

STATE OF NORTH CAROLINA

GEOTECHNICAL SEP 13 2004

N.C.	37831	SUB	1	1
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION		
		P.E.		
		CONST.		

CONTENTS:

RETAINING WALL LEFT
 OF -L- STATION INTERVAL
 24+50 TO 29+00

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

J. Farther
 GEOTECHNICAL SEP 24 2004

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 @ (919) 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 BORINGS 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 SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY 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 PROJECT 37831 I.D. NO. _____

F.A. PROJECT _____

COUNTY BUNCOMBE

PROJECT DESCRIPTION RETAINING WALL
LEFT OF -L- STATION INTERVAL
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

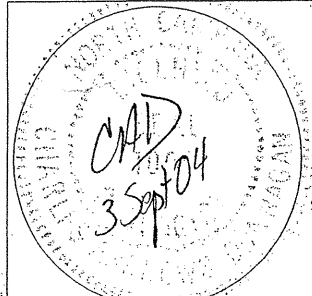
DATE SEPTEMBER 2004

PROJECT: 37831 ID:

DRAWN BY: C A DUNNAGAN

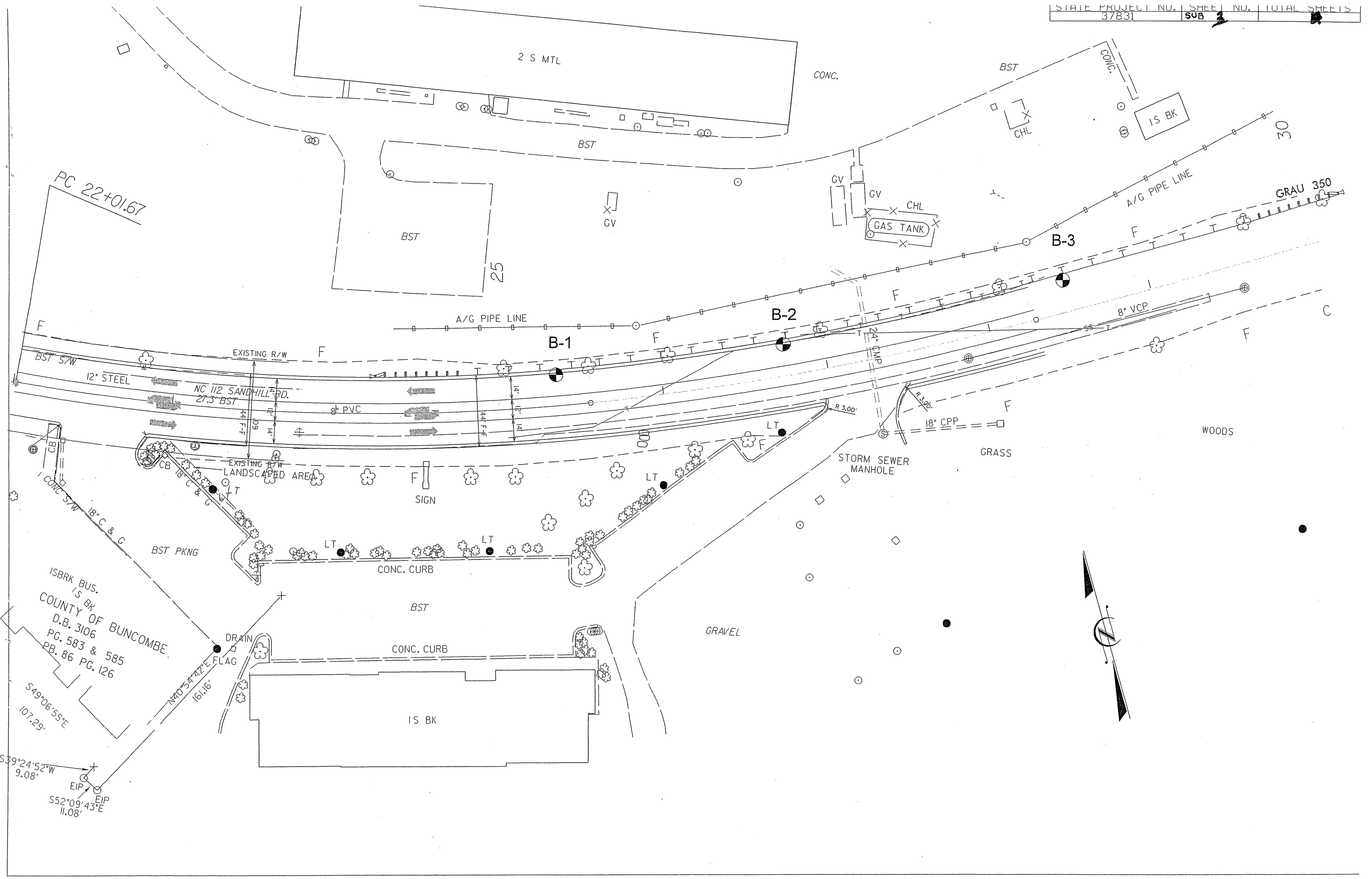
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SEAL

C.A. Dunnagan
SIGNATURE



PC 22+01.67

2 S MTL

CONC.

BST

CONC.

IS BK

30

GRAU 350

BST

25

GV

GAS TANK

B-3

A/G PIPE LINE

A/G PIPE LINE

B-2

8" VCP

BST 5'W
12" STEEL

EXISTING R/W

B-1

NC 112 SANDHILL RD.
27.5' BST

PVC

R 3.00'

R 3.30'

18" CPP

WOODS

GRASS

STORM SEWER
MANHOLE

SIGN

BST PKNG

LT

LT

CONC. CURB

BST

CONC. CURB

IS BK

GRAVEL



ISBRK BUS.
1/5 BK
COUNTY OF BUNCOMBE
D.B. 3106
PG. 583 & 585
PB. 86 PG. 126

S49°06'55"E
107.29'
S39°24'52"W
9.08'
EIP
S52°09'43"E
11.08'

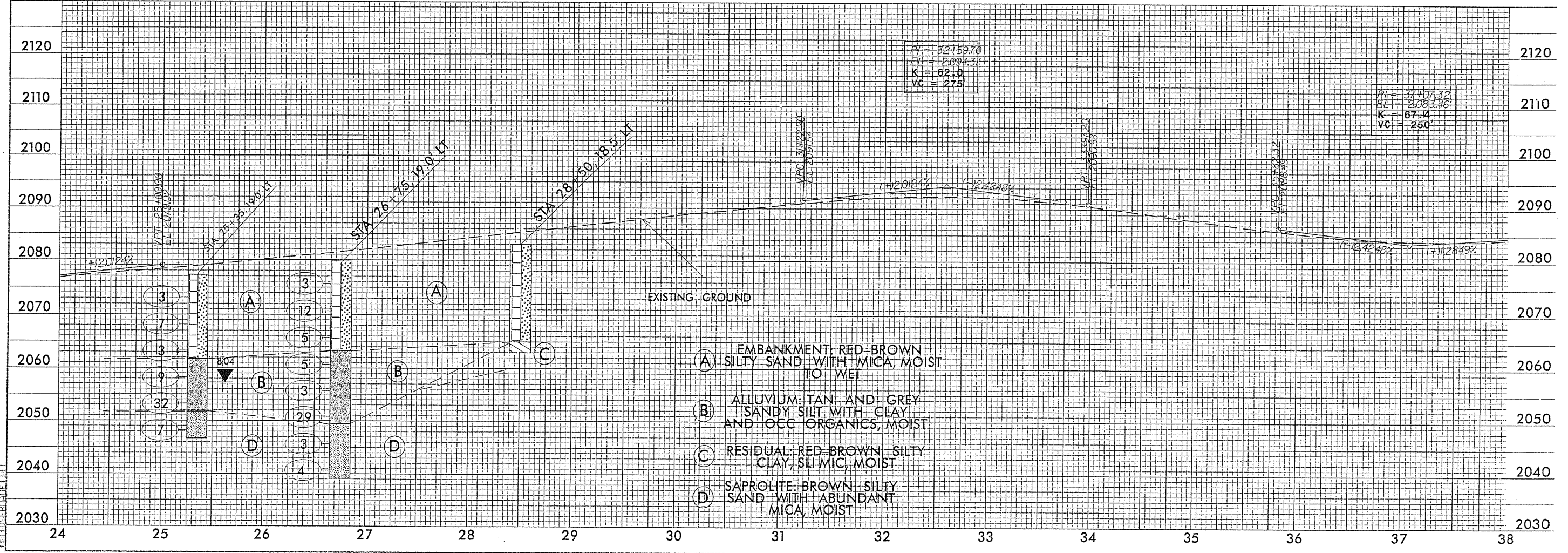
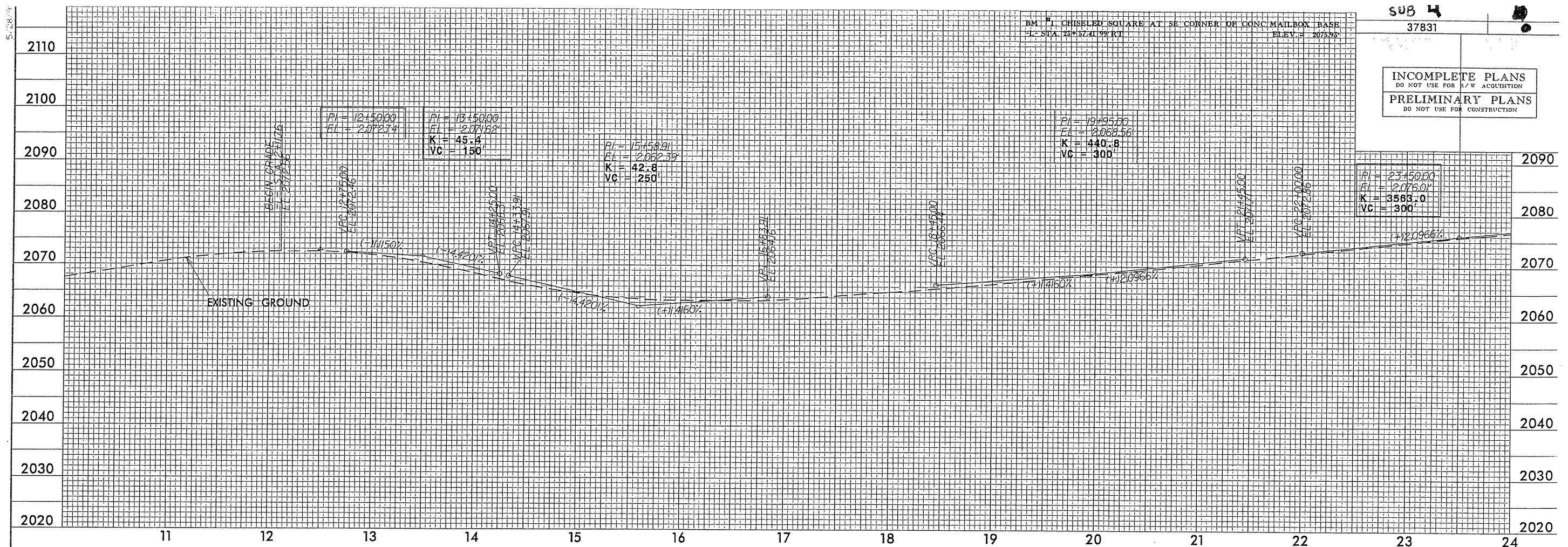
N40°34'42"E
16.116'

DRAIN

FLAG

BM CHISELED SQUARE AT SE CORNER OF CONC. MAILBOX BASE
 STA. 23+57.41 99% RT
 ELEV. = 2075.95'

INCOMPLETE PLANS
 DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION



PROJECT: 37831 ID:

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 13 2004
J. Faragher
GEOTECHNICAL SEP 24 2004

STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C. 37831 SUB	5	5
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
		P.E.
		CONST.

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STRUCTURE
SUBSURFACE INVESTIGATION

STATE PROJECT 37831 I.D. NO. _____
F.A. PROJECT _____
COUNTY Buncombe
PROJECT DESCRIPTION RETAINING WALL
RIGHT OF -L- STATION INTERVAL
29+50 TO 35+50
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

DRAWN BY: C A DUNNAGAN

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SEAL

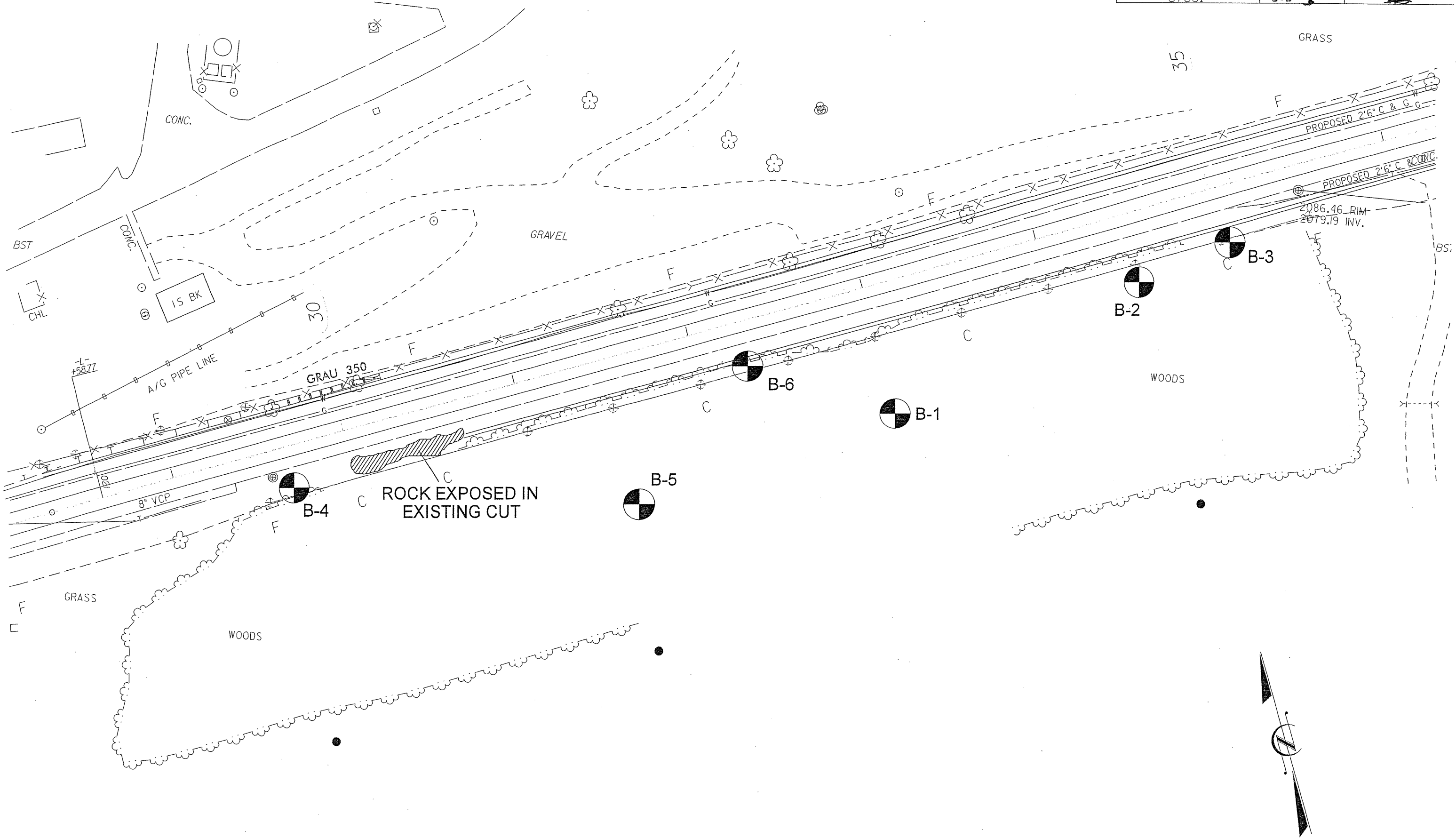
C.A. Dunnagan
SIGNATURE

DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION					GRADATION					ROCK DESCRIPTION					TERMS AND DEFINITIONS				
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHFTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6					WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.					HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED 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. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:					ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, 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 AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. 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. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED AS TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR B.P.F. OF 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 WITH 60 BLOWS. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.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 THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.				
GENERAL CLASS. GRANULAR MATERIALS (< 75% PASSING #200) SILT-CLAY MATERIALS (> 75% PASSING #200) ORGANIC MATERIALS					MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.					WEATHERED ROCK (WR) [Symbol] CRYSTALLINE ROCK (CR) [Symbol] NON-CRYSTALLINE ROCK (NCR) [Symbol] COASTAL PLAIN SEDIMENTARY ROCK (CP) [Symbol]					WEATHERING FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. 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 DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT 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 VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. 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 ALSO AN EXAMPLE.				
SOIL LEGEND AND AASHTO CLASSIFICATION					PERCENTAGE OF MATERIAL					ROCK HARDNESS					BEDDING				
P.I. OF A-7-5 ≤ LL - 30 ; P.I. OF A-7-6 > LL - 30					GROUND WATER					ROCK HARDNESS					BEDDING				
COMPACTNESS OR CONSISTENCY					MISCELLANEOUS SYMBOLS					ROCK HARDNESS					BEDDING				
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)					ABBREVIATIONS					ROCK HARDNESS					BEDDING				
TEXTURE OR GRAIN SIZE					EQUIPMENT USED ON SUBJECT PROJECT					ROCK HARDNESS					BEDDING				
SOIL MOISTURE - CORRELATION OF TERMS					EQUIPMENT USED ON SUBJECT PROJECT					ROCK HARDNESS					BEDDING				
PLASTICITY					EQUIPMENT USED ON SUBJECT PROJECT					ROCK HARDNESS					BEDDING				
COLOR					EQUIPMENT USED ON SUBJECT PROJECT					ROCK HARDNESS					BEDDING				



CONC.

IS BK

A/G PIPE LINE

GRAU 350

8" VCP

ROCK EXPOSED IN EXISTING CUT

PROPOSED 2'6" C & G C

PROPOSED 2'6" C & CONC.

2086.46 RIM
2079.19 INV.

GRASS

GRAVEL

WOODS

GRASS

WOODS

B-4

B-6

B-1

B-5

B-2

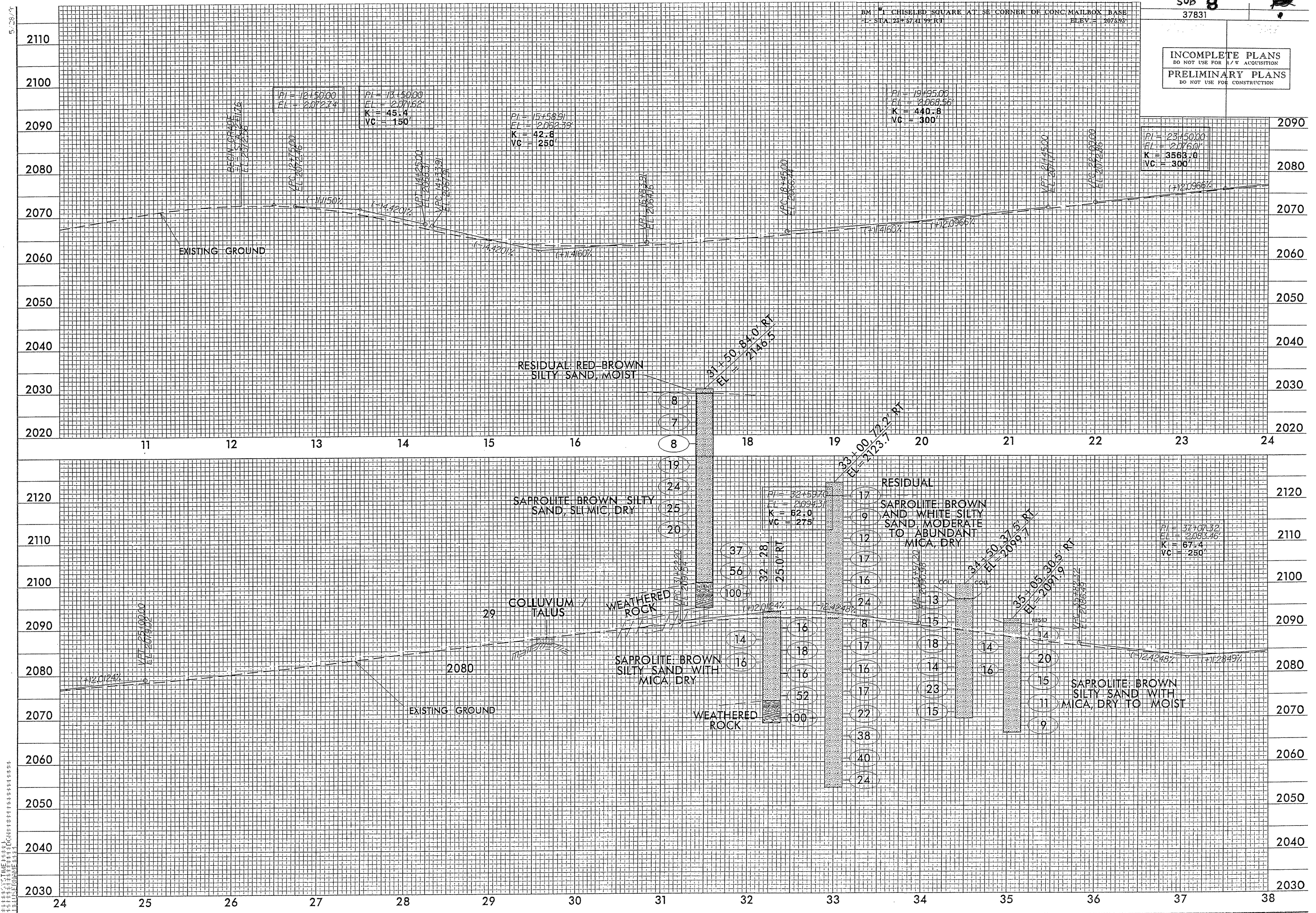
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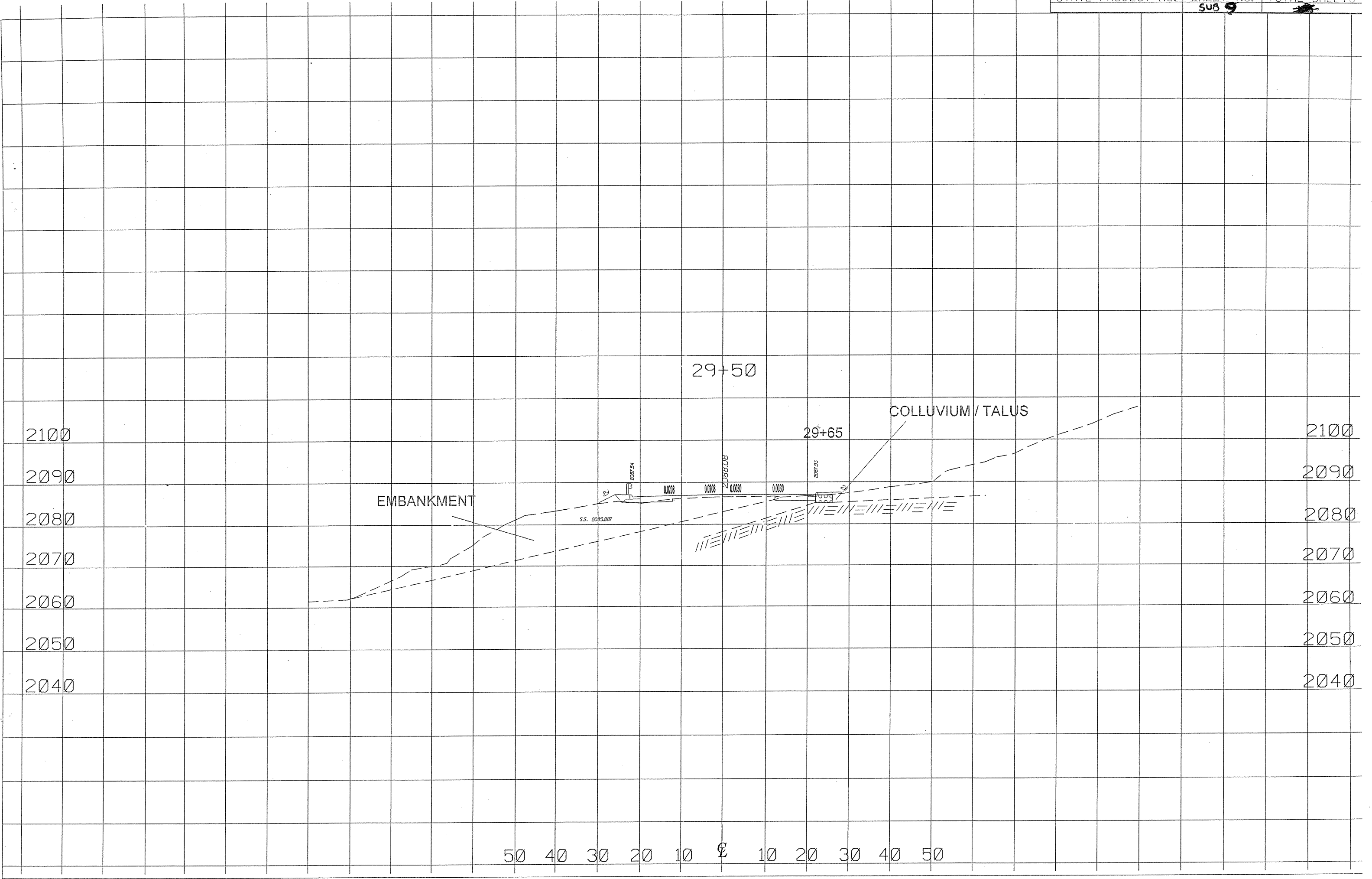


INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM CHISELED SQUARE AT SE CORNER OF CONC MAILBOX BASE
ELEV. 2075.92



5/28/07
REFLECTIVE SHEET
REVISIONS
1. 11/15/07
2. 11/15/07
3. 11/15/07
4. 11/15/07
5. 11/15/07
6. 11/15/07
7. 11/15/07
8. 11/15/07
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37. 11/15/07
38. 11/15/07



2100

2100

2090

2090

2080

2080

2070

2070

2060

2060

2050

2050

2040

2040

29+50

29+65

COLLUVIUM / TALUS

EMBANKMENT

S.S. 2085.887

2087.54

0.0008

0.0208

0.0030

0.0030

2087.93

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30-00

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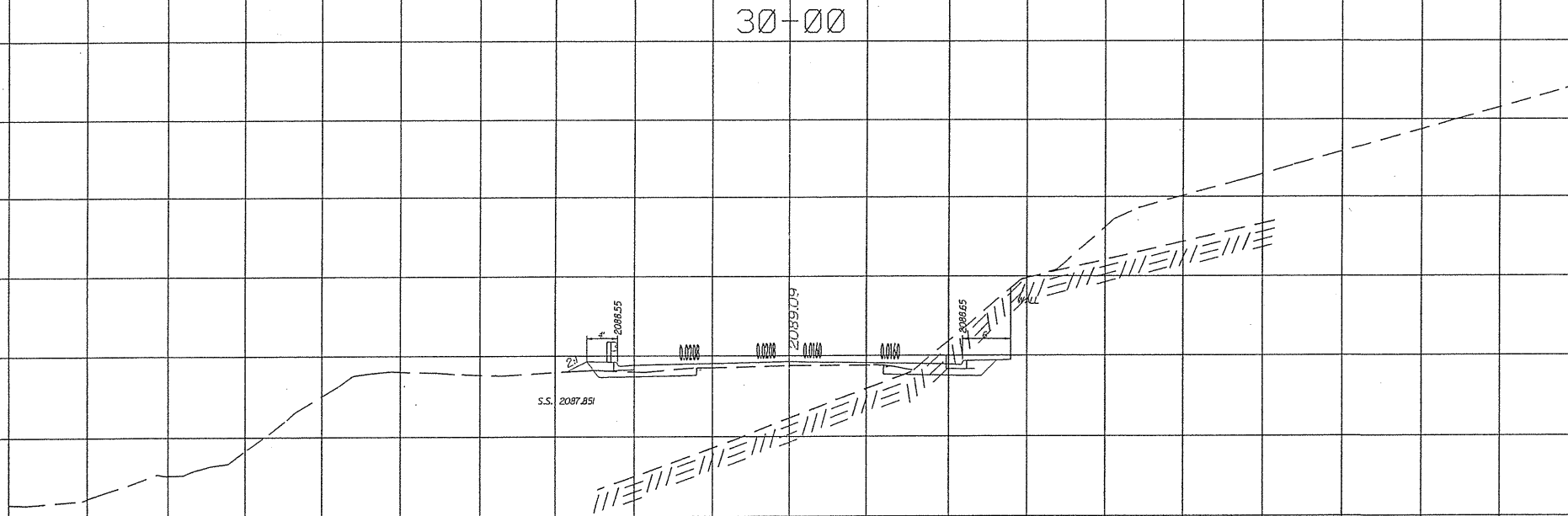
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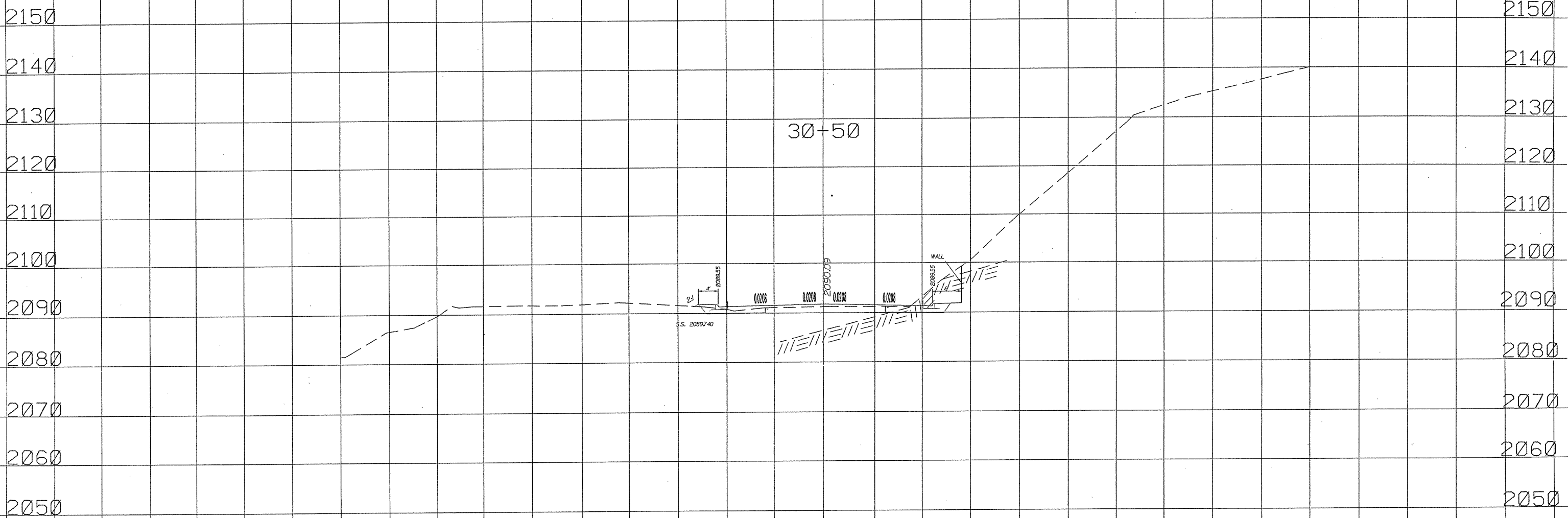
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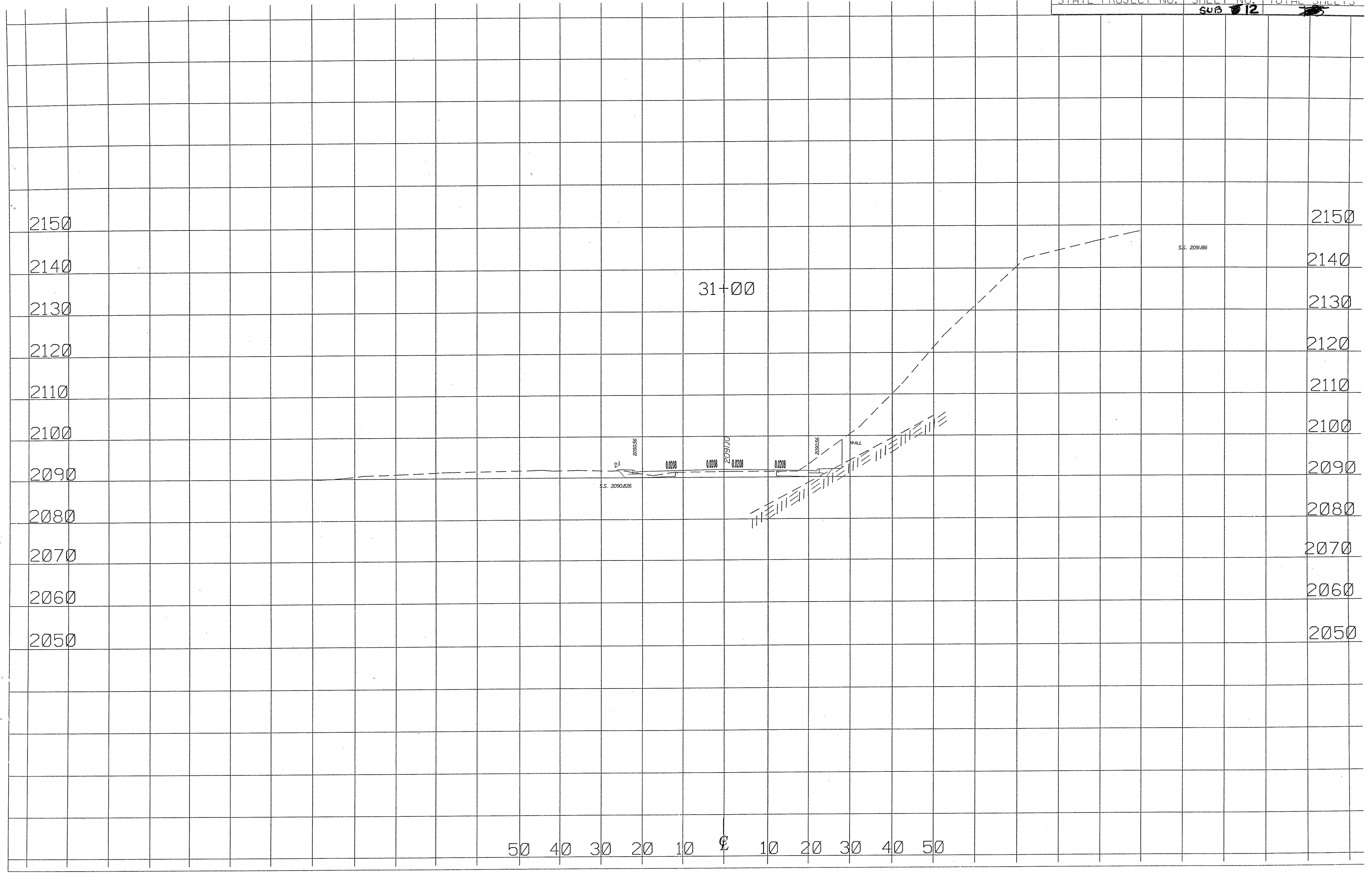
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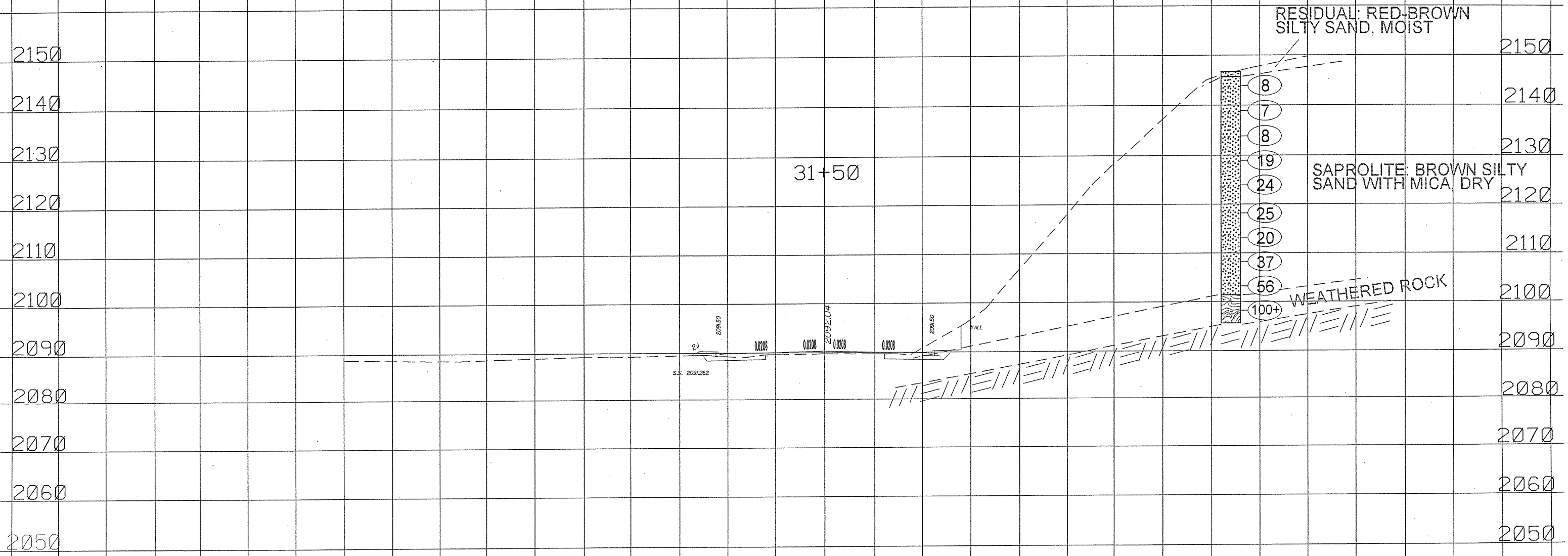




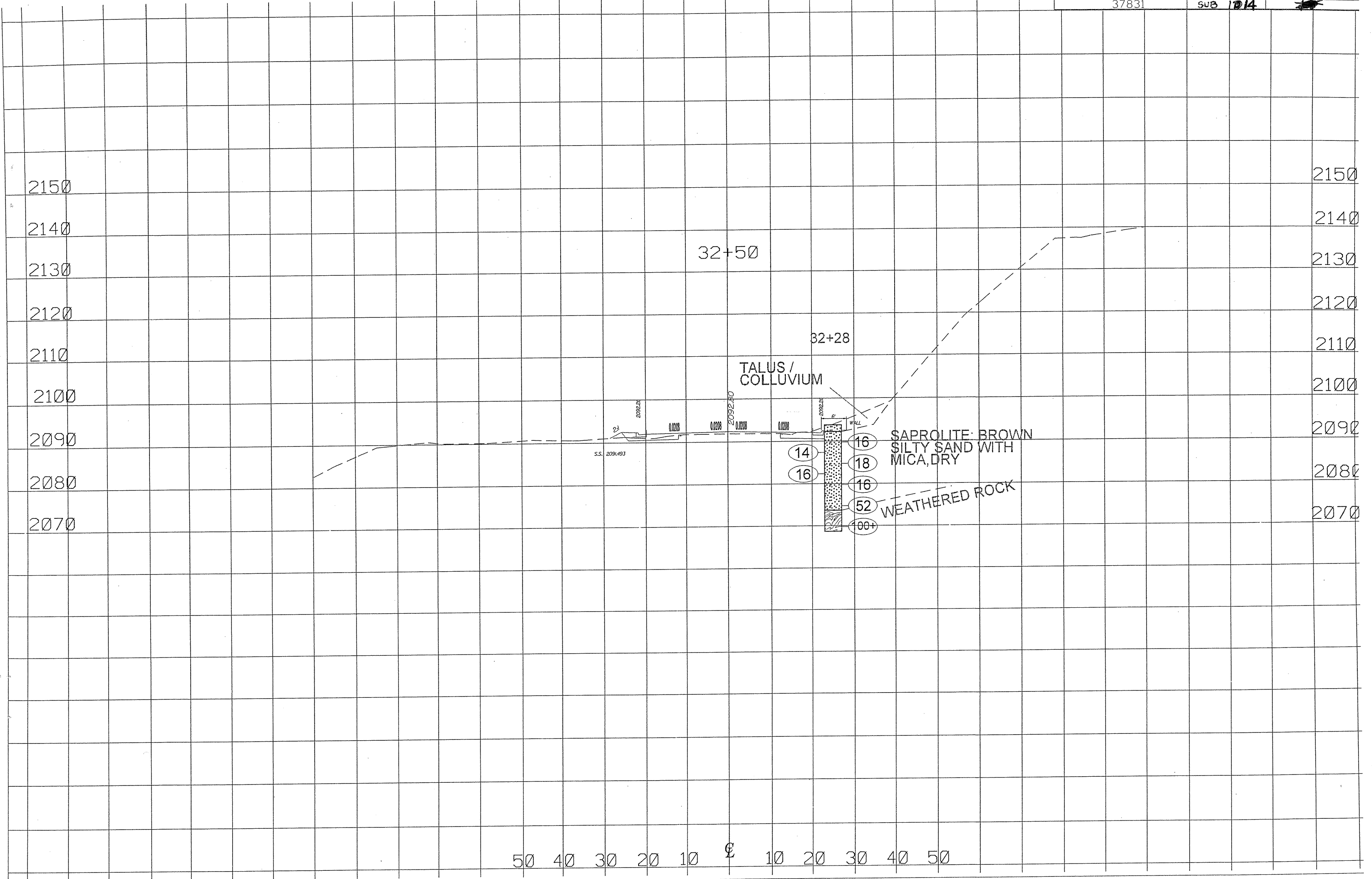
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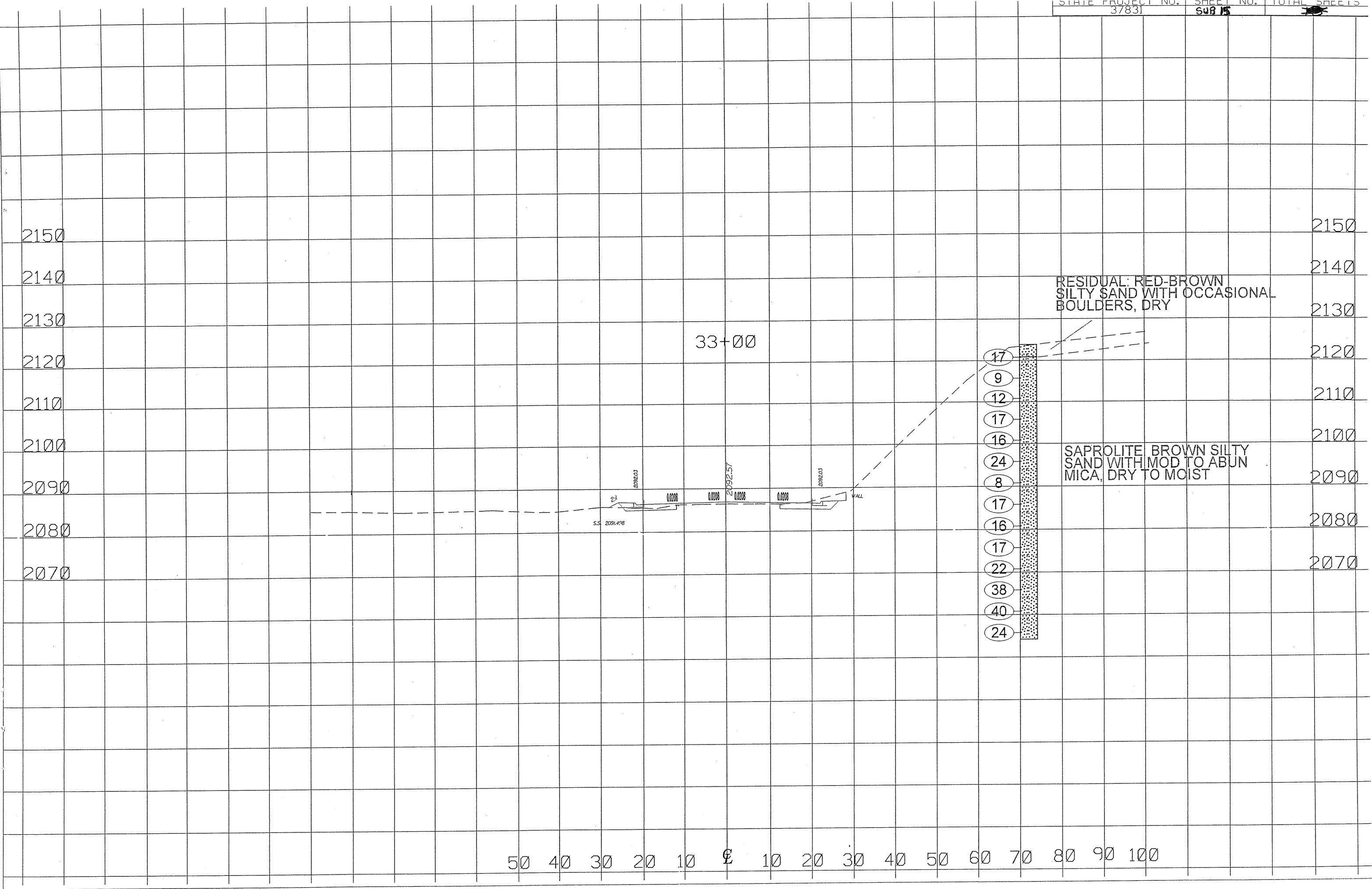


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2150
2140
2130
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2150
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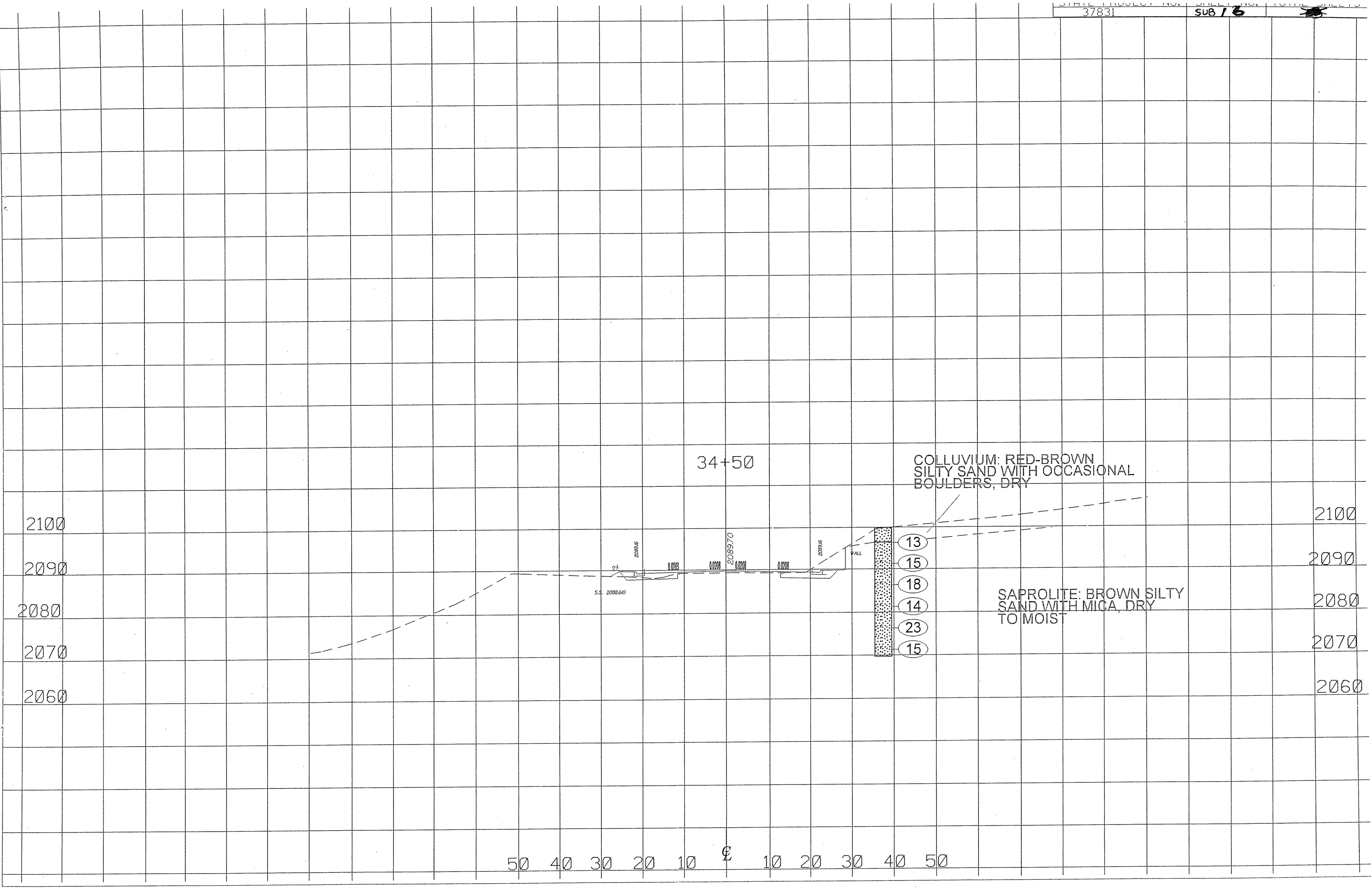
33+00

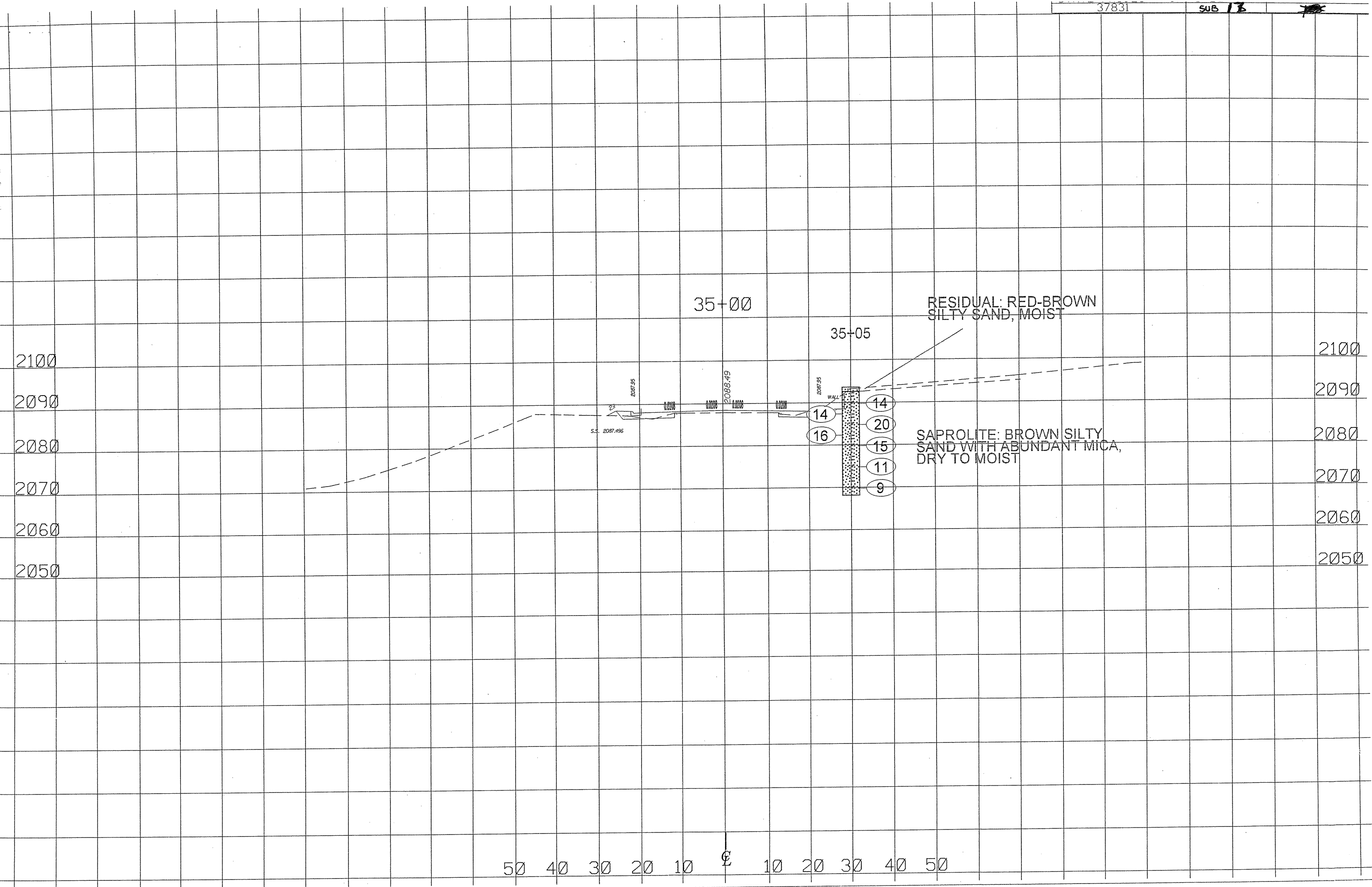
RESIDUAL RED-BROWN
SILTY SAND WITH OCCASIONAL
BOULDERS, DRY

SAPROLITE BROWN SILTY
SAND WITH MOD TO ABUN
MICA, DRY TO MOIST

- (17)
- (9)
- (12)
- (17)
- (16)
- (24)
- (8)
- (17)
- (16)
- (17)
- (22)
- (38)
- (40)
- (24)

50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100





35+00

RESIDUAL: RED-BROWN
SILTY SAND, MOIST

35+05

2100

2100

2090

2090

2080

2080

2070

2070

2060

2060

2050

2050

SAPROLITE: BROWN SILTY
SAND WITH ABUNDANT MICA,
DRY TO MOIST

50 40 30 20 10 0 10 20 30 40 50