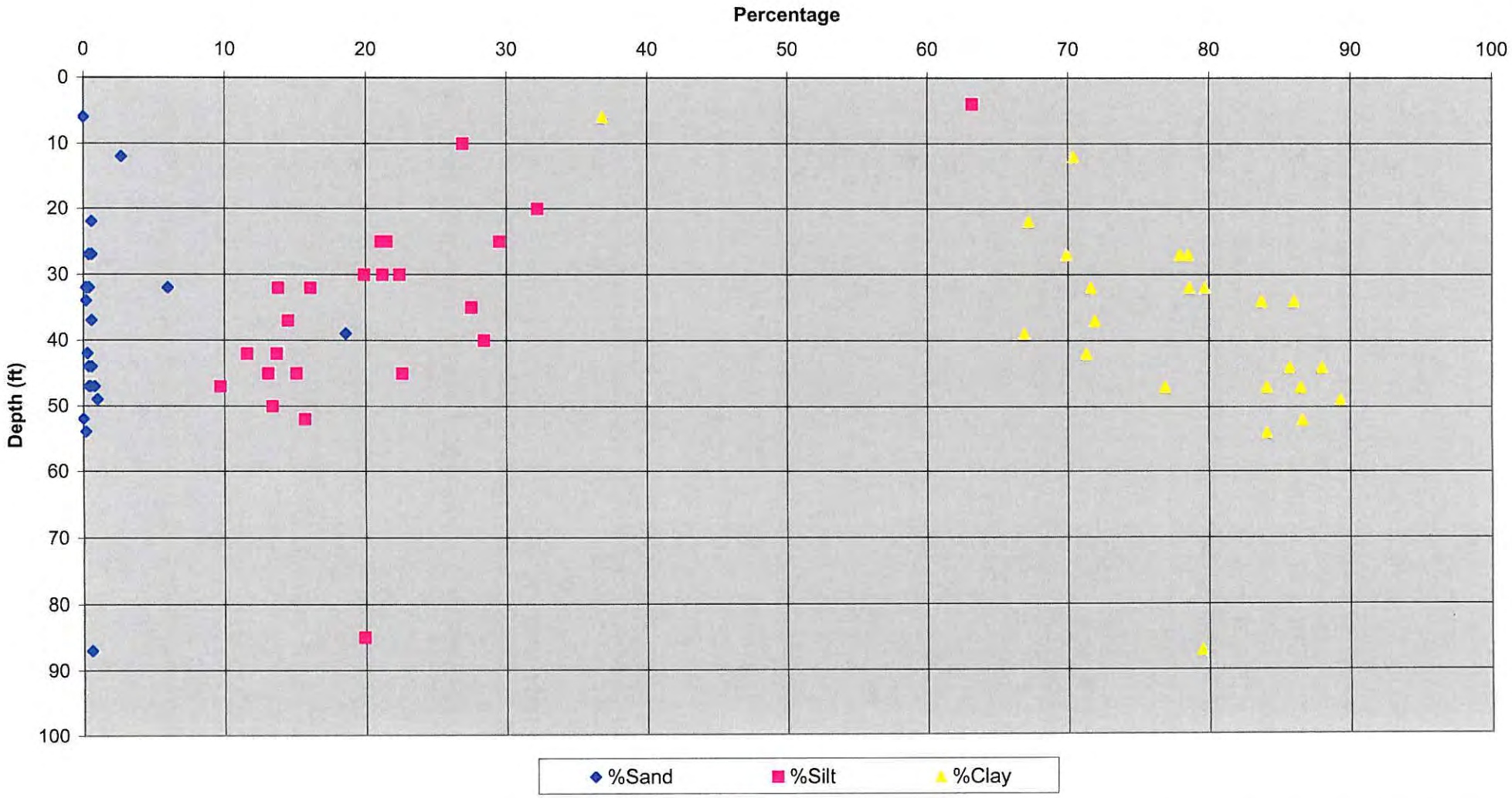
Busway Over Park St.
New Britain- Hartford Busway, Hartford, CT
CT DOT Project Number: 155-H025 GeoDesign Project Number: 380-04

Chart 2 - Hydrometer Summary



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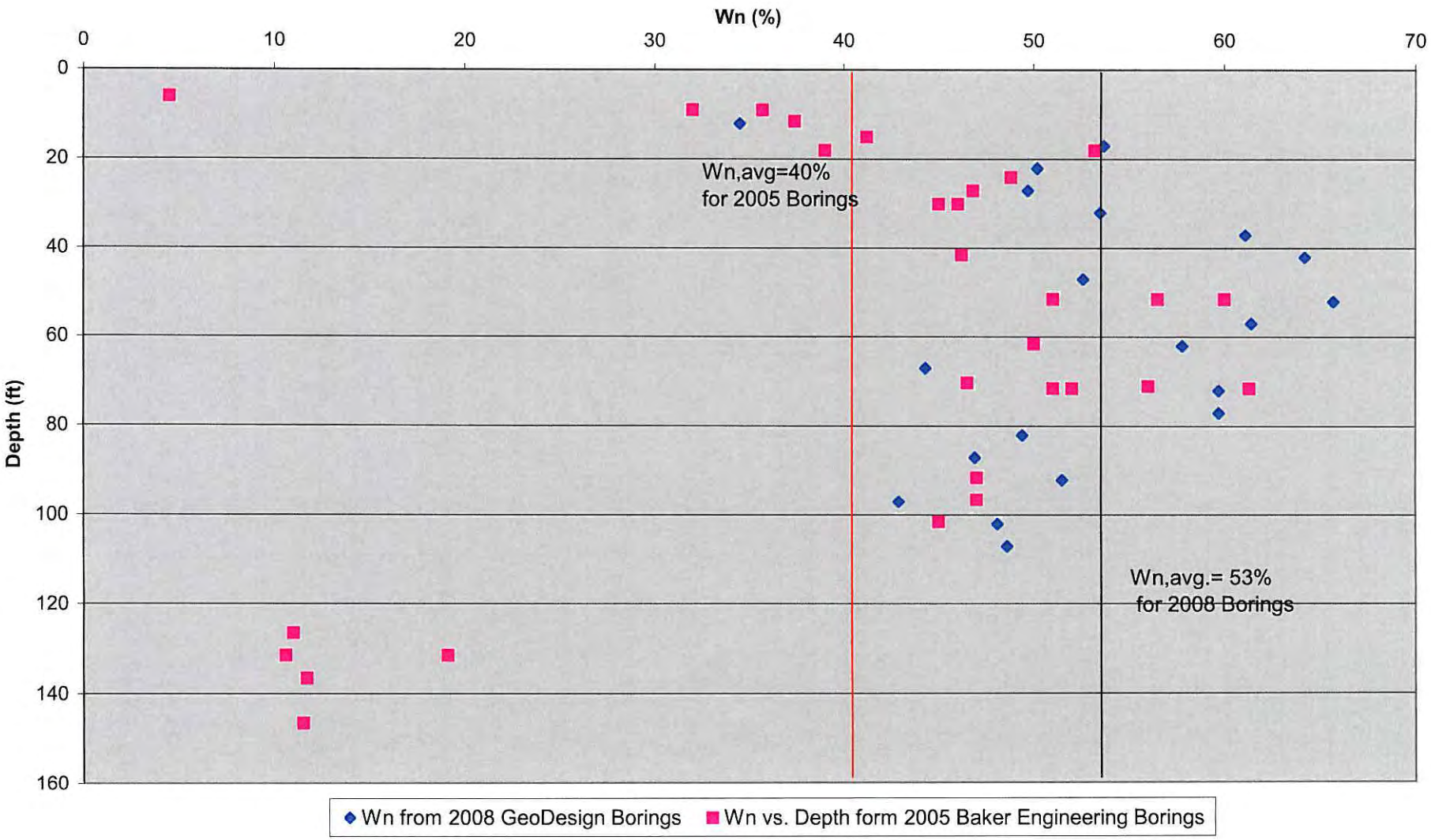
New Britain- Hartford L sway, Hartford, CT
Busway Over Park St.
CT DOT Project Number: 155-H025
GeoDesign Project Number: 380-04

Chart 3 - Moisture Content (Wn) vs. Depth



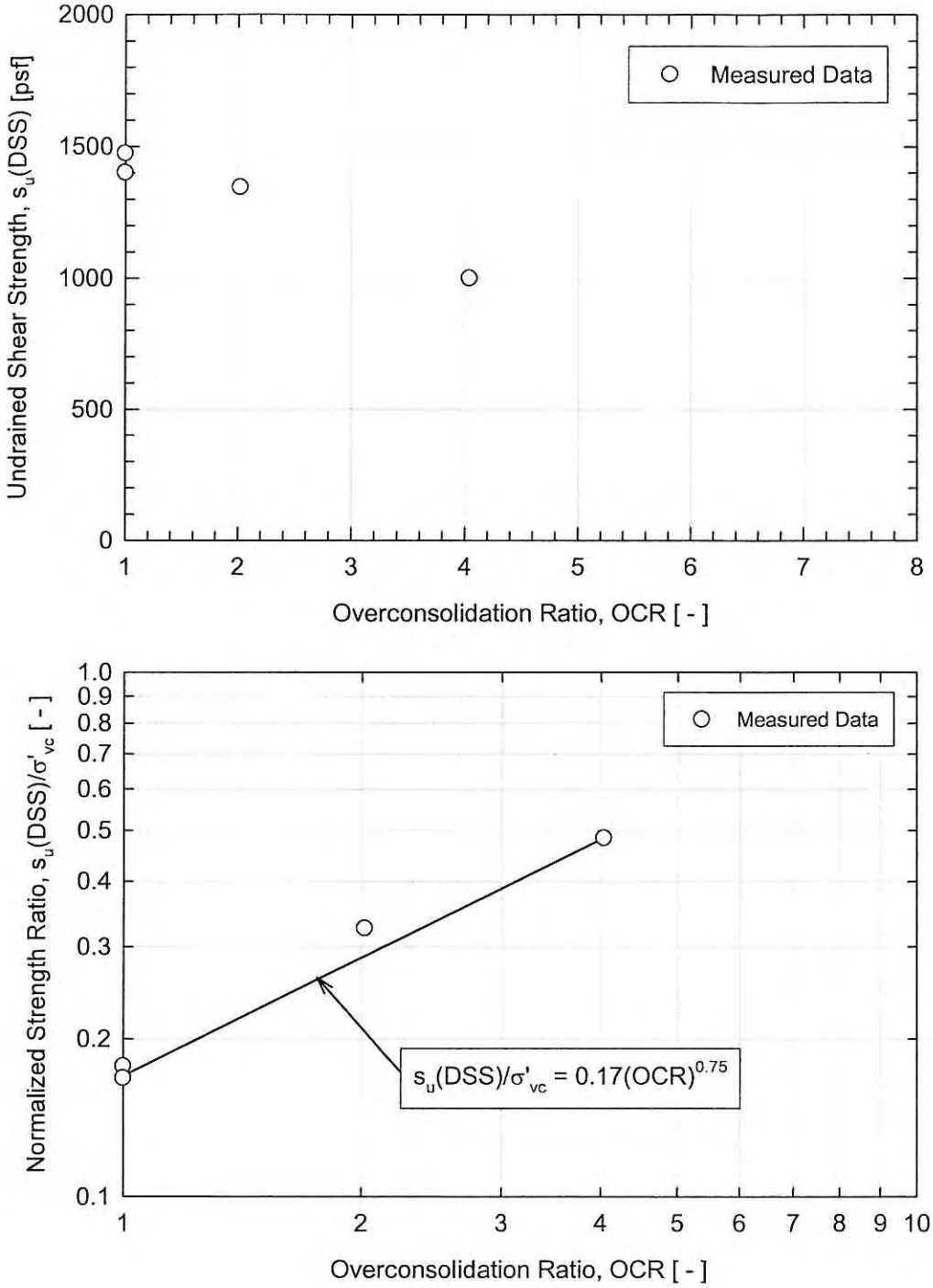


Chart 4
Shear Strength vs. Over Consolidation Ratio

Appendix 3

2003 Boring Logs and Geophysical Results

2003 Boring Logs

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					63
1–2	S-1	7 32 15	1.5	1.0			POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) - black, tan and dark brown fine sand, little silt, little coarse gravel; dry, dense, NP; (FILL).	62, 61
2–3	W-N		1.5					60
3–4	S-2	7 7 5	1.5	1.0			POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) - reddish brown fine sand, little silt, little coarse gravel; dry, medium dense, NP; (FILL).	59
4–5	W-N		1.5			5.5'	ELEV. 57.9	58
5–6							SILTY SAND (SM) - tan fine sand, some silt; moist, loose, NP; (ALLUVIUM).	57
6–7	S-3	3 3 4	1.5	1.4		7.5'	ELEV. 55.9	56
7–8							SANDY SILT (ML) - tan and brown silt, some fine sand; wet, medium stiff, -PL; (ALLUVIUM).	55
8–9	W-N		1.0					54
9–10	S-4	2 2 2	1.5	1.3		10.5'	ELEV. 52.9	53
10–11							SILTY CLAY (CL-ML) - tan, brown and orange silt, little clay, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	52
11–12	W-N		2.0					51
12–13	S-5	1 1 2	1.5	1.5			SILTY CLAY (CL-ML) - gray silt, little clay; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	50
13–14	W-N		1.5					49, 48
14–15	S-6	1 1 1	1.5	1.5		16.5'	ELEV. 46.9	47
15–16							LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	46
16–17	W-N		1.5					45
17–18		1					LEAN CLAY (CL) - gray clay, little silt; moist, soft, +PL;	44

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 1 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 1	1.5	1.5			(GLACIAL LAKE DEPOSIT).	43
21								
22	W-N		1.5					42
23	S-8	1 2 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	41
24	W-N		1.0					40
25	S-9	1 2 2	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	39
26								38
27	W-N		2.0					37
28								36
29	S-10	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	35
30	W-N		5.0					34
31								33
32								32
33								31
34								30
35	S-11	WOR WOH 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	29
36								28
37	W-N		3.5					27
38								26
39								25
								24

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40 41	S-12	WOR WOH 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	23 22
42 43 44	W-N		3.5					21 20 19
45 46	S-13	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	18 17
47 48 49	W-N		3.5					16 15 14
50 51	S-14	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	13 12
52 53 54	W-N		3.5					11 10 9
55 56	S-15	WOR WOR WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	8 7
57 58 59	W-N		3.5					6 5 4

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 3 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	WOR WOR 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	3
61								2
62	W-N		3.5					1
63								0
64								-1
65	S-17	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-2
66								-3
67	W-N		3.5					-4
68								-5
69								-6
70	S-18	WOH WOR WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-7
71								-8
72	W-N		3.5					-9
73								-10
74								-11
75	S-19	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-12
76								-13
77	W-N		3.5					-14
78								-15
79								-16

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 4 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								-17
81	S-20	WOR WOR WOH	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-18
82								-19
83	W-N		3.5					-20
84								-21
85								-22
86	S-21	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-23
87								-24
88	W-N		3.5					-25
89								-26
90								-27
91	S-22	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-28
92								-29
93	W-N		3.5					-30
94								-31
95								-32
96	S-23	WOR 3 3	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-33
97								-34
98	W-N		3.5					-35
99								-36

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 5 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4

Project Description: New Britain to Hartford Busway

Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100								
101	S-24	WOR WOH 5	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-37
								-38
102								
103	W-N		3.5					-39
								-40
104								
								-41
105								
106	S-25	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-42
								-43
107								
								-44
108	W-N		3.5					-45
109								
								-46
110								
111	S-26	WOR WOR WOR	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-47
								-48
112								
								-49
113	W-N		3.5					-50
114								
								-51
115								
116	S-27	4 3 3	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-52
								-53
117								
								-54
118	W-N		3.5					-55
119								
								-56

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 6 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120	S-28	3 5 4	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, stiff, +PL; (GLACIAL LAKE DEPOSIT).	-57
121								-58
122	W-N		3.5					-59
123								-60
124								-61
125	S-29	4 2 5	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; moist, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-62
126								-63
127	W-N		3.5					-64
128								-65
129								-66
130	S-30	4 4 6	1.5	1.5		130.0'	ELEV. -66.6 SILTY CLAY (CL-ML) - reddish brown clay, some silt; wet; stiff, +PL; (GLACIAL LAKE DEPOSIT).	-67
131								-68
132	W-N		3.5					-69
133								-70
134						134.5'	ELEV. -71.1	-71
135	S-31	17 21 21	1.5	1.2			POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine sand, little silt; moist, dense, NP.	-72
136								-73
137	W-N		3.5					-74
138								-75
139						139.0'	ELEV. -75.6	-76

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Al Augustine/GZA	**Connecticut DOT Boring Report**	Hole No.: **SB-79**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836366.2
Start Date: 7/18/03	Route No.:	Easting: 1012462.1
Finish Date: 7/22/03	Bridge No.:	Surface Elevation: 63.4
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 5.0 after: 0 hours, @6.6 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	32 35 50	1.5	1.0			SILTY GRAVEL WITH SAND (GM) - reddish brown fine to coarse gravel, some silt, little fine to coarse sand; wet, very dense, NP; (TILL).	-77
141								-78
142	W-N		3.5					-79
143								-80
144								-81
145	S-33	50 55 48	1.5	1.2		145.0'	ELEV. -81.6 CLAYEY GRAVEL WITH SAND (GC) - reddish brown fine to coarse gravel, little clay, little fine to coarse sand, trace silt; wet, very dense, NP; (TILL).	-82
146								-83
147	W-N		3.5					-84
148								-85
149								-86
150	S-34	43 48 50	1.5	0.8			CLAYEY GRAVEL WITH SAND (GC) - reddish brown fine to coarse gravel, little clay, little fine to coarse sand, trace silt; wet, very dense, NP; (TILL).	-87
151							ELEV. -88.1	-88
152							End of Boring at 151.5'	-89
153								-90
154								-91
155								-92
156								-93
157								-94
158								-95
159								-96

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 151.5' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 8 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					62
2	S-1	3 3 7	1.5	1.0			WELL-GRADED SAND WITH SILT (SW-SM) - black fine to coarse sand, some silt, trace gravel; dry, loose, NP (FILL).	61
3						3.0'	ELEV. 59.7	60
4	A-N		1.5					59
5	S-2	3 4 6	1.5	0.8			SANDY SILT (ML) - gray to yellowish brown silt, some very fine sand; moist, stiff, -PL, laminated, mottled; (ALLUVIUM).	58
6								57
7	W-N		1.5					56
8	S-3	2 2 3	1.5	1.3			SANDY SILT (ML) - gray silt, some very fine sand, trace clay; moist, soft, -PL, laminated, mottled; (ALLUVIUM).	55
9	W-N		1.0					54
10								53
11	S-4	1 2 2	1.5	1.5			SANDY SILT (ML) - gray silt, some very fine sand, trace clay; moist, loose, -PL, laminated, mottled; (ALLUVIUM).	52
12								51
13	W-N		2.0					50
14	S-5	1 1 2	1.5	1.5			SANDY SILT (ML) - gray silt, some very fine sand, trace clay; moist, very soft, -PL, laminated, mottled; (ALLUVIUM).	49
15								48
16	W-N		1.5					47
						16.5'	ELEV. 46.2	
17	S-6	1 1 1	1.5	1.5			SILTY CLAY WITH SAND (ML-CL) - gray clay, some silt, some fine sand; moist, soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	46
18								45
19	W-N		1.5					44
		1				19.5'	ELEV. 43.2	43

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 1 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	42
21								
22	W-N		1.5					41
23	S-8	1 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	40
24	W-N		1.0					39
25								38
26	S-9	WOR 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	37
27	W-N		2.0					36
28								35
29	S-10	WOR 1 1	1.5				CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	34
30								33
31								32
32	W-N		5.0					31
33								30
34								29
35								28
36	S-11	WOR 0 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	27
37								26
38	W-N		3.5					25
39								24
								23

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40								
41	S-12	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	22
42								21
43	W-N		3.5					20
44								19
45								18
46	S-13	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	17
47								16
48	W-N		3.5					15
49								14
50								13
51	S-14	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	12
52								11
53	W-N		3.5					10
54								9
55								8
56	S-15	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	7
57								6
58	W-N		3.5					5
59								4
								3

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 3 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60								
61	S-16	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	2
62								1
63	W-N		3.5					0
64								-1
65								-2
66	S-17	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-3
67								-4
68	W-N		3.5					-5
69								-6
70								-7
71	S-18	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-8
72								-9
73	W-N		3.5					-10
74								-11
75								-12
76	S-19	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-13
77								-14
78	W-N		3.5					-15
79								-16
								-17

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 4 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								
81	S-20	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-18
82								-19
83	W-N		3.5					-20
84								-21
85								-22
86	S-21	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-23
87								-24
88	W-N		3.5					-25
89								-26
90						90.0'	ELEV. -27.3	-27
91	S-22	WOR 0 0	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown to gray clay, some silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-28
92								-29
93	W-N		3.5					-30
94								-31
95								-32
96	S-23	WOR 0 0	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown to gray clay, some silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-33
97								-34
98	W-N		3.5					-35
99								-36
								-37

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger

Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 5 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7

Project Description: New Britain to Hartford Busway

Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100								
101	S-24	WOR 1 0	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown to gray clay, some silt; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-38
102								-39
103	W-N		3.5					-40
104								-41
105								-42
106	S-25	WOR 1 1	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown to gray clay, some silt; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	-43
107								-44
108	W-N		3.5					-45
109								-46
110								-47
111	S-26	WOR 1 1	1.5	1.5			SILTY CLAY (CL-ML) - reddish brown to gray clay, some silt; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	-48
112								-49
113	W-N		3.5					-50
114								-51
115						115.0'	ELEV. -52.3	-52
116	S-27	1 1 2	1.5	1.5			CLAYEY SILT (CL/ML) - reddish brown silt and clay, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	-53
117								-54
118	W-N		3.5					-55
119								-56
								-57

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 6 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120						120.0'	ELEV. -57.3	
121	S-28	15 21 32	1.5	1.5			POORLY-GRADED SAND WITH SILT (SP-SM) - reddish brown fine sand, some silt; moist, very dense, NP.	-58
122								-59
123	W-N		3.5					-60
124								-61
125						125.0'	ELEV. -62.3	-62
126	S-29	22 32 35	1.5	1.5			WELL-GRADED SAND WITH SILT (SW-SM) - reddish brown fine to coarse sand, some silt; moist, very dense, NP; (TILL).	-63
127								-64
128	W-N		3.5					-65
129								-66
130								-67
131	S-30	22 29 39	1.5	1.5			WELL-GRADED SAND WITH SILT (SW-SM) - reddish brown fine to coarse sand, some silt; moist, very dense, NP; (TILL).	-68
132								-69
133	W-N		3.5					-70
134								-71
135								-72
136	S-31	24 29 45	1.5	1.5			WELL-GRADED SAND WITH SILT (SW-SM) - reddish brown fine to coarse sand, some silt; moist, very dense, NP; (TILL).	-73
137								-74
138	W-N		3.5					-75
139								-76
								-77

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-80**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836606.9
Start Date: 8-04-03	Route No.:	Easting: 1012538.2
Finish Date: 8-04-03	Bridge No.:	Surface Elevation: 62.7
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140		23					WELL-GRADED SAND WITH SILT (SW-SM) - reddish brown fine to coarse sand, some silt; moist, very dense, NP; (TILL).	
141	S-32	28 40	1.5	1.5				-78
							ELEV. -78.8	-79
142							END OF BORING AT 141.5 FEET.	
143								-80
144								-81
145								-82
146								-83
147								-84
148								-85
149								-86
150								-87
151								-88
152								-89
153								-90
154								-91
155								-92
156								-93
157								-94
158								-95
159								-96
								-97

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0						0.1'	ASPHALT	58
1	A-N		1.5				ELEV. 58.2	57
2	S-1	5 6 5	1.5	1.0			POORLY-GRADED SAND WITH SILT (SP-SM) - gray very fine sand, some silt; moist, medium dense, NP; (FILL).	56
3								55
4	A-N		1.5					54
5	S-2	6 6 6	1.5	1.5		4.5'	ELEV. 53.8 SANDY SILT (ML) - gray to brown silt, some very fine sand; moist, medium dense, mottled, laminated, NP; (ALLUVIUM).	53
6								52
7	W-N		1.5					51
8	S-3	6 6 9	1.5	1.5			SANDY SILT (ML) - gray to brown silt, some very fine sand; moist, medium dense, mottled, laminated, NP; (ALLUVIUM).	50
9								49
10	W-N		1.5					48
11	S-5	9 7 11	1.5	1.2			SANDY SILT (ML) - gray to brown silt, some very fine sand; moist, medium dense, mottled, laminated, NP; (ALLUVIUM).	47
12								46
13	W-N		1.5					45
14	S-5	7 5 2	1.5	1.5		13.5'	ELEV. 44.8 CLAY (CL) - gray clay, some silt, some fine sand; moist, medium stiff, +PL, varved; (GLACIAL LAKE DEPOSIT).	44
15								43
16	W-N		1.5					42
17	S-6	2 2 1	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	41
18								40
19	W-N		1.5					39
		WOH					CLAY (CL) - gray clay, some silt, some fine sand;	

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 1 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 0	1.5	1.5			moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	38
21								37
22	W-N		1.5					36
23	S-8	1 1 WOH	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	35
24								34
25	W-N		1.5					33
26	S-9	WOH 1 0	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	32
27								31
28	W-N		1.5					30
29	S-10	WOH 1 1	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	29
30								28
31								27
32	W-N		5.0					26
33								25
34								24
35	S-11	1 1 WOR	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	23
36								22
37								21
38	W-N		3.5					20
39								19

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	1 1 WOH	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	18
41								17
42	W-N		3.5					16
43								15
44								14
45	S-13	1 1 1	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	13
46								12
47	W-N		3.5					11
48								10
49								9
50	S-14	1 WOH 0	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, varved; (GLACIAL LAKE DEPOSIT).	8
51								7
52	W-N		3.5					6
53								5
54								4
55	S-15	1 WOH 0	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, varved; (GLACIAL LAKE DEPOSIT).	3
56								2
57	W-N		3.5					1
58								0
59								-1

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 3 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60								-2
61	S-16	1 1 WOH	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, varved; (GLACIAL LAKE DEPOSIT).	-3
62								-4
63	W-N		3.5					-5
64								-6
65								-7
66	S-17	WOR WOR WOH	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, varved; (GLACIAL LAKE DEPOSIT).	-8
67								-9
68	W-N		3.5					-10
69								-11
70								-12
71	S-18	1 1 WOH	1.5	1.5			CLAY (CL) - gray clay, some silt, some fine sand; moist, very soft, varved; (GLACIAL LAKE DEPOSIT).	-13
72								-14
73	W-N		3.5					-15
74								-16
75								-17
76	S-19	1 1 2	1.5	0.5			CLAY (CL) - reddish brown clay, some silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-18
77								-19
78	W-N		3.5					-20
79								-21

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 4 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80	S-20	1 WOH 0	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-22
81								-23
82	W-N		3.5					-24
83								-25
84								-26
85	S-21	1 1 WOH	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-27
86								-28
87	W-N		3.5					-29
88								-30
89								-31
90	S-22	WOR 0 0	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-32
91								-33
92	W-N		3.5					-34
93								-35
94								-36
95	S-23	WOR WOR 1	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-37
96								-38
97	W-N		3.5					-39
98								-40
99								-41

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet **5** of **8** SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3

Project Description: New Britain to Hartford Busway

Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100	S-24	2 1 1	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-42
101								-43
102	W-N		3.5					-44
103								-45
104								-46
105	S-25	1 1 1	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-47
106								-48
107	W-N		3.5					-49
108								-50
109								-51
110	S-26	WOR 0 0	1.5	1.5			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-52
111								-53
112	W-N		3.5					-54
113								-55
114								-56
115	S-27	WOR 1 0	1.5	1.1			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-57
116								-58
117	W-N		3.5					-59
118								-60
119								-61

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 6 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120	S-28	1 WOH 0	1.5	1.0			CLAY (CL) - reddish brown clay, some silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-62
121								-63
122	W-N		3.5					-64
123								-65
124								-66
125	S-29	2 2 1	1.5	1.0			CLAY (CL) - reddish brown clay, some silt; wet, soft , +PL; (GLACIAL LAKE DEPOSIT).	-67
126								-68
127	W-N		3.5					-69
128								-70
129								-71
130	S-30	8 8 12	1.5	0.2		130.0'	ELEV. -71.7 SILT (ML) - reddish brown silt; moist, very stiff, -PL.	-72
131								-73
132	W-N		3.5					-74
133								-75
134								-76
135	S-31	10 10 12	1.5	0.5			SILT (ML) - reddish brown silt; moist, very stiff, -PL.	-77
136								-78
137	W-N		3.5					-79
138								-80
139								-81

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-81**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836729.6
Start Date: 8-06-03	Route No.:	Easting: 1012539.6
Finish Date: 8-08-03	Bridge No.:	Surface Elevation: 58.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 7.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140						140.0'	ELEV. -81.7	-82
141	S-32	32 32 38	1.5	0.7			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM) - reddish brown fine to coarse sand, some silt, some fine to coarse gravel; wet, very dense, NP; (TILL).	-83
142								-84
143	W-N		3.5					-85
144								-86
145								-87
146	S-33	33 41 60	1.5	0.8			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM) - reddish brown fine to coarse sand, some silt, some fine to coarse gravel; wet, very dense, NP; (TILL).	-88
147	W-N		1.5					-89
148	S-34	100/0.3	0.3	0.3			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM) - reddish brown fine to coarse sand, some silt, some fine to coarse gravel; wet, very dense, NP; (TILL).	-90
149								-91
150							ELEV. -90.0	-92
151							END OF BORING AT 148.3 FEET.	-93
152								-94
153								-95
154								-96
155								-97
156								-98
157								-99
158								-100
159								-101

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 148.3' Rock: 0.0' No. of Samples: 34	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					63
2–3	S-1	4 4 5	1.5	1.5			SILTY SAND WITH GRAVEL (SM) - black and dark brown fine sand, some silt, little coarse grave; moist, loose, NP; (FILL).	62, 61
3–4	A-N		1.5					60
5–6	S-2	7 10 13	1.5	1.2			SILTY SAND (SM) - reddish brown fine to medium sand, some silt; moist, medium dense, NP; (FILL).	59
						5.5'	ELEV. 58.0	58
6–7	A-N		1.5				POORLY GRADED SAND WITH SILT (SP-SM) - gray fine sand, little silt; moist, medium dense, NP; (ALLUVIUM).	57
						7.5'	ELEV. 56.0	56
8–9	S-3	6 6 7	1.5	1.3			SANDY SILT (ML) - gray silt, some fine sand varves; wet, stiff, +PL; (ALLUVIUM).	55
9–10	A-N		1.0					54
10–11	S-4	5 5 7	1.5	1.5			SANDY SILT (ML) - gray silt, some fine sand varves; wet, stiff, +PL; (ALLUVIUM).	53
12–13	W-N		2.0					52, 51
						13.5'	ELEV. 50.0	50
14–15	S-5	2 2 3	1.5	1.5			SILTY CLAY (CL-ML) - gray silt, little clay; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	49
15–16	W-N		1.5					48
17–18	S-6	2 2 2	1.5	1.5			SILTY CLAY WITH SAND (CL-ML) - gray silt, little clay, little fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	47, 46
18–19	W-N		1.5					45
		1				19.5'	ELEV. 44.0	44

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0' No. of Samples: 30	NOTES:	Sheet 1 of 7 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5

Project Description: New Britain to Hartford Busway

Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	43
21								
22	W-N		1.5					42
23	S-8	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	41
24	W-N		1.0					40 39
25	S-9	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	38
26								
27	W-N		2.0					37 36
28								
29	S-10	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	35 34
30	W-N		5.0					33
31								
32								32
33								31
34								30 29
35	S-11	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	28
36								
37	W-N		3.5					27 26
38								
39								25 24

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0' No. of Samples: 30	NOTES:	Sheet 2 of 7 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	23
41								22
42	W-N		3.5					21
43								20
44								19
45	S-13	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	18
46								17
47	W-N		3.5					16
48								15
49								14
50	S-14	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	13
51								12
52	W-N		3.5					11
53								10
54								9
55	S-15	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	8
56								7
57	W-N		3.5					6
58								5
59								4

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0' No. of Samples: 30	NOTES:	Sheet 3 of 7 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60								3
61	S-16	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	
62								2
63	W-N		3.5					1
64								0
65								-1
66	S-17	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-2
67								-3
68	W-N		3.5					-4
69								-5
70								-6
71	UP-1		2.0	2.0				-7
72								-8
73	W-N		3.0					-9
74								-10
75								-11
76	S-18	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-12
77								-13
78	W-N		3.5					-14
79								-15
								-16

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0' No. of Samples: 30	NOTES:	Sheet 4 of 7 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80	S-19	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-17
81								-18
82	W-N		3.5					-19
83								-20
84								-21
85	S-20	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-22
86								-23
87	W-N		3.5					-24
88								-25
89								-26
90	S-21	2 4 5	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, stiff, +PL; (GLACIAL LAKE DEPOSIT).	-27
91								-28
92	W-N		3.5					-29
93								-30
94								-31
95	S-22	2 3 4	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-32
96								-33
97	W-N		3.5					-34
98								-35
99								-36

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0'
No. of Samples: 30

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100	S-23	WOR 1 2	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-37
101								-38
102	W-N		3.5					-39
103								-40
104								-41
105	S-24	WOR 1 1	1.5	1.5			LEAN CLAY (CL) - gray and reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-42
106								-43
107	W-N		3.5					-44
108								-45
109								-46
110	S-25	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - reddish brown clay, little silt; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-47
111								-48
112	W-N		3.5					-49
113								-50
114								-51
115	S-26	14 17 23	1.5	1.5		115.0'	ELEV. -51.5 SILTY SAND (SM) - reddish brown fine sand, some silt; wet, dense, NP.	-52
116								-53
117	W-N		3.5					-54
118								-55
119								-56

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0'
No. of Samples: 30

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-82**
Inspector: Mark Martin	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836652.7
Start Date: 7/21/03	Route No.:	Easting: 1012632.1
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 63.5
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 12.0 after: 0 hours, @25.3 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120	S-27	35 100	1.0	0.8			SILTY SAND (SM) - reddish brown fine sand, some silt; wet, very dense, NP.	-57
121								-58
122								-59
123	W-N		4.0					-60
124								-61
125	S-28	26 38 44	1.5	1.5			SILTY SAND (SM) - reddish brown fine sand, some silt; wet, very dense, NP.	-62
126								-63
127								-64
128	W-N		3.5					-65
129								-66
130	S-29	100	0.5	0.5		130.0'	ELEV. -66.5	-67
131							POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown coarse sand, little silt, little fine sand; wet, very dense, NP; (TILL).	-68
132								-69
133	W-N		4.5					-70
134								-71
135	S-30	29 45 71	1.5	1.5			POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM) - reddish brown coarse sand, little silt, little fine sand, little fine gravel; wet, very dense, NP; (TILL).	-72
136								-73
137							ELEV. -73.0 End of Boring at 136.5'	-74
138								-75
139								-76

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 136.5' Rock: 0.0'
No. of Samples: 30

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					62
1–2	S-1	3 4 5	1.5	1.0			POORLY GRADED SAND WITH SILT (SP-SM) - yellowish brown very fine sand, some silt; dry, loose, NP, mottled; (ALLUVIUM).	61
2–3								60
3–4	A-N		1.5					59
4.5'							ELEV. 57.8	58
4–5	S-2	3 3 5	1.5	1.3			SILT (ML) - brownish gray silt, little clay; moist, medium stiff, -PL, mottled; (ALLUVIUM).	57
5–6								56
6–7	A-N		1.5					55
7–8	S-3	1 2 2	1.5	1.2			SILT (ML) - gray silt, little clay, little fine sand; moist, soft, -PL.	54
8–9	A-N		1.0					53
9–10	S-4	1 1 2	1.5	1.0			SILT (ML) - gray silt, little clay, little fine sand; moist, soft, -PL.	52
10–11								51
11–12	W-N		2.0					50
12–13								49
13–14	S-5	1 1 1	1.5	0.8			SILT (ML) - gray silt, little clay, little fine sand; moist, soft, -PL.	48
14–15								47
15–16	W-N		1.5					46
16.5'							ELEV. 45.8	
16–17	S-6	1 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	45
17–18								44
18–19	W-N		1.5					43
		1					CLAY WITH SAND (CL) - gray clay, little to some fine	

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0'
No. of Samples: 32

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-7	1 1	1.5	1.5			sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	42
21								41
22	W-N		1.5					40
23	S-8	1 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	39
24	W-N		1.0					38
25	S-9	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	37
26								36
27	W-N		2.0					35
28								34
29	S-10	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	33
30								32
31								31
32	W-N		5.0					30
33								29
34								28
35	S-11	1 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	27
36								26
37								25
38	W-N		3.5					24
39								23

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0'
No. of Samples: 32

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40	S-12	WOR 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	22
41								21
42	W-N		3.5					20
43								19
44								18
45	S-13	WOR 1 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	17
46								16
47	W-N		3.5					15
48								14
49								13
50	S-14	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	12
51								11
52	W-N		3.5					10
53								9
54								8
55	S-15	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	7
56								6
57	W-N		3.5					5
58								4
59								3

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0'
No. of Samples: 32

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	WOR 0 0	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	2
61								1
62	W-N		3.5					0
63								-1
64								-2
65	S-17	WOR 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-3
66								-4
67	W-N		3.5					-5
68								-6
69								-7
70	S-18	WOR 1 1	1.5	1.5			CLAY WITH SAND (CL) - gray clay, little to some fine sand, trace silt; moist, very soft, +PL, varved; (GLACIAL LAKE DEPOSIT).	-8
71								-9
72	W-N		3.5					-10
73								-11
74								-12
75	S-19	1 1 1	1.5	1.5			CLAY (CL) - reddish brown to gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-13
76								-14
77	W-N		3.5					-15
78								-16
79								-17

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet **4** of **8** SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								-18
81	S-20	1 2 3	1.5	1.2			CLAY (CL) - reddish brown to gray clay, little silt; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-19
82								-20
83	W-N		3.5					-21
84								-22
85								-23
86	S-21	2 2 3	1.5	1.5			CLAY (CL) - reddish brown to gray clay, little silt; wet, medium stiff, +PL; (GLACIAL LAKE DEPOSIT).	-24
87								-25
88	W-N		3.5					-26
89								-27
90								-28
91	S-22	2 2 2	1.5	1.0			CLAY (CL) - reddish brown to gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-29
92								-30
93	W-N		3.5					-31
94								-32
95								-33
96	S-23	2 2 2	1.5	1.5			CLAY (CL) - reddish brown to gray clay, some silt; wet soft, +PL; (GLACIAL LAKE DEPOSIT).	-34
97								-35
98	W-N		3.5					-36
99								-37

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 5 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	
Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours		

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100	S-24	2 2 2	1.5	1.5			CLAY (CL) - reddish brown to gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-38
101								-39
102	W-N		3.5					-40
103								-41
104								-42
105	S-25	1 1 2	1.5	1.5			CLAY (CL) - reddish brown to gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-43
106								-44
107	W-N		3.5					-45
108								-46
109								-47
110	S-26	1 1 2	1.5	1.5			CLAY (CL) - reddish brown to gray clay, little silt; wet, soft, +PL; (GLACIAL LAKE DEPOSIT).	-48
111								-49
112	W-N		3.5					-50
113								-51
114								-52
115	S-27	4 4 5	1.5	1.5		115.0'	ELEV. -52.7 SILT (ML) - reddish brown silt, little clay, trace fine sand; moist, medium stiff, +PL.	-53
116								-54
117	W-N		3.5					-55
118								-56
119								-57

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 6 of 8 SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES: Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120						120.0'	ELEV. -57.7	-58
121	S-28	18 21 26	1.5	0.5		121.5'	POORLY GRADED SAND WITH SILT (SP-SM) - reddish brown fine sand, some silt; moist, medium dense, NP.	-59
122							ELEV. -59.2	-60
123	W-N		3.5					-61
124								-62
125	S-29	18 23 28	1.5	0.5			WELL GRADED SAND WITH GRAVEL (SW) - reddish brown fine to coarse sand, some fine gravel, little silt; moist, very dense, NP; (TILL).	-63
126								-64
127								-65
128	W-N		3.5					-66
129								-67
130	S-30	17 24 44	1.5	1.2			WELL GRADED SAND WITH GRAVEL (SW) - reddish brown fine to coarse sand, some fine gravel, little silt; moist, very dense, NP; (TILL).	-68
131								-69
132								-70
133	W-N		3.5					-71
134								-72
135	S-31	20 28 39	1.5	1.0			WELL GRADED SAND WITH GRAVEL (SW) - reddish brown fine to coarse sand, some fine gravel, little silt; moist, very dense, NP; (TILL).	-73
136								-74
137								-75
138	W-N		3.5					-76
139								-77

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0'
No. of Samples: 32

NOTES:

SM-001-M REV. 1/02

Driller: Mike St. John/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-83**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836673.6
Start Date: 8-05-03	Route No.:	Easting: 1012609.3
Finish Date: 8-06-03	Bridge No.:	Surface Elevation: 62.3
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW 4" ID	Sampler Type/Size: SS/ 1-3/8 " ID	Core Barrel Type: NQ/1 7/8" ID
Hammer Wt.: 300 Fall: 24	Hammer Wt.: 140 Fall: 30	

Groundwater Obs. @ 8.0 after: 0 hours, @7.2 after: 24 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES: Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	33 36 41	1.5	0.8			WELL GRADED SAND WITH GRAVEL (SW) - reddish brown fine to coarse sand, some fine gravel, little silt; moist, very dense, NP; (TILL).	-78
141							ELEV. -79.2	-79
142							END OF BORING AT 141.5.	-80
143								-81
144								-82
145								-83
146								-84
147								-85
148								-86
149								-87
150								-88
151								-89
152								-90
153								-91
154								-92
155								-93
156								-94
157								-95
158								-96
159								-97

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 141.5' Rock: 0.0' No. of Samples: 32	NOTES:	Sheet 8 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
0–1	A-N		1.5					62
1–2	S-1	20 20 13	1.5	0.8			WELL GRADED SAND WITH SILT (SW-SM) - black fine to coarse sand, some silt, little fine gravel; dry, dense, NP; (FILL).	61
2–3								60
3–4	A-N		1.5					59
4.5'							ELEV. 58.1	58
4–5	S-2	6 6 7	1.5	1.5			WELL GRADED SAND WITH SILT (SW-SM) - brown fine to coarse sand, some silt; moist, medium dense, NP; (ALLUVIUM).	57
5–6								56
6–7	A-N		1.5					55
7–8	S-3	7 5 7	1.5	0.6			WELL GRADED SAND WITH SILT (SW-SM) - brown fine to coarse sand, some silt; moist, medium dense, NP; (ALLUVIUM).	54
8–9								53
9–10	A-N		1.5					
10.5'							ELEV. 52.1	52
10–11	S-4	9 5 6	1.5	0.6			SILT (ML) - brown to gray silt, trace clay; moist, stiff, - PL: (ALLUVIUM).	51
11–12								50
12–13	W-N		1.5					
13–14	S-5	15 15 11	1.5	0.0			NO RECOVERY ON S-5, COBBLE	49
14–15								48
15–16								47
16–17	W-N		4.5				COBBLE AT 16.5, NO SAMPLE POSSIBLE	46
17–18								45
18–19								44
19.5'							ELEV. 43.1	43
		6						

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 1 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
20	S-6	6 7	1.5	1.5			SILTY CLAY (CL-ML) - brown to gray silt, some clay, trace fine sand; moist, stiff, -PL; (GLACIAL LAKE DEPOSIT).	42
21								
22	W-N		1.5					41
						22.5'	ELEV. 40.1	40
23	S-7	2 2 2	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	39
24								
25	W-N		1.5					38
26	S-8	2 2 2	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	37
27								36
28	W-N		1.5					35
29	S-9	WOR WOR 2	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	34
30								33
31	UP-1		2.0	2.0				32
32								31
33	S-10	1 1 1	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, soft, +PL; (GLACIAL LAKE DEPOSIT).	30
34	W-N		1.5					29
								28
35	S-11	1 WOH WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	27
36								
37								26
38	W-N		3.5					25
39								24
								23

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet **2** of **8** SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES: Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
40, 41	S-12	1 1 WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	22
42, 43, 44	W-N		3.5					21, 20, 19, 18
45, 46	S-13	1 WOH/1.0	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	17
47, 48, 49	W-N		3.5					16, 15, 14, 13
50, 51	S-14	1 WOR WOR	1.5	1.3			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	12
52, 53, 54	W-N		3.5					11, 10, 9, 8
55, 56	S-15	1 1 WOH	1.5	1.5			LEAN CLAY (CL) - gray clay, little silt, trace fine sand; moist, very soft, +PL; (GLACIAL LAKE DEPOSIT).	7
57, 58, 59	W-N		3.5					6, 5, 4, 3

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 3 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
60	S-16	1 WOH WOH	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	2
61								1
62	W-N		3.5					0
63								-1
64								-2
65	S-17	1 WOH WOH	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-3
66								-4
67	W-N		3.5					-5
68								-6
69								-7
70	S-18	WOH/1.5	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-8
71								-9
72	W-N		3.5					-10
73								-11
74								-12
75	S-19	WOR WOR WOH	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-13
76								-14
77	W-N		3.5					-15
78								-16
79								-17

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 4 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
80								
81	S-20	WOR WOH/1.0	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-18
82								-19
83	W-N		3.5					-20
84								-21
85								-22
86	S-21	WOR WOH WOH	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-23
87								-24
88	W-N		3.5					-25
89								-26
90								-27
91	S-22	WOR WOR 1	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-28
92								-29
93	W-N		3.5					-30
94								-31
95								-32
96	S-23	WOH WOH 1	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-33
97								-34
98	W-N		3.5					-35
99								-36
								-37

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 5 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
100								
101	S-24	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-38
102								-39
103	W-N		3.5					-40
104								-41
105								-42
106	S-25	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-43
107								-44
108	W-N		3.5					-45
109								-46
110								-47
111	S-26	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-48
112								-49
113	W-N		3.5					-50
114								-51
115								-52
116	S-27	WOR/1.5	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-53
117								-54
118	W-N		3.5					-55
119								-56
								-57

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 6 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT E (LD4 1/03)

Depth (ft.)	Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
120	S-28	WOR/1.0 1	1.5	1.5			LEAN CLAY (CL) - brown to gray clay; wet, very soft, +PL; (GLACIAL LAKE DEPOSIT).	-58
121								-59
122	W-N		3.5					-60
123								-61
124								-62
125	S-29	41 100/0.2	0.7	0.7		125.0'	ELEV. -62.4 SILT WITH GRAVEL (ML) - brown silt, some fine to coarse gravel; moist, very dense, NP; (TILL).	-63
126	W-N		4.3					-64
127								-65
128								-66
129								-67
130	S-30	20 41 74	1.5	0.3			SILT WITH GRAVEL (ML) - brown silt, some fine to coarse gravel; moist, very dense, NP; (TILL).	-68
131								-69
132	W-N		3.5					-70
133								-71
134								-72
135	S-31	35 39 81	1.5	0.5			SILT WITH GRAVEL (ML) - brown silt, some fine to coarse gravel; moist, very dense, NP; (TILL).	-73
136								-74
137	W-N		3.5					-75
138								-76
139								-77

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet 7 of 8 SM-001-M REV. 1/02

Driller: Jeff Leavitt/NEBC	**Connecticut DOT Boring Report**	Hole No.: **SB-84**
Inspector: Rachael Marks	Town: West Hartford / Hartford, CT	Stat./Offset:
Engineer: Baker Engineering	Project No.: 171-0305	Northing: 836901.4
Start Date: 7/21/03	Route No.:	Easting: 1012781.8
Finish Date: 7/23/03	Bridge No.:	Surface Elevation: 62.6
Project Description: New Britain to Hartford Busway		
Casing Type/Size: HW/4"	Sampler Type/Size: SS/1-3/8"	Core Barrel Type:
Hammer Wt.: 300 Fall: 24"	Hammer Wt.: 140 Fall: 30"	

Groundwater Obs. @ 28.0 after: 0 hours, @17.4 after: 48 hours, @ after: hours

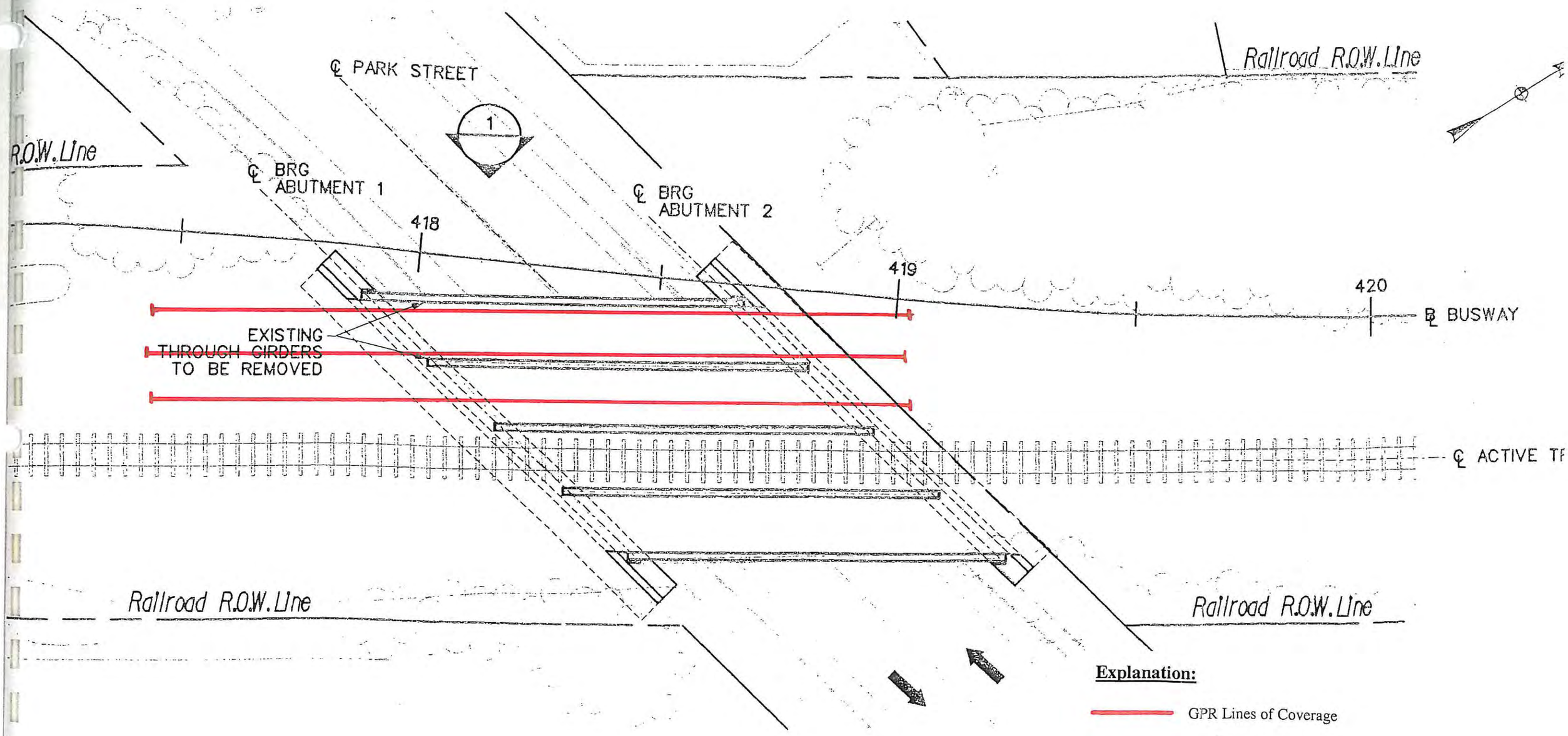
Baker Info: S.O. Number: B25624LPDSOIL41802/42002 File: northern Template: CDOT_E (LD4 1/03)

Depth (ft.)	SAMPLES Sample Type/No.	Blows on Sampler per 0.5 ft.	Pen. (ft.)	Rec. (ft./%)	RQD (ft./%)	Generalized Strata Description	Material Description and Notes	Elevation (ft.)
140	S-32	29 39 46	1.5	0.5			SILT WITH GRAVEL (ML) - brown silt, some fine to coarse gravel; moist, very dense, NP; (TILL).	-78
141								-79
142	W-N		3.5					-80
143								-81
144								-82
145	S-33	31 33 44	1.5	0.6			SILT WITH GRAVEL (ML) - brown silt, some fine to coarse gravel; moist, very dense, NP; (TILL).	-83
146							ELEV. -83.9	-84
147							End of Boring at 146.5'	-85
148								-86
149								-87
150								-88
151								-89
152								-90
153								-91
154								-92
155								-93
156								-94
157								-95
158								-96
159								-97

Sample Type: S=Split Spoon C=Core UP=Undisturbed Piston V=Vane Shear Test A=Auger
Proportions Used: Trace = 1 - 10%, Little = 10 -20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146.5' Rock: 0.0' No. of Samples: 33	NOTES:	Sheet **8** of **8** SM-001-M REV. 1/02

Geophysical Test Results



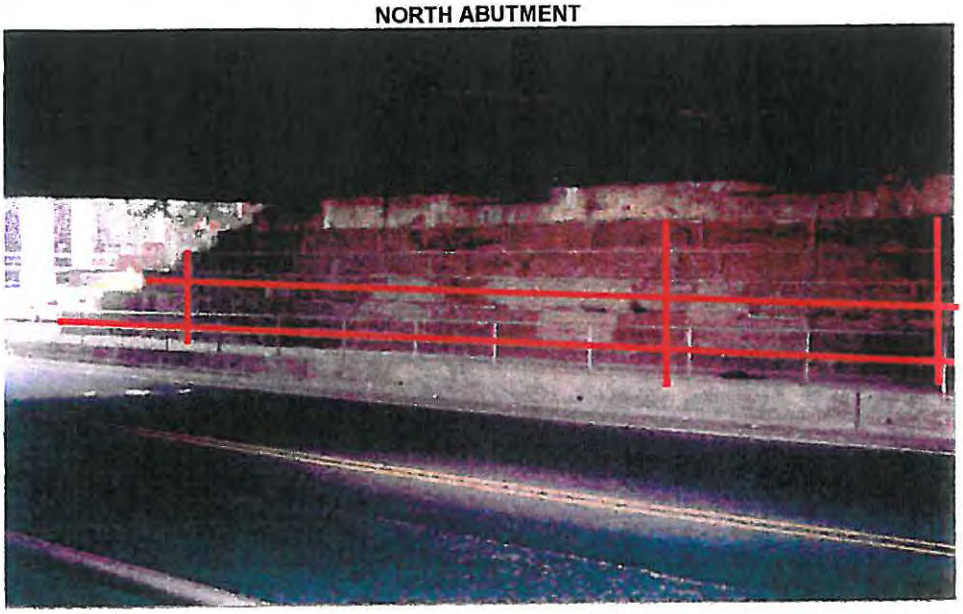
1 PLAN

SCALE: 1'=40'-0"

GEOPHYSICAL TESTING NEW BRITIAN TO HARTFORD BUSWAY CONNDOT PROJECT 171-305 HARTFORD, CONNECTICUT Prepared For BAKER ENGINEERING NY, INC By NDT Corporation	Geophysical Coverage Over Park Street Bridge	
	November, 2003	Figure 4

PARK STREET BRIDGE

NORTH ABUTMENT



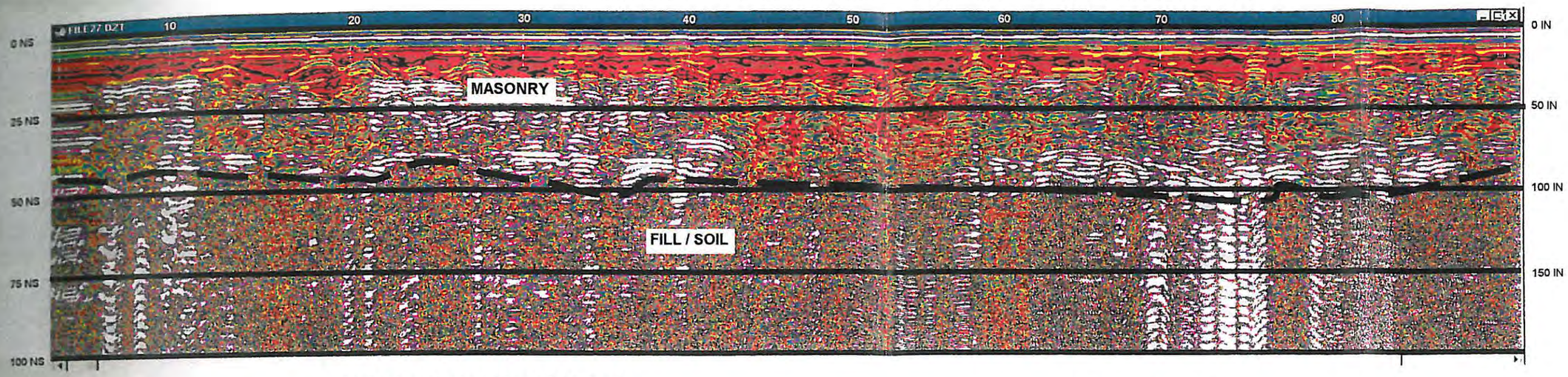
SOUTH ABUTMENT

Explanation:

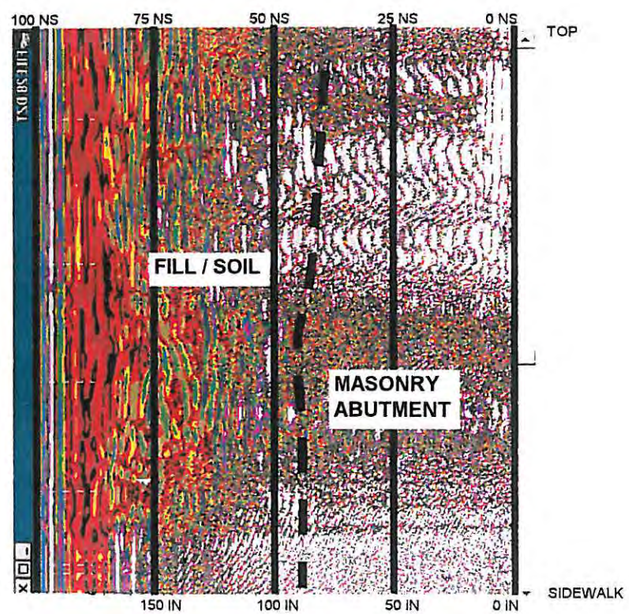
GPR Lines of Coverage

GEOPHYSICAL TESTING NEW BRITIAN TO HARTFORD BUSWAY CONNDOT PROJECT 171-305 HARTFORD, CONNECTICUT Prepared For BAKER ENGINEERING NY, INC By NDT Corporation	Geophysical Coverage Abutments of the Park Street Bridge	
	November, 2003	Figure 5

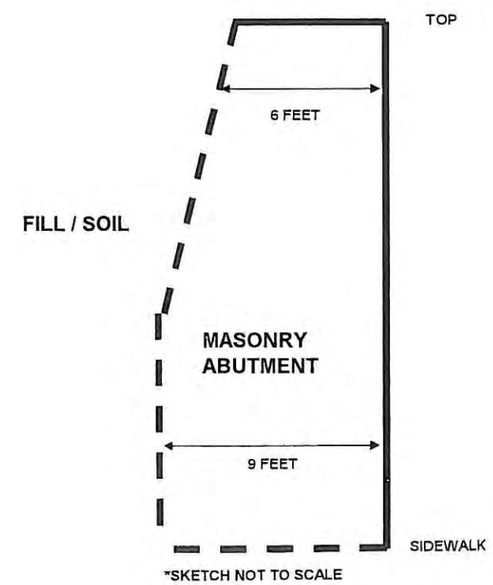
HORIZONTAL GPR RECORD PARK STREET NORTH ABUTMENT 2 FEET ABOVE SIDEWALK



VERTICAL GPR RECORD STATION 0+85



INTERPRETATION



GEOPHYSICAL TESTING NEW BRITIAN TO HARTFORD BUSWAY CONNDOT PROJECT 171-305 HATFORD, CONNECTICUT Prepared For BAKER ENGINEERING NY, INC By NDT Corporation	Annotated Abutments GPR Data Park Street Bridge	
	November, 2003	FIGURE 6

Appendix 4

2008 Boring Logs

SB-Series Boring Logs
(Bridge Structure)

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-1
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southeast
Start Date:	5-12-08	Route No.:		Northing:	836764.1
Finish Date:	5-16-08	Bridge No.:		Easting:	1012664.4
				Surface Elevation:	61.8

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	1 50/2"	8	8		Topsoil Concrete	Very dense, black fine to medium SAND, little Silt, trace Cinders, trace Concrete fragments	60
5								55
						Clay & Silt (varved)		
	S-2	15 14 9 9	24	0			Medium dense, no recovery	
10	S-3	3 5 7 13	24	12			Medium dense, gray Clayey SILT layers to 1/4" thick varved with gray Silt, trace fine Sand layers to 1/8" thick, (wet)	50
15	S-4	7 4 4 4	24	10			No recovery, resampled Medium to stiff, gray Clayey SILT layers to 1/4" thick varved with gray SILT layers to 1/8" thick	45
20	S-5	2 2 2 2	24	24			Soft to medium, gray Clayey SILT layers to 1/4" thick varved with gray Silty CLAY layers to 1/8" thick	40
25	S-6	1 1 1 1	24	22			Soft, gray Clayey SILT layers to 1/4" thick varved with gray Silty CLAY layers to 1/8" thick	35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in
Earth: 156ft Rock: 10ft

No. of Soil Samples: 33 No. of Core Runs: 2

NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-02-1	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset: 10' Southeast	
Start Date: 5-12-08	Route No.:	Northing: 836764.1	
Finish Date: 5-16-08	Bridge No.:	Easting: 1012664.4	
		Surface Elevation: 61.8	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-7	1 2 1 2	24	24		Clay & Silt (varved) *(con't)*	Soft, gray Silty CLAY layers to 1/4" thick varved with gray SILT and CLAY layers 1/8" thick	30
35	S-8	- W O H	24	24			Very soft, gray Silty CLAY layers to 2" thick varved with gray SILT and CLAY layers to 1/4" thick	25
40	UP-1	P U S H	24	24				20
	S-9	- W O H	24	24			Very soft, gray Silty CLAY layers to 2" thick varved with gray SILT and CLAY layers to 1/4" thick	
45	S-10	WOH 0 0 2	24	24			Very soft, gray Silty CLAY layers to 3/4" thick varved with gray SILT and CLAY layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	15
50	UP-2	P U S H	24	24				10
	S-11	WOR 0 2 4	24	24			Very soft, gray Silty CLAY layers to 3/4" thick varved with gray SILT and CLAY layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	
55	S-12	- W O R	24	24			Very soft, gray Silty CLAY layers to 3/4" thick varved with gray SILT and CLAY layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 156ft Rock: 10ft	NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.	Sheet 2 of 6
No. of Soil Samples: 33 No. of Core Runs: 2		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-1
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southeast
				Northing:	836764.1
Start Date:	5-12-08	Route No.:		Easting:	1012664.4
Finish Date:	5-16-08	Bridge No.:		Surface Elevation:	61.8

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-13	- W O R	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown Silty CLAY layers to 1/4" thick varved with brown SILT and CLAY layers to 1/4" thick	0
65	S-14	3 4 4 7	24	24			Medium to stiff, gray brown Silty CLAY layers to 1/4" thick varved with brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings to 1/16" thick	-5
70	S-15	4 8 7 10	24	24			Stiff to very stiff, red brown Silty CLAY layers to 3/4" thick varved with gray brown Clayey SILT layers to 1/2" thick	-10
75	S-16	WOR 0 6 4	24	24			Medium, red brown Silty CLAY layers to 3/4" thick varved with gray brown Clayey SILT layers to 1/2" thick	-15
80	S-17	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved with gray brown Clayey SILT layers to 3/4" thick	-20
85	S-18	8 10 9 11	24	24			Very stiff, red brown Silty CLAY layers to 1 1/2" thick varved with gray brown SILT and CLAY layers to 1" thick	-25
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 156ft Rock: 10ft	NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.	Sheet 3 of 6
No. of Soil Samples: 33 No. of Core Runs: 2		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-1
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southeast
Start Date:	5-12-08	Route No.:		Northing:	836764.1
Finish Date:	5-16-08	Bridge No.:		Easting:	1012664.4
				Surface Elevation:	61.8

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-19	WOR 0 9 6	24	24		Clay & Silt (varved) *(con't)*	Stiff, red brown Silty CLAY layers to 1" thick varved with gray brown Clayey SILT layers to 1 1/2" thick	-30
95	S-20	9 9 8 7	24	24			Very stiff, red brown Silty CLAY layers to 3/4" thick varved with gray brown Clayey SILT layers to 1 1/2" thick	-35
100	S-21	4 1 1 2	24	24			Very soft, red brown Silty CLAY layers to 3/4" thick varved with gray brown Clayey SILT layers to 1 1/2" thick	-40
105	S-22	1 2 1 3	24	12			Soft, red brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 2" thick	-45
110	S-23	- W O R	24	24			Very soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 2" thick	-50
115	S-24	0 WOR 3 4	24	24			Soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 2" thick	-55
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 156ft Rock: 10ft	NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.	Sheet 4 of 6
No. of Soil Samples: 33 No. of Core Runs: 2		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-1
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southeast
Start Date:	5-12-08	Route No.:		Northing:	836764.1
Finish Date:	5-16-08	Bridge No.:		Easting:	1012664.4
				Surface Elevation:	61.8

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
120	S-25	4 5 4 6	24	24		Clay & Silt (varved) *(con't)*	Stiff, red brown Silty CLAY varved with gray brown CLAY and SILT layers	-60
125	S-26	7 8 9 12	24	24			Very stiff, red brown Silty CLAY layers to 2" thick varved with red brown SILT and CLAY layers to 4" thick	-65
130	S-27	5 8 10 11	24	16			Very stiff, red brown Silty CLAY layers to 2" thick varved with red brown SILT and CLAY layers to 4" thick	-70
						Glacial Till		
135	S-28	29 33 36 48	24	12			Very dense, red brown Clayey SILT, trace fine to coarse Gravel, trace fine Sand	-75
140	S-29	26 27 24 26	24	24			Very dense, red brown fine to medium SAND, some Silt	-80
145	S-30	26 28 23 28	24	14			Very dense, red brown fine to coarse SAND, little Silt	-85
150								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 156ft Rock: 10ft No. of Soil Samples: 33 No. of Core Runs: 2	NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.	Sheet 5 of 6 SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-1
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' Southeast
Start Date:	5-12-08	Route No.:		Northing:	836764.1
Finish Date:	5-16-08	Bridge No.:		Easting:	1012664.4
				Surface Elevation:	61.8

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
150	S-31	20 35 50 53	24	12		Glacial Till *(con't)*	Very stiff, red brown CLAY and SILT, trace fine Sand	-90
155	S-32	25 100/5"	11	8			Very stiff, red brown Silty CLAY	
						Bedrock		-95
	C-1		60	25	7		Very Poor Quality, Moderately Hard, Moderately Weathered, red brown, fine grained, SHALE, jointing close to shattered Coring time (min./ft.): 4,4,2,4,3	
160								-100
	C-2		60	36	7		Very Poor Quality, Moderately Hard, Moderately Weathered, red brown, fine grained, SHALE, jointing close to shattered Coring time (min./ft.): 4,2,3,3,2	
165							END OF BORING 166ft	-105
170								-110
175								-115
180								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in

Earth: 156ft Rock: 10ft

No. of Soil Samples: 33 No. of Core Runs: 2

NOTES: Cable drive safety hammer used. Boring offset 10' Southeast. Augered through concrete. Pilot hole to 15' with 3 1/4" ID HSA then switched to 4" flush joint. Rods slipped and fell 10' for S-17 penetration. Likely bedrock at 156'. Casing refused at 156'. Rig malfunctioned during second core run.

SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-2
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	836773.2
Finish Date:	5-15-08	Bridge No.:		Easting:	1012704.1
				Surface Elevation:	63

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	3 4 6 9	24	10		Fill	Medium dense, brown fine to coarse GRAVEL, some fine to medium Sand, trace Silt	
	S-2	10 8 6 8	24	10			Medium dense, brown fine to medium SAND, some fine to coarse Gravel, little Silt	60
5	S-3	6 6 4 5	24	20			Medium dense, brown SILT, little fine Sand, trace Roots	
	S-4	11 13 11 12	24	8		Clay & Silt (varved)	Medium dense, gray brown to orange brown Clayey SILT layers to 1/8" thick varved, (with layers to 1/8" thick SILT, trace fine Sand)	55
10	S-5	11 10 11 13	24	22			Medium dense, gray brown to orange brown Clayey SILT layers to 1/8" thick varved, (with layers to 1/8" thick SILT, trace fine Sand)	
								50
15	S-6	4 2 3 3	24	1			Medium, gray Silty CLAY layers to 1/8" thick varved, (with gray Clayey SILT layers to 1/8" thick)	
								45
20	S-7	1 1 1 1	24	24			Soft to very soft, gray Silty CLAY layers to 1/4" thick varved, (with gray Clayey SILT layers to 1/8" thick)	
								40
25	S-8	1 0 1 1	24	24			Very soft, gray Silty CLAY layers to 1/4" thick varved, (with gray Clayey SILT layers to 1/8" thick)	
								35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 1 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-2
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	836773.2
Finish Date:	5-15-08	Bridge No.:		Easting:	1012704.1
				Surface Elevation:	63

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	UP-1	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-9	1 0 1 2	24	24			Very soft, gray CLAY and SILT layers to 1/4" thick varved, (with gray Clayey SILT layers to 1/8" thick, occasional fine Sand partings to 1/16" thick)	30
35	S-10	WOR 0 1 1	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved, (with gray SILT and CLAY layers to 1/4" thick)	25
40	S-11	1 0 1 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved, (with gray SILT and CLAY layers to 1/4" thick)	20
45	S-12	W O R 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved, (with gray SILT and CLAY layers to 1/4" thick)	15
50	S-13	W O R 2	24	24			Very soft, gray Silty CLAY layer to 3/4" thick varved, (with gray CLAY and SILT layers to 1/4" with occasional red brown fine SAND partings to 1/16" thick)	10
55	S-14	WOR 1 2 2	24	24			Soft, gray Silty CLAY (with occasional gray SILT and CLAY layers to 1/4" thick)	5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 2 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-2
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	836773.2
Finish Date:	5-15-08	Bridge No.:		Easting:	1012704.1
				Surface Elevation:	63

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	0 WOR 2 2	24	24		Clay & Silt (varved) *(con't)*	Soft, gray Silty CLAY layers to 3/4" thick varved, (with gray Clayey SILT layers to 1/4" thick)	0
65	S-16	W O R 2	24	24			Soft, gray Silty CLAY layers to 3/4" thick varved, (with gray Clayey SILT layers to 1/4" thick)	-5
70	S-17	WOR 1 2 3	24	24			Soft, gray Silty CLAY layers to 3/4" thick varved, (with gray Clayey SILT layers to 1/4" thick with occasional red brown fine SAND partings to 1/16")	-10
75	S-18	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved, (with gray borwn SILT and CLAY layers to 2" thick)	-15
80	S-19	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved, (with gray borwn SILT and CLAY layers to 2" thick)	-20
85	S-20	- W O R	24	24			Very soft, red brown Silty CLAY layers to 3/4" thick varved, (with red brown CLAY and SILT layers to 1/2" thick)	-25
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 3 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-2
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	836773.2
Finish Date:	5-15-08	Bridge No.:		Easting:	1012704.1
				Surface Elevation:	63

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	1 0 1 1	24	12		Clay & Silt (varved) *(con't)*	Very soft, gray brown SILT and CLAY layers to 2" thick varved, (with red brown Silty CLAY layers to 3/4" thick)	-30
95	S-22	- W O R	24	18			Very soft, red brown Silty CLAY layers to 3/4" thick varved, (with gray brown SILT and CLAY layers to 1/2" thick)	-35
100	S-23	- W O R	24	24			Very soft, gray brown CLayey SILT layers to 2.5" thick varved, (with red brown Silty CLAY layers to 3/4" thick)	-40
105	S-24	- W O R	24	12			Very soft, red brown Silty CLAY layers to 1.5" thick varved, (with gray brown SILT and CLAY layers to 3/4" thick)	-45
110	S-25	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1.5" thick varved, (with gray brown SILT and CLAY layers to 3/4" thick)	-50
115	S-26	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved, (with gray brown Clayey SILT layers to 1.5" thick)	-55
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 4 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-02-2	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-12-08	Route No.:	Northing: 836773.2	
Finish Date: 5-15-08	Bridge No.:	Easting: 1012704.1	
		Surface Elevation: 63	

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
120	S-27	- W O R	24	24		Clay & Silt (varved) *(con't)*	Very soft, red brown Silty CLAY layers to 1" thick varved, (with gray brown SILT and CLAY layers to 2" thick)	-60
125	S-28	1 1 0 2	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved, (with gray brown SILT and CLAY layers to 2" thick)	-65
130	S-29	2 1 4 6	24	18			Medium, red brown Silty CLAY layers to 3/4" thick varved, (with gray brown Clayey Silt layers to 2" thick)	-70
						Glacial Till		
135	S-30	20 21 17 19	24	12			Dense, red brown fine SAND, some Silt, little fine to coarse Gravel	-75
140	S-31	24 19 16 20	24	12			Dense, red brown Top 8": fine to coarse GRAVEL, some fine to medium Sand, little Silt Bottom 4": fine SAND, little Silt	-80
145	S-32	51 44 26 31	24	18			Very dense, red brown Top 3": fine SAND, some Silt Bottom 15": fine to coarse SAND, little fine to coarse Gravel, little Silt	-85
150								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 5 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-2
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-12-08	Route No.:		Northing:	836773.2
Finish Date:	5-15-08	Bridge No.:		Easting:	1012704.1
				Surface Elevation:	63

Project Description: New Britain - Hartford Busway / Geo **Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @None observed

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
150	S-33	32 39 44 54	24	12		Glacial Till *(con't)*	Very dense, red brown fine to medium SAND, some fine to coarse Gravel, little Silt	
								-90
155	C-1		60	60	0	Bedrock	Very Poor Quality, Moderately Hard, Slightly Weathered, red brown, fine grained, SHALE, very close horizontal fractures 12": 5" thick seam hard red brown Clay Coring time (min./ft.): 8-10-10-10-10	-95
160							END OF BORING 160ft	-100
165								-105
170								-110
175								-115
180								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 155ft Rock: 5ft	NOTES: Low recovery in S-6, resample 24" with weight of hammer. Penetration=24", Recovery = 16".	Sheet 6 of 6
No. of Soil Samples: 32 No. of Core Runs: 1		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' West
Start Date:	5-29-08	Route No.:		Northing:	836910.1
Finish Date:	6-3-08	Bridge No.:		Easting:	1012743.7
				Surface Elevation:	54

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample after 0 hours, @9.8 after 6 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	6 6 7 10	24	18		Fill	Medium dense, brown fine to coarse SAND, some Silt, some fine to coarse Gravel	
	S-2	18 25 35 41	24	18			Very dense, yellow brown fine to coarse SAND, some Silt, litte fine to coarse Gravel	50
5	S-3	5 4 4 6	24	22			Loose, gray brown SILT and fine to medium SAND, little fine Gravel, trace Wood fibers, trace Roots, (methane odor)	
	S-4	10 11 15 22	24	12			Medium dense, gray brown SILT and fine to medium SAND, (methane odor)	45
10	S-5	4 5 6 4	24	18			Medium dense, gray brown SILT, some fine Sand	
						Clay Silt (varved)		40
15	S-6	1 1 1 2	24	12			Very soft, gray brown varved SILT and CLAY	
								35
20	S-7	1 1 0 2	24	24			Very soft, gray brown Silty CLAY layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick	
								30
25	S-8	1 1 2 3	24	24			Soft, gray brown Clayey SILT layers to 3/4" thick varved with gray brown Silty CLAY layers to 1/4" thick with occasional fine Sand partings	
								25
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Vane shear test at 26' was neglected due to erroneous results. Casing advanced to 25' open hole beyond using drillers mud to maintain an open hole. Sands blew into casing on spoon removal at 132'. Multiple running sands prior to sample at 135'. Roller bit refusal at 146' casing shoe collapsed could not core beyond	Sheet 1 of 5
No. of Soil Samples: 31 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-3
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' West
Start Date:	5-29-08	Route No.:		Northing:	836910.1
Finish Date:	6-3-08	Bridge No.:		Easting:	1012743.7
				Surface Elevation:	54

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample after 0 hours, @9.8 after 6 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 1 1 4	24	24		Clay Silt (varved) *(con't)*	Soft, gray brown Clayey SILT layers to 3/4" thick varved with gray brown Silty CLAY layers to 1/4" thick with occasional fine Sand partings	20
35	S-10	WOR 1 2 3	24	24			Soft, gray brown Clayey SILT layers to 3/4" thick varved with gray brown Silty CLAY layers to 1/4" thick with occasional fine Sand partings	15
40	S-11	WOR 1 2 3	24	24			Soft, gray brown Clayey SILT layers to 3/4" thick varved with gray brown Silty CLAY layers to 1/4" thick with occasional fine Sand partings	10
45	S-12	- W O R	24	24			Very soft, gray brown Silty CLAY	5
50	S-13	1 2 2 2	24	24			Soft, gray brown Clayey SILT layers to 3/4" thick varved with gray brown Silty CLAY layers to 1/4" thick with occasional fine Sand partings	0
55	S-14	WOR 0 3 4	24	24			Soft, red brown Silty CLAY layers to 2" thick varved with gray brown Clayey SILT layers to 1/2" thick	-5
60								

Well Construction

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Vane shear test at 26' was neglected due to erroneous results. Casing advanced to 25' open hole beyond using drillers mud to maintain an open hole. Sands blew into casing on spoon removal at 132'. Multiple running sands prior to sample at 135'. Roller bit refusal at 146' casing shoe collapsed could not core beyond	Sheet 2 of 5
No. of Soil Samples: 31 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-3
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' West
Start Date:	5-29-08	Route No.:		Northing:	836910.1
Finish Date:	6-3-08	Bridge No.:		Easting:	1012743.7
				Surface Elevation:	54

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample after 0 hours, @9.8 after 6 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
60	S-15	WOR 2 3 2	24	24		Clay Silt (varved) *(con't)*	Medium, red brown Silty CLAY layers to 2" thick varved with gray brown Clayey SILT layers to 1/2" thick		
									-10
65	S-16	1 2 2 2	24	24			Soft, red brown Silty CLAY layers to 1" varved with gray brown Clayey SILT layers to 1/4" thick		
									-15
70	S-17	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown Clayey SILT layers to 2" thick		
									-20
75	S-18	- W O R	24	24			Very soft, red brown Silty CLAY layers to 2" thick varved with gray brown Clayey SILT layers to 2" thick		
									-25
80	S-19	- W O R	24	24			Very soft, red brown Silty CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 2" thick		
									-30
85	S-20	WOR 0 5 5	24	24			Medium, red brown Silty CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 2" thick		
									-35
90									

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146ft Rock: 0ft No. of Soil Samples: 31 No. of Core Runs: 0	NOTES: Hydraulic safety hammer used. Vane shear test at 26' was neglected due to erroneous results. Casing advanced to 25' open hole beyond using drillers mud to maintain an open hole. Sands blew into casing on spoon removal at 132'. Multiple running sands prior to sample at 135'. Roller bit refusal at 146' casing shoe collapsed could not core beyond	Sheet 3 of 5 SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	SB-02-3
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	10' West
Start Date:	5-29-08	Route No.:		Northing:	836910.1
Finish Date:	6-3-08	Bridge No.:		Easting:	1012743.7
				Surface Elevation:	54

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample after 0 hours, @9.8 after 6 hours

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
90	S-21	WOR 0 4 4	24	24		Clay Silt (varved) *(con't)*	Soft, red brown Silty CLAY layers to 2" thick varved with SILT and CLAY layers to 2" thick		
									-40
95	S-22	4 1 3 2	24	24			Soft, red brown Silty CLAY layers to 2" thick varved with SILT and CLAY layers to 2" thick		
									-45
100	S-23	3 3 3 2	24	24			Loose, red brown Silty CLAY layers to 2" thick varved with SILT and CLAY layers to 2" thick		
									-50
105	S-24	1 2 4 7	24	24			Medium, red brown Silty CLAY layers to 2" thick varved with SILT and CLAY layers to 2" thick		
									-55
110	S-25	WOR 0 9 13	24	24			Stiff, red brown Silty CLAY layers to 10" thick varved with red brown SILT and CLAY layers to 10" thick		
									-60
115	S-26	3 6 5 12	24	24			Stiff, red brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 1" thick		
									-65
120									

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146ft Rock: 0ft No. of Soil Samples: 31 No. of Core Runs: 0	NOTES: Hydraulic safety hammer used. Vane shear test at 26' was neglected due to erroneous results. Casing advanced to 25' open hole beyond using drillers mud to maintain an open hole. Sands blew into casing on spoon removal at 132'. Multiple running sands prior to sample at 135'. Roller bit refusal at 146' casing shoe collapsed could not core beyond	Sheet 4 of 5 SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: SB-02-3	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset: 10' West	
Start Date: 5-29-08	Route No.:	Northing: 836910.1	
Finish Date: 6-3-08	Bridge No.:	Easting: 1012743.7	
		Surface Elevation: 54	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @15' wet sample after 0 hours, @9.8 after 6 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Well Construction	Elevation (ft)
120	S-27	5 5 5 15	24	24		Clay Silt (varved) *(con't)*	Stiff, gray brown CLAY and SILT layers to 2" thick varved with red brown Silty CLAY layers to 1/2" thick		
						Glacial Till			-70
125	S-28	29 30 32 36	24	15			Very dense, Top 2": red brown Silty CLAY Bottom 13": red brown fine to medium SAND, little Silt, trace fine Gravel		-75
130	S-29	33 33 23 23	24	12			Very dense, red brown fine to coarse SAND, some fine Gravel, little Silt		-80
135	S-30	29 32 19 31	24	24			Very dense, red brown fine to coarse SAND, little fine Gravel, trace Silt		-85
140	S-31	27 27 24 25	24	24			Very dense, red brown fine to medium SAND, little fine Gravel, little Silt		-90
145							END OF BORING 146ft		-95
150									

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 146ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Vane shear test at 26' was neglected due to erroneous results. Casing advanced to 25' open hole beyond using drillers mud to maintain an open hole. Sands blew into casing on spoon removal at 132'. Multiple running sands prior to sample at 135'. Roller bit refusal at 146' casing shoe collapsed could not core beyond	Sheet 5 of 5
No. of Soil Samples: 31 No. of Core Runs: 0		SM-001-M REV. 1/02

RW-Series Boring Logs
(Retaining Wall Structures)

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: RW-21	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset: 13' West	
Start Date: 6-2-08	Route No.:	Northing: 836300.3	
Finish Date: 6-2-08	Bridge No.:	Easting: 1012380.5	
		Surface Elevation: 56.5	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @4.5' wet sample

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	5 30 25 72	24	16		Asphalt / Fill	Very dense, gray black fine to coarse GRAVEL, some fine to coarse Sand, trace Cinders, trace Ash	55
	S-2	7 8 8 7	24	18			Medium dense, gray black SILT, some fine Sand, trace Cinders, trace Coal fragments, (petroleum odor)	
5	S-3	2 3 2 2	24	16			Loose, gray brown fine SAND, little Silt, (petroleum odor)	50
	S-4	2 2 2 3	24	15			Loose, gray brown fine SAND, little Silt, (petroleum)	
10	S-5	8 4 4 4	24	12		Clay & Silt (varved)	Medium to stiff, gray Clayey SILT	45
15	S-6	2 2 2 3	24	20			Soft to medium, gray brown Silty CLAY layers to 1/4" thick varved with gray Clayey SILT, trace fine Gravel/Shale (flat fragments)	40
20	S-7	1 1 1 1	24	12			Soft to very soft, gray brown Silty CLAY layes to 1/4" thick varved with gray Clayey SILT, trace fine Gravel/Shale (flat fragments)	35
25	S-8	WOR 1 0 1	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional fine SAND partings	30
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA, then switched to 3" casing. Boring advanced open hole below 10' using drillers mud for stabilization.	Sheet 1 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	RW-21
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	13' West
Start Date:	6-2-08	Route No.:		Northing:	836300.3
Finish Date:	6-2-08	Bridge No.:		Easting:	1012380.5
				Surface Elevation:	56.5

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @4.5' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	WOR 1 1 1	24	24		Clay & Silt (varved) *(con't)*	Soft to very soft, gray brown Silty CLAY layers to 3/8" thick varved with red brown CLAY and SILT layers to 1/4" thick	25
35	S-10	WOR 0 2 2	24	24			Soft, gray brown Silty CLAY layers to 3/8" thick varved with red brown CLAY and SILT layers to 1/4" thick	20
40	S-11	WOR 0 2 2	24	24			Soft to very soft, gray brown Silty CLAY layers to 3/8" thick varved with red brown CLAY and SILT layers to 1/4" thick with occasional red brown fine SAND partings	15
							END OF BORING 42ft	
45								10
50								5
55								0
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 10' with 4" SSA, then switched to 3" casing. Boring advanced open hole below 10' using drillers mud for stabilization.	Sheet 2 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: RW-22	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-3-08	Route No.:	Northing: 836696.6	
Finish Date: 6-3-08	Bridge No.:	Easting: 1012593.2	
		Surface Elevation: 58.7	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	12 20 15 12	24	12		Fill	Dense, gray brown fine to medium SAND, little fine to coarse Gravel, trace Ash, trace Cinders	
	S-2	13 15 17 14	24	12			Dense, red brown fine SAND, little Silt, little fine Gravel	55
5	S-3	10 9 5 5	24	14		Silt	Medium dense, Top 2": red brown fine SAND, little Silt, little fine Gravel Bottom 12": gray brown SILT, trace fine Sand	
	S-4	4 3 3 4	24	16			Loose, gray brown SILT, little fine Sand	50
10	S-5	4 4 4 5	24	18		Clay & Silt (varved)	Medium to stiff, gray brown Clayey SILT with occasional gray brown CLAY and SILT varves to 1/8" thick with occasional fine SAND partings to 1/16" thick	45
15	S-6	1 1 1 1	24	24			Very soft to soft, gray Silty CLAY layers to 1/8" thick varved with gray CLAY and SILT layers to 1/8" thick with occasional fine SAND partings to 1/32" thick	40
20	S-7	1 1 1 1	24	24			Very soft to soft, gray Silty CLAY layers to 1/8" thick varved with gray CLAY and SILT layers to 1/8" thick with occasional fine SAND partings to 1/32" thick	35
25	S-8	1 1 0 1	24	24			Very soft to soft, gray Silty CLAY layers to 1/8" thick varved with gray CLAY and SILT layers to 1/8" thick with occasional fine SAND partings to 1/32" thick	30
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 5' with 4" SSA, then switched to 3" casing. Open hole below 10' advanced with drillers mud to maintain stability.	Sheet 1 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: RW-22	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 6-3-08	Route No.:	Northing: 836696.6	
Finish Date: 6-3-08	Bridge No.:	Easting: 1012593.2	
		Surface Elevation: 58.7	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @5' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	WORWOH 1 2	24	24		Clay & Silt (varved) *(con't)*	Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 3/8" thick with occasional red brown fine SAND partings	
								25
35	S-10	WORWOH 2 2	24	24			Very soft, red brown Silty CLAY layers to 1/2" thick varved with gray brown CLAY and SILT layers to 3/8" thick with occasional red brown fine SAND partings	
								20
40	S-11	WOR 0 1 2	24	24			Very soft, brown to gray brown varved CLAY and SILT	
							END OF BORING 42ft	15
45								
								10
50								
								5
55								
								0
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Pilot hole to 5' with 4" SSA, then switched to 3" casing. Open hole below 10' advanced with drillers mud to maintain stability.	Sheet 2 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Dan Farstad	Town: Hartford / West Hartford	Hole No.: RW-23	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset: 5' East	
Start Date: 5-20-08	Route No.:	Northing: 836684.2	
Finish Date: 5-22-08	Bridge No.:	Easting: 1012662.5	
		Surface Elevation: 63.4	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	7 12 14 13	24	12		Fill	Medium dense, brown fine to coarse SAND and fine to coarse GRAVEL, trace Silt, trace Cinders, trace Ash	
	S-2	16 17 23 24	24	12			Dense, light brown to dark brown to red brown fine to coarse SAND, some fine to coarse Gravel, little Cinders, little Ash, little Brick fragments, trace Silt	60
5	S-3	7 10 10 11	24	18		Clayey Silt	Very stiff, gray brown Clayey SILT, trace fine Sand	
	S-4	7 8 10 11	24	18			Very stiff, gray brown Clayey SILT, trace fine sand	55
10	S-5	5 2 2 1	24	24		Clay & Silt (varved)	Soft, gray brown CLAY and SILT layer to 10" thick varved with red brown Clayey SILT layers to 10" thick	50
15	S-6	2 2 2 2	24	24			Soft, gray brown CLAY and SILT layers to 1" thick varved with red brown Clayey SILT layers to 1/4" thick	45
20	S-7	2 1 1 2	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with red brown Clayey SILT layers to 1/4" thick	40
25	UP-1	P U S H	24	24				
	S-8	WOR 0 3 2	24	24			Soft, gray brown CLAY and SILT layers to 1" thick varved with red brown Clayey SILT layers to 1/4" thick	35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 64ft Rock: 0ft	NOTES: Drilling mud used in lieu of casing. Hydraulic safety hammer used.	Sheet 1 of 3
No. of Soil Samples: 15 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Dan Farstad	Town:	Hartford / West Hartford	Hole No.:	RW-23
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	5' East
Start Date:	5-20-08	Route No.:		Northing:	836684.2
Finish Date:	5-22-08	Bridge No.:		Easting:	1012662.5
				Surface Elevation:	63.4

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	5 2 2 1	24	24		Clay & Silt (varved) *(con't)*	Soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	30
35	S-10	- W O R	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	25
40	UP-2	P U S H	24	24				
	S-11	- W O R	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	20
45	S-12	WOH 0 0 4	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	15
50	S-13	WOR 0 0 1	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	10
55	S-14	WOR 0 0 2	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 64ft Rock: 0ft	NOTES: Drilling mud used in lieu of casing. Hydraulic safety hammer used.	Sheet 2 of 3
No. of Soil Samples: 15 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Dan Farstad	Town: Hartford / West Hartford	Hole No.: RW-23	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset: 5' East	
Start Date: 5-20-08	Route No.:	Northing: 836684.2	
Finish Date: 5-22-08	Bridge No.:	Easting: 1012662.5	
		Surface Elevation: 63.4	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @7' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	UP-3	P U S H	24	24		Clay & Silt (varved) *(con't)*		
	S-15	- W O H	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT layers to 1/4" thick with occasional fine SAND partings to 1/16" thick	0
65							END OF BORING 64ft	-5
70								-10
75								-15
80								-20
85								-25
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 64ft Rock: 0ft	NOTES: Drilling mud used in lieu of casing. Hydraulic safety hammer used.	Sheet 3 of 3
No. of Soil Samples: 15 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Dan Farstad	Town:	Hartford / West Hartford	Hole No.:	RW-24
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' East
Start Date:	5-16-08	Route No.:		Northing:	837010.2
Finish Date:	5-19-08	Bridge No.:		Easting:	1012834.9
				Surface Elevation:	62.1

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	2 5 6 3	24	12		Fill	Medium dense, dark brown fine to coarse SAND, little fine to coarse Gravel, trace Silt, trace Cinders, trace Ash, trace Roots	60
	S-2	6 7 5 6	24	12			Medium dense, black fine to coarse SAND, little fine Gravel, trace Silt, trace Roots	
5	S-3	9 7 8 12	24	16		Clay & Silt (varved)	Stiff, Top 6": red brown fine to coarse SAND, some fine to coarse Gravel, trace Silt Bottom 10": gray brown CLAY and SILT, trace fine Sand	55
	S-4	10 11 11 12	24	14			Very stiff, gray brown CLAY and SILT, trace fine Sand	
10	S-5	7 9 12 13	24	18			Very stiff, gray brown CLAY and SILT, trace fine Sand	50
15	S-6	2 4 4 4	24	24			Stiff, gray brown CLAY and SILT, some fine Sand	45
20	S-7	2 5 6 7	24	14			Stiff, gray brown Silty CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings	40
25	S-8	1 1 1 1	24	20			Very soft, gray brown Silty CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings	35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 147ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Drilling mud used in lieu of casing.	Sheet 1 of 5
No. of Soil Samples: 32 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Dan Farstad	Town:	Hartford / West Hartford	Hole No.:	RW-24
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' East
Start Date:	5-16-08	Route No.:		Northing:	837010.2
Finish Date:	5-19-08	Bridge No.:		Easting:	1012834.9
				Surface Elevation:	62.1

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample

Depth (ft)	SAMPLES Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-9	1 0 1 0	24	20		Clay & Silt (varved) *(con't)*	Very soft, gray brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	30
35	S-10	WOR 0 1 1	24	18			Very soft, gray brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	25
40	S-11	WOR 0 1 1	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	20
45	S-12	- W O R	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	15
50	S-13	- W O R	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	10
55	S-14	- W O R	24	24			Very soft, gray brown CLAY and SILT layers to 1" thick varved with gray brown Clayey SILT to 1/4" thick with occasional red brown fine SAND partings	5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 147ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Drilling mud used in lieu of casing.	Sheet 2 of 5
No. of Soil Samples: 32 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Dan Farstad	Town: Hartford / West Hartford	Hole No.: RW-24	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset: 10' East	
Start Date: 5-16-08	Route No.:	Northing: 837010.2	
Finish Date: 5-19-08	Bridge No.:	Easting: 1012834.9	
		Surface Elevation: 62.1	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
60	S-15	- W O R	24	24		Clay & Silt (varved) *(con't)*	Very soft, gray brown Silty CLAY layers to 1" thick varved with red brown SILT and fine SAND partings to 1/4" - 1/8" thick	0
65	S-16	- W O R	24	24			Very soft, gray brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings to 1/16" thick	-5
70	S-17	- W O R	24	20			Very soft, gray brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 1/4" thick	-10
75	S-18	- W O R	24	24			Very soft, gray brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings to 1/16" thick	-15
80	S-19	- W O R	24	24			Very soft, gray brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 1/4" thick with occasional red brown fine SAND partings to 1/16" thick	-20
85	S-20	- W O R	24	24			Very soft, red brown Silty CLAY layers to 1" thick varved with gray brown SILT and CLAY layers to 3/4" thick	-25
90								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 147ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Drilling mud used in lieu of casing.	Sheet 3 of 5
No. of Soil Samples: 32 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Dan Farstad	Town:	Hartford / West Hartford	Hole No.:	RW-24
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	10' East
Start Date:	5-16-08	Route No.:		Northing:	837010.2
Finish Date:	5-19-08	Bridge No.:		Easting:	1012834.9
				Surface Elevation:	62.1

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
90	S-21	- W O R	24	24		Clay & Silt (varved) *(con't)*	Very soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 3/4" thick	-30
95	S-22	- W O R	24	24			Very soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 3/4" thick	-35
100	S-23	- W O R	24	24			Very soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 3/4" thick	-40
105	S-24	- W O R	24	20			Very soft, red brown CLAY and SILT layers to 2" thick varved with gray brown Clayey SILT layers to 3/4" thick	-45
110	S-25	- W O R	24	24			Very soft, red brown CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 1" thick	-50
115	S-26	- W O R	24	20			Very soft, red brown Silty CLAY layers to 2" thick varved with gray brown SILT and CLAY layers to 2" thick	-55
120								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 147ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Drilling mud used in lieu of casing.	Sheet 4 of 5
No. of Soil Samples: 32 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Dan Farstad	Town: Hartford / West Hartford	Hole No.: RW-24	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset: 10' East	
Start Date: 5-16-08	Route No.:	Northing: 837010.2	
Finish Date: 5-19-08	Bridge No.:	Easting: 1012834.9	
		Surface Elevation: 62.1	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: None	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' wet sample

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
120	S-27	- W O R	24	24		Clay & Silt (varved) *(con't)*	Very soft, red brown Clayey SILT	-60
125	S-28	- W O R	24	24			Very soft, red brown Clayey Silt	-65
130	S-29	4 5 5 6	24	24			Stiff, red brown Clayey SILT with occasional fine SAND partings to 1/16" thick	-70
135	S-30	4 8 6 7	24	24			Stiff, red brown Clayey SILT with occasional fine SAND partings to 1/16" thick	-75
140	S-31	17 36 36 34	24	18		Sand	Very dense, Top 8": red brown SILT, little fine Sand Bottom 10": red brown fine to coarse SAND, little fine Gravel, trace Silt	-80
145	S-32	28 20 20 26	24	18			Dense, red brown fine to coarse SAND, little Silt, trace fine to coarse Gravel	-85
							END OF BORING 147ft	
150								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 147ft Rock: 0ft	NOTES: Hydraulic safety hammer used. Drilling mud used in lieu of casing.	Sheet 5 of 5
No. of Soil Samples: 32 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Patty Kral	Town:	Hartford / West Hartford	Hole No.:	RW-25
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-15-08	Route No.:		Northing:	837081.5
Finish Date:	5-15-08	Bridge No.:		Easting:	1012901.9
				Surface Elevation:	61.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @11' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	9 10 13 15	24	18		Fill	Medium dense, Top 6": Black CINDERS, some fine to medium Sand, little Silt Bottom 12": yellow brown fine to medium SAND, some fine to coarse Gravel, trace Silt	60
	S-2	21 30 31 24	24	16				
	S-3	13 13 15 14	24	16				
5						Sand & Silt	Very dense, Top 4": Black CINDERS, some fine to medium Sand, little Silt Bottom 12": red brown fine to medium SAND, little Silt	55
							Medium dense, Top 3": red brown fine to medium SAND, little Silt Middle 2": gray brown to tan fine SAND and SILT layers to 1/16" thick Bottom 13": orange brown fine SAND and SILT layers to 1/8" thick	
10	S-4	2 4 7 7	24	18				50
							Medium dense, Top 6": orange brown fine SAND and SILT layers to 1/8" thick Bottom 12": gray varved SILT and fine SAND	
						Silt & Clay (varved)		
15	S-5	6 4 4 5	24	24			Medium, gray to tan CLAY and SILT layers to 1/4" thick with occasional gray or red brown fine SAND partings	45
20	S-6	2 2 2 3	24	24			Soft, gray to tan CLAY and SILT layers to 1/4" thick with occasional gray or red brown fine SAND partings	40
25	S-7	2 2 2 2	24	24			Soft, gray silty CLAY layers to 1/4" thick with occasional red brown or gray fine SAND and SILT partings	35
30								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B-53 rig, hydraulic safety hammer used.	Sheet 1 of 2
No. of Soil Samples: 10 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: RW-25	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-15-08	Route No.:	Northing: 837081.5	
Finish Date: 5-15-08	Bridge No.:	Easting: 1012901.9	
		Surface Elevation: 61.6	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: HSA 3 ¼"	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: Fall: in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @11' after 0 hours

Depth (ft)	SAMPLES: Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-8	1 1 2 3	24	24		Silt & Clay (varved) *(con't)*	Soft, gray SILT and CLAY layers to 1/4" thick varved with Silty CLAY layers to 1/4" thick with occasional red brown fine SAND partings	30
35	S-9	1 1 2 3	24	24			Soft, gray SILT and CLAY layers to 1/4" thick with occasional red brown or gray fine SAND partings	25
40	S-10	1 1 2 5	24	24			Soft, gray SILT and CLAY layers to 1/4" thick with occasional red brown or gray fine SAND partings	20
							END OF BORING 42ft	
45								15
50								10
55								5
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B-53 rig, hydraulic safety hammer used.	Sheet 2 of 2
No. of Soil Samples: 10 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector: Patty Kral	Town: Hartford / West Hartford	Hole No.: RW-26	
Engineer: Geo**Design**, Inc.	Project No.: 155-H025	Stat./Offset:	
Start Date: 5-15-08	Route No.:	Northing: 837244.6	
Finish Date: 5-15-08	Bridge No.:	Easting: 1012998.9	
		Surface Elevation: 60.3	

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	15 10 12 18	24	13		Fill	Medium dense, widely variable color and composition, about 25% Cinder content, (GRANULAR FILL)	60
	S-2	17 24 18 9	24	12			Dense, Top 4": gray black fine to coarse GRAVEL, little fine to medium Sand, trace Silt, (fractured Cobble fragments) Bottom 8": red brown fine to medium SAND, little Silt	
5	S-3	8 8 8 10	24	14			Medium dense, dark red brown to yellow brown fine to coarse SAND, some Silt	55
	S-4	11 6 6 5	24	21		Sand & Silt	Medium dense, Top 8": dark red brown fine to coarse SAND, little Silt, little fine Gravel Bottom 18": yellow brown to gray fine SAND with occasional Silt layers to 1" thick	
10	S-5	3 5 4 7	24	7			Loose, yellow to gray brown fine SAND with occasional Silt layers to 1" thick	50
	S-6	5 6 6 6	24	13			Medium dense, yellow brown to gray brown layers of fine SAND to 1" thick varved with Silt to 1" thick with occasional dark brown Silt layers to 1/16" thick	
15	S-7	2 2 2 1	24	12			Medium dense, yellow brown to gray brown layers of fine SAND to 1" thick varved with Silt to 1" thick with occasional dark brown Silt layers to 1/16" thick	45
20	S-8	4 5 6 7	24	24		Clay & Silt (varved)	Stiff, gray to yellow brown SILT and CLAY with occasional fine SAND partings to 1/16" thick	40
25								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B-53 rig, hydraulic safety hammer used. S-10: thickness of layers not defined because sample disturbed when spoon opened	Sheet 1 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Patty Kral	Town:	Hartford / West Hartford	Hole No.:	RW-26
Engineer:	GeoDesign, Inc.	Project No.:	155-H025	Stat./Offset:	
Start Date:	5-15-08	Route No.:		Northing:	837244.6
Finish Date:	5-15-08	Bridge No.:		Easting:	1012998.9
				Surface Elevation:	60.3

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ4	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10' after 0 hours

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
25	S-9	4 4 5 6	24	18		Clay & Silt (varved) *(con't)*	Stiff, gray to yellow brown SILT and CLAY with occasional red brown fine SAND partings to 1/16" thick	35
30	S-10	1 1 1 2	24	24			Very soft, gray SILT and CLAY layers with occasional red brown fine SAND partings	30
35	S-11	1 1 2 2	24	24			Soft, gray CLAY and SILT layers to 1/4" thick with red brown fine SAND partings about 1" apart	25
40	S-12	1 1 2 2	24	24			Soft, gray Silty CLAY layers to 1" thick with occasional red brown fine SAND partings	20
							END OF BORING 42ft	
45								15
50								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42ft Rock: 0ft	NOTES: Mobile B-53 rig, hydraulic safety hammer used. S-10: thickness of layers not defined because sample disturbed when spoon opened	Sheet 2 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

R-Series Boring Logs
(Roadways)

Connecticut DOT Boring Report

Inspector: Robert Marshall	Town: Hartford / West Hartford	Hole No.: R-119	
Engineer: GeoDesign, Inc.	Project No.: 155-H025	Stat./Offset: 4' East	
		Northing: 837254.9	
Start Date: 5-19-08	Route No.:	Easting: 1012947.7	
Finish Date: 5-19-08	Bridge No.:	Surface Elevation: 58.6	

Project Description: New Britain - Hartford Busway / GeoDesign Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10'

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
0	S-1	1 1 1 1	24	2		Fill	Very loose, black ASH and CINDERS, little Silt	
	S-2	0 1 0 1	24	4			Very loose, black ASH and CINDERS, little Silt	55
5	S-3	2 3 2 3	24	20			Loose, black fine to medium SAND, some Ash and Cinders, little Silt	
	S-4	4 5 7 9	24	20			Medium dense, Top 10": black fine to medium SAND, some Ash and Cinders, little Silt Bottom 10": brown SILT and fine SAND	50
10	S-5	4 3 3 4	24	12			Loose, black ASH and CINDERS, little fine to medium Sand	
	S-6	5 3 3 7	24	12			Loose, black ASH and CINDERS, little fine to medium Sand, trace Brick fragments	45
15	S-7	8 3 3 1	24	4			Loose, black ASH and CINDERS, little fine to medium Sand, little Silt	
	S-8	2 2 3 4	24	18			Loose, Top 6": brown fine to coarse SAND and CINDERS Bottom 12": gray SILT, trace fine Sand, slight plasticity	40
20	S-9	7 2 2 3	24	3			Loose, gray brown WOOD fragments	
	S-10	5 2 3 3	24	6		Clay & Silt (varved)	Loose, Top 3": gray black Wood fragments Bottom 3": gray Clayey SILT, trace fine Sand	35
25	S-11	4 1 1 1	24	20			Very soft, gray Silty CLAY layers to 1/4" thick varved with gray SILT and CLAY layers to 1/4" thick	
30								30

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52ft Rock: 0ft	NOTES: Cable drive safety hammer. Pushing wood ahead of casing evident in S-9 and S-10. Borehole advanced open tube past 30', mud used for stability. S-12 was resampled by pushing split spoon with drive head assembly.	Sheet 1 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Connecticut DOT Boring Report

Inspector:	Robert Marshall	Town:	Hartford / West Hartford	Hole No.:	R-119
Engineer:	Geo**Design**, Inc.	Project No.:	155-H025	Stat./Offset:	4' East
Start Date:	5-19-08	Route No.:		Northing:	837254.9
Finish Date:	5-19-08	Bridge No.:		Easting:	1012947.7
				Surface Elevation:	58.6

Project Description: New Britain - Hartford Busway / Geo**Design** Project No. 0380-004.0

Casing Size/Type: FJ3	Sampler Type/Size: SS / 1 3/8" ID	Core Barrel Type:
Hammer Wt.: 300 lbs. Fall: 24in.	Hammer Wt.: 140 lbs. Fall: 30 in.	

Groundwater Observations: @10'

Depth (ft)	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %	Generalized Strata Description	Material Description and Notes	Elevation (ft)
30	S-12	1 1 1 1	24	16		Clay & Silt (varved) *(con't)*	Very soft, gray CLAY and SILT with occasional partings to 1/16" thick gray brown Silty CLAY	25
35	S-13	WOR 0 0 1	24	24			Very soft, gray to gray brown Silty CLAY layers to 3/4" thick varved with CLAY and SILT layers to 1/2" thick	20
40	S-14	WOR 0 0 1	24	24			Very soft, gray to gray brown Silty CLAY layers to 3/4" thick varved with CLAY and SILT layers to 1/2" thick with occasional red brown fine SAND partings to 1/16" thick	15
45	S-15	WOR/21"0 0 1	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with gray SILT and CLAY layers to 1/4" thick with fine SAND partings to 1/16" thick	10
50	S-16	WOR 0 0 2	24	24			Very soft, gray brown Silty CLAY layers to 1/2" thick varved with gray SILT and CLAY layers to 1/4" thick with fine SAND partings to 1/16" thick	5
55							END OF BORING 52ft	0
60								

Sample Type: S = Split Spoon C = Core UP = Undisturbed Piston V = Vane Shear Test

Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52ft Rock: 0ft	NOTES: Cable drive safety hammer. Pushing wood ahead of casing evident in S-9 and S-10. Borehole advanced open tube past 30', mud used for stability. S-12 was resampled by pushing split spoon with drive head assembly.	Sheet 2 of 2
No. of Soil Samples: 11 No. of Core Runs: 0		SM-001-M REV. 1/02

Appendix 5

Consolidation Test Results

Constant Rate of Strain Consolidation Tests

Incremental Load Consolidation Tests

Constant Rate of Strain Consolidation Tests

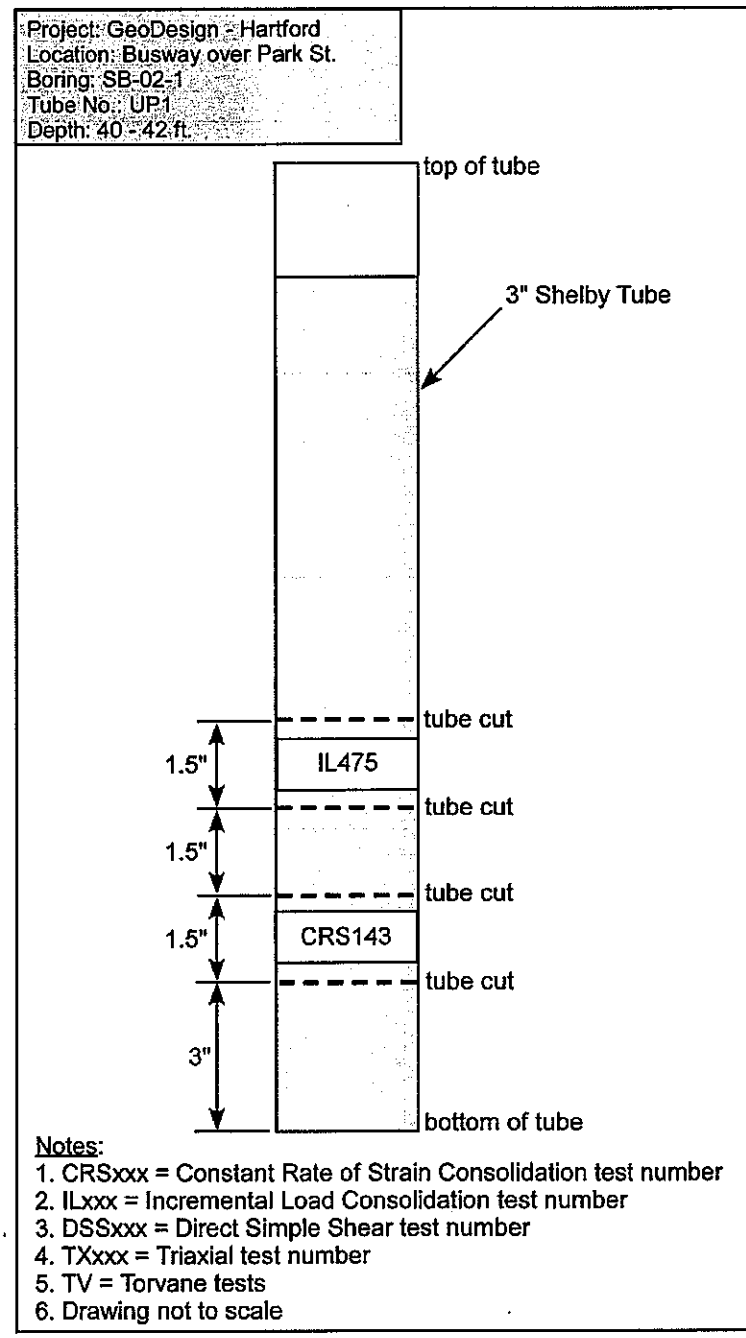


Figure 5.1.3 Test locations for Busway over Park St. Sample SB-02-1 UP1 40-42 ft.

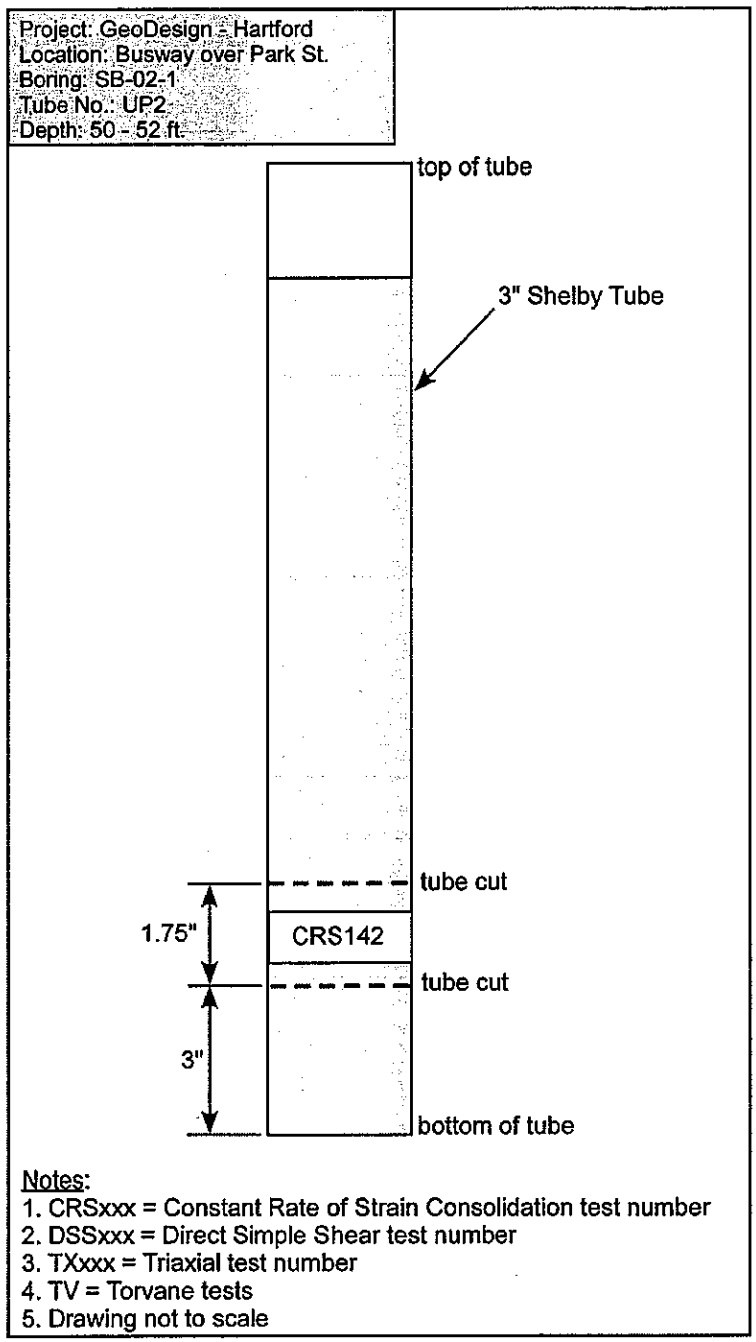


Figure 5.1.4 Test locations for Busway over Park St. Sample SB-02-1 UP2 50-52 ft.

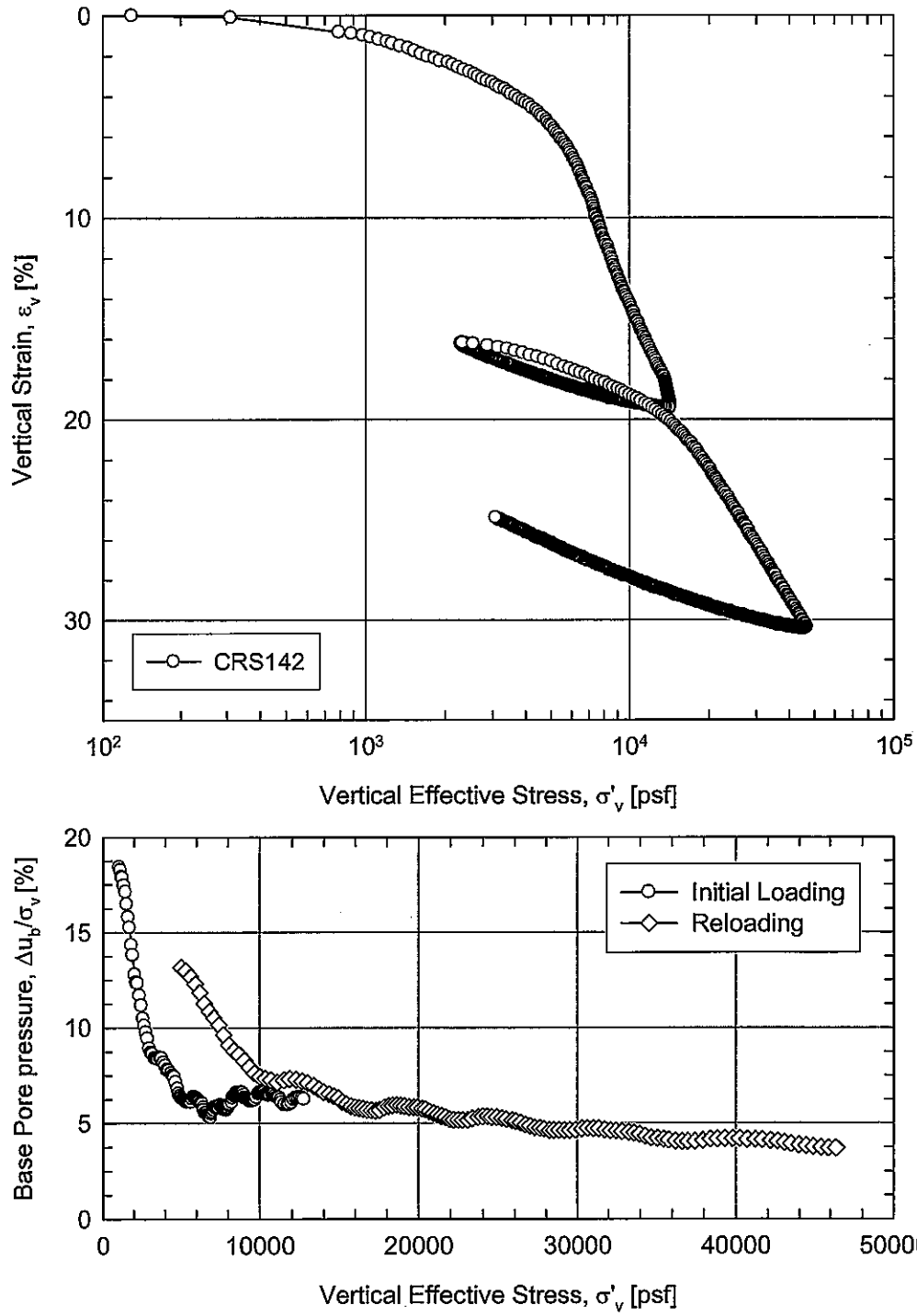


Figure 5.3.10 Vertical strain and normalized base pore pressure versus vertical effective stress for test CRS142 on sample SB-02-1 UP2 50-52 ft.

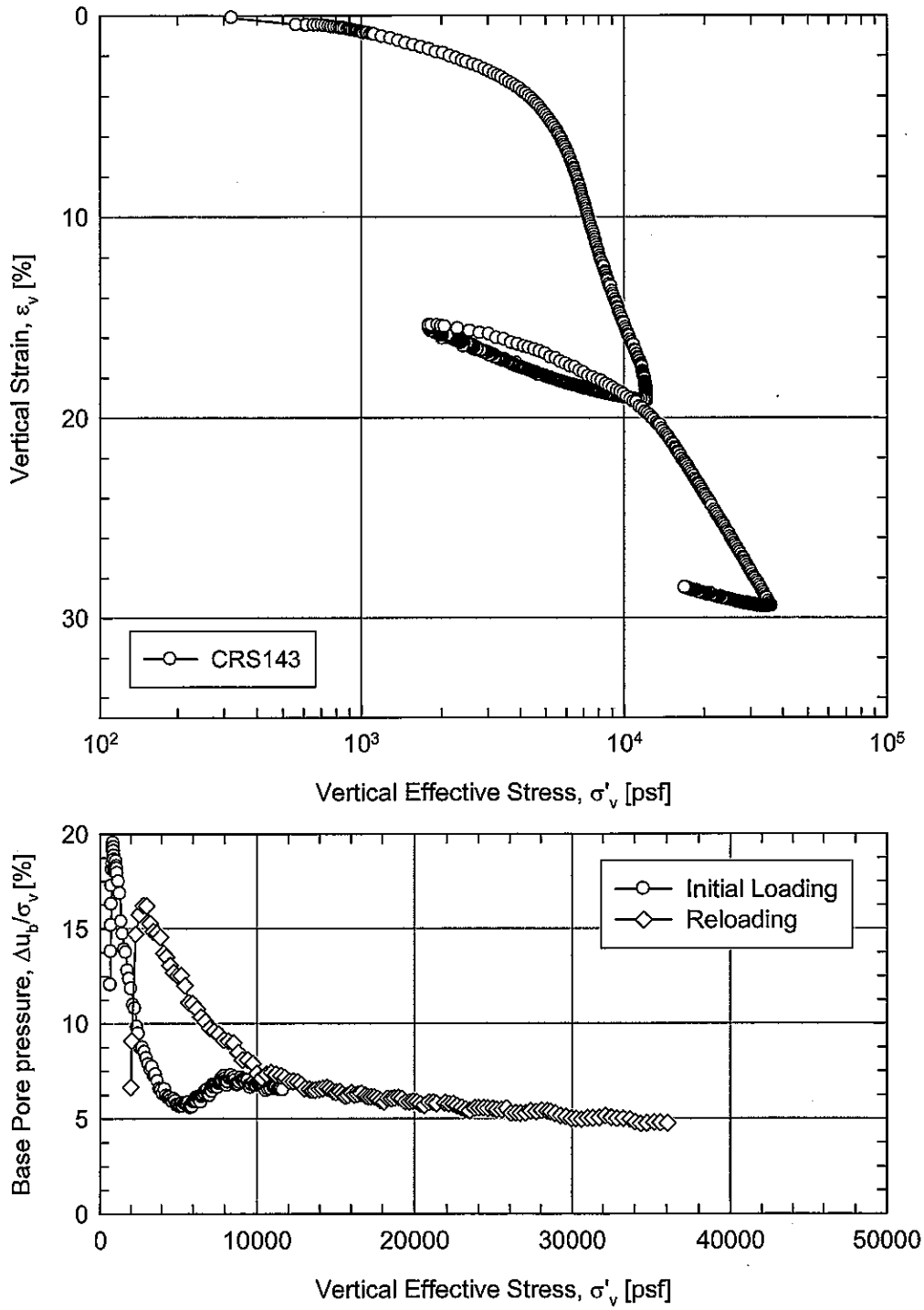


Figure 5.3.14 Vertical strain and normalized base pore pressure versus vertical effective stress for test CRS143 on sample SB-02-1 UP1 40-42 ft..

Incremental Load Consolidation Tests

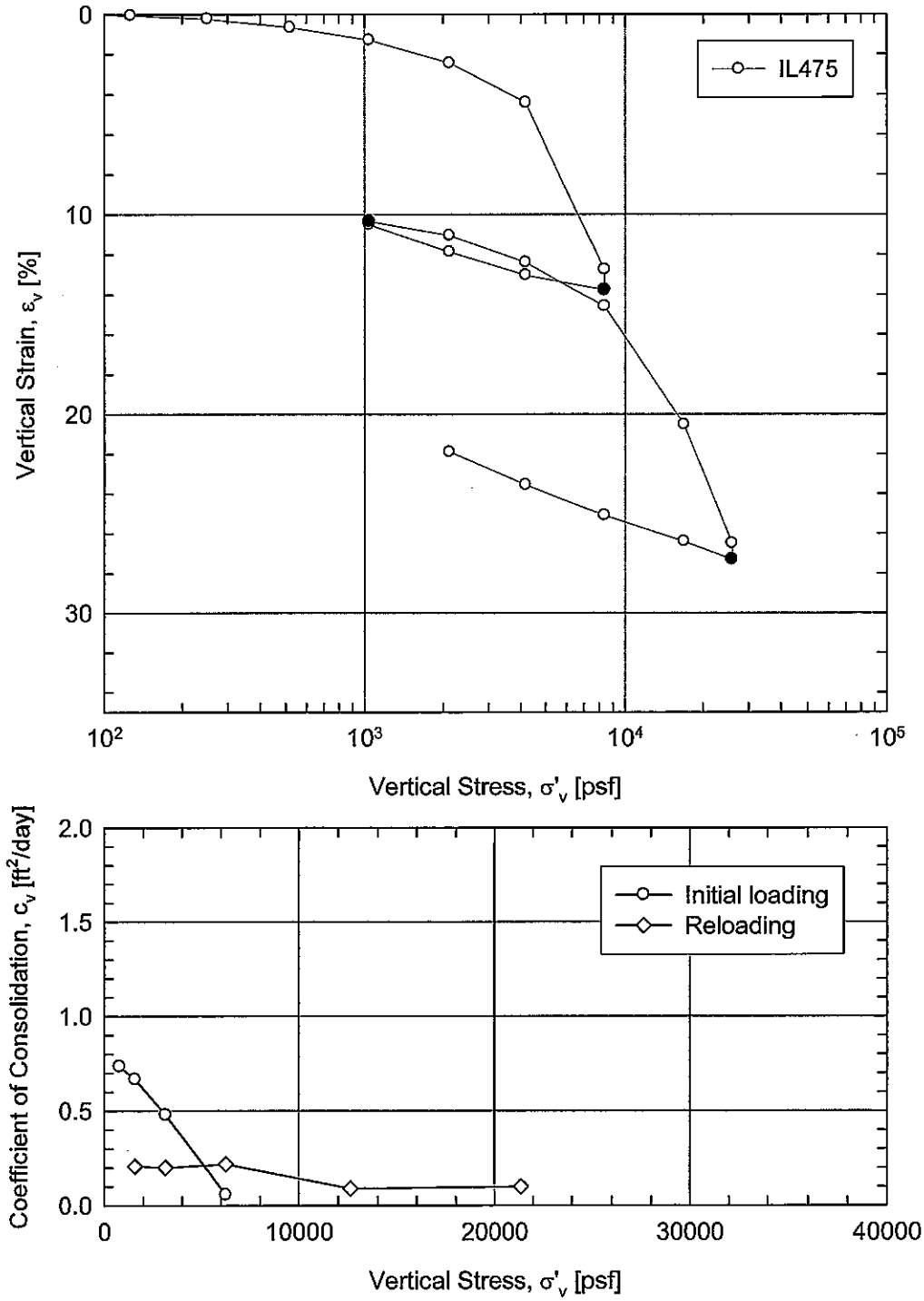
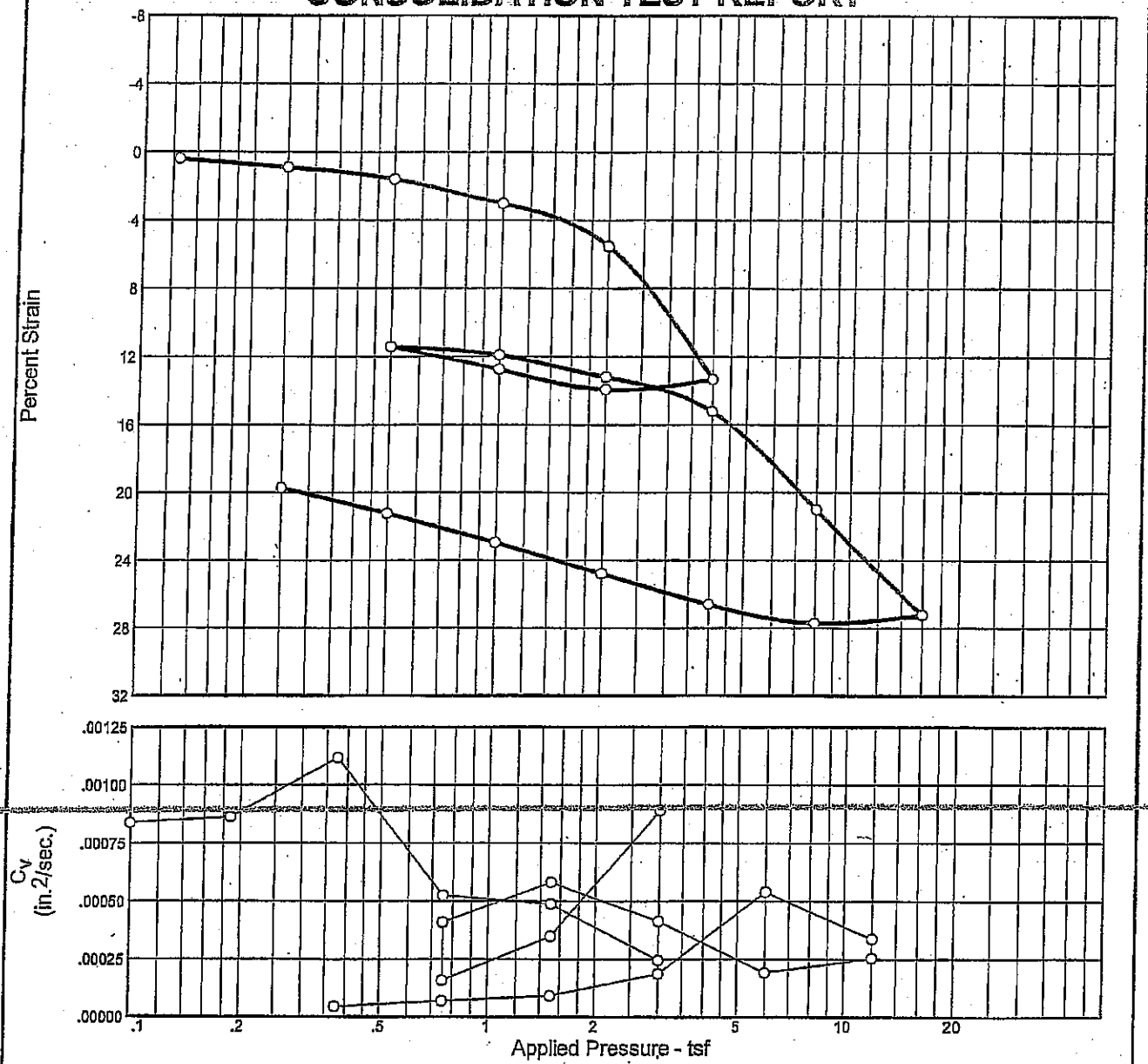


Figure 5.3.26 Vertical strain and coefficient of consolidation versus vertical effective stress for test IL475 on sample SB-02-1 UP1 40-42 ft.

IL Consolidation Tests

By TestCon

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
99.5 %	51.4 %	70.3			2.688		1.09	0.49	0.10			1.387

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** GeoDesign

Project: New Britain-Hartford Busway #155-H025

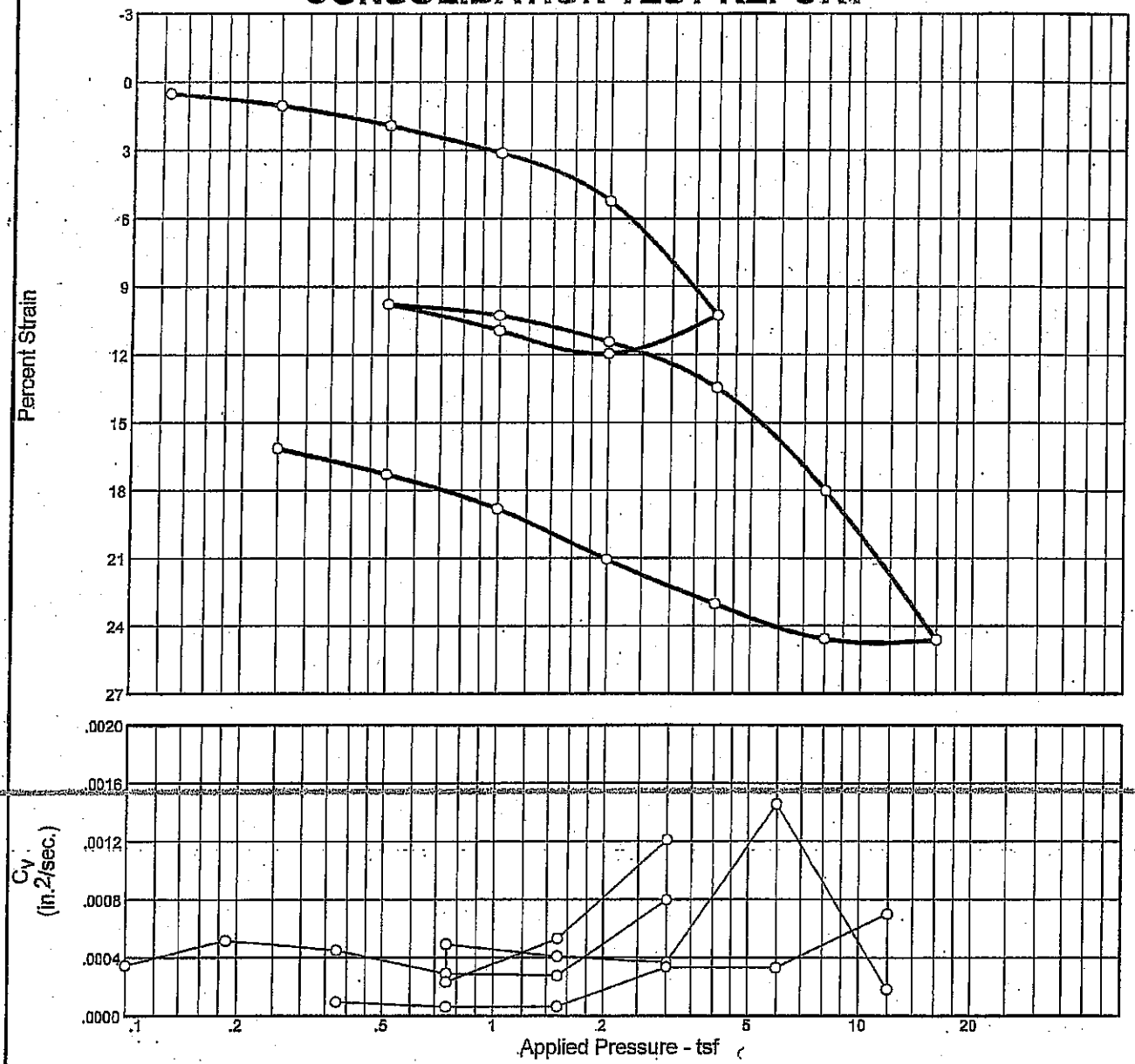
Source: Boring RW-23 (Flatbush **Sample No.:** UP-1 **Elev./Depth:** from 25' to 27'

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

Remarks:
Date Tested 09/07/08.
Boring RW-23, Sample No UP-1,
Depth from 25' to 27'.

Figure

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
102.0 %	57.7 %	66.8	44	21	2.715		2.24	0.56	0.11			1.535

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. **Client:** GeoDesign

Project: New Britain-Hartford Busway #155-H025

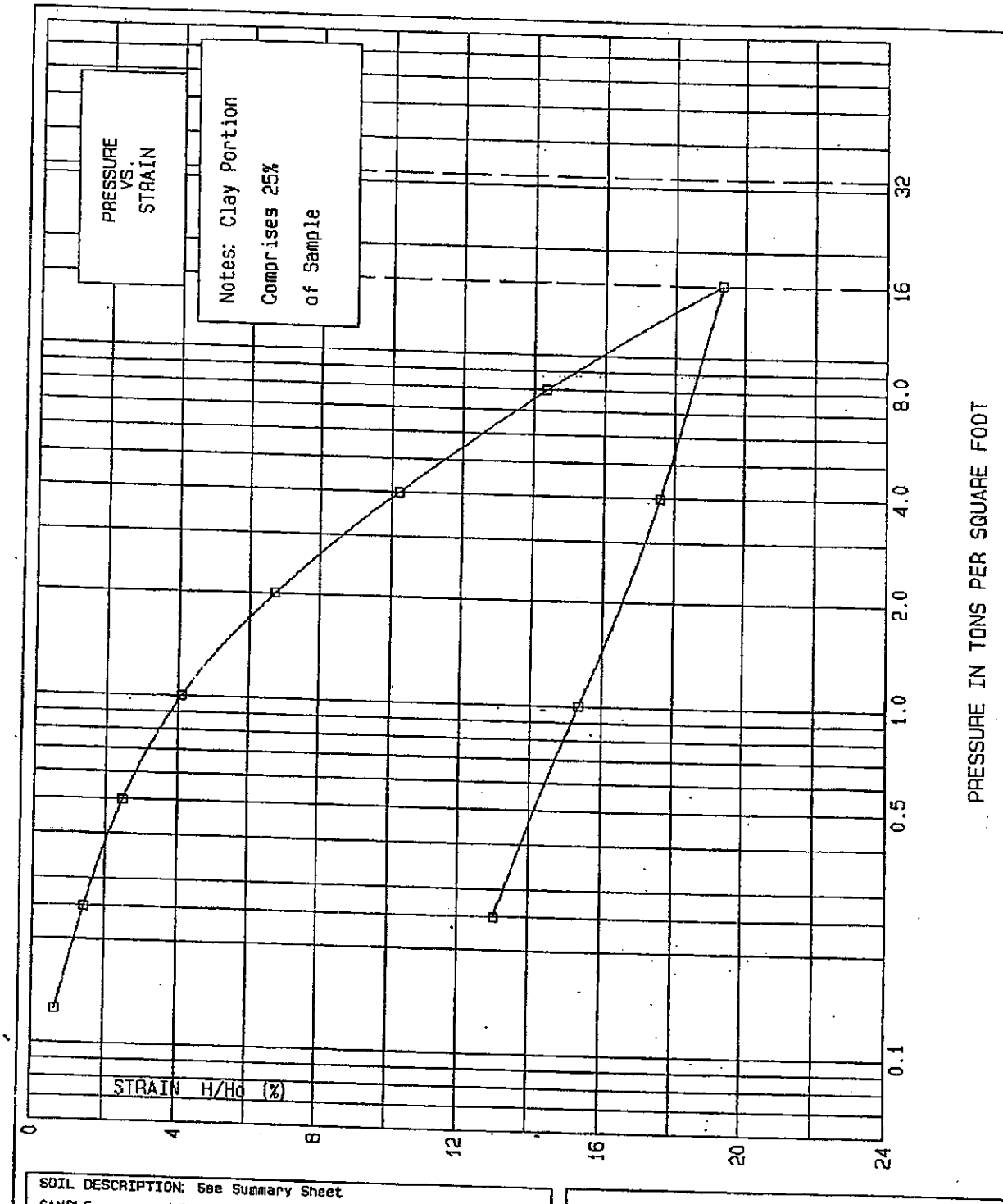
Source: Boring RW-23 (flatbush **Sample No.:** UP-2 **Elev./Depth:** from 40' to 42'

TEST-CON INCORPORATED
PO BOX 3116
Danbury, CT 06813-3116

Remarks:
DateTested: 09/30/2008.
Boring No: RW-23, Sample No UP- 2, Depth from 40' to 42'.

Figure

Constant Rate of Strain Consolidation Tests
Incremental Load Consolidation Tests



SOIL DESCRIPTION: See Summary Sheet

SAMPLE DIAM.	LIQUID LIMIT	PLASTIC LIMIT	SPECIFIC GRAVITY
2.5 IN.	0 %	0 %	2.79

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	47.10	76.77			0.80
FINAL	36.70	88.25			0.70

New Britain-Hartford Busway

CONSOLIDATION TEST

BORING NO. SB-B4
SAMPLE UP-1
DEPTH 31.6-31.7'
TECH. MST
REVIEWER DAS

TEST SERIES NO C407.1
DATE 9/4/04
FILE L17828

FIGURE

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

Appendix 6

Direct Simple Shear Tests

Table 5 Summary of Direct Simple Shear (DSS) specimen properties and test results

Test No.	Sample Tube	Depth	w_n	γ_t	γ_d	σ'_{vo}	Laboratory Consolidation					Shear Data at Peak $(\tau_h)_{max} = s_u$				Figure Numbers
							σ'_{vc}	σ'_{vmax}	OCR	ε_{vmax}	ε_{vf}	γ	τ_h	τ_h/σ'_{vc}	σ'_v/σ'_{vc}	
-	-	ft	%	pcf	pcf	psf	psf	psf	-	%	%	%	psf	-		-
1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	16
G336	SB-01-04 UP2	40 - 42	63	108	68	2109	8326	8326	1.00	13.4	13.4	5.8	1473	0.177	0.650	5.4.1 to 5.4.5
G337	SB-01-01 UP2	30 - 32	62	106	65	1703	8336	8336	1.00	14.9	14.9	9.0	1400	0.168	0.561	5.4.6 to 5.4.10
G338	SB-01-04 UP2	40 - 42	49	104	70	2109	2069	8362	4.04	12.9	10.9	13.0	999	0.483	1.124	5.4.11 to 5.4.15
G339	SB-01-01 UP2	30 - 32	59	107	67	1703	4142	8354	2.02	13.1	12.2	7.8	1345	0.325	0.910	5.4.16 to 5.4.20

Notes:
1. Notation given in Section 7
2. σ'_{v0} values provided by GeoDesign Inc
3. Undrained shear strength $s_u(DSS) = (\tau_h)_{max}$

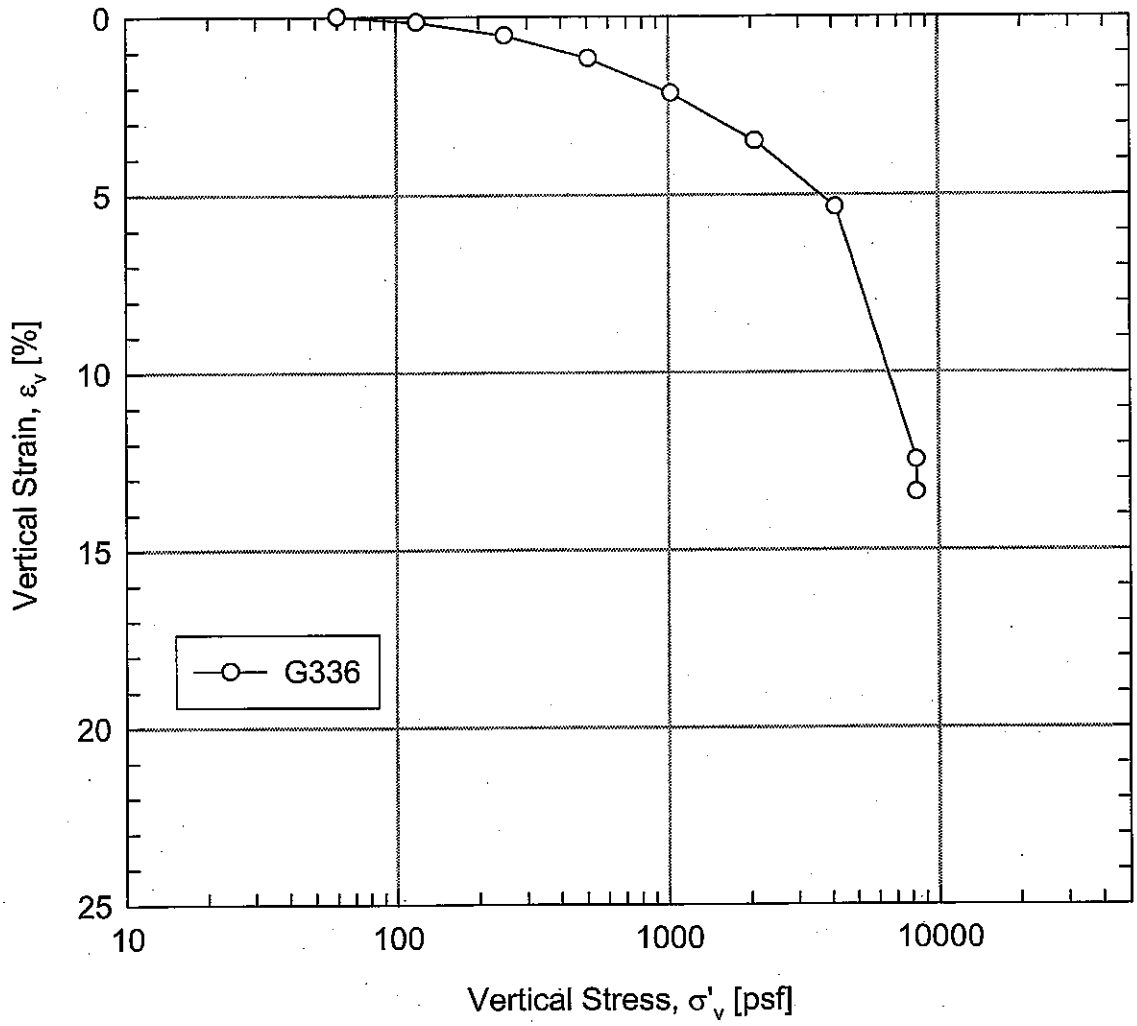


Figure 5.4.1 Vertical strain versus vertical effective stress for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

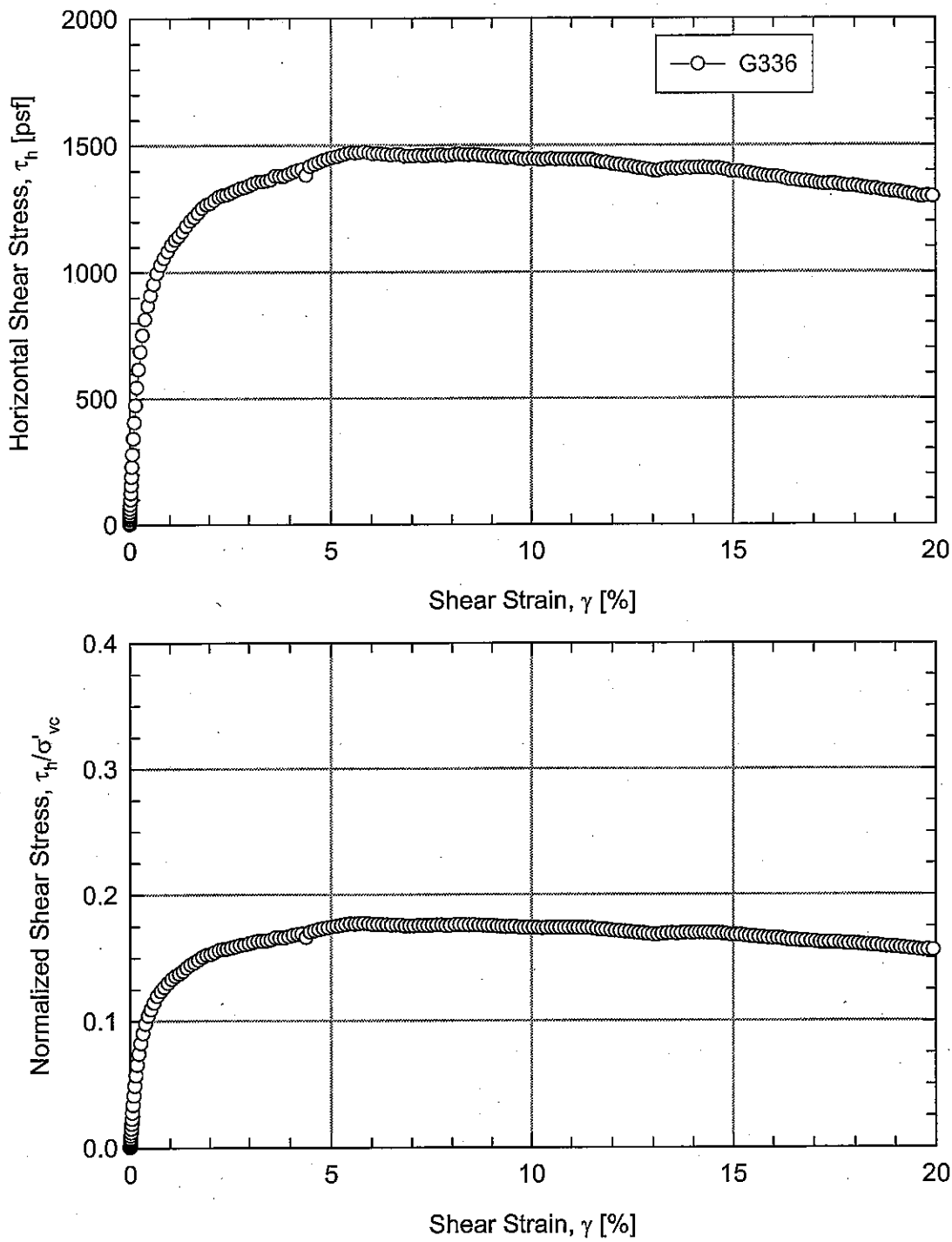


Figure 5.4.2 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

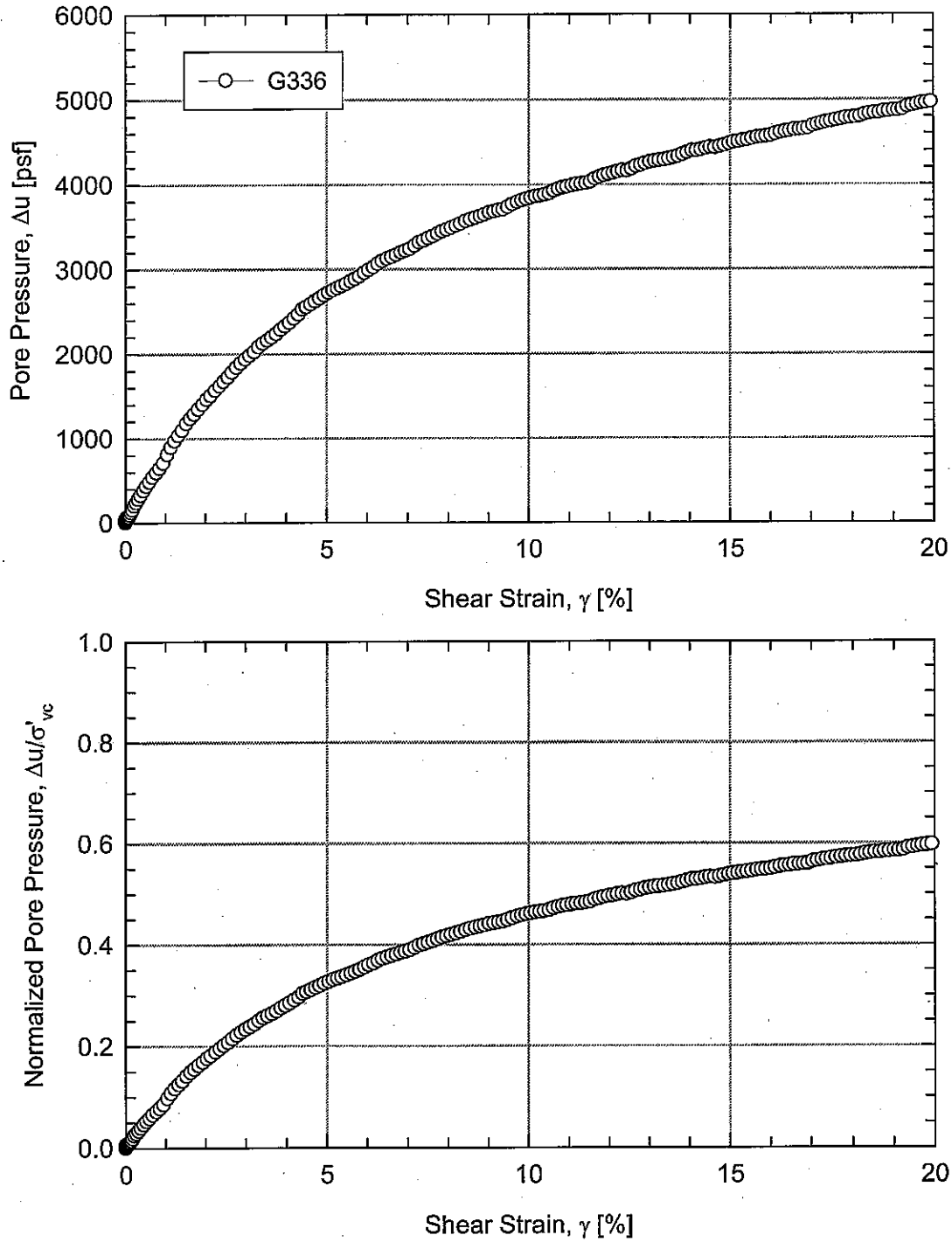


Figure 5.4.3 Pore pressure and normalized pore pressure versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

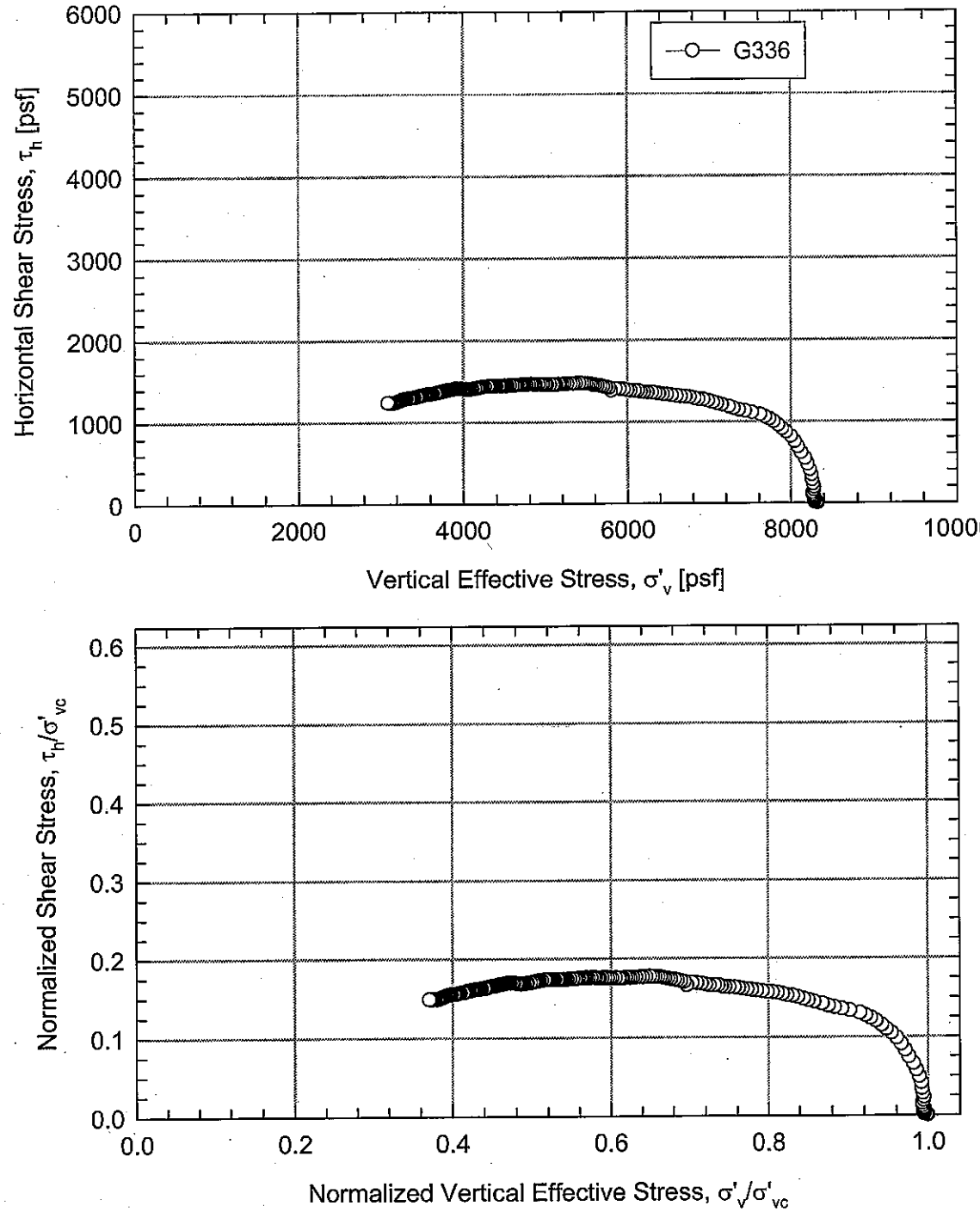


Figure 5.4.4 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

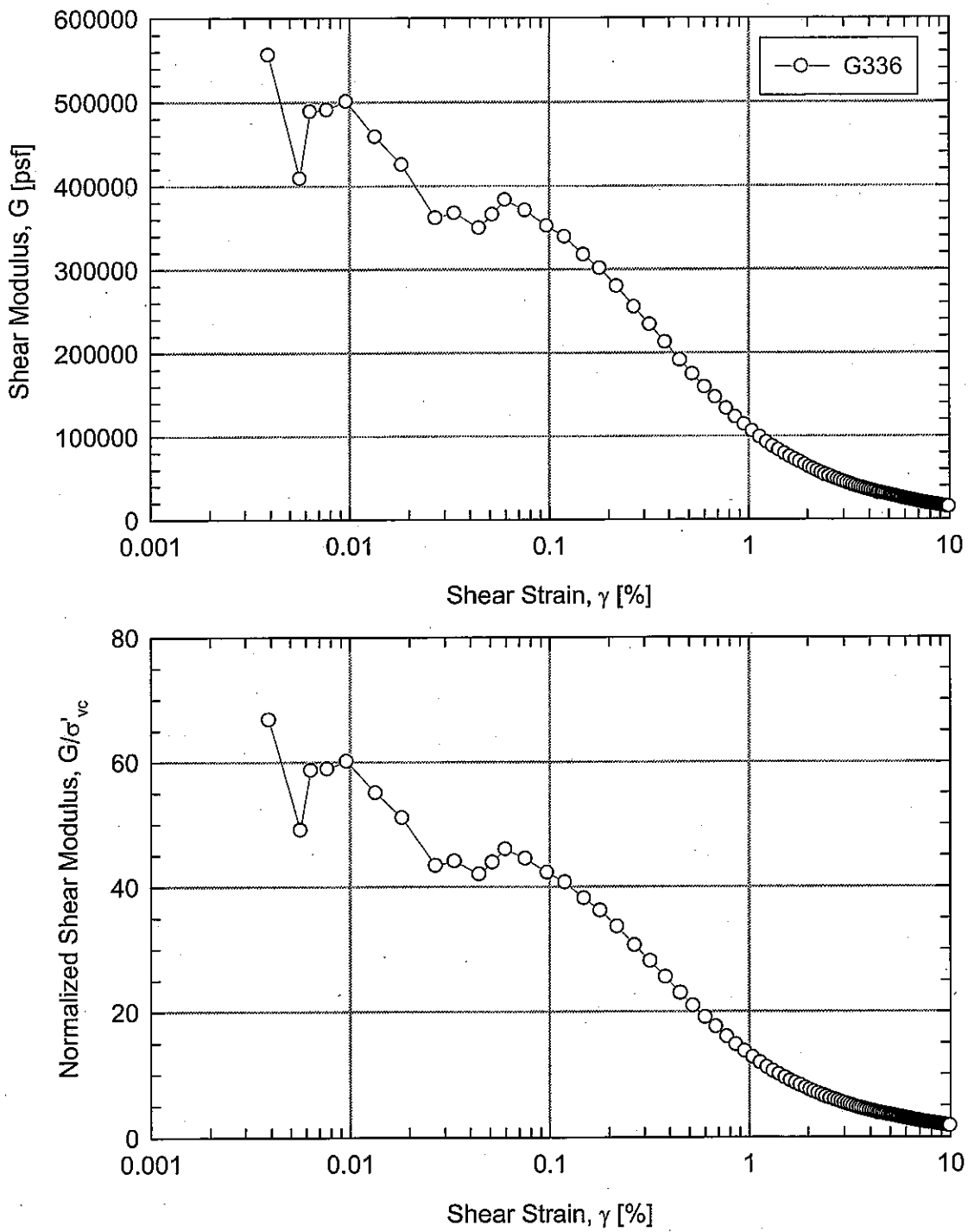


Figure 5.4.5 Shear modulus and normalized shear modulus versus shear strain for test DSS G336 on sample SB-01-04 UP2 40-42 ft.

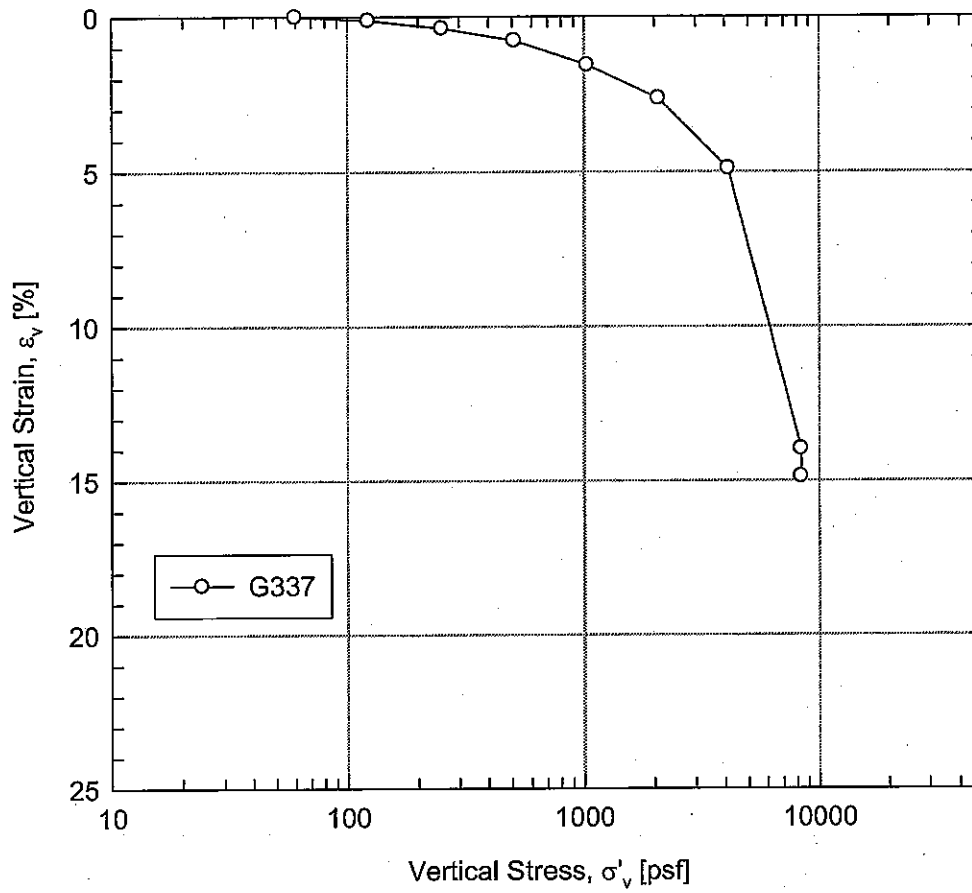


Figure 5.4.6 Vertical strain versus vertical effective stress for test DSS G337 on sample SB-01-1 UP2 30-32 ft

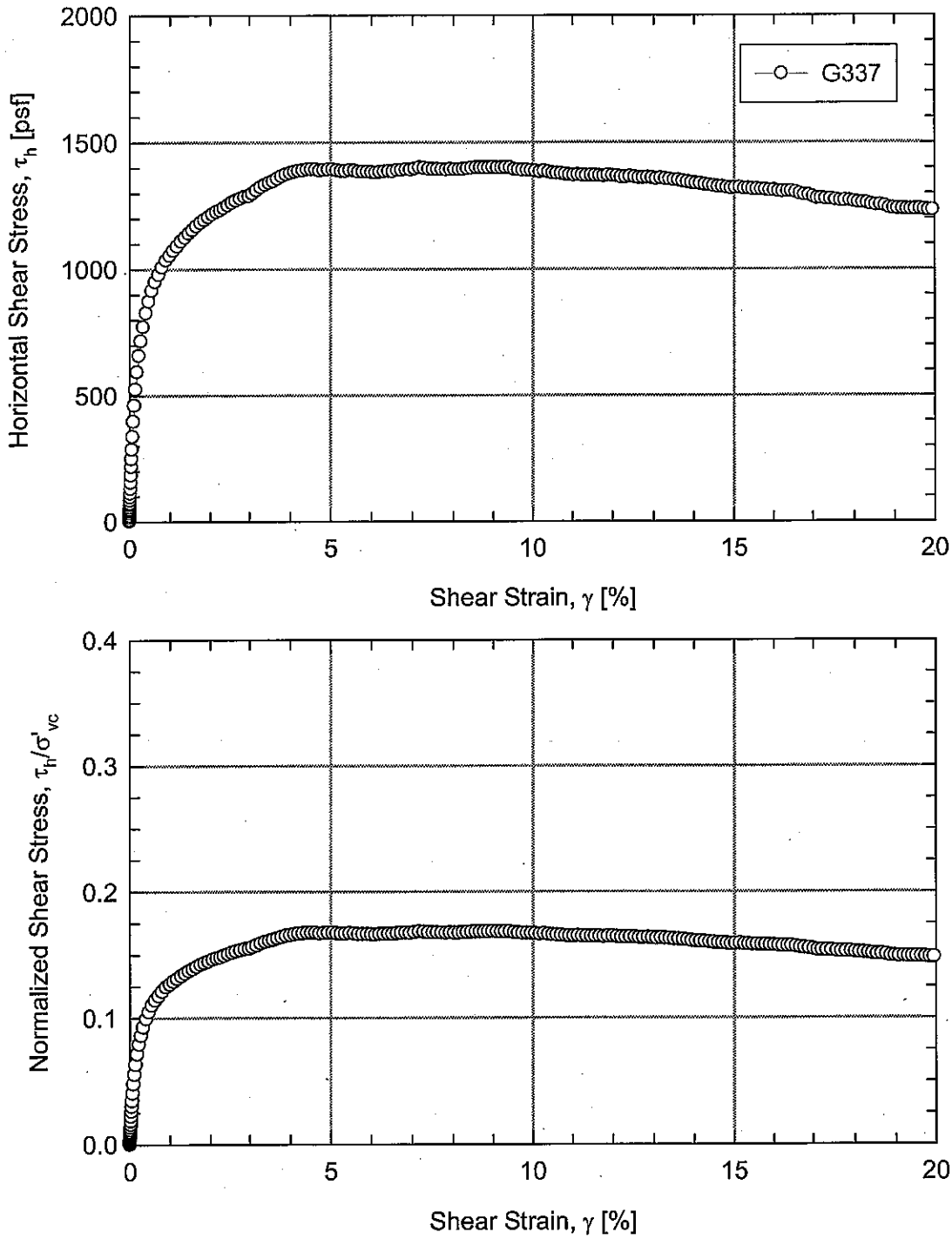


Figure 5.4.7 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft

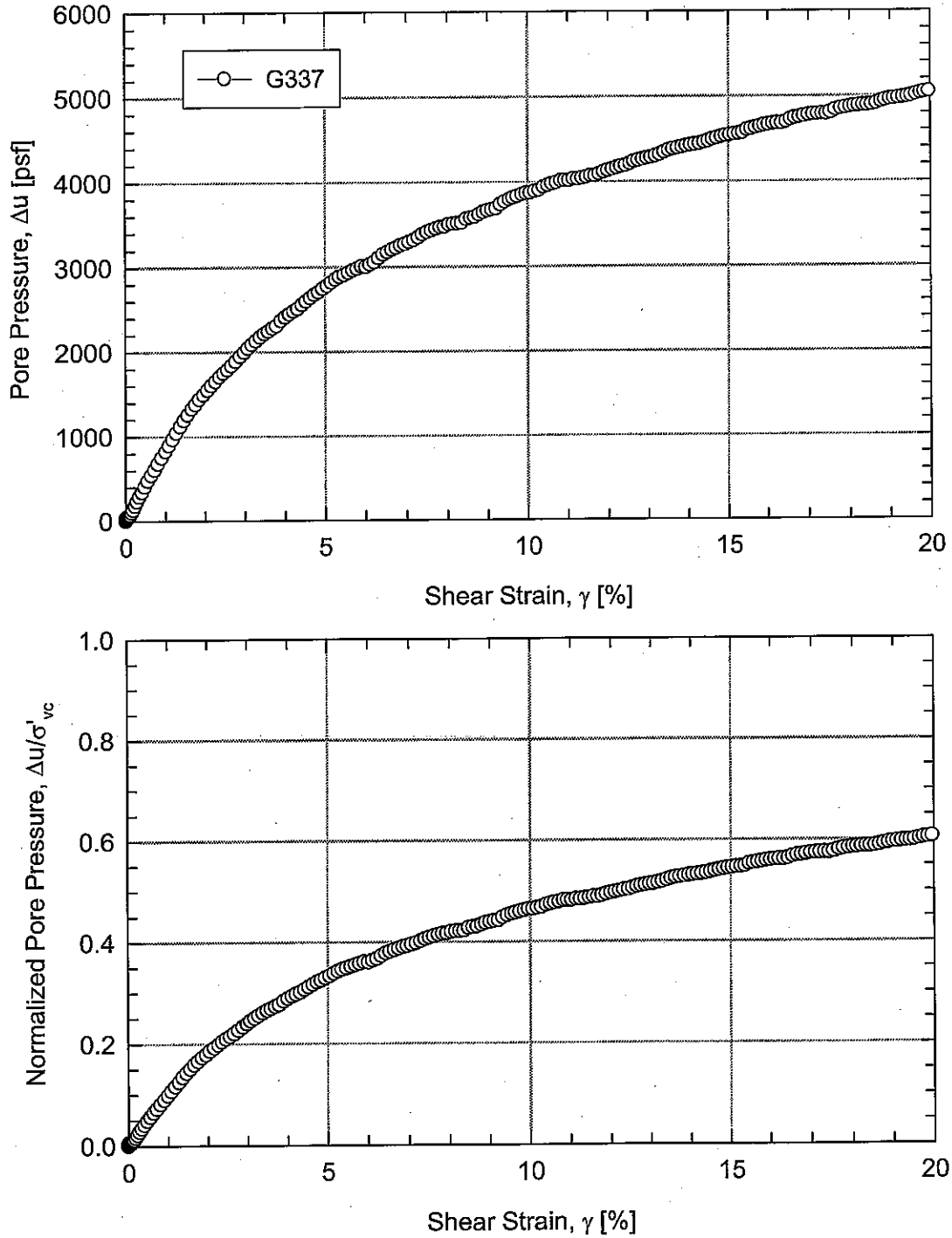


Figure 5.4.8 Pore pressure and normalized pore pressure versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft

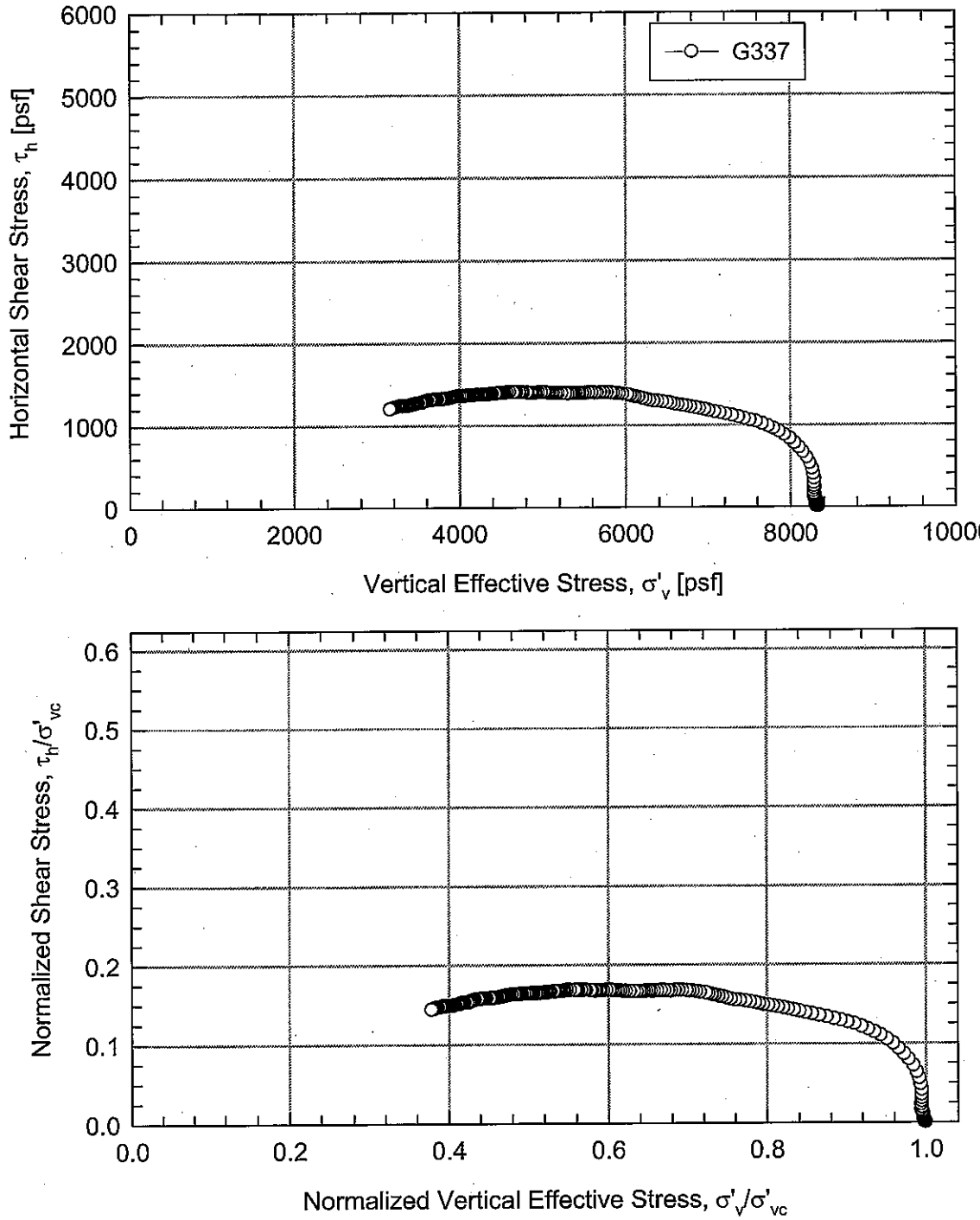


Figure 5.4.9 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G337 on sample SB-01-1 UP2 30-32 ft

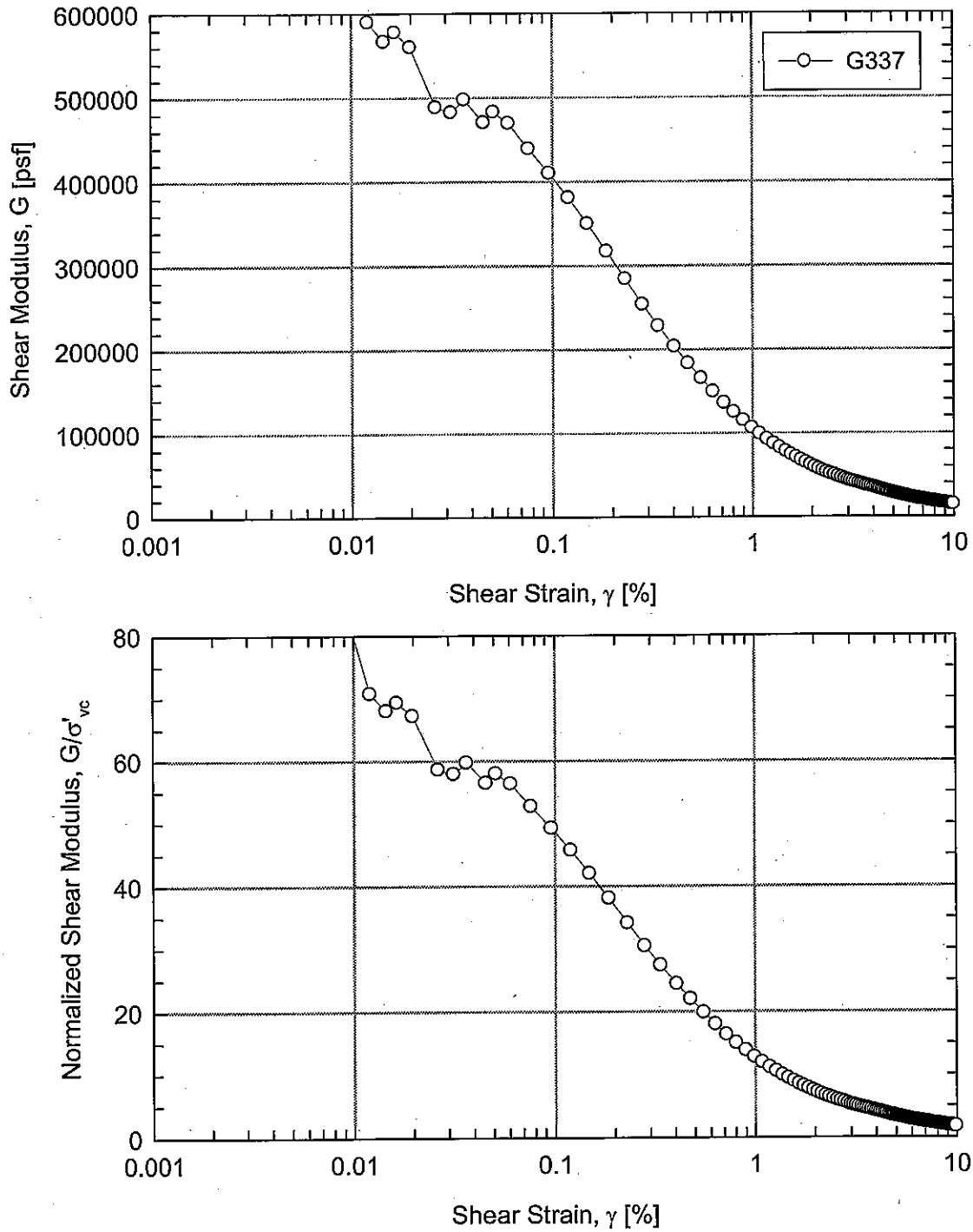


Figure 5.4.10 Shear modulus and normalized shear modulus versus shear strain for test DSS G337 on sample SB-01-1 UP2 30-32 ft.

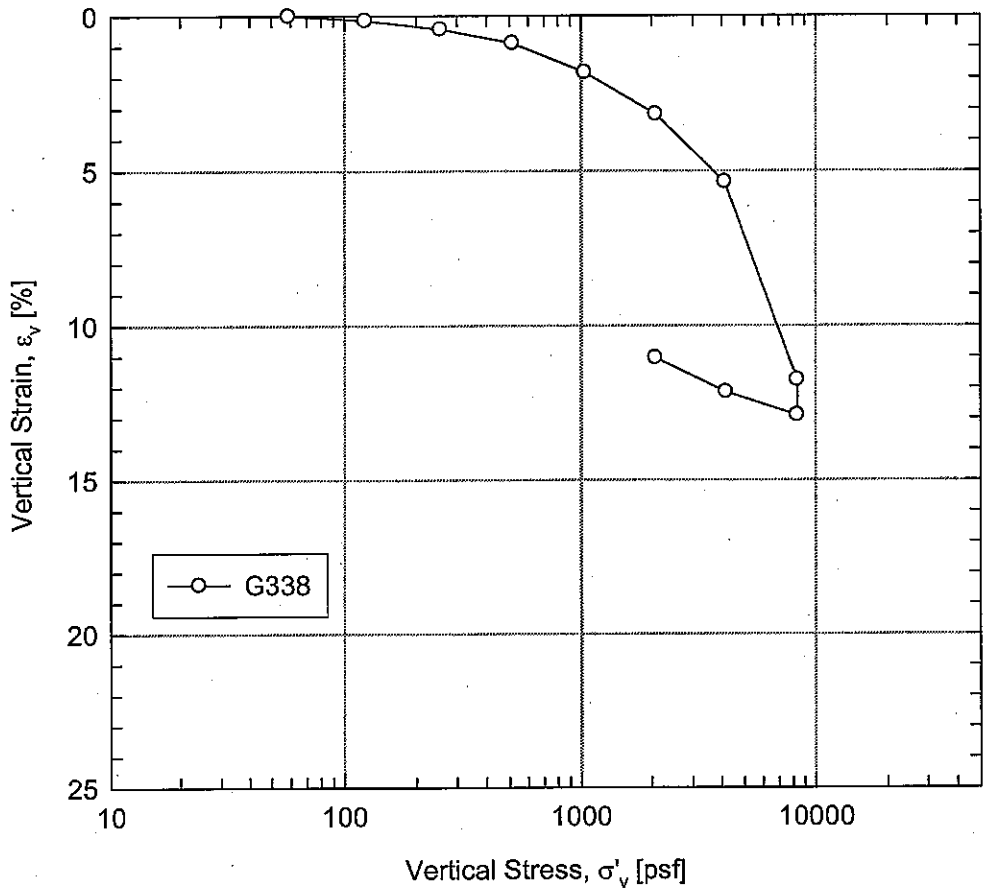


Figure 5.4.11 Vertical strain versus vertical effective stress for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

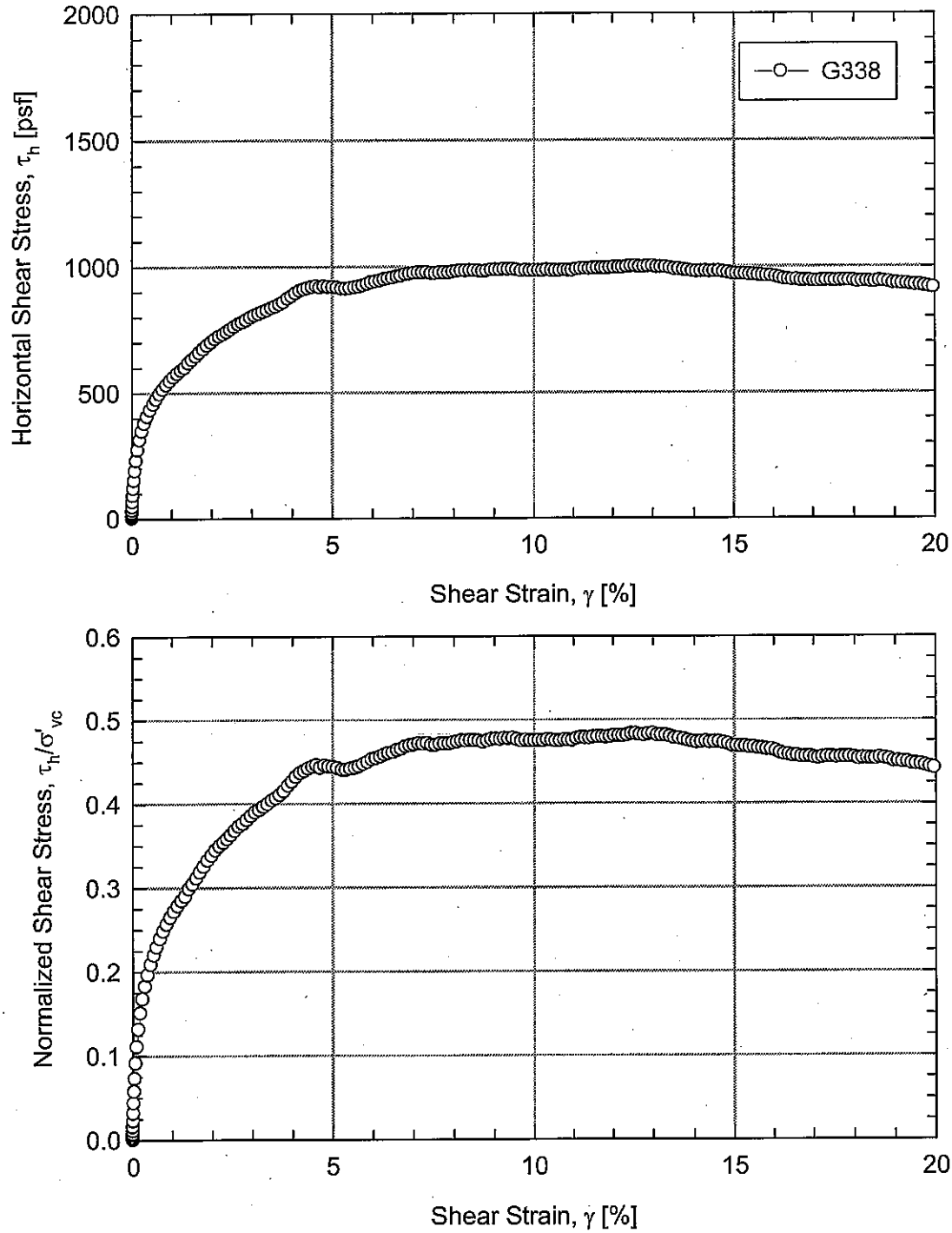


Figure 5.4.12 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

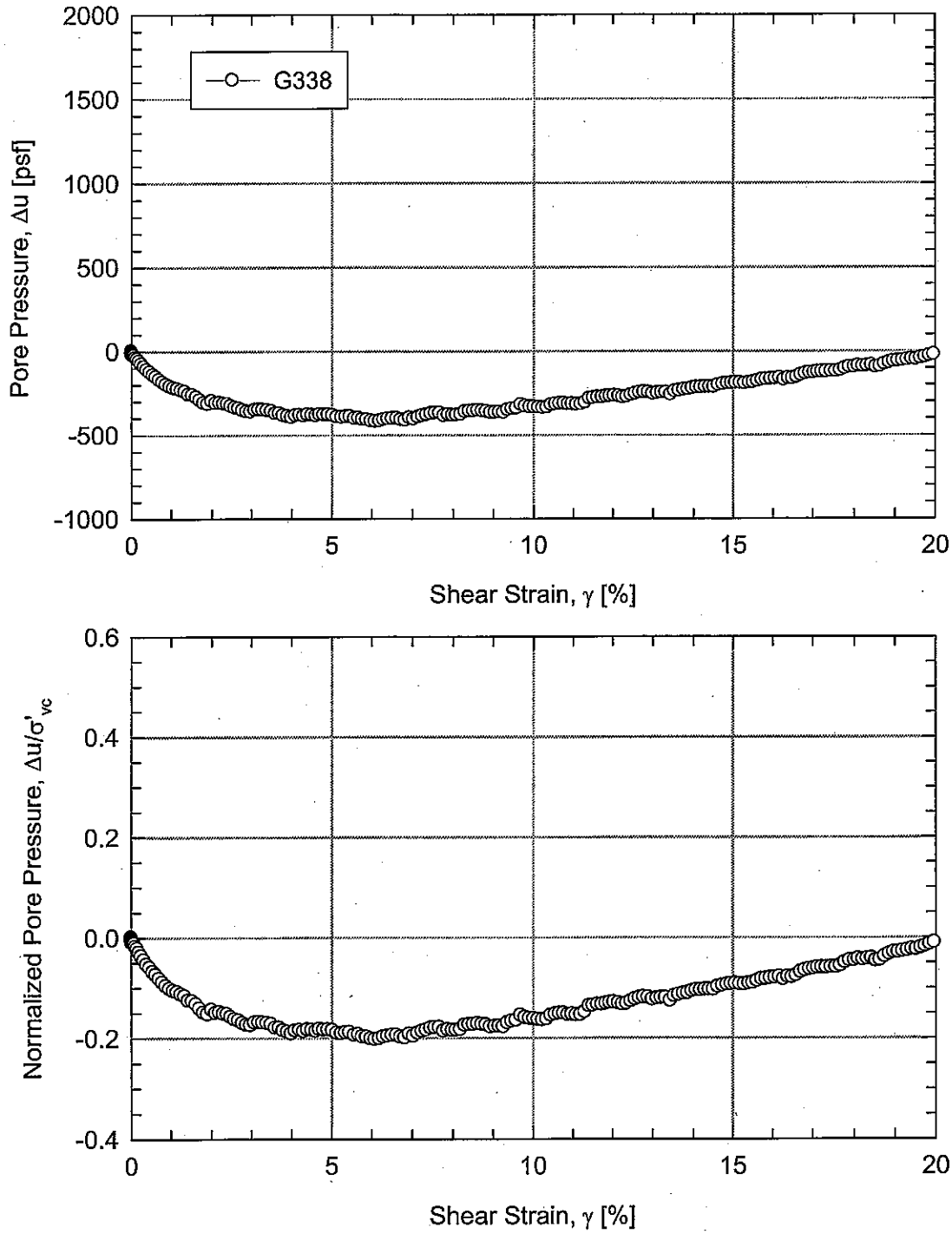
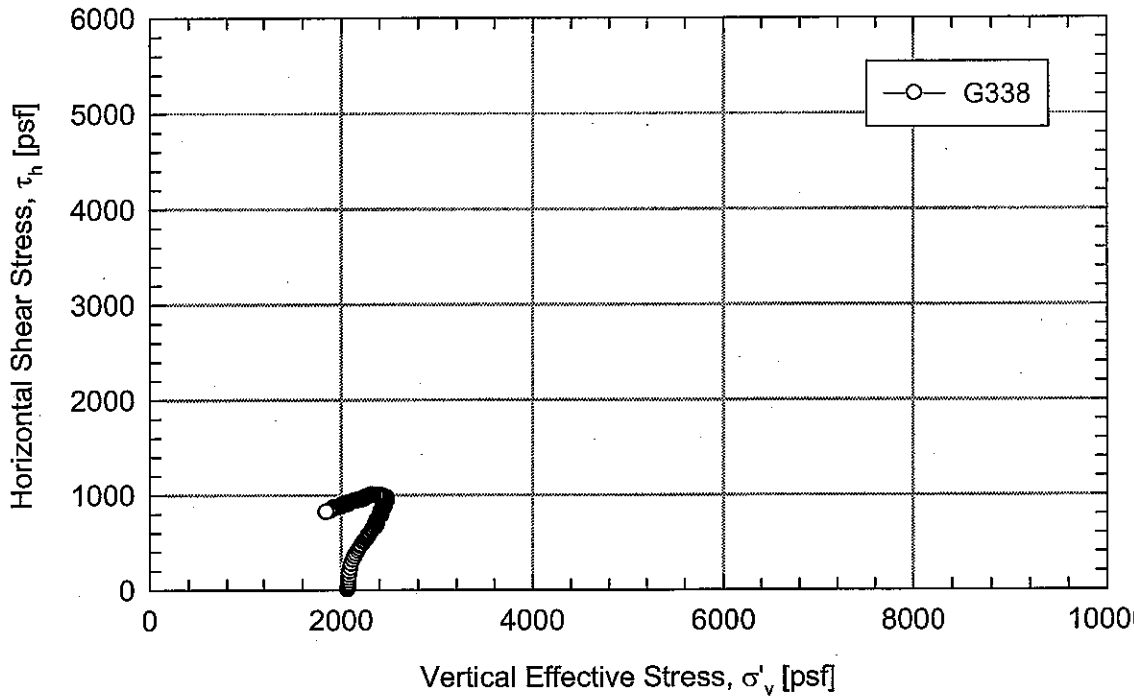


Figure 5.4.13 Pore pressure and normalized pore pressure versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.



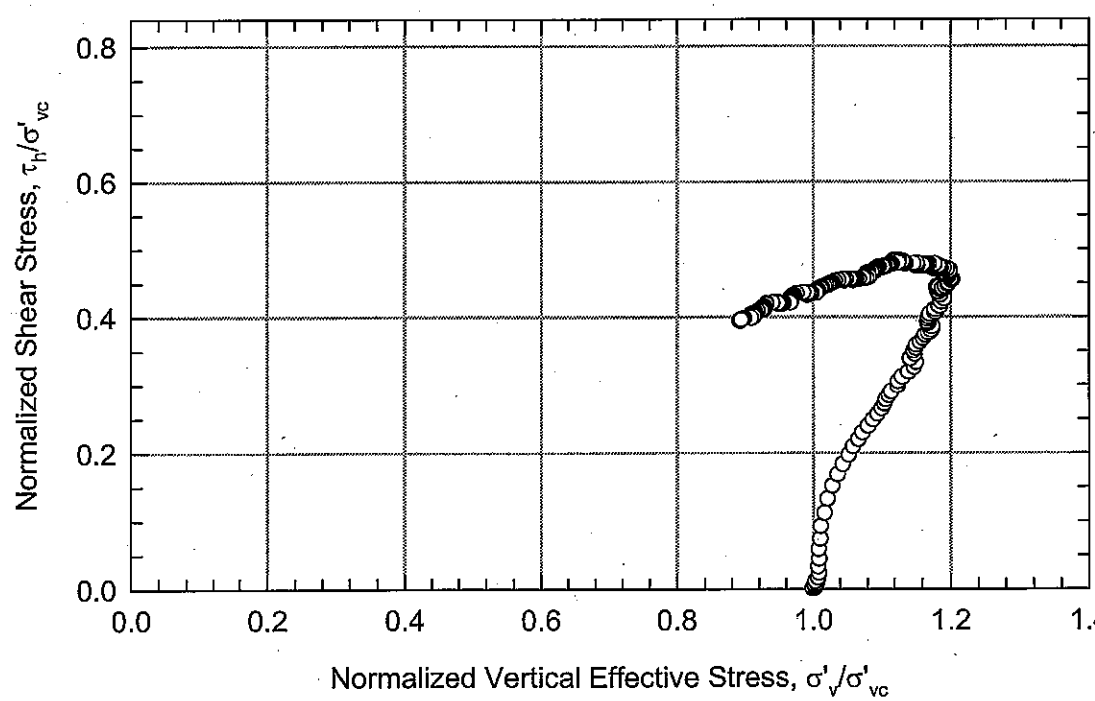


Figure 5.4.14 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

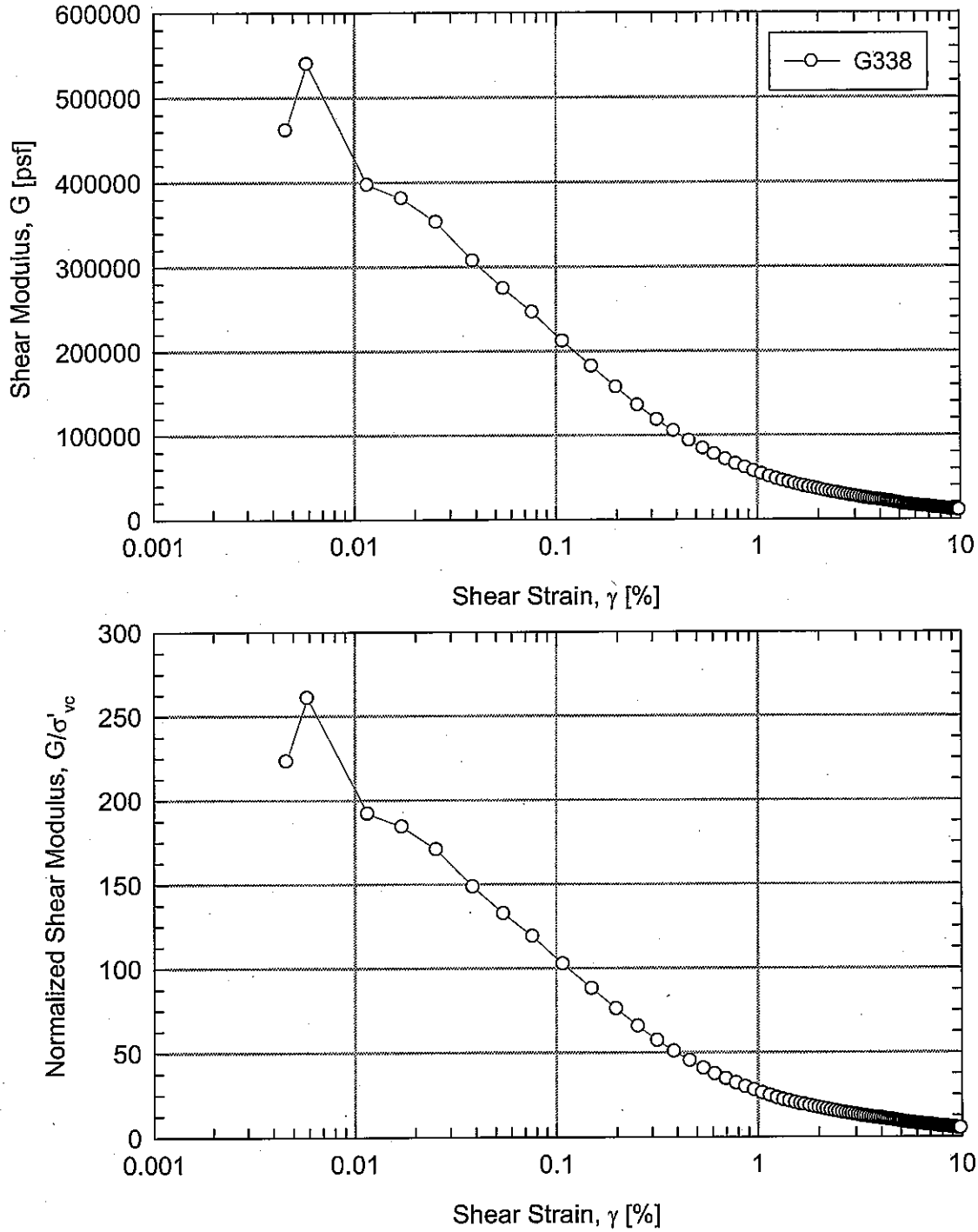


Figure 5.4.15 Shear modulus and normalized shear modulus versus shear strain for test DSS G338 on sample SB-01-04 UP2 40-42 ft.

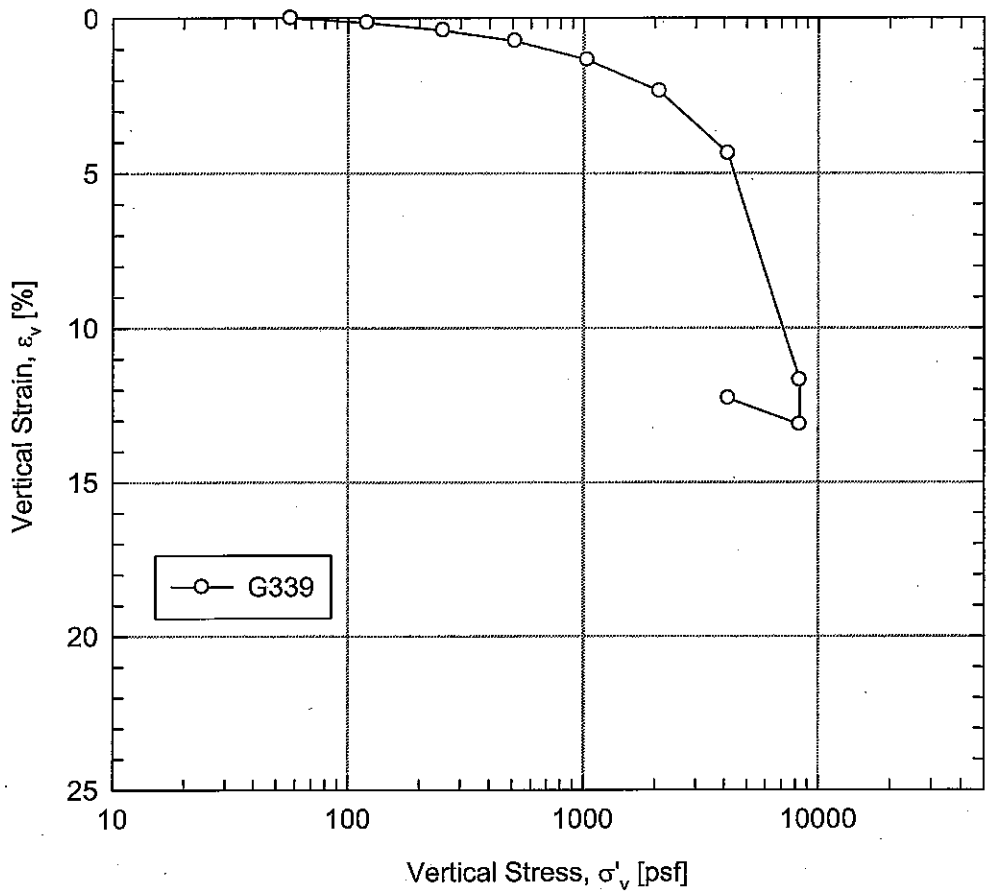


Figure 5.4.16 Vertical strain versus vertical effective stress for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

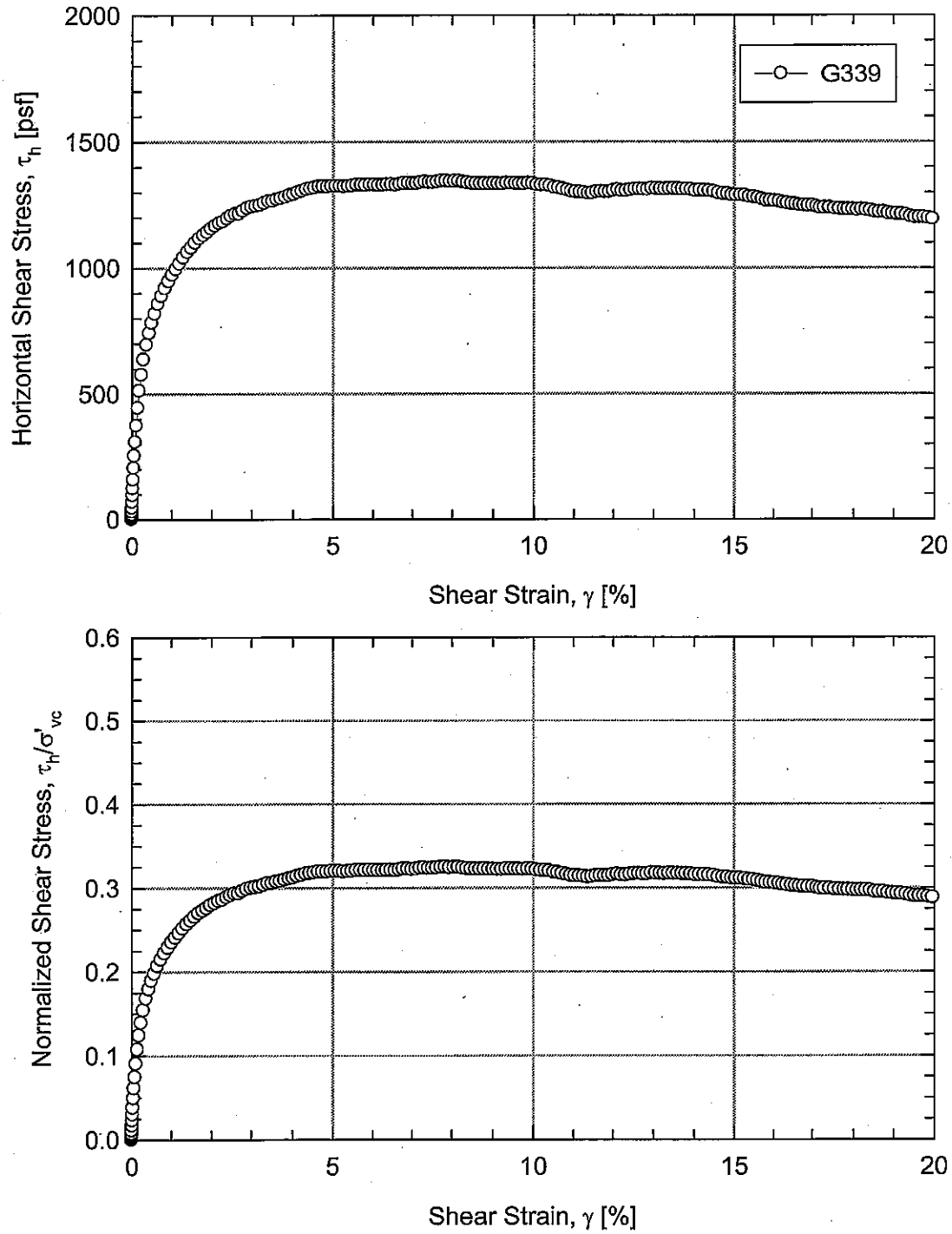


Figure 5.4.17 Horizontal shear stress and normalized shear stress versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

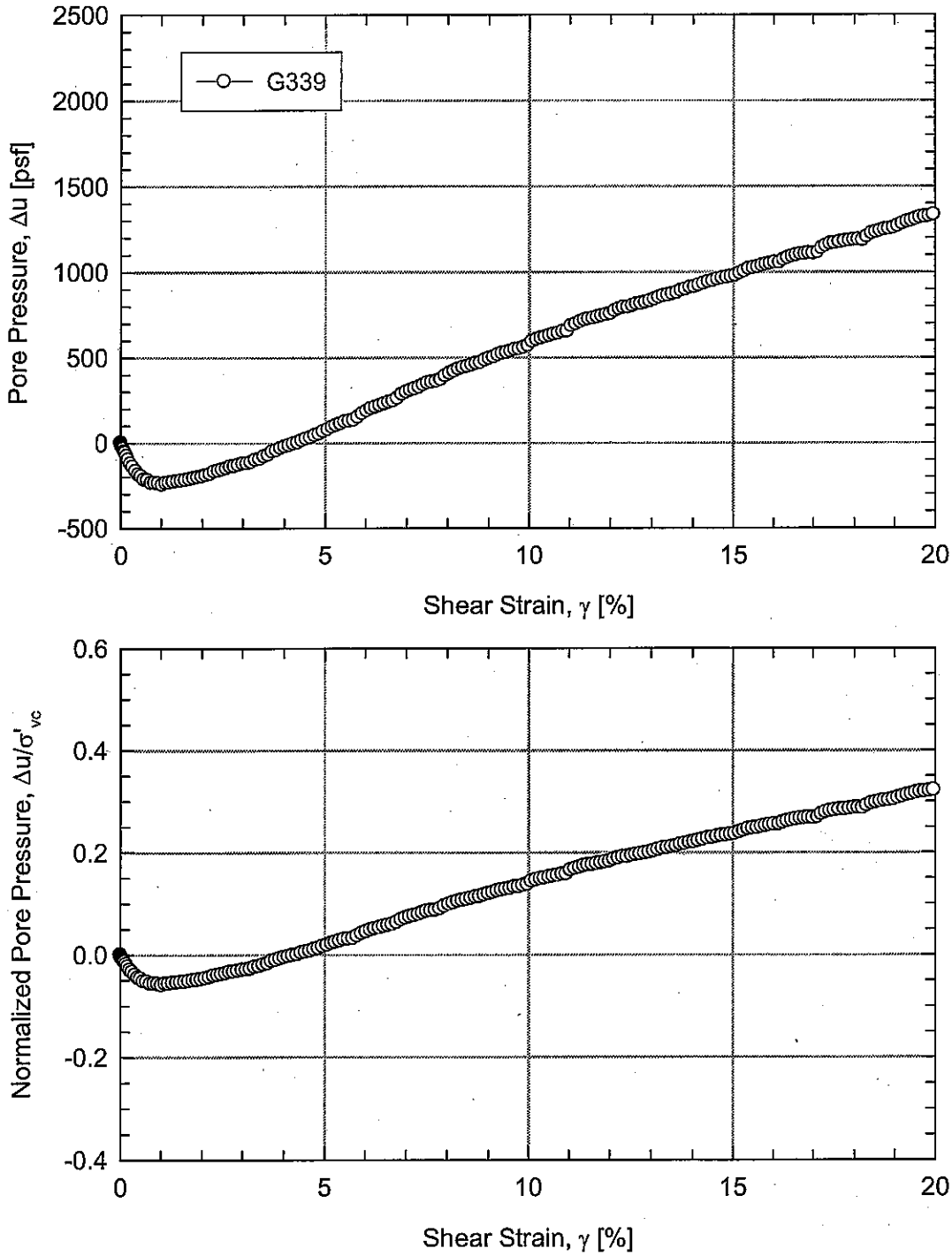


Figure 5.4.18 Pore pressure and normalized pore pressure versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

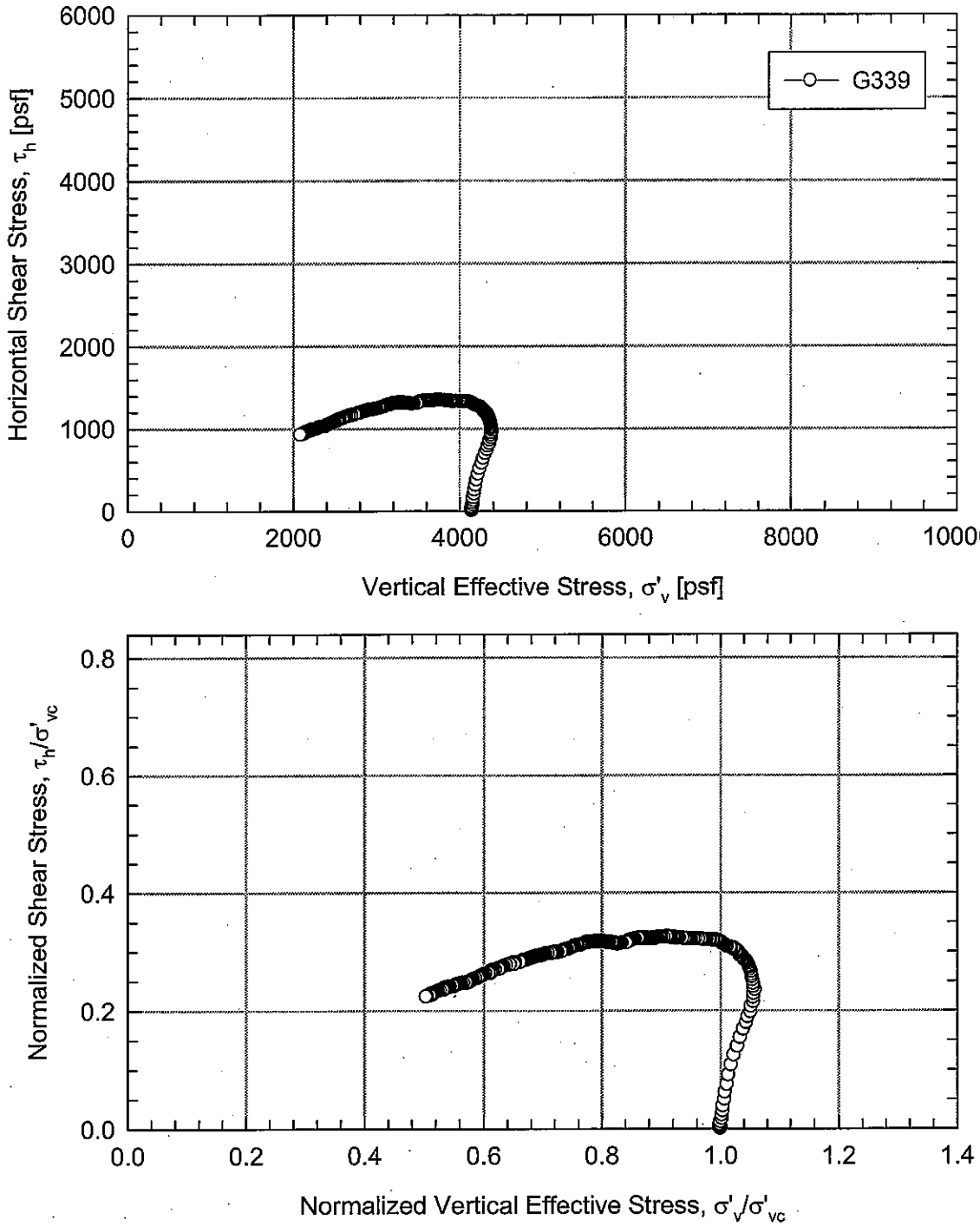


Figure 5.4.19 Horizontal shear stress versus vertical effective stress and normalized shear stress versus normalized vertical effective stress for test DSS G339 on sample SB-01-1 UP2 30-32 ft.

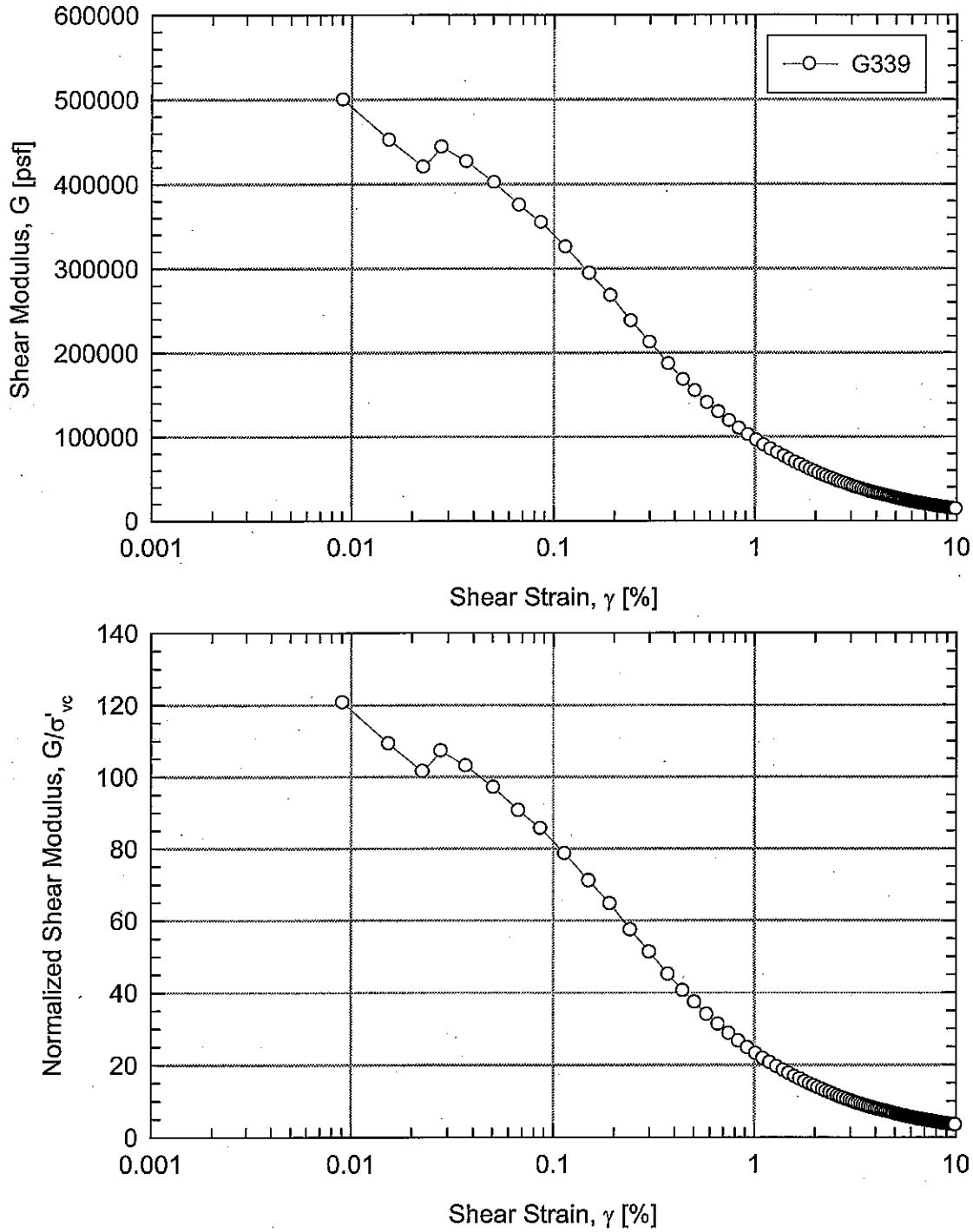
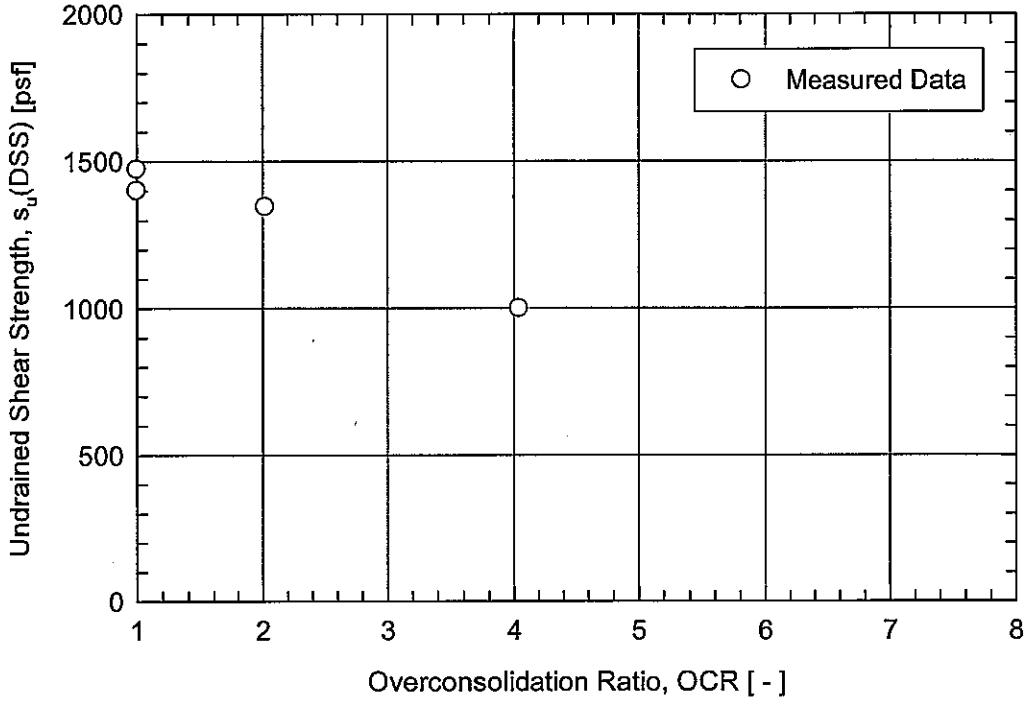
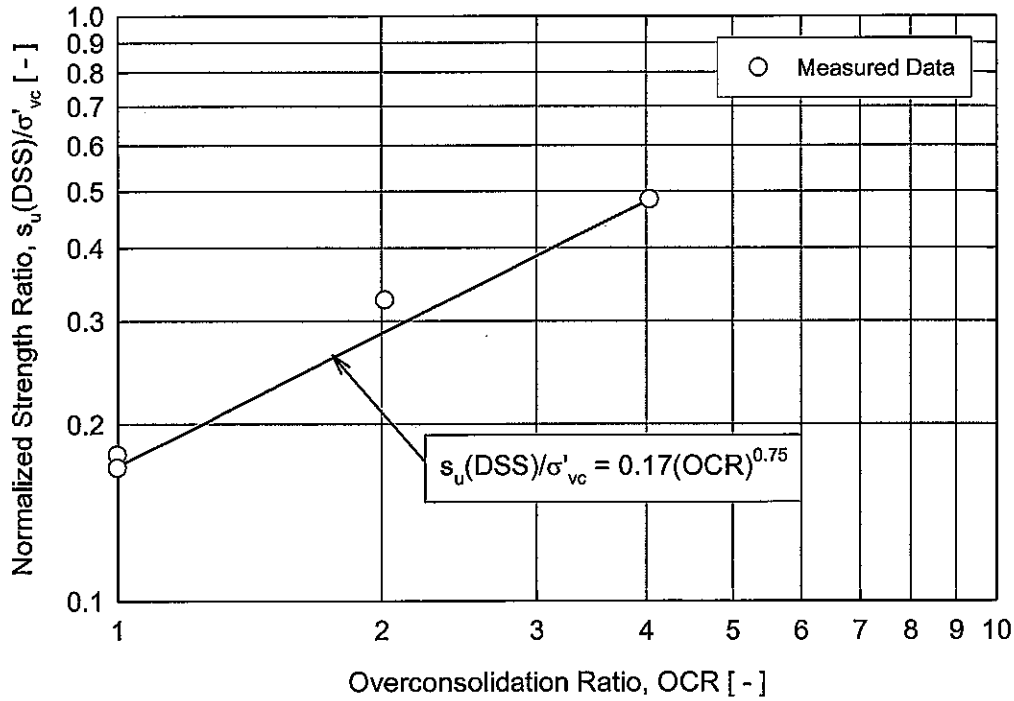


Figure 5.4.20 Shear modulus and normalized shear modulus versus shear strain for test DSS G339 on sample SB-01-1 UP2 30-32 ft.


Undrained Shear Strength, s_u(DSS) [psf]
2000
1500
1000
500
0
1
2
3
4
5
6
7
8
Overconsolidation Ratio, OCR [-]
Measured Data


Normalized Strength Ratio, s_u(DSS)/σ'_{vc} [-]
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1
2
3
4
5
6
7
8
9
10
Overconsolidation Ratio, OCR [-]
Measured Data
$s_u(DSS)/\sigma'_{vc} = 0.17(OCR)^{0.75}$

Appendix 7

Atterberg Limits and Moisture Contents

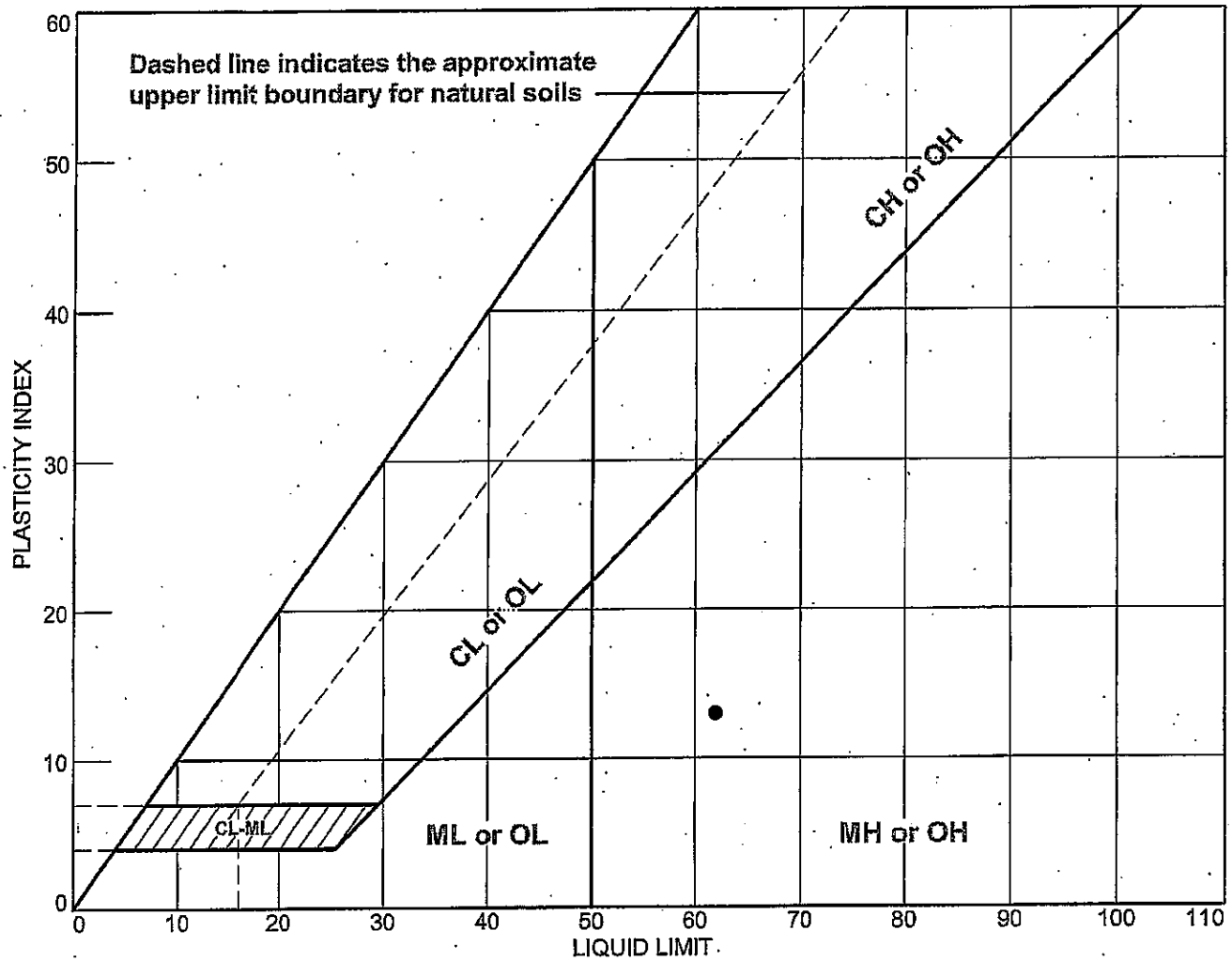
2008 Atterberg Limits

2003 Moisture Contents

2008 Moisture Contents

2008 Atterberg Limits

LIQUID AND PLASTIC LIMITS TEST REPORT



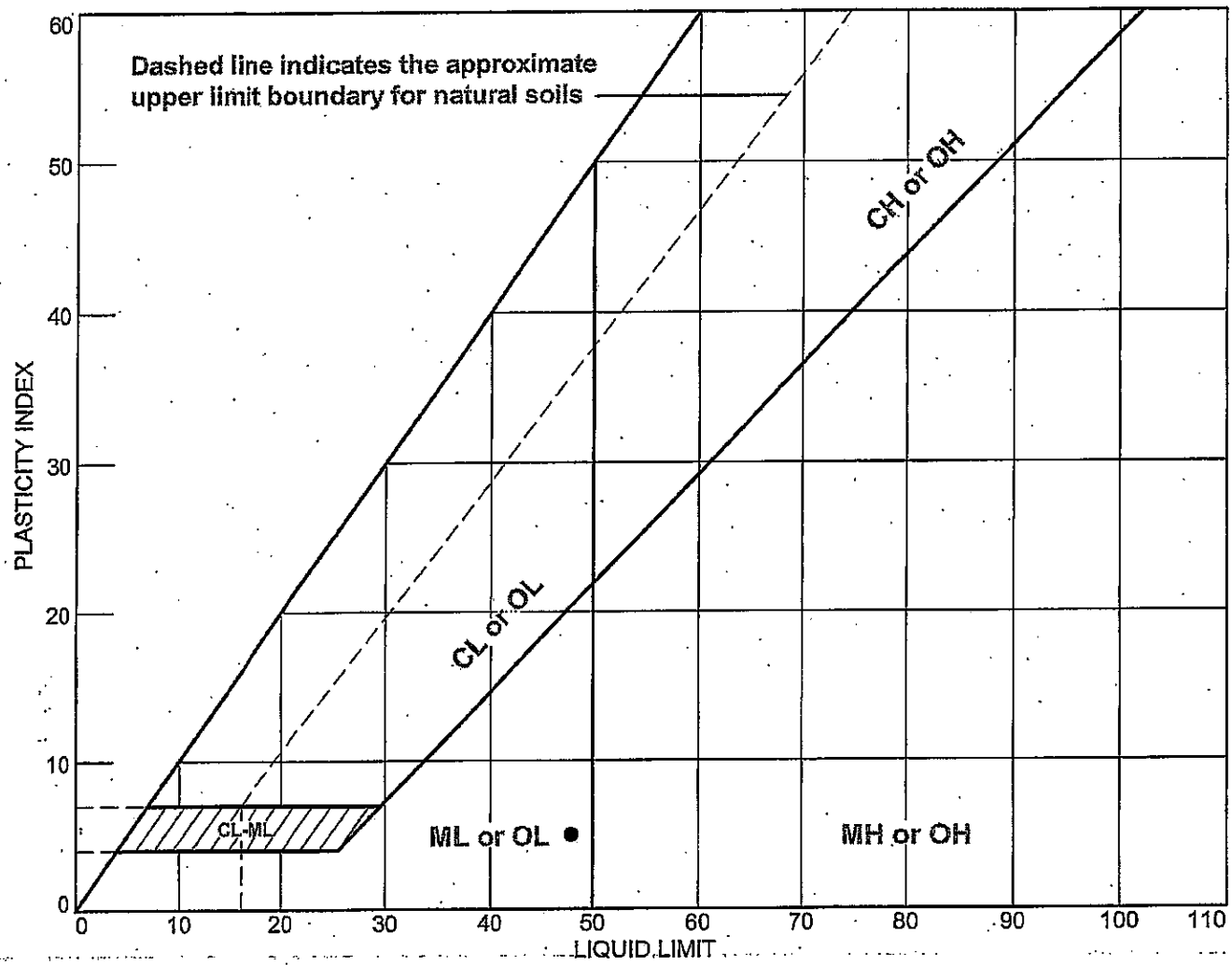
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-1	S-10	45' - 47'		49	62	13	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT

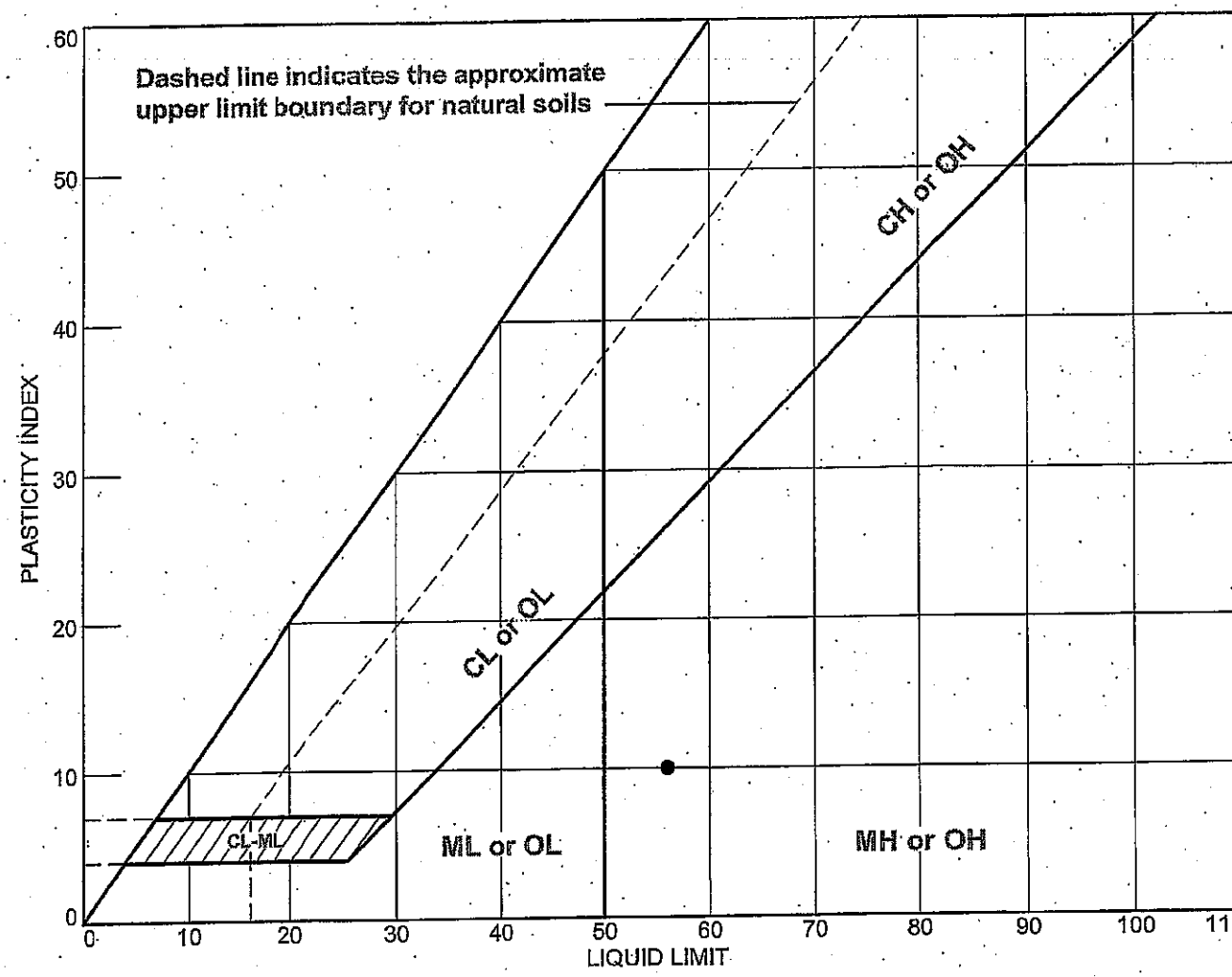


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-1	S-12	55' - 57'		43	48	5	

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No.:** **Figure**

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-1	S-14	65' - 67'		46	56	10	

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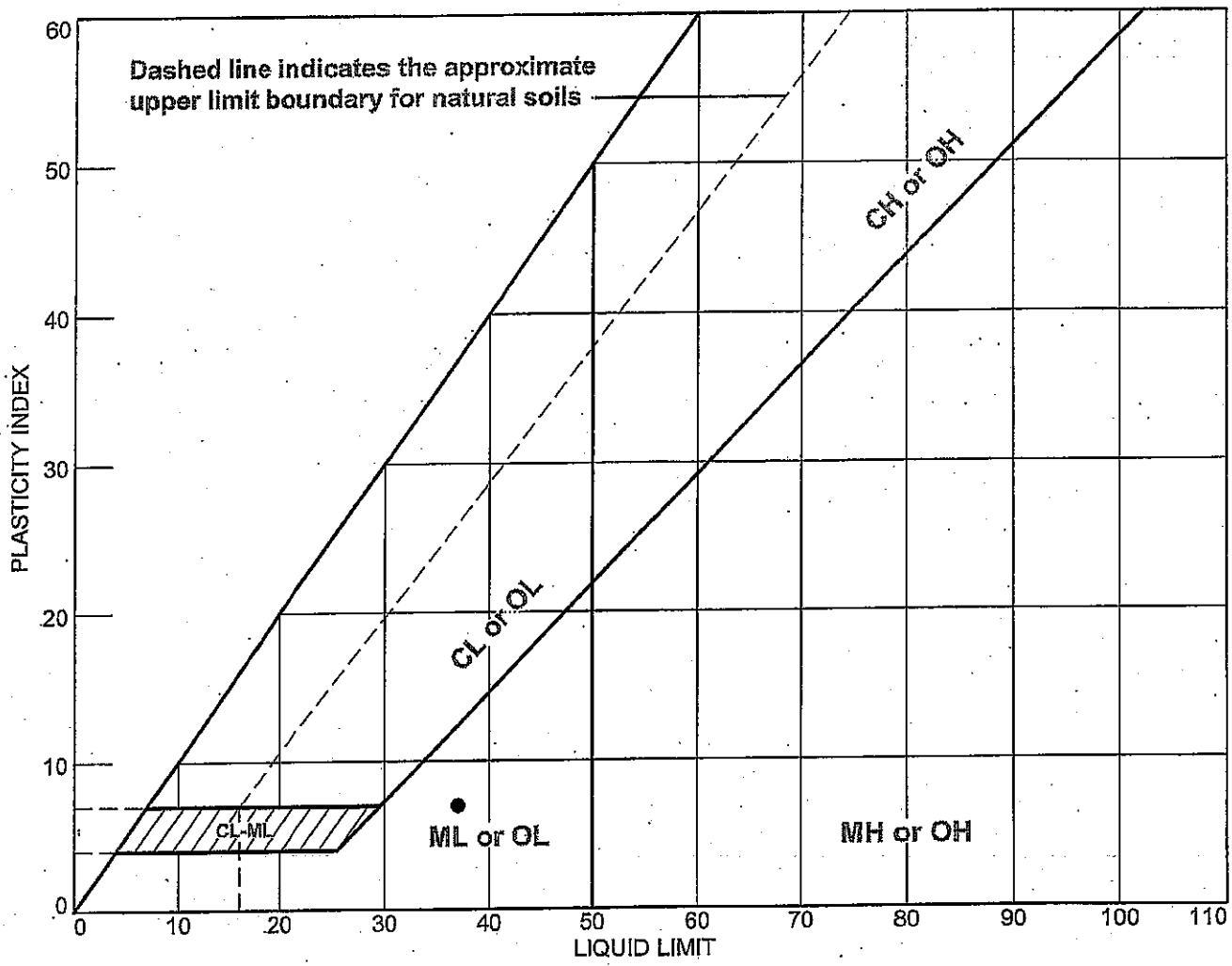
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-1	S-17	80' - 80'		30	37	7	

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16 East Franklin Street, PO BOX 3116
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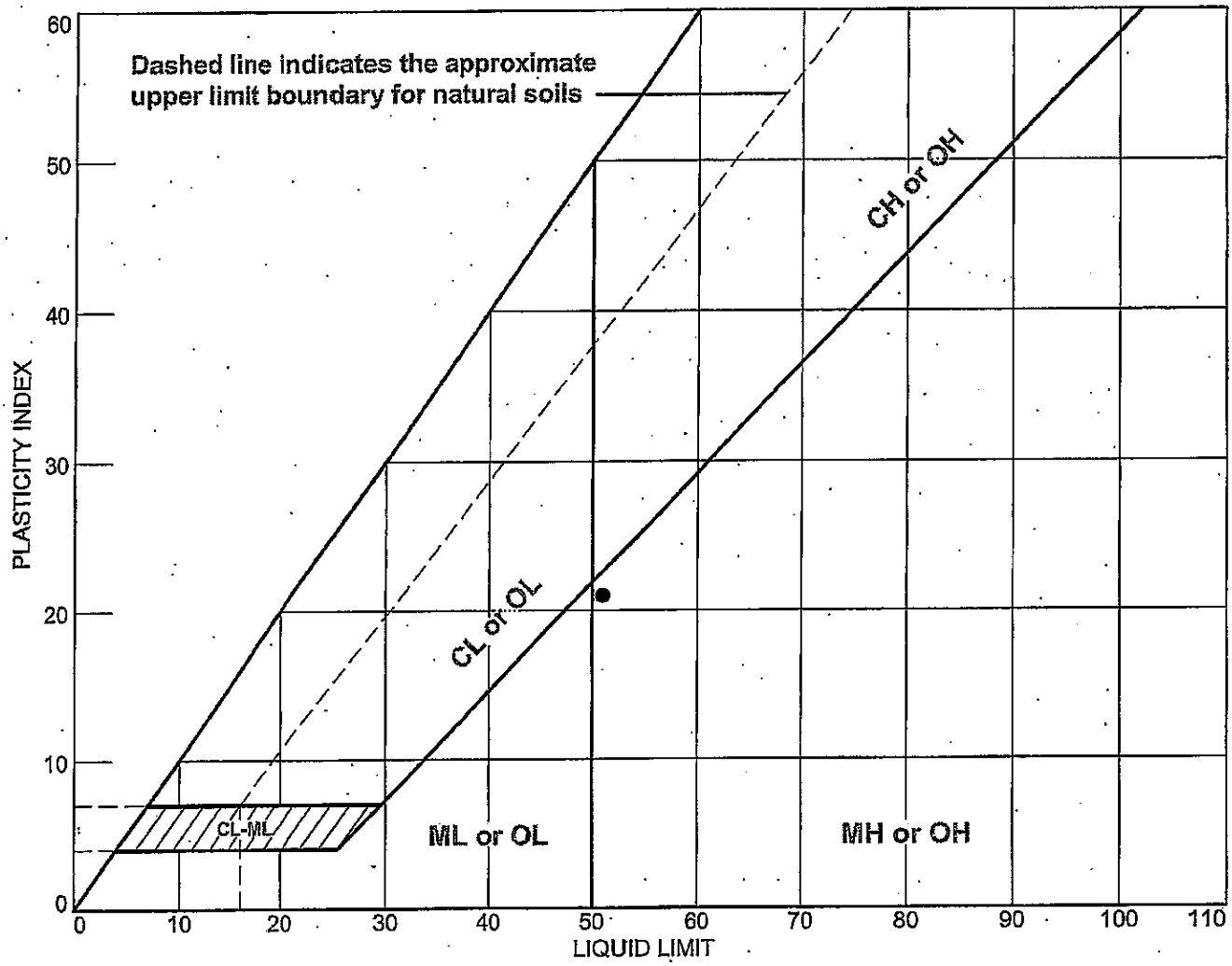
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-3	S-10	35' - 37'		30	51	21	

TEST-CON INCORPORATED
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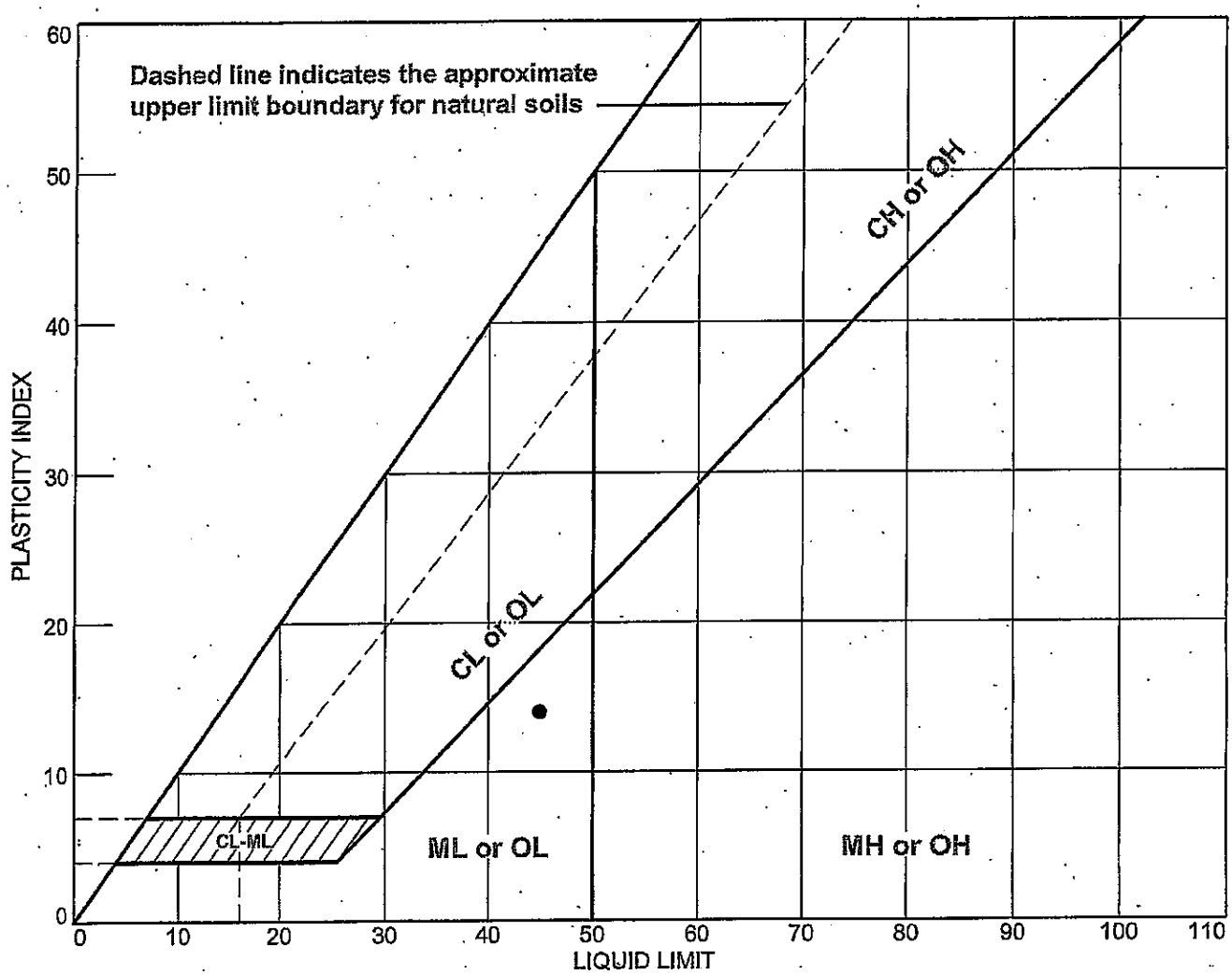
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT



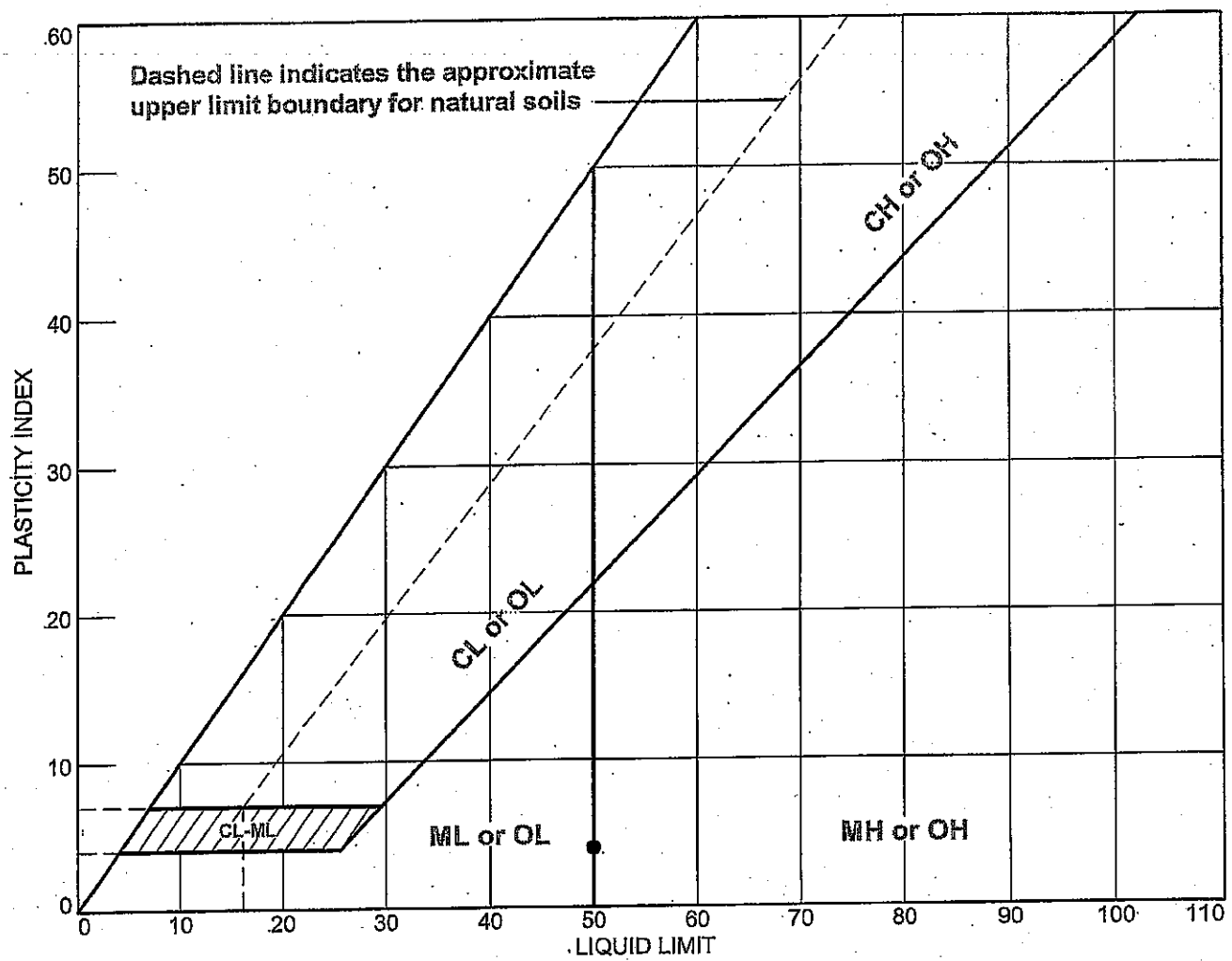
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-3	S-7	20' - 22'		31	45	14	

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT

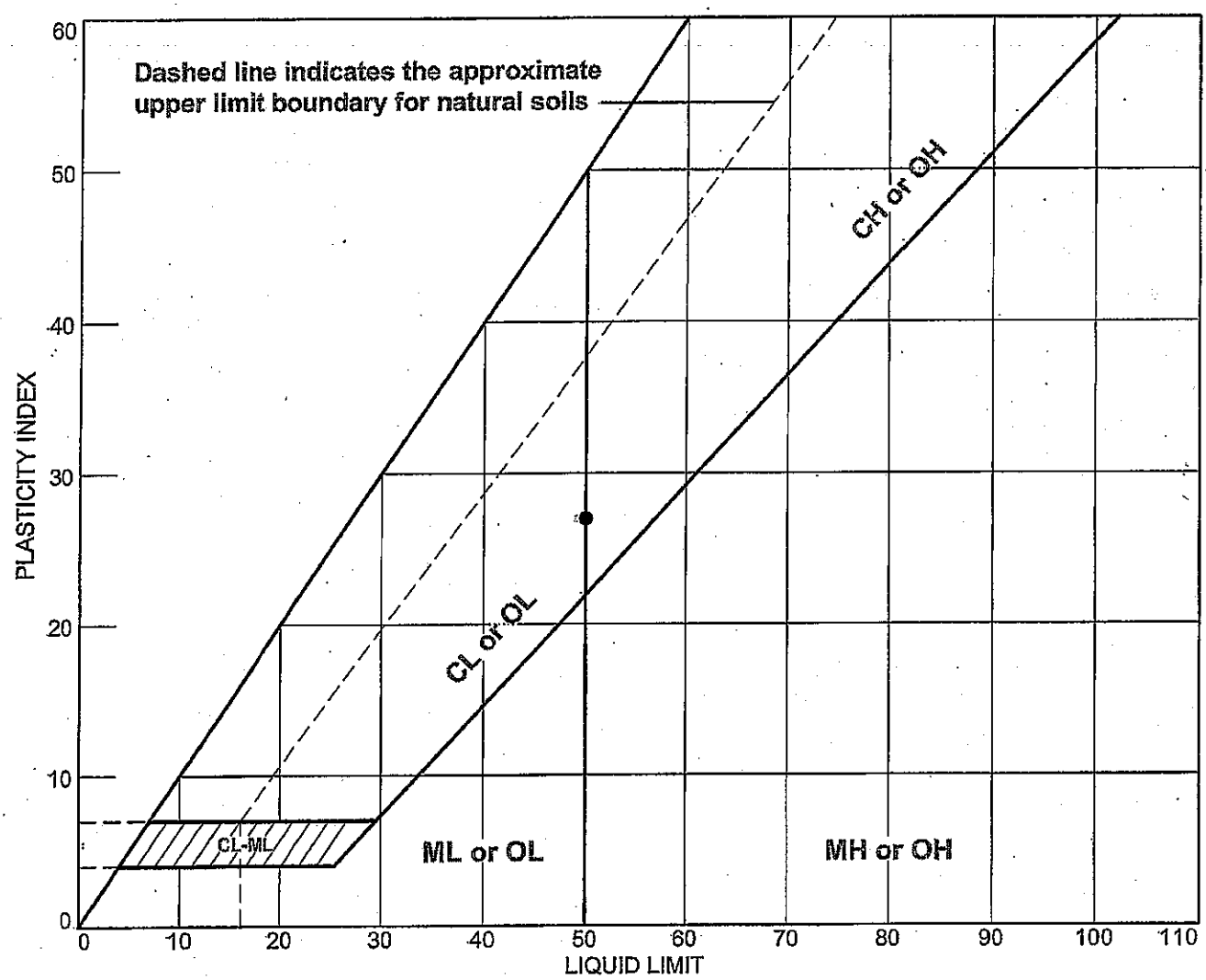


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	SB-02-3	S-15	60' - 62'		46	50	4	

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No.:** **Figure**

Tested By: R. DeCesare

LIQUID AND PLASTIC LIMITS TEST REPORT

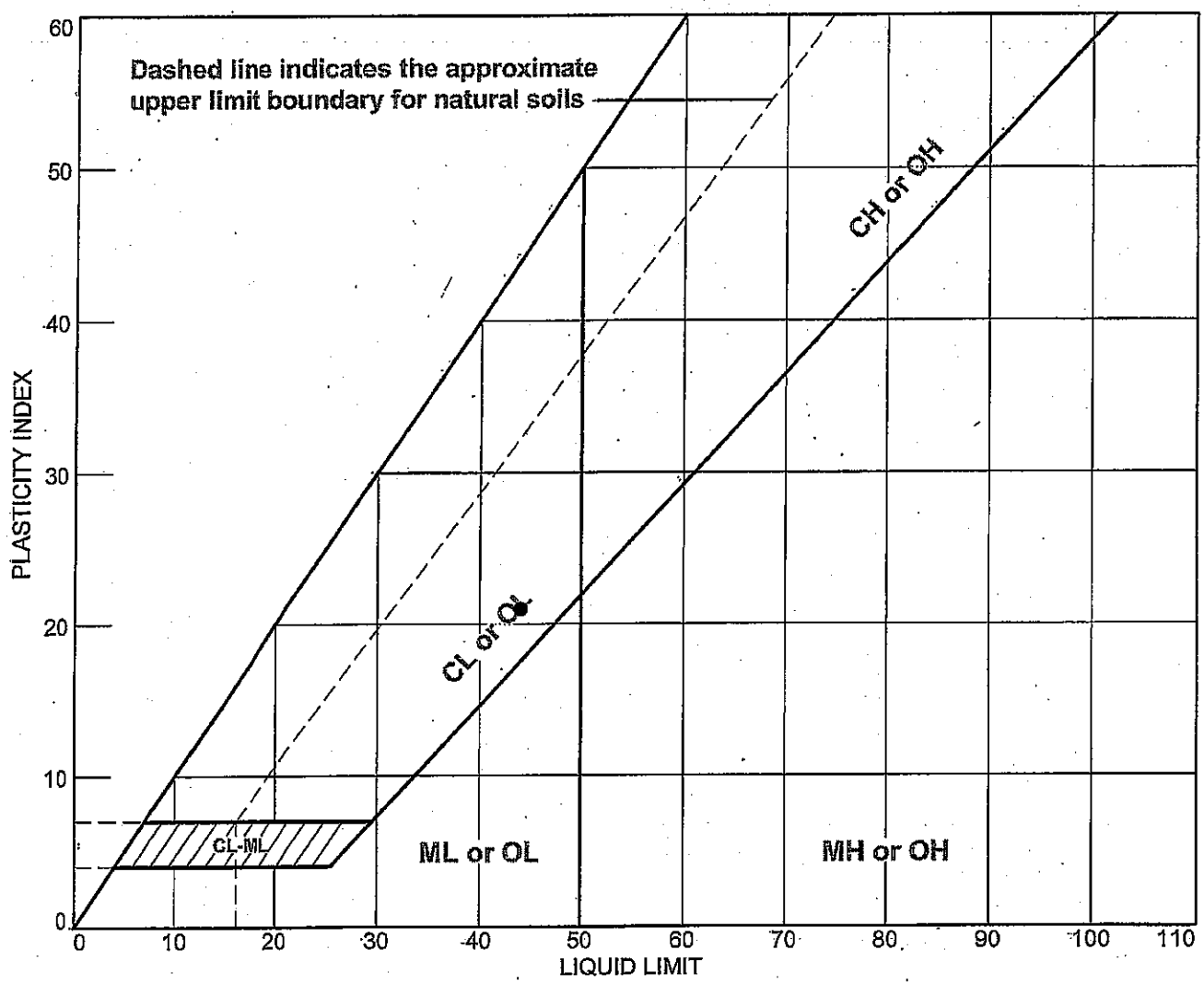


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring RW-23 UP1	UP1	25' to 27'		23	50	27	CH

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Boring RW-23 - UP2	UP2	40' to 42'		23	44	21	CL

TEST-CON INCORPORATED
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No.:
Figure

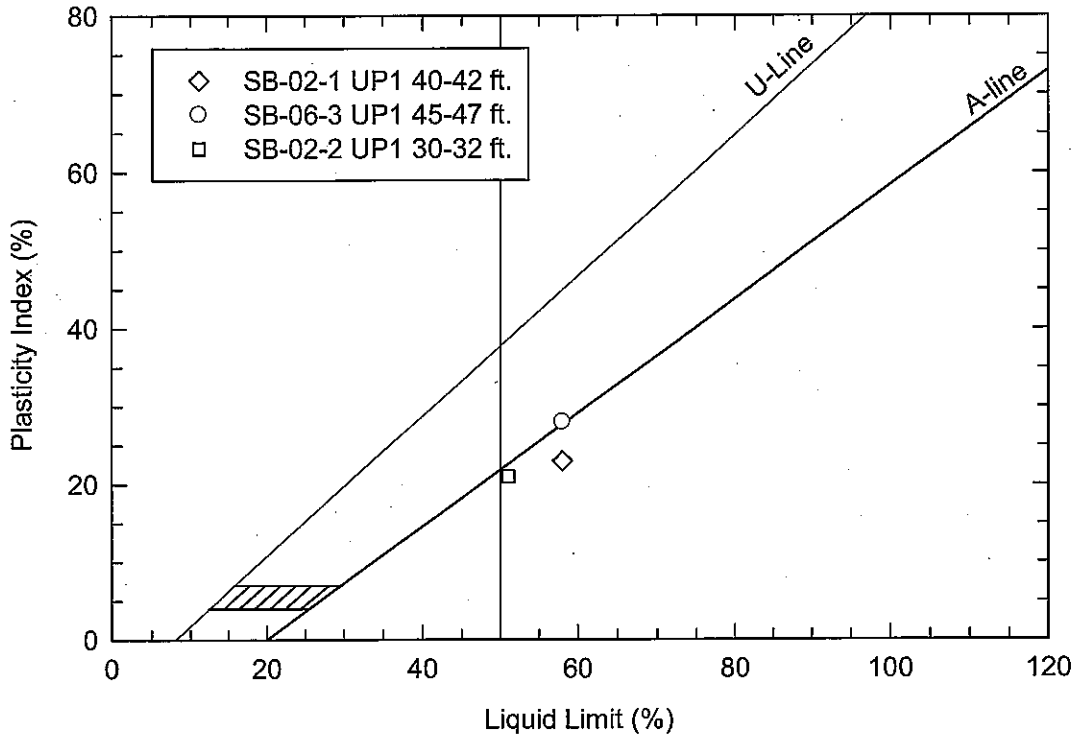


Figure 5.2.1 Plasticity Chart with Atterberg Limits results for selected samples

2003 Moisture Content

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. GAFFNEY — Reviewed By: [signature]
Project Engineer: D. SCHULZE — Date: DEC.03 — Date Reviewed: 12/18/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	$\bar{G}_s$	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{G_s}{1+e_0}$	Laboratory Log and Soil Description
SB-78	S-10	28.5-30.0	190	56.7	51	25	100	54												Gray Fat clay (CH)
SB-78	S-20	80.0-81.5	191	43.9	38	24	100	36												Brown Lean clay (CL)
SB-78	S-31	130.0-131.5	192	9.9	18	16	18													Red-brown Silty sand with gravel (SM)
SB-79	S-16	60.0-61.5	193	50.1	63	27	100	65												Brown Fat clay (CH)
SB-79	S-33	145.0-146.5	194	11.5	20	17	18													Red-brown Silty sand with gravel (SM)
SB-80	S-4	10.0-11.5	195	37.4	30	27	99	15												Gray Silt (ML)
SB-80	S-12	40.0-41.5	196	46.2	50	27	99	60												Gray Fat clay (CH)
SB-80	S-18	70.0-71.5	197	51.0	55	28	100	69												Brown Fat clay (CH)
SB-80	S-24	100.0-101.5	198	44.9	42	24	100	31												Brown Lean clay (CL)
SB-80	S-30	130.0-131.5	199	19.1	NP	NP	11													Brown Poorly-graded sand with silt and gravel (SP-SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 | Assigned By: D. Gaffney | Reviewed By: Don Schulze
Project Engineer: D. SCHULZE | Date: Nov.03 | Date Reviewed: 11/24/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
		70.0																		
SB-82	UP-1	72.0	393		Average Total Unit Weight (70.0-71.9') = 100.4 Pcf															Brown Varved Soil as follows:
		70.3		46.5	(disturbed)															Fat Clay (CH) grading to Silt (ML) (Entire sample disturbed)
		70.9		56.0	(disturbed)															
		71.5		61.3	(disturbed)															No Limit, sieve/hydrometer, specific gravity, consolidation tests performed, due to disturbance

GZA GeoEnvironmental, Inc.
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labform1.xls

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: Don Schulze
Date Reviewed: 12/23/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
SB-81	S-14	50.0-51.5	200	51.0	59	27	100	64												Brown Fat clay (CH)
SB-82	S-6	16.5-18.0	201	39.1	36	24	99	26												Gray Lean clay (CL)
SB-82	S-14	50.0-51.5	202	60.2	59	27	100	66												Gray-brown Fat clay (CH)
SB-82	S-22	95.0-96.5	203	46.9	42	25	100	37												Brown Lean clay (CL)
SB-82	S-28	125.0-126.5	204	11.0	NP	NP	8													Red-brown Well-graded sand with silt (SW-SM)
SB-83	S-3	7.5-9.0	205	35.7	NP	NP	99	13												Gray Silt (ML)
SB-83	S-18	70.0-71.5	206	52.0	59	27	100	65												Brown Fat clay (CH)
SB-83	S-30	130.0-131.5	207	10.6	NP	NP	7													Red-brown Well-graded sand with silt and gravel (SW-SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. GAFFNEY
Date: DEC.03
Reviewed By: [signature]
Date Reviewed: 12/29/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{\Delta e}{1+e_0}$	Laboratory Log and Soil Description
SB-84	S-2	4.5-6.0	208	4.5	*	*	12		* Insufficient sample for limit test											Red-brown Well-graded sand with silt (SW-SM)
SB-84	S-8	25.5-27.0	209	46.8	44	25	100	45												Gray Lean clay (CL)
SB-84	S-14	50.0-51.5	210	56.5	62	28	100	55												Gray Fat clay (CH)
SB-84	S-22	90.0-91.5	211	46.9	58	26	100	58												Red-brown Fat clay (CH)
SB-84	S-30 S-31	130.0-136.5	212	11.7	21	17	11	3												Red-brown Poorly-graded gravel with silt and sand (GP-GM)
SB-85	S-9	25.0-26.5	213	46.6	59	29	100	62												Gray Fat clay (CH)
SB-85	S-19	75.0-76.5	214	53.1	53	23	100	42												Brown Fat clay (CH)
SB-85	S-26	110.0-111.5	215	10.8	17	16	41	10												Red-brown Gravelly silt with sand (ML)
SB-86	S-5	13.5-15.0	216	35.1	45	25	97	43												Gray Lean clay (CL)
SB-86	S-12	40.0-41.5	217	42.9	56	28	100	72												Gray Fat clay (CH)
SB-86	S-19	75.0-76.5	218	43.3	43	24	100	40												Red-brown Lean clay (CL)
SB-86	S-26	110.0-111.5	219	11.6	15	14	30													Brown Silty sand (SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 | Assigned By: D. GAFFNEY | Reviewed By: Dw Schulze
Project Engineer: D. SCHULZE | Date: DEC.03 | Date Reviewed: 12/30/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
SB-72	S-6	16.5-18.0	353	39.3																
SB-73	S-6	16.5-18.0	354	29.9																
SB-74	S-9	25.0-26.5	355	63.5																
SB-75	S-6	16.5-18.0	356	43.8																
SB-76	S-4	10.5-12.0	357	53.0																
SB-77	S-4	10.0-11.5	358	25.8																
SB-78	S-5	13.5-15.0	359	32.1																
SB-79	S-5	13.5-15.0	360	41.2																
SB-80	S-8	22.5-24.0	361	48.8																
SB-81	S-3	7.5-9.0	362	31.9																
SB-81	S-6	16.5-18.0	363	53.2																
SB-81	S-10	28.5-30.0	364	45.9																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT

Project No.: L17828 | Assigned By: D. GAFFNEY | Reviewed By: Dee Schulze

Project Engineer: D. SCHULZE | Date: DEC.03 | Date Reviewed: 12/30/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
SB-83	S-10	28.5-30.0	365	44.8																
SB-85	S-6	16.5-18.0	366	23.3																
SB-87	S-8	22.5-24.0	367	59.1																
SB-88	S-3	7.5-9.0	368	23.6																
SB-88	S-10	28.5-30.0	369	54.2																
SB-90	S-4	10.5-12.0	370	40.3																
SB-93	S-7	19.5-21.0	371	14.1																
SB-97	S-4	13.5-15.0	372	9.7																
SB-98	S-6	16.5-18.0	373	11.1																
SB-99	S-6	16.5-18.0	374	11.6																
SB-99	S-7	19.5-21.0	375	23.2																
SB-99	S-8	22.5-24.0	376	30.3																
SB-99	S-10	28.5-30.0	377	11.0																

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. GAFFNEY — Reviewed By: Don Schulze
Project Engineer: D. SCHULZE — Date: DEC.03 — Date Reviewed: 12/18/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{C_c}{1+e_0}$	Laboratory Log and Soil Description
SB-78	S-10	28.5-30.0	190	56.7	51	25	100	54												Gray Fat clay (CH)
SB-78	S-20	80.0-81.5	191	43.9	38	24	100	36												Brown Lean clay (CL)
SB-78	S-31	130.0-131.5	192	9.9	18	16	18													Red-brown Silty sand with gravel (SM)
SB-79	S-16	60.0-61.5	193	50.1	63	27	100	65												Brown Fat clay (CH)
SB-79	S-33	145.0-146.5	194	11.5	20	17	18													Red-brown Silty sand with gravel (SM)
SB-80	S-4	10.0-11.5	195	37.4	30	27	99	15												Gray Silt (ML)
SB-80	S-12	40.0-41.5	196	46.2	50	27	99	60												Gray Fat clay (CH)
SB-80	S-18	70.0-71.5	197	51.0	55	28	100	69												Brown Fat clay (CH)
SB-80	S-24	100.0-101.5	198	44.9	42	24	100	31												Brown Lean clay (CL)
SB-80	S-30	130.0-131.5	199	19.1	NP	NP	11													Brown Poorly-graded sand with silt and gravel (SP-SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828
Project Engineer: D. SCHULZE
Assigned By: D. Gaffney
Date: Nov.03
Reviewed By: Don Schulze
Date Reviewed: 11/24/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
		70.0																		
SB-82	UP-1	72.0	393		Average Total Unit Weight (70.0-71.9') = 100.4 Pcf															Brown Varved Soil as follows:
		70.3		46.5	(disturbed)															Fat Clay (CH) grading to Silt (ML) (Entire sample disturbed)
		70.9		56.0	(disturbed)															
		71.5		61.3	(disturbed)															No Limit, sieve/hydrometer, specific gravity, consolidation tests performed, due to disturbance

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. GAFFNEY — Reviewed By: Dan Schulze
Project Engineer: D. SCHULZE — Date: DEC.03 — Date Reviewed: 12/23/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol.: $\frac{\Delta e}{1 + e_0}$	Laboratory Log and Soil Description
SB-81	S-14	50.0-51.5	200	51.0	59	27	100	64												Brown Fat clay (CH)
SB-82	S-6	16.5-18.0	201	39.1	36	24	99	26												Gray Lean clay (CL)
SB-82	S-14	50.0-51.5	202	60.2	59	27	100	66												Gray-brown Fat clay (CH)
SB-82	S-22	95.0-96.5	203	46.9	42	25	100	37												Brown Lean clay (CL)
SB-82	S-28	125.0-126.5	204	11.0	NP	NP	8													Red-brown Well-graded sand with silt (SW-SM)
SB-83	S-3	7.5-9.0	205	35.7	NP	NP	99	13												Gray Silt (ML)
SB-83	S-18	70.0-71.5	206	52.0	59	27	100	65												Brown Fat clay (CH)
SB-83	S-30	130.0-131.5	207	10.6	NP	NP	7													Red-brown Well-graded sand with silt and gravel (SW-SM)

LABORATORY TESTING DATA SHEET

Project Name: NEW BRITAIN-HARTFORD BUSWAY CONNECTICUT
Project No.: L17828 — Assigned By: D. GAFFNEY — Reviewed By: [signature]
Project Engineer: D. SCHULZE — Date: DEC.03 — Date Reviewed: 12/29/03

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests: Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Density: γ_d MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Strength Tests: Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	Consol. $\frac{\Delta e}{1+e_0}$	Laboratory Log and Soil Description
SB-84	S-2	4.5-6.0	208	4.5	*	*	12		* Insufficient sample for limit test											Red-brown Well-graded sand with silt (SW-SM)
SB-84	S-8	25.5-27.0	209	46.8	44	25	100	45												Gray Lean clay (CL)
SB-84	S-14	50.0-51.5	210	56.5	62	28	100	55												Gray Fat clay (CH)
SB-84	S-22	90.0-91.5	211	46.9	58	26	100	58												Red-brown Fat clay (CH)
SB-84	S-30 S-31	130.0-136.5	212	11.7	21	17	11	3												Red-brown Poorly-graded gravel with silt and sand (GP-GM)
SB-85	S-9	25.0-26.5	213	46.6	59	29	100	62												Gray Fat clay (CH)
SB-85	S-19	75.0-76.5	214	53.1	53	23	100	42												Brown Fat clay (CH)
SB-85	S-26	110.0-111.5	215	10.8	17	16	41	10												Red-brown Gravelly silt with sand (ML)
SB-86	S-5	13.5-15.0	216	35.1	45	25	97	43												Gray Lean clay (CL)
SB-86	S-12	40.0-41.5	217	42.9	56	28	100	72												Gray Fat clay (CH)
SB-86	S-19	75.0-76.5	218	43.3	43	24	100	40												Red-brown Lean clay (CL)
SB-86	S-26	110.0-111.5	219	11.6	15	14	30													Brown Silty sand (SM)

2008 Moisture Contents

GEODESIGN, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Busway over Park St.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 1 of 3

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall

Date(s) Samples Collected 05/12/2008-05/16/2008

Assigned to GeoDesign, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consolidated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
SB-02-1	S-3	10	12	34.5																
SB-02-1	S-5	20	22	50.2																
SB-02-1	S-7	30	32	53.5																
SB-02-1	S-9	40	42	64.2																
SB-02-1	S-11	50	52	65.6																
SB-02-1	S-13	60	62	57.8																
SB-02-1	S-15	70	72	59.7																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEOD[illegible]N, INC.
LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town,State*): Hartford/West Hartford, CT (Busway over Park St.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 2 of 3

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall

Date(s) Samples Collected 05/12/2008-06/03/2008

Assigned to GeoDesign, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoldated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	NOTES
SB-02-1	S-17	80	82	49.4																
SB-02-1	S-19	90	92	51.5																
SB-02-1	S-21	100	102	48.1																
SB-02-3	S-6	15	17	53.7																
SB-02-3	S-8	25	27	49.7																
SB-02-3	S-10	35	37	61.1																
SB-02-3	S12	45	47	52.6																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN
INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

GEOD[illegible]N, INC.

LAB ASSIGNMENT SHEET

Project Name: New Britain-Hartford Busway

Location (*Town, State*): Hartford/West Hartford , CT (Busway over Park St.) #155-H025

GeoDesign File No.: 380-04

Client / Company Name: URS/Washington Group

Project Engineer's Name: Chi Zhang

Contact Phone: (203) 758 8836 x 119

Page 3 of 3

Date Samples Submitted

Date Results Requested

Samples Collected By Robert Marshall

Date(s) Samples Collected 05/29/2008-06/03/2008

Assigned to GeoDesign, Inc.

SAMPLE IDENTIFICATION				IDENTIFICATION TESTS							ROCK STRENGTH	CONSOLIDATION			SOIL STRENGTH			CORROSITIVITY		NOTES
Boring / Test Pit No.	Sample No.	From Depth (ft)	To Depth (ft)	Water Content (%)	Atterberg Limits	Washed Sieve -200 (%)	Hydrometer	Sieve - Hydrometer	Organic Content Determination (%)	Soil Specific Gravity	Unconfined Compressive Strength	Thin Walled Tube Extrusion [1]	Consolidation Test with Coefficent of Consolidation Data (Constant Rate of Strain Consolidation)	Consolidation Test with Coefficent of Consolidation Data (With unload - reload)	Unconsolidated Undrained (UU)	Consoldated Undrained (CIU)	Direct Simple Shear (DSS)	pH	Sulfides	
SB-02-3	S-14	55	57	61.4																
SB-02-3	S-16	65	67	44.3																
SB-02-3	S-18	75	77	59.7																
SB-02-3	S-20	85	87	46.9																
SB-02-3	S-22	95	97	42.9																
SB-02-3	S-24	105	107	48.6																

[1]Tube Extrusion includes Torvane measurements and Natural Water Contents.

Submitted By		*Date*	
Printed Name			
Samples Received By		*Date*	
Printed Name			

GEODESIGN
INCORPORATED
984 Southford Rd
Middlbury, CT 06762
Phone: 203 758 8836 Fax: 203 758 8842

Appendix 8

Gradation and Hydrometer Tests

2003 Gradation Tests

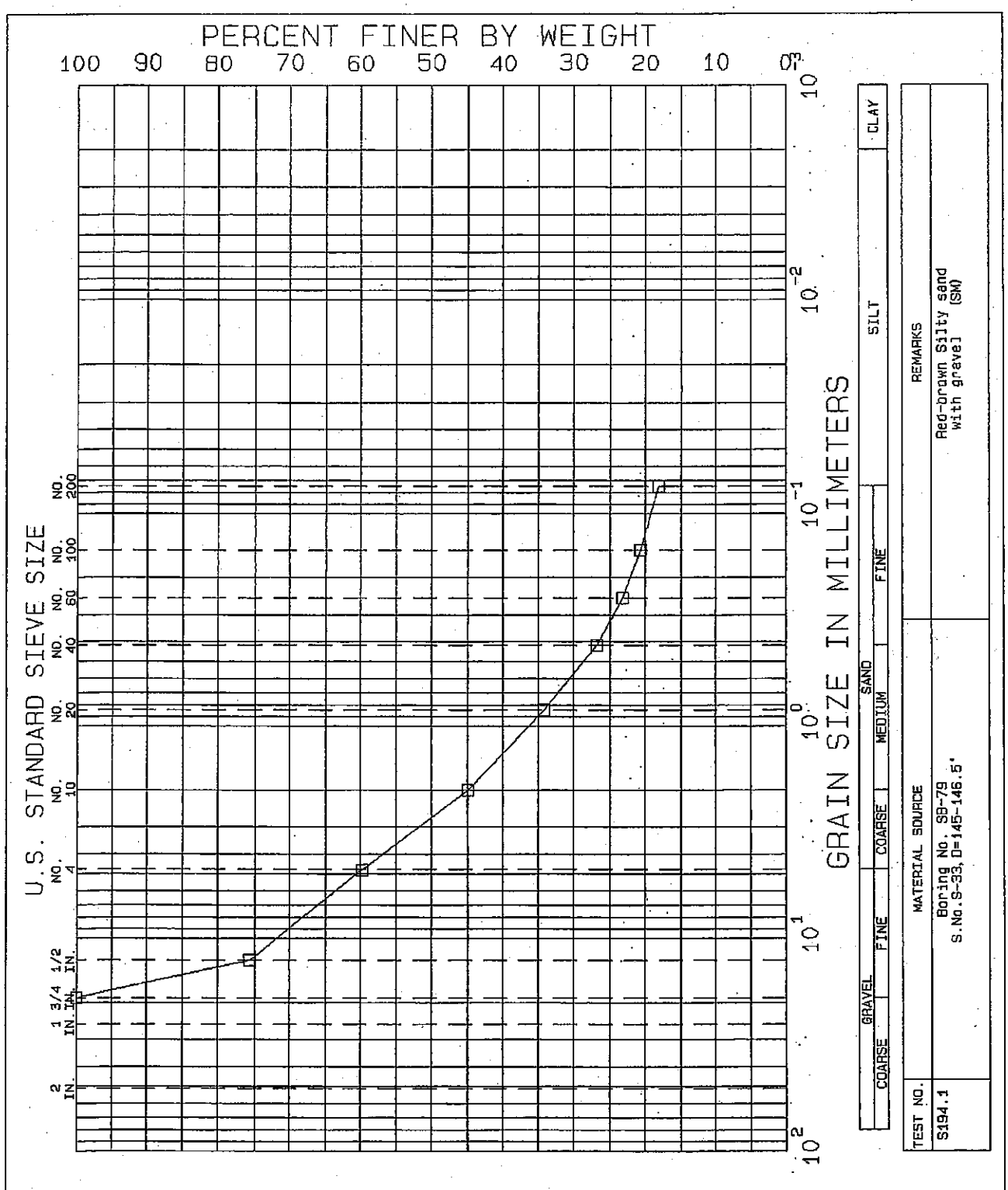
2008 Gradation Tests

2008 Minus No. 200 Gradation Tests

2003 Hydrometer Tests

2008 Hydrometer Tests

2003 Gradation Tests

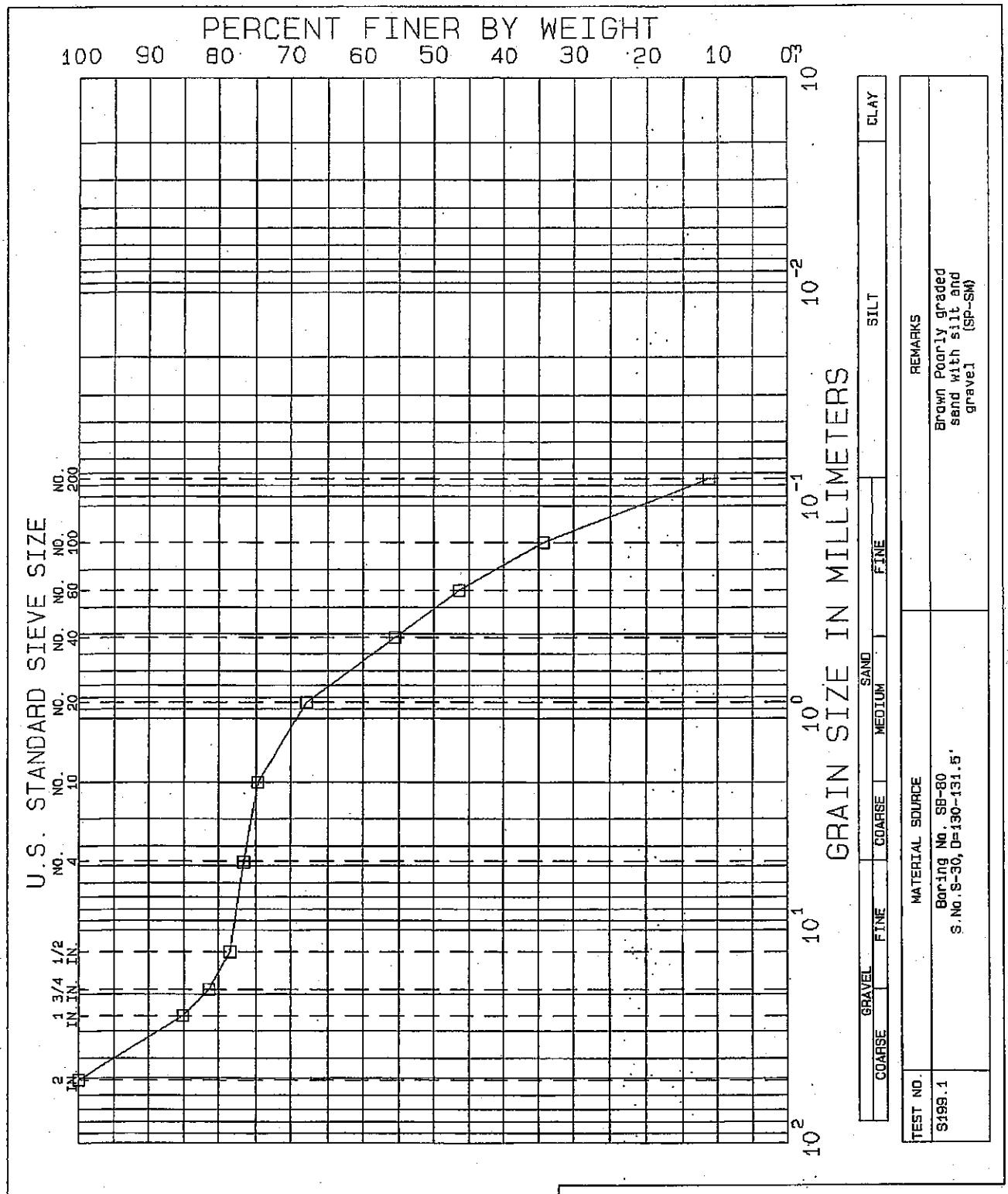


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

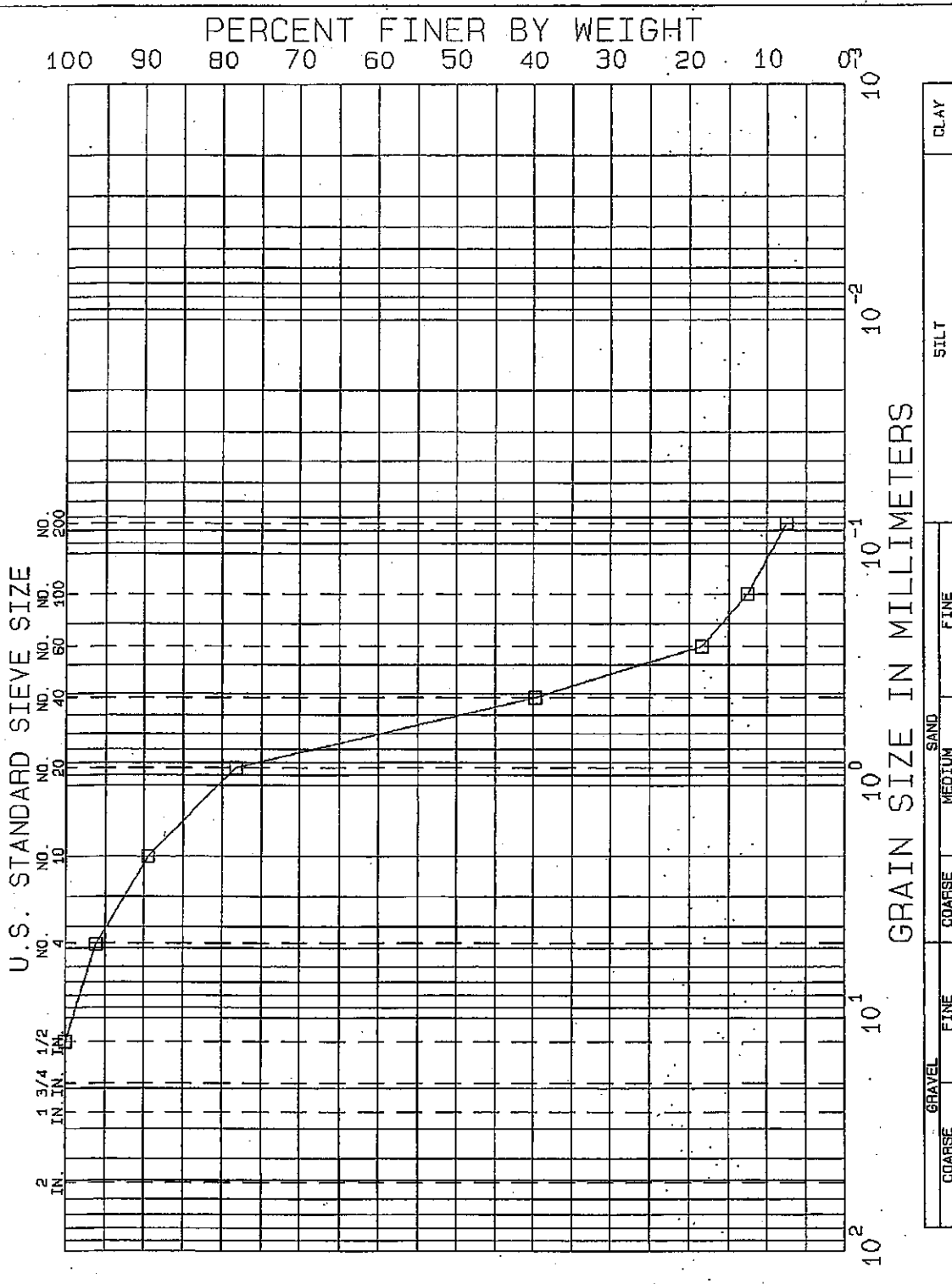
GRADATION TESTS

BORING NO.	SB-79	TEST SERIES	
SAMPLE	S-33	NO.	194
DEPTH	145-146.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17628



NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
GRADATION TESTS

BORING NO.	SB-80	TEST SERIES	
SAMPLE	S-30	NO.	199
DEPTH	130-131.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



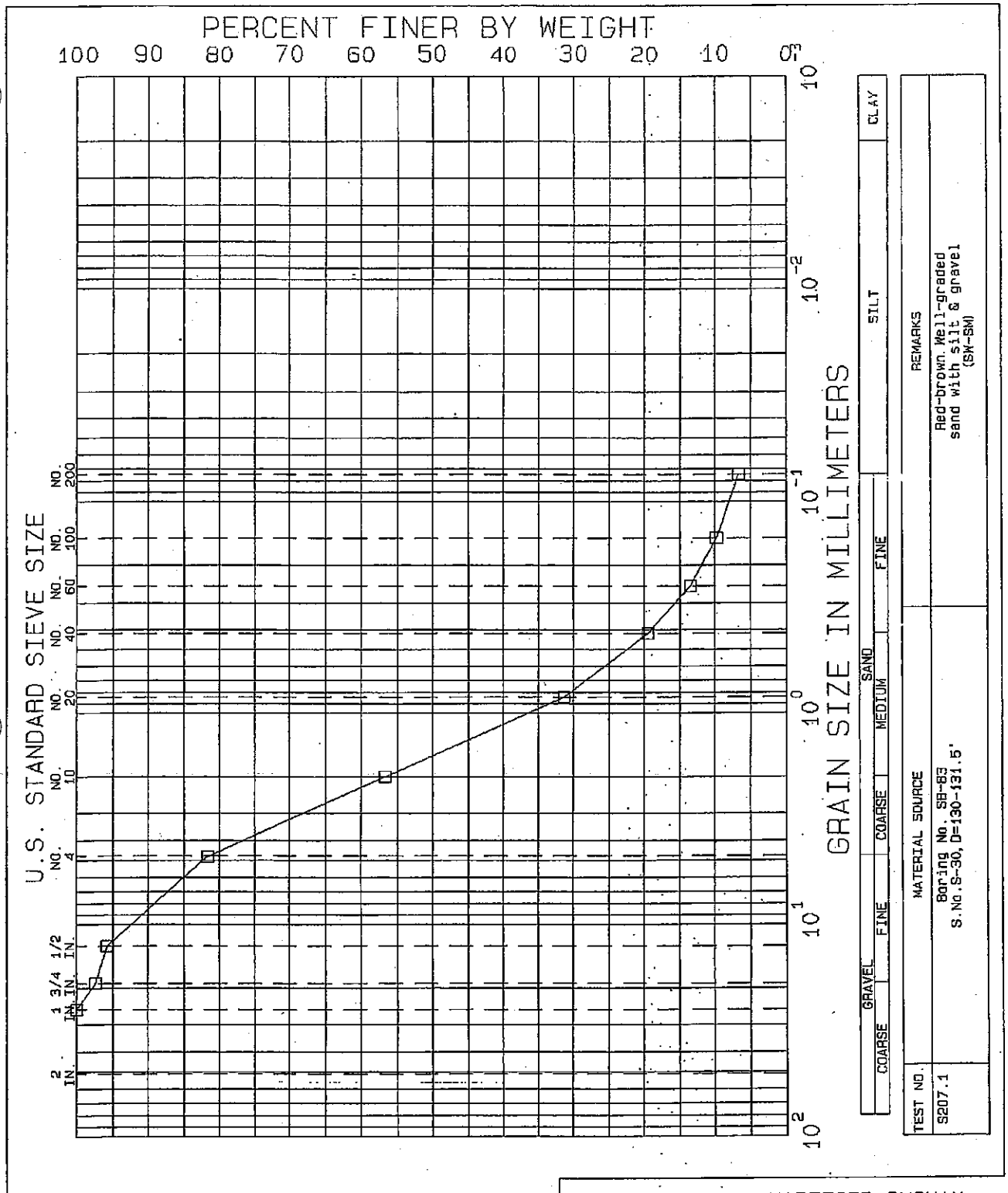
TEST NO.	MATERIAL SOURCE	REMARKS
S204.1	Boring No. SB-82 S.No.S-28, D=125-126.5'	Red-brown Well-graded sand with silt (SW-SM)

NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-82	TEST SERIES NO.	204
SAMPLE	S-28	DATE	Dec.03
DEPTH	125-126.5'		
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

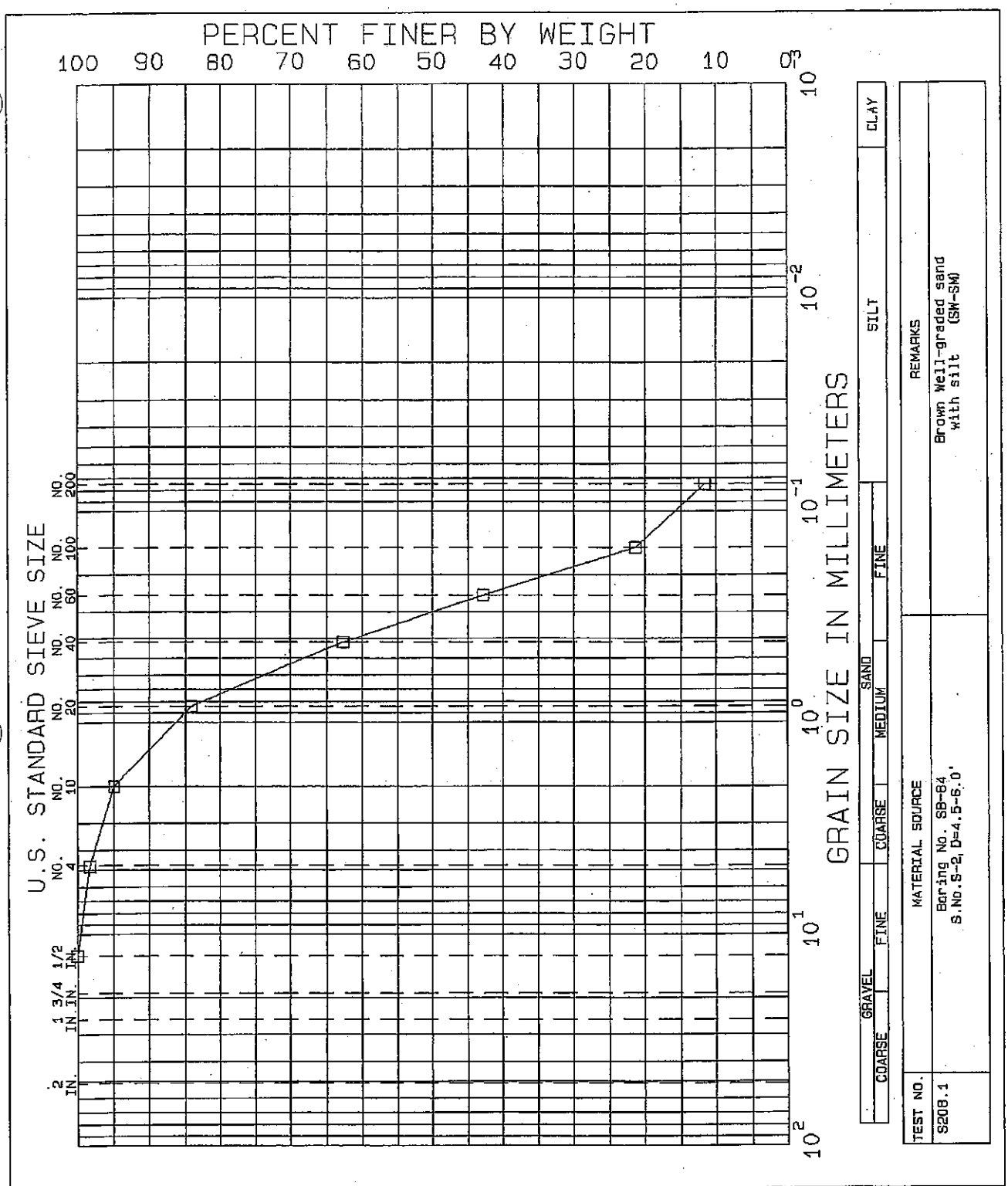
CONNECTICUT

GRADATION TESTS

BORING NO. SB-83
SAMPLE S-30
DEPTH 130-131.5'
TECH. CAG
REVIEWER MBP

TEST SERIES
NO. 207
DATE Dec.03

FILE L17828



NEW BRITAIN-HARTFORD BUSWAY

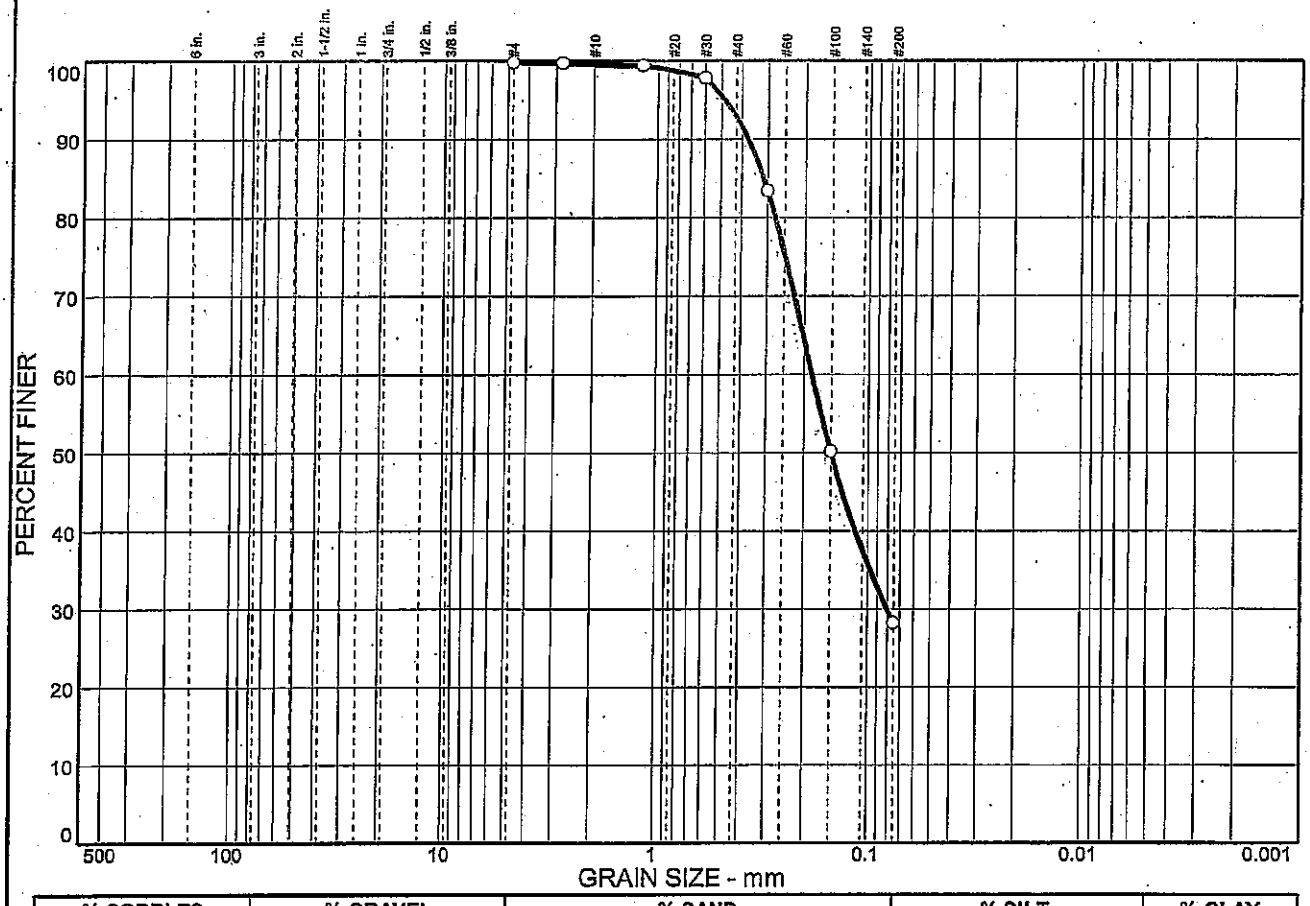
CONNECTICUT

GRADATION TESTS

BORING NO.	SB-84	TEST SERIES	
SAMPLE	S-2	NO.	208
DEPTH	4.5-6.0'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

2008 Gradation Tests

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		71.6	28.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	99.8		
#7	99.7		
#16	99.4		
#30	97.8		
#50	83.4		
#100	50.2		
#200	28.2		

* (no specification provided)

Soil Description

Reddish brown - Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.314 D_{60}= 0.184 D_{50}= 0.149
D_{30}= 0.0804 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

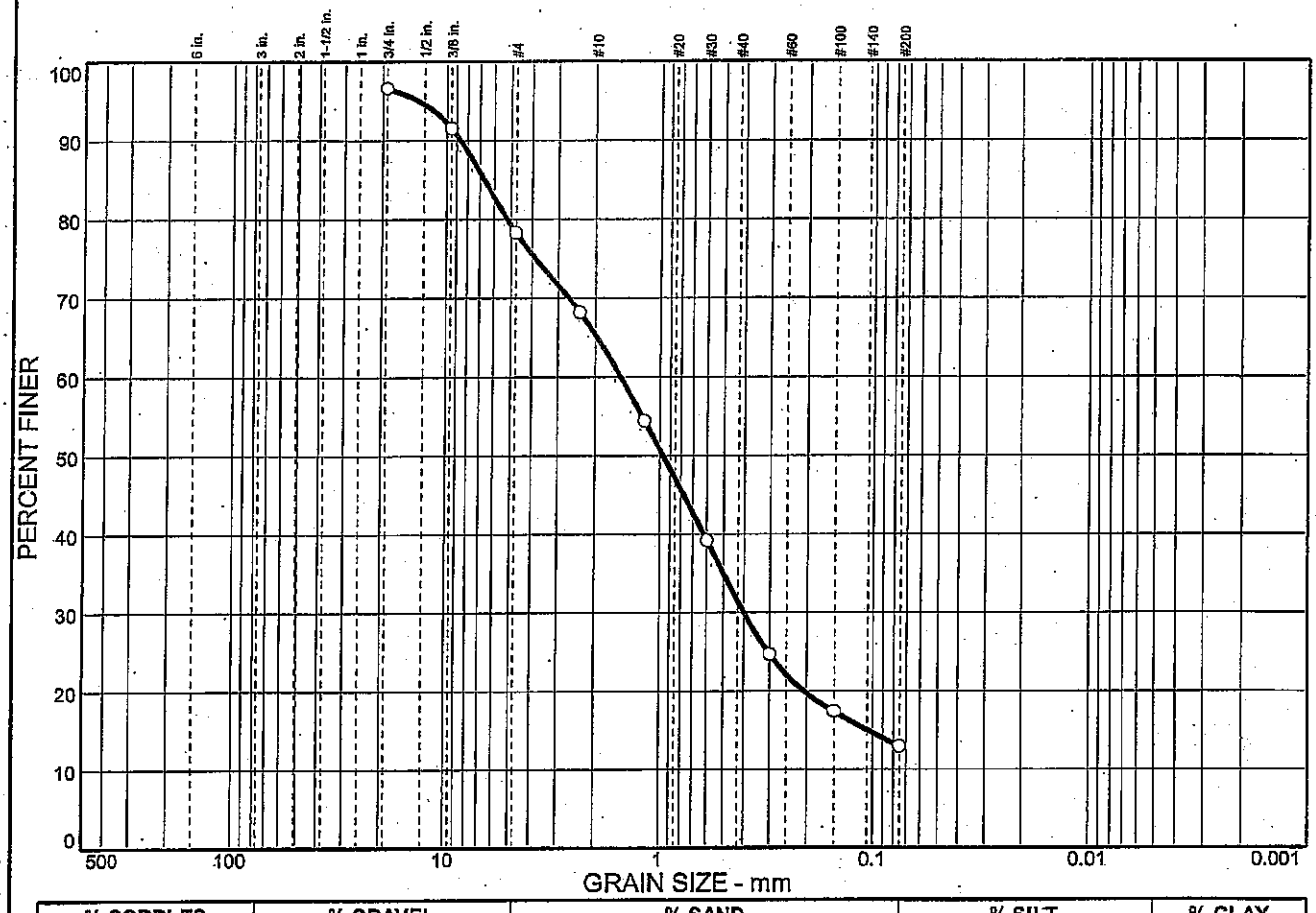
Remarks

Sample delivered by client on 07/28/08. Tested by M. Mbakwe on 10/08/08

Sample No.: 1 SA **Source of Sample:** SB-02-1 (S-29) **Date:** 10/08/08
Location: **Elev./Depth:** 140' - 142'

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No:** **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		65.4	12.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	96.6		
.375 in.	91.5		
#4	78.3		
#8	68.2		
#16	54.4		
#30	39.2		
#50	24.7		
#100	17.4		
#200	12.9		

* (no specification provided)

Soil Description

Reddish brown & gray white-Silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 6.67 D_{60}= 1.53 D_{50}= 0.967
D_{30}= 0.398 D_{15}= 0.105 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

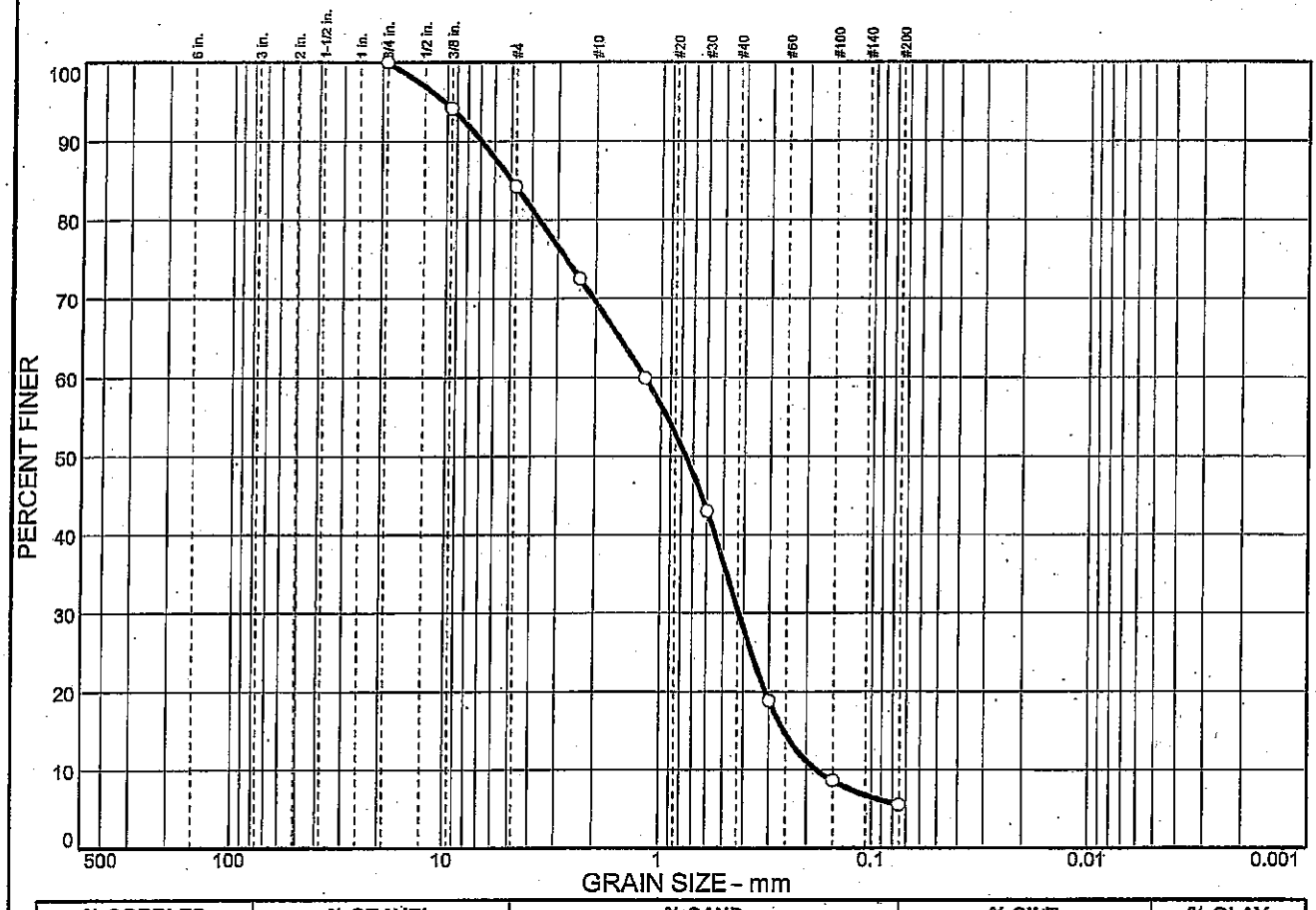
Remarks

Sample delivered by client on 07/28/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 7 SA **Source of Sample:** SB-02-2 (S-32) **Date:** 10/08/08
Location: **Elev./Depth:** 145' - 147'

TEST-CON INCORPORATED	Client: GeoDesign
16 East Franklin Street, PO BOX 3116	Project: New Britain-Hartford Busway #155-H025
DANBURY, CT 06813-3116	Project No: Plate

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	15.8	78.7	5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	94.1		
#4	84.2		
#8	72.5		
#16	59.9		
#30	43.0		
#50	18.8		
#100	8.6		
#200	5.5		

* (no specification provided)

Soil Description

Reddish brown/gray-Poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 4.99 D_{60}= 1.19 D_{50}= 0.760
D_{30}= 0.420 D_{15}= 0.255 D_{10}= 0.179
C_u= 6.62 C_c= 0.83

Classification

USCS= SP-SM AASHTO=

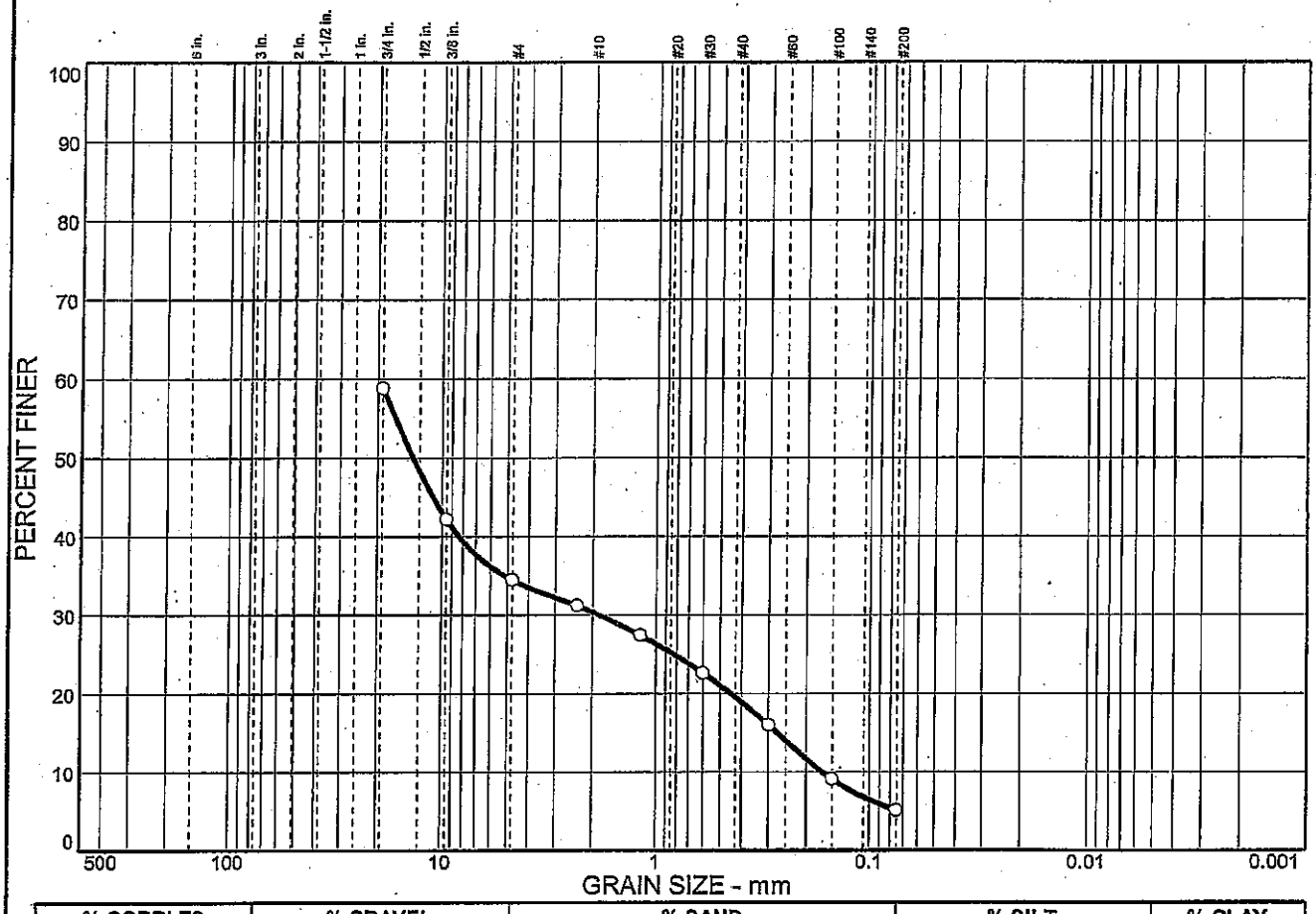
Remarks

Sample delivered by client on 07/28/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 9 SA **Source of Sample:** SB-02-3 (S-30) **Date:** 10/08/08
Location: **Elev./Depth:** 135' - 137'

TEST-CON INCORPORATED 16 East Franklin Street, PO BOX 3116 DANBURY, CT 06813-3116	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No:** **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		29.4	5.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	58.8		
.375 in.	42.2		
#4	34.5		
#8	31.2		
#16	27.4		
#30	22.6		
#50	16.0		
#100	9.1		
#200	5.1		

* (no specification provided)

Soil Description

Dark brown-Poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}= 13.6
D_{30}= 1.85 D_{15}= 0.273 D_{10}= 0.167
C_u= C_c=

Classification

USCS= GP-GM AASHTO=

Remarks

Sample delivered by client on 08/01/08. Tested by M. Mbakwe on 10/08/08.

Sample No.: 41 SA **Source of Sample:** SB-02-2 (S-1) **Date:** 10/08/08
Location: **Elev./Depth:** 0'-2'

TEST-CON INCORPORATED **16 East Franklin Street, PO BOX 3116** **DANBURY, CT 06813-3116**	**Client:** GeoDesign **Project:** New Britain-Hartford Busway #155-H025 **Project No:** **Plate**

2008 Minus No. 200 Gradation Tests

TEST-CON INCORPORATED

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E-Mail: Service@test-con.com Web-Site: www.test-con.com

LABORATORY TEST CERTIFICATE

Date: 08/15/08

Report #: 1 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Reddish Brown

Date Received: Sample delivered by client on 07/28/08

Identification #: SB-02-1 (S-29) Elevation/Depth: 140-142'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked

SUMMARY DATA

Initial Weight:	247.5 g
Weight After Wash:	177.9g
Percentage of material finer than #200:	28.1 %

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6/26/08

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E-Mail: Service@test-con.comWeb-Site: www.test-con.com

TEST-CON Incorporated

LABORATORY TEST CERTIFICATE

Date: 08/18/08

Report #: 9 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Reddish Brown – Gray

Date Received: Sample delivered by client on 07/28/08

Identification #: SB-02-3 (S-30) Elevation/Depth: 135'- 137'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	221.4 g
Weight After Wash:	208.6 g
Percentage of material finer than #200:	5.7 %

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6/26/08

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LABORATORY TEST CERTIFICATE

Date: 09/10/08

Report #: 41 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Dark brown

Date Received: Sample delivered by client on 08/01/08

Identification #: SB-02-2 (S-1) Elevation/Depth: 0' – 2'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	253.6 g
Weight After Wash:	242.9 g
Percentage of material finer than #200:	4.2 %

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LABORATORY TEST CERTIFICATE

Date: 08/18/08

Report #: 7 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Reddish Brown & Gray White

Date Received: Sample delivered by client on 07/28/08

Identification #: SB-02-2 (S-32) Elevation/Depth: 145'- 147'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	341.7 g
Weight After Wash:	298.3 g
Percentage of material finer than #200:	12.7 %

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LABORATORY TEST CERTIFICATE

Date: 08/18/08

Report #: 5 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Light Brown – Gray

Date Received: Sample delivered by client on 07/28/08

Identification #: SB-02-3 (S-5) Elevation/Depth: 10'- 12'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked

SUMMARY DATA

Initial Weight:	191.08 g
Weight After Wash:	56.8 g
Percentage of material finer than #200:	70.2 %

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6/26/08

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LABORATORY TEST CERTIFICATE

Date: 08/27/08

Report #: 38 SA
Technician: R. DeCesare

Client: Geodesign Inc.
984 Southford Rd
Middlebury, CT 06762

Project: New Britain-Hartford Busway #155-H025
Hartford/West Hartford, CT

Description: Grayish brown

Date Received: Sample delivered by client on 08/01/08

Identification #: R-119 (S-3) Elevation/Depth: 5'- 7'

Test Requirements: Material in soil finer than #200 sieve

Remarks: D1140 Method A – Dry mass calculated by oven drying. Specimen was soaked.

SUMMARY DATA

Initial Weight:	178.7 g
Weight After Wash:	146.7 g
Percentage of material finer than #200:	17.9 %

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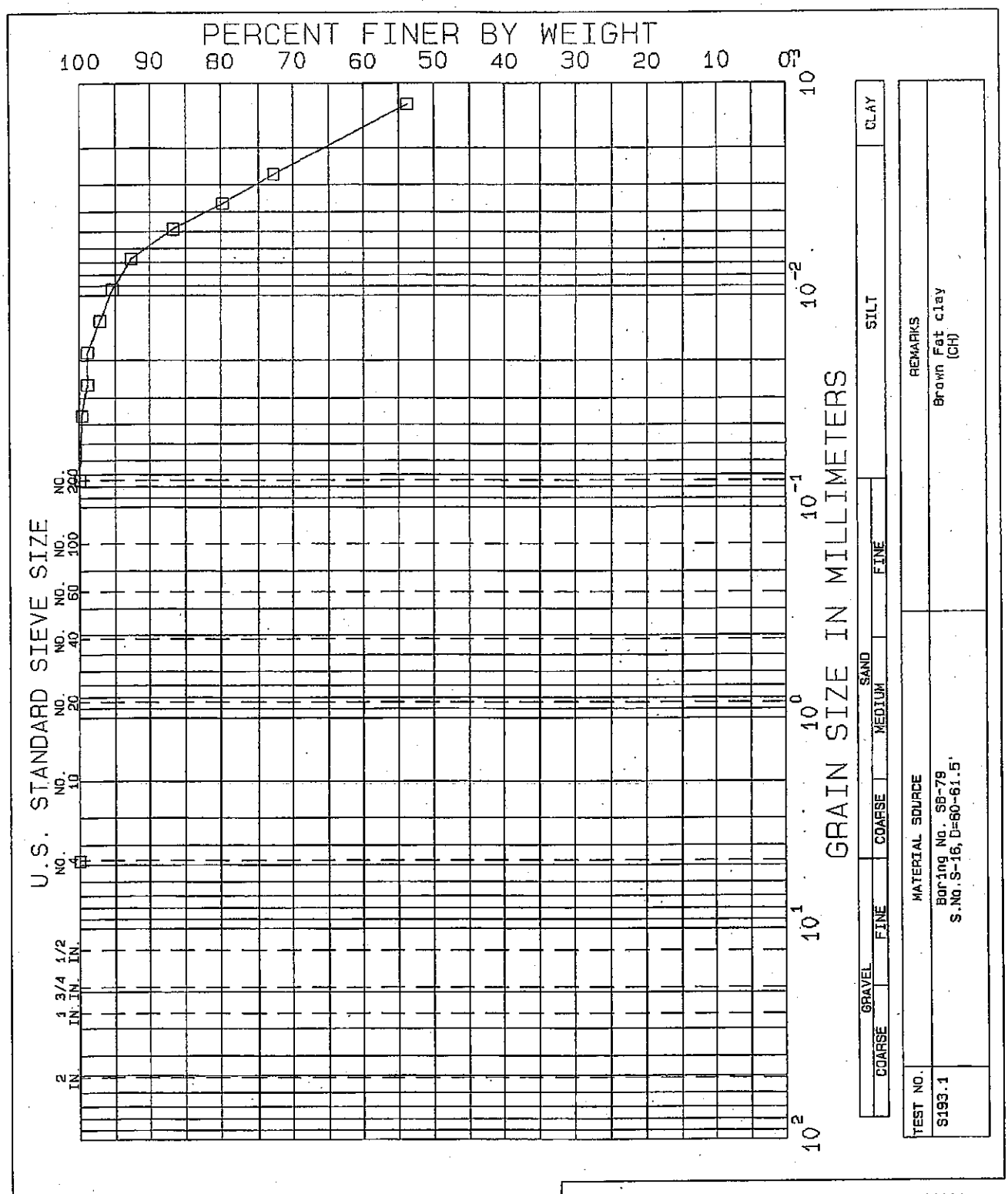
6/26/08

2003 Hydrometer Tests

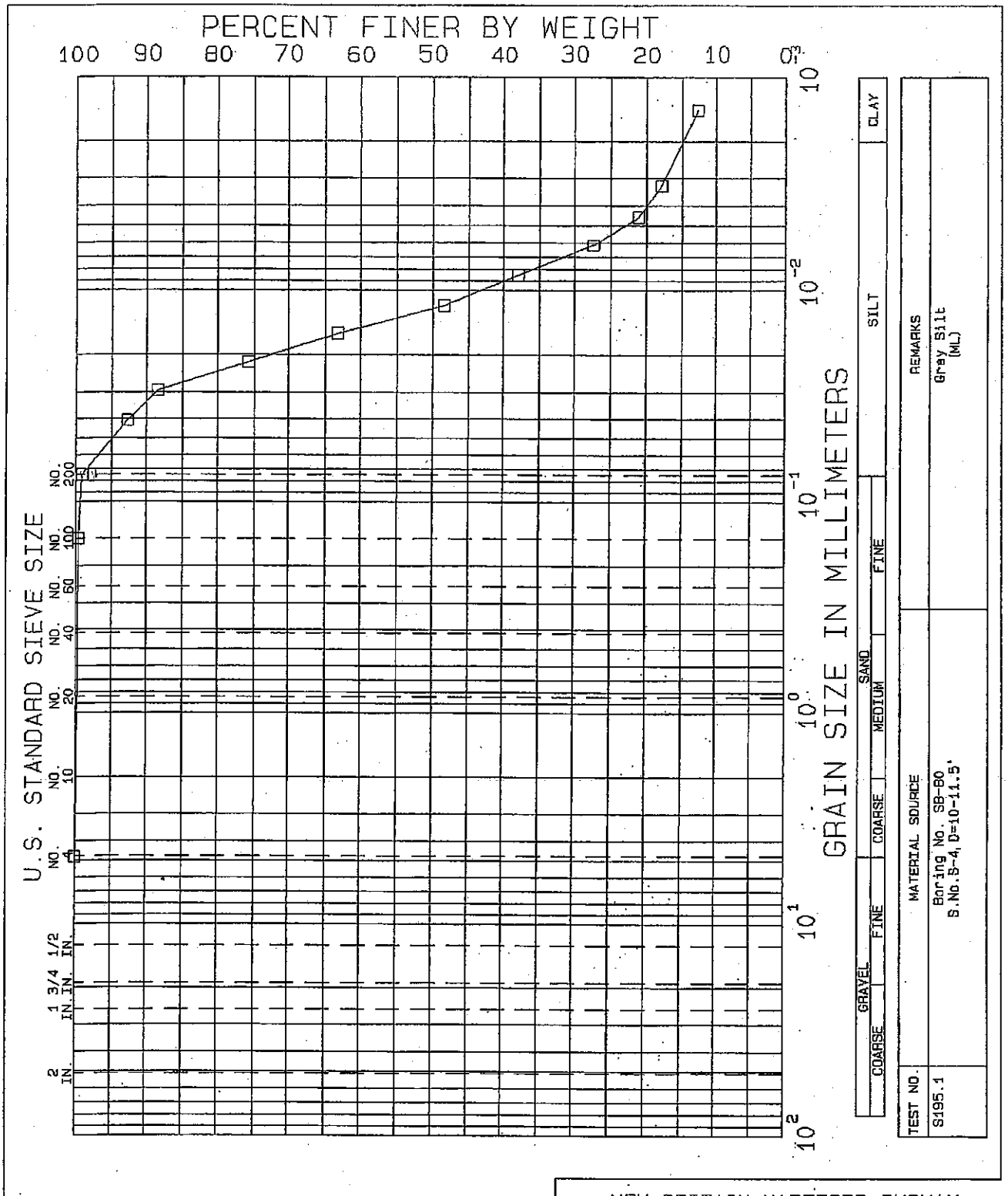


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-79	TEST SERIES	
SAMPLE	S-16	NO.	193
DEPTH	60-61.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

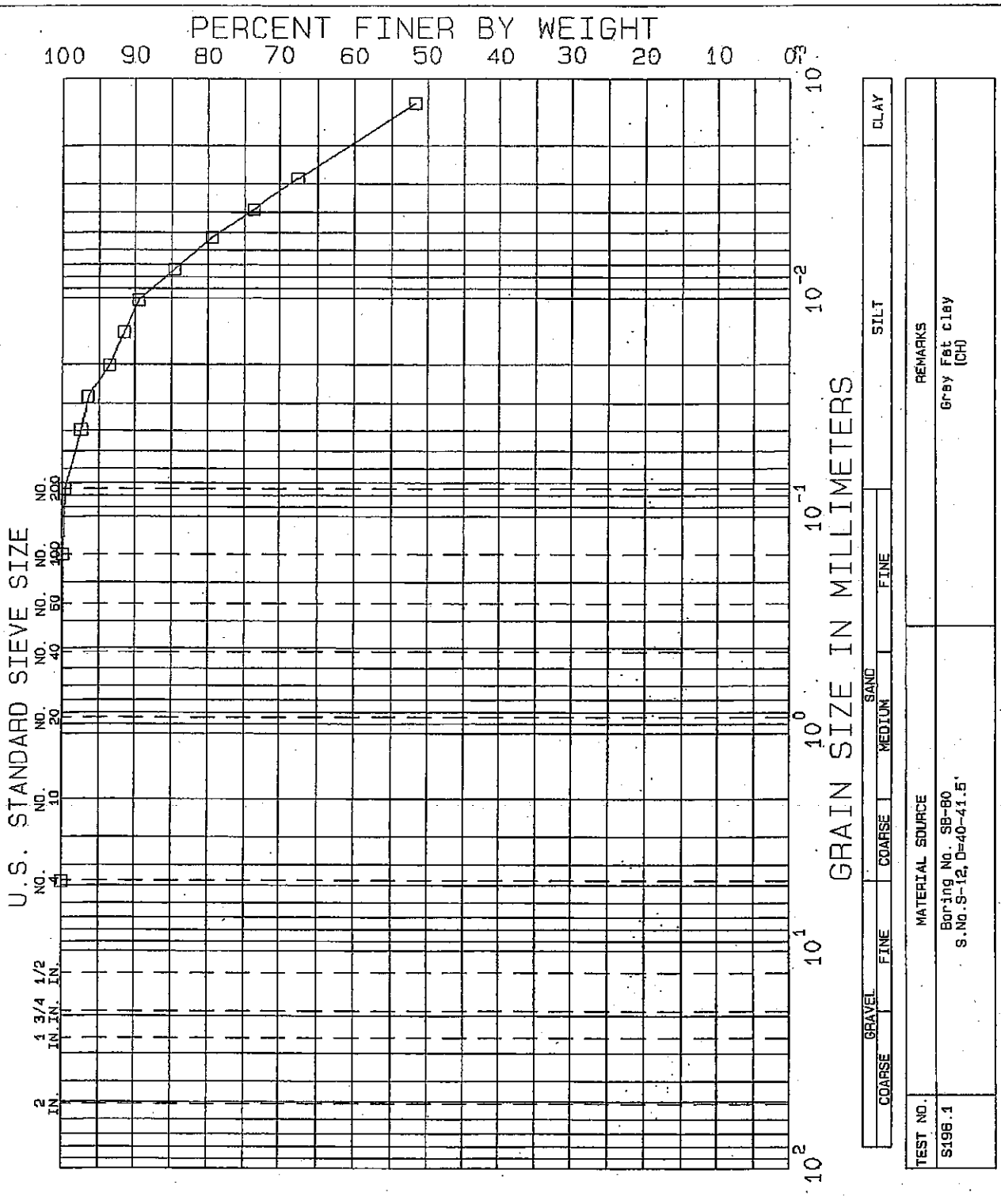
CONNECTICUT

GRADATION TESTS

BORING NO. SB-80
SAMPLE S-4
DEPTH 10-11.5'
TECH. CAG
REVIEWER MBP

TEST SERIES
NO. 195
DATE Dec.03

FILE L17828

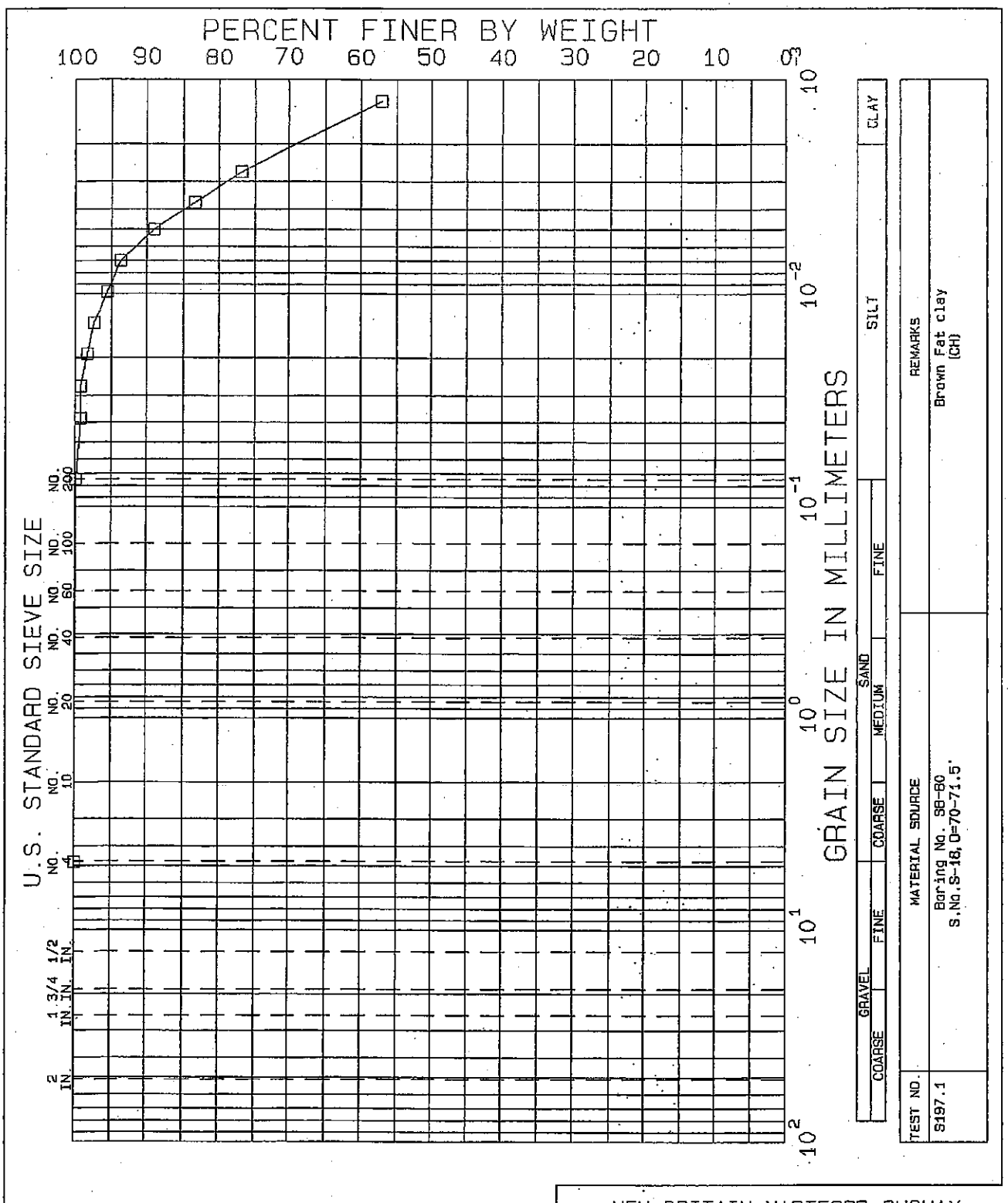


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	S8-80	TEST SERIES	
SAMPLE	S-12	NO.	196
DEPTH	40-41.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

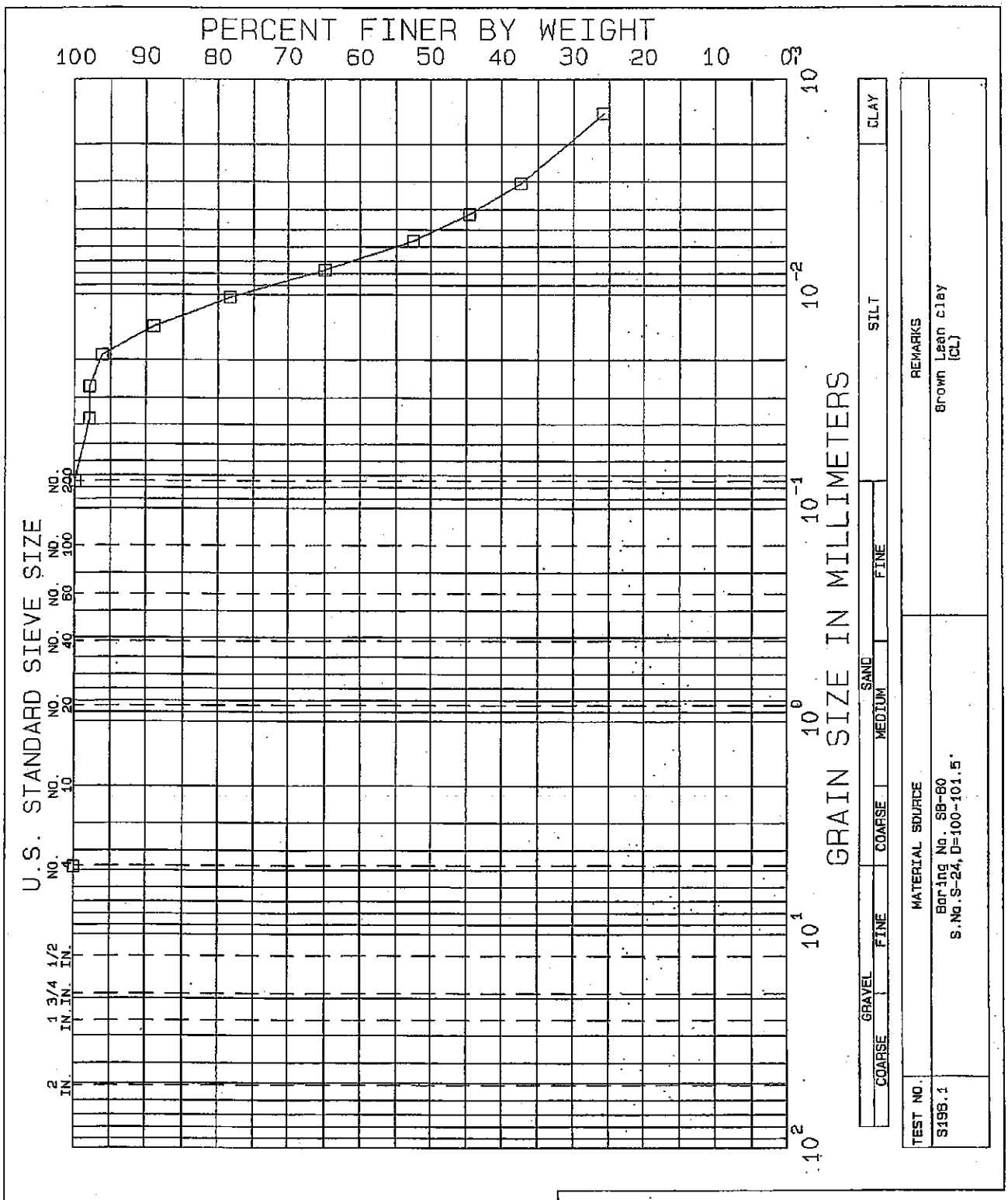


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-80	TEST SERIES	
SAMPLE	S-18	NO.	197
DEPTH	70-71.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

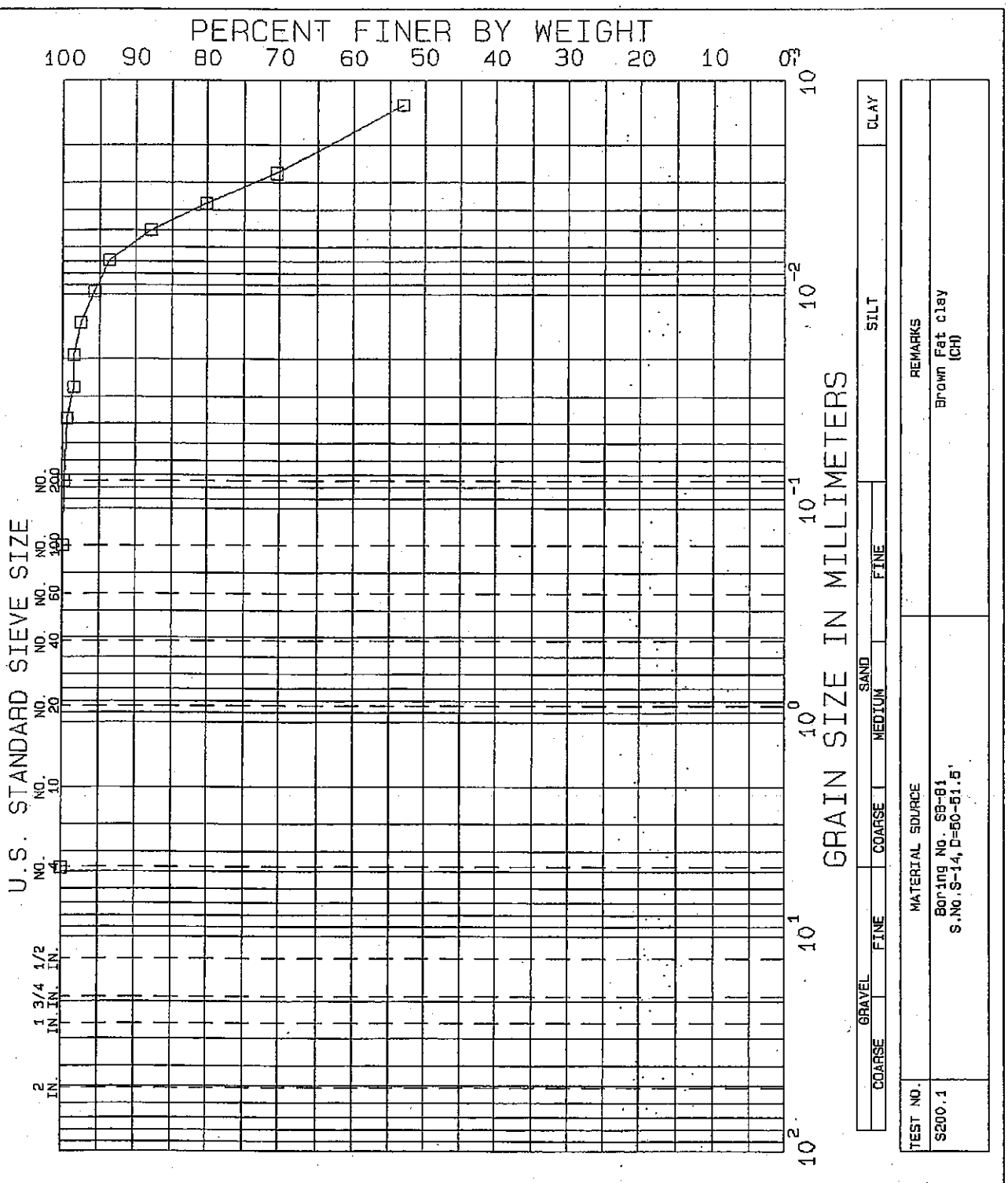


NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
GRADATION TESTS

BORING NO. SB-60
SAMPLE S-24
DEPTH 100-101.5'
TECH. CAG
REVIEWER MBP

TEST SERIES
NO. 198
DATE Dec.03

FILE L17828

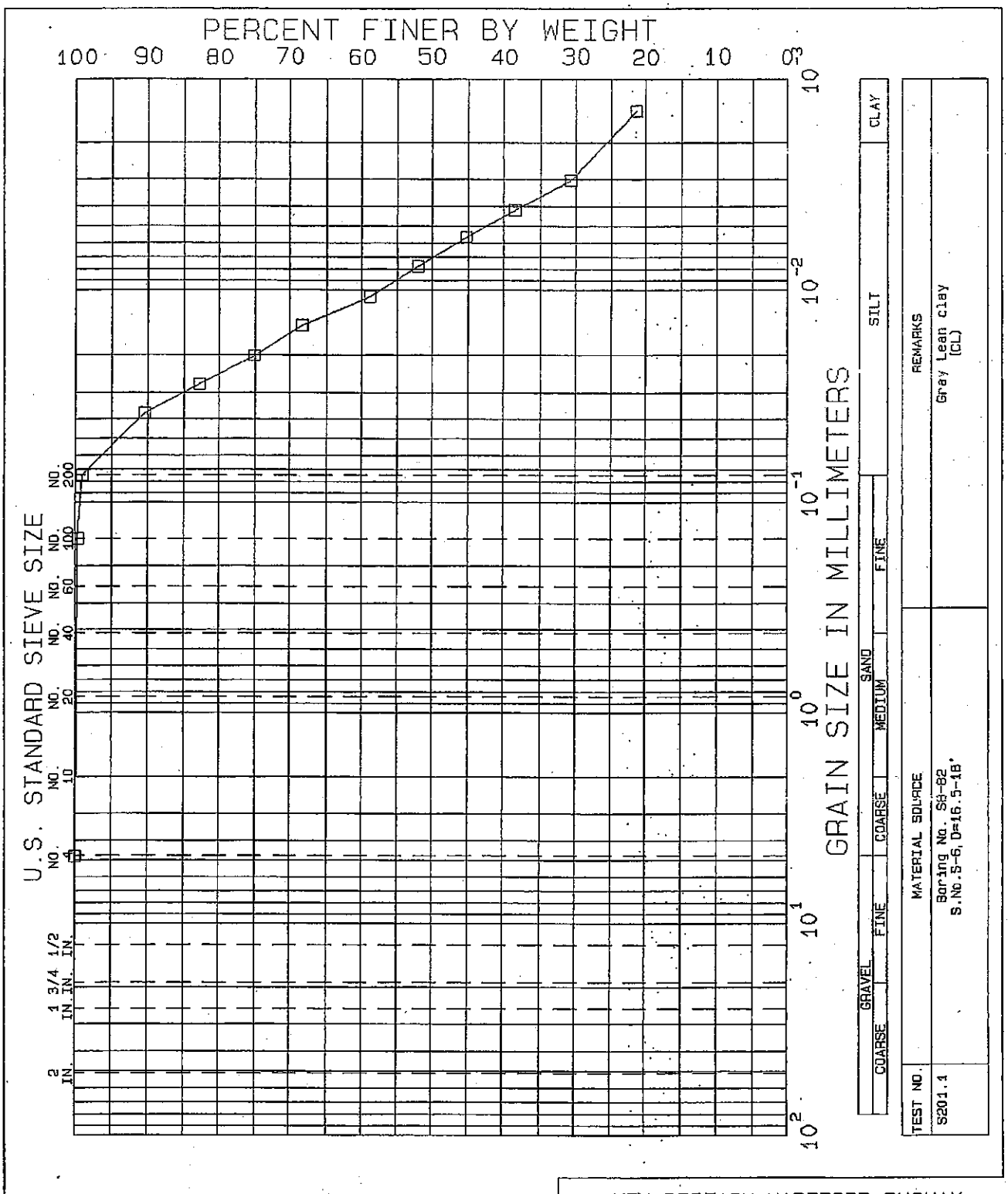


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-81	TEST SERIES	
SAMPLE	S-14	NO.	200
DEPTH	50-51.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

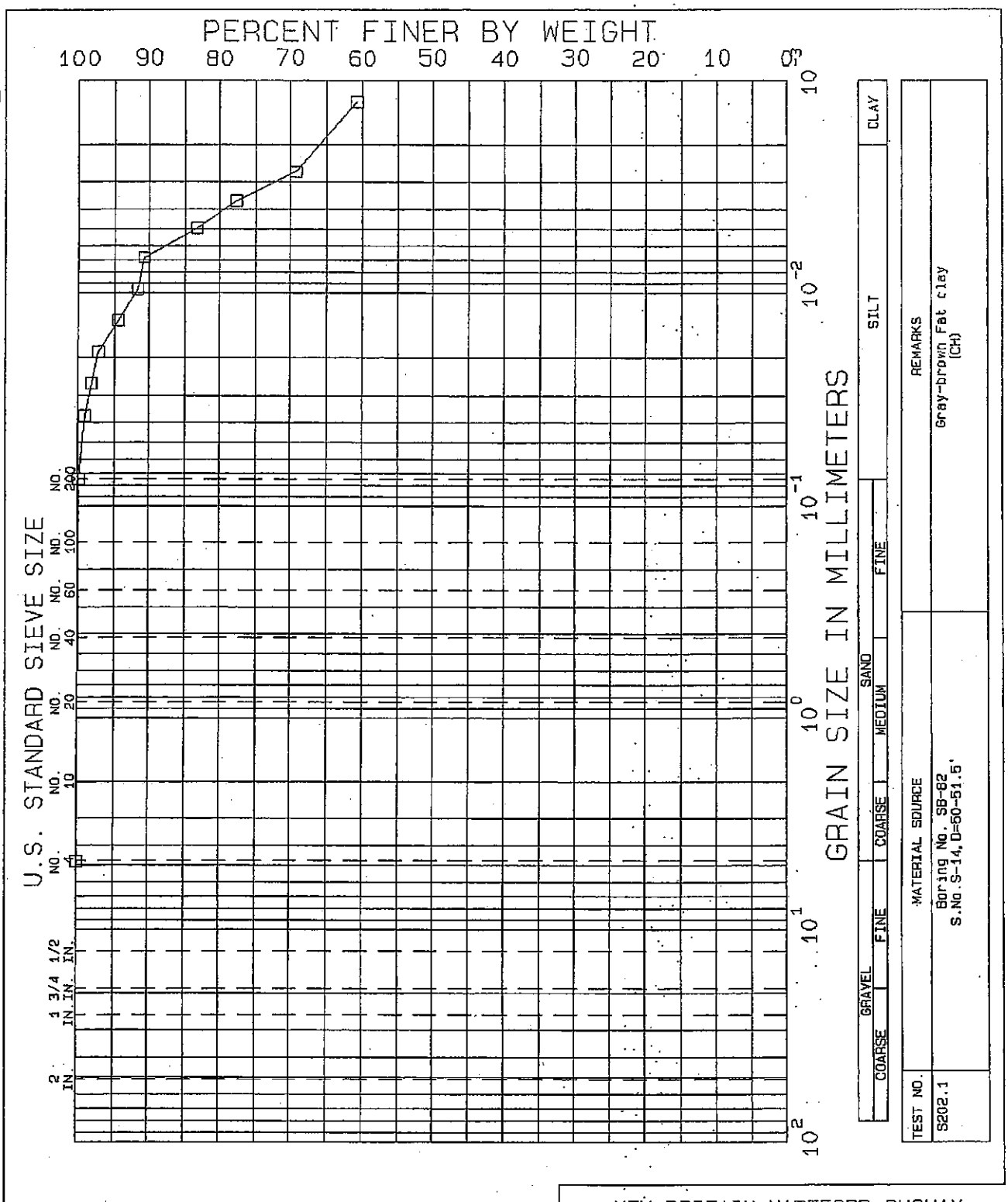


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-82	TEST SERIES	
SAMPLE	S-6	NO.	201
DEPTH	16.5-18'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

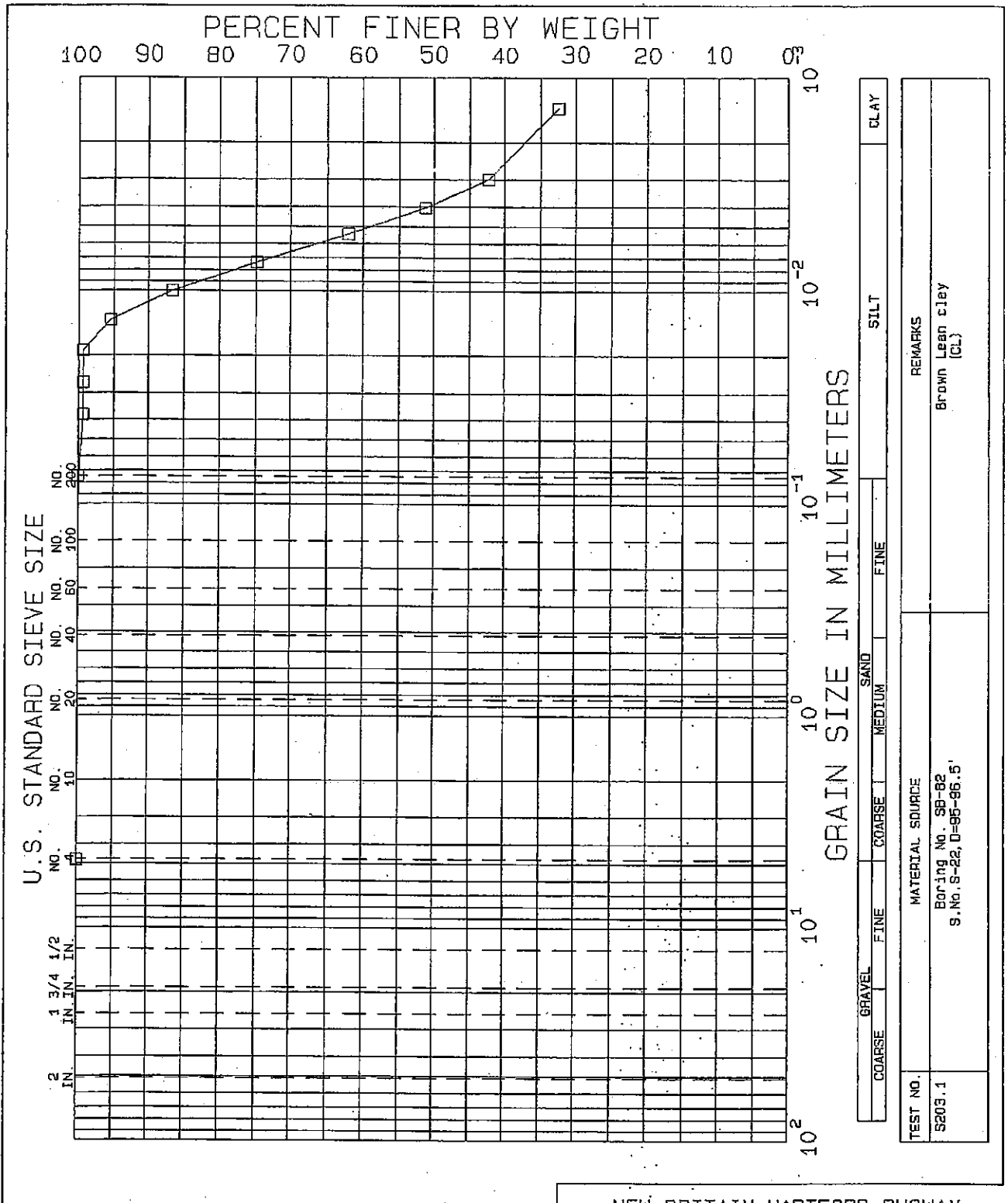


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

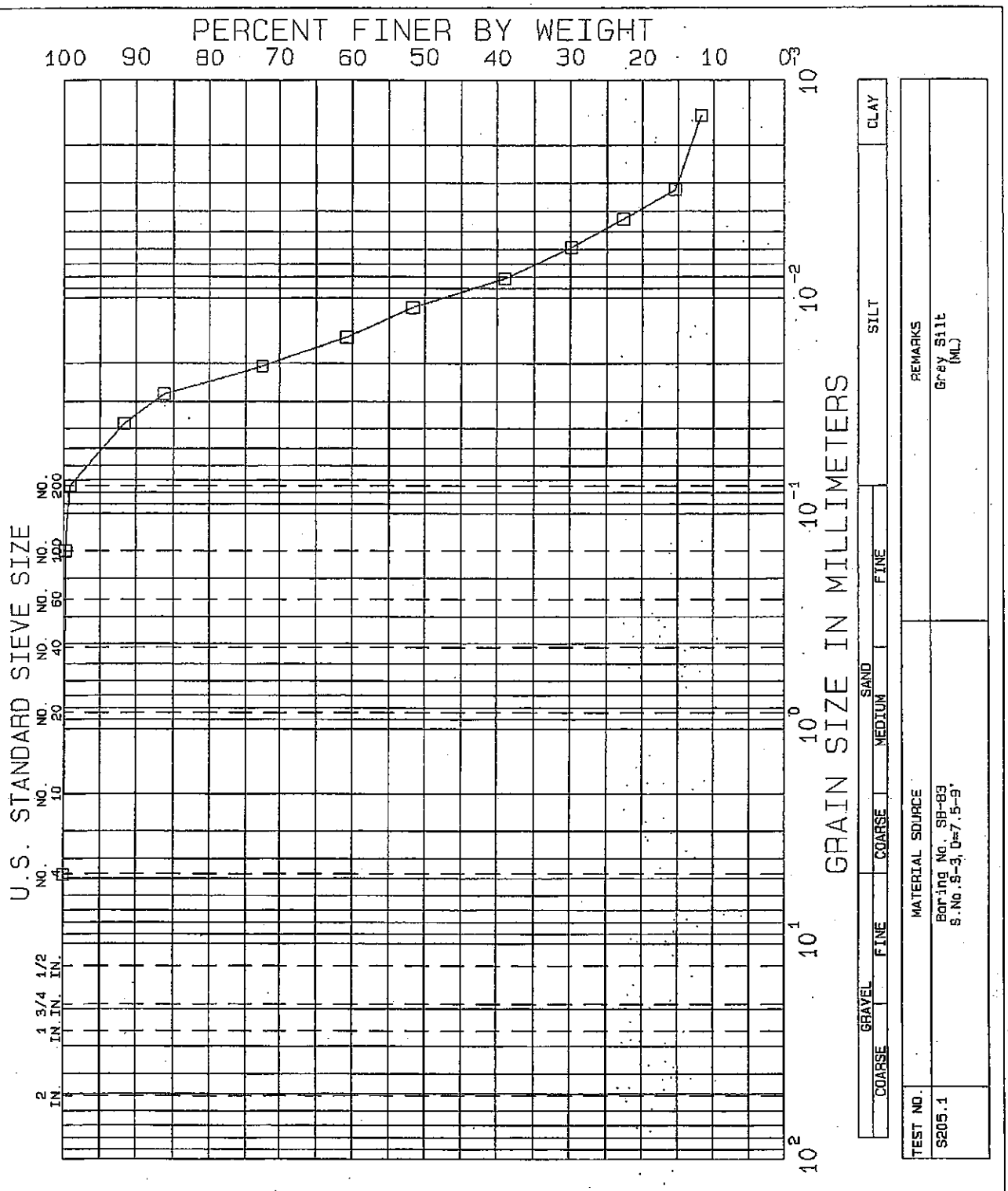
GRADATION TESTS

BORING NO.	SB-82	TEST SERIES	
SAMPLE	S-14	NO.	202
DEPTH	50-51.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
GRADATION TESTS

BORING NO.	SB-82	TEST SERIES	
SAMPLE	S-22	NO.	203
DEPTH	95-96.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17628



NEW BRITAIN-HARTFORD BUSWAY

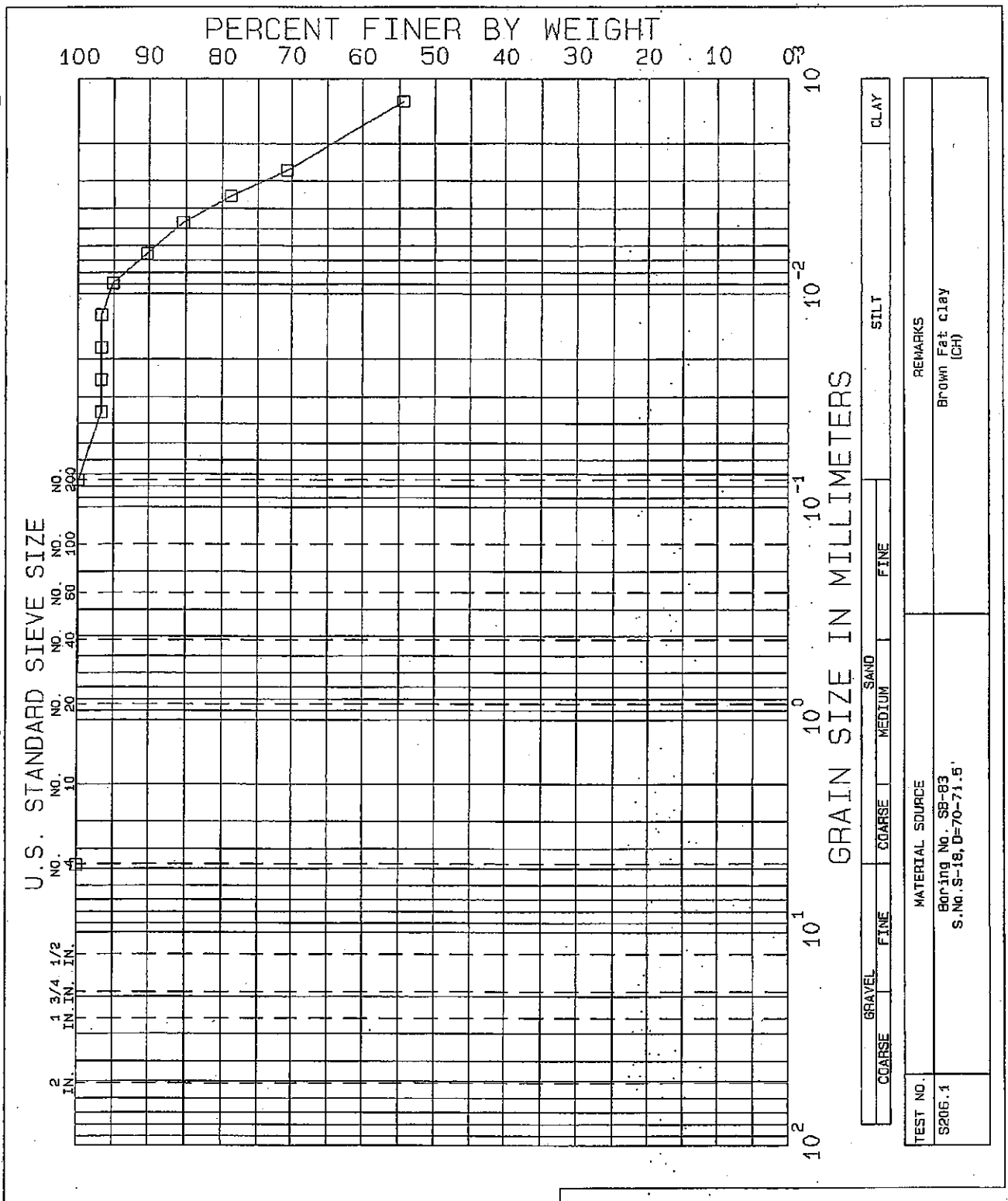
CONNECTICUT

GRADATION TESTS

BORING NO: SB-83
SAMPLE S-3
DEPTH 7.5-9'
TECH. CAG
REVIEWER MBP

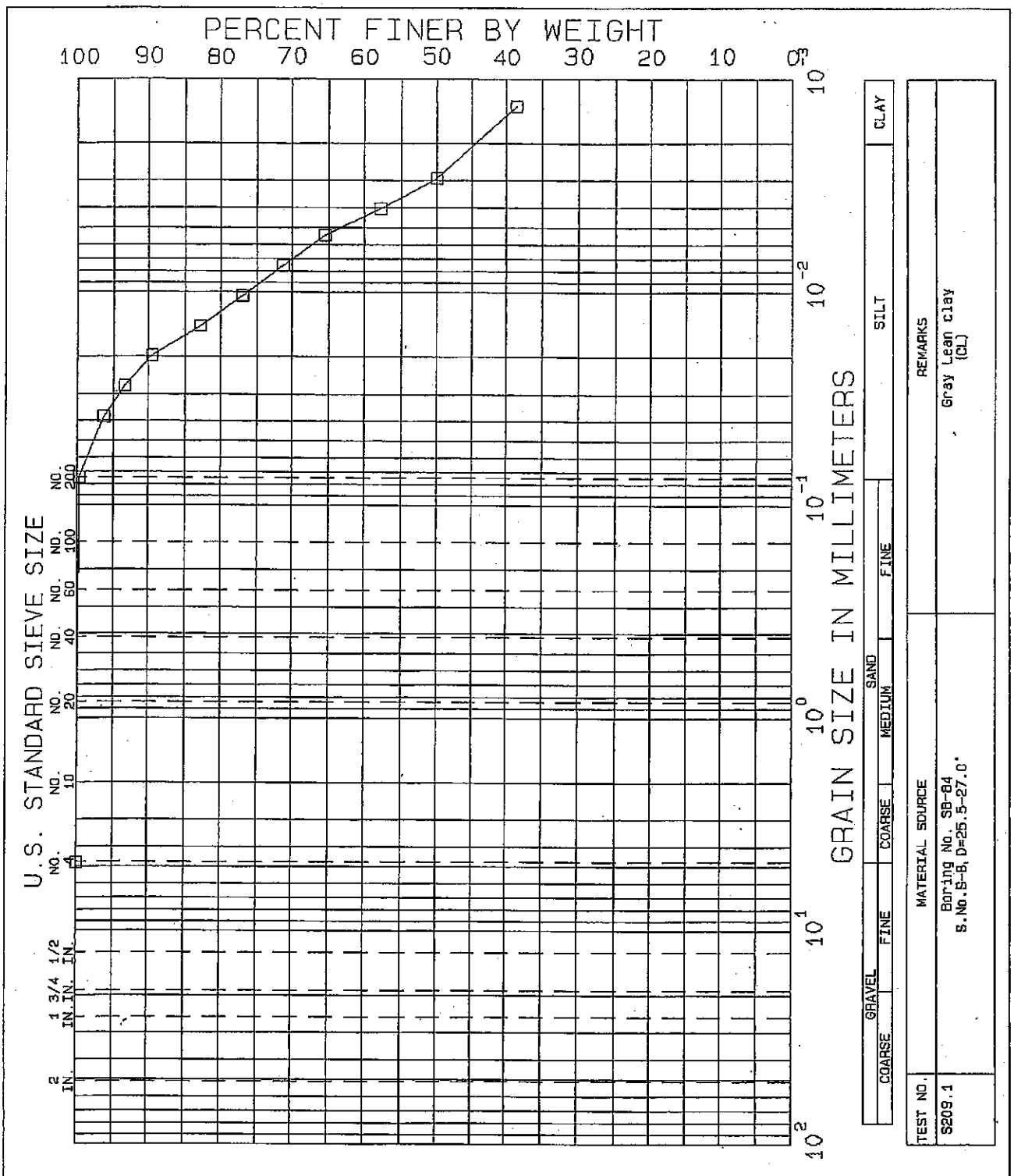
TEST SERIES
NO. 205
DATE Dec.03

FILE L17628



NEW BRITAIN-HARTFORD BUSWAY
CONNECTICUT
GRADATION TESTS

BORING NO.	SB-83	TEST SERIES NO.	206
SAMPLE	S-18	DATE	Dec.03
DEPTH	70-71.5'		
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

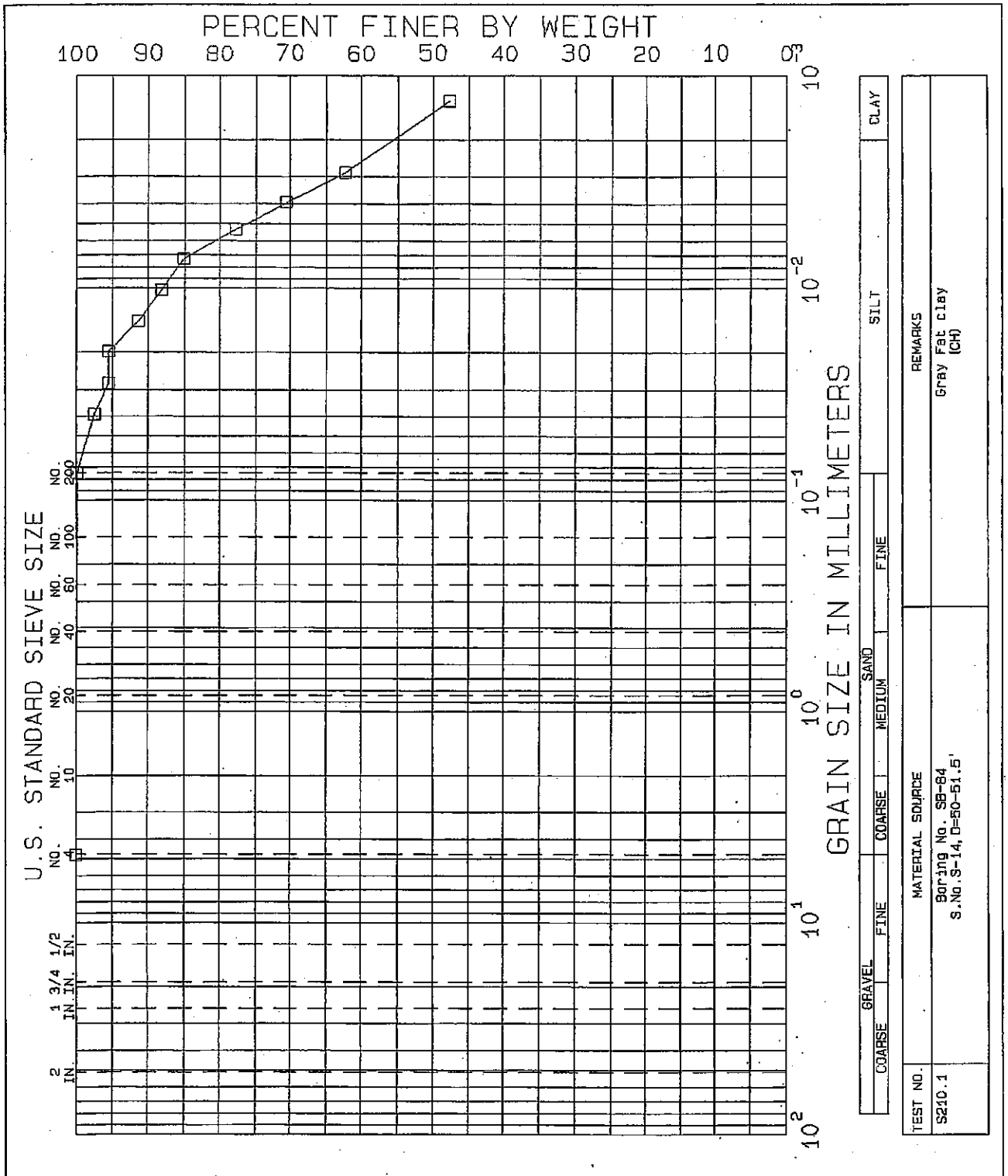


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-84	TEST SERIES NO.	209
SAMPLE	S-8	DATE	Dec.03
DEPTH	25.5-27'		
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

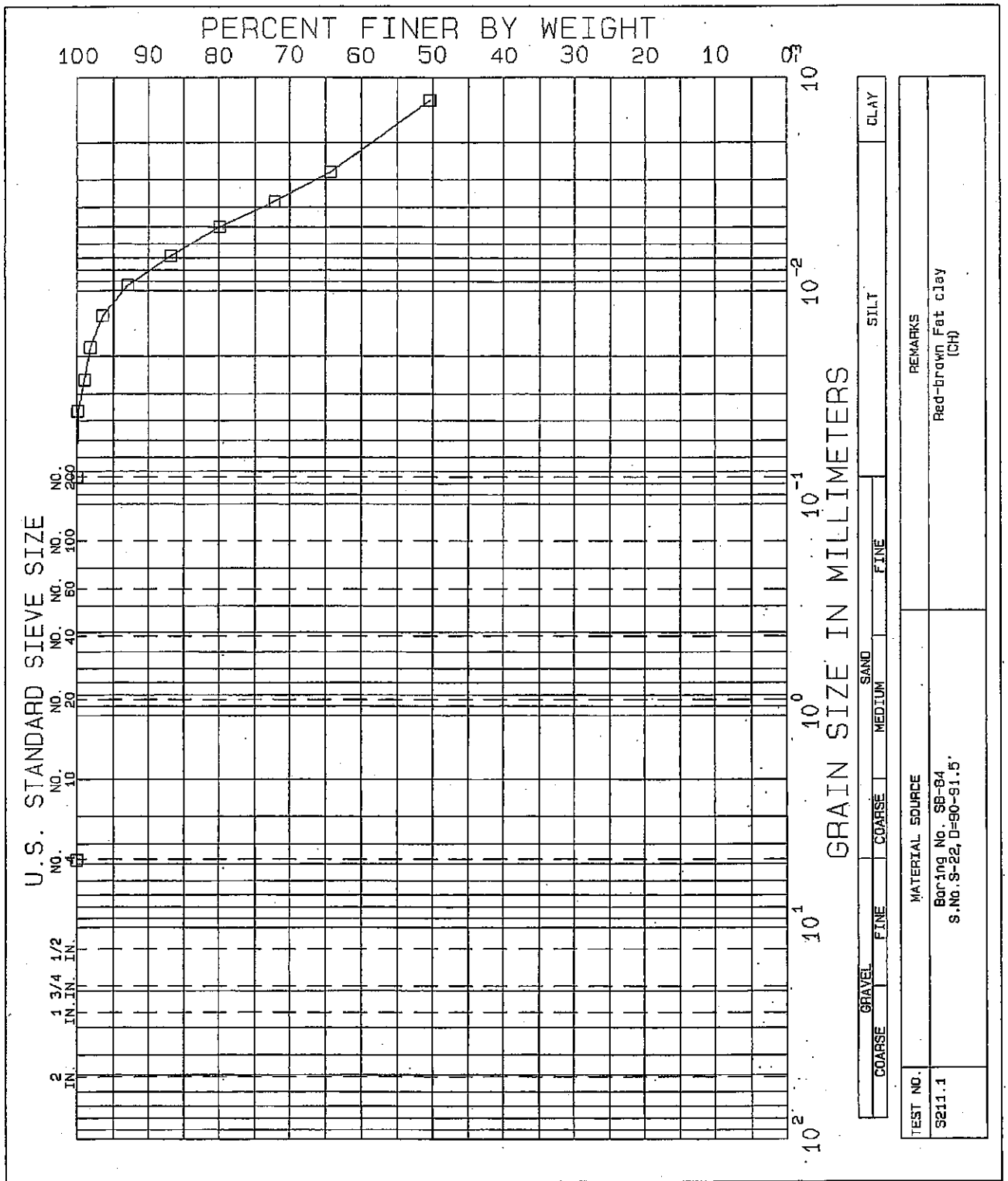


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-84	TEST SERIES	
SAMPLE	S-14	NO.	210
DEPTH	50-51.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

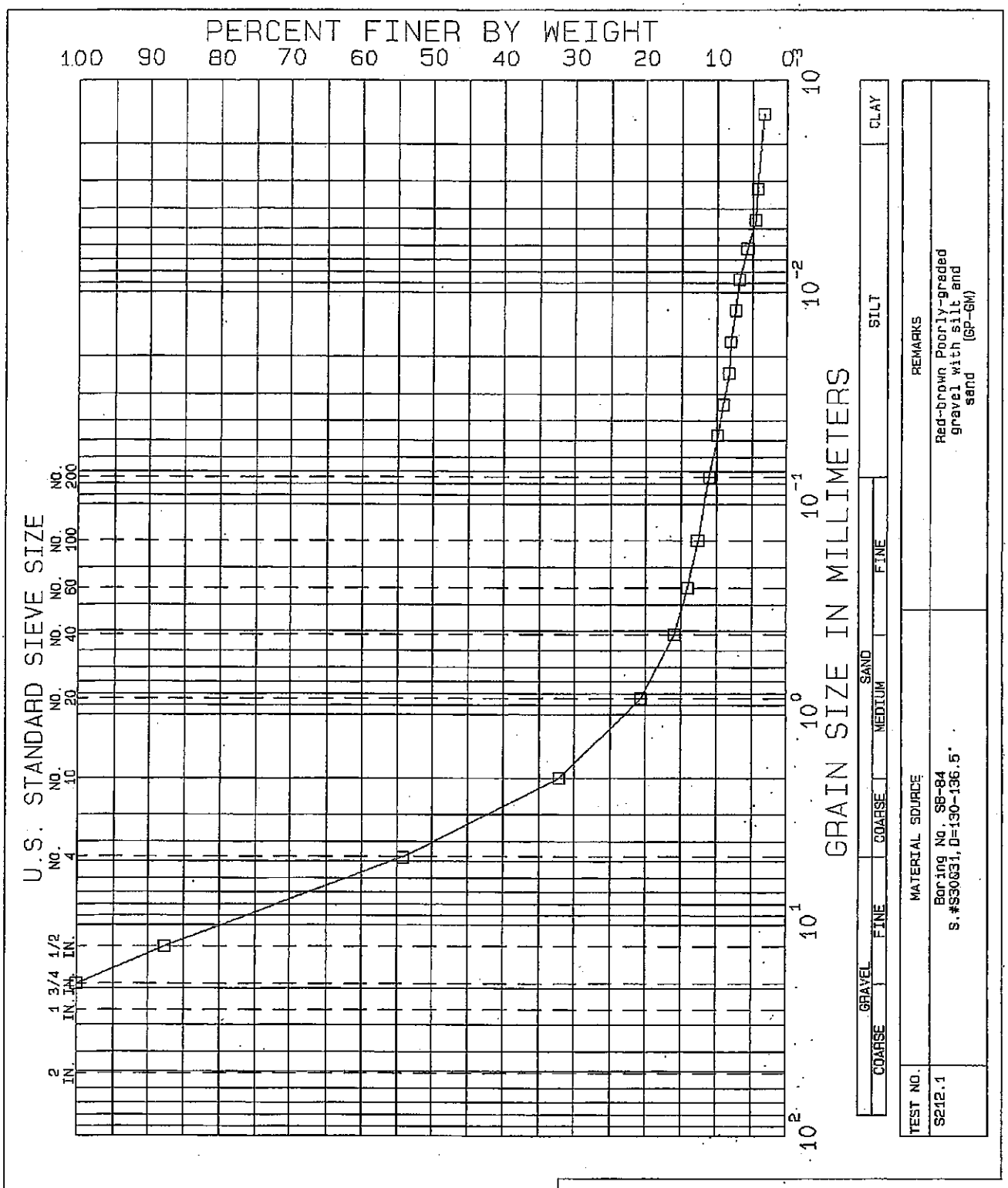


NEW BRITAIN-HARTFORD BUSWAY

CONNECTICUT

GRADATION TESTS

BORING NO.	SB-84	TEST SERIES	
SAMPLE	S-22	NO.	211
DEPTH	90-91.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828



NEW BRITAIN-HARTFORD BUSWAY

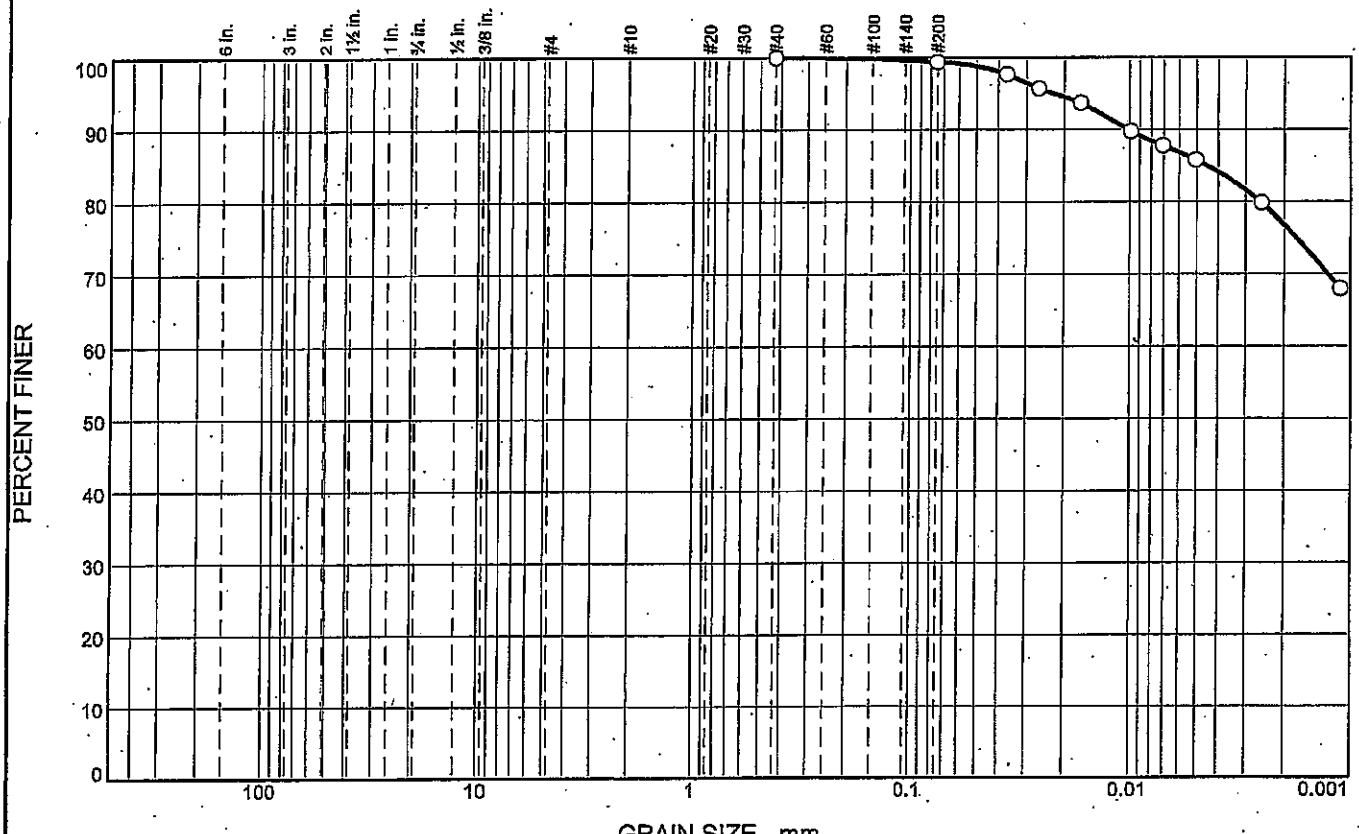
CONNECTICUT

GRADATION TESTS

BORING NO.	SB-84	TEST SERIES	
SAMPLE	S30&31	NO.	212
DEPTH	130-136.5'	DATE	Dec.03
TECH.	CAG		
REVIEWER	MBP	FILE	L17828

2008 Hydrometer Tests

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.6	13.7	85.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	99.4		
0.0367 mm.	97.7		
0.0262 mm.	95.7		
0.0167 mm.	93.7		
0.0099 mm.	89.7		
0.0070 mm.	87.8		
0.0050 mm.	85.8		
0.0025 mm.	79.8		
0.0011 mm.	68.0		

* (no specification provided)

Soil Description

Grey color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0045 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by clien from 5/12/08 to 6/3/08. Dropped off for test analysis on 7/28/08.

Sample No.: S-9 **Source of Sample:** SB-02-1 **Date:**
Location: Boring SB-02-1 (Busway over Park St.) **Elev./Depth:** 42' - 44'

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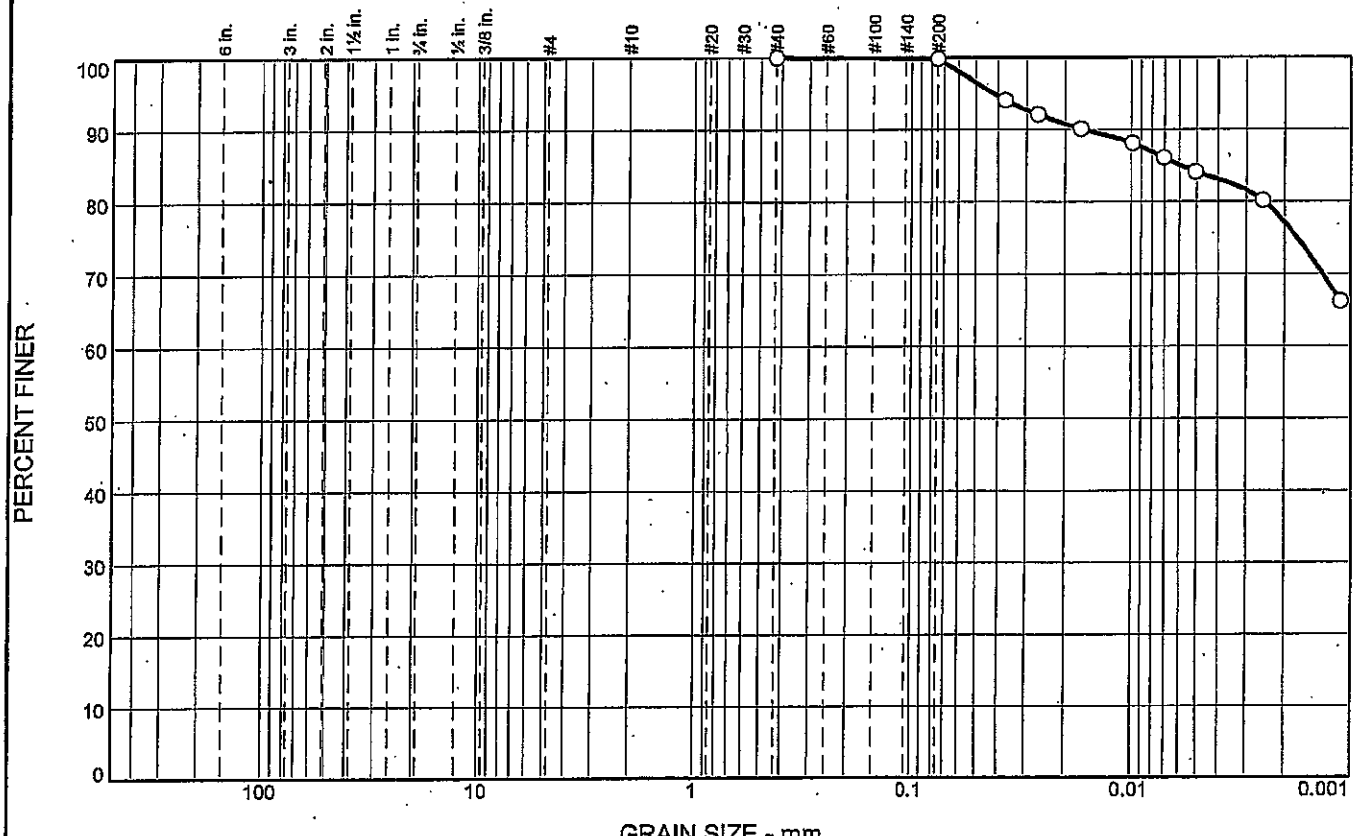
16 East Franklin Street, PO BOX 3116
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.2	15.7	84.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	99.8		
0.0371 mm.	94.1		
0.0265 mm.	92.1		
0.0169 mm.	90.1		
0.0099 mm.	88.1		
0.0071 mm.	86.1		
0.0050 mm.	84.1		
0.0025 mm.	80.1		
0.0011 mm.	66.2		

* (no specification provided)

Soil Description

Grey color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0059 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Samples collected by client from 5/12/08 to 6/3/08. Dropped off for test analysis on 7/28/08.

Sample No.: S-11 **Source of Sample:** SB-02-1 **Date:**
Location: Boring SB-02-1 (Busway over Park St.) **Elev./Depth:** 52' - 54'

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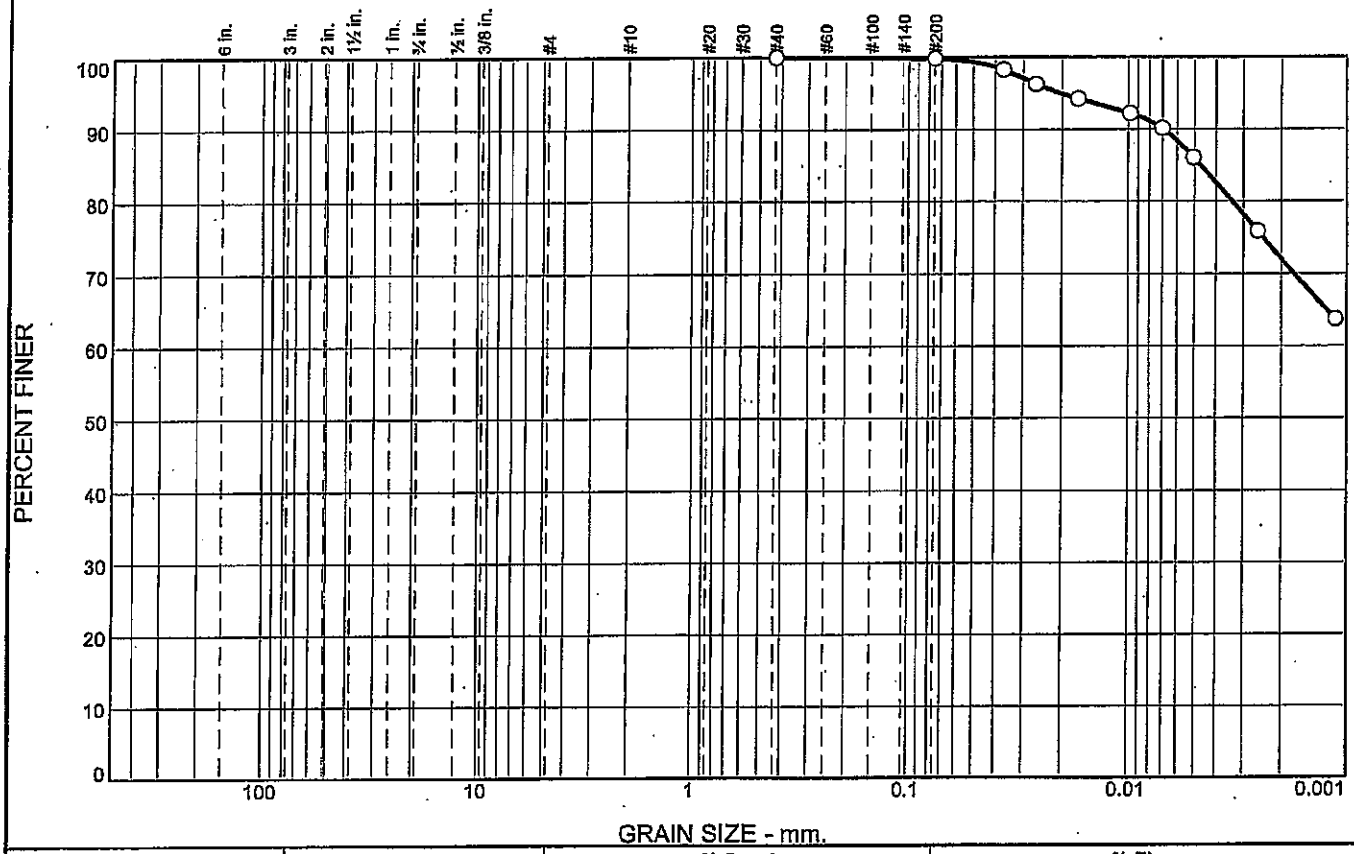
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.2	13.8	86.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	99.8		
0.0367 mm.	98.3		
0.0262 mm.	96.2		
0.0168 mm.	94.2		
0.0098 mm.	92.2		
0.0070 mm.	90.1		
0.0050 mm.	86.1		
0.0026 mm.	75.9		
0.0011 mm.	63.7		

* (no specification provided)

Soil Description

Grey color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0047 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by client from 5/12/08 to 6 3/08. dropped off for test analysis on 7/28/08.

Sample No.: S-9 **Source of Sample:** SB-02-2 **Date:**
Location: Boring SB-02-2 (Busway over Park St.) **Elev./Depth:** 32' - 34'

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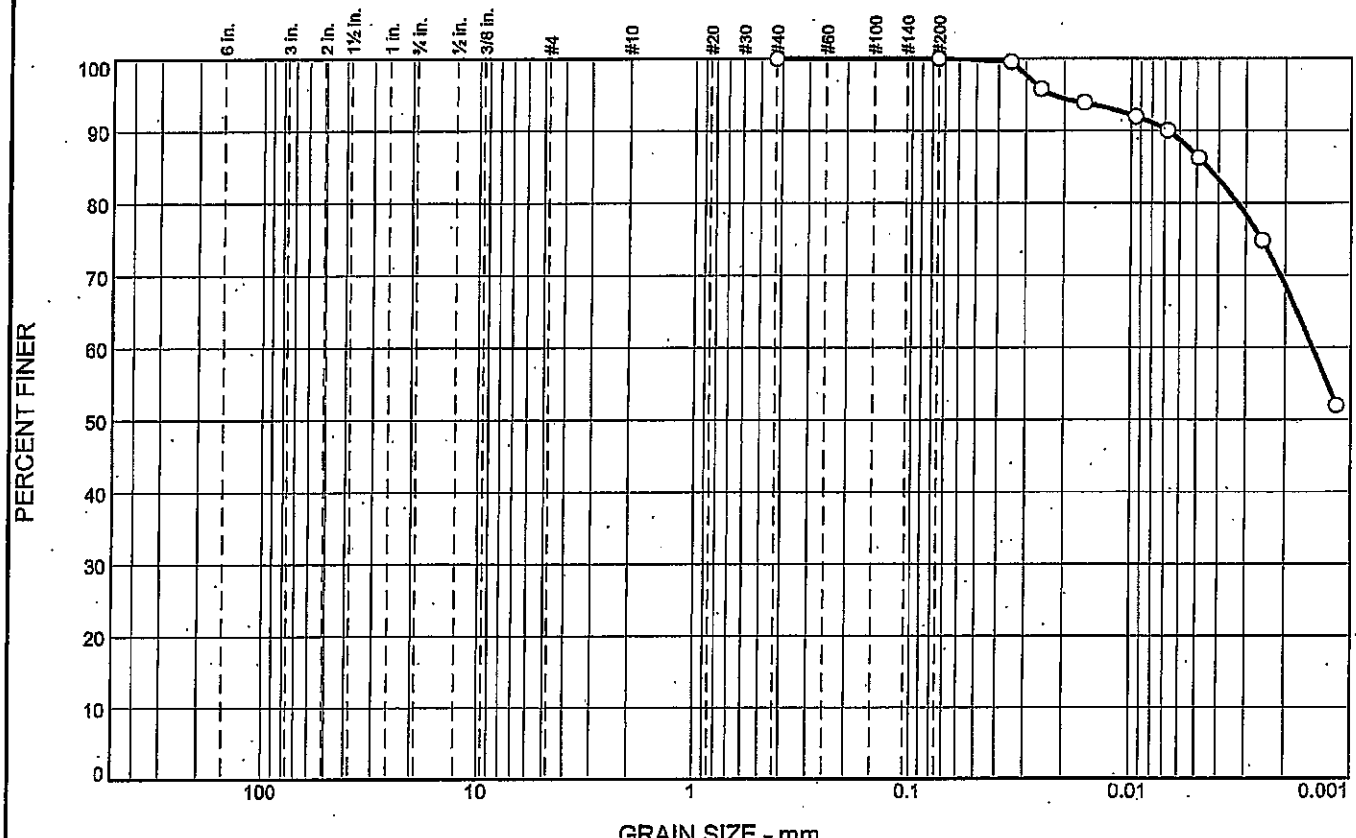
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.0	13.4	86.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	100.0		
0.0351 mm.	99.6		
0.0254 mm.	95.8		
0.0163 mm.	93.9		
0.0095 mm.	92.0		
0.0068 mm.	90.1		
0.0049 mm.	86.3		
0.0025 mm.	74.8		
0.0012 mm.	52.0		

* (no specification provided)

Soil Description

Grey color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0045 D_{60}= 0.0015 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by client from 5/12/08 to 6 3/08. Dropped off for test analysis on 7/28/08.

Sample No.: S-13 **Source of Sample:** SB-02-2 **Date:**
Location: Boring SB-02-2 (Busway over Park St.) **Elev./Depth:** 50' - 52'

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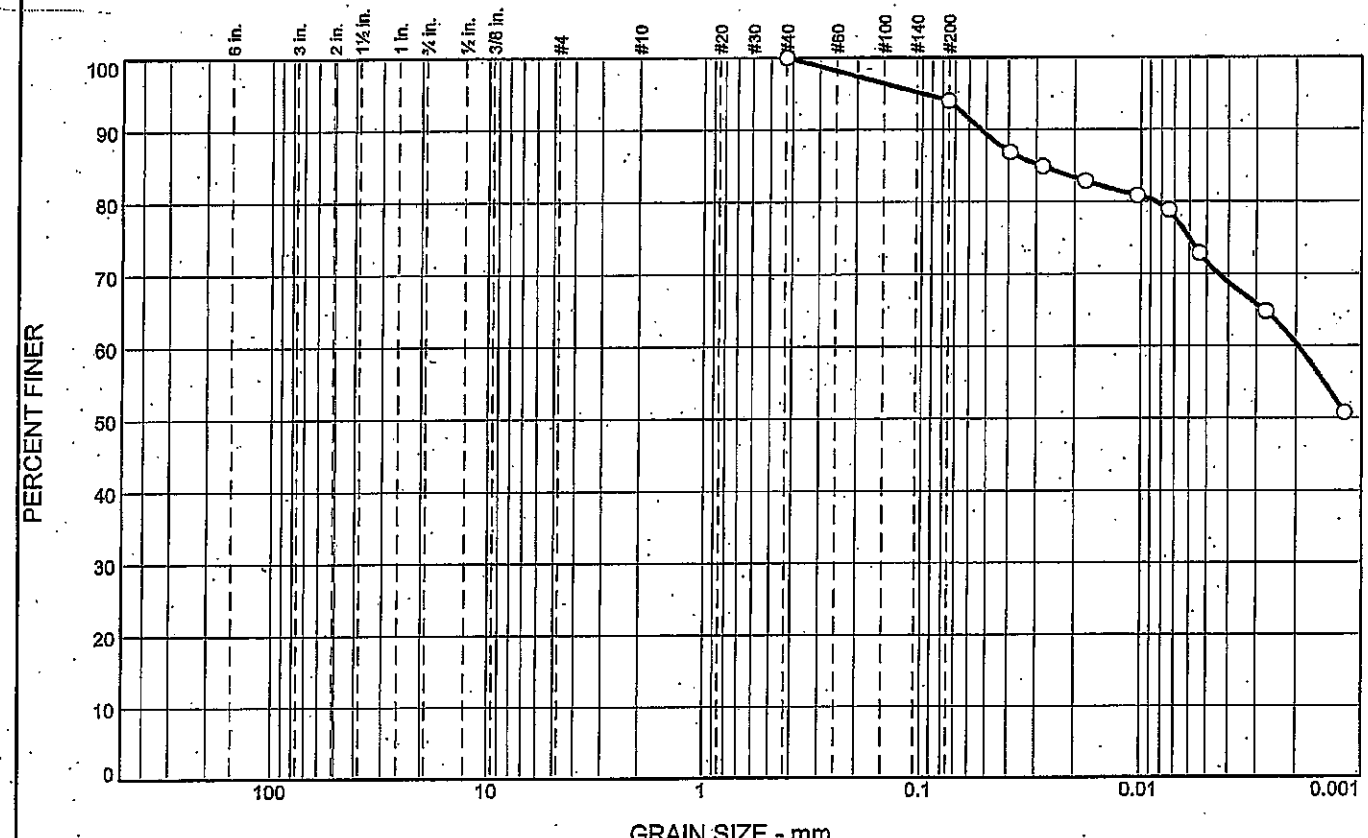
Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	6.0	22.4	71.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	94.0		
0.0391 mm.	86.9		
0.0279 mm.	84.9		
0.0178 mm.	82.9		
0.0104 mm.	80.9		
0.0074 mm.	78.8		
0.0054 mm.	72.8		
0.0027 mm.	64.8		
0.0012 mm.	50.8		

* (no specification provided)

Soil Description

Grey/Brown color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0287 D_{60}= 0.0020 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by client from 5/12/08 to 6/ 03/08. Dropped off for test analysis on 7/28/ 08.

Sample No.: S-9 **Source of Sample:** SB-02-3 **Date:**
Location: Boring SB-02-3 (Busway over Park St.) **Elev./Depth:** 30' - 32'

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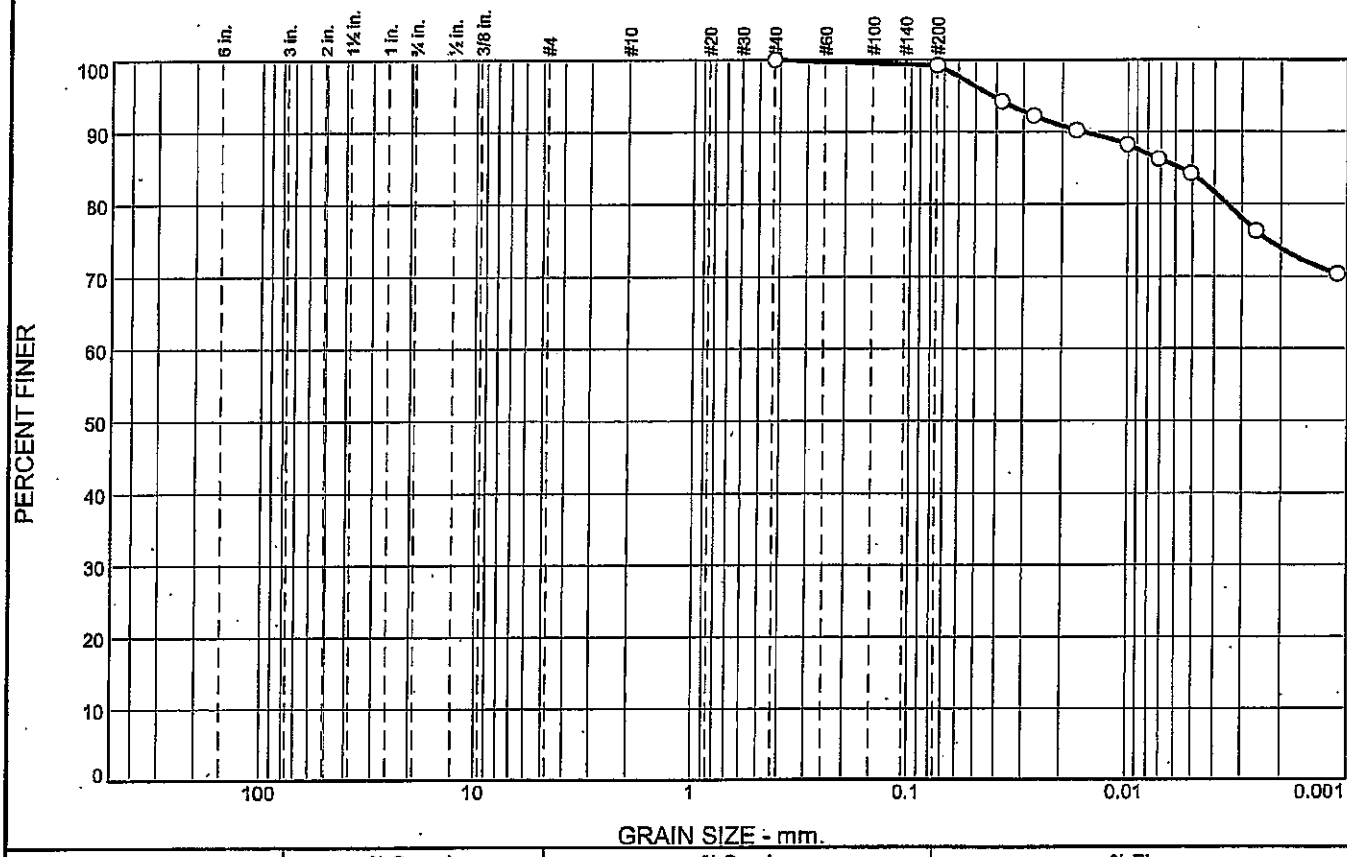
DANBURY, CT 06813-3116

Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.8	15.1	84.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 40	100.0		
# 200	99.2		
0.0376 mm.	94.2		
0.0268 mm.	92.2		
0.0172 mm.	90.2		
0.0100 mm.	88.2		
0.0071 mm.	86.2		
0.0051 mm.	84.3		
0.0026 mm.	76.3		
0.0011 mm.	70.3		

* (no specification provided)

Soil Description

Brown color

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0057 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample collected by client from 5/12/08 to 6 3/08. dropped off for test analysis on 7/28/08.

Sample No.: S-12 **Source of Sample:** SB-02-3 **Date:**
Location: Boring SB-02-3 (Flatbush Ave., Over Busway) **Elev./Depth:**

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Client: GeoDesign
Project: New Britain-Hartford Busway #155-H025
Project No: **Figure**

Tested By: R. DeCesare

Appendix 9

pH and Sulfide Tests

TEST-CON INCORPORATED

16 East Franklin Street
P. O. Box 3116
Danbury, CT 06813-3116
Phone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.com Web-Site: www.test-con.com

Construction Material Testing & Inspection - Geotechnical Services

SULFIDE TEST REPORT

Client:	GeoDesign Incorporated 984 Southford Rd. Middlebury, CT 06762	**Date:** **Tested by:** **Collected Date:**	9/30/08 York (CT # PH-0723) 7/28/08
Project:	New Britain-Hartford Busway # 155-H025 Hartford/West Hartford, CT	**Matrix:** **Report No.:**	Soil 1 – 10 Sulfide (08090862)

Progress of Work:
The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the summary tables.

The results of the analysis, which are all reported on an as-received basis unless otheriwise noted, are summarized in the following table(s).

Analysis Results

Boring/Test Pit No.	Sample No.	Depth (ft)	Parameter	Method	Units	Results	MDL
SB-01-2	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-3	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-4	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-01-3	S-3	5' – 7'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-1	S-1	0' – 0.7'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-3	S-1	0' – 2'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-02-2	S-2	2' – 4'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-2	S-4	7' – 9'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-3	S-1	0' – 2'	Sulfide	EPA376.1	mg/kg	Not detected	20.0
SB-03-3	S-4	7' – 9'	Sulfide	EPA376.1	mg/kg	Not detected	20.0

Units Key: For Waters/Liquids: mg/L = ppm ; ug/L – ppb For Soils/Solids: mg/hg = ppm ; ug/kg = ppb

Notes:

1. The MDL (Minimum Detectable Limit) reported is adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. This MDL is the REPORTING LIMIT and is based upon the lowest standard utilized for calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. Test-Con's liability for the above data is limited to the dollar value paid to Test-Con for the reference project.
4. All samples were received in proper condition for analysis with proper documentation.

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Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.com Web-Site: www.test-con.com

PH OF SOIL MATERIAL REPORT

Date: September 26, 2008

Report #: 1 - 10pH
Technician: R. DeCesare

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762

Project: New Britain-Harford Busway
155-H025

Date Received: Delivered by Client on 7/28/08

Test Requirements: pH

Summary Data

Boring/Test Pit No.	Sample No.	Depth (ft)	pH Test Results
SB-01-2	S-2	From 2' to 4'	6.7
SB-01-3	S-2	From 2' to 4'	7.4
SB-01-4	S-2	From 2' to 4'	7.4
SB-01-3	S-3	From 5' to 7'	7.5
SB-02-1	S-1	From 0' to 0.7'	5.9
SB-02-3	S-1	From 0' to 2'	3.6
SB-02-2	S-2	From 2' to 4'	5.9
SB-03-2	S-3	From 5' to 7'	7.4
SB-03-3	S-2	From 2' to 4'	3.7
SB-03-3	S4	From 7' to 9'	4.0

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5/15/07

Appendix 10

Unconfined Compression Tests (Rock)

TEST-CON INCORPORATED

16 East Franklin Street
P. O. Box 3116
Danbury, CT 06813-3116
Telephone: (203) 748-3012 Fax: (203) 778-0633
E-Mail: Service@test-con.com · Web-Site: www.test-con.com

Construction Material Testing & Inspection - Geotechnical Services

ROCK CORE REPORT

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762
Project: New Britain-Hartford Busway # 155-H025

Date: 9/30/08
Technician: R. DeCesare
Report #: 1 – 5 Core
Page 1 of 2

Progress of Work: As requested, Test-Con performed unconfined compressive strength of rock core samples and the results are as follow:

Identification #:	SB-01-3 (C-1) 135' to 140'	SB-01-3 (C-1) 135' to 140'	SB-06-4 (C-1) 125' to 130"
ACTUAL DEPTH	139.5ft.	138.5ft.	114.5ft.
Total Length of Core Recovered, inches; and No. of pieces of Core, in parenthesis	5.4" (1)	5.9" (2)	5.7" (1)
Sample Height, inches, after cutting and capping	3.7"	1.9"	4.0"
Capping Material	Sulfur	Sulfur	Sulfur
Diameter, inches	2.0"	2.0"	2.0"
Area, square inches	3.14	3.14	3.14
Heigh/Diameter Ratio	1.85 : 1	0.95 : 1	2 : 1
Total Load, lbs.	16252	22247	12820
Load, P.S.I.	5175.8	7085	4082
Correction Factor	0.984	0.860	N/A
Corrected P.S.I.	5093	6093	4082
Date Tested	9/30/08	9/30/08	9/30/08
No. of End Cuts	2	2	2

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E-Mail: Service@test-con.com Web-Site: www.test-con.com

Construction Material Testing & Inspection - Geotechnical Services

ROCK CORE REPORT

Client: GeoDesign Incorporated
984 Southford Rd.
Middlebury, CT 06762
Project: New Britain-Hartford Busway # 155-H025

Date: 9/30/08
Technician: R. DeCesare
Report #: 1 – 5 Core
Page 2 of 2

Progress of Work: As requested, Test-Con performed unconfined compressive strength of rock core samples and the results are as follow:

Identification #:	SB-06-4 (C1) 125' to 130'	SB-06-4 (C-2) 130' to 135'
ACTUAL DEPTH	111ft.	122.5ft.
Total Length of Core Recovered, inches; and No. of pieces of Core, in parenthesis	9.1" (1)	4.4" (1)
Sample Height, inches, after cutting and capping	4.0"	4.0"
Capping Material	Sulfur	Sulfur
Diameter, inches	2.0"	2.0"
Area, square inches	3.14	3.14
Heigh/Diameter Ratio	2 : 1	2 : 1
Total Load, lbs.	20015	19383
Load, P.S.I.	6374	6173
Correction Factor	N/A	N/A
Corrected P.S.I.	6374	6173
Date Tested	9/30/08	9/30/08
No. of End Cuts	2	2

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5-15-07

Appendix 11

Limitations

GEOTECHNICAL LIMITATIONS

Explorations

1. The analyses and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further explorations are made and construction occurs. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

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

3. The geologic and geomorphologic settings at this site are complex and the uncertain historic site usage has resulted in the varied distribution and stress history of compressible soils across the site. Limited spacing of borings and lab testing can at best, only allow for estimates to be developed for duration and magnitude of consolidation settlements.

4. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in river levels, rainfall, temperature, and other factors occurring since the time measurements were made.

Review

5. In the event that any changes in the nature, design or location, of the proposed bridge the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by Geo**Design**, Inc. It is recommended that this firm be provided the opportunity for a general review of design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications.

Use of Report

6. This report has been prepared for the exclusive use URS/Washington Group (URS/WGI), the Connecticut Department of Transportation (ConnDOT), and other members of the design team for specific application to the construction of New Britain - Hartford Busway over Park Street located in Hartford, Connecticut, in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

7. This final design soil and foundation engineering report has been prepared for this project by Geo**Design**. This report is for design purposes only and is not sufficient to prepare an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to design considerations only.