CONTENTS:

RETAINING WALL LEFT

OF -L- STATION INTERVAL

24+50 TO 29+00

## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

	SEP	All married to	3	2004	
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N.C.	37851	<b>5</b> 08	1	1
STATE PROJ. NO.	F. A. PROJ. NO.		DESCRIE	TION
			P.E.	
			CONS	T.

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT & 1919 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSTRACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY CANSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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## STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT37831I.D. NO	
F.A. PROJECT	
COUNTYBUNCOMBE	
PROJECT DESCRIPTION RETAINING WALL	
LEFT OF -L- STATION INTERVAL	. 25
24+50 TO 29+00	
SITE DESCRIPTION	

INVESTIGATED BY C A DUNNAGAN PERSONNEL T B DANIEL

CHECKED BY W D FRYE, JR J T WILLIAMS

SUBMITTED BY W D FRYE, JR G K ROSE

DATE SEPTEMBER 2004

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS
FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE
CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



SIGNATURE SIGNATURE

DRAWN BY: C A DUNNAGAN

#### DIVISION OF HIGHWAYS

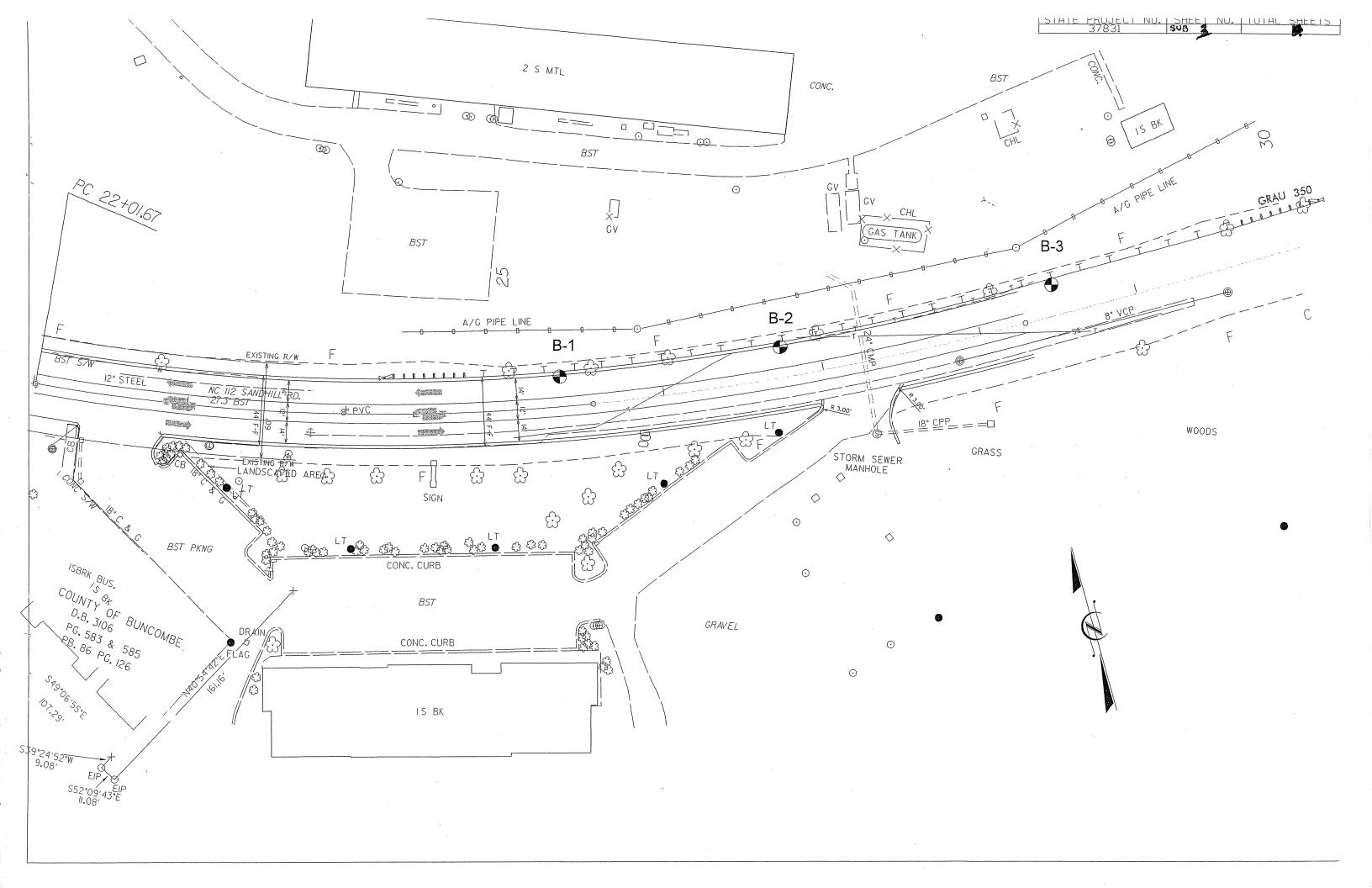
GEOTECHNICAL UNIT

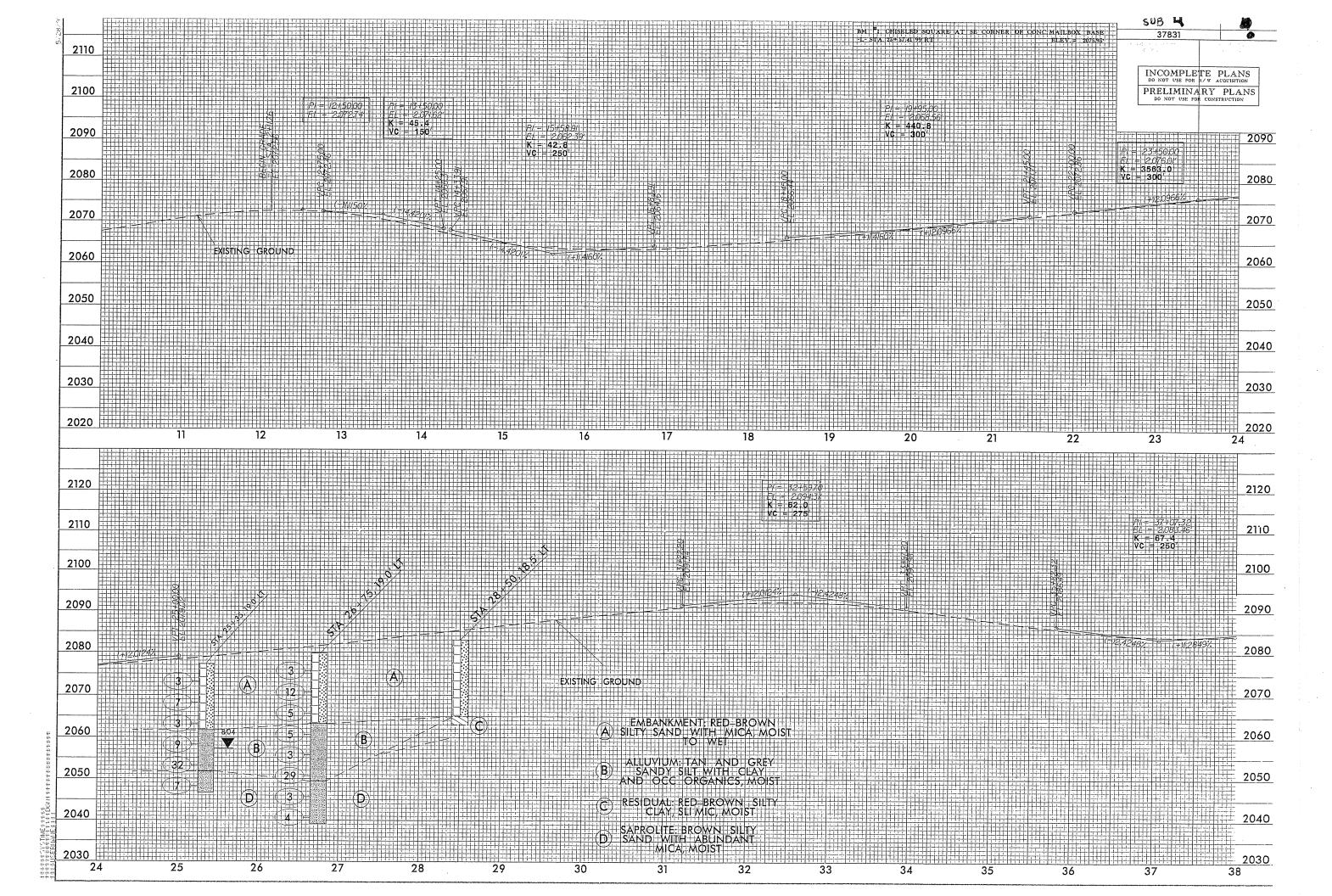
#### SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

3	1		
SOIL DESCRIPTION	GRADATION  WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	ROCK DESCRIPTION  HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLICHT POWER AUGER, AND WHICH YIELDS LESS THAN	UNIFORM- INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.
DIMM BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL	POORLY GRADED) . <u>GAP-GRADED-</u> INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.  IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	ACCUPER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK.  ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:	ARGILLACEOUS - APPLIED TO ACCES THAT HAVE BEEN BERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	MEATHERED TO THE PROPERTY OF T	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6		ROCK (WR)  PER FOOT.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERAL OGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS  CLASS. (△57. PASSING *200) C≫57. PASSING *200)	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30	HULK (NLK) INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL 000000000000000000000000000000000000	MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK LIMESTONE, SEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
* PACCING	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
# 10 50 MX GRANULAR CLAY MUCK,	ORGANIC MATERIAL GRANULAR SILT- CLAY SOILS SOILS OTHER MATERIAL		ROCKS OR CUTS MASSIVE ROCK.
# 40   30 MX 50 MX 51 MN   PEAT   SOILS   SOILS   SOILS   PEAT   FOR THE PEAT   SOILS   PEAT   PEAT	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 40 MX41 MN 40 MX41 MN 40 MX41 MN 40 MX41 MN SQUE WITH	LITTLE ORGANIC MATTER	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL AND SAND GRAVEL AND SAND SOILS SOILS MATTER	▼ STATIC WATER LEVEL AFTER 24 HOURS.	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.  MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
GEN. RATING FAIR TO	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE		DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
P.I. OF A-7-5 ≤ L.L. ~ 30 : P.I. OF A-7-6 > L.L. ~ 30	SPRING OR SEEPAGE	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH  (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT STEP BHT TEST BORING SAMPLE	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.  IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
CONSISTENCE (N-VALUE) (TONS/FT2 )	WITH SOIL DESCRIPTION THE DESIGNATIONS	SEVERE ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	
GENERALLY LOOSE (4 LOOSE 4 TO 10	SOIL SYMBOL AUGER BORING S- BULK SAMPLE	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME  EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL OTHER THAN COOK PORTING SS- SPLIT SPOON	IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50  VERY DENSE >50	ROADWAY EMBANKMENTS - CORE BORING SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AFRATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	ST- SHELBY TUBE  The sample of	(V. SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.5	SITE INFERRED ROCK LINE  A PIEZOMETER  RS- ROCK SAMPLE	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, YIELDS SPT N VALUES &lt; 100 BPF</u>	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1           MATERIAL         STIFF         8 TO 15         1 TO 2	ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATOR TRIAXIAL SAM	PLE ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AN
HARD >30 >4	25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE ROCK STRUCTURES	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	- SPT_N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	• - SOUNDING ROD REF— SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.	PARENT ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL PMT - PRESSUREMETER TEST	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS
(BLDR.) (COB.) (GR.) (CSE. SD.) (F. SD.) (SL.) (CL.)	BT - BORING TERMINATED SD SAND, SANDY CL CLAY SL SILT, SILTY	HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12' 3'	CPT - CONE PENETRATION TEST SLI SLIGHTLY	BY MODERATE BLOWS.  MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE TCR - TRICONE REFUSAL  DMT - DILATOMETER TEST	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION
COLL MOISTING COLLE FIELD MOISTING	DPT - DYNAMIC PENETRATION TEST 7 - ONLY WEIGHT	POINT OF A GEOLOGISTS PICK.	WITH 60 BLOWS.
(ATTERBERG LIMITS)  OESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO / G STUDENT STORE CONTENT	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS V VERY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.  STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY:
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED VST - VANE SHEAR TEST FRAGS FRACMENTS	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC SEMISOLIO; REQUIRES DRYING TO	MED MEDIUM	FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOP SOIL VI.S.7 SURFICE SOILS USUALET CONTRIBITION UNDANGE PIATTER.
PL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS  VERY THICKLY BEDDED > 4 FEET	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	CLAY BITS	MANUAL VERY WIDE MURE THAN 18 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION:
SLSHRINKAGE LIMIT	- United Brown	MODERATELY CLOSE	
REOUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE		VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET  THINLY LAMINATED < 0.008 FEET	NOTES:
	-	INDURATION .	
PLASTICITY	- CME-45 HARD FACED FINGER BITS -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC 0-5 VERY LOW	X TUNGCARBIDE INSERTS -H	DIROTHIC MITH CINCED EDEEC MIMEDOUS CRAIMS.	
LOW PLASTICITY · 6-15 SLIGHT	CASING W/ ADVANCER HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGE	R MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
and the state of t	TRICONE TUNG,-CARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	OTHER CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;  DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	VANE SHEAR TES	CHARL HANNED BLOND TO BEEN CANDIE	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER OTHER	EXTREMELY INDURATED SHARP HAMMER BLOWS REDUCTED TO BREAK SAMPLE:  SAMPLE BREAKS ACROSS GRAINS.	
		/ .	REVISED 09/15/00

STATE PROJECT NO. SHEET NO. TOTAL SHEETS
37831 SUB 2





CONTENTS:

RETAINING WALL RIGHT OF -L- STATION INTERVAL 29+50 TO 35+50

## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

# GEOTECHNICAL SEP 1 3 2004

STATE STATE PR	OJECT REFEREN	NCE NO.	SHEET NO.	TOTAL
N.C.	378 <b>3</b> 1	SU	B 5	溪
STATE PROJ.NO.	F. A. PROJ. N	ro.	DESCRIE	TION
			P.E.	
			CONS	iT.

GEÖTECHNICAL SEP 2 4 2004 CAUTION NOTICE

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# STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT <u>3783I</u> I.D. NO
F.A. PROJECT
COUNTY_Buncombe
PROJECT DESCRIPTIONRETAINING WALL
RIGHT OF -L- STATION INTERVAL
29+50 TO 35+50
SITE DESCRIPTION

PERSONNEL\_ T B Daniel INVESTIGATED BY\_C A Dunnagan W D Frye, JR J T Williams CHECKED BY SUBMITTED BY W D Frye, JR G K ROSE SEPTEMBER 2004

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

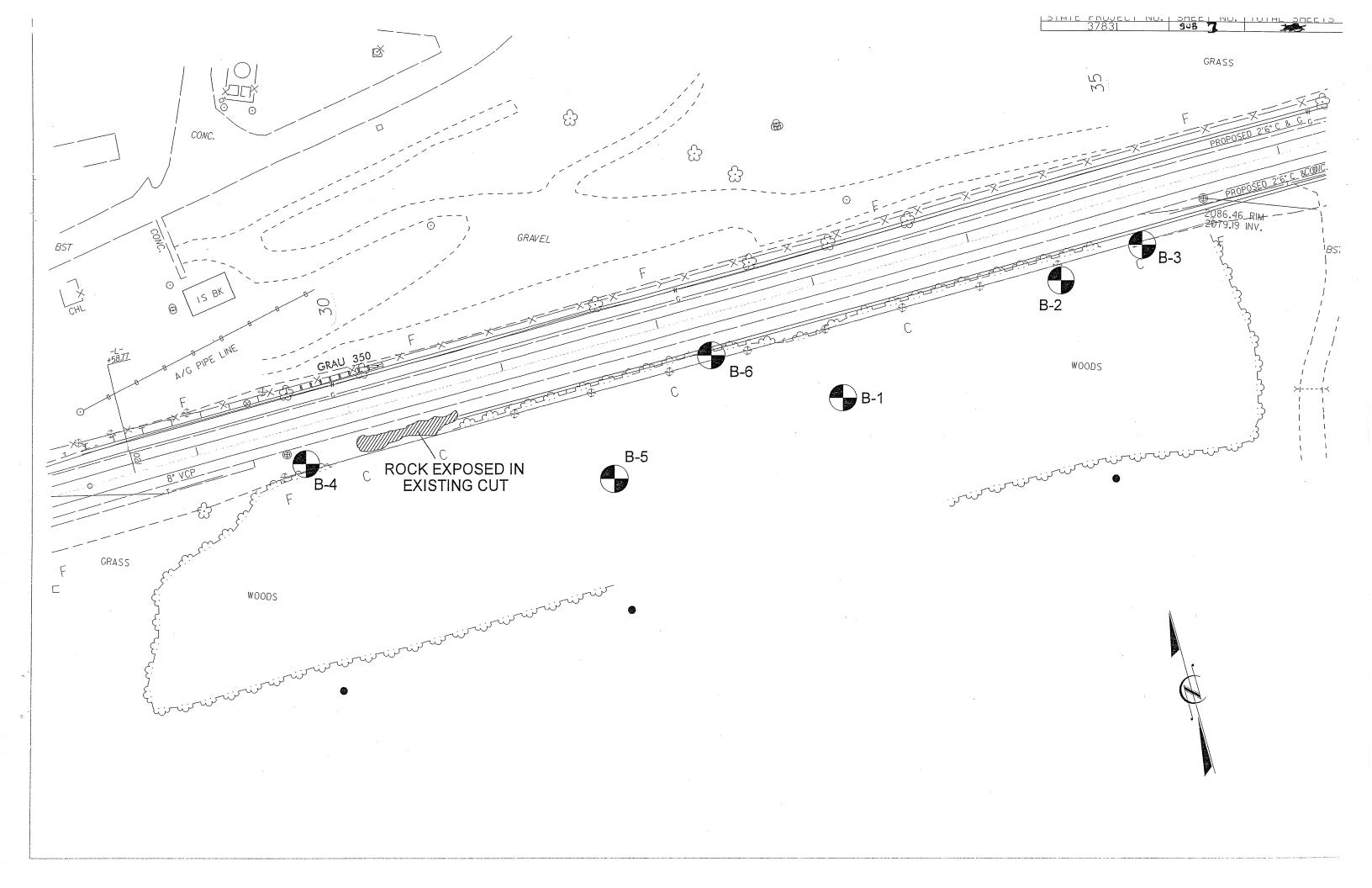
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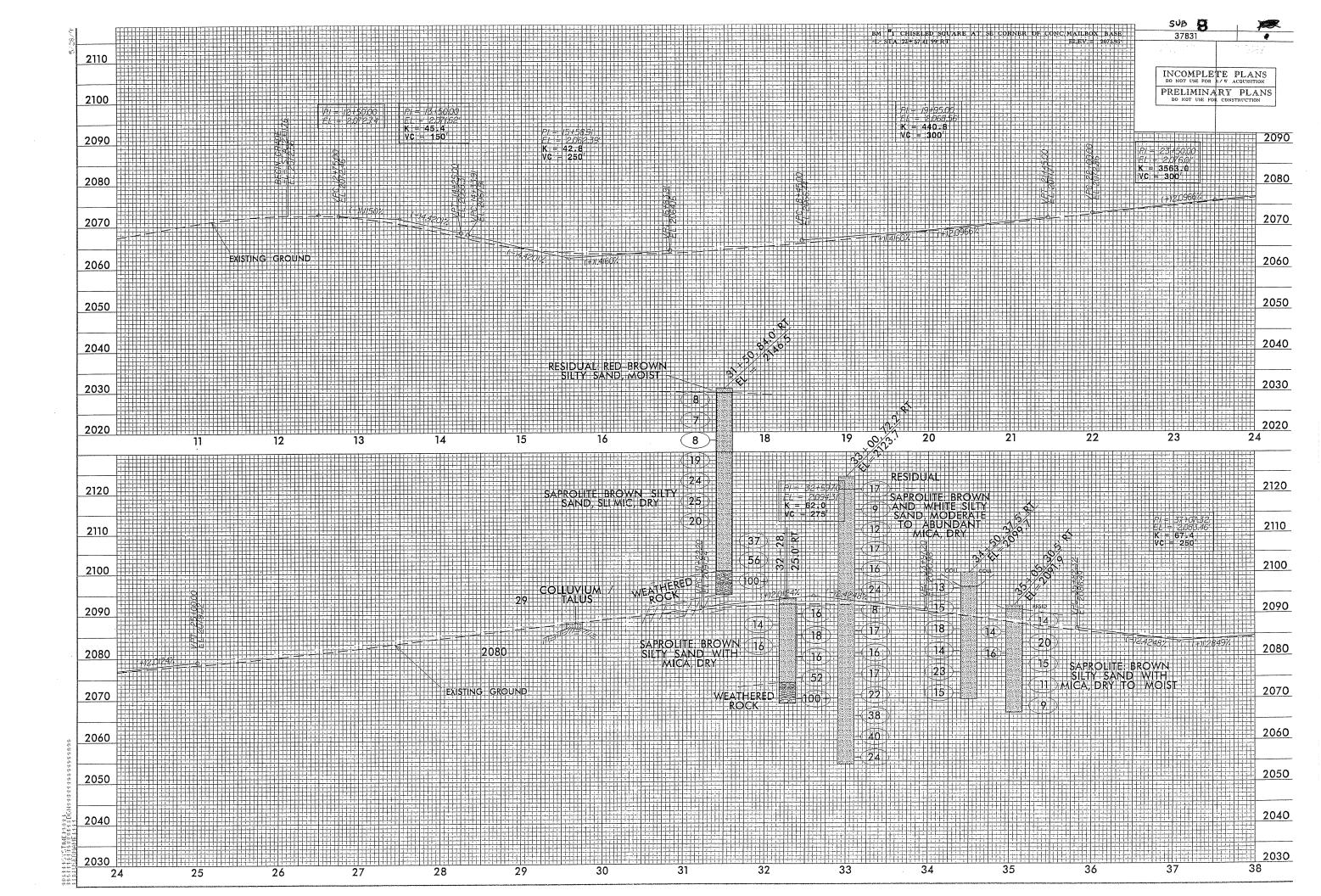
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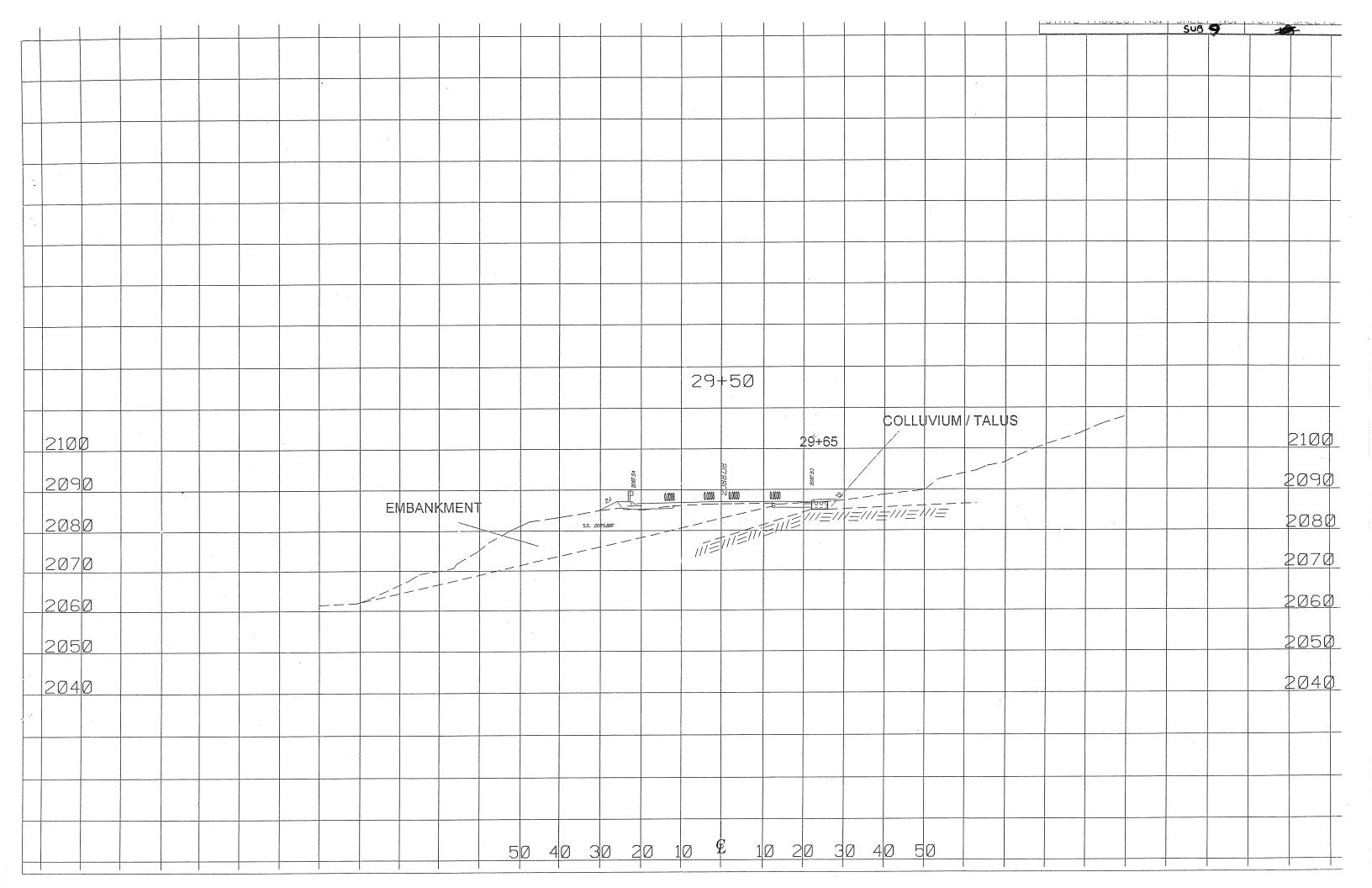
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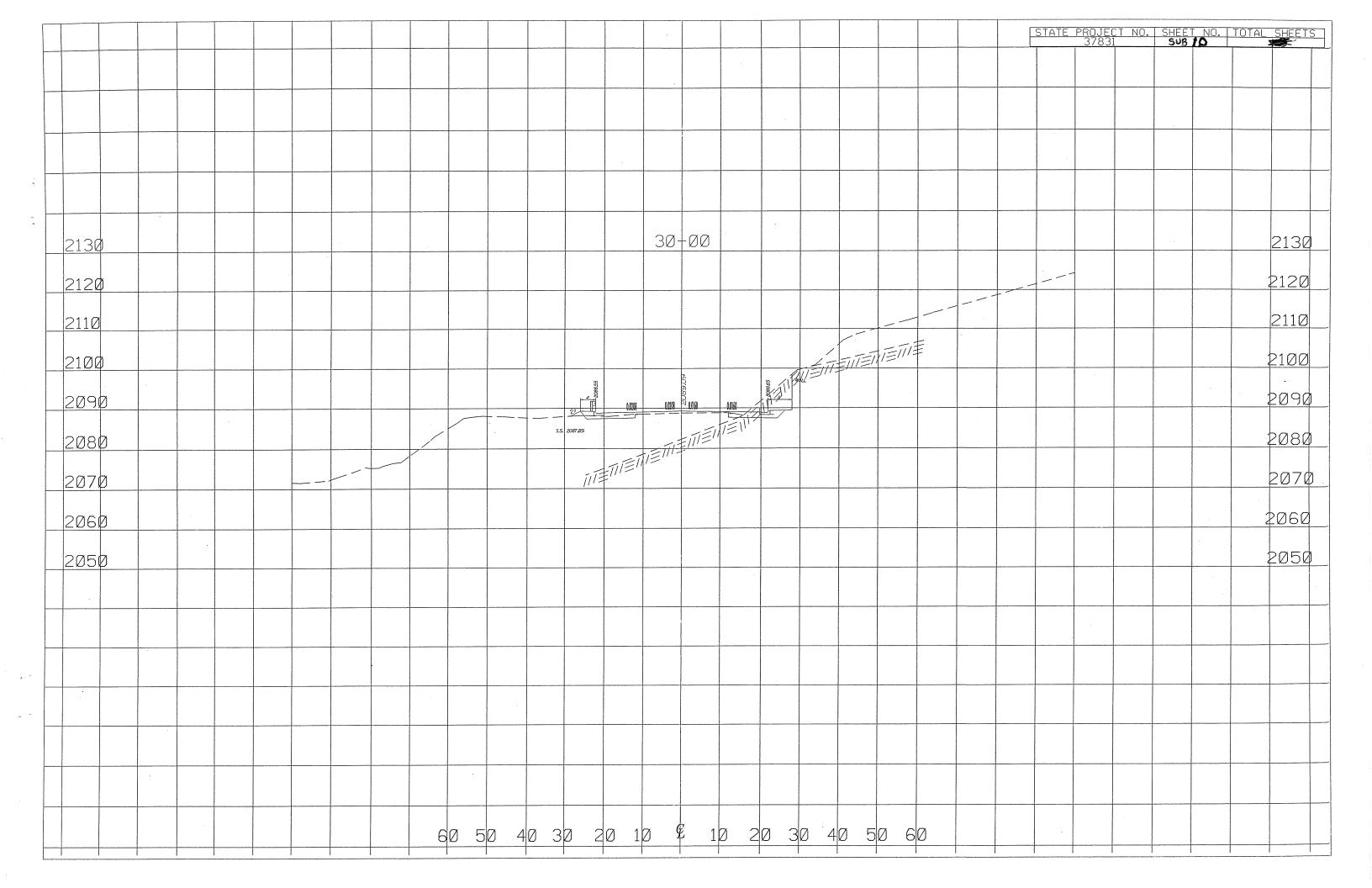
#### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

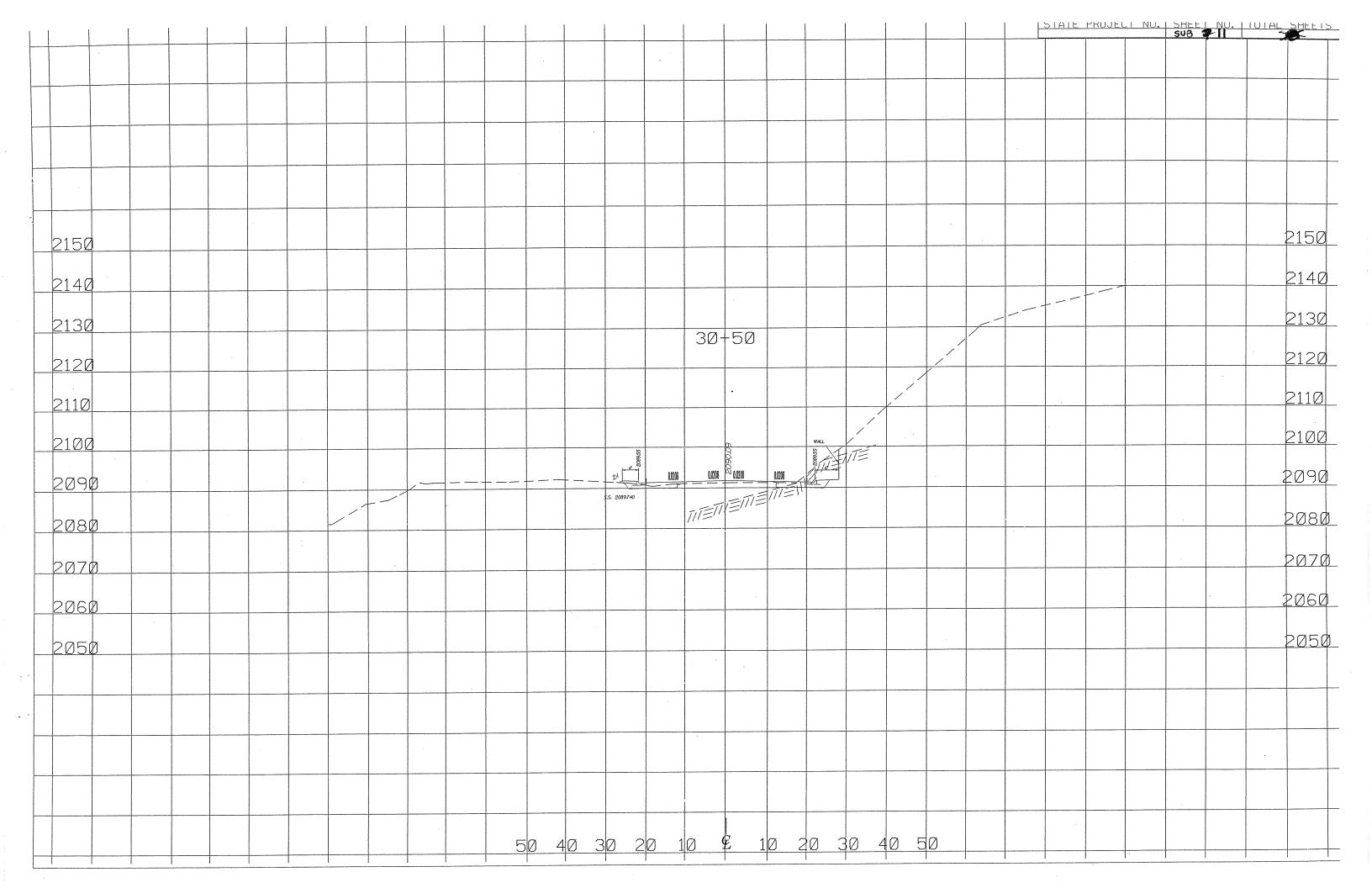
	CDADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL DESCRIPTION	GRADATION  WELL GRADED- INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	LARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS	UNIFORM- INDICATES THAT SUIL PARTICLES ARE ALL AFFROXIBILET THE STATE STEEL WEST	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.  SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT FOWER AGGEN, AND WHICH TELEST (ASSIM D-1586), SOIL	POORLY GRADED) GAP-GRADED- INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEDUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
	ANGULARITY OF GRAINS	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
CLASSIFICATION IS BASED ON THE MASTINE ASSISTED CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS; ANGULAR,	WEATHERED NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
VERY STIFF, GRAY SILTY CLAY, MOIST WITH INTERBEDOED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	ROCK (WR)  PER FOOT.  PER FOOT.	AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO CUARSE CHAIN TORGUOS AND PELIFICIARIES TORGET TO CONTROL OF THE TORGET TO CO	GROUND SURFACE.
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELOSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROLK (CR) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. ( 95% PASSING *200) ( 85% PASSING *200)	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30	NUCK (NCR) INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
ELASS. A-1-8 A-1-6 A-2-9 A-2-9 A-2-6 A-2-7 A-7-6	MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SYMBOL 000000000000000000000000000000000000	HIGHLY TO APPESSIBLE ELOUID LIMIT GREATER THAN 50	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
Z PASSING GRANULAR SILT- MUCK.	GRANII AR SILT- CLAY		ROCKS OR CUTS MASSIVE ROCK.
# 10 50 MX   GRANULAR CLAY   PEAT   SOILS   SOILS   CHAY   SOILS   CLAY   PEAT   PEAT	SUILS SUILS	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
* 200   15 MX   25 MX   10 MX   35 MX   35 MX   35 MX   36 MN   36 MN   36 MN   36 MN	TRACE OF ORGAN 2 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC Man. 3 - 5% 5 - 12% LITTLE 10 - 20%	VERY CUCUI, POCK PENERALLY ERESH IDINTS STAINED SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
LIQUID LIMIT 40 MX41 MN 40 MX41 MN 40 MX41 MN 40 MX41 MN SOILS WITH	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	(V. SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, HOCK HINGS UNDER HAMMER BLOWS IF	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10 MX 11 MN 11 MN 11 MN LITTLE OR HIGHLY	COUNTY LIATED	OF A CRYSTALLINE NATURE.  SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
GROUP INDEX W W A MX 12 MX 18 MX 18 MX 12 MX 18	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER ORILLING.	(SLI) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
USUAL TYPES STONE FRACS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC OF MAJOR GRAVEL AND CRAYEL AND SAMD SOULS SOULS MATTER	· · · · · · · · · · · · · · · · · · ·	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
OF MAJUR   URAYEL AND SAND   SOILS   SOILS   MATTER   MATERIALS   SAND   SAND   SOILS   SOILS   MATTER	STATIC WATER LEVEL AFTER 24 HOURS.	MODERATE (MOD.)  SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	PARENT MATERIAL.
GEN. RATING AS A FXCFLLENT TO GOOD FAIR TO POOR POOR UNSUITAB	PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE SUBGRADE	SPRING OR SEEPAGE	WITH FRESH ROCK.  MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
P.I. OF A-7-5 ≤ L.L 30 : P.I. OF A-7-6 > L.L 30	MISCELLANEOUS SYMBOLS	I SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LUSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
CONSISTENCY OR DENSENESS	COT PPT	MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.  JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT TEST BORING SAMPLE	IF TESTED, WOULD YIELD SPT REFUSAL  SEVERE ALL ROCKS EXCEPT DUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	
PRIMARY SULL TIFE CONSISTENCY (N-VALUE) (TONS/FT2 )	- WITH SOIL DESCRIPTION	SEVERE (SEV.)  ALL ROCKS EXCEPT DURN'T DISCOUNED ON STAINED, ROCK PAINTED TO SOME (SEV.)  IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GENERALLY VERY LOOSE (4	SOIL SYMBOL AUGER BORING S- BULK SAMPLE	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GRANULAR MEDIUM DENSE 10 TO 30 N/A	ARTIFICIAL FILL OTHER THAN CORE BORING SAMPLE	IF TESTED, YIELDS SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
MATERIAL DENSE 30 TO 50	ROADWAY EMBANKMENTS CURE BURING SAMPLE ST- SHELBY TUBE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V. SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE. 200	INFERRED SOIL BOUNDARIES AMPLE SAMPLE	DEMAINING CARROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A BEGREE SUCH THAT UNLY MINUM	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF A INTERVENING IMPERVIOUS STRATUM.
VERY SOFT         <2         <0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.5	RS- ROCK SAMPLE	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES ( 100 BPF	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1	INSTALLATION RT- RECOMPACTED	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	BOCK DUALITY DESCRIBED 6 (: TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (CONFCIVE) VERY STIFF 15 TO 30 2 TO 4	TTTTT ALLUVIAL SOIL BOUNDARY  SLOPE INDICATOR  TRIAXIAL SAMPLE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO DR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CURE FUN A
(COHESIVE) VERY \$11FF 15 10 30 2 10 4	25/025 DIP/DIP DIRECTION OF INSTALLATION CBR - CBR SAMPLE	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES —— SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES	SAPPOLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
ILS, STD, SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD     REF— SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGISTS PICK.	SILL - AN INTRUSIVE RODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.0 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL
COARSE FINE SULT SLOV	POSCOUNTED TOO	TO DETACH HAND SPECIMEN.  MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
BOULDER         COBBLE         GRAVEL         SAND         SAND         SILT         CLAY           (BLDR.)         (COB.)         (GR.)         (CSE. SD.)         (F. SD.)         (SL.)         (CL.)	AR - AUGER REFUSAL PMT - PRESSUREMETER TEST BT - BORING TERMINATED SD SAND, SANDY	HARD EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED	SLIP PLANE.
1050, 50,7 (F. 50,7)	CL CLAY SL SILTY	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN 12' 3'	CPT - CONE PENETRATION TEST SLI SLIGHTLY CSE COARSE TCR - TRICONE REFUSAL	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WIT A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION
SOIL MOISTURE - CORRELATION OF TERMS	DMT - DILATOMETER TEST	POINT OF A GEOLOGISTS PICK.	WITH 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGT
(ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTONE BESCHIEFTS	F FINE W - MOISTURE CONTENT	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS V VERY FRAC FRACTURED VST - VANE SHEAR TEST	CAN BE CARVED WITH MILE CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES I INCH	STRATA ROCK QUALITY DESIGNATION (S.R.O.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY T
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAGS FRAGMENTS	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID: REQUIRES DRYING TO	MED MEDIUM	FINGERNAIL. FRACTURE SPACING BEDDING	TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
RANGE <   - WET - (W)   ATTAIN OPTIMIM MOISTIRE	EQUIPMENT USED ON SUBJECT PROJECT	TERM THICKNESS	BENCH MARK:
(PI) PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	VERY THICKLY BEDDED ) 4 FEET	
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURI	X AUTOMATIC MANUAL	WIDE 3 TO 10 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION:
OM _ DPTIMUM MOISTURE	MOBILE B-	MODERATELY CLOSE 110 3 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
REQUIRES ADDITIONAL WATER TO	G*CONTINUOUS FLIGHT AUGER CORE SIZE:  BK-51 X R*HOLLOW AUGERS -B	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET  THINLY LAMINATED < 0.008 FEET  THINLY LAMINATED	770.25
- DRY - (D) ATTAIN OPTIMUM MOISTURE	BK-51 X 8 HOLLOW AUGERS	INDURATION	
PLASTICITY	CME-45 HARD FACED FINGER BITS -N	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) DRY STRENGTH	TUNG,-CARBIDE INSERTS	RUBRING WITH FINGER FREES NUMEROUS GRAINS;	
NONPLASTIC 0-5 VERY LOW	X CME-550	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	1777	MODERATELY INDURATED CRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
HIGH PLASTICITY 26 OR MORE HIGH		BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	OTHER TRICONS TOTAL	INDURATED CRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY)	CORE BIT	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	OTHER OTHER OTHER	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;  SAMPLE BREAKS ACROSS GRAINS.	
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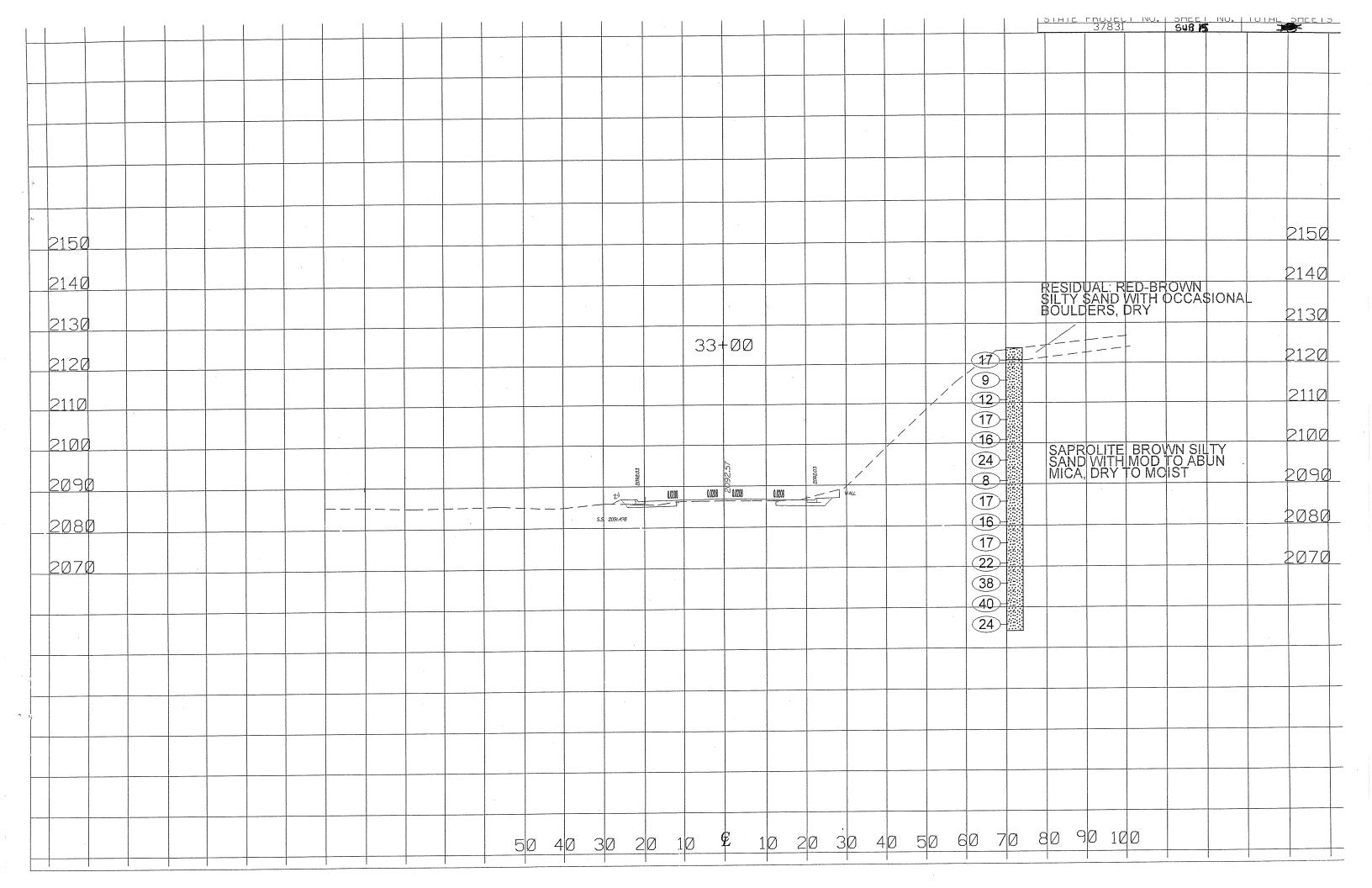




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