DESIGN EARTH TECHNOLOGY

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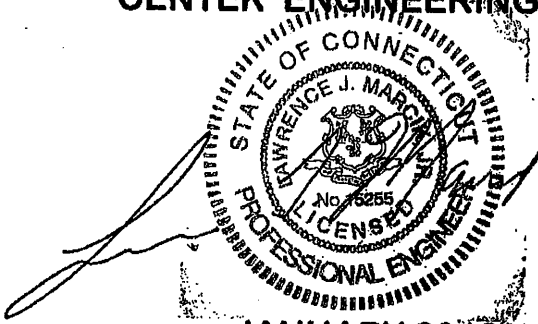
GENERAL CIVIL ENGINEERING ▪ GEOTECHNICAL ENGINEERING ▪ HYDROGEOLOGY ▪ HYDROLOGY AND HYDRAULICS ▪ TESTING—SOILS & MATERIALS ▪ CONSTRUCTION ENGINEERING

GEOTECHNICAL AND GEOPHYSICAL TESTING REPORT

PROPOSED VERIZON WIRELESS COMMUNICATIONS TOWER
723 LEETES ISLAND ROAD
BRANFORD SOUTH
BRANFORD, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, Inc.



JANUARY 2012

DESIGN EARTH TECHNOLOGY

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January 28, 2012

Mr. Carlo F. Centore, P.E.
Centek Engineering, Inc.
63-2 North Branford Road
Branford, CT 06405

Re: Proposed Verizon Communications Tower
723 Leetes Island Road (Branford South)
Branford, Connecticut
DET Job No. 2010.19

Dear Mr. Centore:

Lawrence J. Marcik, Jr., P.E. dba **Design Earth Technology (DET)** has completed a geotechnical engineering study for the above referenced project. Included in this report is a summary of subsurface conditions, delineation of engineering characteristics of the foundation materials, and the implications of the conditions and characteristics with respect to the design and construction of the proposed communication facilities. This report was prepared under our agreement dated December 22, 2011 and your subsequent authorization.

The purpose of this study is to develop geotechnical engineering recommendations for the proposed foundation design and site development. The subsurface investigation and sampling program was conducted by **DET** for the sole purpose of obtaining subsurface information as part of a geotechnical study. No services were performed to evaluate subsurface environmental conditions; however, the client requested that as a courtesy, **DET** log any noticeable non-typical visual and/or odorous conditions from the soil and rock core samples.

SITE DESCRIPTION

The project site is located off of Leetes Island Road in Branford, Connecticut. The project location is shown on the attached "Location Plan, Figure No. 1". The general site area is located within a residential area along a scenic roadway. The proposed cell tower site is located between Connecticut. Route 146 (Leetes Island Road) and the Amtrak Railroad Right-of-Way. The site is not developed and is wooded with trees and brambles. There are trails located through-out the site used for walking and ATV's (quads). Surface relief at the site is significant with elevations ranging from about El. 10 at Leetes Island Road to El. 52 at its high point near the proposed tower.

PROJECT DESCRIPTION

The proposed project consists of the installation and the site development of a new +/-109' high wireless communications tower that resembles an old-fashioned wooden water tower supported on a four legged steel support structure with the addition of wireless equipment structures (i.e. canopy, shelter).

SUBSURFACE EXPLORATION

Associated Borings Company, Inc. performed the subsurface exploration work on January 18th and 19th of 2012. Locations of the subsurface exploration are shown on Figure Nos. 2A & 2B and logs have been included in Appendix A. The subsurface exploration program consisted of a total of one (1) boring and thirty-four (34) bedrock verification probes (Power Drill Soundings). All subsurface penetrations were conducted in the area of the proposed Verizon Wireless facilities and access drive. The center of tower location and probes was staked-out by your office.

Boring B-1 was drilled near the proposed center of tower. The boring was advanced using hollow stem auger technique to 2.5' below existing grade where bedrock was encountered. Rock coring was performed from 2.5' to 22.5' below grade where coring was terminated.

Bedrock verification probes (Power Drill Soundings) were drilled in the vicinity of the proposed compound and along the centerline of the access drive. All probes were advanced to refusal which is "assumed" to be possible bedrock or a large boulder. The probes depths range between 4" and 114" below existing ground surface.

The rock cores in borings B-1 were drilled using a standard NQ-2 size core bit resulting in the diameter of core sample being about ± 2". The coring was conducted using a standard wet core boring technique. Note: The bedrock was found to be very hard and strong as it wore-out a new diamond bit during the first 15' of drilling.

Bedrock verification probes were drilled using solid stem auger technique.

Standard Penetration Tests (SPT) of the soil were not performed in boring B-1 due to depth to bedrock (2.5').

Logs of the bedrock verification probes (Power Drill Soundings) and boring are included in Appendix A. See attached photos Nos. 1 of the boring/coring process.

RESISTIVITY TESTING

In place soil resistivity testing was conducted by **DET** personnel on December 26, 2011 within the vicinity of the existing/proposed tower facilities. Two (2) test sections were established in an approximate northwest-southeast direction, and two (2) test sections were established in an approximate southwest-northeast direction. Approximate test section locations are illustrated in Figure 2A. All test sections were tested up to an electrode "A" spacing of 40 feet. Test results yielded resistivity values within acceptable ranges for the given soil/rock types and moisture

conditions typically found in the New England geology. It should be noted, however, that resistivity measurements are strongly influenced by local variations in surface conductivity caused by soil/rock weathering, soil/rock moisture content, soil temperature, rugged topography and existing subsurface manmade conductive materials. Attempts were made (where possible) during field operations to minimize some of these effects on the test results. Results of the resistivity tests are summarized in Table No. 1 with detailed calculations shown in Appendix B. See attached photograph of a typical test.

LABORATORY TESTING

The laboratory testing program consisted of three (3) Unconfined Compressive Strength of Intact Rock Core Samples taken from boring B-1. Laboratory test data is attached in Appendix C.

SUBSURFACE CONDITIONS

Proposed Tower and Compound Area

Based upon our review of the testing program in the area of the proposed tower foundation, compound area, and access drive, the site is covered with a somewhat shallow layer of soil consisting of a topsoil layer underlain by silty subsoil, underlain by a silty glacial till. This silty subsoil and till generally consists of boulders, cobbles, gravel, sand, silt, clay in varying proportions and underlain by bedrock. The topsoil, subsoil, and till layers (total of all soil layers) varies from at surface to 9.5 feet deep from existing grades as observed in the boring and probes. Groundwater was found about 2' below grade in some of the probes, most likely this groundwater is perched on-top of the bedrock in localized pockets.

As indicated above, the bedrock surface at the site varies from at surface to 9.5 feet below ground surface (near Leetes Island Road) in the area tested. According to the "Bedrock Geological Map of Connecticut", by John Rodgers dated 1985, the bedrock at the site is classified as Zw+Zsc+Pn. This is a combination of rock types, the first rock type is a light to dark, medium grained gneiss, the second type is a Stony Creek Granite Gneiss; red to pink, medium to very coarse grained granite gneiss and the final type is a Narragansett Pier Granite; pink to red, medium to coarse grained massive granite. A geologist was not retained to log the core samples obtained so no determination of specific rock type was made. To assess the engineering properties of the bedrock, rock cores were conducted in boring B-1. The rock cores were reviewed by this writer to determine "Rock Quality Designation" (RQD). The RQD values were conducted to measure the rock core quality of fracture frequency. The results of RQD varied from 83 to 87 at boring B-1. The average of all RQD tests was 85. For specific results of RQD, see Appendix C. The bedrock Rock Quality Classification is "good".

Uni-axial compressive strength of rock core samples were conducted on three (3) rock core samples with strengths of 19,300 psi, 18,300 psi and 23,700 psi (avg. 20,433 psi). For specific compressive strength results, see Appendix C.

GEOTECHNICAL DESIGN CONSIDERATIONS

Tower Foundation

It is recommended that the proposed tower be supported on a spread footing (mat foundation) bearing on suitable, competent (sound) rock. For these foundations, an allowable bearing pressure of 15 tons per square foot is recommended for the design. These allowable loading pressures can be increased by $^1/_3$ for seismic or wind loading. Settlement of the tower should be negligible if founded directly on (sound) bedrock.

All proposed foundations **must** bear on competent (sound) rock. The bottom of the excavation is to be carried down below any weathered and fractured rock to obtain competent (sound) rock bearing. If the Contractor over-excavates and/or over-blasts and competent (sound) rock is not obtained at the proposed bottom of foundation elevation, the Contractor shall excavate down to competent (sound) rock and remove all of the loose material and fill excavation to the proposed bottom of footing with 3,000 psi concrete (lean concrete).

Competent (Sound) Rock is defined as where no fragmentation is produced under heavy hammer blows or rock will not break down with the use of a single-tooth ripper on a D-8 Caterpillar Power Bulldozer or equal force.

All foundations that bear on sound bedrock shall have the following preparations (See Figure 3 for additional details):

⇒ Bedrock bearing surface shall be cleaned of any soil, loose rock fragments and any unsuitable bearing material. The bearing surface is to be air blown clean and/or swept clean.

⇒ Bedrock bearing surface shall be level.

⇒ Bedrock bearing surface to be observed by geotechnical engineer for approval.

As a result of the required seismic and wind loading, towers typically have portions of their foundation that undergo uplift and lateral loading. To address these issues, to resist this uplift and lateral loading, and to reduce the foundation size, **DET** recommends rock anchors. A pre-stress rock anchor system is to be used for design. A pre-stress rock anchor system is superior to the non-prestress system in that the prestressing of rock anchors minimizes foundation movement when stress is applied. Foundations are not allowed to move under constantly changing loading conditions. This will result in reducing the potential for long term fatigue of the rock anchor system.

The rock anchor system we recommend is the DYWIDAG System or approval equal. DYWIDAG rock anchors are post-tensioned tendons installed in drilled holes for which at least the entire bond length is located in suitable rock. The anchor force is transmitted to the rock by bond between the grout body and the rock. The following information is for general consideration, but **DET** recommends that the design of these anchors should be a joint effort between **DET** (geotechnical engineer) and the structural engineer.

⇒ All rock anchors are to be designed in accordance with the publication entitled, *Recommendations For Prestressed Rock and Soil Anchors,* by Post-Tensioning Institute lasted edition.

⇒ The anchor bolt system shall be corrosion protection "Class 1" (double corrosion protection) unless others conduct an environmental study to determine the aggressivity of the host soil/rock system.

⇒ The load carrying capacity of each anchor is to be verified by load testing after installation and prior to being placed in service.

⇒ The anchor system is to be designed using permanent anchor design criteria.

⇒ The working bond stress along the interface between rock and grout to be used for design shall be 75 psi.

⇒ The rock anchor pull-out cone has an angle of 30° with the center of the anchor and total cone angle of 60°. The resulting rock anchor pull-out cone must be evaluated for global stability when single and/or multiple anchors are used.

⇒ The point where the cone starts is taken at the midway distance of the bonded length.

Given the empirical nature of the design of these rock anchors, it is advisable that **DET** be retained to assist in the design of the rock anchor system.

Equipment Shelter

A spread footing is considered appropriate for the subsurface conditions at the proposed equipment shelter with the following foundation preparation requirements.

1. Remove all topsoil and till material down to bedrock. Remove bedrock and loose bedrock as required, to provide a level surface to construct the spread footing
2. If bedrock/till is over-excavated, use compacted ½" size crushed stone to fill and level the area. Note: Crushed stone leveling course **can not** be used in the tower foundation construction as it is to bear on sound bedrock.

With this foundation preparation requirements, use allowable bearing pressure of 2 tons per square foot for foundation design of the spread footing. Settlement of the spread footing will be negligible. The bottom of footing needs to be at least 42" below outside grades for frost protection.

EARTHQUAKE DESIGN (SEISMIC)

Seismic design requirements for the State of Connecticut are based on the Connecticut State Building Code, which incorporates the Seismic design Category approach from the International Building Code. The seismic design Category determination is based on a few category factors. One such category is the "Site Classification (soil type)". From our test borings, we consider that the site subsurface conditions match the General Description of "Rock". The site classification is therefore "B".

For transfer of ground shear into the natural ~~soil~~ rock, the friction factor between the concrete and natural deposit can be 0.70.

The proposed foundation is to bear on sound bedrock. This sound bedrock will not liquefy during a seismic event and needs not be addressed in the foundation design.

Passive earth pressure is not typically used in resisting sliding of structures due to the potential of this earthen material being removed in the future. If this material can be guaranteed to remain in place for the life of the structure, the following design parameters can be used for design:

⇒ Dry unit weight of gravel backfill soil should be 125 pound per cubic foot (pcf).
⇒ Ultimate passive earth pressure coefficient (K_p = 3.0)
⇒ A factor of safety of 3 is to be used in the design to obtain "allowable" passive pressure from ultimate passive pressure.

GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

General

This section provides comments related to foundation construction and other geotechnical aspects of the project. It will aid personnel responsible for preparation of Contract Plans and Specifications and those involved with the actual construction and construction monitoring. The contractor **must** evaluate potential construction problems on the basis of his own knowledge and experience in the area and on the basis of similar projects in other localities, taking into consideration his own proposed construction methods and procedures. The contractor shall visit the site to become familiar with the topography, the rock out-cropping, and other features that will affect their work.

Excavation

Materials to be excavated are expected to be topsoil, subsoil, silty till and bedrock in the proposed compound area; hence excavation is expected to be very difficult when excavating bedrock. The bedrock on-site is "very" hard and strong, during the rock coring process; a new diamond bit was worn out in the first 10 to 15 feet of coring. Bedrock is at ground surface to about 5.42' below ground surface in compound area, so most excavations below this depth will be within the bedrock. This will be a major site issue for the contractor. It is anticipated that blasting will be required for rock excavation. Controlled blasting procedures are recommended. Blasting specifications should limit blast vibrations, air blast overpressure, and provide criteria for perimeter control. As an alternative to blasting, methods such as core cracker, hydraulic impact and hydraulic splitting have a track record of reducing vibration and air blast. Pre and post construction surveys of the surrounding structure should be performed to minimize damage claims.

In the access drive and shelter construction, if filling or cutting is required to develop the site, the cut/fill slopes should generally be no steeper than an inclination of 2(H):1(V).

Site soils are not expected to be stable on steep slopes for any appreciable length of time. It is recommended that un-braced excavations be laid back to a field determined safe slope. Temporary excavations should be laid back or braced to OSHA requirements.

Dewatering/Groundwater
Normal groundwater levels are expected to be at or above the proposed excavation at the soil/bedrock interface. Therefore, dewatering is expected to be limited to pumping of surface runoff, precipitation that enters the excavation, and localized groundwater. It is anticipated that dewatering will be performed by localized sump techniques.

Materials
Gravel backfill is material used to backfill the foundation/retaining walls and is to be obtained from off-site borrow sources. This material shall consist of inert material that is hard, durable stone and coarse stone, free from loam and clay, surface coatings and deleterious materials. These materials shall conform to the following gradation requirements (using washed sieve analysis):

Sieve Size	Percent Finer by Weight
1-1 1/2"	100
¾"	45 – 80
¼"	25 – 60
No. 10	15 – 45
No. 40	5 – 25
No. 100	0 – 10
No. 200	0 – 5

Placement and Compaction of Foundation Backfill

A. All backfill materials shall be placed in horizontal layers not exceeding 6". Each layer shall be spread evenly and thoroughly blade mixed during spreading to ensure uniformity of material in each layer. Each layer shall be evenly compacted with an approved hand operated compactor, making a minimum of at least five (5) passes.

B. In no case shall fill be placed over frozen material or snow. No fill material shall be placed, spread, or compacted during unfavorable weather conditions where soil moisture precludes achievement of the specified compaction. When the work is interrupted by heavy rains or snow, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

C. Gravel fill shall be compacted in individual layers (not exceeding 6") to 95% maximum dry density using ASTM D1557.

LIMITATIONS

Explorations
The analysis and recommendations submitted in this report are based in part upon the data obtained from a limited number of widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction excavation. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report at that time.

The soil profiles described and shown in this report are generalized and are intended to convey trends in subsurface conditions. The boundaries between strata and bedrock are approximate and generalized. They have been developed by data that is limited in number and widely spaced.

Water level readings have been observed in the drill holes at times and under conditions stated on the boring logs and in this report. This data has been reviewed, analyzed, and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, time of the year and other factors not evident at the time measurements were taken.

Designer Review
In the event that any changes in the design or location of the monopole or proposed site development, the conclusions and recommendations contained in this report shall not be considered valid unless these changes are reviewed by this office and conclusions of this report modified.

Construction
It is recommended that Design Earth Technology retained to provide geotechnical field monitoring services based on familiarity with the subsurface conditions, design concepts and specifications, technical expertise, and experience in monitoring of site development construction.

Use of This Report
This report has been prepared for specific application and use of the proposed Verizon Wireless Tower to be located off of Leetes Island Road, Branford, Connecticut and is in accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied is made.

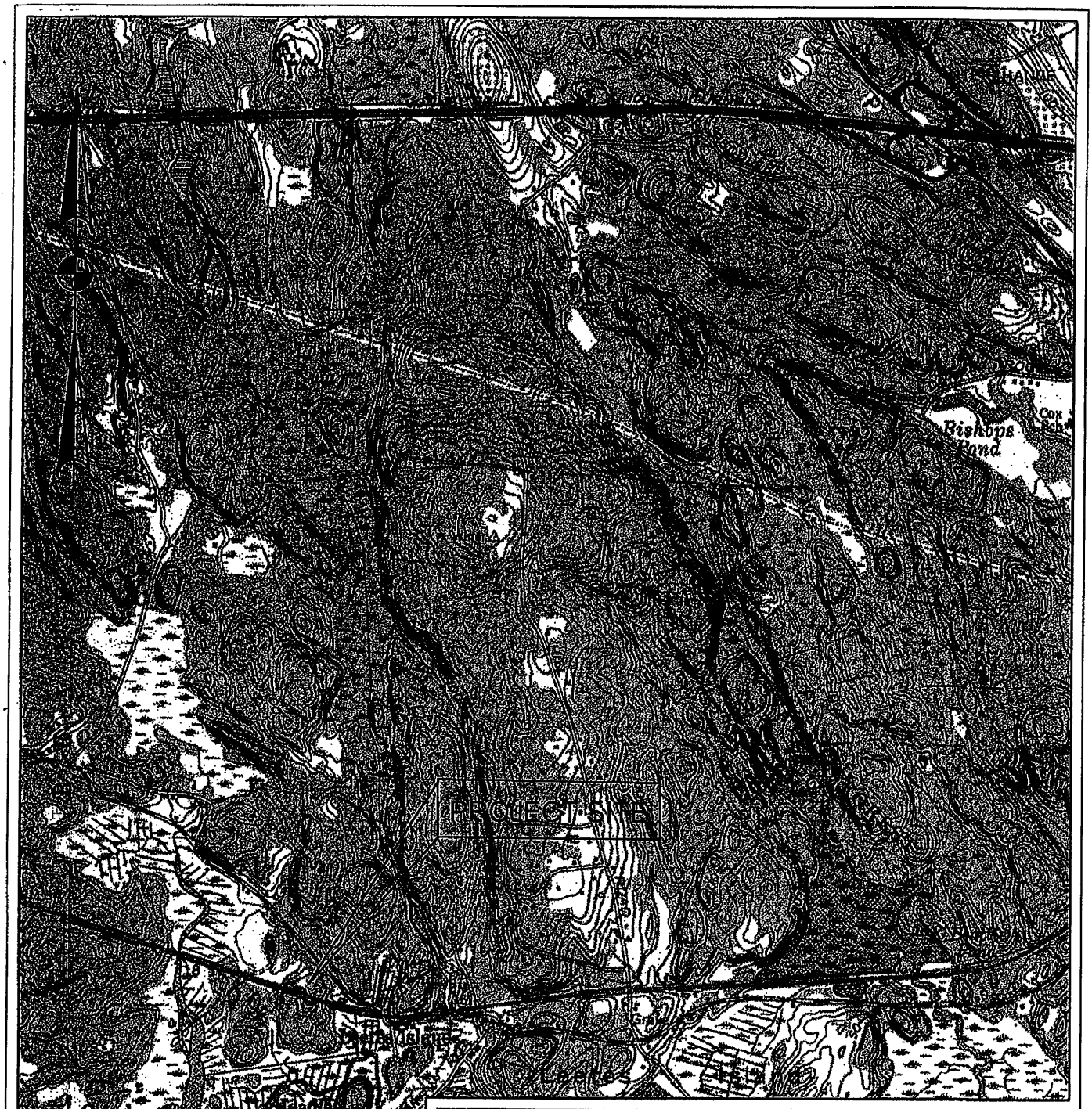
If you have any questions regarding the above information, please call.

Sincerely,

DESIGN EARTH TECHNOLOGY

Lawrence J. Marcik, Jr., P.E.

FIGURES



JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATIONS FACILITY AT 723 LEETES ISLAND ROAD BRANFORD, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: JANUARY 23, 2012

SCALE: NTS

SOURCE: U.S.G.S. QUADRANGLE GUILFORD

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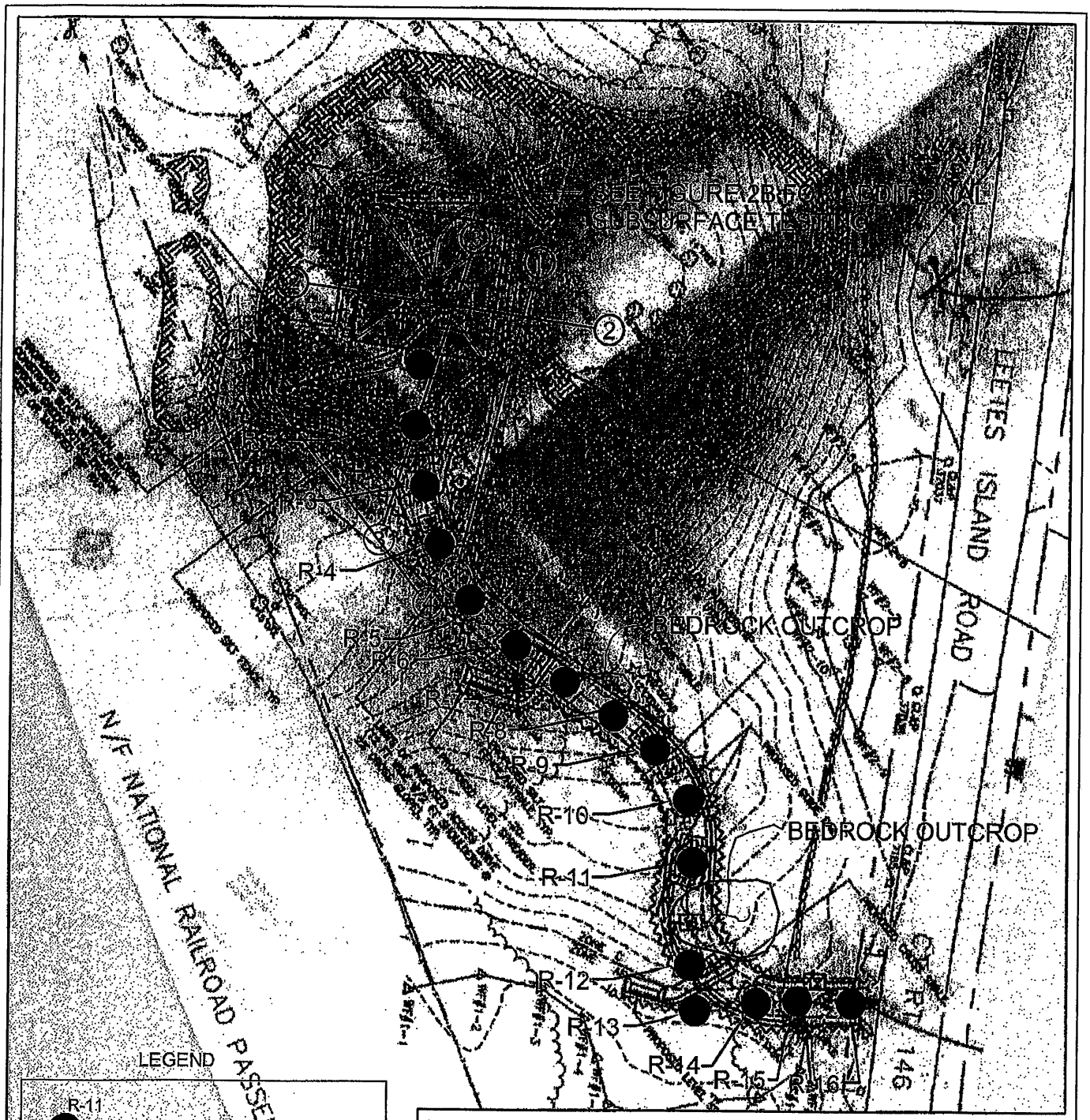
PROJECT No.: 2011-19

DRAWN: LJM

FIGURE No.: 1

FIGURE TITLE: LOCATION PLAN

CAD FILE: Location Plan



LEGEND

R-11 — TYPICAL PROBE

(1) — SECTION NUMBER RESISTIVITY TESTING

NOTE: PROBE LOCATIONS ARE APPROXIMATE

JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATIONS FACILITY AT 723 LEETES ISLAND ROAD BRANFORD, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: JANUARY 28, 2011

SCALE: 1" = 60' +/-

PROJECT No.: 2011-19

DRAWN: LJM

FIGURE No.: 2A

CAD FILE: Figures

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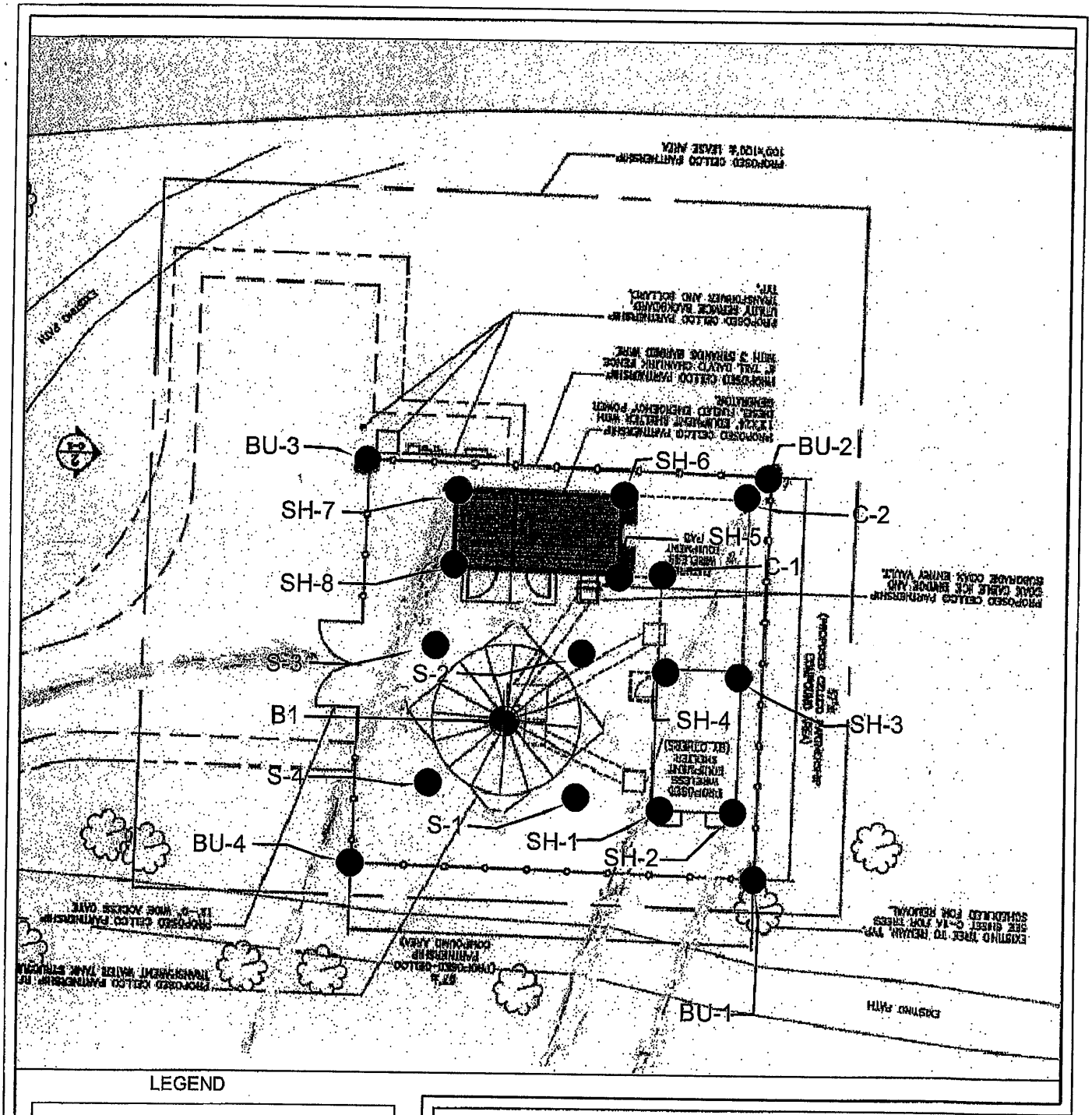
FIGURE TITLE: SKETCH OF LOCATIONS OF SUBSURFACE EXPLORATIONS



LEGEND

S-1 TYPICAL PROBE

B1 BORING WITH ROCK CORES

NOTE: PROBE LOCATIONS ARE APPROXIMATE

JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATIONS FACILITY AT 723 LEETES ISLAND ROAD BRANFORD, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: JANUARY 28, 2011

SCALE: 1" = 20' +/-

PROJECT No.: 2011-19

DRAWN: LJM

FIGURE No.: 2B

CAD FILE: Figures

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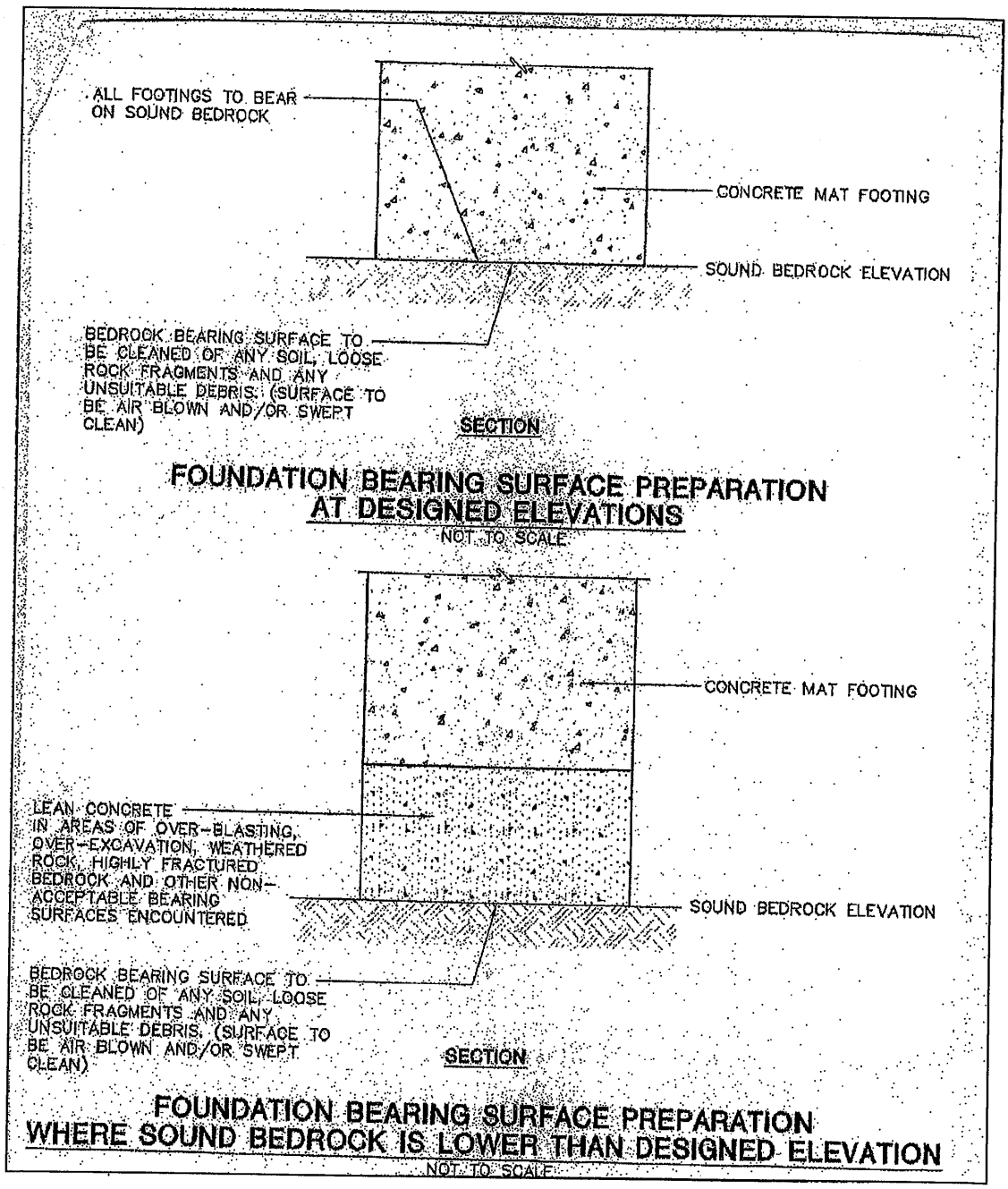
FIGURE TITLE: SKETCH OF LOCATIONS OF SUBSURFACE EXPLORATIONS



JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATIONS FACILITY AT 723 LEETES ISLAND ROAD BRANFORD, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: JANUARY 23, 2012

SCALE: NTS

PROJECT No.: 2011-19

DRAWN: LJM

FIGURE No.: 3

CAD FILE: Figures

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FIGURE TITLE: FOUNDATION DETAILS

TABLES

TABLE 1

PROPOSED VERIZON WIRELESS TOWER
723 LEETES ISLAND ROAD
BRANFORD, CT

IN-SITU SOIL RESISTIVITY RESULTS[1]

ELECTRODE SPACING (ft)	Section No. 1	2	3	4
5	266,185	343,742	692,272	328,422
10	263,887	430,875	687,485	295,293
20	321,337	542,711	827,280	255,844
30	302,187	630,801	509,007	236,694
40	342,402	875,538	517,050	204,522

NOTES:
1. Resistivity values indicated are in OHM-CM
2. [1]Test completed using Wenner Four Probe Method with a Det 2/2 Auto Earth Tester as manufactured by Avo, Inc.

APPENDICES

APPENDIX A

Thomas Lloret	**TEST BORING REPORT**		SHEET 1 OF 1
DRILLER	**ASSOCIATED BORINGS CO., INC.**		
Larry Marcik, Jr.	**119 MARGARET CIRCLE, NAUGATUCK, CT 06770**		CME-45B
INSPECTOR	**Tel (203) 729-5435 Fax (203) 729-5116**		DRILLING EQUIPMENT
	PROJECT NAME: 723 Leetes Isl. Rd. Tower		Design Earth Technology
SOILS ENGINEER	PROJECT NUMBER:		CLIENT
Surface Elevation:	LOCATION: Branford, Connecticut		

		Auger	Casing	Sampler	Core Bar	
Date Started: 1/18/2012						Hole No. **B-1**
Date Finished: 1/19/2012	Type	HSA		SS	NQ-2	Line & Station
Groundwater Observations	Size I. D.	3 1/4 in		2 in		Offset
AT None ' AFTER 0 HRS	Hammer			140 lb	Bit	N Coordinate
AT ' AFTER HRS	Fall			30 in		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	NO.	PEN. INCH	REC. INCH	TYPE	BLOWS PER 6 INCHES ON SAMPLER 0 - 6	6 - 12	12-18	18-24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											0.4	Topsoil
											2.5	Br. M-F Silty Sand, Some C-F Gravel
	9	2.5 - 7.5	1	60	57	C						Cored Run # 1
	7											From - 2.5 feet to 7.5 feet
5	7											Recovery - 57"
	6											
	6										7.5	
	8	7.5 - 12.5	2	60	60	C						Cored Run # 2
	9											From - 7.5 feet to 12.5 feet
10	7											Recovery - 60"
	11											
	15										12.5	
	11	12.5 - 17.5	3	60	60	C						Cored Run # 3
	20											From - 12.5 feet to 17.5 feet
15	26											Recovery - 60"
	30											
	60	17.5 - 22.5	4	60	60	C					17.5	
	6											Cored Run # 4
	8											From - 17.5 feet to 21.5 feet
20	8											Recovery - 60"
	6											
	8										22.5	
												End of Boring - 22.5
25												
30												
35												
40												

From Ground Surface to Feet Used Inch Casing Then Inch Casing For Feet

Footage In Earth 2.5 Footage In Rock 20.0 No. of Samples 0 Hole No. B-1

SAMPLE TYPE CODING: D = DRIVEN C = CORE A = AUGER UP = UNDISTURBED PISTON

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

Jaime Lloret DRILLER Larry Marcik, Jr. INSPECTOR	**TEST BORING REPORT** **ASSOCIATED BORINGS CO., INC.** **119 MARGARET CIRCLE, NAUGATUCK, CT 06770** **Tel (203) 729-5435 Fax (203) 729-5116**	SHEET 1 OF 1 CME-45B DRILLING EQUIPMENT Design Earth Technology CLIENT
DATE; 1/19/2012	PROJECT NAME: 723 Leetes Isl. Rd Tower PROJECT NUMBER: LOCATION: Branford, Connecticut	

POWER DRILL SOUNDING REPORT

Station	Offset	Elev	Probe #	From	To	Remarks: Soil Encountered, Groundwater Depth, Refusal Etc.
			R-1		4"	R = ROADWAY PROBES
			R-2		21"	
			R-3		15"	
			R-4		15"	
			R-5		72"	
			R-6		14"	
			R-7		20"	
			R-8		3"	
			R-9		53"	
			R-10		37"	
			R-11		60"	
			R-12		21"	
			R-13		65"	
			R-14		74"	
			R-15		108"	
			R-16		114"	
			BU-1		17"	BU = BLUE PROBES
			BU-2		24"	
			BU-3		6"	
			BU-4		26"	
			C-1		24"	C = CANOPY PROBES
			C-2		24"	
			SH-1		24"	SH = SHELTER PROBES
			SH-2		36"	
			SH-3		26"	
			SH-4		36"	
			SH-5		18"	
			SH-6		14"	
			SH-7		65"	
			SH-8		24"	
			S-1		29"	S = SUPPORT PROBES
			S-2		17"	
			S-3		34"	
			S-4		17"	

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

APPENDIX B

RESISTIVITY DATA

SITE: Branford, Connecticut (723 Leetes Island Road)
DATE: December 26, 2011
SIGNATURE:

A=(FT)	5	10	20	30	40
FORMULA □= (OHM-CM)	957.5*R	1915*R	3830*R	5745*R	7660*R
AREA 1 MEASURED R (OHM)	278	137.8	83.9	52.6	44.7
AREA 1 CALCULATED (OHM-CM)	266,185	263,887	321,337	302,187	342,402
AREA 2 MEASURED R (OHM)	359	225	141.7	109.8	114.3
AREA 2 CALCULATED (OHM-CM)	343,742	430,875	542,711	630,801	875,538
AREA 3 MEASURED R (OHM)	723	359	216	88.6	67.5
AREA 3 CALCULATED (OHM-CM)	692,272	687,485	827,280	509,007	517,050
AREA 4 MEASURED R (OHM)	343	154.2	66.8	41.2	26.7
AREA 4 CALCULATED (OHM-CM)	328,422	295,293	255,844	236,694	204,522

APPENDIX C

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless Communications Facility
723 Leetes Island Road, Branford, Connecticut

DET PROJECT NO.: 2011.19

DATE OF TEST: January 23, 2012

ROCK TYPE: Metamorphic & Igneous Type Rocks

TEST CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

CORE IDENTIFICATION	LOCATION OF SAMPLE	CORE DIAMETER (in.)	LENGTH OF CORE (in.)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE
A	B-1, Run #1 Depth ±6.5'	2.10	4.4	19,300	Columnar
B	B-1, Run #2 Depth ±8.5'	2.10	4.0	18,300	Columnar
C	B-1, Run #4 Depth ±18'	2.10	4.5	23,700	Columnar

Notes: Not all ASTM procedures and reporting have been meet.

ROCK QUANTITY DESIGNATION

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless Tower,
723 Leetes Island Road, Branford, Ct.

DET PROJECT NO.: 2011.19

MEASUREMENTS CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

BORING IDENTIFICATION AND CORE RUN DEPTH (ft)	CORE RUN LENGTH (In)	CORE RECOVERY LENGTH And % (In/%)	RQD (%)
B-1 Run #1 2.5' – 7.5'	60"	57/95	85
B-1 Run #2 7.5" – 12.5'	60"	60/100	87
B-1 Run #3 12.5' – 17.5'	60"	60/100	85
B-2 Run #1 17.5' – 22.5'	60"	60/100	83

PHOTOGRAPHS

PHOTOGRAPHS

DRILLING BORING No. 1

TYPICAL RESISTIVITY TESTING