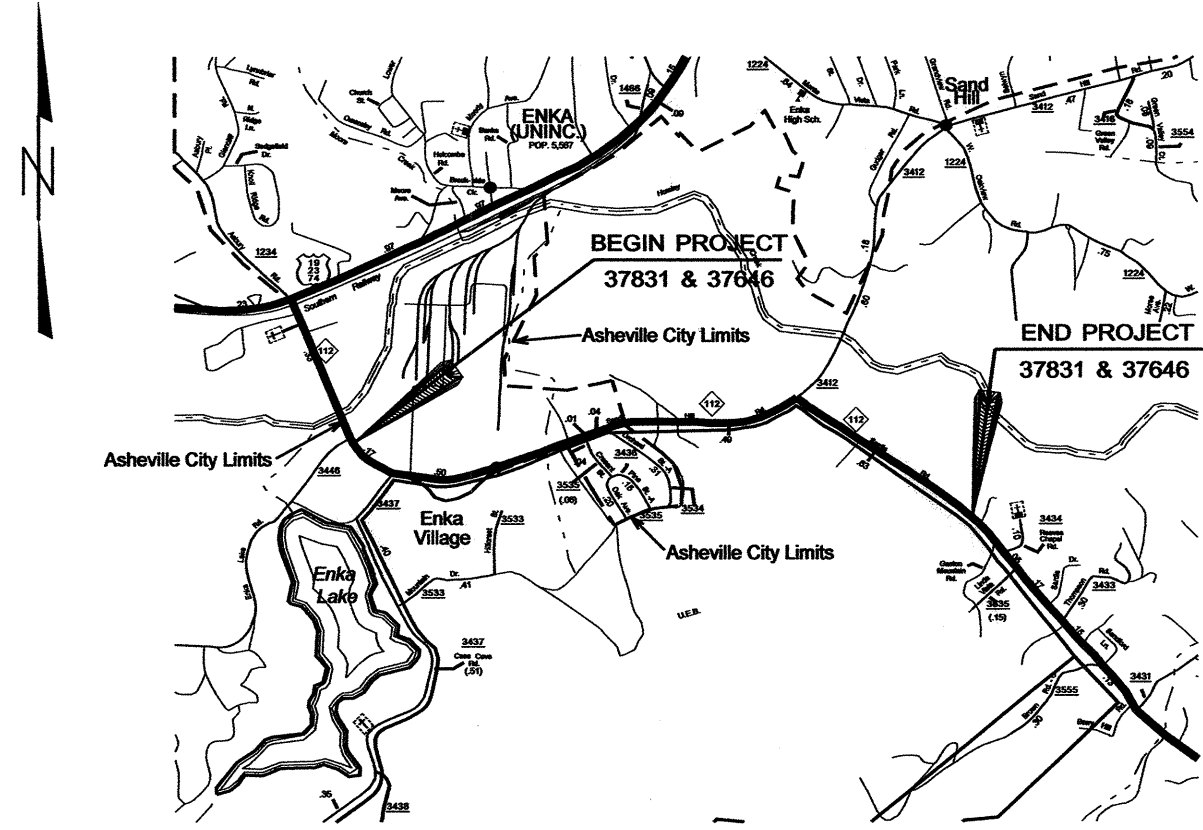


WBS 37831

PROJECT: MAI3028R

19-JUL-2007 14:38 F:\nc\moving_dhead\nol2_mai3028r\and28r\13028r-ddc-fsh_040513.dgn \$\$\$SERNAME\$\$\$

See Sheet 1-A For Index of Sheets



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BUNCOMBE

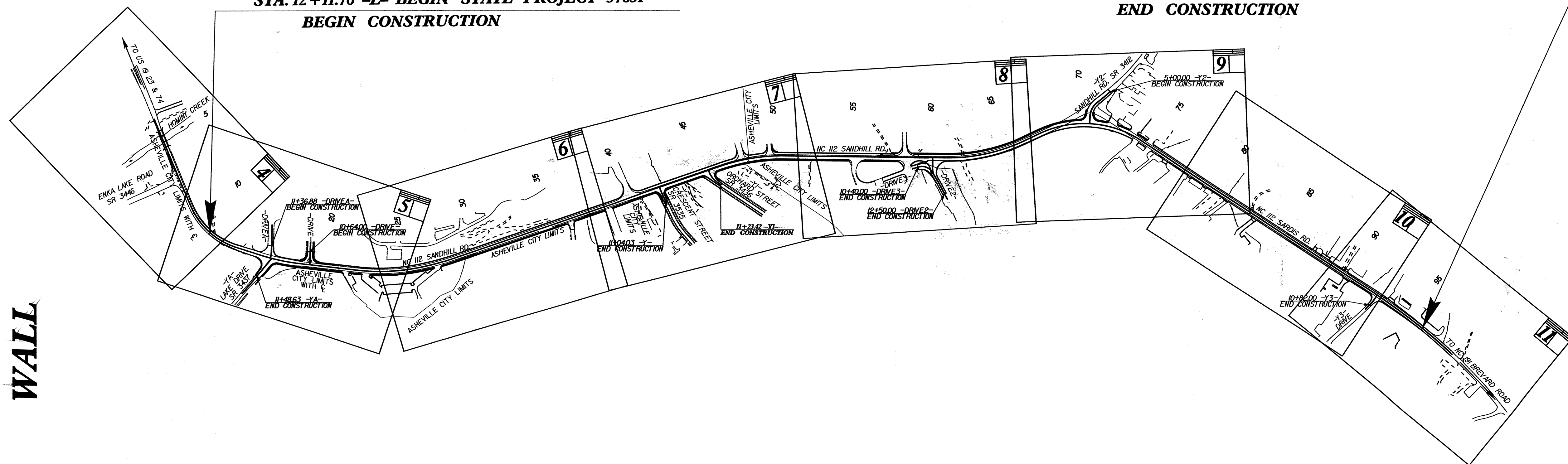
LOCATION: NC 112 SAND HILL ROAD AND SARDIS ROAD FROM WEST OF SR 3437 LAKE DRIVE TO 2500' EAST OF INTERSECTION OF SAND HILL RD. SR 3412 WITH SARDIS RD NC 112
TYPE OF WORK: GRADING, DRAINAGE, WIDENING, CURB AND GUTTER, PAVING AND THERMOPLASTIC PAVEMENT MARKINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	37831	W-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

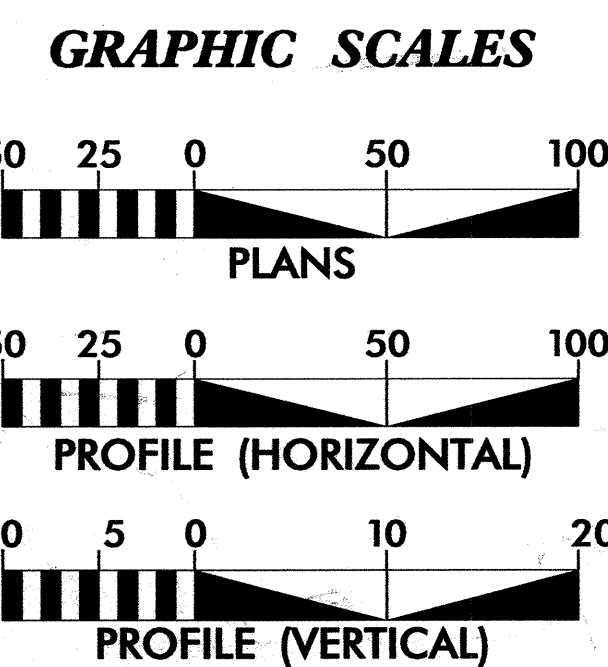
PART OF JOB INSIDE ASHEVILLE CITY LIMITS

STA. 12+11.76 -L- BEGIN STATE PROJECT 37831
BEGIN CONSTRUCTION

STA. 95+83.50 -L- END STATE PROJECT 37831
END CONSTRUCTION



WALL



DESIGN DATA

ADT 2002 =	12,000
ADT 2022 =	18,000
DHV =	10 %
D =	10 %
T =	5 % *
V =	35 & 45 MPH
* TTST 2	DUAL 3

PROJECT LENGTH
TOTAL LENGTH OF STATE PROJECT 37831 = 1.586 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

K. A. WILSON, PE
OPERATIONS ENGINEER

M. K. PENLAND
DIVISION DESIGN ENGINEER

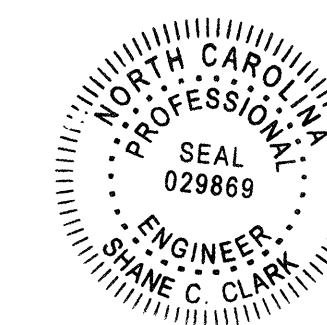
GEOTECHNICAL ENGINEER

7/19/07
SIGNATURE: *Shane C. Clark* P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

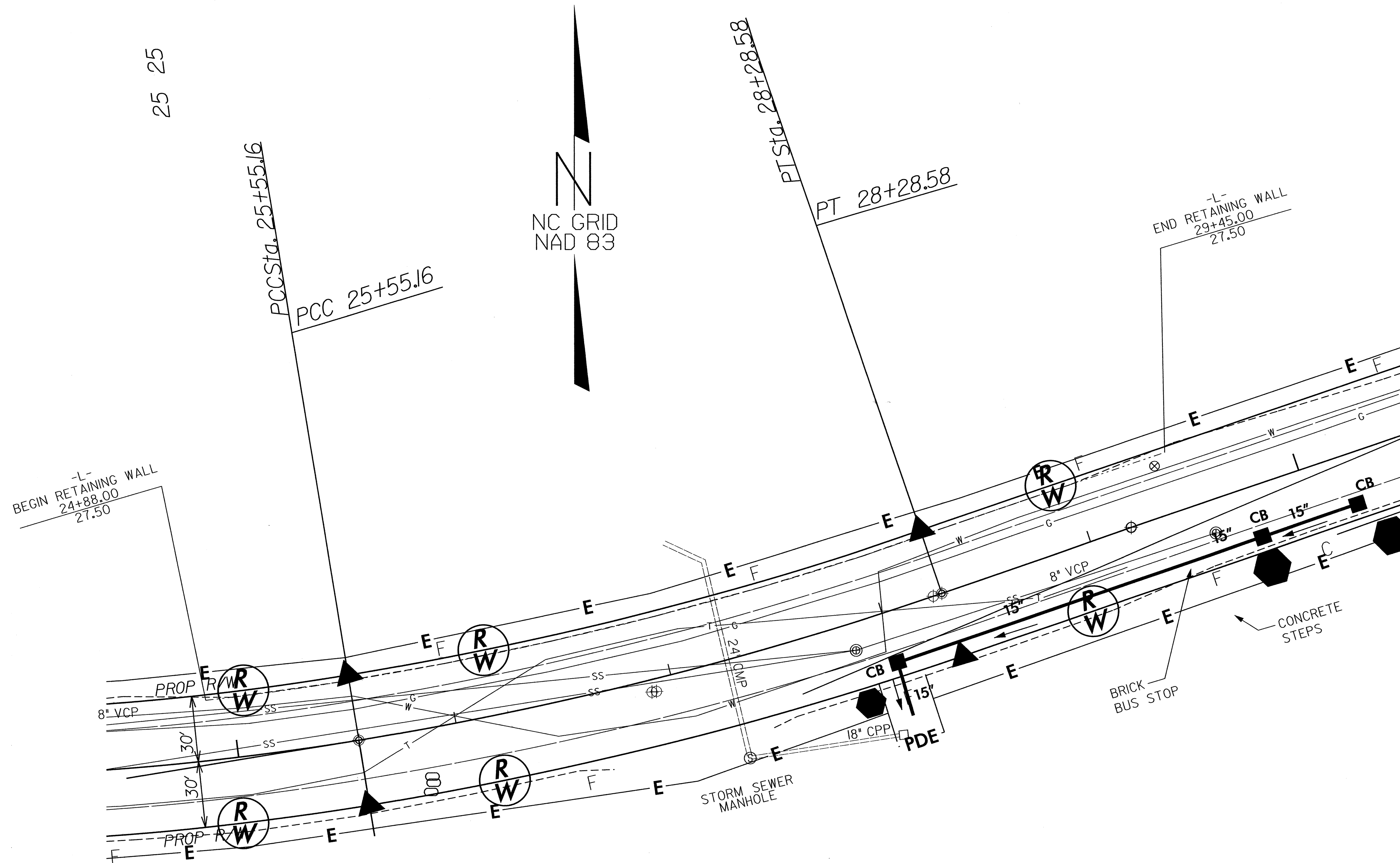
STATE DESIGN ENGINEER
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR
DATE



Shane C. Clark 11/21/06
SIGNATURE DATE

SIGNATURE DATE



LOCATION SKETCH

SHOWING LIMITS OF GRAVITY WALL
27.5' LEFT OF -L-

Concrete Gravity Wall

ON NC 112 STA. 24+88 -L- to 29+45 -L-

GEOTECHNICAL ENGINEERING UNIT

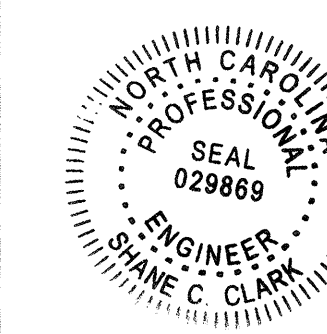
EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**GRAVITY WALL
BUNCOMBE COUNTY**

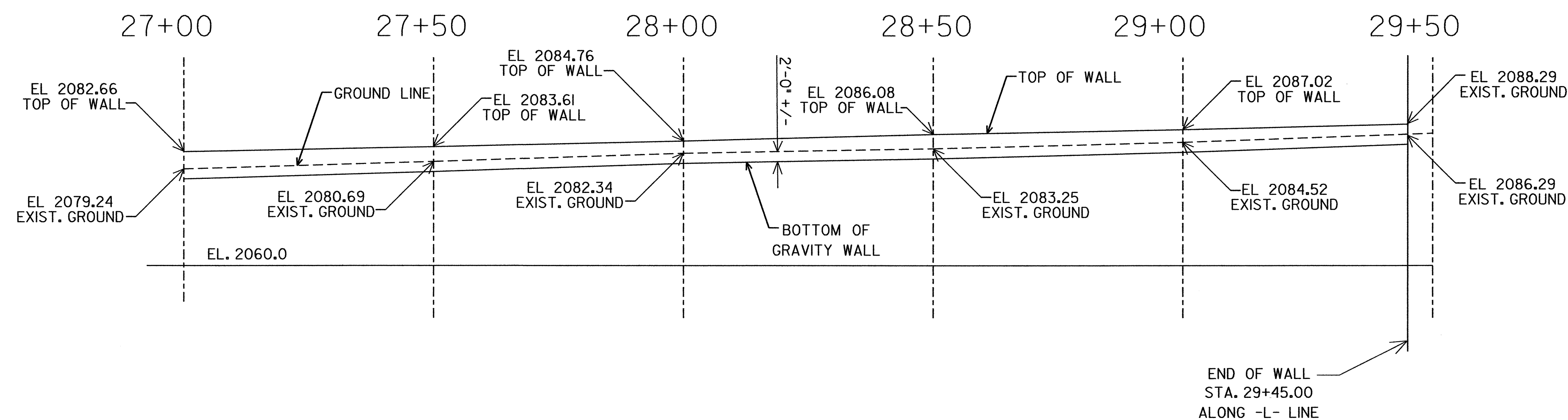
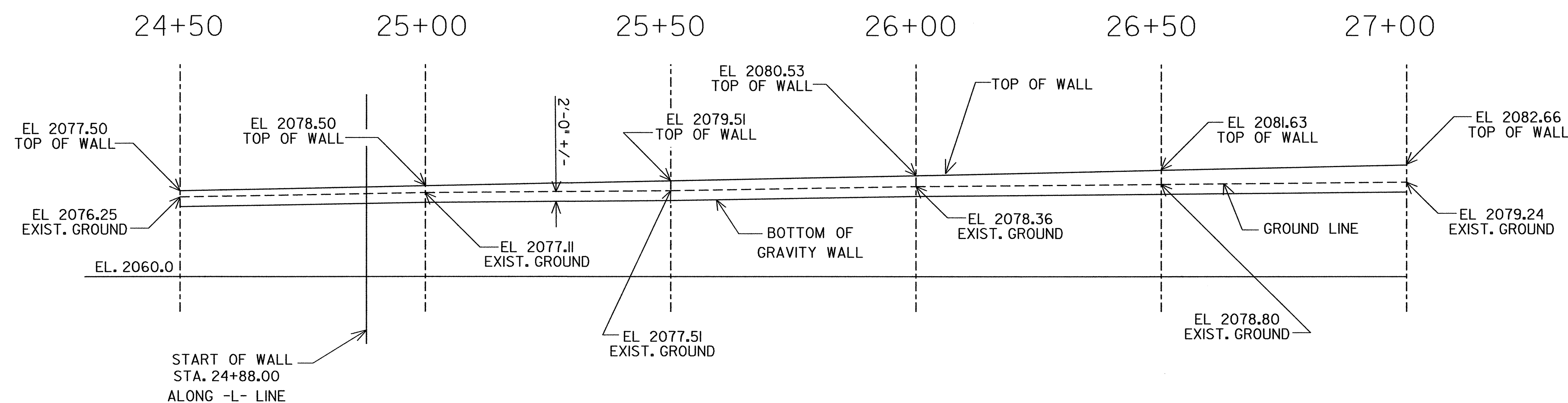
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06



Shawn Clark 11/20/16
SIGNATURE DATE

SIGNATURE DATE



Concrete Gravity Wall

ON NC 112 STA. 24+88 -L- to 29+45 -L-

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE

WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

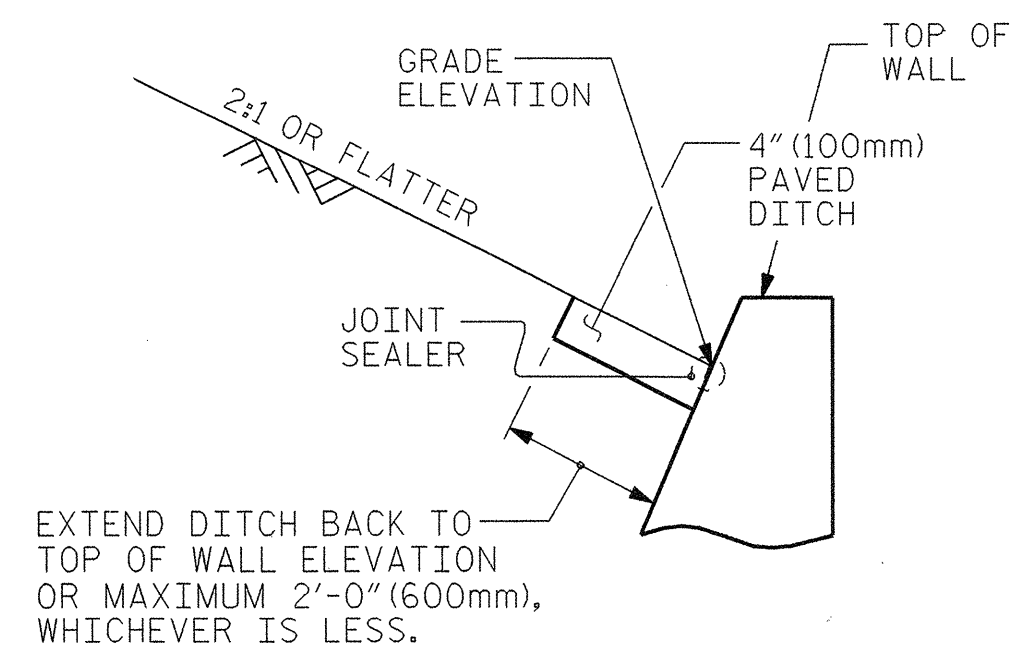
**GRAVITY WALL
BUNCOMBE COUNTY**

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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2			4		

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06

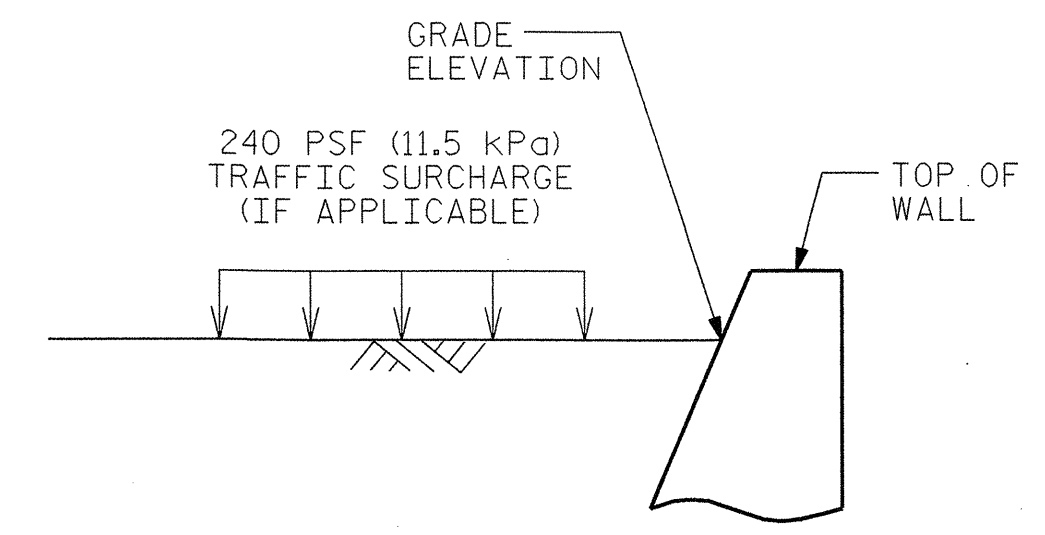
ENGINEER

Scott A. Hadden 4/3/07

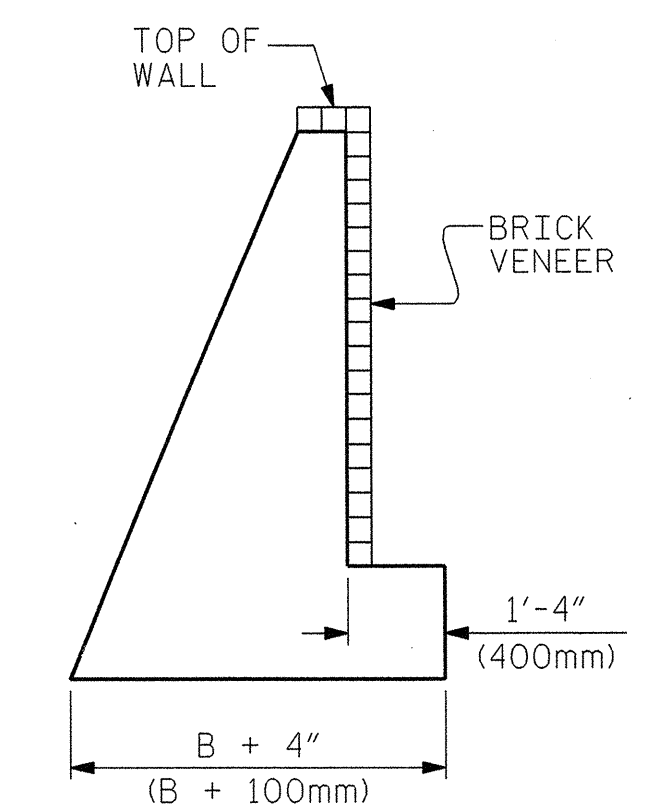


EXTEND DITCH BACK TO TOP OF WALL ELEVATION OR MAXIMUM 2'-0" (600mm), WHICHEVER IS LESS.

SLOPE CONDITION



NO SLOPE CONDITION



BRICK VENEER DETAIL

(WHEN APPLICABLE)

NOTES

FOR GRAVITY RETAINING WALLS, SEE SECTION 453 OF THE STANDARD SPECIFICATIONS.

THE STANDARD GRAVITY RETAINING WALL IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
 TOTAL UNIT WEIGHT = 120 PCF (18.8 kN/m³)
 COHESION = 0 PSF (0 kPa)
 FRICTION ANGLE = 35 DEGREES
 (GROUNDWATER WITHIN 5'-0" (1.5m) OF BOTTOM OF FOOTING)
 FRICTION ANGLE = 30 DEGREES
 (GROUNDWATER MORE THAN 5'-0" (1.5m) BELOW BOTTOM OF FOOTING)

DO NOT USE A STANDARD GRAVITY RETAINING WALL IF THE ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR GROUNDWATER IS ABOVE THE BOTTOM OF FOOTING.

DO NOT USE A STANDARD GRAVITY RETAINING WALL WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS PRESENT BELOW THE WALL.

DO NOT PLACE CONCRETE UNTIL OBTAINING APPROVAL OF THE EXCAVATION DEPTH AND CHECKING FOUNDATION MATERIAL FOR IN-SITU ASSUMED SOIL PARAMETERS.

USE CLASS "A" CONCRETE AND PROVIDE CLASS I SURFACE FINISH FOR ALL EXPOSED SURFACES.

PROVIDE 3" (75mm) DIAMETER WEEP HOLES ON 10'-0" (3m) CENTERS ALONG WALL. SLOPE WEEP HOLES ON A 1" (25mm) PER FOOT (300mm) SLOPE THROUGH THE WALL SO THAT WATER DRAINS OUT OF THE FRONT OF THE WALL.

CONSTRUCT A HORIZONTAL DRAIN IN SUBDRAIN FINE AGGREGATE AT LEAST 1'-0" (300mm) TALL AND 1'-0" (300mm) WIDE TO CONNECT ALL STONE DRAINS.

PROVIDE GROOVED CONTRACTION JOINTS EVERY 10'-0" (3m) AND EXPANSION JOINTS EVERY 30'-0" (9m) ALONG THE WALL.

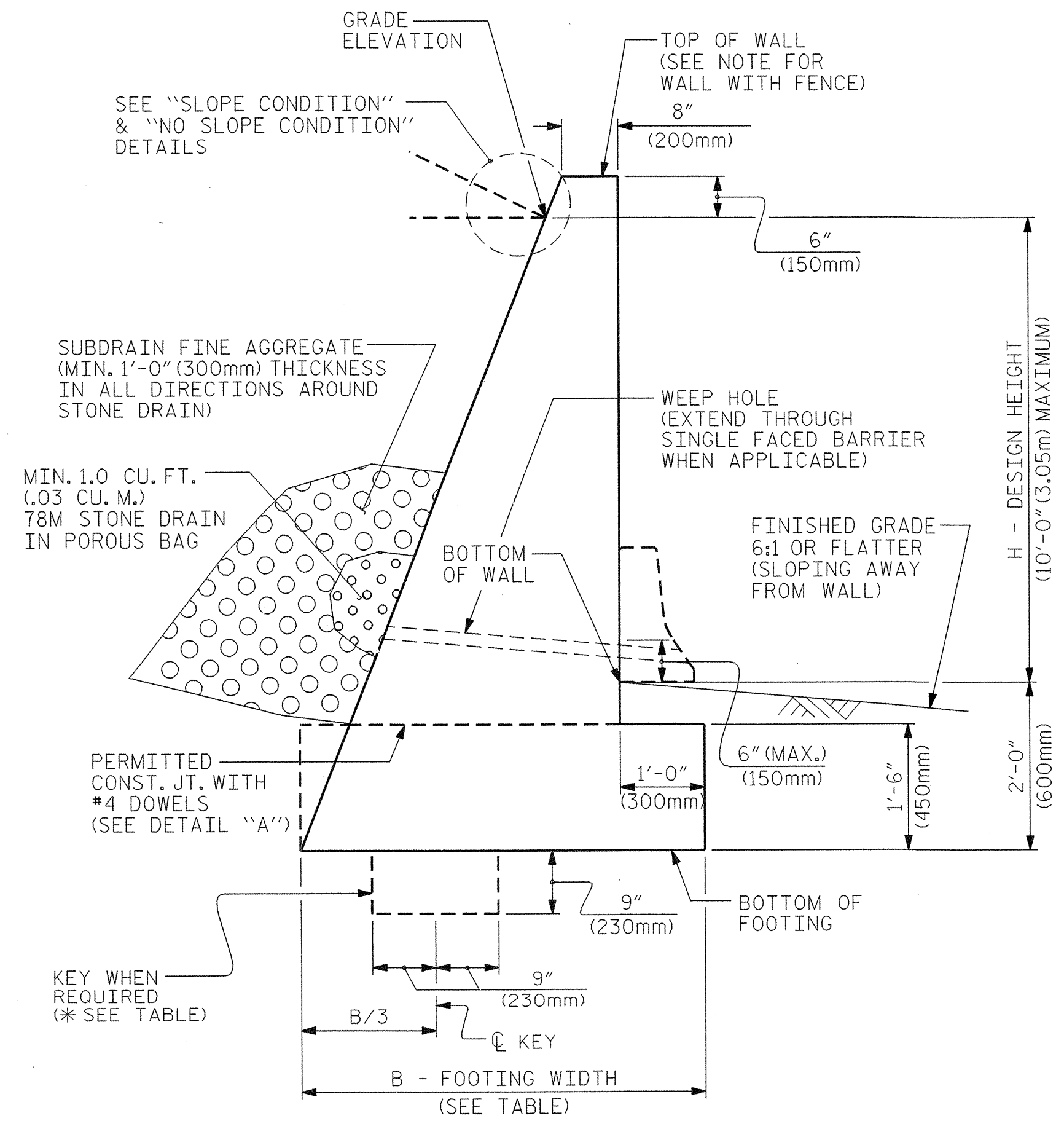
FOR WALL WITH BRICK VENEER, SUBMIT BRICK SAMPLES TO THE ENGINEER FOR APPROVAL BEFORE BEGINNING CONSTRUCTION. ANCHOR BRICK VENEER TO CONCRETE RETAINING WALL WITH BRICK TO CONCRETE TYPE ANCHORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS WITH A MINIMUM VERTICAL SPACING OF 1'-4" (400mm) AND A MINIMUM HORIZONTAL SPACING OF 2'-8" (800mm) WITH EACH ROW STAGGERED 1'-4" (400mm) FROM THE ROW OF ANCHORS ABOVE AND BELOW.

DO NOT BACKFILL BEHIND WALL UNTIL CONCRETE DEVELOPS A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI (20.7 MPa). COMPACT BACKFILL IN ACCORDANCE WITH SUBARTICLE 235-4(C) OF THE STANDARD SPECIFICATIONS. PLACE BACKFILL WITHIN 3'-0" (1m) OF THE BACK OF THE WALL WITH HAND OPERATED EQUIPMENT. DO NOT OPERATE HEAVY EARTH MOVING EQUIPMENT WITHIN 10'-0" (3m) OF THE BACK OF WALL.

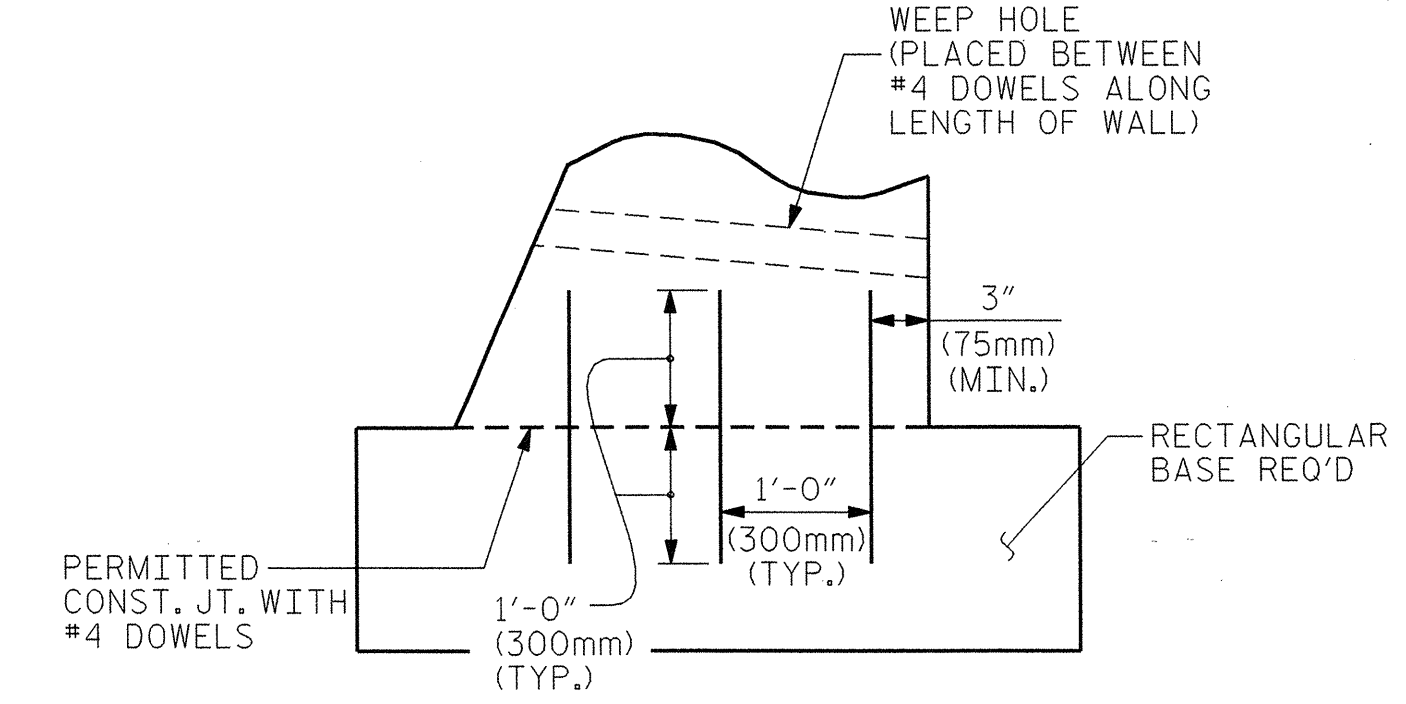
WHEN A CONSTRUCTION JOINT IS LOCATED AT THE BASE OF THE WALL, IN SECTION, PROVIDE A MINIMUM OF 3-#4 DOWELS AT AN EQUAL SPACING. SPACE ALL DOWELS AT 1'-6" (460mm) CENTERS ALONG THE LENGTH OF THE WALL.

SEE PREVIOUS SHEET(S) FOR PLAN AND PROFILE VIEW (WALL ENVELOPE) AND PROPOSED ELEVATIONS FOR GRAVITY RETAINING WALL(S).

FOR WALL WITH FENCE, USE SLEEVES IN ACCORDANCE WITH SECTION 866 OF THE STANDARD SPECIFICATIONS FOR FENCE POSTS, OR SUBMIT FENCE POST ANCHOR PLATE DETAILS.



TYPICAL SECTION



DETAIL "A"

H + 2 (ft)	< 6	6 - 9	> 9 - 12
H + 0.6 (m)	< 1.83	1.83 - 2.74	> 2.74 - 3.65
NO SLOPE CONDITION WITHOUT TRAFFIC SURCHARGE	.60	.60	.60
NO SLOPE CONDITION WITH TRAFFIC SURCHARGE	.80	.75 *	.70 *
SLOPE CONDITION	.66	.70 *	.75 *

B/(H + 2) RATIO

* KEY IS REQUIRED FOR SLOPE CONDITION OR NO SLOPE CONDITION WITH TRAFFIC SURCHARGE WHEN H + 2ft (H + 0.6m) IS 6'-0" (1.83m) OR GREATER.

PROJECT NO.: 37831
BUNCOMBE COUNTY
STATION: 24+88-L- to 29+45-L-
 SHEET OF

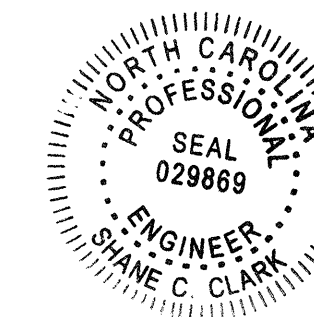
GEOTECHNICAL ENGINEERING UNIT
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD DRAWING NO. 453.01

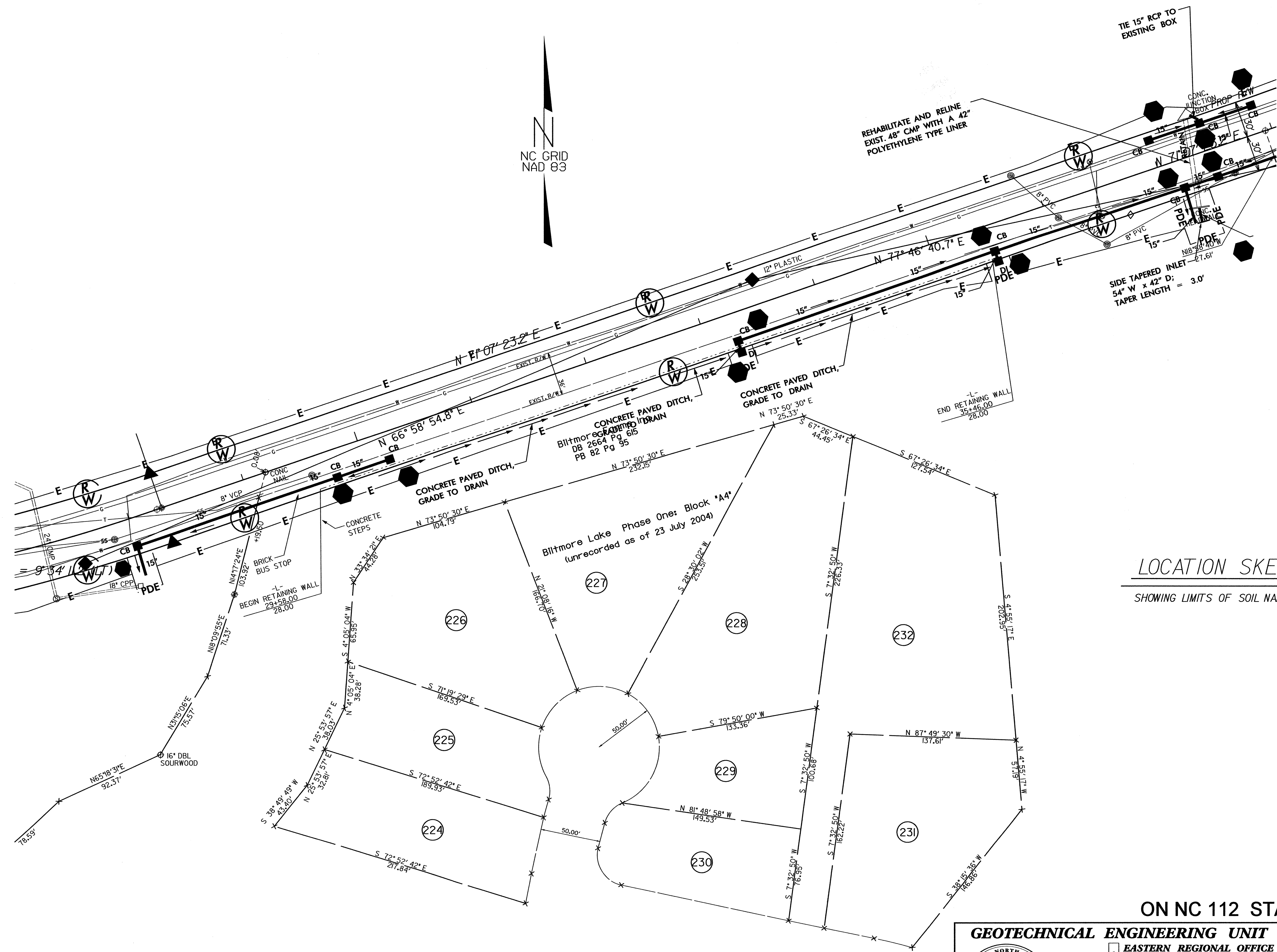
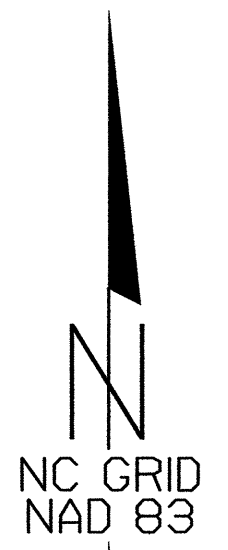
STANDARD GRAVITY RETAINING WALL

SHEET NO. W-34
TOTAL SHEETS

DATE: 7-18-06



Signature: *Shane G. Clark* 11/20/06
 DATE: _____ SIGNATURE: _____ DATE: _____

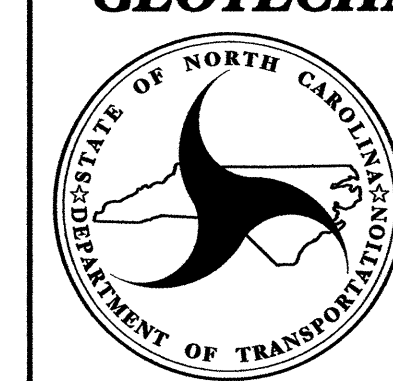


LOCATION SKETCH
 SHOWING LIMITS OF SOIL NAIL WALL

ON NC 112 STA. 29+58 -L- to 35+46 -L-

GEOTECHNICAL ENGINEERING UNIT

- EASTERN REGIONAL OFFICE
- WESTERN REGIONAL OFFICE

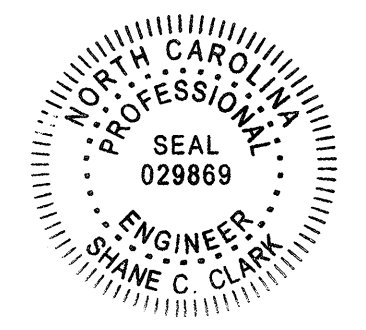


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SOIL NAIL WALL
 BUNCOMBE COUNTY**

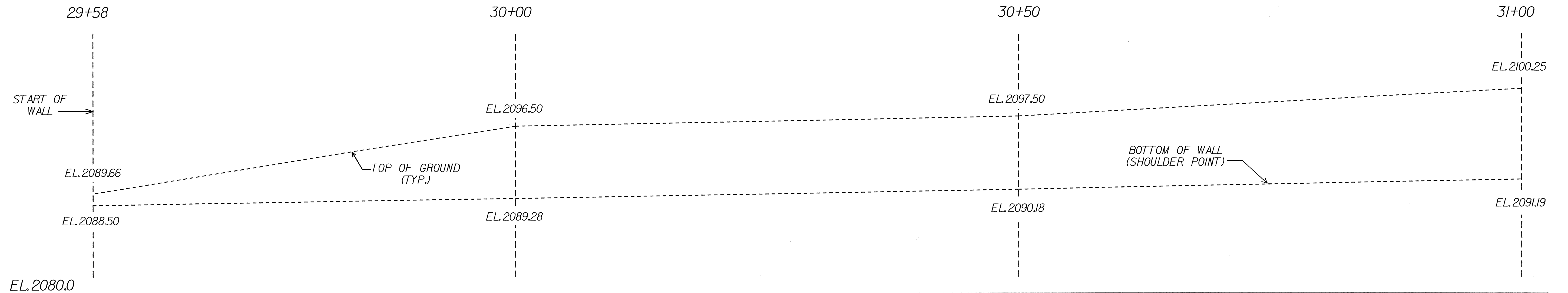
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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2			4		

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06



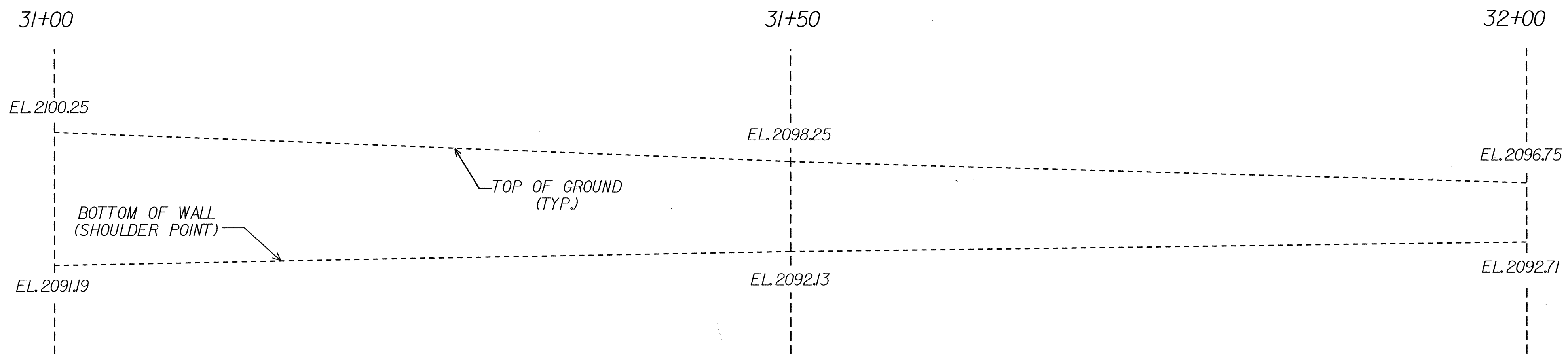
Signature: *Shane C. Clark* Date: 11/29/06

Signature: _____ Date: _____



ELEVATION OF WALL

STA. 29+58 TO STA. 31+00
28' RIGHT OF -L- LINE



ELEVATION OF WALL

STA. 31+00 TO STA. 32+00
28' RIGHT OF -L- LINE

ON NC 112 STA. 29+58 -L- to 35+46 -L-

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06

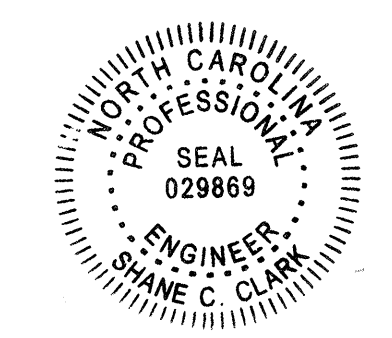
GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

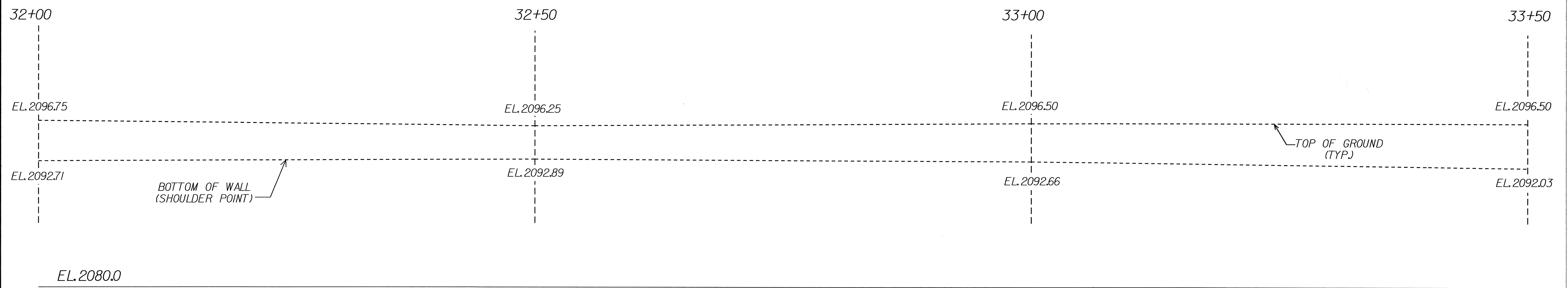
SOIL NAIL WALL
BUNCOMBE COUNTY

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

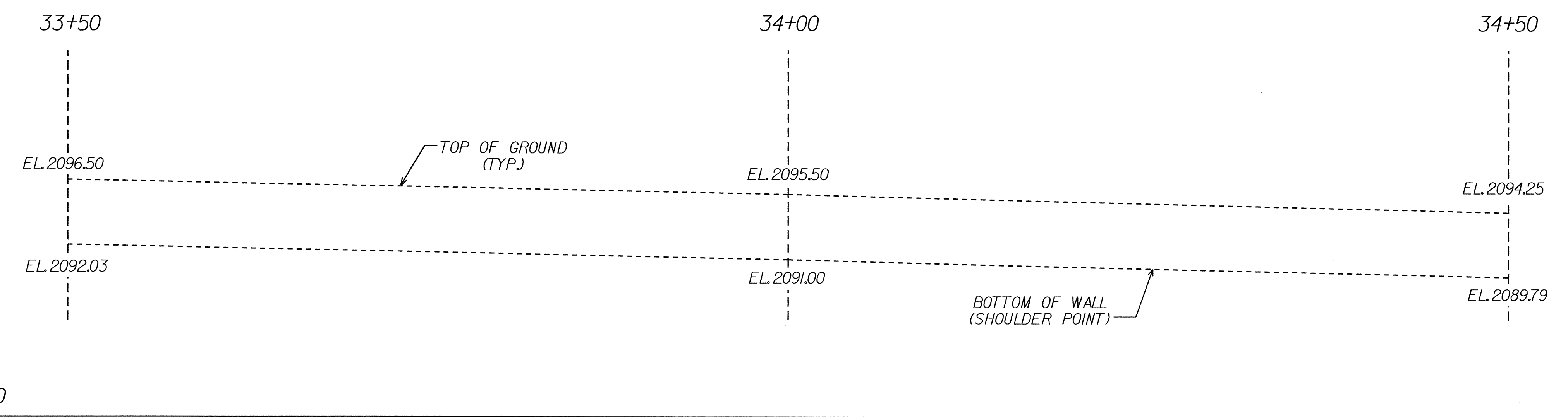


Shane C. Clark 11/29/04
SIGNATURE DATE

SIGNATURE DATE



ELEVATION OF WALL
STA. 32+00 TO STA. 33+50
28' RIGHT OF -L- LINE



ELEVATION OF WALL
STA. 33+50 TO STA. 34+50
28' RIGHT OF -L- LINE

ON NC 112 STA. 29+58 -L- to 35+46 -L-

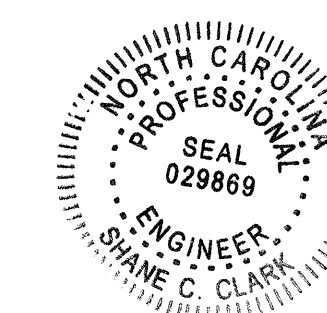
GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SOIL NAIL WALL
BUNCOMBE COUNTY**

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06



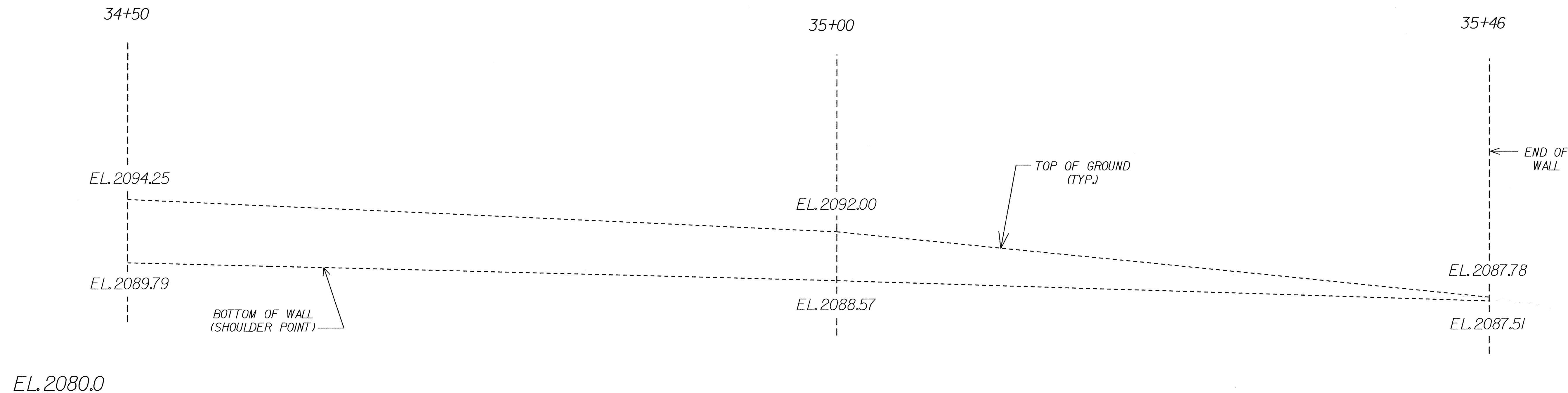
Shane Clark 11/20/c

SIGNATURE

DATE

SIGNATURE

DATE



ELEVATION OF WALL

STA. 34+50 TO STA. 35+46
28' RIGHT OF -L- LINE

ON NC 112 STA. 29+58 -L- to 35+46 -L-

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SOIL NAIL WALL
BUNCOMBE COUNTY

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY: E.J. SALVO	DATE: 08/05
REVIEWED BY: S.C. CLARK	DATE: 09/06

TOTAL BILL OF MATERIAL

SOIL NAIL RETAINING WALL
AT STA. 29+58-L- TO 35+46-L-
2,886 SQ. FT.

LUMP SUM

NOTES

BEFORE BEGINNING RETAINING WALL DESIGN, SURVEY ALL EXISTING GROUND ELEVATIONS SHOWN ON THE PLANS AND SUBMIT A REVISED WALL ENVELOPE FOR REVIEW. DO NOT BEGIN WALL DESIGN OR CONSTRUCTION UNTIL THIS ENVELOPE HAS BEEN APPROVED.

IN ELEVATION VIEW, SHOW THE TOP OF WALL (SOLID LINE), THE EXISTING GROUND LINE (LARGE DASHED LINE), AND THE BOTTOM OF WALL (SOLID LINE). SHOW ELEVATIONS FOR THE TOP OF WALL AT VERTICAL BREAK POINTS, AND AT NO GREATER THAN 50 FOOT INTERVALS. LABEL WHETHER THE ELEVATION VIEW IS FRONT FACE OR BACK FACE.

FINAL PLANS MUST BE ON REPRODUCIBLE SHEETS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA.

PROVIDE A CAST-IN-PLACE CONCRETE FACE WITH AN ASHLAR STONE PATTERN FINISH ON THE FACE OF THE WALL. SEE SPECIAL PROVISIONS.

NOTE ON CONTRACTOR'S WORKING DRAWINGS: VERIFY BEARING CAPACITY OF THE WALL FOUNDATION SOILS IN THE FIELD.

THE RESIDENT ENGINEER WILL SCHEDULE A PRECONSTRUCTION CONFERENCE WITH REPRESENTATIVES FROM THE CONTRACTOR, THE RETAINING WALL SYSTEM SUPPLIER, AND THE GEOTECHNICAL ENGINEERING UNIT TO DISCUSS DETAILS AND INSPECTION OF THE RETAINING WALL PRIOR TO ANY WORK BEING PERFORMED AT THE SITE.

SEE ROADWAY PLANS FOR CROSS SECTIONS AND TYPICAL SECTIONS.

FOR DESIGN CRITERIA AND DETAILS, SEE SPECIAL PROVISIONS.

PLANS, WORKING DRAWINGS, SOIL REINFORCEMENT, AND DESIGN CALCULATIONS SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER FOR REVIEW AND APPROVAL. SEE SPECIAL PROVISIONS.

ALL NAIL BARS FOR THE SOIL NAIL RETAINING WALLS SHALL BE ENCAPSULATED FOR CORROSION PROTECTION.

CONCRETE LEVELING PADS FOR THE CAST-IN-PLACE WALL FACING AND THE DRAINAGE DITCHES BEHIND THE WALLS WILL BE CONSIDERED INCIDENTAL TO THE COST OF THE WALLS.

THE WALLS SHALL BE DESIGNED TO MEET THE LATEST FHWA REPORT NO. SA-96-069 AND THE LATEST AASHTO DESIGN CRITERIA AND ITS INTERIM, SEE THE SPECIAL PROVISIONS, AND THE PLANS.

PLANS SUBMITTED FOR REVIEW SHALL INCLUDE THE FOLLOWING: PLAN VIEW, ELEVATION VIEW, TYPICAL SECTIONS, CAST-IN-PLACE FACING, OBSTRUCTION DETAILS AND DRAINAGE DETAILS.

BLASTING WILL NOT BE ALLOWED TO INSTALL THE NAIL BARS OF THE PROPOSED SOIL NAIL RETAINING WALLS.

THE SOIL NAIL RETAINING WALLS SHALL BE DESIGNED WITH THE FOLLOWING SOIL PARAMETERS:

FRICTION ANGLE $\phi = 30^\circ$ COHESION $c = 0.0$ PSF
UNIT WEIGHT OF SOIL ABOVE WATER TABLE, $\gamma = 120$ PCF
UNIT WEIGHT OF SOIL BELOW WATER TABLE, $\gamma = 60$ PCF

THE OFFSET FOR WALL LAYOUT TO FRONT FACE OR BACK FACE OF WALL NEEDS TO BE GIVEN WITH STATIONING INCREASING FROM LEFT TO RIGHT ON PLAN SHEETS.

FOR POTENTIAL CONFLICTS WITH WATER SUPPLY PIPES, DRAINAGE STRUCTURES, OR UTILITIES, SEE ROADWAY PLANS.

PROVIDE PAVED DRAINAGE DITCH ON TOP OF THE WALLS.

BOTTOM OF WALL ELEVATIONS ARE FINISHED GRADE ELEVATIONS AND THESE ELEVATIONS DO NOT INCLUDE EMBEDMENT FOR THE SOIL NAIL WALLS.

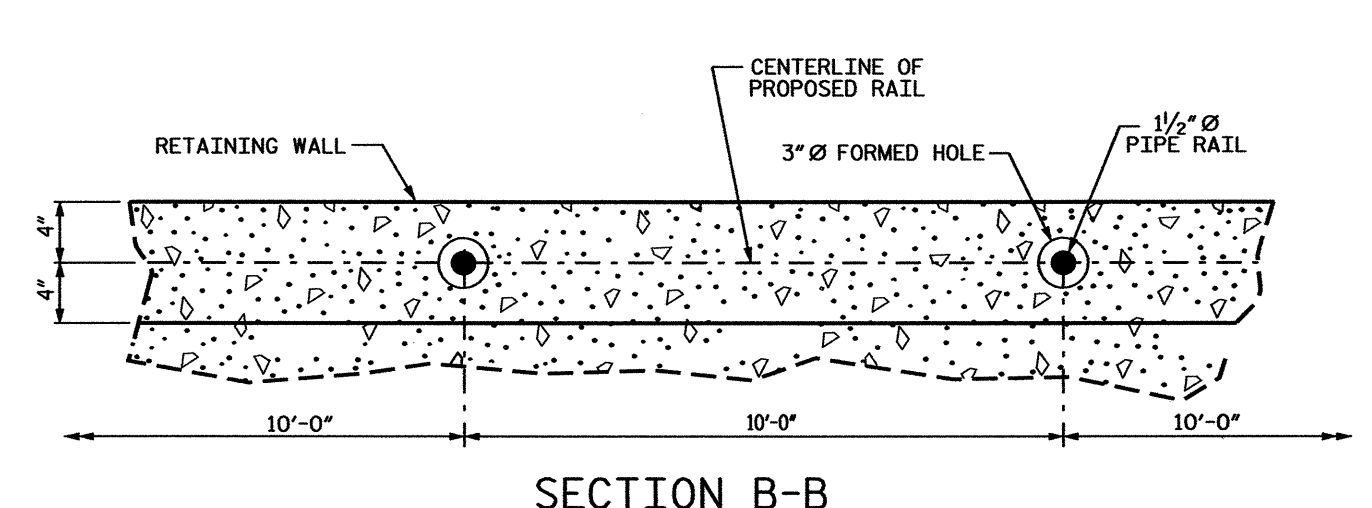
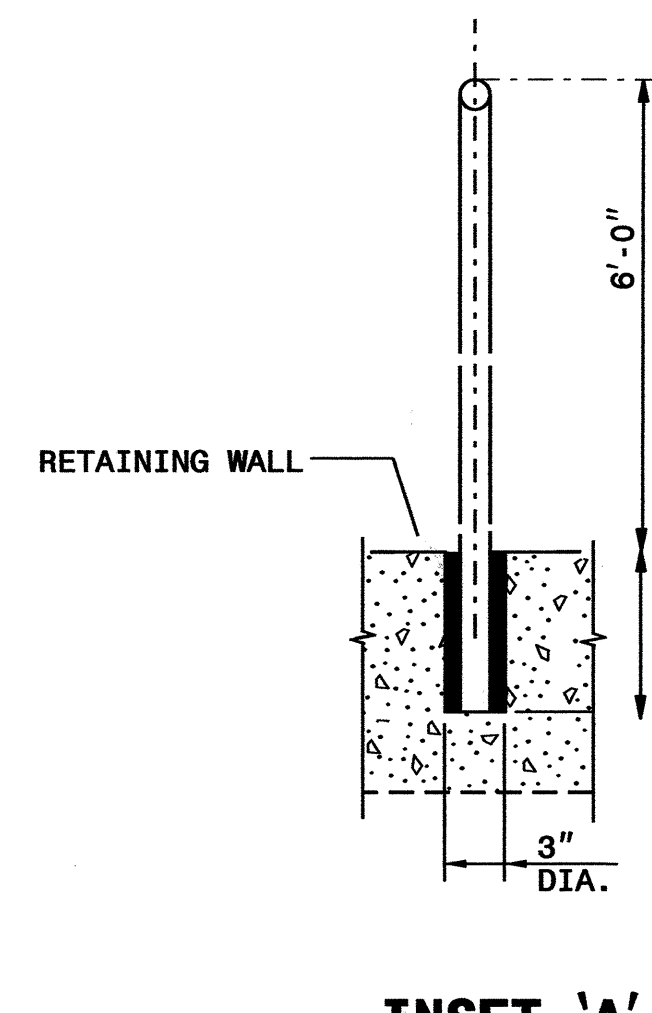
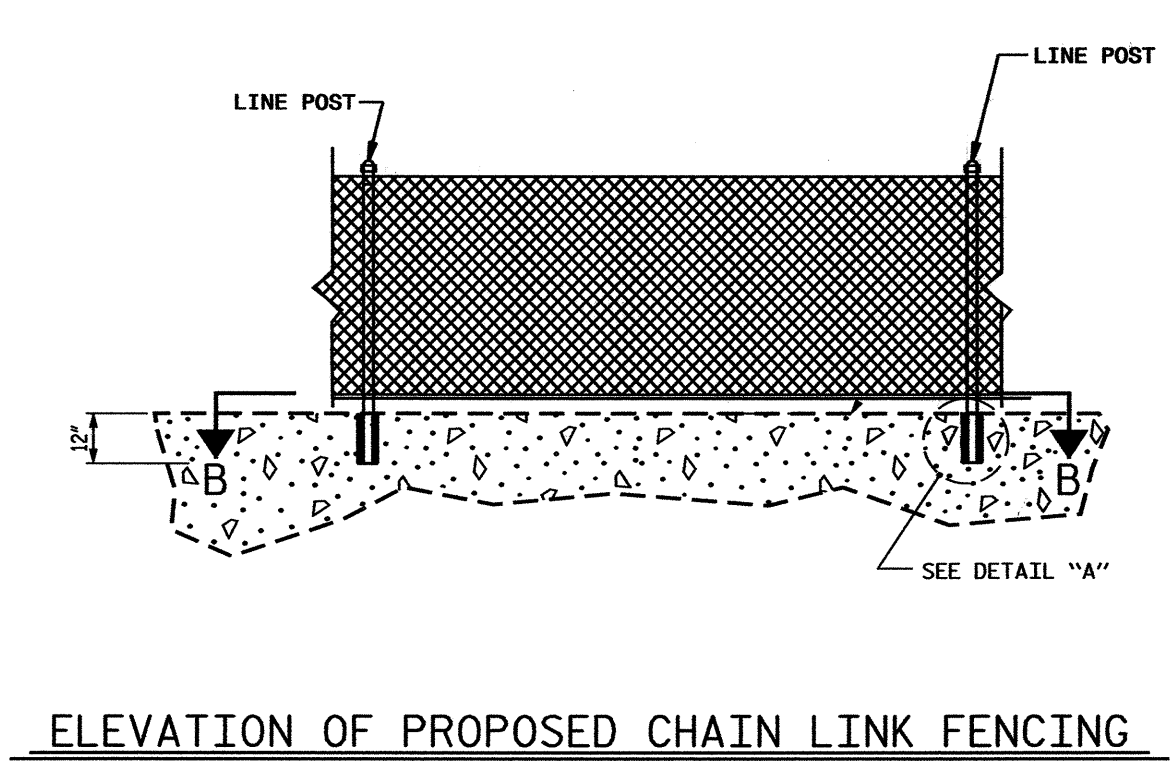
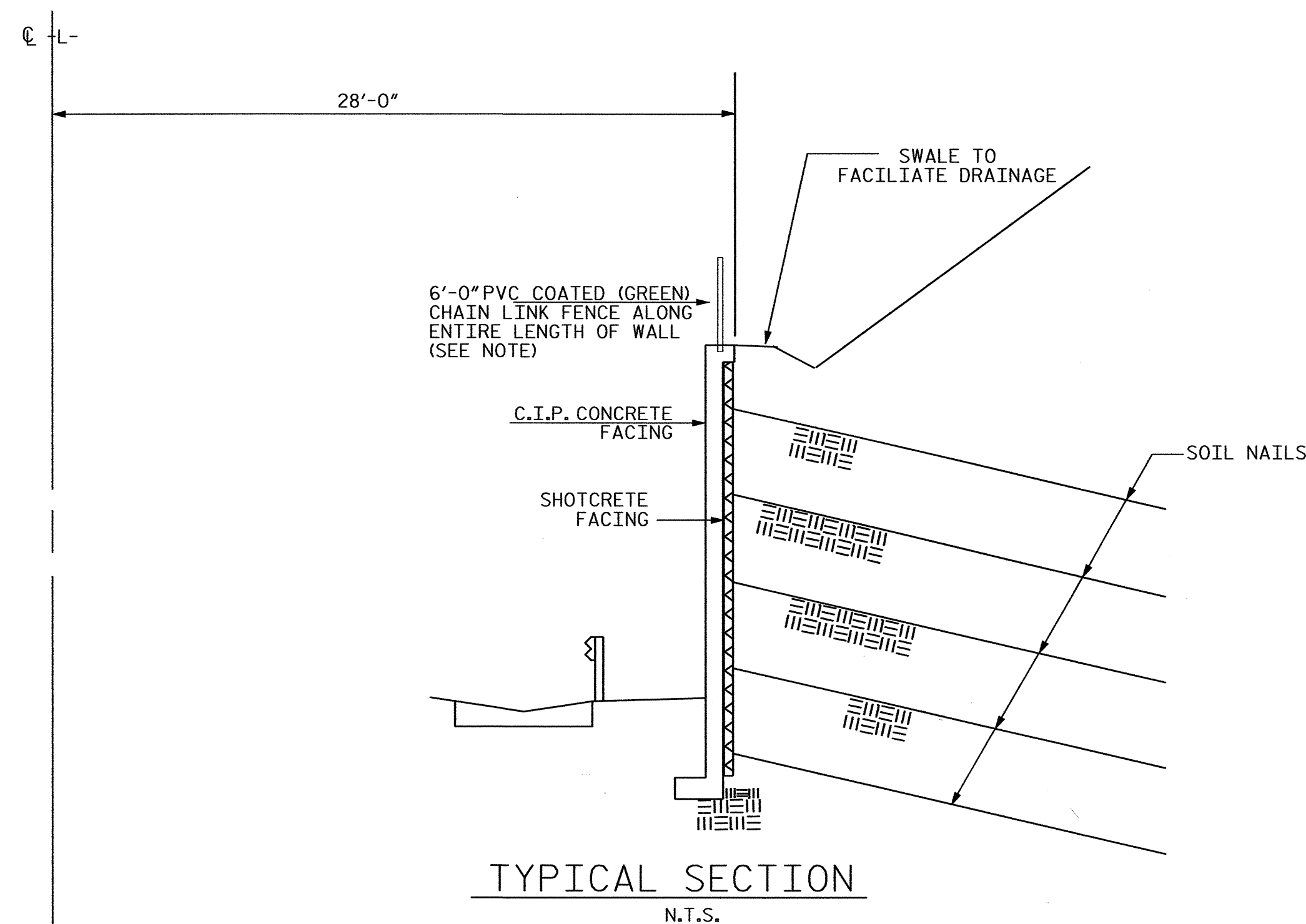
ALL STRUCTURE EXCAVATION AND BACKFILL NECESSARY FOR THE CONSTRUCTION OF THE PERMANENT SOIL NAIL RETAINING WALLS WILL BE CONSIDERED INCIDENTAL TO THE COST OF THE WALLS.

SEE SOIL NAIL WALL SPECIAL PROVISION FOR ADDITIONAL INFORMATION.

CONTRACTOR RESPONSIBLE FOR SUBMITTING A WALL REINFORCEMENT DETAIL SHOWING PROPOSED REINFORCEMENT, SLEEVES AND ANY ADDITIONAL CONNECTIONS, AS NEEDED. SEE ROADWAY STANDARD 866.01 FOR INFORMATION ON THE CHAIN LINK FENCING REQUIREMENTS.

CHAIN LINK FENCING SHALL HAVE A GREEN PVC COATING, OR AS DIRECTED BY THE ENGINEER.

ON NC 112 STA. 29+58 -L- to 35+46 -L-



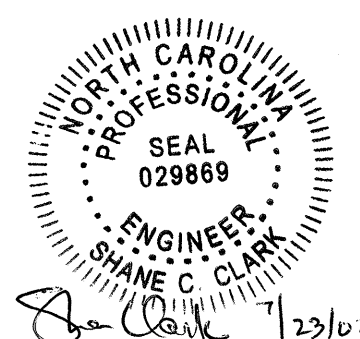
ON NC 112 STA. 29+58 -L- to 35+46 -L-

GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SOIL NAIL WALL
BUNCOMBE COUNTY

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



PREPARED BY: E.J. SALVO	DATE: 08/06
REVIEWED BY: S.C. CLARK	DATE: 08/06