09/09/99

TIP PROJECT: R-2518A

CONTRACT: C201372

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2518A	OSM1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34445.1.1		PE
34445.2.1		ROW

METRIC

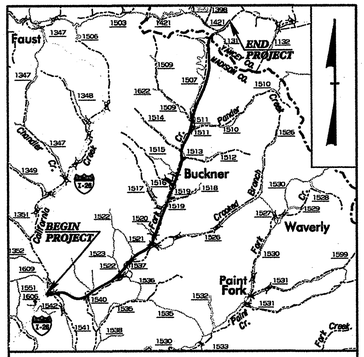
ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN

PLAN FOR PROPOSED ON-SITE MITIGATION MADISON / YANCEY COUNTIES

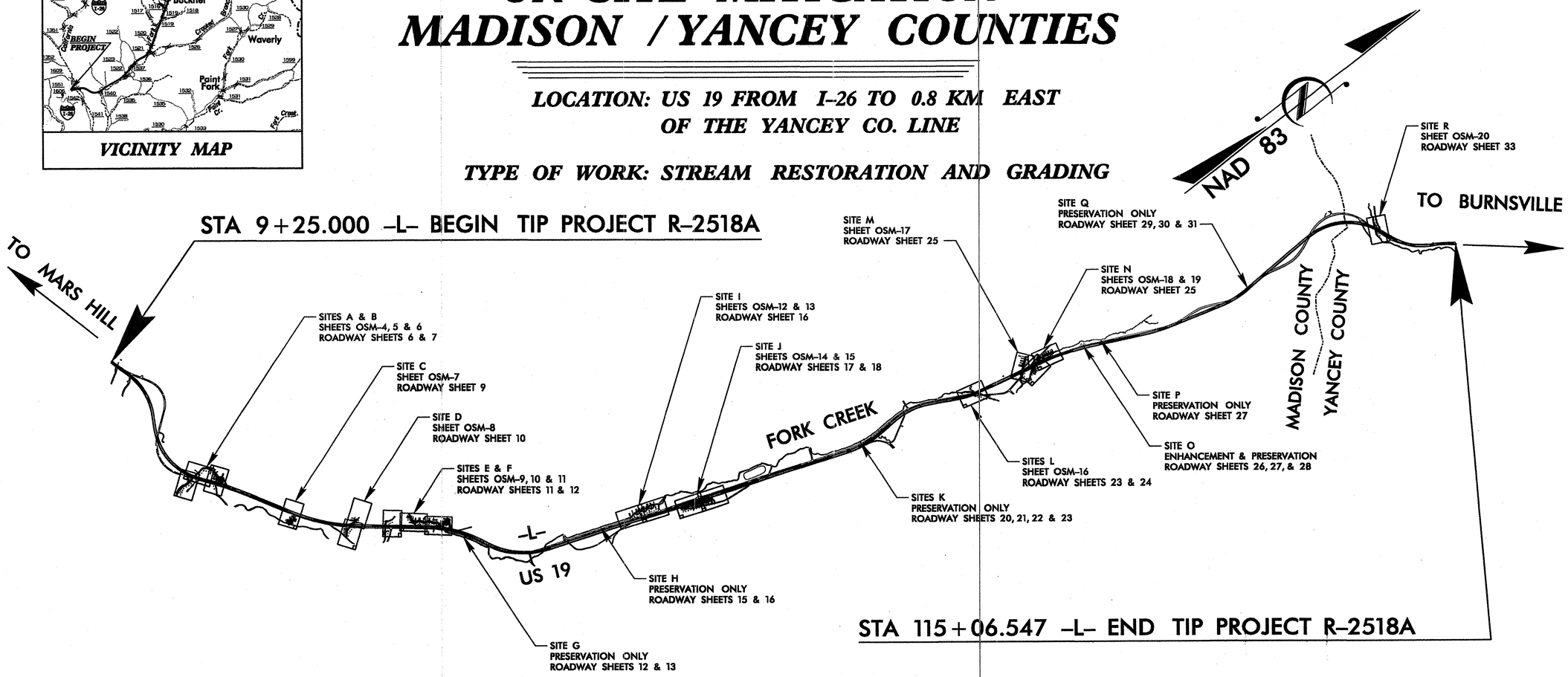
LOCATION: US 19 FROM I-26 TO 0.8 KM EAST OF THE YANCEY CO. LINE

TYPE OF WORK: STREAM RESTORATION AND GRADING

See Sheet 1-A For Conventional Symbols



VICINITY MAP



GRAPHIC SCALES

2.5 0 5
PLANS

2.5 0 5
PROFILE (HORIZONTAL)

0.5 0 1
PROFILE (VERTICAL)

PROJECT LENGTH

STREAM RESTORATION/RELOCATION LENGTH	=	1323 M
STREAM ENHANCEMENT LENGTH	=	195 M
STREAM PRESERVATION LENGTH	=	4674 M

Prepared In the Office of:
HSMM
1305 NAVAHO DR., SUITE 303
RALEIGH, NC 27609

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

S. G. GINN, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

SYSTIME$$$$
SYSNAME$$$$
DGN$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2518A	OSM-1B

METRIC

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

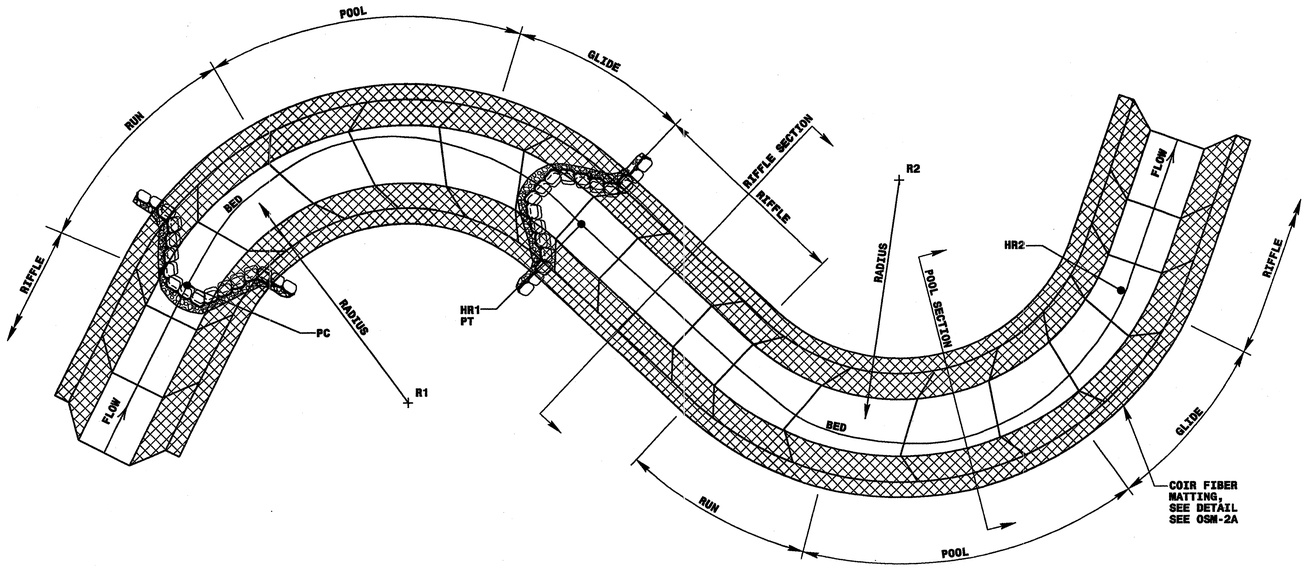
SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

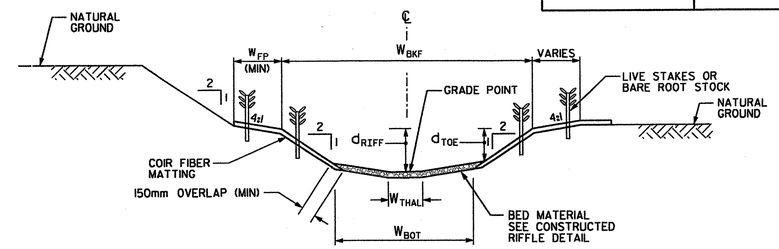
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



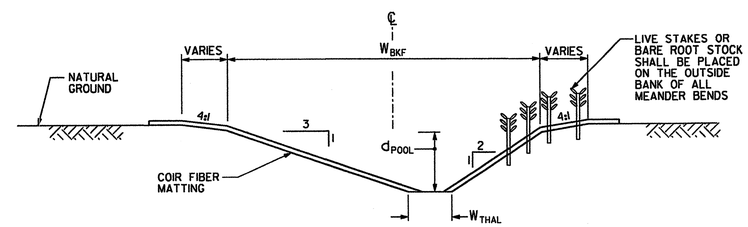
TYPICAL PLAN



CONTRACTOR SHALL EXCAVATE TO A DEPTH EQUAL TO d_{toe}, AND PRESS A DEPRESSION IN THE CENTER OF THE CHANNEL TO CREATE THE d_{riff} DEPTH.
NOTE: ELEVATION SHOWN ON PROFILE IS GRADE POINT AT DEPTH = d_{riff}.

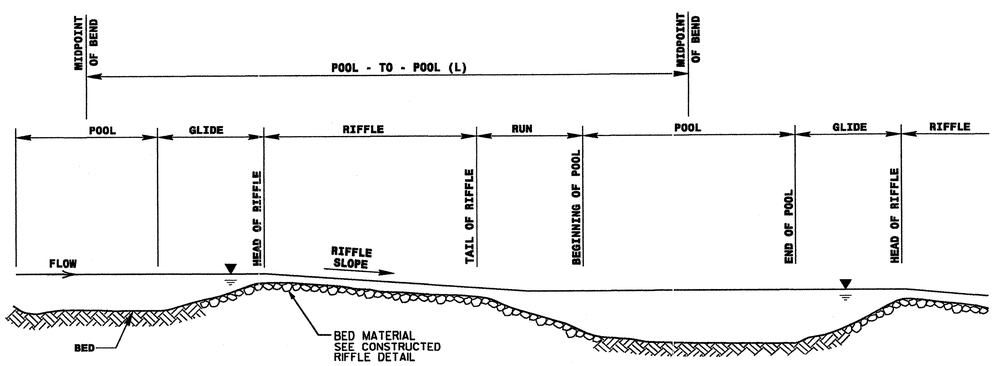
TYPICAL RIFFLE SECTION

NOT TO SCALE



TYPICAL POOL SECTION

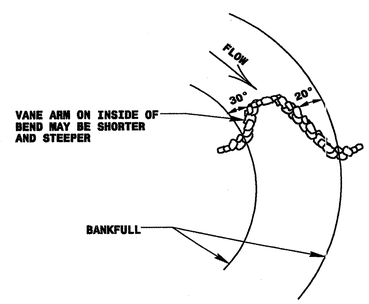
NOT TO SCALE



TYPICAL PROFILE FOR ARMORED RIFFLE SECTION

CHANNEL TYPICAL DETAIL

NOT TO SCALE



CROSS VANE CONSTRUCTION IN MEANDER-BEND PLAN VIEW

NOTES:

1. THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1","R2") AND EACH HEAD OF RIFFLE (EX. "HR1", "HR2") ARE INDICATED ON THE PLAN SHEETS.

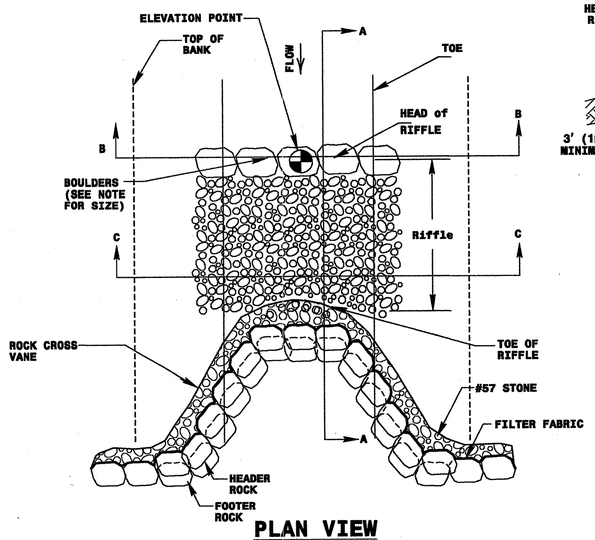
SECTION DIMENSIONS

SITE	REACH	W_{BKF} (m)	W_{BOT} (m)	d_{RIFF} (m)	d_{TOE} (m)	d_{POOL} (m)	W_{THAL} (m)	W_{FP} (m)
A	STA 10+54.4 -A- TO STA 14+77 -A-	9.0	6.1	1.04	0.73	1.30	1.22	3.1
B	STA 10+00 -B- TO STA 10+57 -B-	1.8	1.2	0.21	0.15	0.31	0.30	0.9
C	STA 10+00 -C- TO STA 10+79 -C-	1.4	0.9	0.17	0.11	0.27	0.30	0.6
D	STA 11+02 -D- TO STA 12+48 -D-	3.5	2.3	0.43	0.30	0.60	0.46	1.2
E	STA 10+00 -E- TO STA 21+46.5 -E-	8.2	5.3	0.98	0.73	1.30	1.07	3.1
F	STA 10+00 -F- TO STA 10+69 -F-	2.1	1.5	0.24	0.17	0.34	0.30	0.9
I	STA 10+00 -I- TO STA 12+40 -I-	7.3	4.9	0.85	0.61	1.10	0.91	3.1
J	STA 10+00 -J- TO STA 12+41.63 -J-	2.4	1.6	0.30	0.21	0.45	0.30	0.9
M	STA 10+00 -M- TO STA 10+84 -M-	4.0	2.6	0.46	0.34	0.66	0.46	1.5
N	STA 10+00 -N- TO STA 12+26.5 -N-	3.8	2.5	0.43	0.34	0.63	0.46	1.5

6/2/99

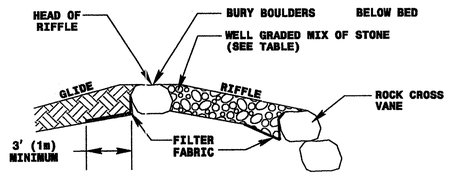
PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-2A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 022487 ENGINEER GRANT GINN 9-1-06

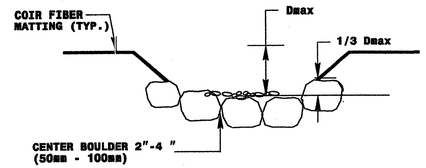


PLAN VIEW

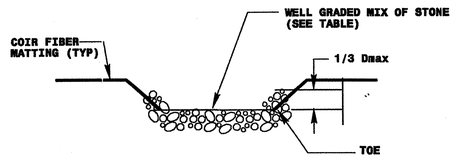
SITE	NOMINAL THICKNESS (mm)	% OF NO. 57 STONE	% OF CLASS A STONE	% OF CLASS B STONE
A	200	25	75	0
B	200	25	75	0
C	200	25	75	0
D	300	25	25	50
E	200	25	75	0
F	200	25	75	0
I	300	25	25	50
J	200	25	75	0
M	300	25	25	50
N	300	25	25	50



SECTION A-A



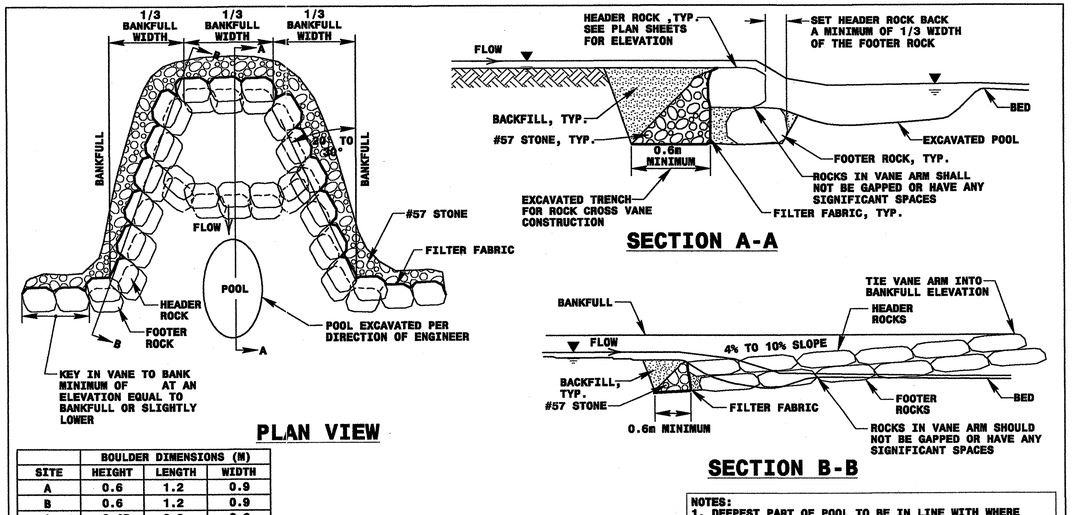
SECTION B-B



SECTION C-C

CONSTRUCTED RIFFLE DETAIL

NOT TO SCALE



PLAN VIEW

SECTION A-A

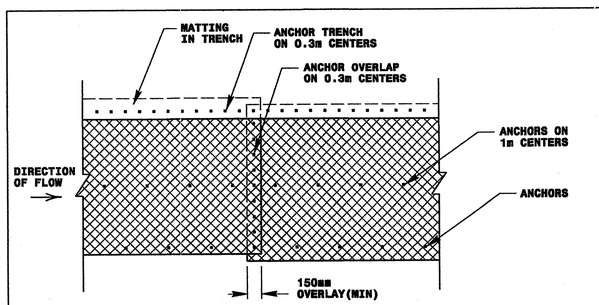
SECTION B-B

	BOULDER DIMENSIONS (M)		
SITE	HEIGHT	LENGTH	WIDTH
A	0.6	1.2	0.9
B	0.6	1.2	0.9
C	0.45	0.9	0.6
D	0.6	1.2	0.9
E	0.6	1.2	0.9
F	0.6	1.2	0.9
I	0.6	1.2	0.9
J	0.45	0.9	0.6
L	0.6	1.2	0.9
M	0.6	1.2	0.9
N	0.6	1.2	0.9
R	0.6	1.2	0.9

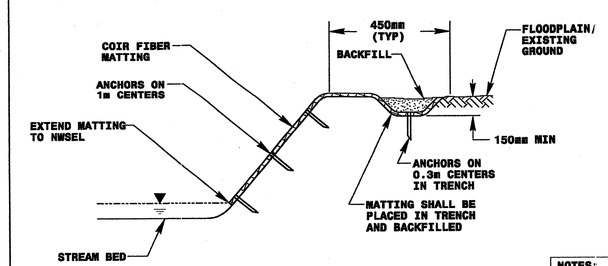
NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK CROSS VANE DETAIL

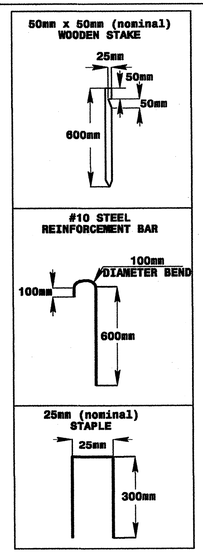
NOT TO SCALE



PLAN VIEW



TYPICAL CROSS SECTION

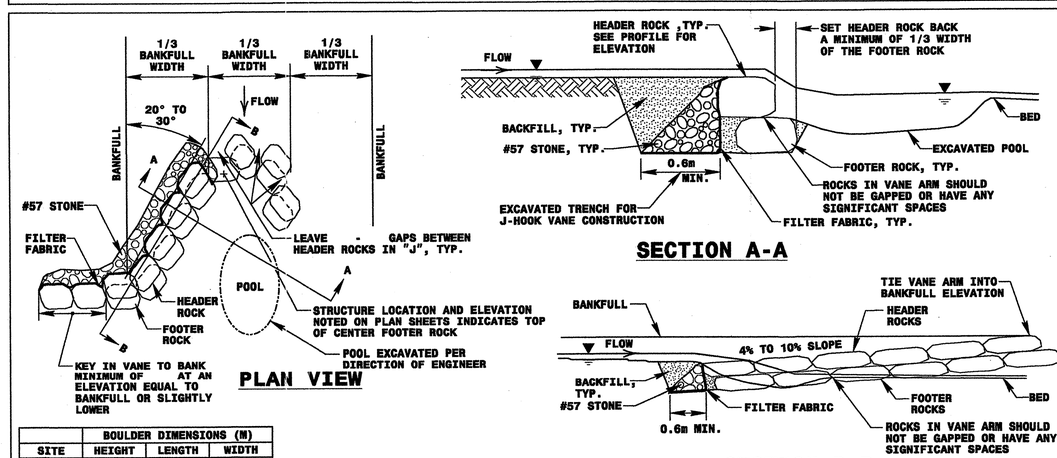


ANCHOR OPTIONS

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

COIR FIBER MATTING DETAIL

NOT TO SCALE



PLAN VIEW

SECTION A-A

SECTION B-B

	BOULDER DIMENSIONS (M)		
SITE	HEIGHT	LENGTH	WIDTH
A	0.6	1.2	0.9
B	0.6	1.2	0.9
C	0.45	0.9	0.6
D	0.6	1.2	0.9
E	0.6	1.2	0.9
F	0.6	1.2	0.9
I	0.6	1.2	0.9
J	0.45	0.9	0.6
L	0.6	1.2	0.9
M	0.6	1.2	0.9
N	0.6	1.2	0.9
R	0.6	1.2	0.9

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

J-HOOK VANE DETAIL

NOT TO SCALE

6/2/99

6/2/99

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-2B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER G. GRANT GINN 7-17-06

MORPHOLOGICAL MEASUREMENTS TABLE

Variables	Proposed Site A	Proposed Site B	Proposed Site C	Proposed Site D_1	Proposed Site D_2	Proposed Site E	Proposed Site F	Proposed Site I_1	Proposed Site I_2	Proposed Site J_1	Proposed Site J_2	Proposed Site M	Proposed Site N_1	Proposed Site N_2	Reference Reach 1	Reference Reach 2
1. Stream type	B4c	B4c	B4c	B4	B4	B4c	B4c	B4c	B4c	B4c	B4c	B4c	B4c	B4c	B4c	B4c
2. Drainage area (km2)	33.15	0.41	0.21	2.46	2.46	26.94	0.57	18.34	18.34	0.96	0.96	3.37	2.95	2.95	18.91	31.08
3. Bankfull width	8.96	1.86	1.43	3.54	3.54	8.32	2.10	7.25	7.25	2.53	2.53	3.96	3.78	3.78	5.91-6.13	7.77-8.72
4. Bankfull mean depth	0.75	0.16	0.12	0.30	0.30	0.69	0.17	0.59	0.59	0.21	0.21	0.33	0.31	0.31	0.58-0.61	0.68
5. Width/depth ratio	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9.5-10.8	10.7-12.8
6. Bankfull cross-sectional area	6.69	0.29	0.17	1.04	1.04	5.75	0.37	4.37	4.37	0.53	0.53	1.30	1.19	1.19	3.47-3.69	5.62-5.96
7. Bankfull mean velocity	1.80	1.25	1.16	1.43	1.43	1.80	1.25	1.74	1.74	1.34	1.34	1.49	6.00	6.00	1.49-1.59	1.68
8. Bankfull discharge, cms	12.12	0.36	0.20	1.50	1.50	10.25	0.45	7.53	7.53	0.71	0.71	1.93	1.73	1.73	5.52	9.97
9. Bankfull max depth	0.88-1.13	0.18-0.22	0.14-0.18	0.37-0.46	0.37-0.46	0.82-1.04	0.21-0.26	0.73-0.91	0.73-0.91	0.25-0.32	0.25-0.32	0.40-0.49	0.40	0.40	0.70-0.91	0.82-0.94
10. Width of floodprone area	15.24	3.17	2.44	5.79	5.79	14.02	3.57	12.34	12.34	4.27	4.27	6.71	3.05	3.05	2.37-2.51	3.16-8.36
11. Entrenchment ratio	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.3-1.4	1.2-3.5
12. Meander length	88.39-124.97	18.59-25.91	14.33-20.12	35.36-49.38	35.36-49.38	83.21-116.43	21.03-29.44	72.54-101.50	72.54-101.50	25.36	25.36	39.60-55.47	17.70-24.70	17.70-24.70	–	–
13. Ratio of meander length to bankfull width	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	10-14	–	–
14. Radius of curvature	17.98-26.82	3.54-5.30	2.87-4.30	7.01-10.67	7.01-10.67	16.64-24.96	4.21-6.31	14.51-21.76	14.51-21.76	5.06-7.59	5.06-7.59	7.92-11.89	7.01-10.67	7.01-10.67	7.16-15.79	9.14-37.19
15. Ratio of radius of curvature to bankfull width	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-3	1.2-2.7	1.1-4.8
16. Belt width	11.0	4.2-5.4	3.2-4.5	–	–	13.2-17.8	4.1-5.9	18.5-21.4	18.7-20.3	3.8-6.7	–	6.8-10.1	6.3-7.8	–	–	–
17. Meander width ratio	1.24	2.6	2.7	–	–	2.0	2.5	2.8	2.7	2.07	–	2.1	1.86	–	–	–
18. Sinuosity (stream length/valley length)	1.08	1.09	1.3	1.0	1.0	1.12	1.15	1.1	1.1	1.07	1.07	1.04	1.05	1.0	1.04	1.0
19. Valley slope	0.0092	0.0375	0.0094	0.0333	0.0244	0.0069	0.0174	0.0102	0.0166	0.0145	0.0065	0.0375	0.0258	0.0354	0.011	0.007
20. Average slope	0.0085	0.0344	0.007	0.0333	0.0244	0.0061	0.0152	0.0093	0.0151	0.0136	0.0061	0.0361	0.0245	0.0354	0.0093-0.0108	0.007
21. Pool slope	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0-0.001	0-0.004
22. Ratio of pool slope to average slope	0	0-0.6	0-0.06	0-0.6	0 - 0.6	0-0.6	0-0.6	0-0.6	0-0.6	0-0.6	0-0.6	0-0.6	0	0	0.093-0.11	0-0.6
23. Maximum pool depth	1.28	0.28	0.21	0.55	0.55	1.25	0.30	1.10	1.10	0.37	0.37	0.55	0.56	0.56	0.91-1.01	0.94-1.49
24. Ratio of pool depth to average bankfull depth	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.8	1.7-1.8	1.4-2.2
25. Pool width	7.16-8.08	1.46-1.68	1.16-1.28	2.83-3.17	2.83-3.17	6.64-7.50	1.68-1.89	5.79-6.52	5.79-6.52	2.01-2.29	2.01-2.29	3.17-3.57	1.40-1.59	1.40-1.59	5.00-5.43	7.13-7.86
26. Ratio of pool width to bankfull width	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8 - 0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9	0.8-0.9
27. Pool to pool spacing	35.97-44.81	7.01-8.84	5.79-7.32	14.02-177.09	14.02-177.09	33.22-41.76	8.53-10.67	28.96-36.27	28.96-36.27	10.06-12.80	10.06-12.80	15.85-19.81	14.33-17.98	14.33-17.98	11.58-32.61	19.81-57.91
28. Ratio of pool to pool spacing to bankfull width	4-5	4-5	4-5	4-5	4 - 5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	1.9-5.3	2.3-7.5
29. Ratio of lowest bank height to bankfull height (or max bankfull depth)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

STATE OF NORTH CAROLINA

SUMMARY OF QUANTITIES

DESC	SECT	QUANTITY	UNIT	ITEM DESCRIPTION
6133000000-N	SP	1	LS	Construction Surveying for Mitigation
6133000000-N	SP	1	LS	Grading for Mitigation
1077000000-M	SP	1105	MTON	#57 Stone
3656000000-M	876	5,625	SM	Filter Fabric for Drainage
6133000000-N	SP	1	LS	Diversion Pumping for Mitigation
3651000000-M	SP	4,480	MTON	Boulders
3642000000-M	876	446	MTON	Plain Rip Rap - Class A
3649000000-M	876	304	MTON	Plain Rip Rap - Class B

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pallen AT PDEA214778

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-3A
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

STATE OF NORTH CAROLINA

SUMMARY OF EARTHWORK FOR MITIGATION

IN CUBIC METERS

US 19				
LOCATION	MITIGATION UNCL. EXCAVATION	MITIGATION EMBT +%	MITIGATION BORROW	MITIGATION WASTE
SITE A	142.3	97.4	0	44.9
SITE B	835.2	0	0	835.2
SITE C	213.2	89.9	0	123.3
SITE D	281.1	25.2	0	255.9
SITE E	2433.5	249.6	0	2183.9
SITE F	155.2	0	0	155.2
SITE I	1213.9	1458.6	244.7	0
SITE J	4084.3	0	0	4084.3
SITE M	233.6	44.3	0	189.3
SITE N	5187.5	199.2	0	4988.3
SUBTOTAL	14779.8	2164.2	244.7	12860.3
WASTE USED IN LIEU OF BORROW			-244.7	-244.7
PROJECT TOTAL	14779.8	2164.2	0	12615.6

APPROXIMATE QUANTITIES ONLY. MITIGATION UNCLASSIFIED EXCAVATION, MITIGATION BORROW EXCAVATION, MITIGATION FINE GRADING AND MITIGATION CLEARING AND GRUBBING WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING FOR MITIGATION".

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PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

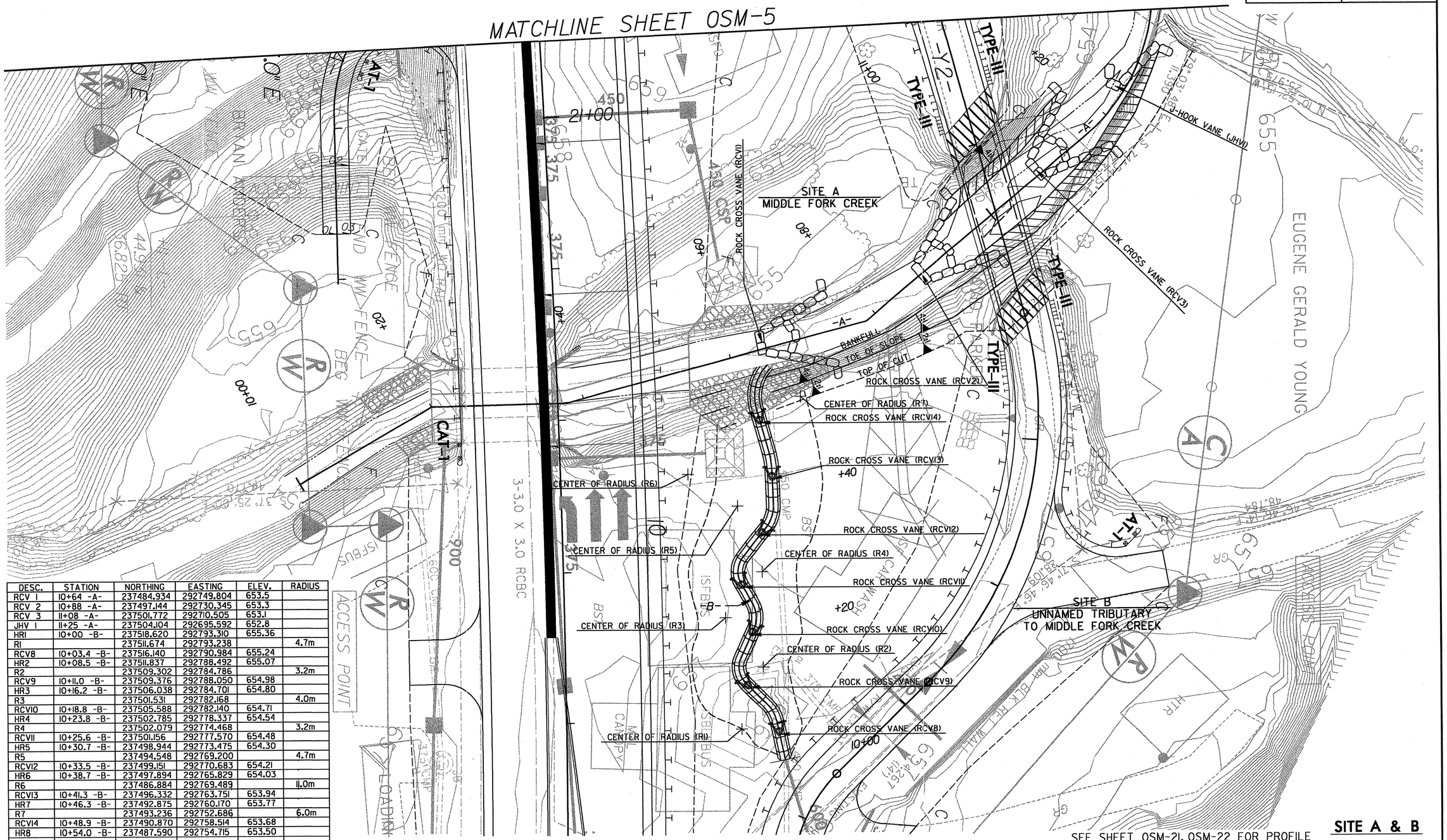
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN

9-1-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV 1	10+64 -A-	237484.934	292749.804	653.5	
RCV 2	10+88 -A-	237497.144	292730.345	653.3	
RCV 3	11+08 -A-	237501.772	292710.505	653.1	
JHV 1	11+25 -A-	237504.104	292695.592	652.8	
HR1	10+00 -B-	237518.620	292793.310	655.36	
R1		237511.674	292793.238		4.7m
RCV8	10+03.4 -B-	237516.140	292790.984	655.24	
HR2	10+08.5 -B-	237511.837	292788.492	655.07	
R2		237509.302	292784.786		3.2m
RCV9	10+11.0 -B-	237509.376	292788.050	654.98	
HR3	10+16.2 -B-	237506.038	292784.701	654.80	
R3		237501.531	292782.168		4.0m
RCV10	10+18.8 -B-	237505.588	292782.140	654.71	
HR4	10+23.8 -B-	237502.785	292778.337	654.54	
R4		237502.079	292774.468		3.2m
RCV11	10+25.6 -B-	237501.156	292777.570	654.48	
HR5	10+30.7 -B-	237498.944	292773.475	654.30	
R5		237494.548	292769.200		4.7m
RCV12	10+33.5 -B-	237499.151	292770.683	654.21	
HR6	10+38.7 -B-	237497.894	292765.829	654.03	
R6		237486.884	292769.489		11.0m
RCV13	10+41.3 -B-	237496.332	292763.751	653.94	
HR7	10+46.3 -B-	237492.875	292760.170	653.77	
R7		237493.236	292752.686		6.0m
RCV14	10+48.9 -B-	237490.870	292758.514	653.68	
HR8	10+54.0 -B-	237487.590	292754.715	653.50	

SEE SHEET OSM-21, OSM-22 FOR PROFILE

SITE A & B

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-5
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

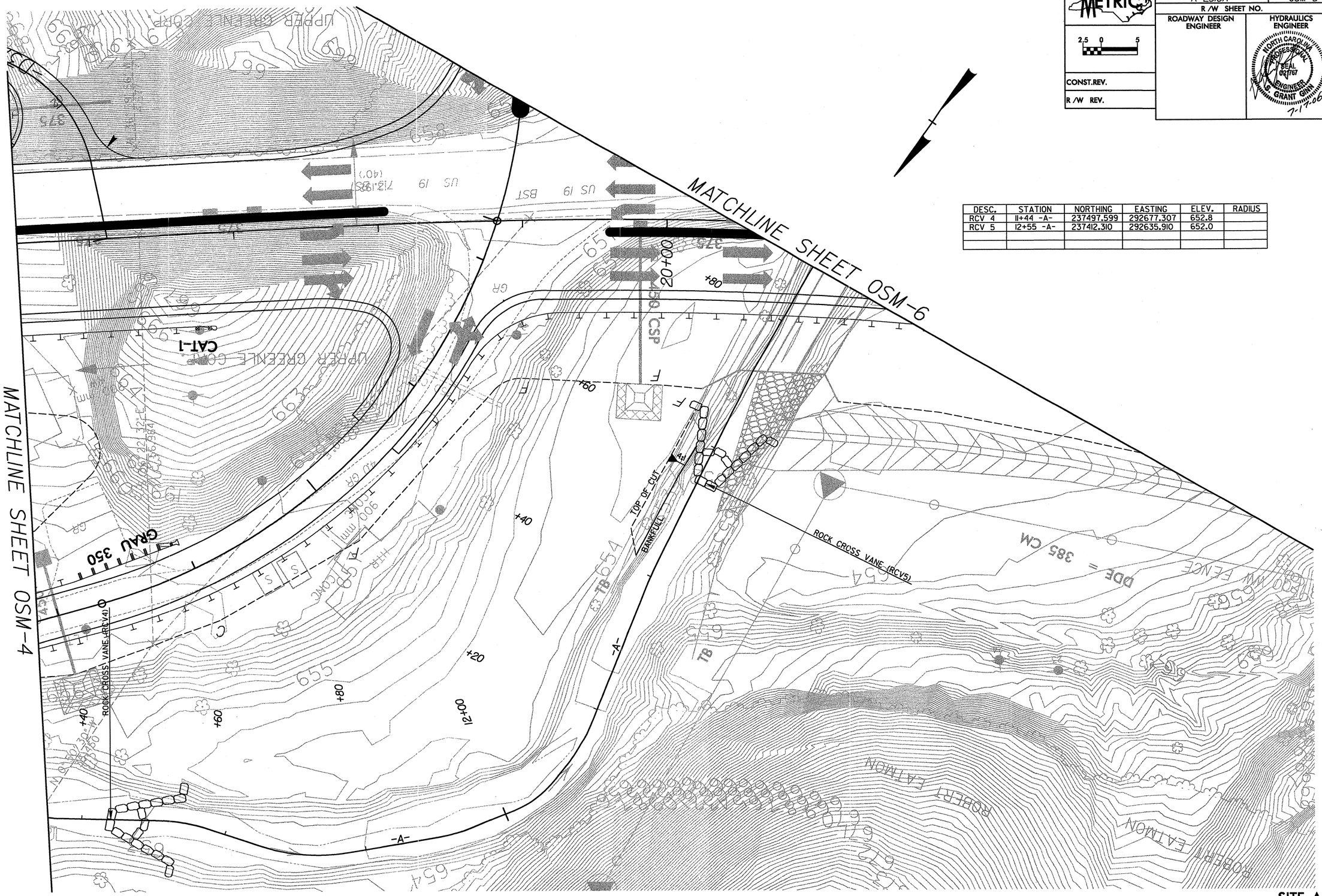
METRIC

2.5 0 5

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-17-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV 4	11+44 -A-	237497.599	292677.307	652.8	
RCV 5	12+55 -A-	237412.310	292635.910	652.0	

SEE SHEET OSM-21 FOR PROFILE

SITE A

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

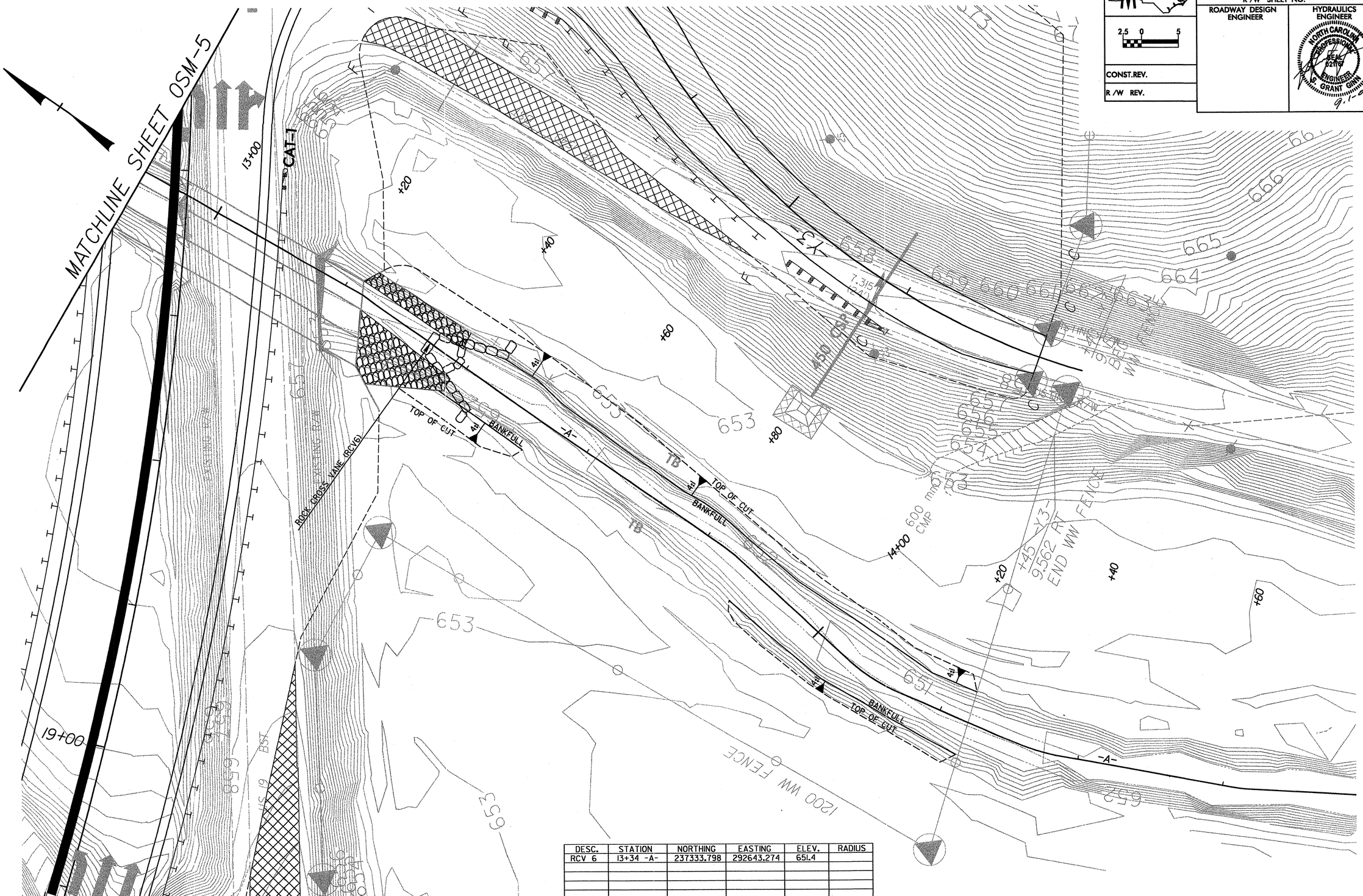
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021110 ENGINEER S. GRANT GINN 9-1-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV 6	13+34 -A-	237333.798	292643.274	651.4	

SEE SHEET OSM-21, OSM-22 FOR PROFILE

SITE A

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

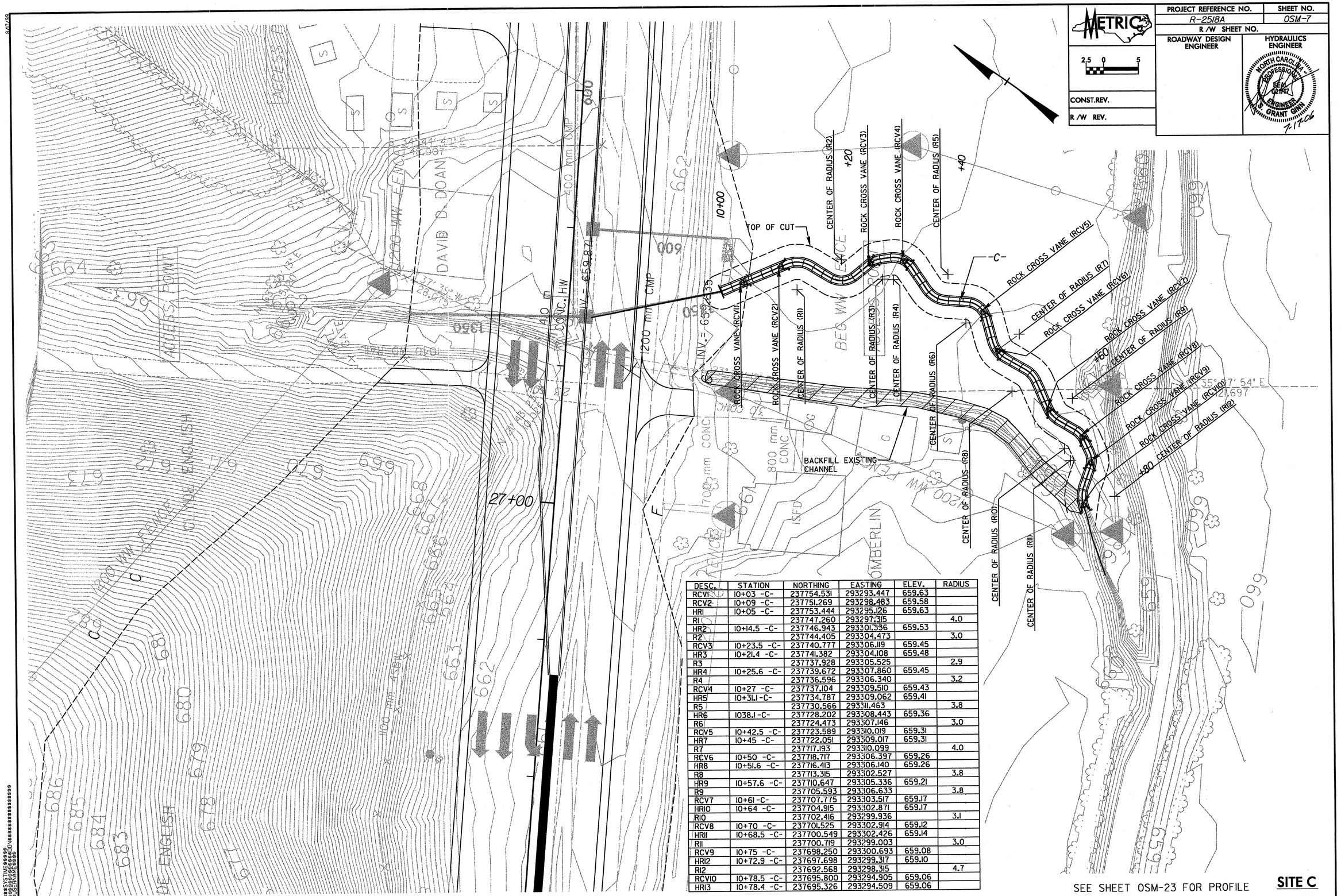
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 024162 ENGINEER GRANT GINN 7/17/06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV1	10+03 -C-	237754.531	293293.447	659.63	
RCV2	10+09 -C-	237751.269	293298.483	659.58	
HR1	10+05 -C-	237753.444	293295.126	659.63	
R1		237747.260	293297.315		4.0
HR2	10+14.5 -C-	237746.943	293301.336	659.53	
R2		237744.405	293304.473		3.0
RCV3	10+23.5 -C-	237740.777	293306.119	659.45	
HR3	10+21.4 -C-	237741.382	293304.108	659.48	
R3		237737.928	293305.525		2.9
HR4	10+25.6 -C-	237739.672	293307.860	659.45	
R4		237736.596	293306.340		3.2
RCV4	10+27 -C-	237737.104	293309.510	659.43	
HR5	10+31.1 -C-	237734.787	293309.062	659.41	
R5		237730.566	293311.463		3.8
HR6	1038.1 -C-	237728.202	293308.443	659.36	
R6		237724.473	293307.146		3.0
RCV5	10+42.5 -C-	237723.589	293310.019	659.31	
HR7	10+45 -C-	237722.051	293309.017	659.31	
R7		237717.193	293310.099		4.0
RCV6	10+50 -C-	237718.717	293306.397	659.26	
HR8	10+51.6 -C-	237716.413	293306.140	659.26	
R8		237713.315	293302.527		3.8
HR9	10+57.6 -C-	237710.647	293305.336	659.21	
R9		237705.593	293306.633		3.8
RCV7	10+61 -C-	237707.775	293303.517	659.17	
HR10	10+64 -C-	237704.915	293302.871	659.17	
R10		237702.416	293299.936		3.1
RCV8	10+70 -C-	237701.525	293302.914	659.12	
HR11	10+68.5 -C-	237700.549	293302.426	659.14	
R11		237700.719	293299.003		3.0
RCV9	10+75 -C-	237698.250	293300.693	659.08	
HR12	10+72.9 -C-	237697.698	293299.317	659.10	
R12		237692.568	293298.315		4.7
RCV10	10+78.5 -C-	237695.800	293294.905	659.06	
HR13	10+78.4 -C-	237695.326	293294.509	659.06	

SEE SHEET OSM-23 FOR PROFILE

SITE C

8/07/99

SYSTIME$$$$$$$$
VARIEBLE$$$$$$$$
RENAME$$$$$$$$CDV8

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

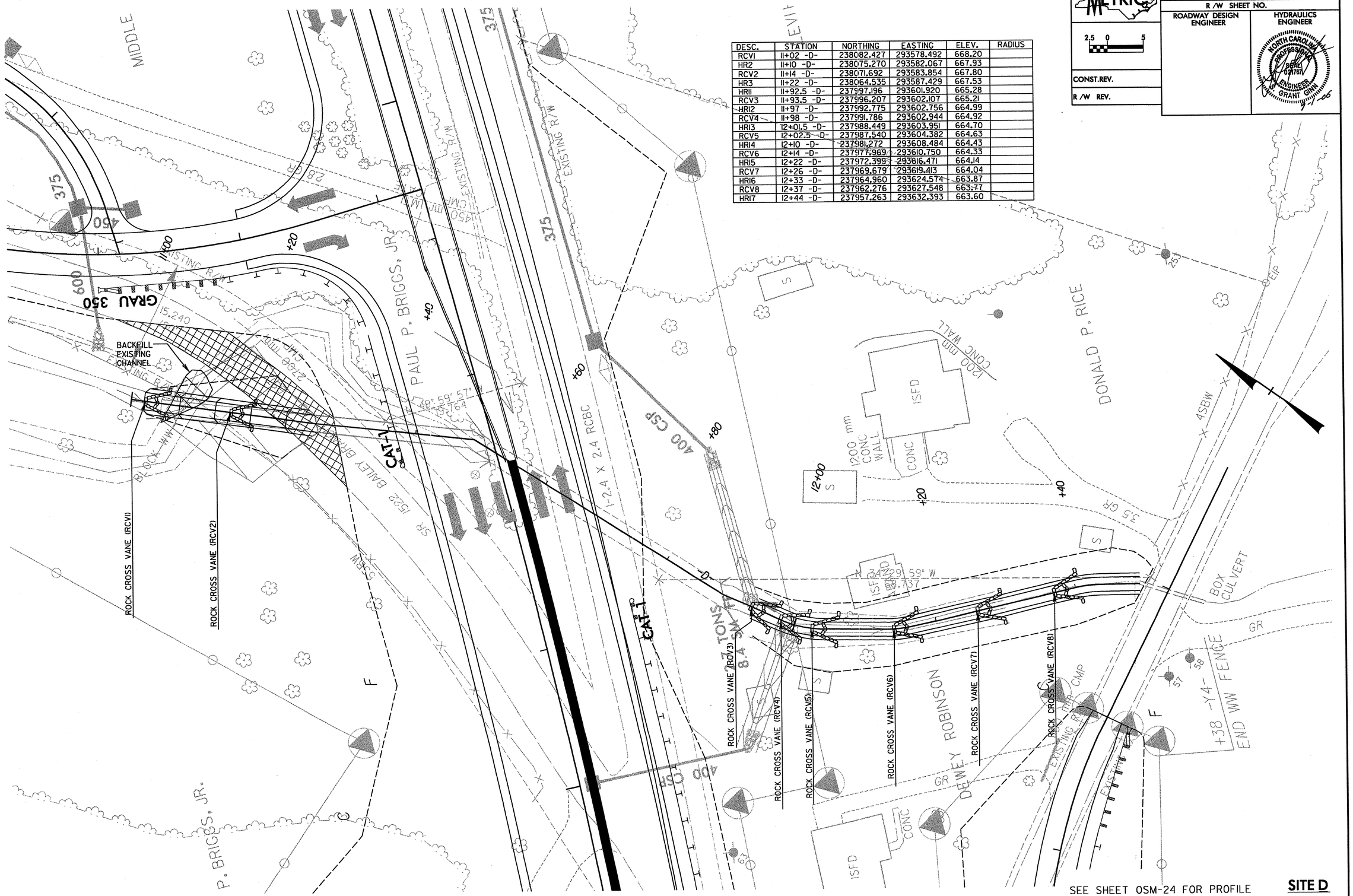
2.5 0 5

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021761 ENGINEER GRANT GINN 9-17-06

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV1	11+02 -D-	238082.427	293578.492	668.20	
HR2	11+10 -D-	238075.270	293582.067	667.93	
RCV2	11+14 -D-	238071.692	293583.854	667.80	
HR3	11+22 -D-	238064.535	293587.429	667.53	
HR11	11+92.5 -D-	237997.196	293601.920	665.28	
RCV3	11+93.5 -D-	237996.207	293602.107	665.21	
HR12	11+97 -D-	237992.775	293602.756	664.99	
RCV4	11+98 -D-	237991.786	293602.944	664.92	
HR13	12+01.5 -D-	237988.449	293603.951	664.70	
RCV5	12+02.5 -D-	237987.540	293604.382	664.63	
HR14	12+10 -D-	237981.272	293608.484	664.43	
RCV6	12+14 -D-	237977.969	293610.750	664.33	
HR15	12+22 -D-	237972.399	293616.471	664.14	
RCV7	12+26 -D-	237969.679	293619.413	664.04	
HR16	12+33 -D-	237964.960	293624.574	663.87	
RCV8	12+37 -D-	237962.276	293627.548	663.77	
HR17	12+44 -D-	237957.263	293632.393	663.60	



SITE D

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-9
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

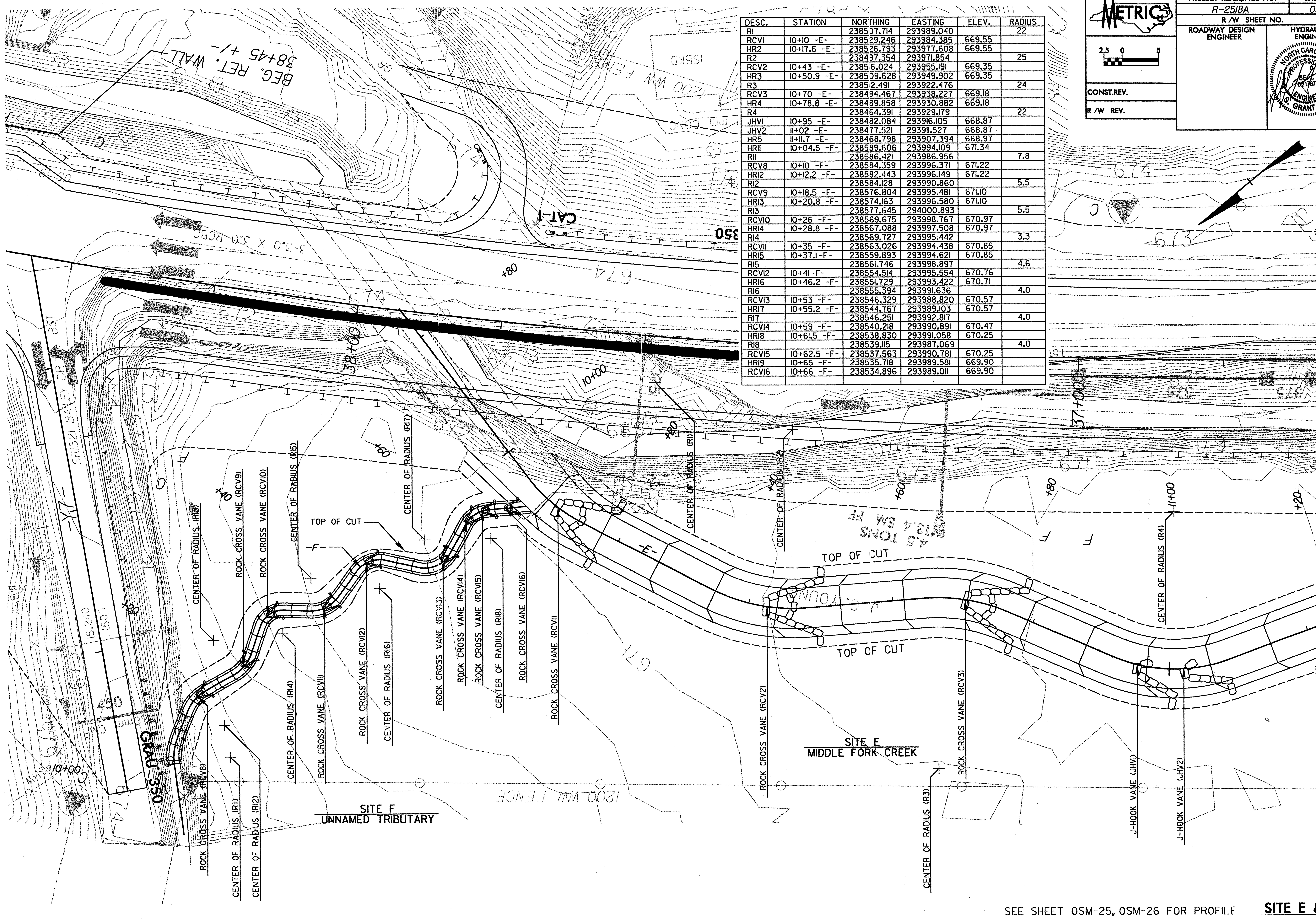
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 021767 S. GRANT GINN 7-17-06

METRIC

CONST.REV.

R/W REV.

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
R1		238507.714	293989.040		22
RCV1	10+10 -E-	238529.246	293984.385	669.55	
HR2	10+17.6 -E-	238526.793	293977.608	669.55	
R2		238497.354	293971.854		25
RCV2	10+43 -E-	238516.024	293955.191	669.35	
HR3	10+50.9 -E-	238509.628	293949.902	669.35	
R3		238512.491	293922.476		24
RCV3	10+70 -E-	238494.467	293938.227	669.18	
HR4	10+78.8 -E-	238489.858	293930.882	669.18	
R4		238464.391	293929.179		22
JHV1	10+95 -E-	238482.084	293916.105	668.87	
JHV2	11+02 -E-	238477.521	293911.527	668.87	
HR5	11+11.7 -E-	238468.798	293907.394	668.97	
HR11	10+04.5 -F-	238589.606	293994.109	671.34	
R11		238586.421	293986.956		7.8
RCV8	10+10 -F-	238584.359	293996.371	671.22	
HR12	10+12.2 -F-	238582.443	293996.149	671.22	
R12		238584.128	293990.860		5.5
RCV9	10+18.5 -F-	238576.804	293995.481	671.10	
HR13	10+20.8 -F-	238574.163	293996.580	671.10	
R13		238577.645	294000.893		5.5
RCV10	10+26 -F-	238569.675	293998.767	670.97	
HR14	10+28.8 -F-	238567.088	293997.508	670.97	
R14		238569.727	293995.442		3.3
RCV11	10+35 -F-	238563.026	293994.438	670.85	
HR15	10+37.1 -F-	238559.893	293994.621	670.85	
R15		238561.746	293998.897		4.6
RCV12	10+41 -F-	238554.514	293995.554	670.76	
HR16	10+46.2 -F-	238551.729	293993.422	670.71	
R16		238555.394	293991.636		4.0
RCV13	10+53 -F-	238546.329	293988.820	670.57	
HR17	10+55.2 -F-	238544.767	293989.103	670.57	
R17		238546.251	293992.817		4.0
RCV14	10+59 -F-	238540.218	293990.891	670.47	
HR18	10+61.5 -F-	238538.830	293991.058	670.25	
R18		238539.115	293987.069		4.0
RCV15	10+62.5 -F-	238537.563	293990.781	670.25	
HR19	10+65 -F-	238535.718	293989.581	669.90	
RCV16	10+66 -F-	238534.896	293989.011	669.90	



SEE SHEET OSM-25, OSM-26 FOR PROFILE

SITE E & F

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-10
R/W SHEET NO.	

METRIC

ROADWAY DESIGN ENGINEER

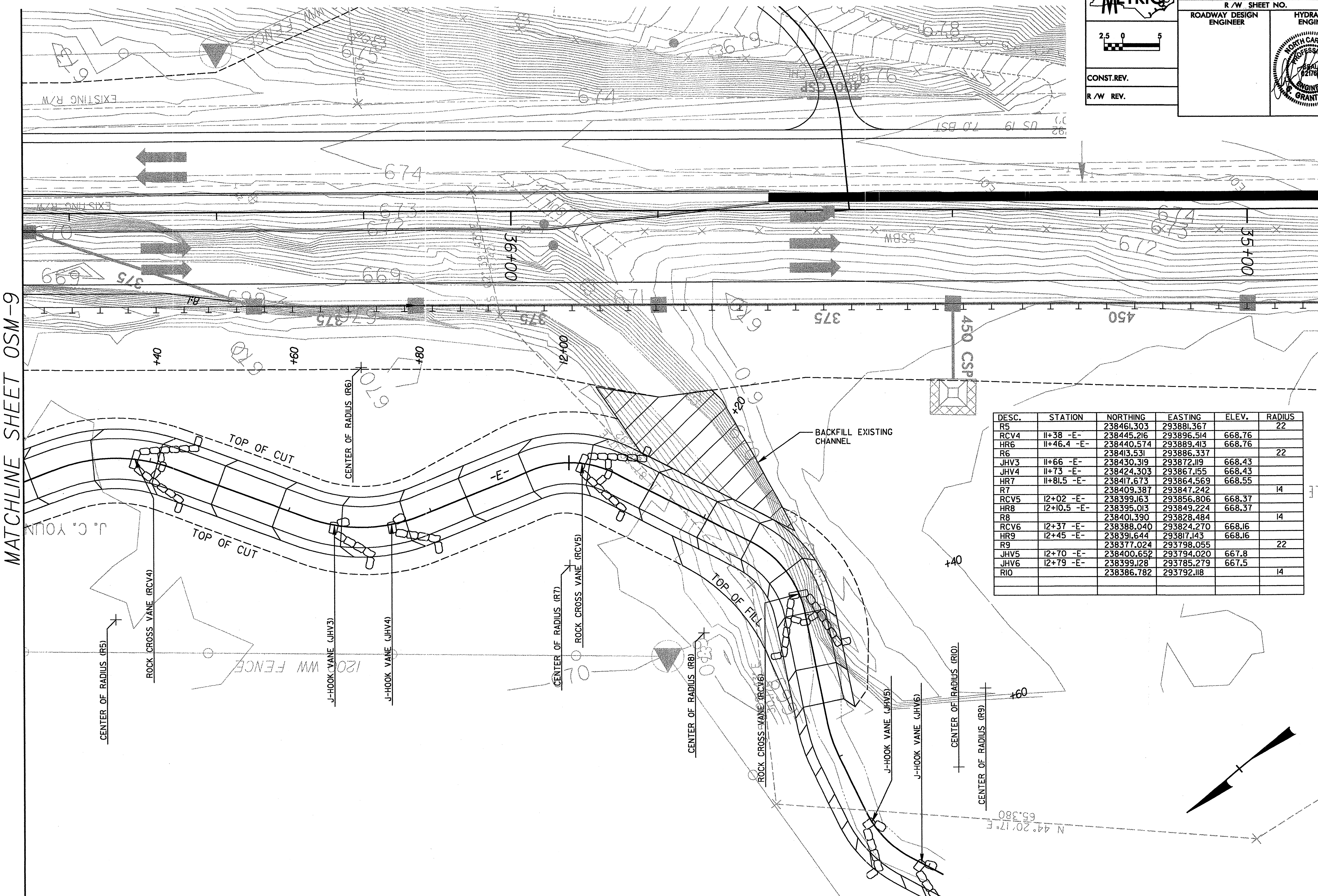
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-17-06

CONST.REV.

R/W REV.

8/17/99



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
R5		238461.303	293881.367		22
RCV4	11+38 -E-	238445.216	293896.514	668.76	
HR6	11+46.4 -E-	238440.574	293889.413	668.76	
R6		238413.531	293886.337		22
JHV3	11+66 -E-	238430.319	293872.119	668.43	
JHV4	11+73 -E-	238424.303	293867.155	668.43	
HR7	11+81.5 -E-	238417.673	293864.569	668.55	
R7		238409.387	293847.242		14
RCV5	12+02 -E-	238399.163	293856.806	668.37	
HR8	12+10.5 -E-	238395.013	293849.224	668.37	
R8		238401.390	293828.484		14
RCV6	12+37 -E-	238388.040	293824.270	668.16	
HR9	12+45 -E-	238391.644	293817.143	668.16	
R9		238377.024	293798.055		22
JHV5	12+70 -E-	238400.652	293794.020	667.8	
JHV6	12+79 -E-	238399.128	293785.279	667.5	
R10		238386.782	293792.118		14

SEE SHEET OSM-25 FOR PROFILE

SITE E

$$$$$SYSTIME$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

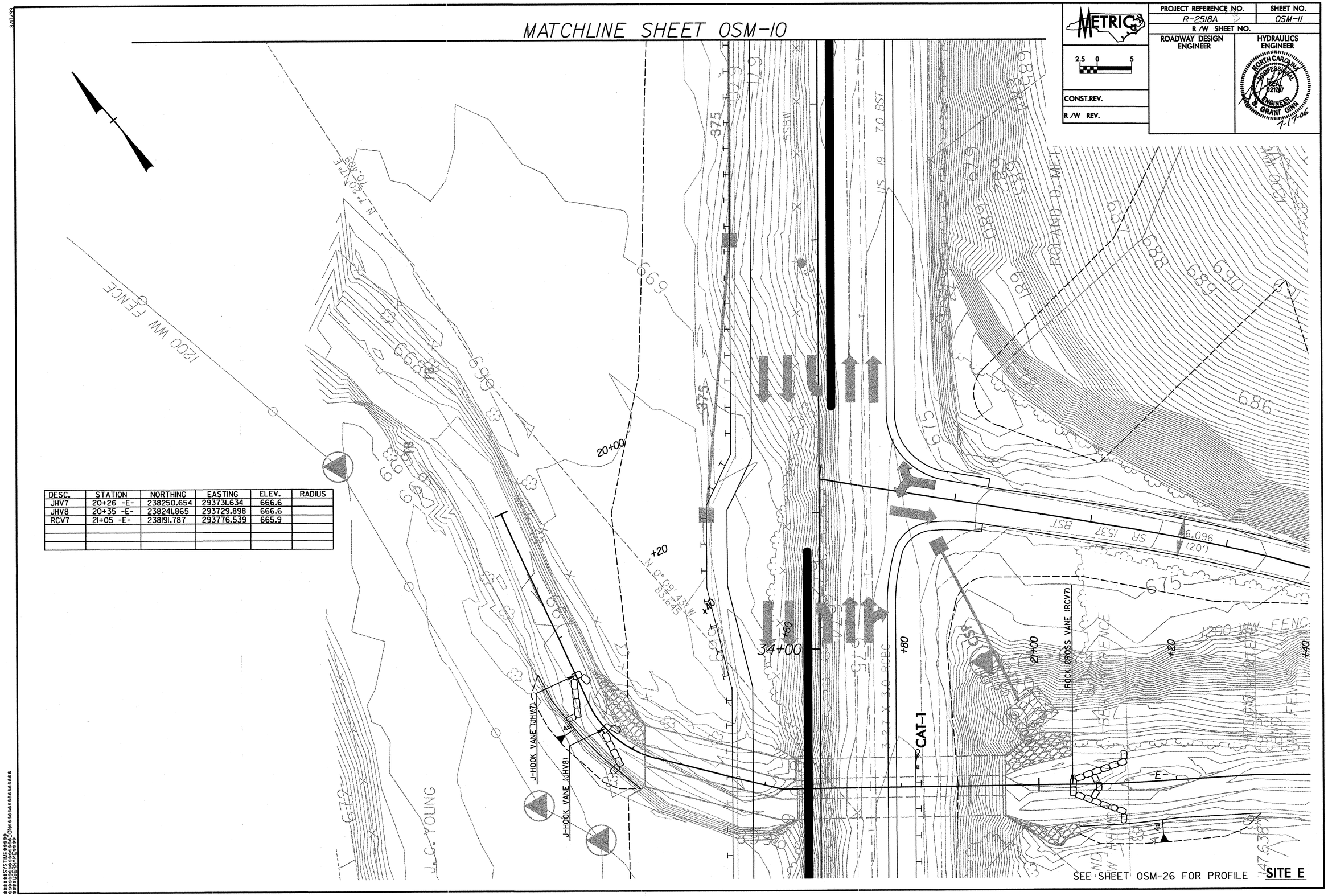
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021757 ENGINEER S. GRANT GINN 7-17-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
JHV7	20+26 -E-	238250.654	293731.634	666.6	
JHV8	20+35 -E-	238241.865	293729.898	666.6	
RCV7	21+05 -E-	238191.787	293776.539	665.9	

SEE SHEET OSM-26 FOR PROFILE

SITE E

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

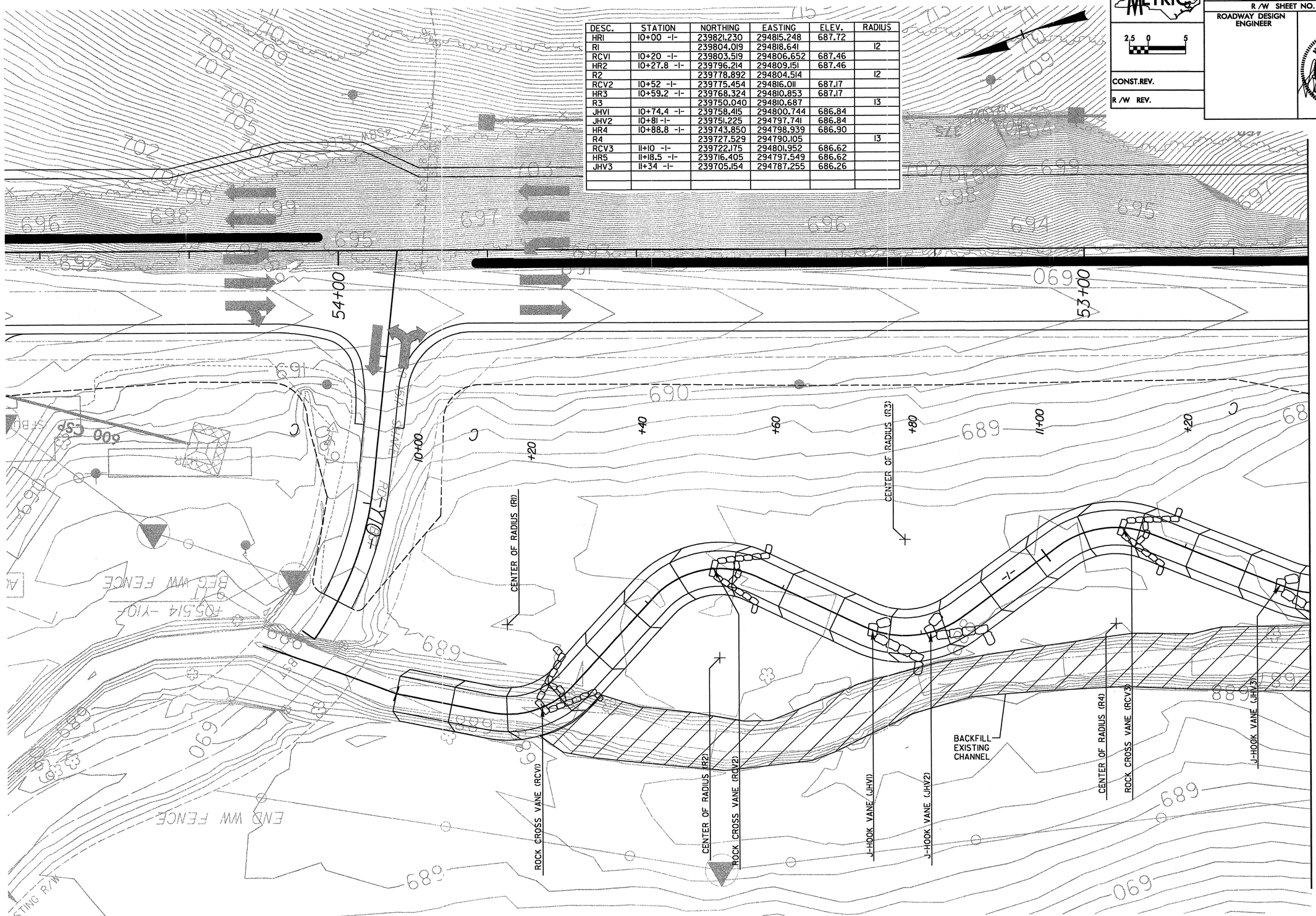
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-17-06

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
HR1	10+00 -1-	239821.230	294815.248	687.72	
R1		239804.019	294818.641		12
RCV1	10+20 -1-	239803.519	294806.652	687.46	
HR2	10+27.8 -1-	239796.214	294809.151	687.46	
R2		239778.892	294804.514		12
RCV2	10+52 -1-	239775.454	294816.011	687.17	
HR3	10+59.2 -1-	239768.324	294810.853	687.17	
R3		239750.040	294810.687		13
JHV1	10+74.4 -1-	239758.415	294800.744	686.84	
JHV2	10+81 -1-	239751.225	294797.741	686.84	
HR4	10+88.8 -1-	239743.850	294798.939	686.90	
R4		239727.529	294790.105		13
RCV3	11+10 -1-	239722.175	294801.952	686.62	
HR5	11+18.5 -1-	239716.405	294797.549	686.62	
JHV3	11+34 -1-	239705.154	294787.255	686.26	



MATCHLINE SHEET OSM-13

SEE SHEET OSM-27 FOR PROFILE

SITE 1

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-13
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

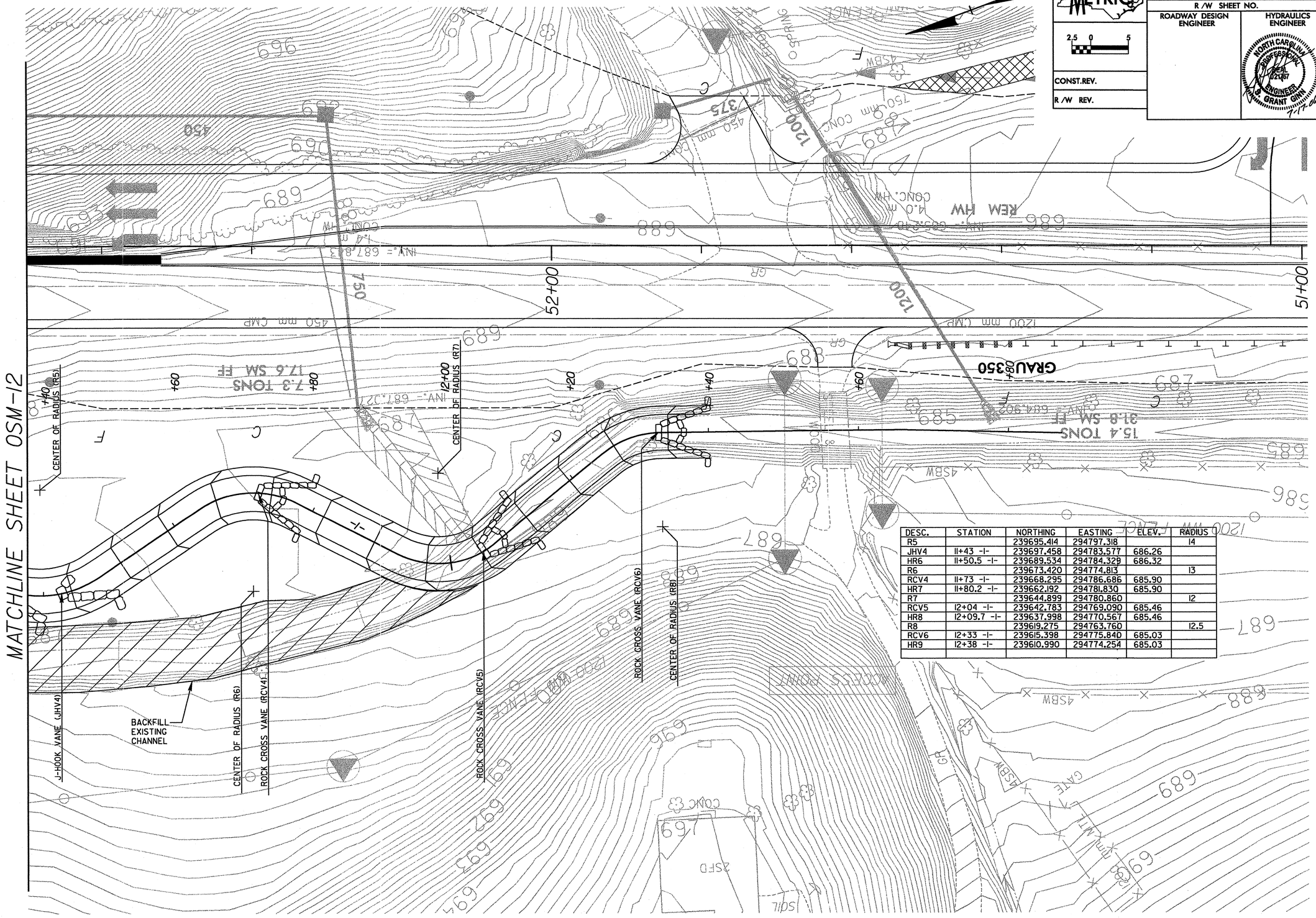
METRIC

2.5 0 5

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021267 ENGINEER GRANT GINN 7/17/06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
R5		239695.414	294797.318		14
JHV4	11+43 -l-	239697.458	294783.577	686.26	
HR6	11+50.5 -l-	239689.534	294784.329	686.32	
R6		239673.420	294774.813		13
RCV4	11+73 -l-	239668.295	294786.686	685.90	
HR7	11+80.2 -l-	239662.192	294781.830	685.90	
R7		239644.899	294780.860		12
RCV5	12+04 -l-	239642.783	294769.090	685.46	
HR8	12+09.7 -l-	239637.998	294770.567	685.46	
R8		239619.275	294763.760		12.5
RCV6	12+33 -l-	239615.398	294775.840	685.03	
HR9	12+38 -l-	239610.990	294774.254	685.03	

SEE SHEET OSM-27 FOR PROFILE

SITE 1

8/17/99

SYSTIME
DGN
USERNAME

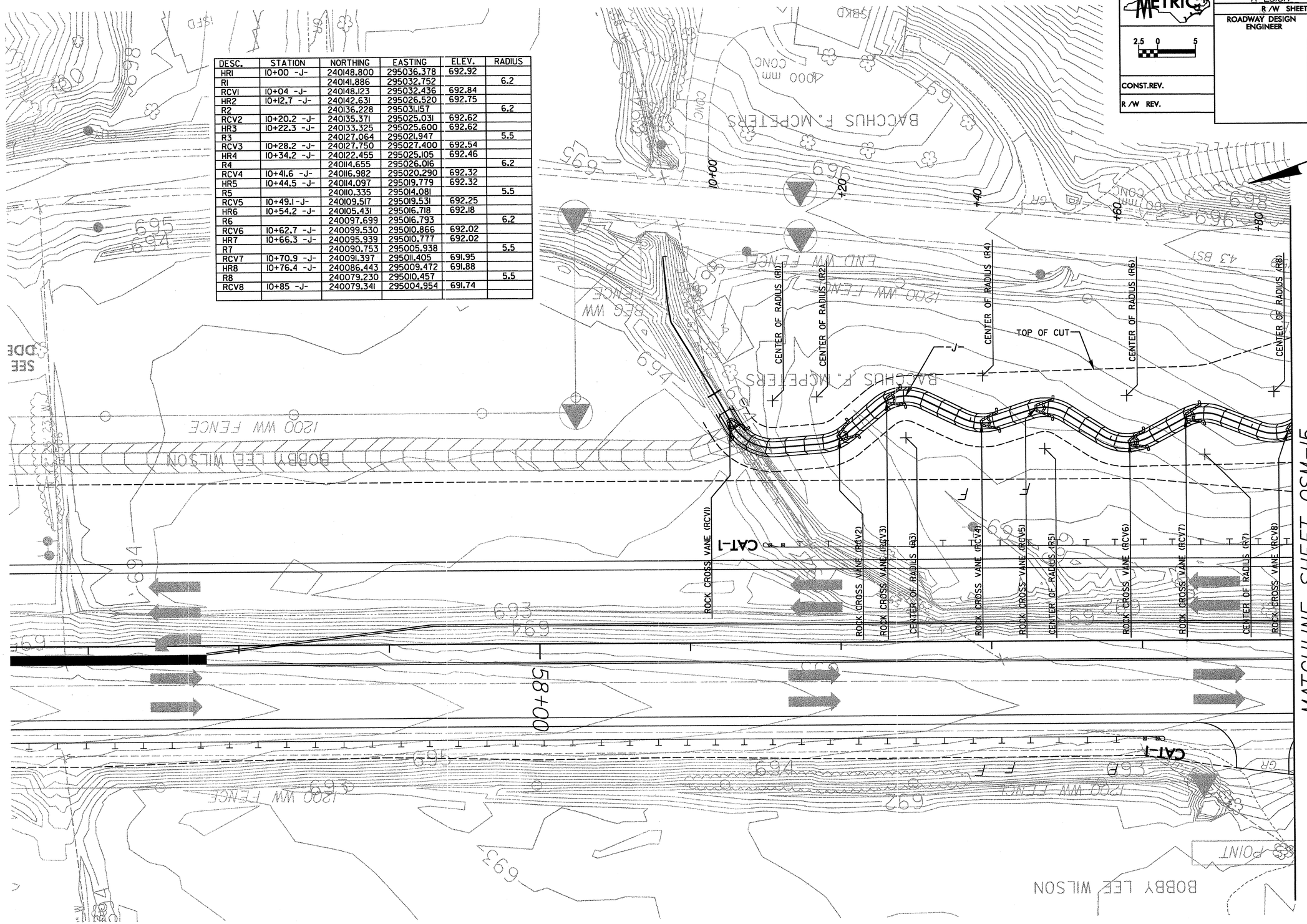
PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-14
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R /W REV.	

METRIC

2.5 0 5

NORTH CAROLINA PROFESSIONAL SEAL 024767 ENGINEER GRANT GINN 7-17-08

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
HR1	10+00 -J-	240148.800	295036.378	692.92	
R1		240141.886	295032.752		6.2
RCV1	10+04 -J-	240148.123	295032.436	692.84	
HR2	10+12.7 -J-	240142.631	295026.520	692.75	
R2		240136.228	295031.157		6.2
RCV2	10+20.2 -J-	240135.371	295025.031	692.62	
HR3	10+22.3 -J-	240133.325	295025.600	692.62	
R3		240127.064	295021.947		5.5
RCV3	10+28.2 -J-	240127.750	295027.400	692.54	
HR4	10+34.2 -J-	240122.455	295025.105	692.46	
R4		240114.655	295026.016		6.2
RCV4	10+41.6 -J-	240116.982	295020.290	692.32	
HR5	10+44.5 -J-	240114.097	295019.779	692.32	
R5		240110.335	295014.081		5.5
RCV5	10+49.1 -J-	240109.517	295019.531	692.25	
HR6	10+54.2 -J-	240105.431	295016.718	692.18	
R6		240097.699	295016.793		6.2
RCV6	10+62.7 -J-	240099.530	295010.866	692.02	
HR7	10+66.3 -J-	240095.939	295010.777	692.02	
R7		240090.753	295005.938		5.5
RCV7	10+70.9 -J-	240091.397	295011.405	691.95	
HR8	10+76.4 -J-	240086.443	295009.472	691.88	
R8		240079.230	295010.457		5.5
RCV8	10+85 -J-	240079.341	295004.954	691.74	



SEE SHEET OSM-28 FOR PROFILE

SITE J

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

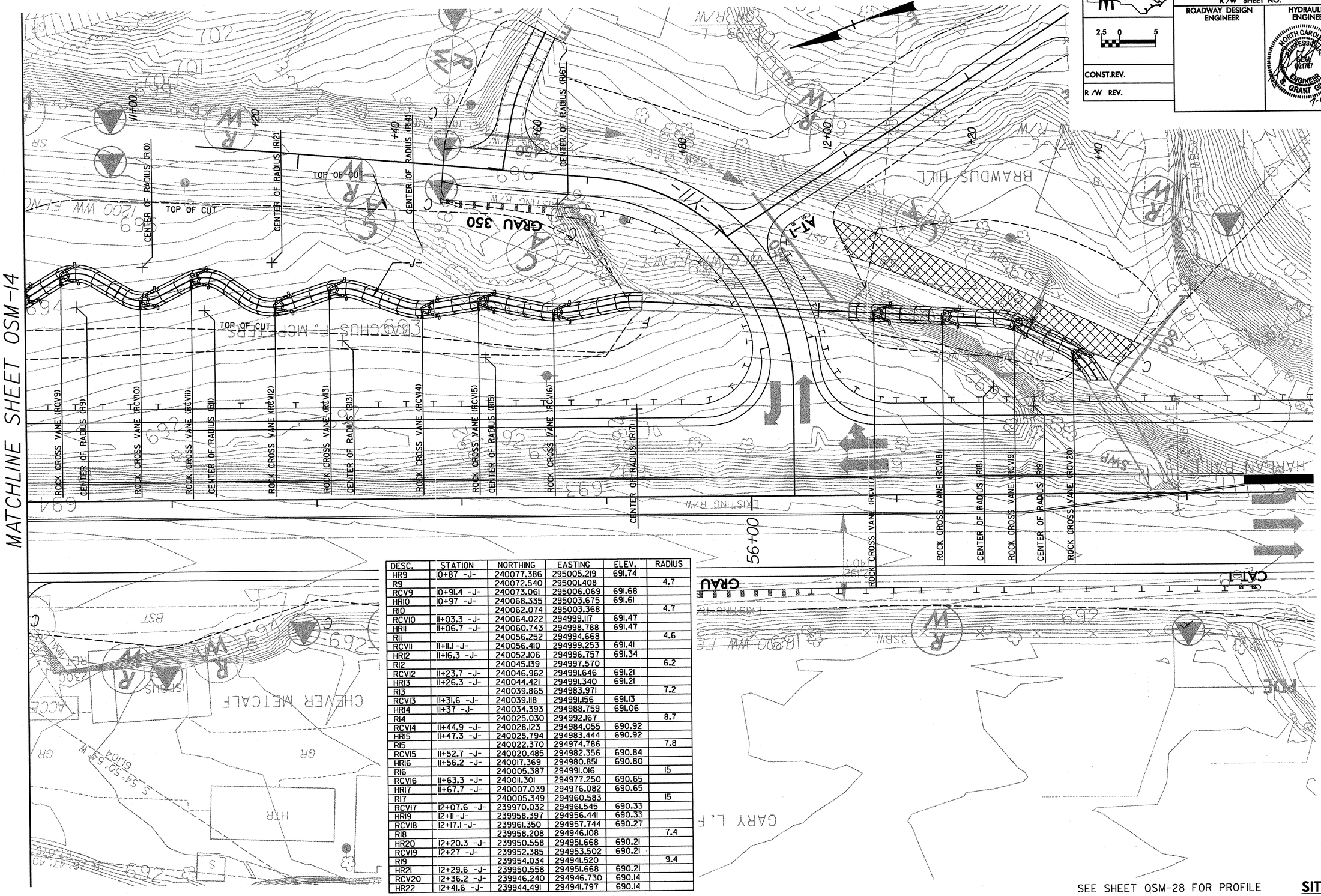
METRIC

2.5 0 5

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-1-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
HR9	10+87 -J-	240077.386	295005.219	691.74	
R9		240072.540	295001.408		4.7
RCV9	10+91.4 -J-	240073.061	295006.069	691.68	
HRI0	10+97 -J-	240068.335	295003.675	691.61	
RI0		240062.074	295003.368		4.7
RCVI0	11+03.3 -J-	240064.022	294999.117	691.47	
HRII	11+06.7 -J-	240060.743	294998.788	691.47	
RII		240056.252	294994.668		4.6
RCVII	11+11.1 -J-	240056.410	294999.253	691.41	
HRI2	11+16.3 -J-	240052.106	294996.757	691.34	
RI2		240045.139	294997.570		6.2
RCVI2	11+23.7 -J-	240046.962	294991.646	691.21	
HRI3	11+26.3 -J-	240044.421	294991.340	691.21	
RI3		240039.865	294983.971		7.2
RCVI3	11+31.6 -J-	240039.118	294991.156	691.13	
HRI4	11+37 -J-	240034.393	294988.759	691.06	
RI4		240025.030	294992.167		8.7
RCVI4	11+44.9 -J-	240028.123	294984.055	690.92	
HRI5	11+47.3 -J-	240025.794	294983.444	690.92	
RI5		240022.370	294974.786		7.8
RCVI5	11+52.7 -J-	240020.485	294982.356	690.84	
HRI6	11+56.2 -J-	240017.369	294980.851	690.80	
RI6		240005.387	294991.016		15
RCVI6	11+63.3 -J-	240011.301	294977.250	690.65	
HRI7	11+67.7 -J-	240007.039	294976.082	690.65	
RI7		240005.349	294960.583		15
RCVI7	12+07.6 -J-	239970.032	294961.545	690.33	
HRI9	12+11 -J-	239958.397	294956.441	690.33	
RCVI8	12+17.1 -J-	239961.350	294957.744	690.27	
RI8		239958.208	294946.108		7.4
HR20	12+20.3 -J-	239950.558	294951.668	690.21	
RCVI9	12+27 -J-	239952.385	294953.502	690.21	
RI9		239954.034	294941.520		9.4
HR21	12+29.6 -J-	239950.558	294951.668	690.21	
RCV20	12+36.2 -J-	239946.240	294946.730	690.14	
HR22	12+41.6 -J-	239944.491	294941.797	690.14	

SEE SHEET OSM-28 FOR PROFILE

SITE J

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-16

R/W SHEET NO.

METRIC

ROADWAY DESIGN ENGINEER

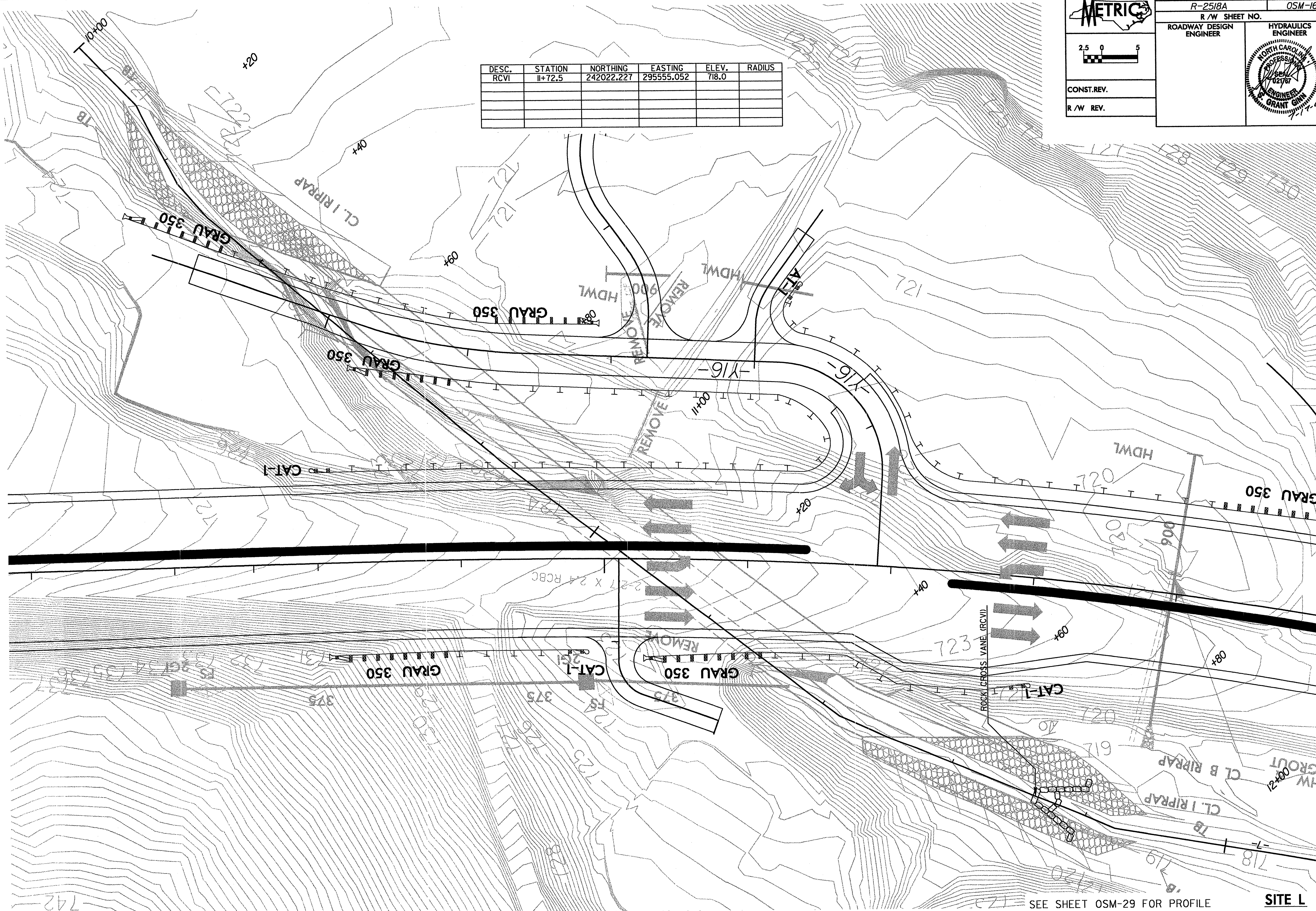
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER J. GRANT GINN 7-17-06

CONST.REV.

R/W REV.

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCVI	11+72.5	242022.227	295555.052	718.0	



SEE SHEET OSM-29 FOR PROFILE

SITE L

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

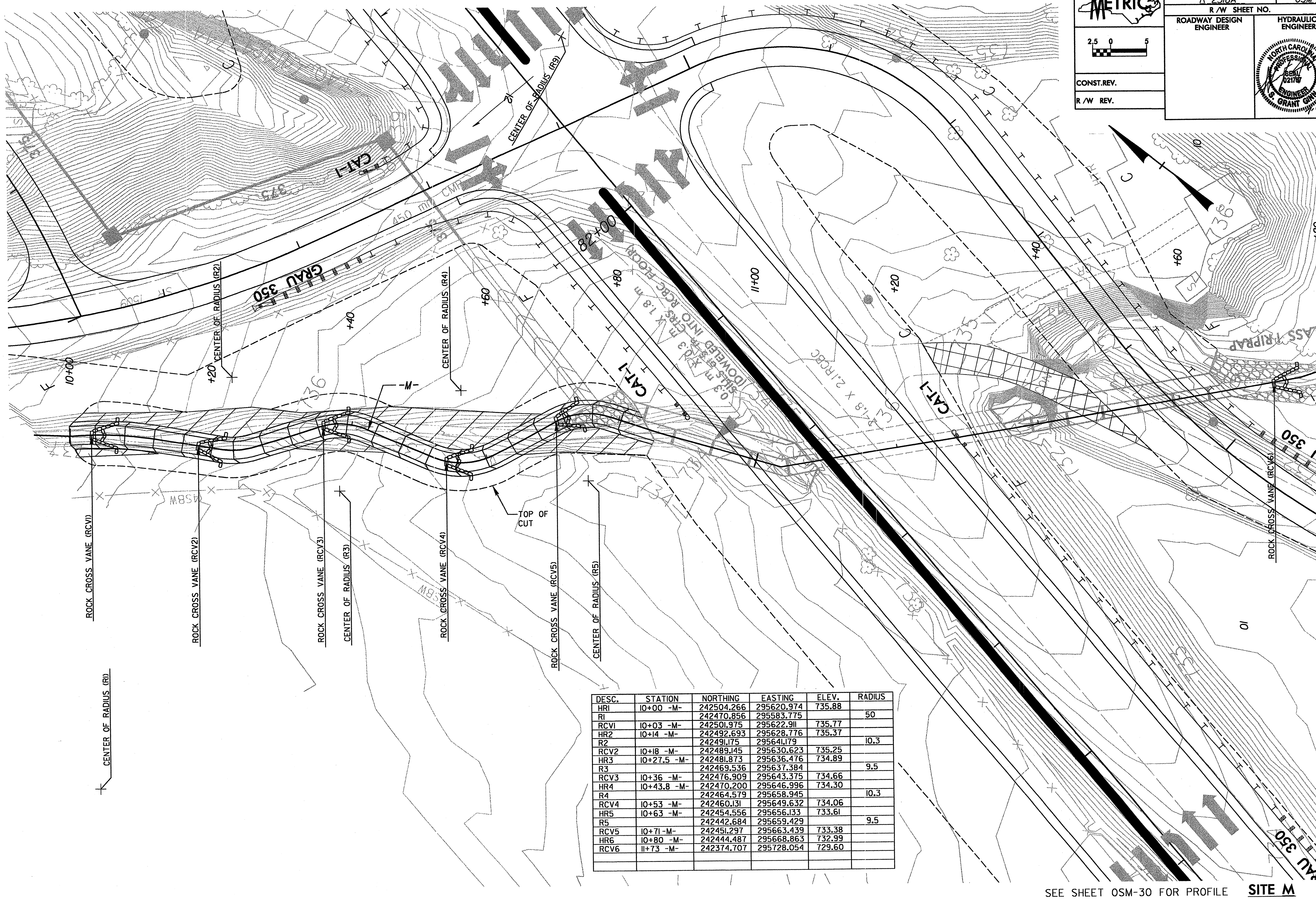
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021787 ENGINEER S. GRANT GINN 7-17-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
HR1	10+00 -M-	242504.266	295620.974	735.88	
R1		242470.856	295583.775		50
RCV1	10+03 -M-	242501.975	295622.911	735.77	
HR2	10+14 -M-	242492.693	295628.776	735.37	
R2		242491.175	295641.179		10.3
RCV2	10+18 -M-	242489.145	295630.623	735.25	
HR3	10+27.5 -M-	242481.873	295636.476	734.89	
R3		242469.536	295637.384		9.5
RCV3	10+36 -M-	242476.909	295643.375	734.66	
HR4	10+43.8 -M-	242470.200	295646.996	734.30	
R4		242464.579	295658.945		10.3
RCV4	10+53 -M-	242460.131	295649.632	734.06	
HR5	10+63 -M-	242454.556	295656.133	733.61	
R5		242442.684	295659.429		9.5
RCV5	10+71 -M-	242451.297	295663.439	733.38	
HR6	10+80 -M-	242444.487	295668.863	732.99	
RCV6	11+73 -M-	242374.707	295728.054	729.60	

SEE SHEET OSM-30 FOR PROFILE **SITE M**

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

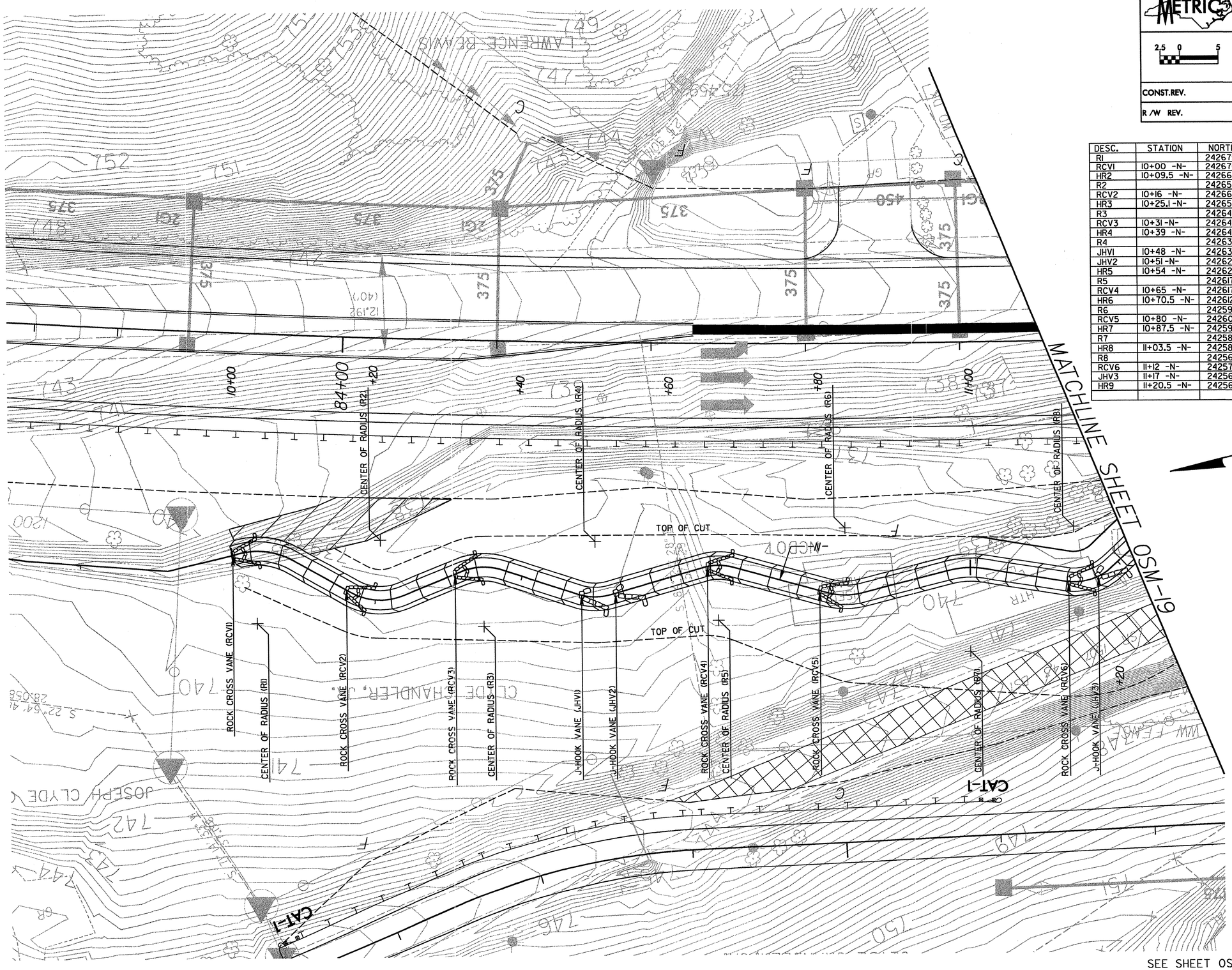
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-17-06



DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
R1		242675.510	295709.390		9.5
RCV1	10+00 -N-	242676.283	295718.859	738.25	
HR2	10+09.5 -N-	242667.883	295715.229	738.02	
R2		242657.292	295715.834		7.8
RCV2	10+16 -N-	242663.212	295710.709	737.88	
HR3	10+25.1 -N-	242654.895	295708.284	737.63	
R3		242647.205	295701.436		7.8
RCV3	10+31 -N-	242649.047	295709.060	737.50	
HR4	10+39 -N-	242641.564	295707.082	737.29	
R4		242630.419	295708.478		7.2
JHV1	10+48 -N-	242633.894	295702.255	736.96	
JHV2	10+51 -N-	242629.561	295701.272	736.96	
HR5	10+54 -N-	242628.154	295701.337	736.92	
R5		242617.572	295694.426		7.2
RCV4	10+65 -N-	242617.158	295701.614	736.72	
HR6	10+70.5 -N-	242612.114	295699.591	736.52	
R6		242598.637	295701.869		8.7
RCV5	10+80 -N-	242603.882	295694.850	736.31	
HR7	10+87.5 -N-	242596.725	295693.154	736.10	
R7		242587.027	295682.079		11
HR8	11+03.5 -N-	242581.002	295691.446	735.71	
R8		242569.921	295694.436		7.2
RCV6	11+12 -N-	242572.375	295687.701	735.53	
JHV3	11+17 -N-	242568.463	295687.387	735.35	
HR9	11+20.5 -N-	242565.167	295688.814	735.29	

SEE SHEET OSM-31 FOR PROFILE

SITE N

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

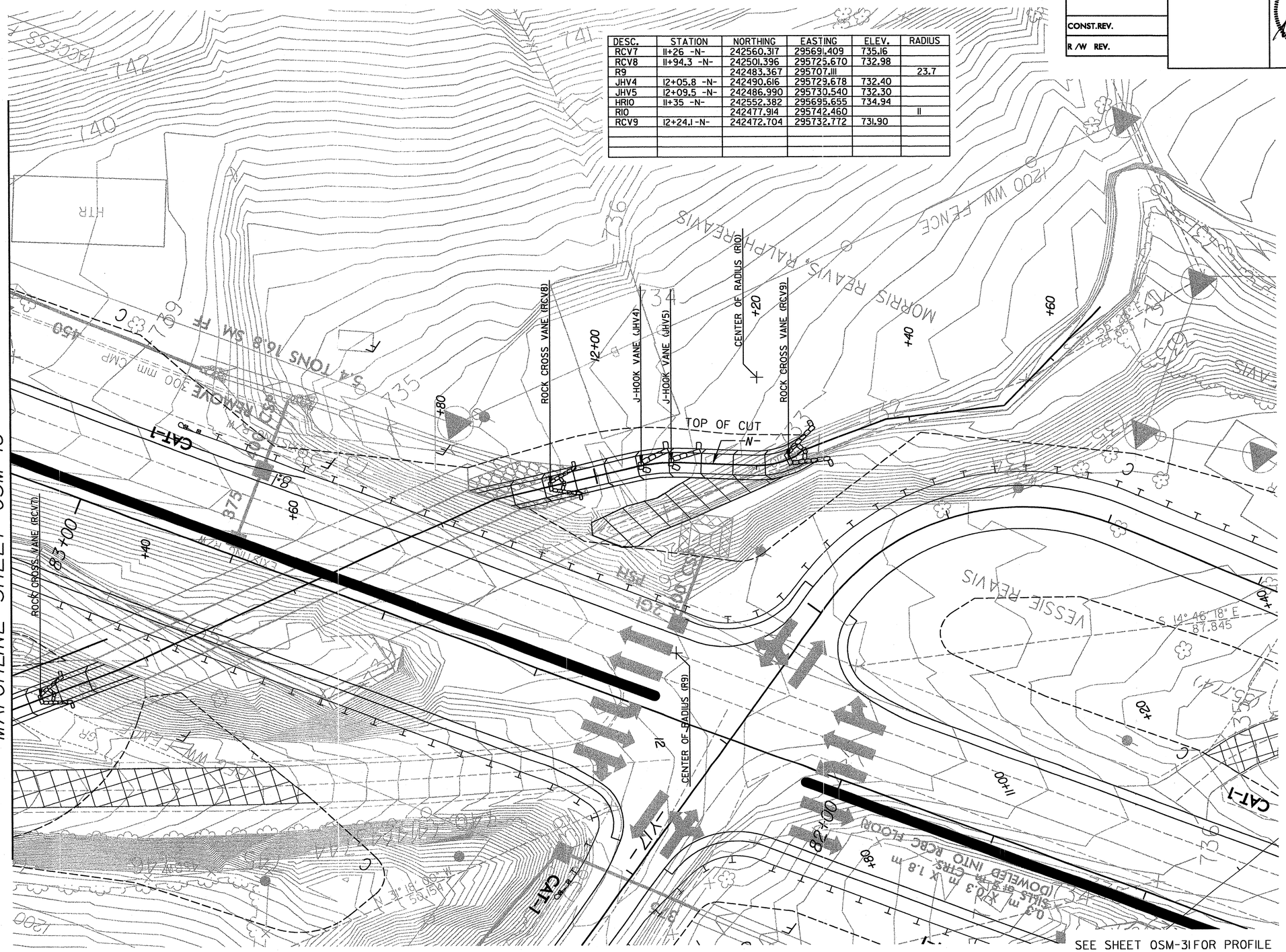
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021761 ENGINEER GRANT GINN

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCV7	11+26 -N-	242560.317	295691.409	735.16	
RCV8	11+94.3 -N-	242501.396	295725.670	732.98	
R9		242483.367	295707.111		23.7
JHV4	12+05.8 -N-	242490.616	295729.678	732.40	
JHV5	12+09.5 -N-	242486.990	295730.540	732.30	
HR10	11+35 -N-	242552.382	295695.655	734.94	
R10		242477.914	295742.460		11
RCV9	12+24.1 -N-	242472.704	295732.772	731.90	



SEE SHEET OSM-31 FOR PROFILE

SITE N

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

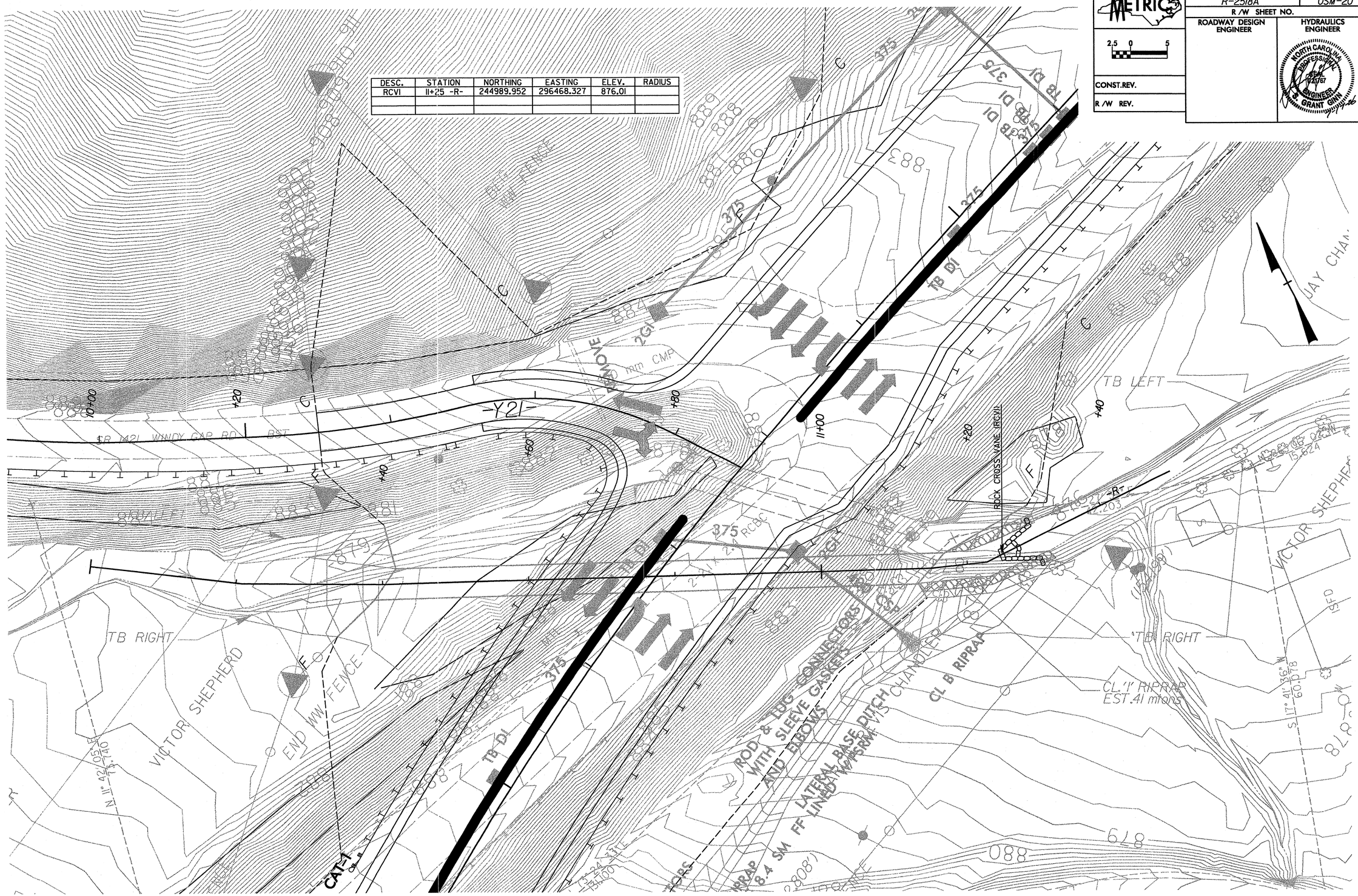
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN

DESC.	STATION	NORTHING	EASTING	ELEV.	RADIUS
RCVI	11+25 -R-	244989.952	296468.327	876.01	



SEE SHEET OSM-32 FOR PROFILE

SITE R

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-21

METRIC

2.5 0 5

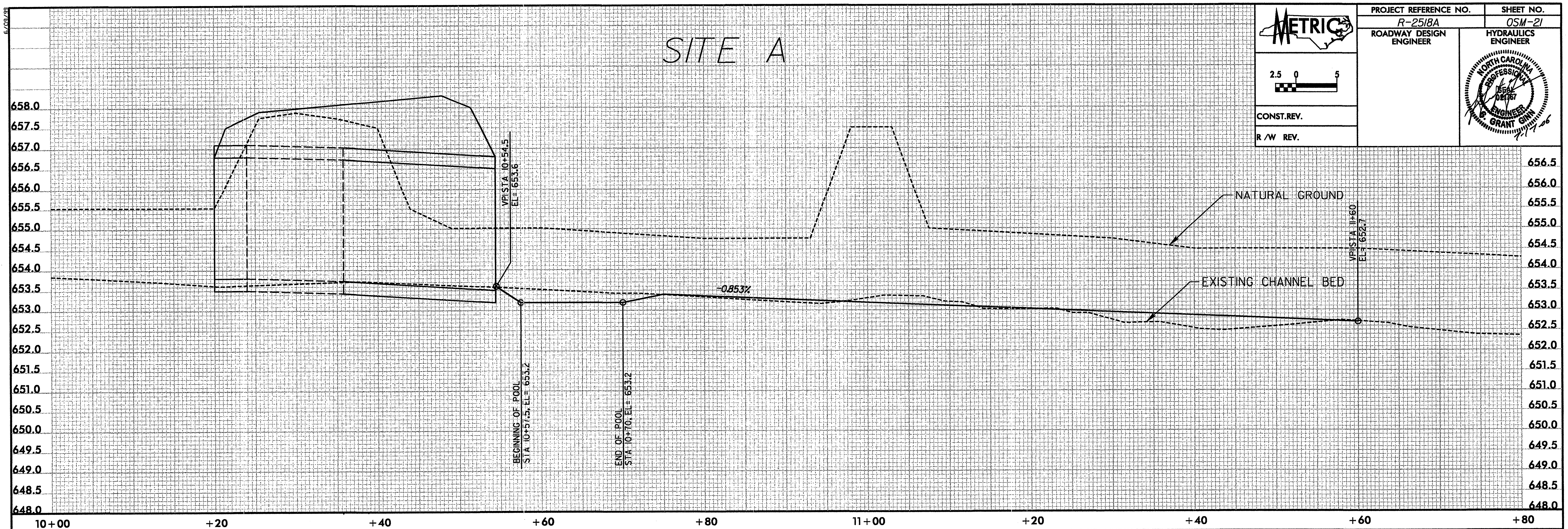
CONST.REV.

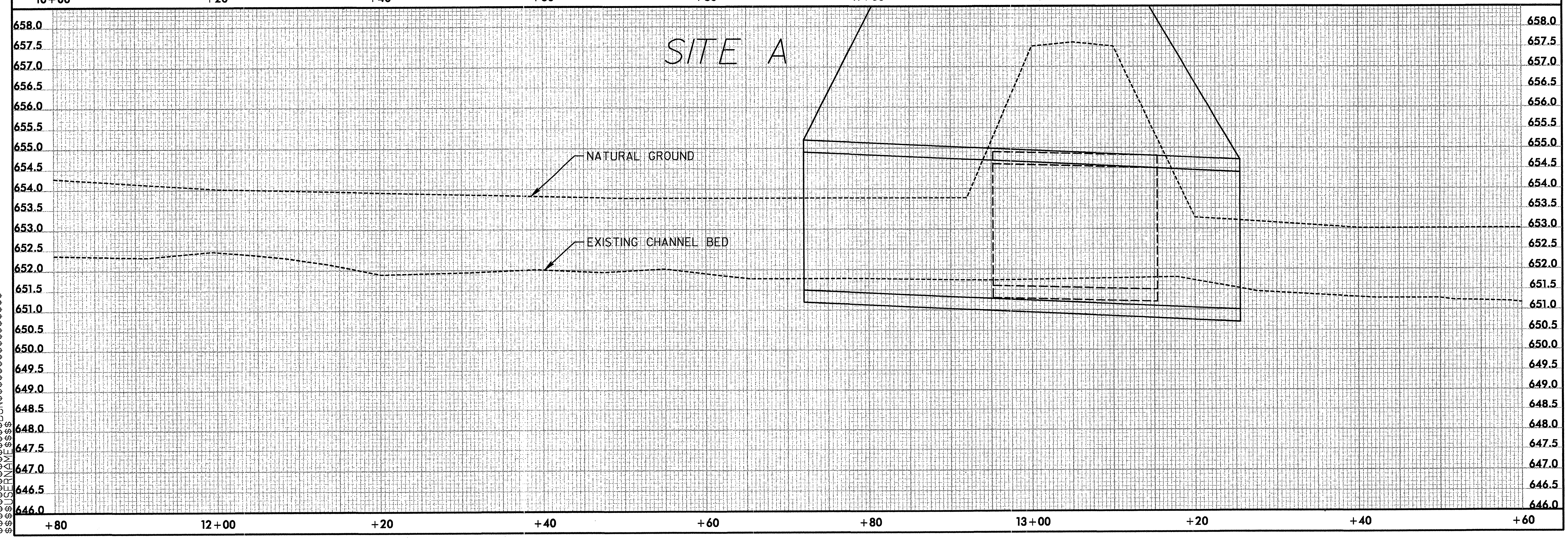
R /W REV.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER G. GRANT GINN 7-17-06





6/09/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

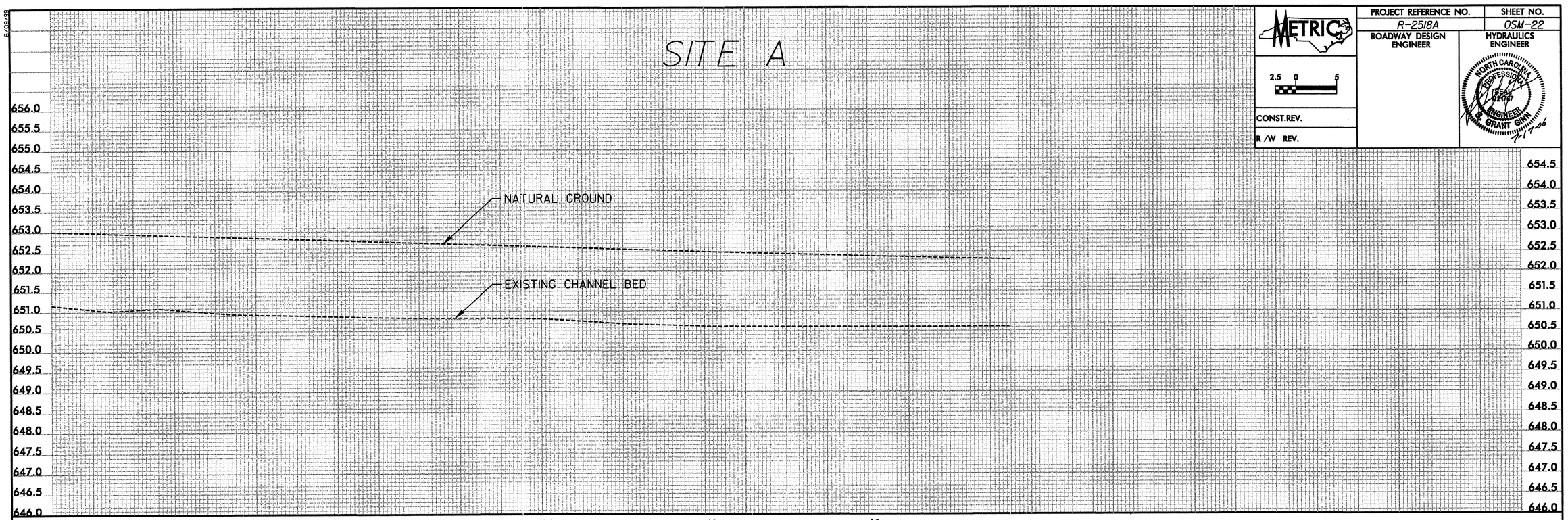
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 21787 ENGINEER GRANT GINN 7/7/06

SITE A



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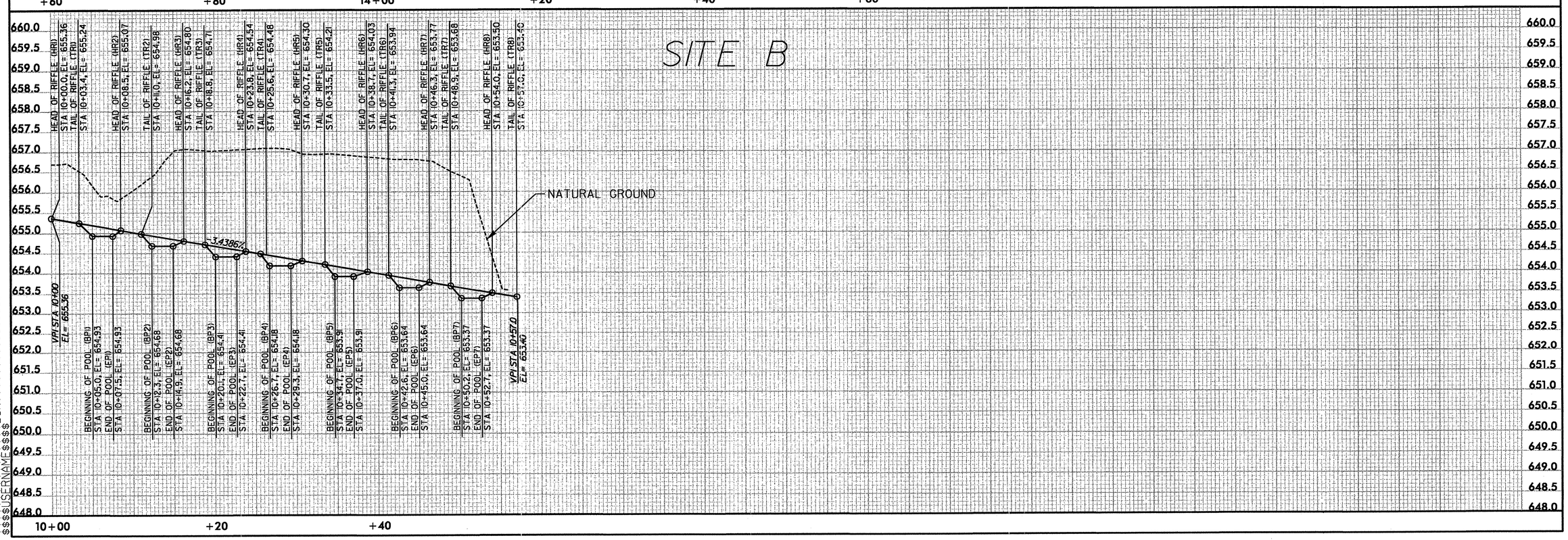

5/09/99

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$$$$DGN$$$$
$$$$USERNAME$$$$

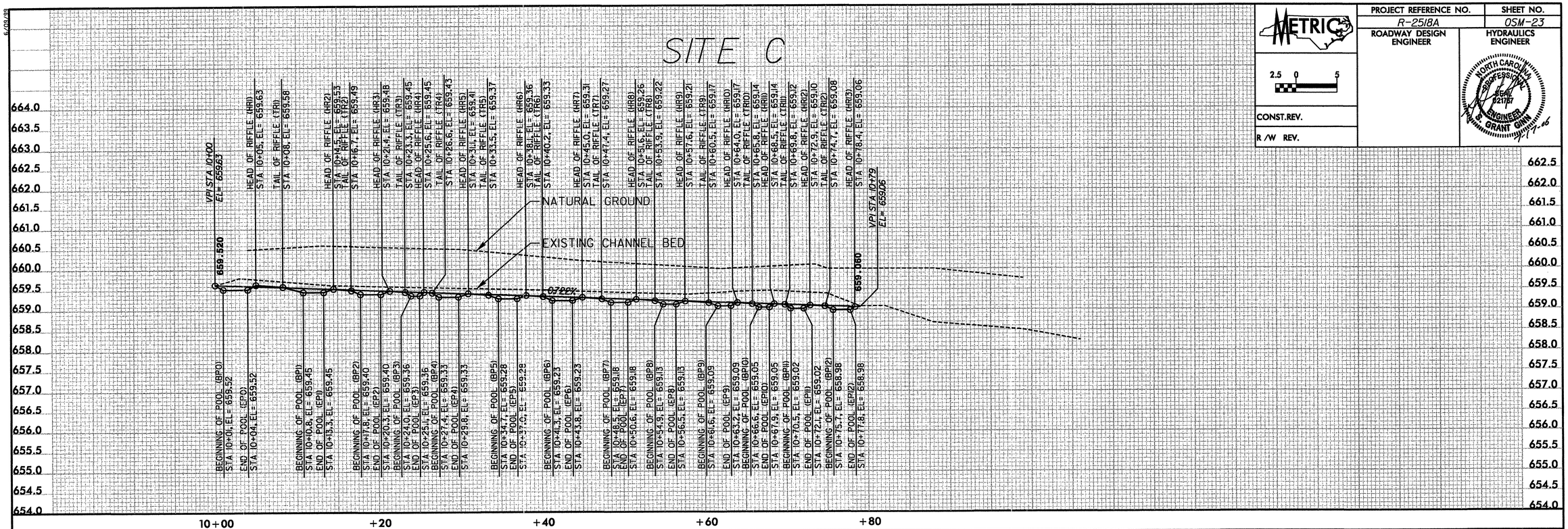
PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

2.5 0 5

CONST.REV.

R/W REV.



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PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

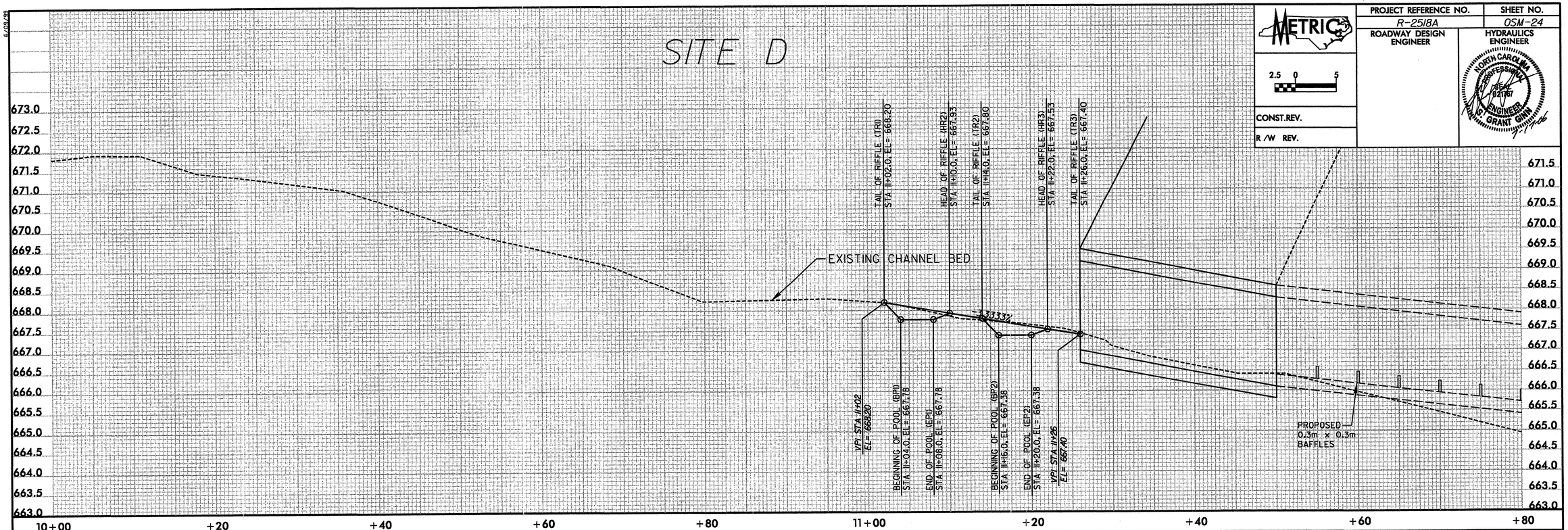
METRIC

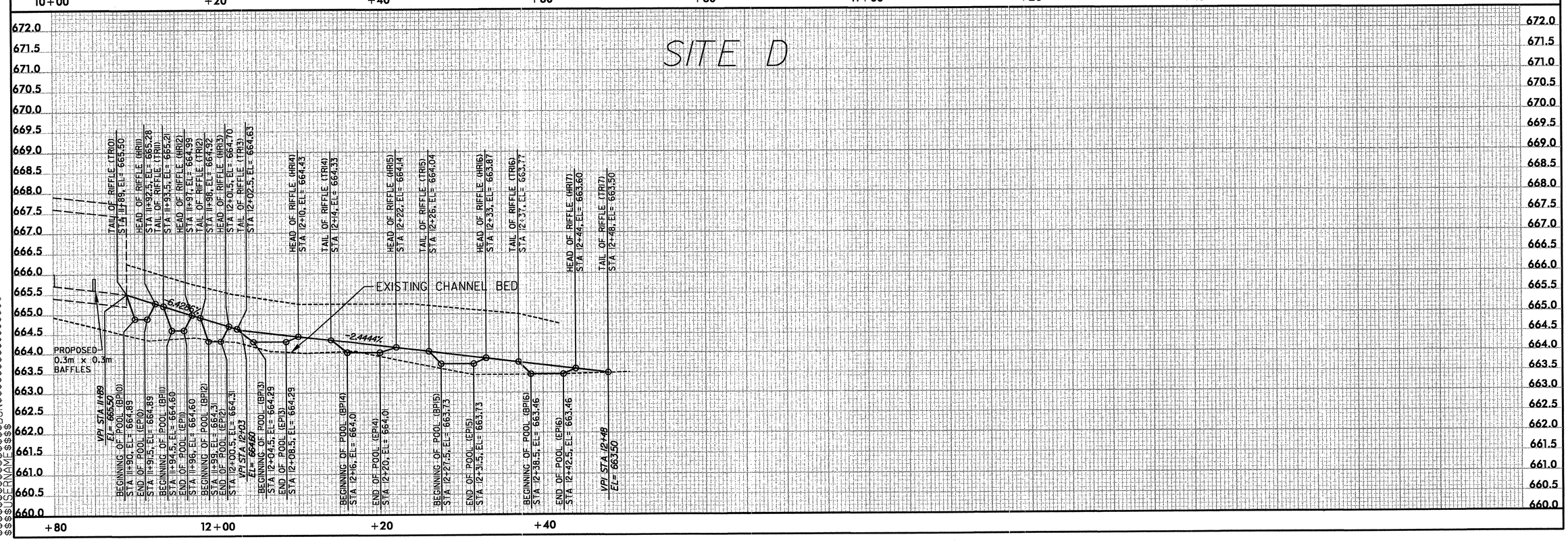
2.5 0 5

CONST.REV.

R /W REV.

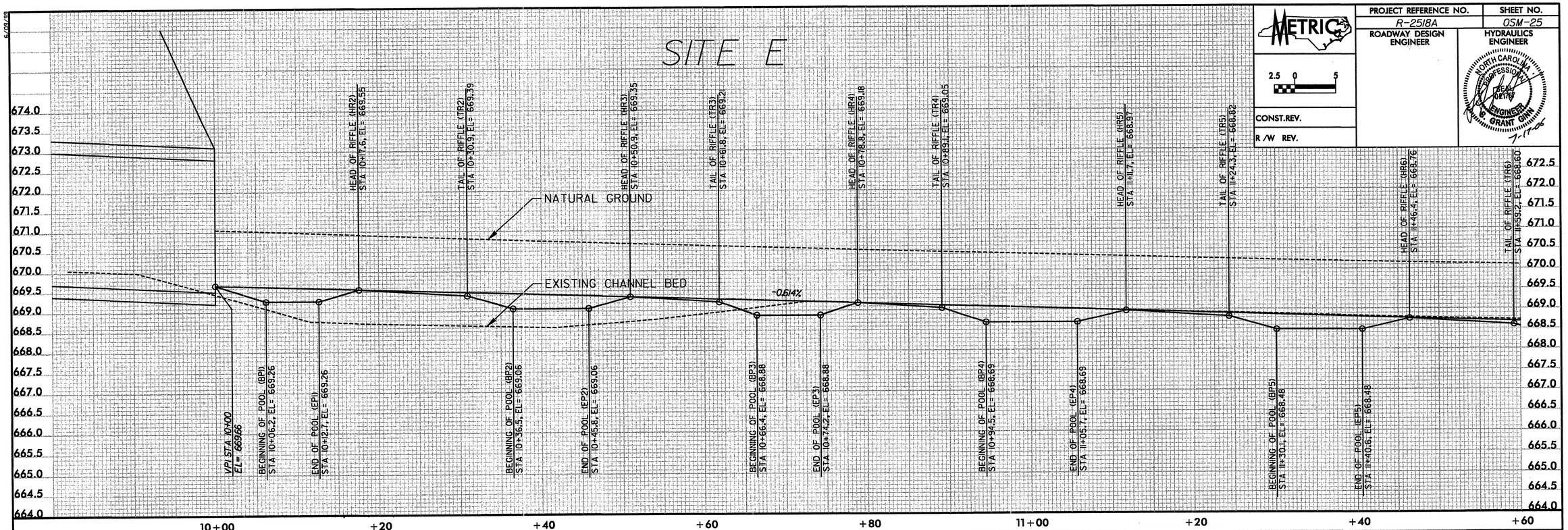
NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER GRANT GINN

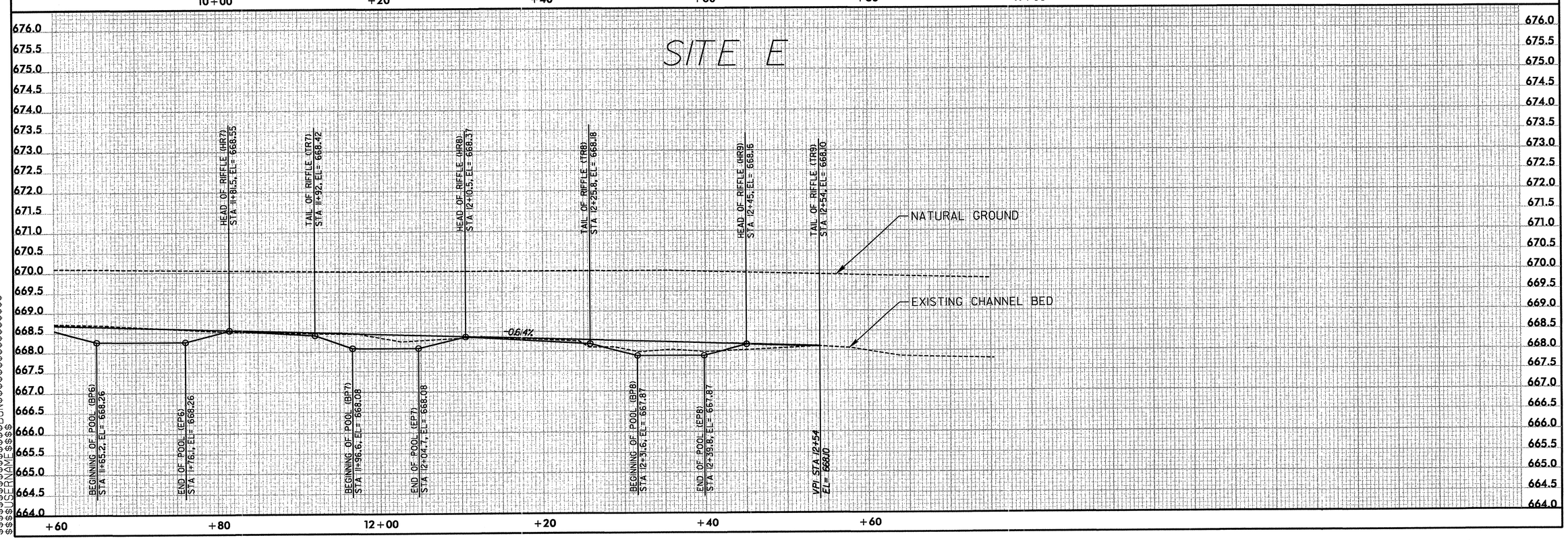




6/09/99
$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

METRIC	PROJECT REFERENCE NO.	SHEET NO.
2.5 0 5	R-2518A	OSM-25
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.		NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN 7-17-06





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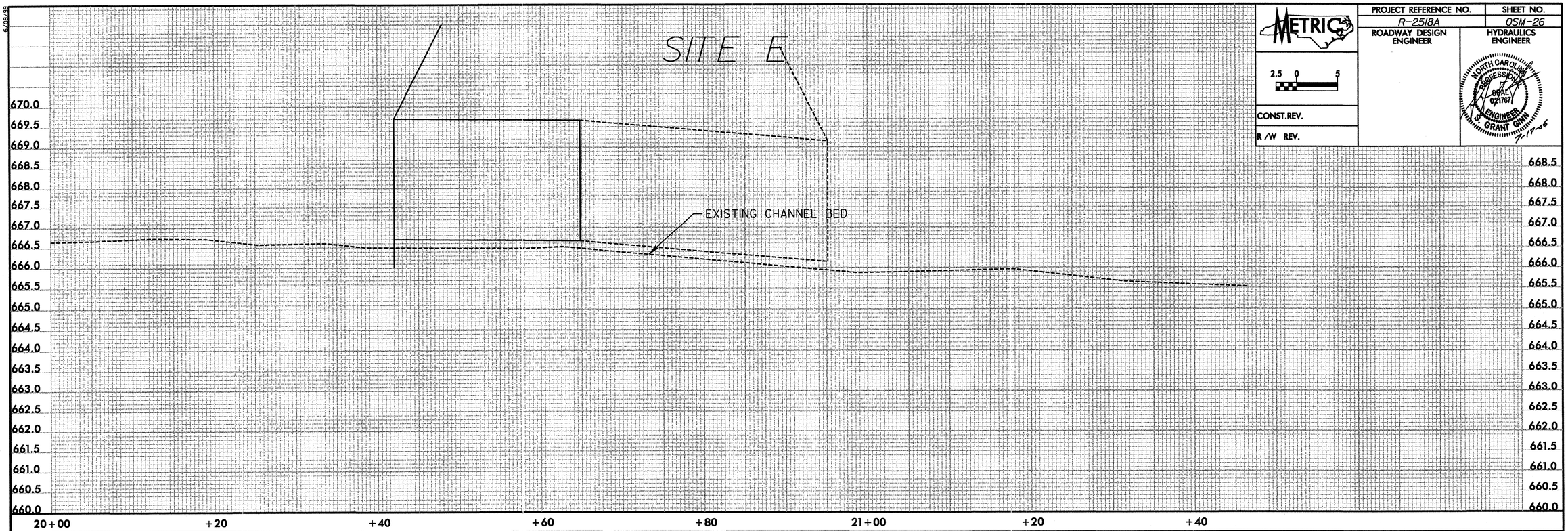
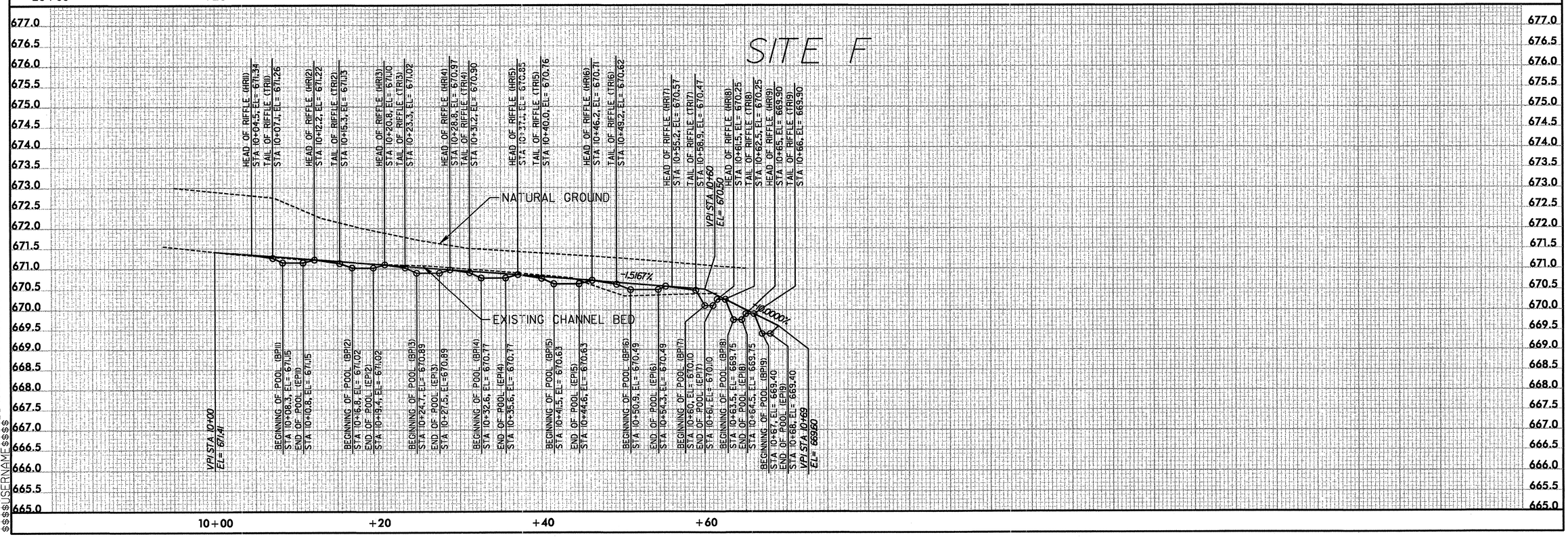
$$$$$$$$DGN$$$$$$$$
$$$$$$$$USERNAME$$$$

METRIC	PROJECT REFERENCE NO.	SHEET NO.
2.5 0 5	R-2518A	OSM-26
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.		NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER J. GRANT GINN 7/17/06





$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

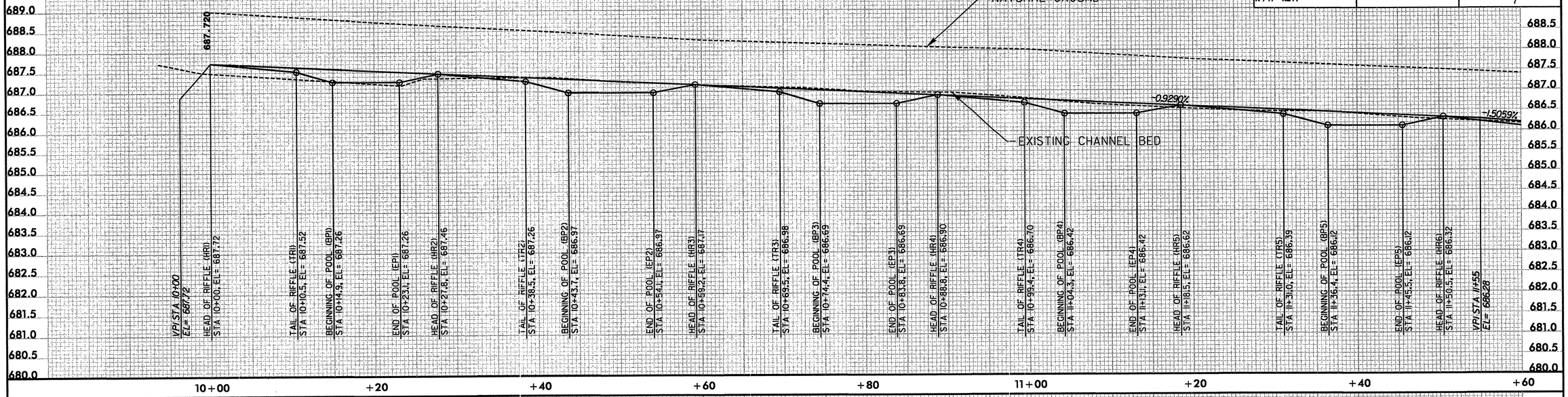
METRIC

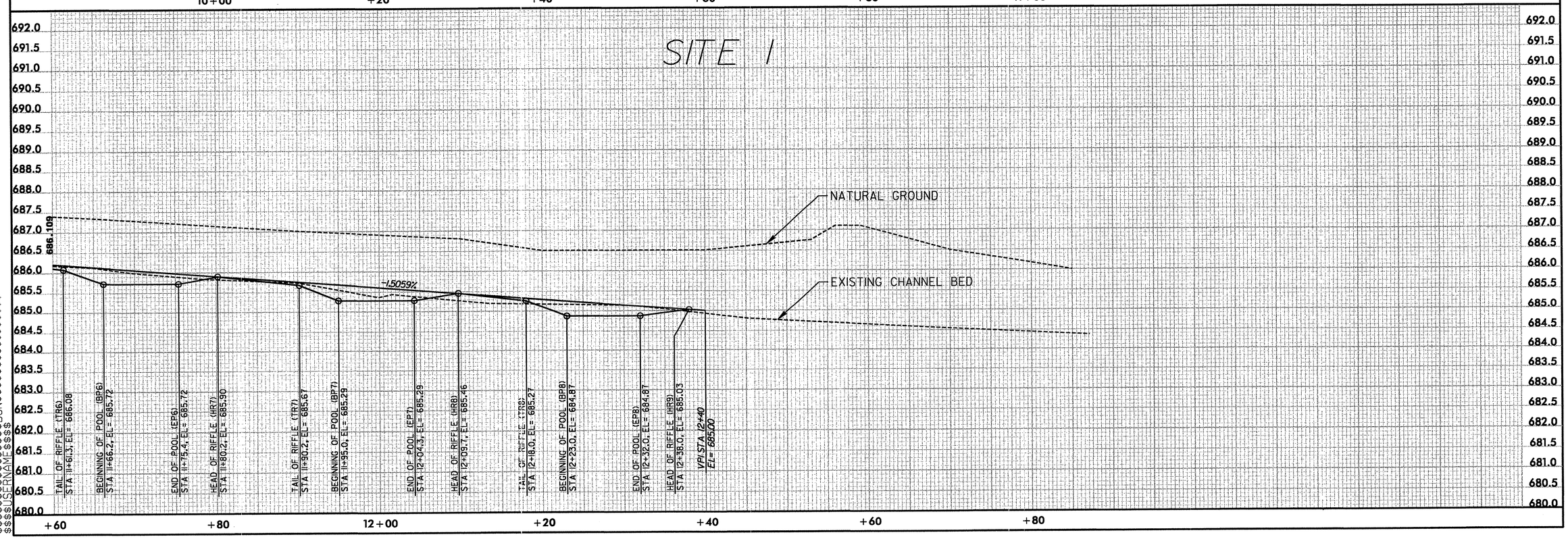
2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 21161 ENGINEER GRANT GINN 7-17-06





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$$$$DGN$$$$
$$$$USERNAME$$$$

6/09/99
METRIC
PROJECT REFERENCE NO. R-2518A
SHEET NO. OSM-28
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER S. GRANT GINN
7-7-06
2.5 0 5
CONST.REV.
R /W REV.
SITE J
HEAD OF RIFFLE (HR1) STA 10+00, EL= 692.92
TAIL OF RIFFLE (TR1) STA 10+04, EL= 692.84
HEAD OF RIFFLE (HR2) STA 10+12.7, EL= 692.75
TAIL OF RIFFLE (TR2) STA 10+16.6, EL= 692.67
HEAD OF RIFFLE (HR3) STA 10+22.3, EL= 692.62
TAIL OF RIFFLE (TR3) STA 10+26.1, EL= 692.54
HEAD OF RIFFLE (HR4) STA 10+34.2, EL= 692.46
TAIL OF RIFFLE (TR4) STA 10+38.1, EL= 692.38
HEAD OF RIFFLE (HR5) STA 10+44.5, EL= 692.32
TAIL OF RIFFLE (TR5) STA 10+47.7, EL= 692.25
HEAD OF RIFFLE (HR6) STA 10+54.2, EL= 692.18
TAIL OF RIFFLE (TR6) STA 10+57.9, EL= 692.11
HEAD OF RIFFLE (HR7) STA 10+66.3, EL= 692.02
TAIL OF RIFFLE (TR7) STA 10+69.9, EL= 691.95
HEAD OF RIFFLE (HR8) STA 10+76.4, EL= 691.88
TAIL OF RIFFLE (TR8) STA 10+80.2, EL= 691.81
HEAD OF RIFFLE (HR9) STA 10+87.0, EL= 691.74
TAIL OF RIFFLE (TR9) STA 10+90.2, EL= 691.68
HEAD OF RIFFLE (HR10) STA 10+97.0, EL= 691.61
TAIL OF RIFFLE (TR10) STA 11+00.3, EL= 691.54
HEAD OF RIFFLE (HR11) STA 11+06.7, EL= 691.47
TAIL OF RIFFLE (TR11) STA 11+09.9, EL= 691.41
HEAD OF RIFFLE (HR12) STA 11+16.3, EL= 691.34
TAIL OF RIFFLE (TR12) STA 11+18.9, EL= 691.29
HEAD OF RIFFLE (HR13) STA 11+26.3, EL= 691.21
TAIL OF RIFFLE (TR13) STA 11+30.2, EL= 691.13
HEAD OF RIFFLE (HR14) STA 11+37.0, EL= 691.06
TAIL OF RIFFLE (TR14) STA 11+40.9, EL= 690.98
HEAD OF RIFFLE (HR15) STA 11+47.3, EL= 690.92
TAIL OF RIFFLE (TR15) STA 11+51.4, EL= 690.84
HEAD OF RIFFLE (HR16) STA 11+56.2, EL= 690.80
TAIL OF RIFFLE (TR16) STA 11+59.9, EL= 690.73
NATURAL GROUND
EXISTING CHANNEL BED
-1.355%
VPI STA 10+00 EL= 692.92
BEGINNING OF POOL (BP1) STA 10+05.9, EL= 692.63
END OF POOL (EP1) STA 10+10.6, EL= 692.63
BEGINNING OF POOL (BP2) STA 10+18.2, EL= 692.49
END OF POOL (EP2) STA 10+20.7, EL= 692.49
BEGINNING OF POOL (BP3) STA 10+28.1, EL= 692.33
END OF POOL (EP3) STA 10+32.2, EL= 692.33
BEGINNING OF POOL (BP4) STA 10+39.8, EL= 692.19
END OF POOL (EP4) STA 10+42.9, EL= 692.19
BEGINNING OF POOL (BP5) STA 10+49.3, EL= 692.06
END OF POOL (EP5) STA 10+52.5, EL= 692.06
BEGINNING OF POOL (BP6) STA 10+59.9, EL= 691.90
END OF POOL (EP6) STA 10+64.3, EL= 691.90
BEGINNING OF POOL (BP7) STA 10+71.6, EL= 691.76
END OF POOL (EP7) STA 10+74.7, EL= 691.76
BEGINNING OF POOL (BP8) STA 10+82.0, EL= 691.61
END OF POOL (EP8) STA 10+85.4, EL= 691.61
BEGINNING OF POOL (BP9) STA 10+91.9, EL= 691.48
END OF POOL (EP9) STA 10+95.3, EL= 691.48
BEGINNING OF POOL (BP10) STA 11+01.9, EL= 691.35
END OF POOL (EP10) STA 11+05.1, EL= 691.35
BEGINNING OF POOL (BP11) STA 11+11.5, EL= 691.21
END OF POOL (EP11) STA 11+14.8, EL= 691.21
BEGINNING OF POOL (BP12) STA 11+20.5, EL= 691.08
END OF POOL (EP12) STA 11+24.4, EL= 691.08
BEGINNING OF POOL (BP13) STA 11+31.9, EL= 690.94
END OF POOL (EP13) STA 11+35.2, EL= 690.94
BEGINNING OF POOL (BP14) STA 11+42.6, EL= 690.80
END OF POOL (EP14) STA 11+45.5, EL= 690.80
BEGINNING OF POOL (BP15) STA 11+52.9, EL= 690.67
END OF POOL (EP15) STA 11+54.7, EL= 690.67
695.0 694.5 694.0 693.5 693.0 692.5 692.0 691.5 691.0 690.5 690.0 689.5 689.0 688.5 688.0 687.5 687.0 686.5 686.0
10+00 +20 +40 +60 +80 11+00 +20 +40 +60
SITE J
HEAD OF RIFFLE (HR17) STA 11+67.7, EL= 690.65
TAIL OF RIFFLE (TR17) STA 11+71.1, EL= 690.58
VPI STA 11+75.63 EL= 690.54
NATURAL GROUND
HEAD OF RIFFLE (HR19) STA 12+11.0, EL= 690.33
TAIL OF RIFFLE (TR19) STA 12+14.3, EL= 690.29
HEAD OF RIFFLE (HR20) STA 12+20.3, EL= 690.27
TAIL OF RIFFLE (TR20) STA 12+23.6, EL= 690.23
HEAD OF RIFFLE (HR21) STA 12+29.6, EL= 690.21
TAIL OF RIFFLE (TR21) STA 12+33.7, EL= 690.16
HEAD OF RIFFLE (HR22) STA 12+41.6, EL= 690.14
EXISTING CHANNEL BED
-0.6061%
-0.606%
BEGINNING OF POOL (BP16) STA 11+61.9, EL= 690.52
END OF POOL (EP16) STA 11+65.8, EL= 690.52
BEGINNING OF POOL (BP17) STA 11+72.6, EL= 690.39
END OF POOL (EP17) STA 11+75.6, EL= 690.39
BEGINNING OF POOL (BP18) STA 12+06.0, EL= 690.19
END OF POOL (EP18) STA 12+09.3, EL= 690.19
BEGINNING OF POOL (BP19) STA 12+16.0, EL= 690.13
END OF POOL (EP19) STA 12+19.3, EL= 690.13
BEGINNING OF POOL (BP20) STA 12+25.3, EL= 690.07
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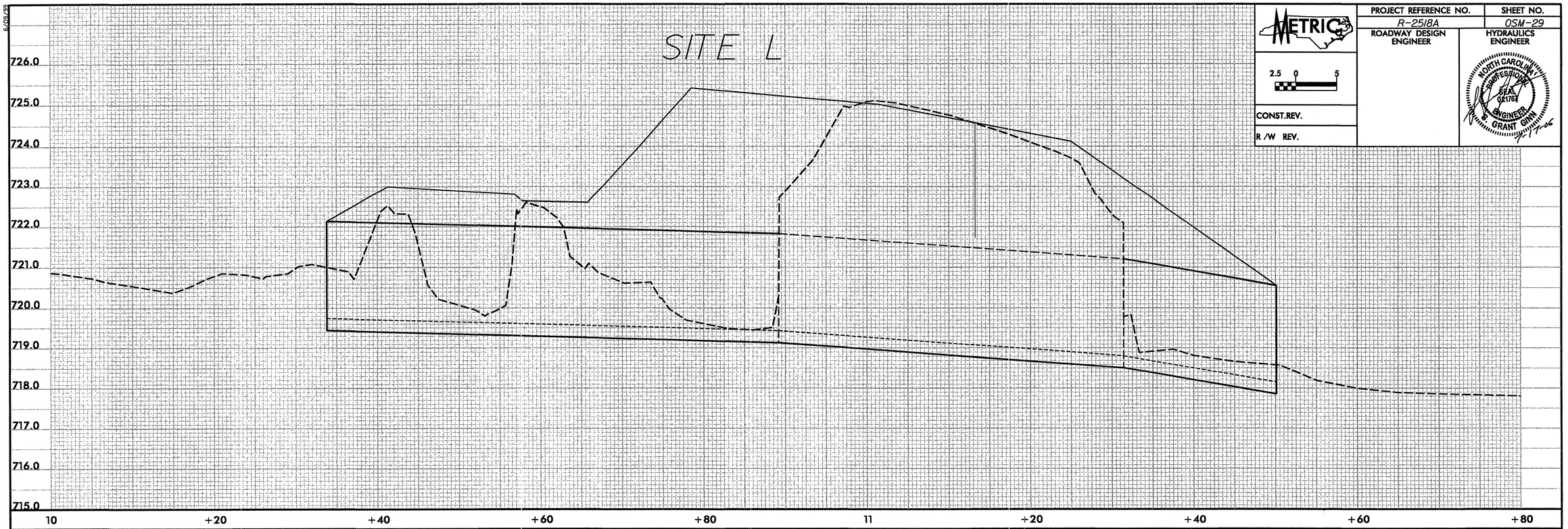
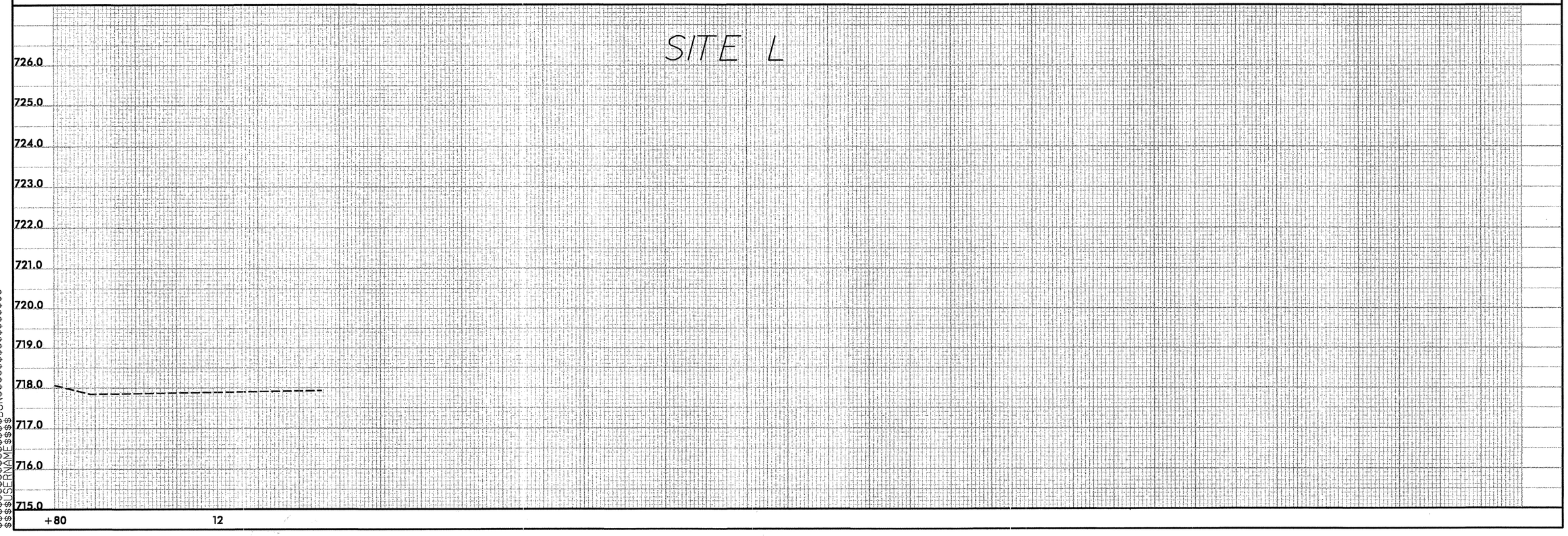
BEGINNING OF POOL (BP21) STA 12+35.6, EL= 690.01
END OF POOL (EP21) STA 12+38.9, EL= 690.01
VPI STA 12+41.63 EL= 690.14
697.0 696.5 696.0 695.5 695.0 694.5 694.0 693.5 693.0 692.5 692.0 691.5 691.0 690.5 690.0 689.5 689.0 688.5 688.0 687.5 687.0 686.5 686.0 685.5 685.0
+60 +80 12+00 +20
$$$$SYSTIME$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

6/09/99



METRIC 2.5 0 5	PROJECT REFERENCE NO.	SHEET NO.
	R-2518A	OSM-29
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.		NORTH CAROLINA PROFESSIONAL SEAL 021761 ENGINEER GRANT GINN 7/17/06



$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

6/19/98

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

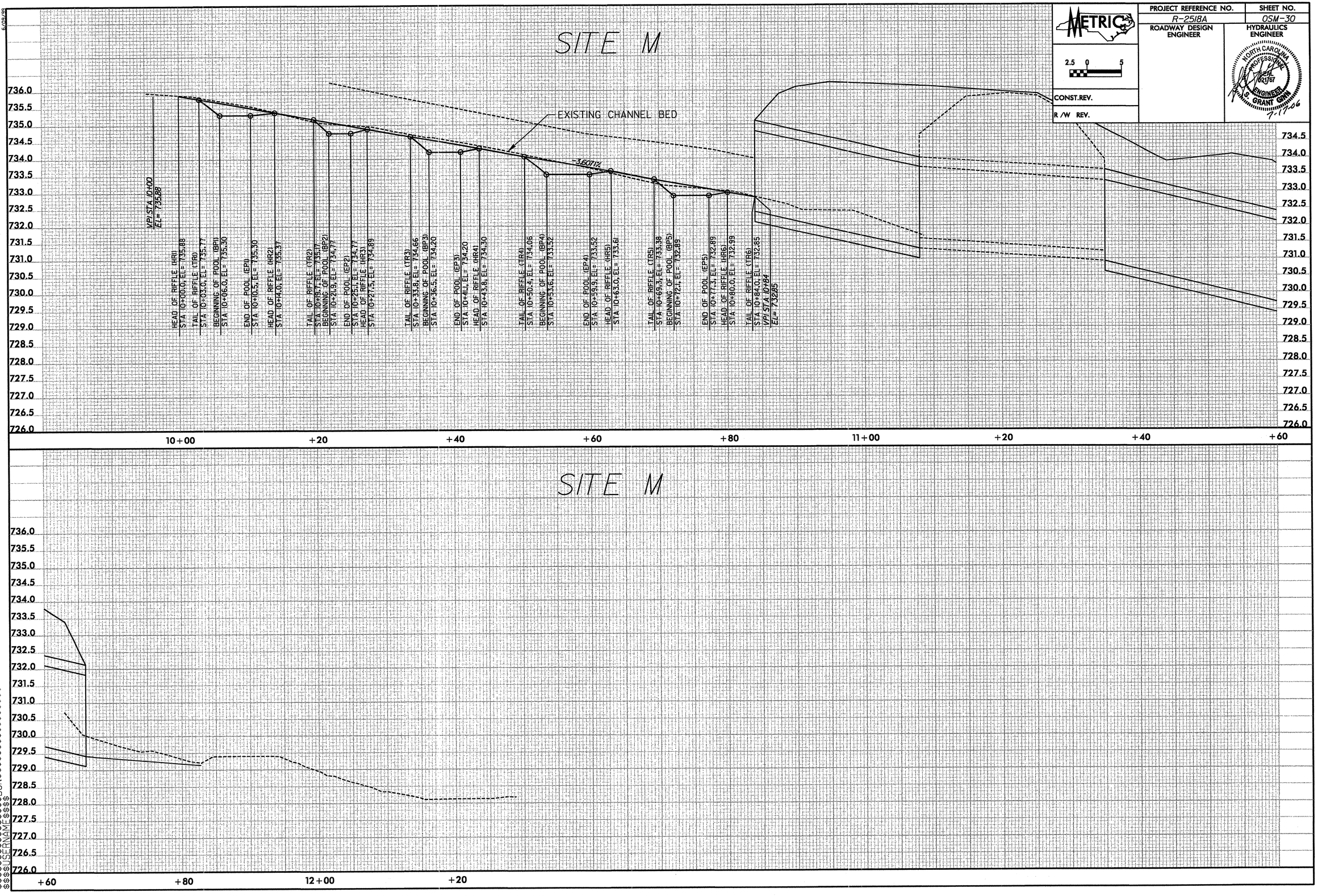
METRIC

2.5 0 5

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19267 J. GRANT GINN 7-17-06



$$$$SYSTIME$$$$DGN$$$$LSRNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2518A	OSM-31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

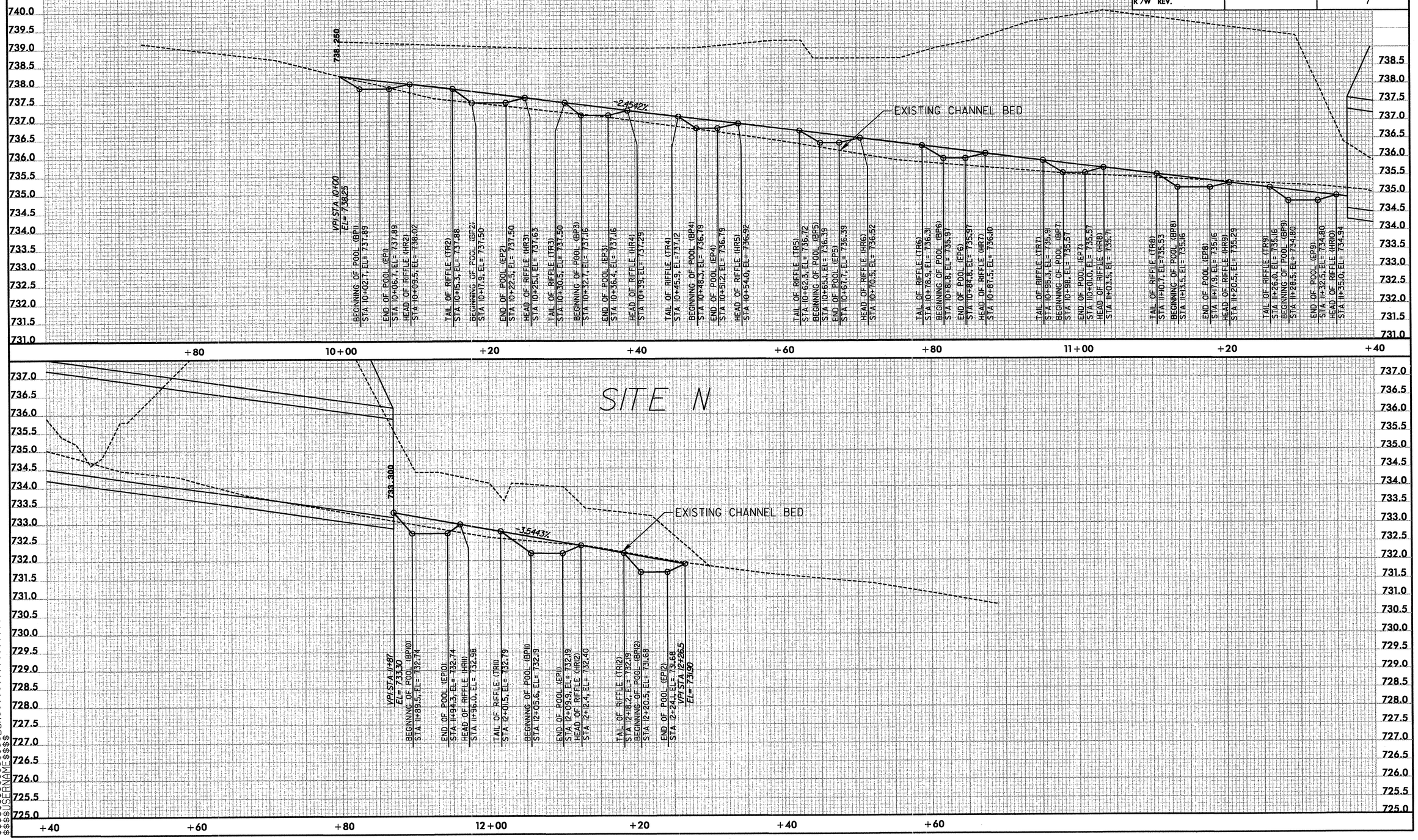
METRIC

2.5 0 5

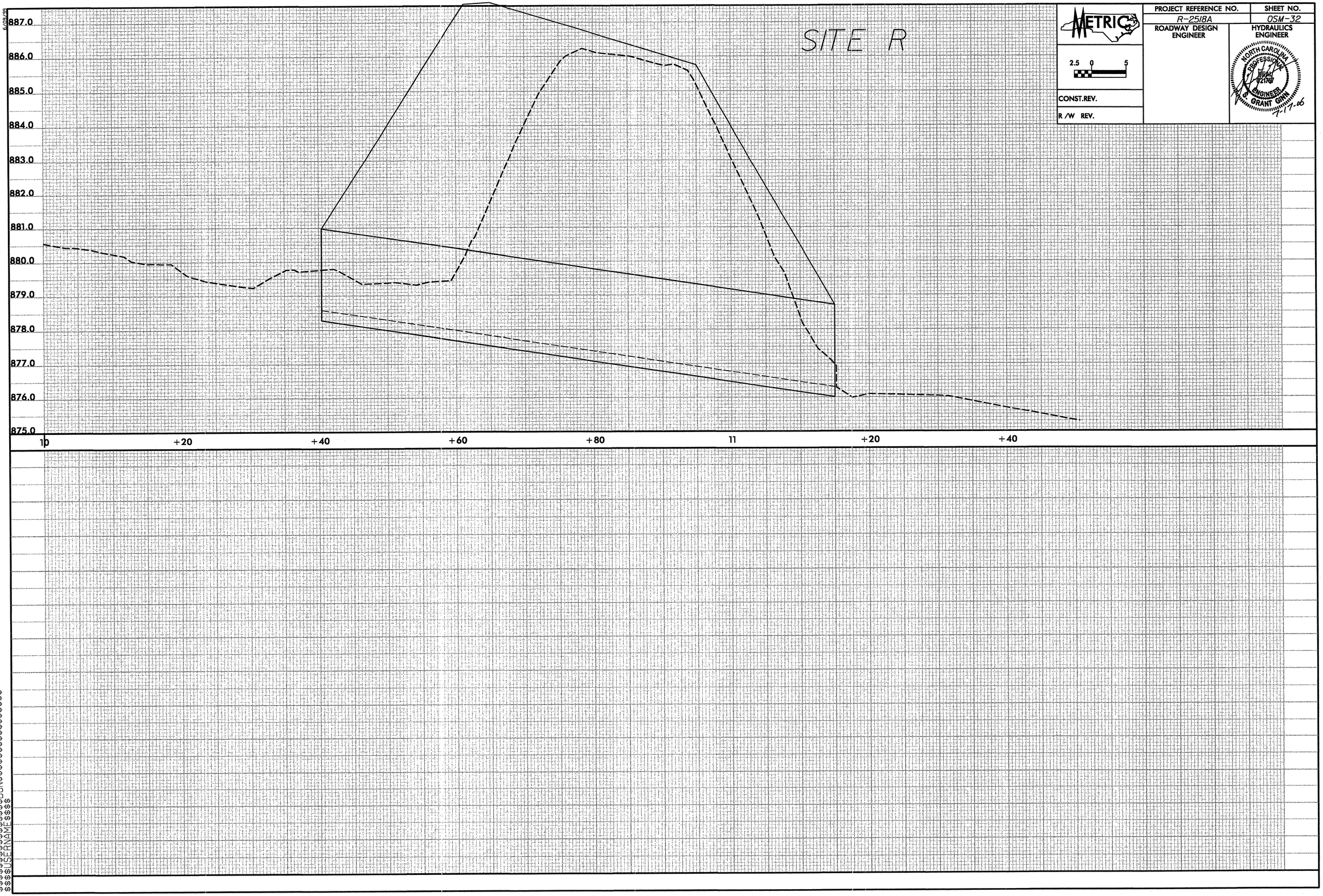
CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 021167 ENGINEER GRANT GINN 7-7-16



$$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$



SITE R
887.0
886.0
885.0
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876.0
875.0
10
+20
+40
+60
+80
11
+20
+40
METRIC
2.5 0 5
CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R-2518A
SHEET NO.
OSM-32
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 021767 ENGINEER GRANT GINN
7-17-06