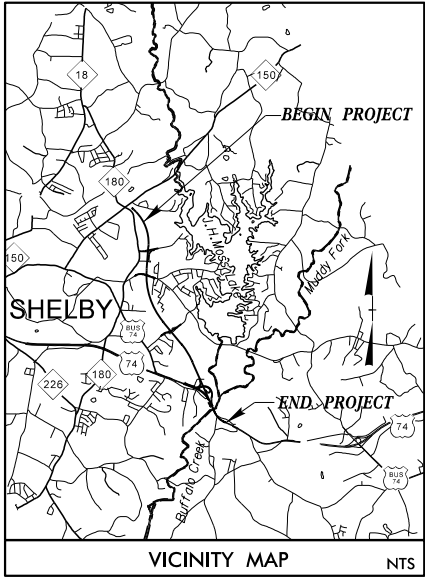


09/08/19

7/24/2018
c:\pw_working\0018711\R2707D_NEU.OSM-01.TSH.dgn
jodjackson

TIP PROJECT: R-2707D

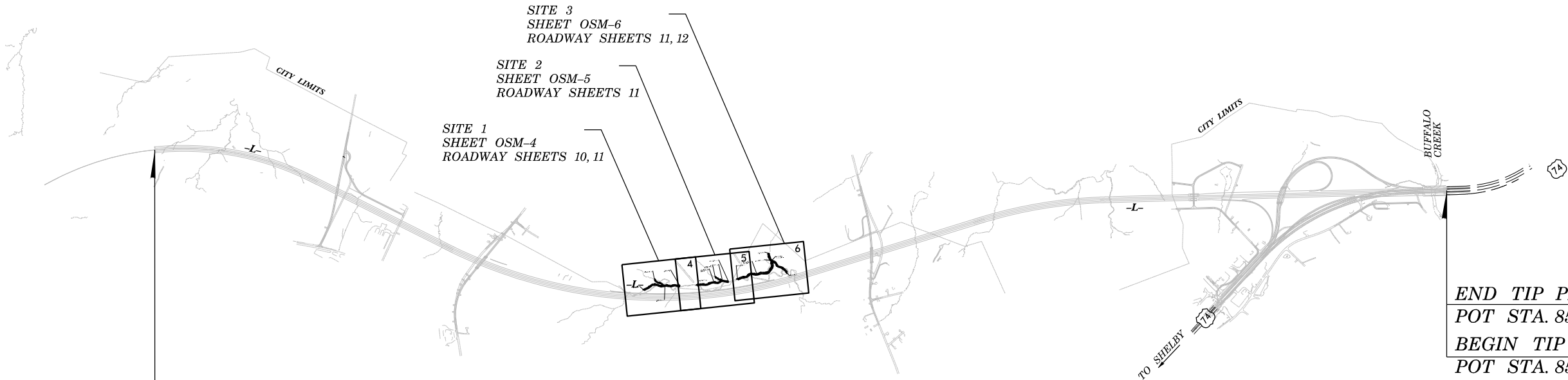
CONTRACT:



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

**PLAN FOR CHANNEL RELOCATION
CLEVELAND COUNTY**

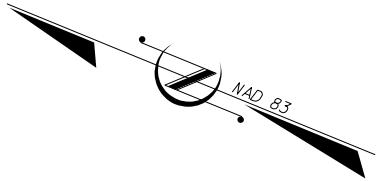
LOCATION: US 74, SHELBY BYPASS FROM EAST OF NC 150
TO EXISTING US 74, WEST OF SR 2238
(LONG BRANCH ROAD)
TYPE OF WORK: STREAM RELOCATION



END TIP PROJECT R-2707C
POC STA. 635+00.00 -L-

BEGIN TIP PROJECT R-2707D
POC STA. 635+00.00 -L-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707D	OSM-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34497.1.F56	N/A	P.E.	
34497.1.F56	N/A	R/W & UTIL	



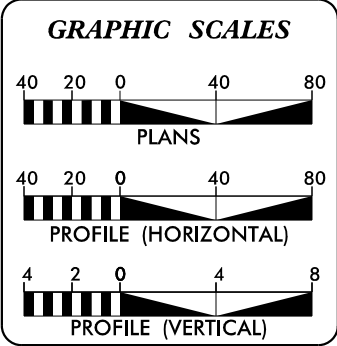
END TIP PROJECT R-2707D
POT STA. 851+00.00 -L-

BEGIN TIP PROJECT R-2707E
POT STA. 851+00.00 -L-

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DESIGN DATA

PROJECT LENGTH

MITIGATION SITE	MITIGATION TYPE	LENGTH
SITE 1	RELOCATION	820LF
SITE 2	RELOCATION	664LF
SITE 3	RELOCATION	1201LF



PREPARED IN THE OFFICE OF:
STANTEC CONSULTING
801 Jones Franklin Road | Suite 300 | Raleigh, NC 27606
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License No. P-0072

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 2018

LETTING DATE:
AUGUST 2019

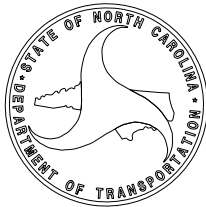
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

THAD DUNCAN, P.E.
NCDOT DIVISION 12

DESIGN ENGINEER

SIGNATURE: P.E.



GENERAL NOTES

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

- A) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2018, AND ANY SUPPLEMENTS THERETO ISSUED PRIOR TO THE DATE OF RECEIPT OF BIDS.
- B) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "ROADWAY STANDARD DRAWINGS, ENGLISH" DATED JANUARY 2018, AND ANY SUPPLEMENTS ISSUED THERETO PRIOR TO THE DATE OF RECEIPT OF BIDS.

ALL RIGHT OF WAY CORNER MARKERS OR FENCING SHALL BE PLACED BY OTHERS AS NECESSARY.

THE CONTRACTOR IS RESPONSIBLE FOR AVOIDING ANY DISTURBANCE OR DAMAGE TO EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR IMMEDIATELY REPAIRING ANY DAMAGES AT A COST INCIDENT TO THIS CONTRACT.

ABANDONED SECTIONS OF THE EXISTING CHANNEL SHALL BE FILLED TO THE MAXIMUM EXTENT FEASIBLE WITH MATERIAL EXCAVATED ON-SITE. THIS EXCAVATED MATERIAL SHALL BE STOCKPILED ADJACENT TO THE REACHES OF CHANNEL OR DITCHES TO BE BACKFILLED.

THE PROPOSED STREAM RELOCATION SHALL BE CONSTRUCTED IN ACCORDANCE TO THE PROPOSED TYPICAL SECTIONS AND PROFILES, IN CONFORMANCE WITH THE PLANS.

SUBSURFACE PLANS: NO SUBSURFACE PLANS ARE AVAILABLE ON THE PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

ROADWAY STANDARD DRAWINGS

(REV. JANUARY 2018)

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - ROADWAY DESIGN UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 AND THE LATEST REVISION THERETO ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

CONSTRUCTION SEQUENCING

THIS STREAM RELOCATION PROJECT CONSISTS OF TWO REACHES (1 & 2) INCLUSIVE OF MULTIPLE DESIGNED SUB REACHES(1A,1B,1ATR1B,1BTR1B,2A,2B,2C). ONCE WORK BEGINS ON A STREAM REACH, THE CONTRACTOR MUST COMPLETE THAT REACH BEFORE MOVING WORK CREWS AND EQUIPMENT TO A DIFFERENT REACH, UNLESS APPROVED TO DO SO BY THE ENGINEER.

PERFORM STAKEOUT SURVEY FOR THE PROPOSED STREAM CHANNEL, CONSTRUCTION EASEMENT LIMITS, AND GRADE STAKES. THE ENGINEER MUST INSPECT AND APPROVE ALL STAKEOUT WORK BEFORE CONSTRUCTION MAY BEGIN.

MOBILIZE EQUIPMENT AND MATERIALS TO THE SITE.

INSTALL CONSTRUCTION ENTRANCE PER EROSION CONTROL PLAN.(REFER TO ROADWAY CONSTRUCTION DRAWINGS)

ESTABLISH STAGING AREAS AND MARK CONSTRUCTION EQUIPMENT ACCESS LOCATIONS WITH VISIBLE MARKERS. CONSTRUCTION EQUIPMENT SHALL BE CONTAINED WITHIN THE LIMITS OF CONSTRUCTION AS DEPICTED IN THE PLANS OR SPECIFIED BY THE ENGINEER.

INSTALL TEMPORARY EROSION CONTROL MEASURES.

BEGIN FLOODPLAIN GRADING, INCLUDING EXCAVATION OF BANKFULL BENCHES AT LOCATIONS DEPICTED IN THE PLANS AND AS DIRECTED BY THE ENGINEER. STOCKPILE MATERIALS ONLY WITHIN APPROVED LIMITS OF DISTURBANCE AS DESIGNATED ON THE EROSION CONTROL PLANS(REFER TO ROADWAY CONSTRUCTION DRAWINGS). KEEP TOPSOIL SEPARATE FROM OTHER STOCKPILE MATERIAL FOR LATER USE IN FLOODPLAIN. FINISH GRADING AND REVEGETATION PREPARATION.

TOPSOIL SHALL BE EXCAVATED AND STOCKPILED SEPARATELY FROM THE WASTE MATERIAL SO THAT IT CAN BE PLACED BACK ON THE FLOODPLAIN ONCE GRADING IS COMPLETE. NO DIRECT PAYMENT WILL BE MADE FOR THIS EXCAVATION. OVER-EXCAVATE FLOODPLAIN AND FLOODPLAIN SLOPES TO A DEPTH OF 6" BELOW FINAL GRADE AND PLACE 6" OF TOPSOIL TO FILL TO FINAL GRADE. OVER-EXCAVATION SHOULD BEGIN 3' FROM TOP OF BANK AND EXTEND TO EXCAVATION LIMITS. SEE TYPICAL SECTIONS FOR DETAIL. INSTALL IMPERVIOUS DIKES AND PUMP AROUND SYSTEM TO PUMP STREAM DISCHARGE AROUND THE IMMEDIATE WORK AREA AS NECESSARY.

CONSTRUCTION SHALL PROCEED IN SUCCESSIVE REACHES WITH THE UPSTREAM REACH BEING COMPLETED PRIOR TO INITIATING CONSTRUCTION OF THE ADJACENT DOWNSTREAM REACH. EACH REACH SHALL BE LIMITED IN LENGTH TO WORK THAT CAN BE COMPLETED BEFORE ALLOWING WATER TO FLOW THROUGH THAT REACH. COMPLETION OF A REACH SHALL CONSIST OF CHANNEL CONSTRUCTION, FLOODPLAIN GRADING, IN-STREAM STRUCTURE INSTALLATION, BED MATERIAL INSTALLATION, AND EROSION CONTROL MEASURES. CONSTRUCTION SHALL BE DONE IN THE DRY, WITH THE CHANNEL FLOW PUMPED AROUND THE DEWATERED REACH UNDER CONSTRUCTION AS NECESSARY.

AT THE END OF EACH DAY'S CONSTRUCTION WORK, THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS AND COVER THE STREAM BANKS AND BANKFULL BENCHES WITH COIR FIBER MATTING TO THE EXTENT AS SHOWN ON PLANS. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY EROSION CONTROL MEASURES ON A DAILY BASIS THROUGHOUT THE CONSTRUCTION PROCESS.

ONCE NEW CHANNEL CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL INSTALL STREAM PLUGS TO DIRECT STREAM FLOW INTO THE NEW CHANNEL. THE CONTRACTOR SHALL THEN FILL IN THE ABANDONED SECTIONS OF THE EXISTING CHANNEL TO THE EXTENT FEASIBLE AND AS DIRECTED BY THE ENGINEER. CONTRACTOR WILL ENSURE THAT EITHER: 1) VEGETATION HAS BEEN ESTABLISHED ALONG THE BANKS OF THE NEW STREAM CHANNEL OR 2)BANKS HAVE BEEN FULLY MATTED,STEAKED AND PLANTED PER VEGETATION PLAN. FOR NEW STREAM CHANNEL REACHES WHERE THIS IS NOT POSSIBLE, THE CONTRACTOR SHOULD GET APPROVAL FROM THE ENGINEER BEFORE DIRECTING FLOW INTO THE NEW STREAM CHANNEL.

AFTER ALL IN-STREAM WORK IS COMPLETED, THE CONTRACTOR SHALL REMOVE TEMPORARY EROSION CONTROL MEASURES AND TEMPORARY STREAM ACCESS PER EROSION CONTROL PLAN (REFER TO ROADWAY CONSTRUCTION DRAWINGS). SCARIFY ANY COMPACTED AREAS AS DIRECTED BY THE ENGINEER. ALL PORTIONS OF THE SITE SHALL BE STABILIZED WITH TEMPORARY EROSION CONTROL MEASURES.

R-2707D
ON-SITE MITIGATION
CLEVELAND COUNTY



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PROJECT REFERENCE NO.

R2707D

SHEET NO.

OSM-1A

PROJECT ENGINEER

APPROVED BY:

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DATE:

INDEX OF SHEETS

OSM-1	TITLE SHEET
OSM-1A	INDEX OF SHEETS, CONSTRUCTION SEQUENCING, GENERAL NOTES
OSM-1B	CONVENTIONAL PLAN SHEET SYMBOLS
OSM-2 - OSM-2A	CHANNEL TYPICAL DETAIL
OSM-2B	DETAILS -COIR FIBER MATTING -ROCK CROSS VANE
OSM-2C	-CONSTRUCTED RIFFLE -WOOD TOE PROTECTION -ROCK ENERGY DISSIPATOR BASIN
OSM-2D	-STREAM PLUG -ROCK J-HOOK VANE -LOG VANE WITH ROCK J-HOOK
OSM-2E - OSM-2F	-MORPHOLOGICAL TABLES
OSM-3	SUMMARY OF QUANTITIES EARTHWORK SUMMARY
OSM-4 - OSM-6	PLAN SHEETS
OSM-7 - OSM-10	PROFILE SHEETS
OSM-11 - OSM-31	CROSS SECTIONS
RF-1	PLANTING DETAILS
RF-2 - RF-4	PLANTING PLAN SHEETS

STREAM SYMBOLS

PLAN VIEW SYMBOLS

	LOG VANE WITH ROCK J-HOOK		ROCK ENERGY DISSIPATOR BASIN
	WOOD TOE		CONSTRUCTED RIFFLE
	STREAM PLUG		BACKFILL EXISTING CHANNEL
	J-HOOK VANE		ROCK CROSS VANE
	FLOODPLAIN LINE		

PROFILE SYMBOLS

	EXISTING GROUND ELEVATION		PROPOSED ROCK CROSS VANE
	PROPOSED GROUND ELEVATION		
	PROPOSED BANKFULL		
	PROPOSED LOG VANE WITH ROCK J-HOOK		ROCK J-HOOK VANE
	CONSTRUCTED RIFFLE		

PLANTING SYMBOLS

	TYPE I		TYPE II
--	--------	--	---------

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	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
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	
Proposed Right of Way Line with Iron Pin and Cap Marker	
Proposed Right of Way Line with Concrete or Granite Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	
Proposed Temporary Construction Easement	
Proposed Temporary Drainage Easement	
Proposed Permanent Drainage Easement	
Proposed Permanent Utility Easement	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Wheel Chair Ramp	
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	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

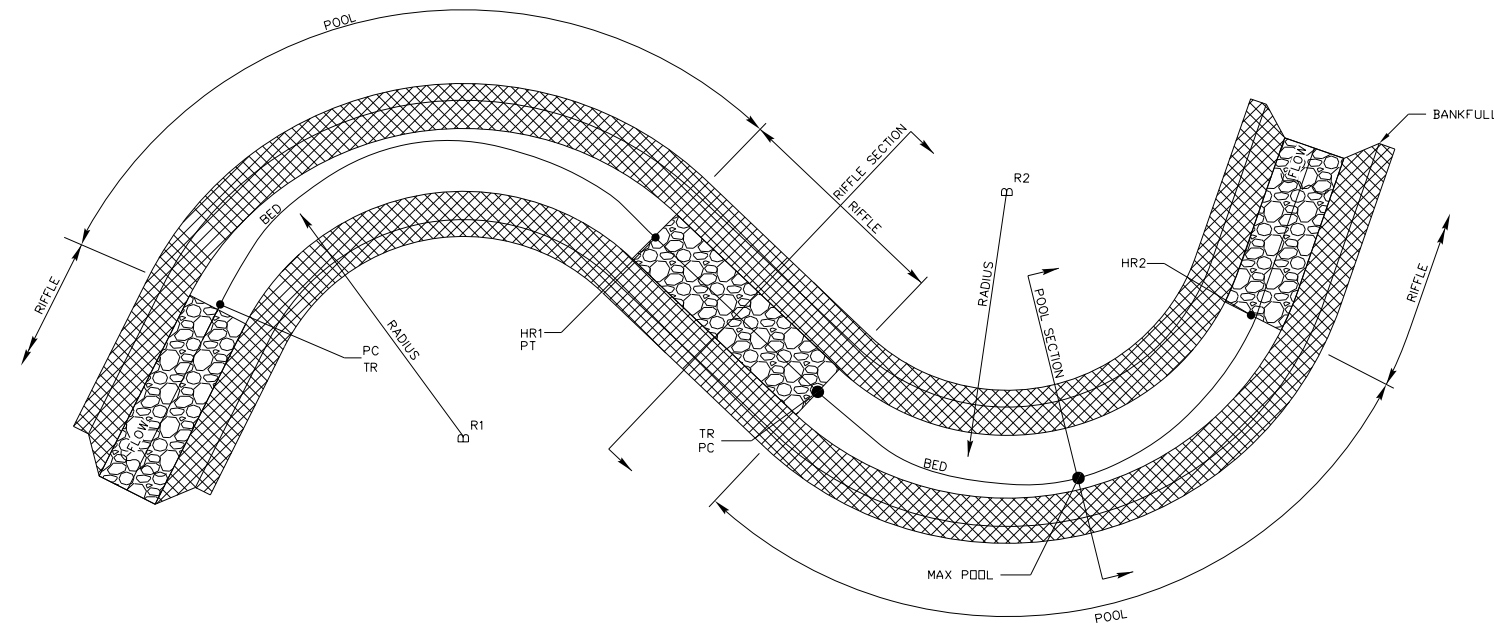
Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line	
U/G Tank; Water, Gas, Oil	
A/G Tank; Water, Gas, Oil	
U/G Test Hole (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	

R2707D
CHANNEL RELOCATION
CLEVELAND COUNTY

**Stantec**

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www.stantec.com
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PROJECT REFERENCE NO.	SHEET NO.
R2707D	OSM-2
PROJECT ENGINEER	
APPROVED BY:	
DATE:	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

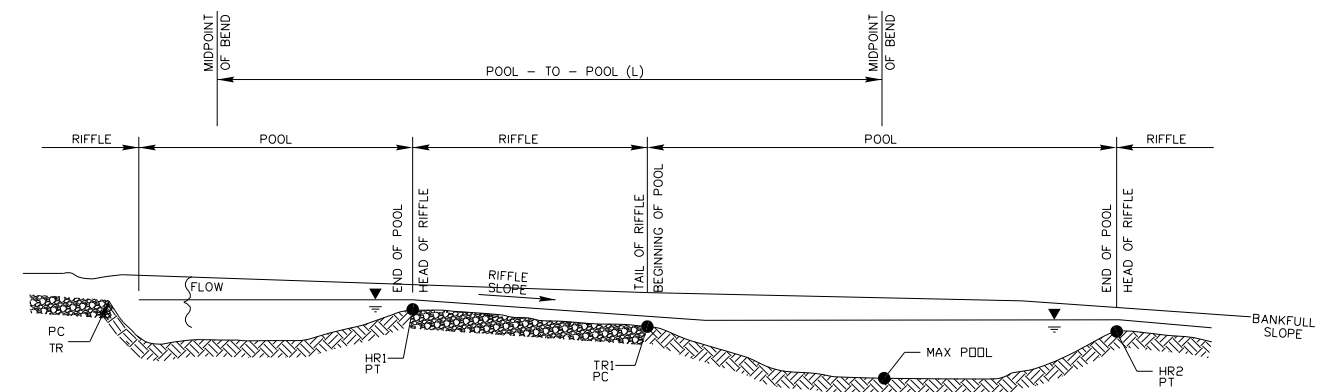


TYPICAL PLAN

- NOTE:**
- 1.TYPICAL PLAN NOT REFLECTIVE OF ACTUAL DESIGN.
 - 2.REFER TO PLAN SHEETS FOR SPECIFIC PROPOSED TREATMENTS, GEOMETRY DATA, AND HORIZONTAL PLACEMENT.
 - 3.REFER TO PROFILE SHEETS FOR VERTICAL PLACEMENT.

- NOTE:**
- PC: POINT OF CURVATURE
TR: TAIL OF RIFFLE
PT: POINT OF TANGENCY
HR: HEAD OF RIFFLE

REFER TO CHANNEL TYPICAL DETAIL SECTIONS FOR ADDITIONAL INFORMATION



TYPICAL PROFILE

CHANNEL TYPICAL DETAIL-PLAN & PROFILE

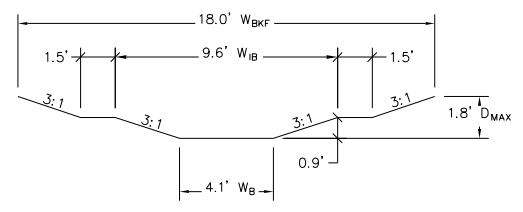
NOT TO SCALE

R2707D
CHANNEL RELOCATION
CLEVELAND COUNTY

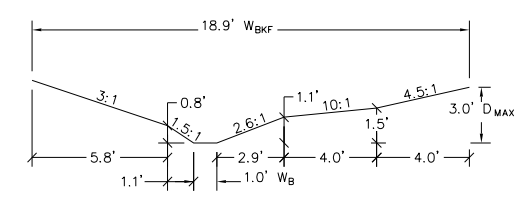


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R2707D	OSM-2A
PROJECT ENGINEER	
APPROVED BY:	
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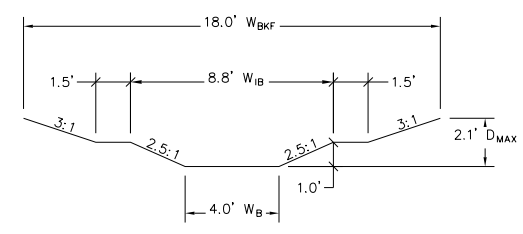


TYPICAL RIFFLE

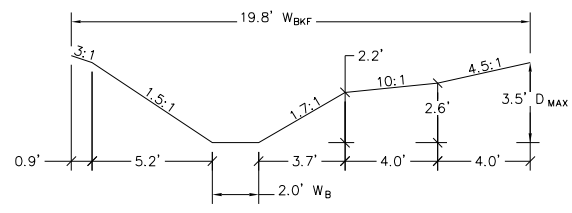


TYPICAL POOL

REACH 1A: STA 10+00 – 16+21.34

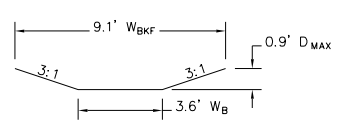


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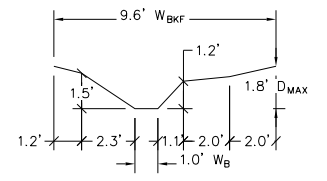


TYPICAL POOL

REACH 1B UPPER: STA 30+00 – 32+83.34

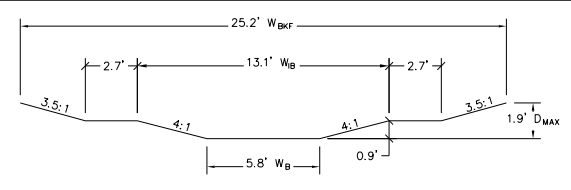


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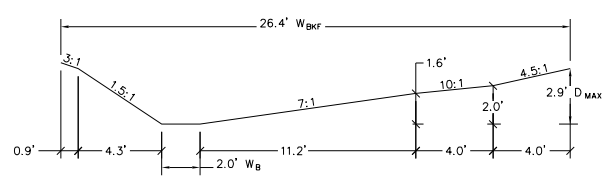


TYPICAL POOL

REACH 1B TRIBUTARY: STA 40+00 – 41+33.89

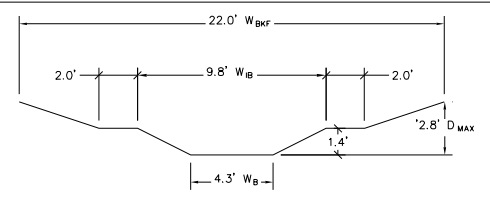


TYPICAL RIFFLE

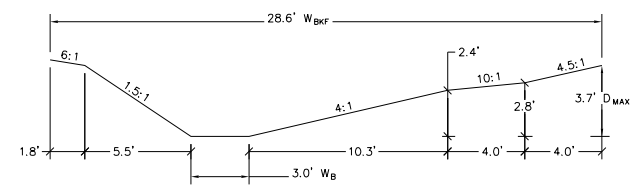


TYPICAL POOL

REACH 2A LOWER: STA 53+38.09 – 57+41.00

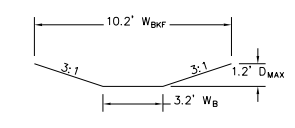


TYPICAL RIFFLE

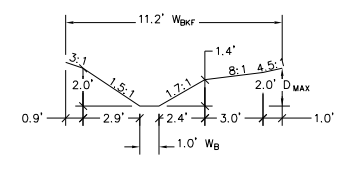


TYPICAL POOL

REACH 2C: STA 63+23.20 – 64+60.02

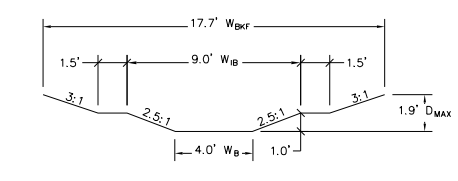


TYPICAL RIFFLE

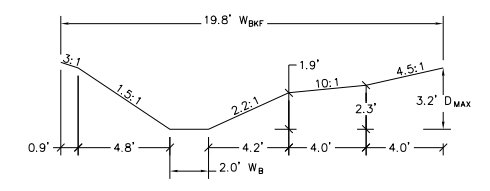


TYPICAL POOL

REACH 1A TRIBUTARY: STA 20+00 – 21+98.90

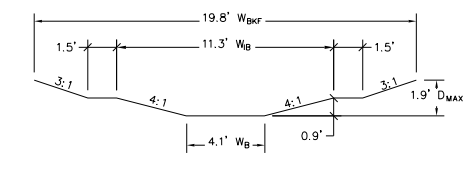


TYPICAL RIFFLE

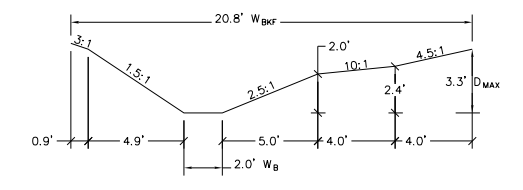


TYPICAL POOL

REACH 1B LOWER: STA 32+83.34 – 35+30.28

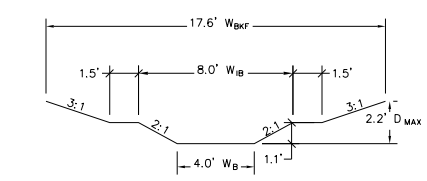


TYPICAL RIFFLE

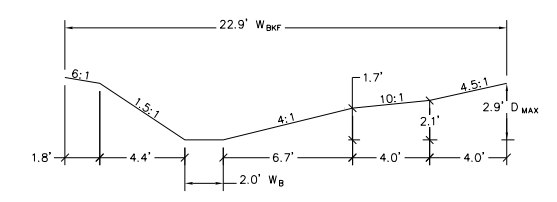


TYPICAL POOL

REACH 2A UPPER: STA 50+00 – 53+38.09



TYPICAL RIFFLE



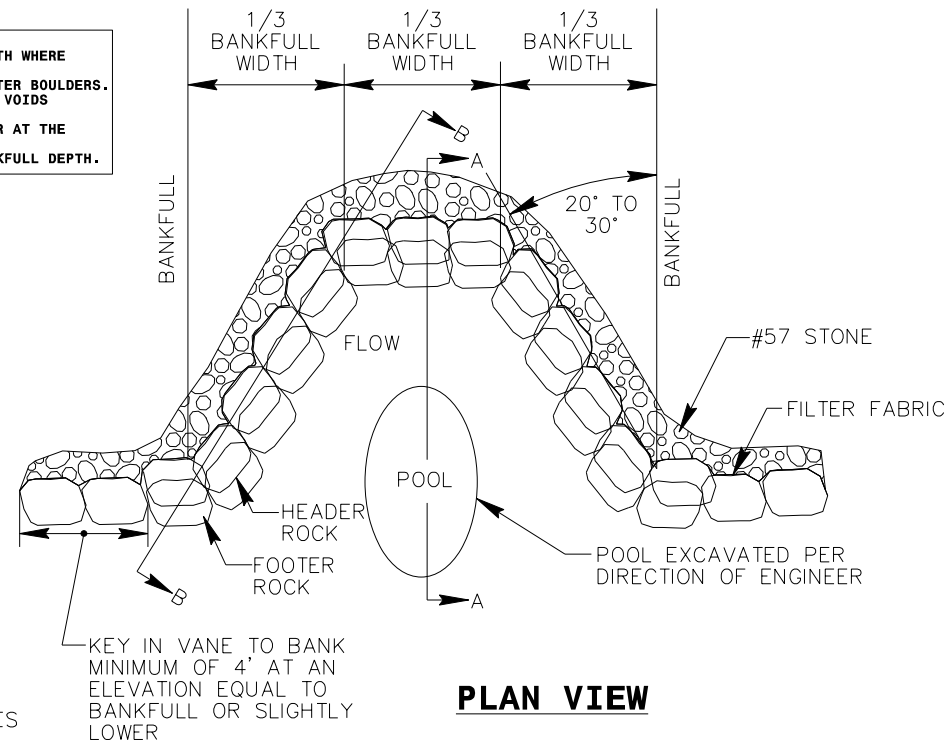
TYPICAL POOL

REACH 2B: STA 60+00 – 63+23.20

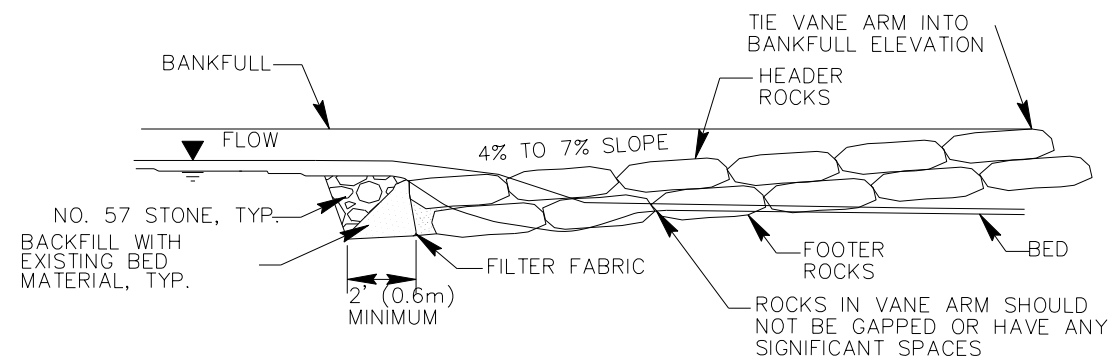
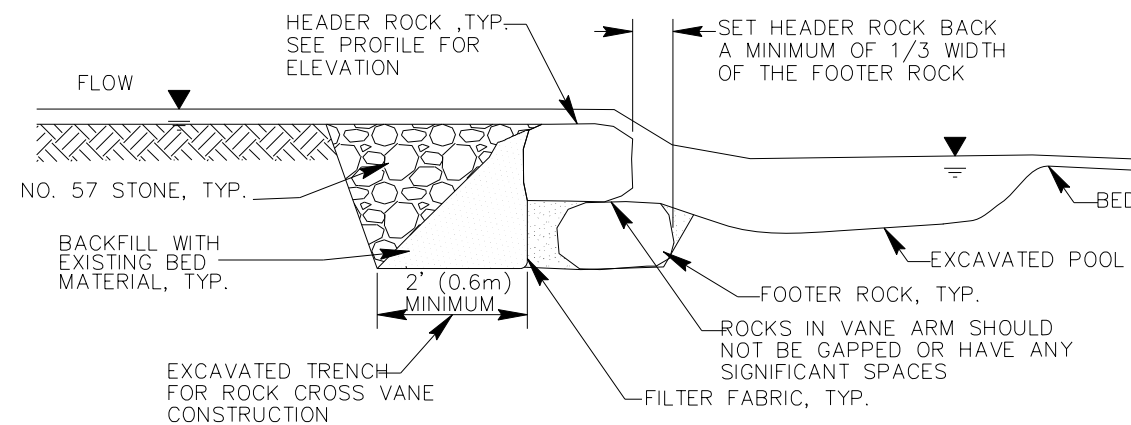
CHANNEL TYPICAL DETAIL SECTIONS

NOT TO SCALE

- 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 BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
 5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.



NOTE: REFER TO CONSTRUCTED RIFFLE DETAIL FOR BOULDER SIZES



ROCK CROSS VANE DETAIL (MODIFIED)

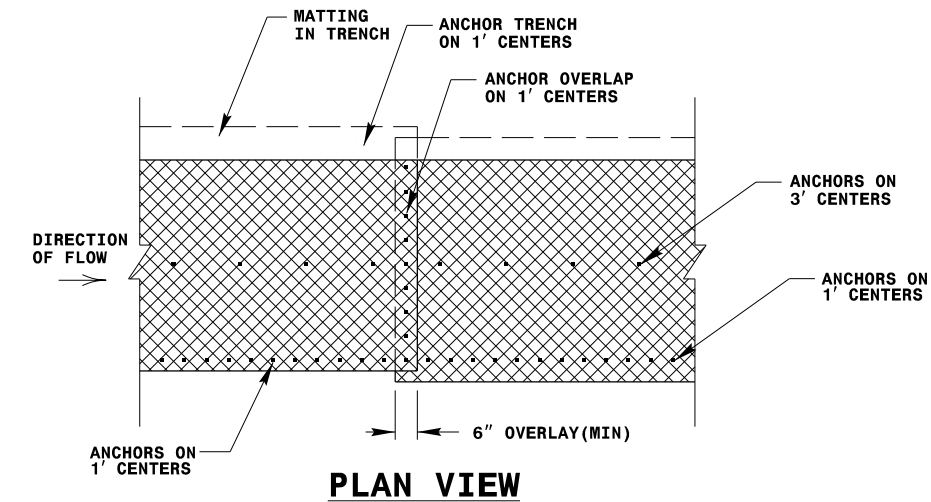
NOT TO SCALE

R2707D CHANNEL RELOCATION CLEVELAND COUNTY

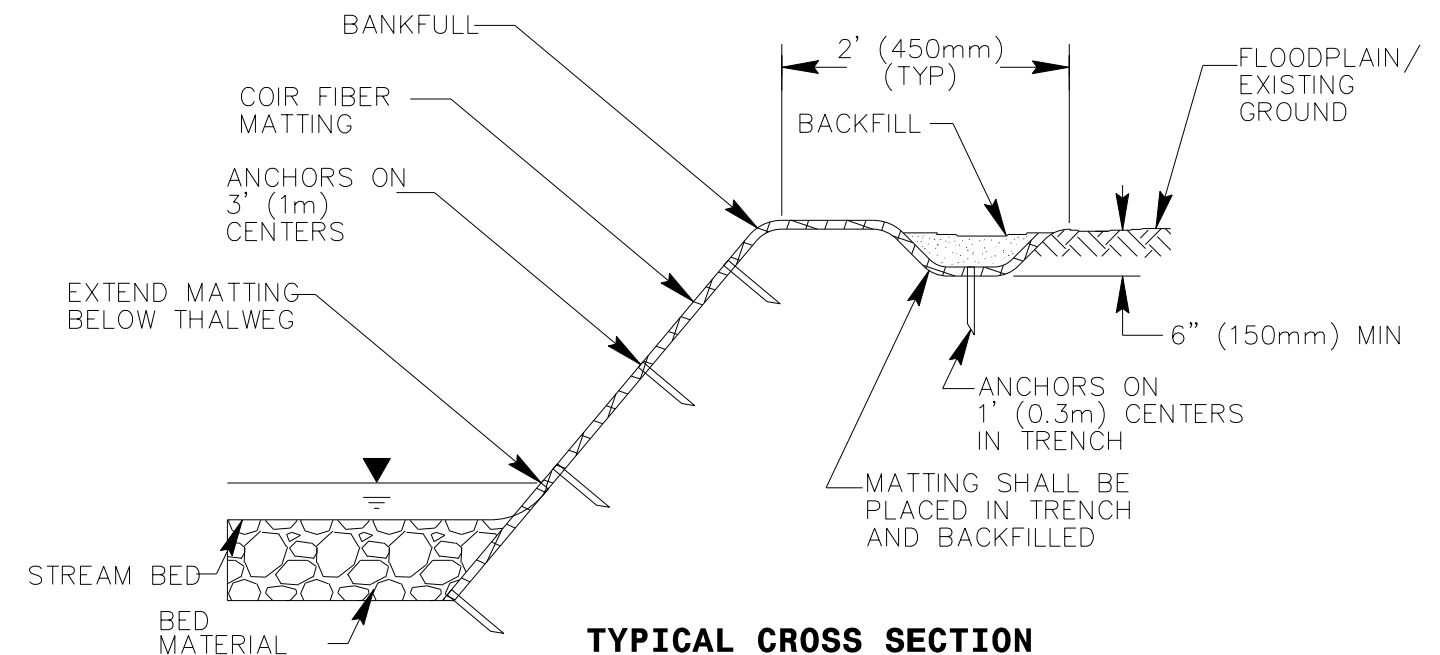
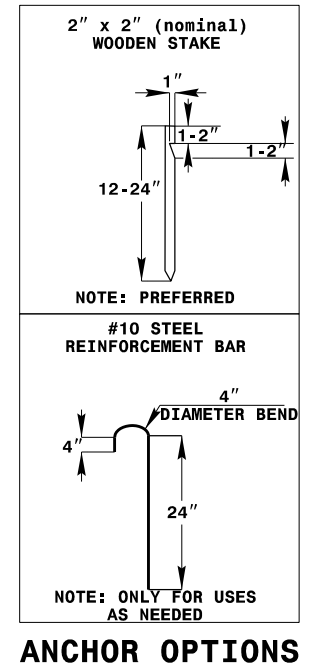


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PROJECT REFERENCE NO.	SHEET NO.
R2707D	OSM-2B
PROJECT ENGINEER	
APPROVED BY:	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DATE:	



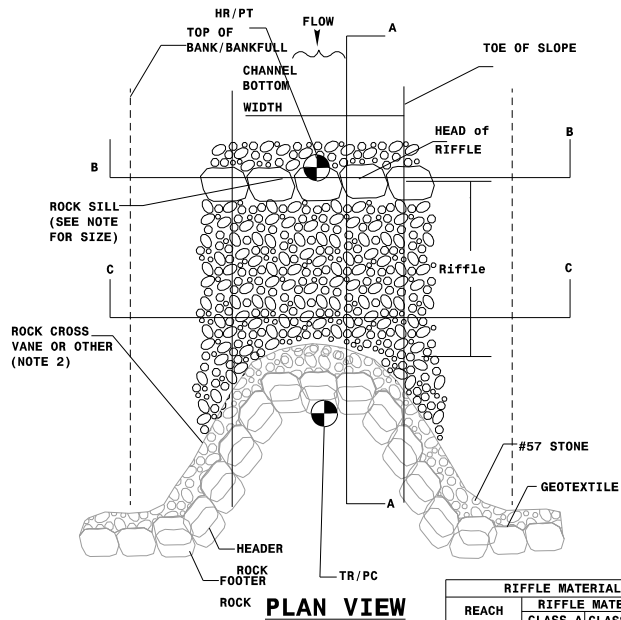
- NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
 2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER



COIR FIBER MATTING DETAIL (MODIFIED)

NOT TO SCALE

NOTE: REFER TO CONSTRUCTED RIFFLE DETAIL FOR BOULDER SIZES



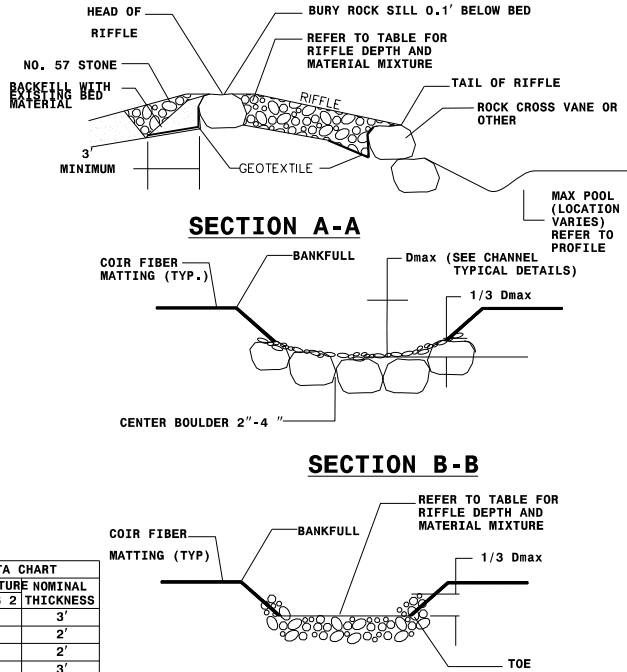
BOULDER SIZE DATA CHART			
REACH	BOULDER DIMENSIONS		
	HEIGHT	WIDTH	LENGTH
1A	2'	3'	4'
1A TRIB	1'	2'	3'
1B-UPPER	1'	2'	3'
1B-LOWER	2'	3'	4'
1B TRIB	1'	2'	3'
2A-UPPER	2'	3'	4'
2A-LOWER	1'	2'	3'
2B	2'	3'	4'
2C	2'	3'	4'

NOTE: THESE DIMENSIONS SPECIFY THE MINIMUM BOULDER SIZE

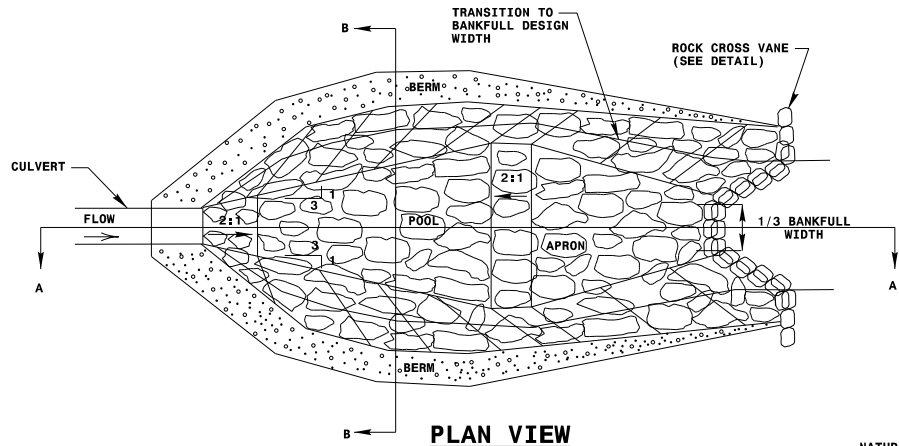
REACH	RIFFLE MATERIAL MIXTURE NOMINAL			
	CLASS A	CLASS 1	CLASS 2	THICKNESS
1A	10	45	45	3'
1A TRIB	10	90	-	2'
1B-UPPER	10	90	-	2'
1B-LOWER	10	45	45	3'
1B TRIB	10	90	-	2'
2A-UPPER	10	45	45	3'
2A-LOWER	10	90	-	2'
2B	10	45	45	3'
2C	10	45	45	3'

CONSTRUCTED RIFFLE DETAIL (MODIFIED)

NOT TO SCALE

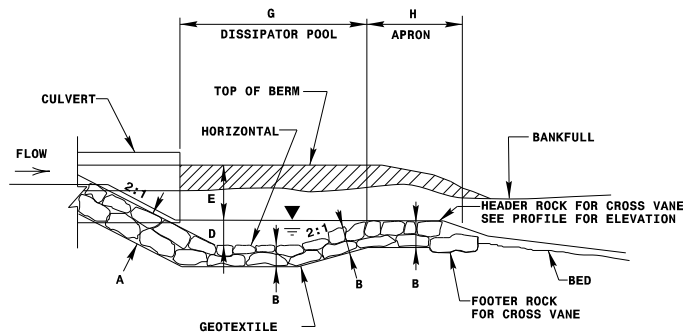


- NOTE:
- BOULDER ROCK SILL SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AN AXIS APPROXIMATELY 4'Lx3'Wx2'D
 - REFER TO PLAN SHEET AND PROFILE FOR SPECIFIC STRUCTURE AND CORRESPONDING DETAIL.

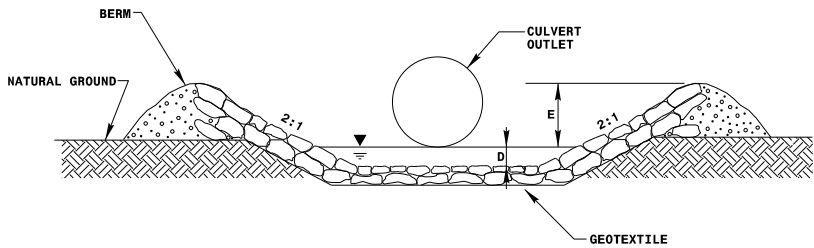


ROCK ENERGY DISSIPATOR BASIN DETAIL

NOT TO SCALE



SECTION A-A



SECTION B-B

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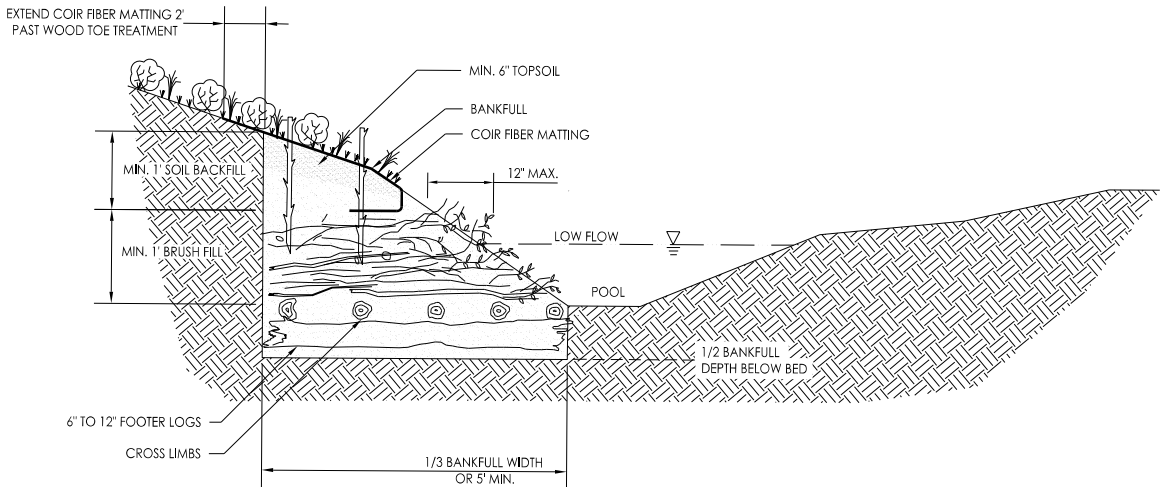
OSM-2C

PROJECT ENGINEER

APPROVED BY:

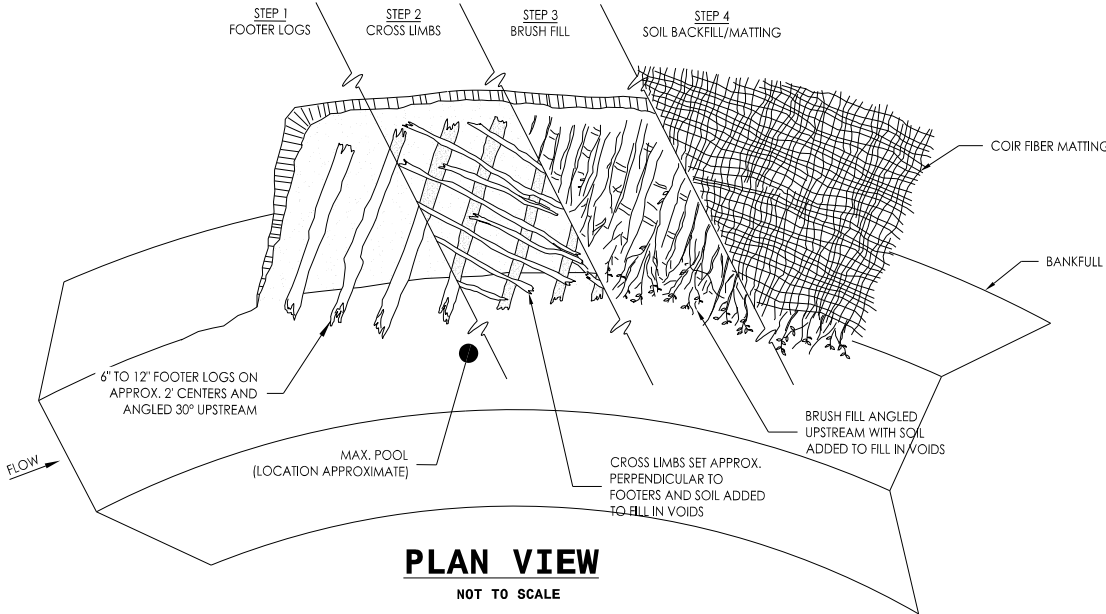
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DATE:



CROSS SECTION

NOT TO SCALE



PLAN VIEW

NOT TO SCALE

NOTES:

- MIX LAYERS OF SOIL WITH COARSE WOODY DEBRIS. (30% TO BE FROM LIVE MATERIAL OF NON-INVASIVE SPECIES). THIS SHALL EXTEND TO A DEPTH OF 1/2 BANKFULL, BELOW THE BOTTOM OF THE BED.
- WRAP SOIL BACKFILL/TOPSOIL WITH COIR FIBER MATTING AND PLANT WITH LIVE STAKES PER THE PLANTING PLAN.
- WOODY DEBRIS SHALL NOT EXTEND INTO THE PROPOSED CHANNEL MORE THAN 12" MAXIMUM.
- NO WOOD MATERIALS SHALL BE DEAD OR ROTTING.
- ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
- EXTEND WOOD TOE TREATMENT DOWNSTREAM BEYOND HEAD OF RIFFLE PER PLAN.

WOOD TOE PROTECTION

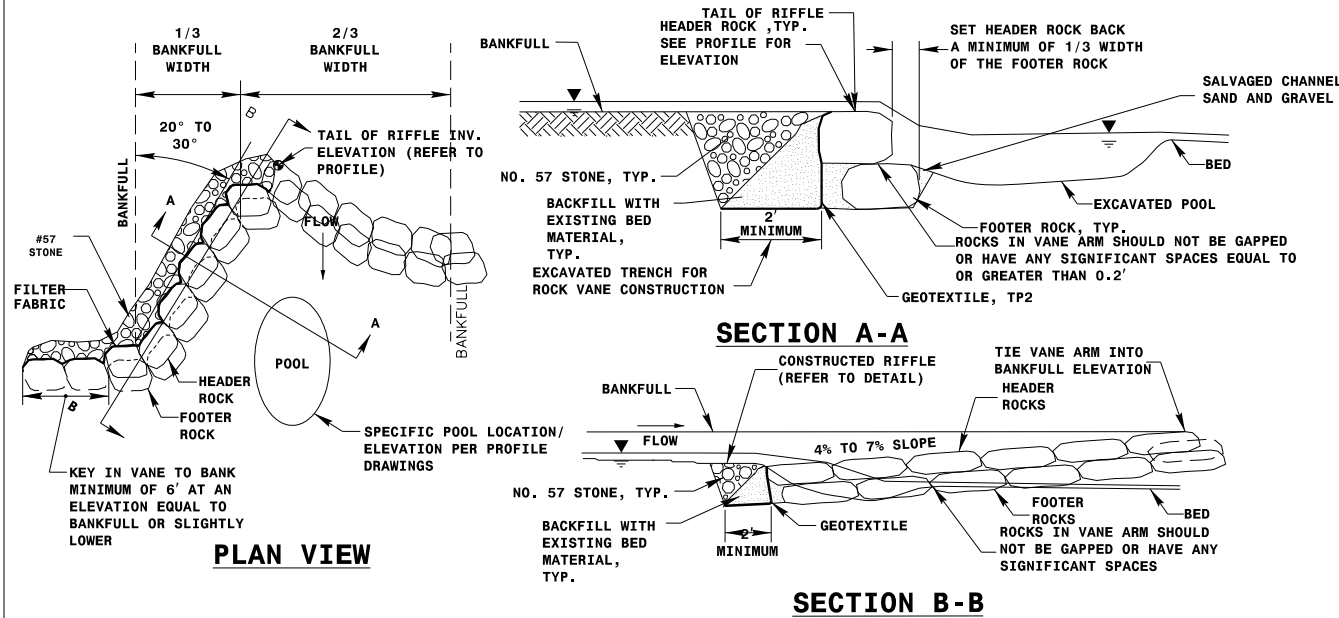
NOT TO SCALE

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- NOTES:
1. DEEPEST PART OF POOL (MAX POOL).
 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 BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
 5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

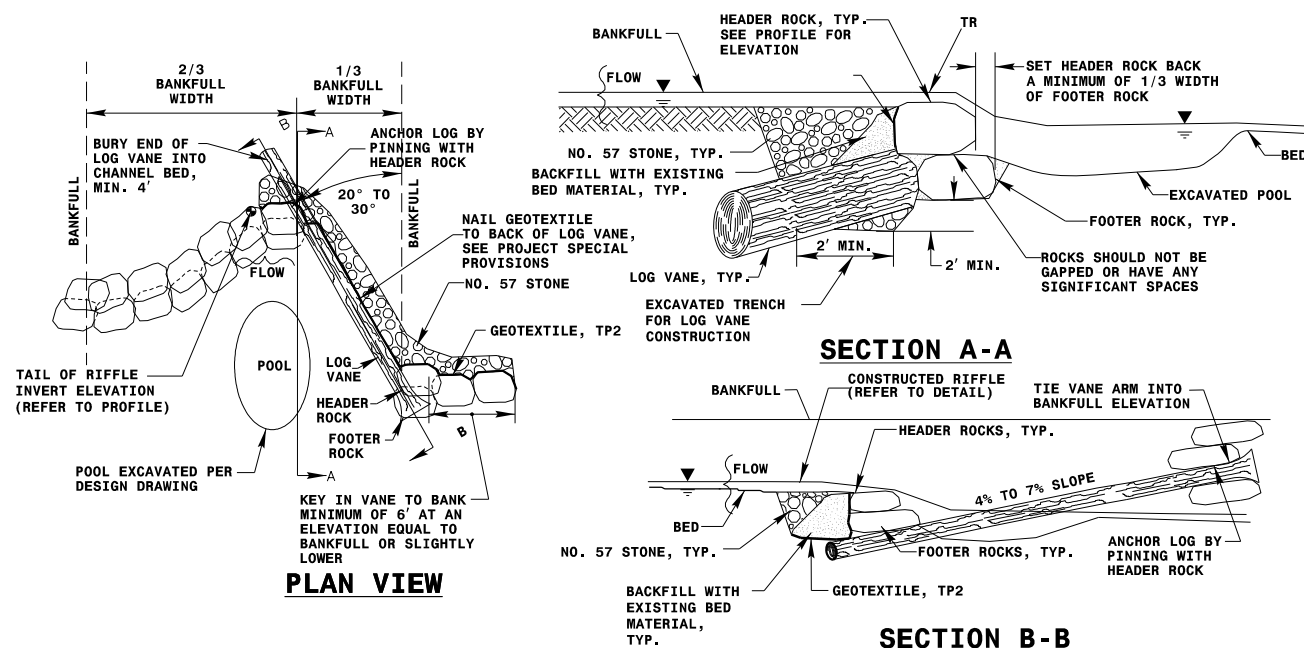
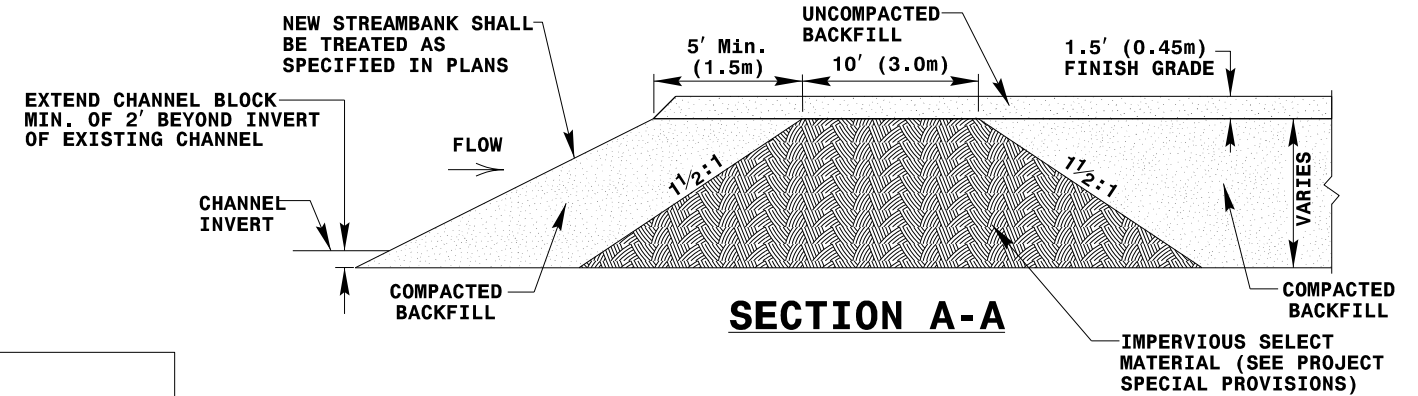
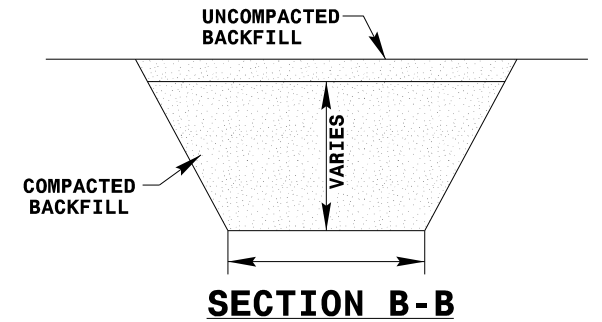
NOTE: NUMBER OF STONES VARY DEPENDING ON 1/3 BANFULL WIDTH

ROCK J-HOOK VANE DETAIL (MODIFIED)

NOT TO SCALE

REFER TO CONSTRUCTED RIFFLE
DETAIL FOR BOULDER SIZES

- NOTES:
- 1) STREAM PLUG SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND AS SHOWN ON PLANS.
 - 3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 2.0' BELOW THE INVERT OF THE EXISTING CHANNEL.
 - 4) BLOCK SHOULD EXTEND A MINIMUM OF 2.0' BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
 - 5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
 - 6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.



#57 STONE	
1.5"	100
1"	85-100
0.5"	25-60
#4	0.10
#8	0.5

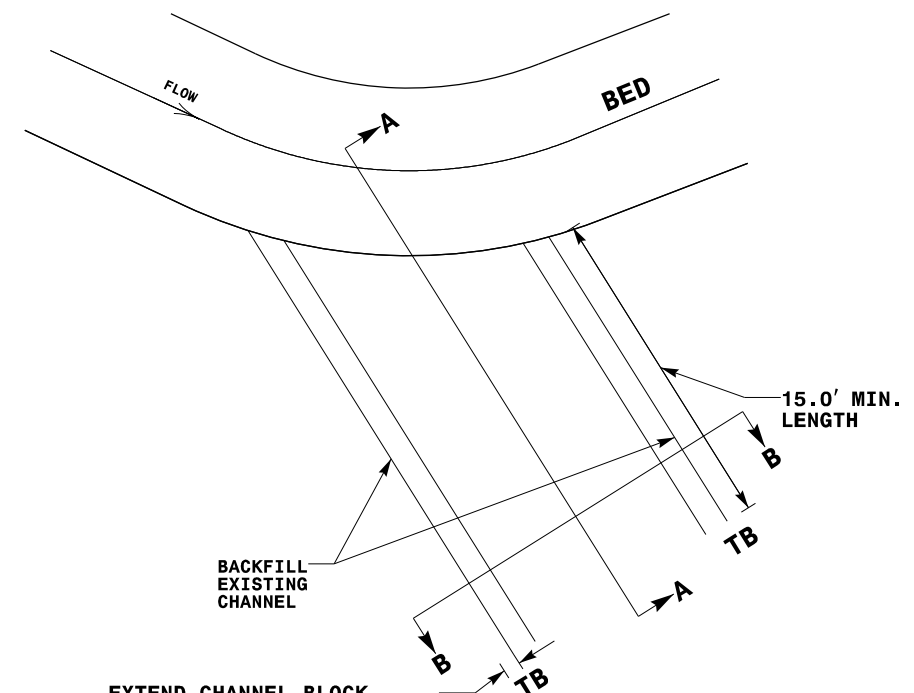
REFER TO CONSTRUCTED RIFFLE
DETAIL FOR BOULDER SIZES

**LOG VANE WITH ROCK J-HOOK DETAIL
(MODIFIED)**

NOT TO SCALE

- NOTES:
1. DEEPEST PART OF POOL (MAX POOL).
 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 BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
 5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

NOTE: NUMBER OF STONES VARY DEPENDING ON 1/3 BANFULL WIDTH



EXTEND CHANNEL BLOCK
MIN. OF 2.0' BEYOND LIMITS
OF EXISTING CHANNEL

STREAM PLUG

NOT TO SCALE

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SHEET NO.
OSM-2E

PROJECT ENGINEER

APPROVED BY:

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DATE:

VARIABLES		Reference Reach		Reference Reach		Reference Reach		Existing Reach 1A		Design Reach 1A		Design Reach 1A Tributary		Existing Reach 1B		Design Reach 1B Upper		Design Reach 1B Lower		Design Reach 1B Tributary	
STATION																					
1. Stream Type (Rosgen)		C4		B 4/1c		B 4		B 4c		B4/1		B/Bc		B 4c		Bc		Bc		B	
2. Drainage Area [mi2]		0.21		0.19		0.81		0.42		0.42		0.09		0.46		0.53		0.53		0.05	
Riffle Dimensions																					
3. Bankfull Width (Wbkf) [ft]		Mean:	7.55	Mean:	7.37	Mean:	13.14	Mean:	12.31	Mean:	17.98	Mean:	10.20	Mean:	15.67	Mean:	10.20	Mean:	17.73	Mean:	9.13
4. Mean Riffle Depth (dbkf) [ft]		Range:	7.03 8.06	Range:	6.58 8.15	Range:	12.12 14.16	Range:	10.57 14.04	Range:		Range:		Range:	15.4 15.94	Range:		Range:		Range:	
5. Maximum Riffle Depth (dmax) [ft]		Mean:	0.90	Mean:	1.04	Mean:	0.86	Mean:	1.31	Mean:	1.20	Mean:	0.78	Mean:	1.49	Mean:	1.20	Mean:	1.27	Mean:	0.61
6. Width of Flood-Prone Area (Wfpa) [ft]		Range:	0.82 0.97	Range:	0.94 1.13	Range:	0.82 0.89	Range:	1.09 1.53	Range:		Range:		Range:	1.15 1.82	Range:		Range:		Range:	
7. Riffle Inner Berm Width (Wib) [ft]		Mean:	1.29	Mean:	1.53	Mean:	1.22	Mean:	1.7	Mean:	1.80	Mean:	1.80	Mean:	2.20	Mean:	1.80	Mean:	1.90	Mean:	0.91
8. Riffle Inner Berm Depth (dib) [ft]		Range:	1.19 1.39	Range:	1.38 1.67	Range:	1.16 1.27	Range:	1.44 1.96	Range:		Range:		Range:	1.77 2.62	Range:		Range:		Range:	
9. Riffle Inner Berm Area (Aib) [ft2]		Mean:	31	Mean:	20	Mean:	21	Mean:	17	Mean:		Mean:		Mean:	23	Mean:		Mean:		Mean:	
10. Riffle Cross-Sectional Area (Abkf) [ft2]		Range:	27 34	Range:	19 22	Range:	18 25	Range:	14 20	Range:		Range:		Range:	22 24	Range:		Range:		Range:	
11. Riffle Width/Depth Ratio (Wbkf/dbkf)		Mean:	-	Mean:	-	Mean:	-	Mean:	-	Mean:	9.60	Mean:	-	Mean:	-	Mean:	8.8	Mean:	9.0	Mean:	-
12. Max Riffle Depth to Mean Riffle Depth (dmax/dbkf)		Range:	- -	Range:	- -	Range:	- -	Range:	- -	Range:		Range:	- -	Range:	- -	Range:		Range:		Range:	- -
13. Entrenchment Ratio (Wfpa/Wbkf)		Mean:	-	Mean:	-	Mean:	-	Mean:	-	Mean:	0.90	Mean:	-	Mean:	-	Mean:	1.0	Mean:	1.0	Mean:	-
14. Bankfull Mean Velocity (Vbkf) [ft/s]		Range:	- -	Range:	- -	Range:	- -	Range:	- -	Range:		Range:	- -	Range:	- -	Range:		Range:		Range:	- -
15. Bankfull discharge (Qbkf) [ft3/s]		Mean:	-	Mean:	-	Mean:	-	Mean:	-	Mean:	6.14	Mean:	-	Mean:	-	Mean:	6.7	Mean:	6.2	Mean:	-
16. Pool Width (Wbfp) [ft]		Range:	- -	Range:	- -	Range:	- -	Range:	- -	Range:		Range:	- -	Range:	- -	Range:		Range:		Range:	- -
17. Mean Pool Depth (dbfp)		Mean:	-	Mean:	-	Mean:	-	Mean:	-	Mean:	21.56	Mean:	8.00	Mean:	23.33	Mean:	24.96	Mean:	22.47	Mean:	5.56
18. Pool Cross-Sectional Area (Abkfp) [ft2]		Range:	5.76 7.80	Range:	7.42 7.68	Range:	10.85 11.65	Range:	15.37 16.16	Range:		Range:		Range:	17.66 28.99	Range:		Range:		Range:	
19. Maximum Pool Depth (dmaxp)		Mean:	8.44	Mean:	7.25	Mean:	15.44	Mean:	9.90	Mean:	15.00	Mean:	15.00	Mean:	11.08	Mean:	13.00	Mean:	14.00	Mean:	15.00
20. Pool Width to Riffle Width (Wbfp/Wbkf)		Range:	8.31 8.57	Range:	5.82 8.68	Range:	13.62 17.27	Range:	6.91 12.88	Range:		Range:		Range:	8.76 13.39	Range:		Range:		Range:	
21. Mean Pool Depth to Mean Riffle Depth (dbfp/dbkf)		Mean:	1.44	Mean:	1.47	Mean:	1.43	Mean:	1.30	Mean:	1.50	Mean:	1.50	Mean:	1.49	Mean:	1.50	Mean:	1.50	Mean:	1.50
22. Pool Area to Riffle Area (Abkfp/Abkf)		Range:	1.43 1.45	Range:	1.47 1.48	Range:	1.30 1.55	Range:	1.28 1.32	Range:		Range:		Range:	1.44 1.54	Range:		Range:		Range:	
23. Max Pool Depth to Mean Riffle Depth (dbkfp/dbkf)		Mean:	4.03	Mean:	2.83	Mean:	1.62	Mean:	1.38	Mean:	1.60	Mean:	1.60	Mean:	1.47	Mean:	2.50	Mean:	1.90	Mean:	1.60
24. Stream Meander Length (Lm)		Range:	3.85 4.21	Range:	2.29 3.36	Range:	1.47 1.77	Range:	1.37 1.40	Range:		Range:		Range:	1.42 1.51	Range:		Range:		Range:	
25. Stream Meander Length Ratio (Lm/Wbkf)		Mean:		Mean:		Mean:		Mean:	4.4	Mean:	4.9	Mean:	4.0	Mean:	4.9	Mean:	4.8	Mean:	4.9	Mean:	3.5
26. Radius of Curvature (Rc)		Range:		Range:		Range:		Range:		Range:	4.7 5.1	Range:	3.8 4.2	Range:	4.6 5.2	Range:	4.6 4.9	Range:	4.7 5.1	Range:	3.3 3.7
27. Radius of Curvature to Riffle Width (Rc/Wbkf)		Mean:		Mean:		Mean:		Mean:		Mean:	97.0	Mean:	29.2	Mean:	125.7	Mean:	105.8	Mean:	98.2	Mean:	17.4
28. Belt Width (Wblt)		Range:		Range:		Range:		Range:		Mean:	67.1	Mean:	67.1	Mean:	67.1	Mean:	67.1	Mean:	67.1	Mean:	67.1
29. Meander Width Ratio (Wblt/Wbkf)		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:	
30. Riffle Length (Lr)		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:	
31. Riffle Length to Riffle Width (Lr/Wbkf)		Range:		Range:		Range:		Range:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:	
32. Individual Pool Length (Lp)		Mean:		Mean:		Mean:		Mean:		Range:		Range:		Range:		Range:		Range:		Range:	
33. Individual Pool Length to Riffle Width (Lp/Wbkf)		Range:		Range:		Range:		Range:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:	
34. Pool to Pool Spacing (Ps)		Mean:		Mean:		Mean:		Mean:		Range:		Range:		Range:		Range:		Range:		Range:	
35. Pool to Pool Spacing to Riffle Width (Ps/Wbkf)		Range:		Range:		Range:		Range:		Mean:		Mean:		Mean:		Mean:		Mean:		Mean:	
Channel Profile																					
36. Valley Slope (Svalley) [ft/ft]		Mean:	0.022	Mean:	0.020	Mean:	0.04	Mean:	0.0234	Mean:	0.027	Mean:	0.027	Mean:	0.014	Mean:	0.011	Mean:	0.023	Mean:	0.032
37. Average Water Surface Slope (S)		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:	
38. Sinuosity (k) (Svalley/S)		Mean:	0.016	Mean:	0.018	Mean:	0.022	Mean:	0.0126	Mean:	0.026	Mean:	0.026	Mean:	0.011	Mean:	0.011	Mean:	0.022	Mean:	0.031
		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:	
		Mean:	1.36	Mean:	1.10	Mean:	1.12	Mean:	1.86	Mean:	1.04	Mean:	1.02	Mean:	1.26	Mean:	1.03	Mean:	1.03	Mean:	1.03
		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:		Range:	

VARIABLES		Reference Reach		Reference Reach		Reference Reach		Existing Reach 2A		Design Reach 2A Upper		Design Reach 2A Lower		Existing Reach 2B		Design Reach 2B		Existing Reach 2C		Design Reach 2C	
STATION																					
1. Stream Type (Rosgen)		C4		B 4/1c		B 4		B 3/1		B3/1		B3/1c		C 4		C4		C 4		C	
2. Drainage Area [mi2]		0.21		0.19		0.81		0.55		0.57		0.57		0.56		0.56		1.14		1.14	
Riffle Dimensions																					
3. Bankfull Width (Wbkf) [ft]	Mean: Range:	7.55 7.03 8.06	Mean: Range:	7.37 6.58 8.16	Mean: Range:	13.14 12.12 14.16	Mean: Range:	19.81 17.99 21.63	Mean: Range:	19.80 17.99 21.63	Mean: Range:	25.19 17.99 21.63	Mean: Range:	26.58 16.07 37.08	Mean: Range:	17.61 16.07 37.08	Mean: Range:	35.68 16.07 37.08	Mean: Range:	22.03 16.07 37.08	
4. Mean Riffle Depth (dbkf) [ft]	Mean: Range:	0.90 0.82 0.97	Mean: Range:	1.04 0.94 1.13	Mean: Range:	0.86 0.82 0.89	Mean: Range:	1.14 0.71 1.29	Mean: Range:	1.32 0.71 1.29	Mean: Range:	1.15 0.71 1.29	Mean: Range:	1.00 0.71 1.29	Mean: Range:	1.47 0.71 1.29	Mean: Range:	0.95 0.71 1.29	Mean: Range:	1.84 0.71 1.29	
5. Maximum Riffle Depth (dmax) [ft]	Mean: Range:	1.29 1.19 1.39	Mean: Range:	1.53 1.38 1.67	Mean: Range:	1.22 1.16 1.27	Mean: Range:	1.76 1.21 2.31	Mean: Range:	1.85 1.21 2.31	Mean: Range:	1.85 1.21 2.31	Mean: Range:	1.76 1.21 2.31	Mean: Range:	2.20 1.21 2.31	Mean: Range:	2.05 1.21 2.31	Mean: Range:	2.75 1.21 2.31	
6. Width of Flood-Prone Area (Wfpa) [ft]	Mean: Range:	31 27 34	Mean: Range:	20 19 22	Mean: Range:	21 18 25	Mean: Range:	55 45 66	Mean: Range:	 45 66	Mean: Range:	 45 66	Mean: Range:	 45 66	Mean: Range:	 45 66	Mean: Range:	109 109 109	Mean: Range:	 109 109	
7. Riffle Inner Berm Width (Wib) [ft]	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	11.3 - -	Mean: Range:	13.1 - -	Mean: Range:	- - -	Mean: Range:	8.0 - -	Mean: Range:	- - -	Mean: Range:	9.8 - -	
8. Riffle Inner Berm Depth (dib) [ft]	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	0.9 - -	Mean: Range:	0.9 - -	Mean: Range:	- - -	Mean: Range:	1.1 - -	Mean: Range:	- - -	Mean: Range:	1.4 - -	
9. Riffle Inner Berm Area (Aib) [ft2]	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	- - -	Mean: Range:	7.1 - -	Mean: Range:	8.7 - -	Mean: Range:	- - -	Mean: Range:	6.6 - -	Mean: Range:	- - -	Mean: Range:	9.7 - -	
10. Riffle Cross-Sectional Area (Abkf) [ft2]	Mean: Range:	6.78 5.76 7.80	Mean: Range:	7.55 7.42 7.68	Mean: Range:	11.25 10.85 11.65	Mean: Range:	23.46 20.72 26.19	Mean: Range:	26.13 20.72 26.19	Mean: Range:	26.13 20.72 26.19	Mean: Range:	23.46 20.72 26.19	Mean: Range:	25.84 20.72 26.19	Mean: Range:	33.82 20.72 26.19	Mean: Range:	40.43 20.72 26.19	
11. Riffle Width/Depth Ratio (Wbkf/dbkf)	Mean: Range:	8.44 8.31 8.57	Mean: Range:	7.25 5.82 8.68	Mean: Range:	15.44 13.62 17.27	Mean: Range:	32.34 12.46 52.23	Mean: Range:	15.00 12.46 52.23	Mean: Range:	15.00 12.46 52.23	Mean: Range:	15.00 12.46 52.23	Mean: Range:	12.00 12.46 52.23	Mean: Range:	37.56 12.46 52.23	Mean: Range:	12.00 12.46 52.23	
12. Max Riffle Depth to Mean Riffle Depth (dmax/dbkf)	Mean: Range:	1.44 1.43 1.45	Mean: Range:	1.47 1.47 1.48	Mean: Range:	1.43 1.30 1.55	Mean: Range:	1.75 1.70 1.79	Mean: Range:	1.40 1.70 1.79	Mean: Range:	1.40 1.70 1.79	Mean: Range:	1.75 1.70 1.79	Mean: Range:	1.50 1.70 1.79	Mean: Range:	2.16 1.70 1.79	Mean: Range:	1.50 1.70 1.79	
13. Entrenchment Ratio (Wfpa/Wbkf)	Mean: Range:	4.03 3.85 4.21	Mean: Range:	2.83 2.29 3.36	Mean: Range:	1.62 1.47 1.77	Mean: Range:	2.66 1.21 4.11	Mean: Range:	1.60 1.21 4.11	Mean: Range:	1.60 1.21 4.11	Mean: Range:	2.66 1.21 4.11	Mean: Range:	4.00 1.21 4.11	Mean: Range:	3.06 1.21 4.11	Mean: Range:	4.00 1.21 4.11	
14. Bankfull Mean Velocity (Vbkf) [ft/s]	Mean: Range:	 	Mean: Range:	 	Mean: Range:	 	Mean: Range:	4.6 	Mean: Range:	5.0 4.8 5.2	Mean: Range:	3.5 3.4 3.7	Mean: Range:	4.3 4.19 4.44	Mean: Range:	5.2 5.0 5.5	Mean: Range:	2.9 2.54 3.19	Mean: Range:	4.6 3.4 5.8	
15. Bankfull discharge (Qbkf) [ft3/s]	Mean: Range:	 	Mean: Range:	 	Mean: Range:	 	Mean: Range:	97.4 	Mean: Range:	112.9 108.1 117.6	Mean: Range:	102.3 98.6 106.1	Mean: Range:	89.4 86.87 91.95	Mean: Range:	117.6 111.9 123.3	Mean: Range:	96.9 86.03 107.75	Mean: Range:	151.9 119.4 204.5	
Pool Dimensions																					
16. Pool Width (Wbkfp) [ft]	Mean: Range:	9.72 8.87 10.57	Mean: Range:	10.6 10.55 10.65	Mean: Range:	10.37 9.27 11.46	Mean: Range:	16.67 14.93 18.4	Mean: Range:	20.79 14.93 18.4	Mean: Range:	26.45 14.93 18.4	Mean: Range:	40.97 14.93 18.4	Mean: Range:	22.89 14.93 18.4	Mean: Range:	58.72 14.93 18.4	Mean: Range:	28.63 14.93 18.4	
17. Mean Pool Depth (dbkfp)	Mean: Range:	1.25 0.84 1.65	Mean: Range:	1.43 1.4 1.45	Mean: Range:	1.22 0.85 1.58	Mean: Range:	1.79 1.05 2.53	Mean: Range:	1.85 1.05 2.53	Mean: Range:	1.61 1.05 2.53	Mean: Range:	1.03 1.03 1.03	Mean: Range:	2.20 1.03 1.03	Mean: Range:	1.03 1.03 1.03	Mean: Range:	2.20 1.03 1.03	
18. Pool Cross-Sectional Area (Abkfp) [ft2]	Mean: Range:	11.75 8.9 14.6	Mean: Range:	15.07 14.73 15.41	Mean: Range:	13.02 7.87 18.16	Mean: Range:	28.62 19.4 37.84	Mean: Range:	41.81 19.4 37.84	Mean: Range:	46.18 19.4 37.84	Mean: Range:	42.14 19.4 37.84	Mean: Range:	46.52 19.4 37.84	Mean: Range:	60.37 19.4 37.84	Mean: Range:	72.77 19.4 37.84	
19. Maximum Pool Depth (dmaxp)	Mean: Range:	1.93 1.59 2.26	Mean: Range:	2.17 1.99 2.35	Mean: Range:	1.68 1.33 2.02	Mean: Range:	2.73 1.8 3.65	Mean: Range:	3.30 1.8 3.65	Mean: Range:	2.88 1.8 3.65	Mean: Range:	3.27 1.8 3.65	Mean: Range:	2.94 1.8 3.65	Mean: Range:	2.77 1.8 3.65	Mean: Range:	3.67 1.8 3.65	
20. Pool Width to Riffle Width (Wbkfp/Wbkf)	Mean: Range:	1.29 1.17 1.40	Mean: Range:	1.44 1.43 1.45	Mean: Range:	0.79 0.71 0.87	Mean: Range:	0.84 0.75 0.93	Mean: Range:	1.05 0.75 0.93	Mean: Range:	1.05 0.75 0.93	Mean: Range:	1.54 0.75 0.93	Mean: Range:	1.30 0.75 0.93	Mean: Range:	1.65 0.75 0.93	Mean: Range:	1.30 0.75 0.93	
21. Mean Pool Depth to Mean Riffle Depth (dbkfp/dbkf)	Mean: Range:	1.39 0.93 1.83	Mean: Range:	1.38 1.35 1.39	Mean: Range:	1.42 0.99 1.84	Mean: Range:	1.57 0.92 2.22	Mean: Range:	1.40 0.92 2.22	Mean: Range:	1.40 0.92 2.22	Mean: Range:	1.03 0.92 2.22	Mean: Range:	1.50 0.92 2.22	Mean: Range:	1.08 0.92 2.22	Mean: Range:	1.50 0.92 2.22	
22. Pool Area to Riffle Area (Abkfp/Abkf)	Mean: Range:	1.73 1.31 2.15	Mean: Range:	2.00 1.95 2.04	Mean: Range:	1.16 0.70 1.61	Mean: Range:	1.27 0.86 1.68	Mean: Range:	1.60 0.86 1.68	Mean: Range:	1.60 0.86 1.68	Mean: Range:	1.80 0.86 1.68	Mean: Range:	1.80 0.86 1.68	Mean: Range:	1.79 0.86 1.68	Mean: Range:	1.80 0.86 1.68	
23. Max Pool Depth to Mean Riffle Depth (dbkfp/dbkf)	Mean: Range:	2.14 1.77 2.51	Mean: Range:	2.09 1.91 2.26	Mean: Range:	1.95 1.55 2.35	Mean: Range:	2.39 1.58 3.20	Mean: Range:	2.50 1.58 3.20	Mean: Range:	2.50 1.58 3.20	Mean: Range:	3.27 1.58 3.20	Mean: Range:	2.00 1.58 3.20	Mean: Range:	2.92 1.58 3.20	Mean: Range:	2.00 1.58 3.20	
Channel Pattern																					
24. Stream Meander Length (Lm)	Mean: Range:	87.0 57.0 117.0	Mean: Range:	87.0 57.0 117.0	Mean: Range:	136.3 69.2 197.7	Mean: Range:	173.2 168.0 175.8	Mean: Range:	212.8 168.0 175.8	Mean: Range:	212.8 168.0 175.8	Mean: Range:	183.3 168.0 175.8	Mean: Range:	183.3 168.0 175.8	Mean: Range:	183.3 168.0 175.8	Mean: Range:	183.3 168.0 175.8	
25. Stream Meander Length Ratio (Lm/Wbkf)	Mean: Range:	11.5 7.5 15.5	Mean: Range:	11.8 7.7 15.9	Mean: Range:	10.4 5.3 15.0	Mean: Range:	8.7 8.5 8.9	Mean: Range:	8.7 8.5 8.9	Mean: Range:	8.4 7.7 9.2	Mean: Range:	10.4 7.7 9.2	Mean: Range:	10.4 7.7 9.2	Mean: Range:	8.3 7.7 9.2	Mean: Range:	8.3 7.7 9.2	
26. Radius of Curvature (Rc)	Mean: Range:	12.9 7.6 17.3	Mean: Range:	61.7 45.0 80.0	Mean: Range:	85.0 41.0 132.0	Mean: Range:	55.5 32.0 80.0	Mean: Range:	82.7 32.0 80.0	Mean: Range:	82.7 32.0 80.0	Mean: Range:	116.8 45.0 296.0	Mean: Range:	116.8 45.0 296.0	Mean: Range:	72.5 45.0 296.0	Mean: Range:	72.5 45.0 296.0	
27. Radius of Curvature to Riffle Width (Rc/Wbkf)	Mean: Range:	1.7 1.0 2.3	Mean: Range:	8.4 6.1 10.9	Mean: Range:	6.5 3.1 10.0	Mean: Range:	2.8 1.6 4.0	Mean: Range:	3.3 1.6 4.0	Mean: Range:	3.3 1.6 4.0	Mean: Range:	6.6 2.6 16.8	Mean: Range:	6.6 2.6 16.8	Mean: Range:	3.3 2.3 4.3	Mean: Range:	3.3 2.3 4.3	
28. Belt Width (Wblt)	Mean: Range:	40.7 31.8 49.6	Mean: Range:	- - -	Mean: Range:	22.3 19.8 28.7	Mean: Range:	40.0 29.6 52.7	Mean: Range:	59.3 32.2 86.5	Mean: Range:	59.3 32.2 86.5	Mean: Range:	36.9 33.9 40.9	Mean: Range:	36.9 33.9 40.9	Mean: Range:	45.5 33.9 40.9	Mean: Range:	45.5 33.9 40.9	
29. Meander Width Ratio (Wblt/Wbkf)	Mean: Range:	5.4 4.2 6.6	Mean: Range:	- - -	Mean: Range:	1.7 1.5 2.2	Mean: Range:	2.0 1.5 2.7	Mean: Range:	2.4 1.5 2.7	Mean: Range:	2.4 1.5 2.7	Mean: Range:	2.1 1.9 2.3	Mean: Range:	2.1 1.9 2.3	Mean: Range:	2.1 0.0 0.0	Mean: Range:	2.1 0.0 0.0	
30. Riffle Length (Lr)	Mean: Range:	12.1 7.0 17.2	Mean: Range:	13.0 9.1 17.0	Mean: Range:	10.8 9.0 12.9	Mean: Range:	56.3 52.3 59.3	Mean: Range:	59.0 52.3 59.3	Mean: Range:	59.0 52.3 59.3	Mean: Range:	44.2 40.8 46.8	Mean: Range:	44.2 40.8 46.8	Mean: Range:	50.3 39.8 60.9	Mean: Range:	50.3 39.8 60.9	
31. Riffle Length to Riffle Width (Lr/Wbkf)	Mean: Range:	1.6 0.9 2.3	Mean: Range:	1.6 0.9 2.3	Mean: Range:	0.8 0.7 1.0	Mean: Range:	2.8 2.6 3.0	Mean: Range:	2.3 2.3 2.5	Mean: Range:	2.3 2.3 2.5	Mean: Range:	2.5 2.3 2.7	Mean: Range:	2.5 2.3 2.7	Mean: Range:	2.3 1.8 2.8	Mean: Range:	2.3 1.8 2.8	
32. Individual Pool Length (Lp)	Mean: Range:	19.6 10.1 33.1	Mean: Range:	18.6 6.8 32.4	Mean: Range:	13.6 6.9 29.3	Mean: Range:	28.5 26.2 30.0	Mean: Range:	55.7 31.6 69.4	Mean: Range:	55.7 31.6 69.4	Mean: Range:	36.6 34.6 40.8	Mean: Range:	36.6 34.6 40.8	Mean: Range:	36.0 32.2 39.8	Mean: Range:	36.0 32.2 39.8	
33. Individual Pool Length to Riffle Width (Lp/Wbkf)	Mean: Range:	2.6 1.3 4.4	Mean: Range:	2.5 0.9 4.4	Mean: Range:	1.0 0.5 2.2	Mean: Range:	1.4 1.3 1.5	Mean: Range:	2.2 1.3 1.5	Mean: Range:	2.2 1.3 1.5	Mean: Range:	2.1 2.0 2.3	Mean: Range:	2.1 2.0 2.3	Mean: Range:	1.6 1.5 1.8	Mean: Range:	1.6 1.5 1.8	
34. Pool to Pool Spacing (Ps)	Mean: Range:	51.6 30.5 69.3	Mean: Range:	31.1 25.2 36.4	Mean: Range:	26.8 20.7 34.4	Mean: Range:	86.0 80.5 88.2	Mean: Range:	106.6 87.6 126.4	Mean: Range:	106.6 87.6 126.4	Mean: Range:	80.9 76.2 85.9	Mean: Range:	80.9 76.2 85.9	Mean: Range:	97.4 4.4	Mean: Range:	97.4 4.4	
35. Pool to Pool Spacing to Riffle Width (Ps/Wbkf)	Mean: Range:	6.8 4.0 9.2	Mean: Range:	4.2 3.4 4.9	Mean: Range:	2.0 1.6 2.6	Mean: Range:	4.3 4.1 4.5	Mean: Range:	4.2 3.5 5.0	Mean: Range:	4.2 3.5 5.0	Mean: Range:	4.6 4.3 4.9	Mean: Range:	4.6 4.3 4.9	Mean: Range:	4.4	Mean: Range:	4.4	
Channel Profile																					
36. Valley Slope (Svalley) [ft/ft]	Mean: Range:	0.022 	Mean: Range:	0.020 	Mean: Range:	0.04 	Mean: Range:	0.039 	Mean: Range:	0.020 	Mean: Range:	0.010 	Mean: Range:	0.011 	Mean: Range:	0.024 	Mean: Range:	0.008 	Mean: Range:	0.024 	
37. Average Water Surface Slope (S)	Mean: Range:	0.016 	Mean: Range:	0.018 	Mean: Range:	0.022 	Mean: Range:	0.033 	Mean: Range:	0.019 	Mean: Range:	0.009 	Mean: Range:	0.0065 	Mean: Range:	0.023 	Mean: Range:	0.0053 	Mean: Range:	0.023 	
38. Sinuosity (k) (Svalley/S)	Mean: Range:	1.36 	Mean: Range:	1.10 	Mean: Range:	1.12 	Mean: Range:	1.18 	Mean: Range:	1.04 	Mean: Range:	1.07 	Mean: Range:	1.66 	Mean: Range:	1.04 	Mean: Range:	1.49 	Mean: Range:	1.04 	

R2707D
CHANNEL RELOCATION
CLEVELAND COUNTY



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PROJECT REFERENCE NO.	SHEET NO.
R2707D	OSM-3
PROJECT ENGINEER	
APPROVED BY:	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DATE:	

SUMMARY OF QUANTITIES

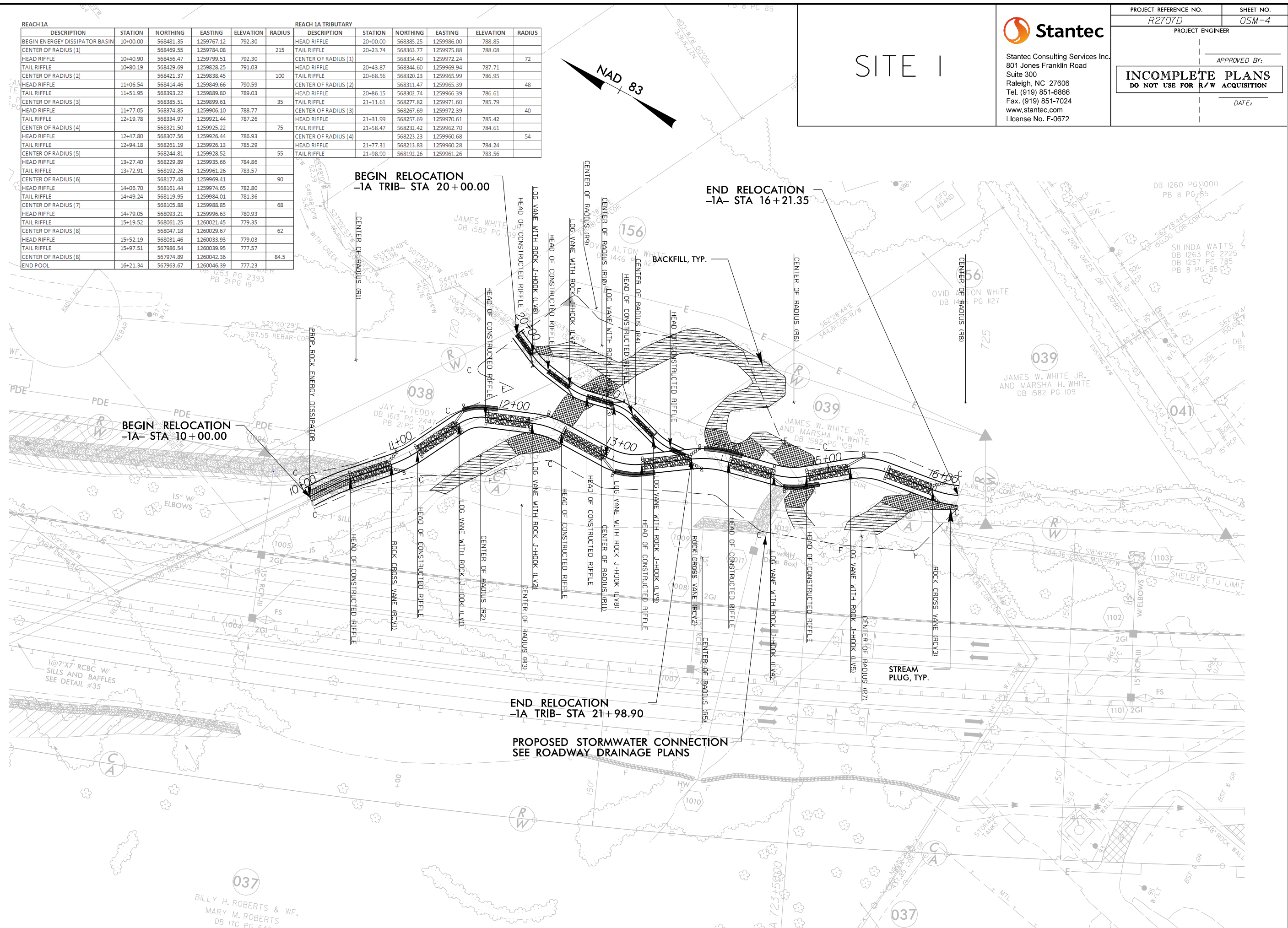
SECTION	QUANTITIY	UNIT	ITEM DESCRIPTION
225	1	LS	UNCLASSIFIED EXCAVATION (CUT)
SP, 226	1	LS	GRADING FOR STREAM RELOCATION
230	1	LS	BORROW EXCAVATION (FILL)
876	957	SY	GEOTEXTILE
876, 1042	213	TON	PLAIN RIP RAP, CLASS A
876, 1042	1,490	TON	PLAIN RIP RAP, CLASS 1
876, 1042	729	TON	PLAIN RIP RAP, CLASS 2
876, 1042	10	TON	PLAIN RIP RAP, CLASS B
1005	576	TON	#57 STONE
1060, 14	7241	SY	COIR FIBER MATTING
1060	4.8	AC	STREAMBANK REFORESTATION
SP	20	EA	LOGS
SP	629	LF	WOOD TOE
SP	719	TON	BOULDER
SP	1488	CY	IMPERVIOUS SELECT MATERIAL

SUMMARY OF APPROXIMATE EARTHWORK FOR STREAM RELOCATION

LOCATION	RELOCATION UNCLASSIFIED EXCAV. (CU.YD.)	RELOCATION EMBANKMENT	RELOCATION BORROW (CU.YD.)	RELOCATION WASTE (CU.YD.)
1A COMBINED	2358	2485	127	
1B COMBINED	2253	1035		1218
2ABC COMBINED	7292	14639	7347	

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

REACH 1A					REACH 1A TRIBUTARY						
DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS	DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS
BEGIN ENERGY DISSIPATOR BASIN	10+00.00	568481.35	1259767.12	792.30		HEAD RIFFLE	20+00.00	568385.25	1259986.00	788.85	
CENTER OF RADIUS (1)		568469.55	1259784.08		215	TAIL RIFFLE	20+23.74	568363.77	1259975.88	788.08	
HEAD RIFFLE	10+40.90	568456.47	1259799.51	792.30		CENTER OF RADIUS (1)		568354.40	1259972.24		72
TAIL RIFFLE	10+80.19	568429.69	1259828.25	791.03		HEAD RIFFLE	20+43.87	568344.60	1259969.94	787.71	
CENTER OF RADIUS (2)		568421.37	1259838.45		100	TAIL RIFFLE	20+68.56	568320.23	1259965.99	786.95	
HEAD RIFFLE	11+06.54	568414.46	1259849.66	790.59		CENTER OF RADIUS (2)		568311.47	1259965.39		48
TAIL RIFFLE	11+51.95	568393.22	1259889.80	789.03		HEAD RIFFLE	20+86.15	568302.74	1259966.39	786.61	
CENTER OF RADIUS (3)		568385.51	1259899.61		35	TAIL RIFFLE	21+11.61	568277.82	1259971.60	785.79	
HEAD RIFFLE	11+77.05	568374.85	1259906.10	788.77		CENTER OF RADIUS (3)		568267.69	1259972.39		40
TAIL RIFFLE	12+19.78	568334.97	1259921.44	787.26		HEAD RIFFLE	21+31.99	568257.69	1259970.61	785.42	
CENTER OF RADIUS (4)		568321.50	1259925.22		75	TAIL RIFFLE	21+58.47	568232.42	1259962.70	784.61	
HEAD RIFFLE	12+47.80	568307.56	1259926.44	786.93		CENTER OF RADIUS (4)		568223.23	1259960.68		54
TAIL RIFFLE	12+94.18	568261.19	1259926.13	785.29		HEAD RIFFLE	21+77.31	568213.83	1259960.28	784.24	
CENTER OF RADIUS (5)		568244.81	1259928.52		55	TAIL RIFFLE	21+98.90	568192.26	1259961.26	783.56	
HEAD RIFFLE	13+27.40	568229.89	1259935.66	784.86							
TAIL RIFFLE	13+72.91	568192.26	1259961.26	783.57							
CENTER OF RADIUS (6)		568177.48	1259969.41		90						
HEAD RIFFLE	14+06.70	568161.44	1259974.65	782.80							
TAIL RIFFLE	14+49.24	568119.95	1259984.01	781.36							
CENTER OF RADIUS (7)		568105.88	1259988.85		68						
HEAD RIFFLE	14+79.05	568093.21	1259996.63	780.93							
TAIL RIFFLE	15+19.52	568061.25	1260021.45	779.35							
CENTER OF RADIUS (8)		568047.18	1260029.67		62						
HEAD RIFFLE	15+52.19	568031.46	1260033.93	779.03							
TAIL RIFFLE	15+97.51	567986.54	1260039.95	777.57							
CENTER OF RADIUS (8)		567974.89	1260042.36		84.5						
END POOL	16+21.34	567963.67	1260046.39	777.23							

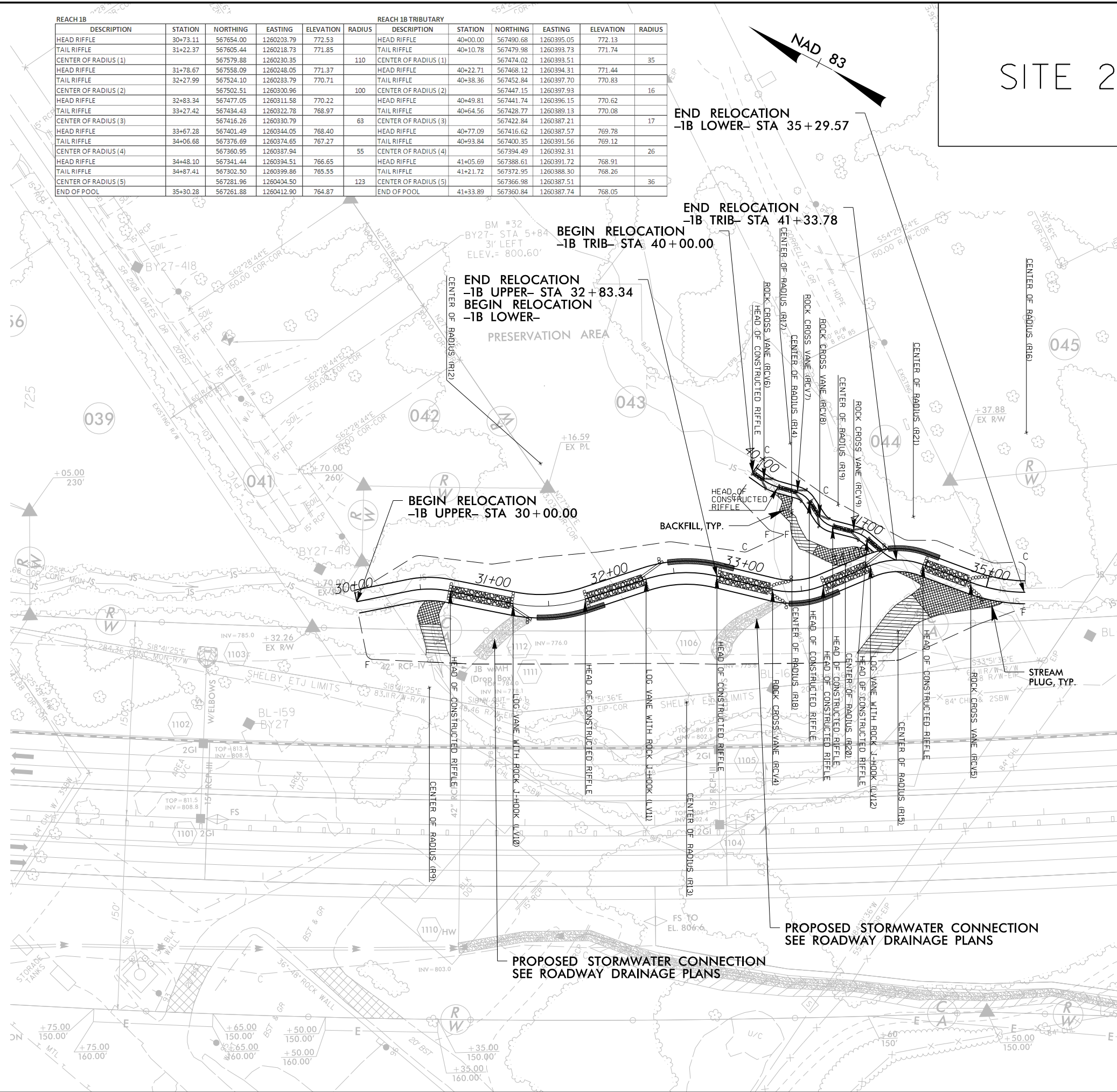


8/17/99

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REACH 1B					REACH 1B TRIBUTARY						
DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS	DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS
HEAD RIFFLE	30+73.11	567654.00	1260203.79	772.53		HEAD RIFFLE	40+00.00	567490.68	1260395.05	772.13	
TAIL RIFFLE	31+22.37	567605.44	1260218.73	771.85		TAIL RIFFLE	40+10.78	567479.98	1260393.73	771.74	
CENTER OF RADIUS (1)		567579.88	1260230.35		110	CENTER OF RADIUS (1)		567474.02	1260393.51		35
HEAD RIFFLE	31+78.67	567558.09	1260248.05	771.37		HEAD RIFFLE	40+22.71	567468.12	1260394.31	771.44	
TAIL RIFFLE	32+27.99	567524.10	1260283.79	770.71		TAIL RIFFLE	40+38.36	567452.84	1260397.70	770.83	
CENTER OF RADIUS (2)		567502.51	1260300.96		100	CENTER OF RADIUS (2)		567447.15	1260397.93		16
HEAD RIFFLE	32+83.34	567477.05	1260311.58	770.22		HEAD RIFFLE	40+49.81	567441.74	1260396.15	770.62	
TAIL RIFFLE	33+27.42	567434.43	1260322.78	768.97		TAIL RIFFLE	40+64.56	567428.77	1260389.13	770.08	
CENTER OF RADIUS (3)		567416.26	1260330.79		63	CENTER OF RADIUS (3)		567422.84	1260387.21		17
HEAD RIFFLE	33+67.28	567401.49	1260344.05	768.40		HEAD RIFFLE	40+77.09	567416.62	1260387.57	769.78	
TAIL RIFFLE	34+06.68	567376.69	1260374.65	767.27		TAIL RIFFLE	40+93.84	567400.35	1260391.56	769.12	
CENTER OF RADIUS (4)		567360.95	1260387.94		55	CENTER OF RADIUS (4)		567394.49	1260392.31		26
HEAD RIFFLE	34+48.10	567341.44	1260394.51	766.65		HEAD RIFFLE	41+05.69	567388.61	1260391.72	768.91	
TAIL RIFFLE	34+87.41	567302.50	1260399.86	765.55		TAIL RIFFLE	41+21.72	567372.95	1260388.30	768.26	
CENTER OF RADIUS (5)		567281.96	1260404.50		123	CENTER OF RADIUS (5)		567366.98	1260387.51		36
END OF POOL	35+30.28	567261.88	1260412.90	764.87		END OF POOL	41+33.89	567360.84	1260387.74	768.05	



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PROJECT REFERENCE NO.	SHEET NO.
R2707D	OSM-5
PROJECT ENGINEER	
APPROVED BY:	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DATE:	

8/17/99

REVISIONS

1/24/2018
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2B-C	DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS
	BEGIN ENERGY DISSIPATOR BASIN	60+00.00	566446.90	1260911.39	754	
	CENTER OF RADIUS (1)		566446.09	1260921.01		296
	HEAD RIFFLE	60+40.97	566483.73	1260929.26	754.00	
	TAIL RIFFLE	60+86.03	566525.54	1260946.08	752.76	
	CENTER OF RADIUS (2)		566542.24	1260950.50		70
	HEAD RIFFLE	61+20.68	566559.52	1260950.70	752.15	
	TAIL RIFFLE	61+64.71	566603.27	1260945.76	750.88	
	CENTER OF RADIUS (3)		566620.40	1260947.13		45
	HEAD RIFFLE	61+99.30	566635.77	1260954.82	750.34	
	TAIL RIFFLE	62+40.11	566668.12	1260979.72	749.13	
	CENTER OF RADIUS (4)		566684.00	1260988.28		56
	HEAD RIFFLE	62+76.36	566701.78	1260991.34	748.55	
	TAIL RIFFLE	63+23.20	566748.62	1260991.76	747.24	
	CENTER OF RADIUS (5)		566768.05	1260999.41		95
	HEAD RIFFLE	63+64.61	566785.00	1261010.83	746.51	
	TAIL RIFFLE	64+24.63	566823.78	1261056.65	744.84	
	CENTER OF RADIUS (6)		566832.74	1261071.60		54
	END OF POOL	64+60.02	566836.50	1261089.00	744.31	

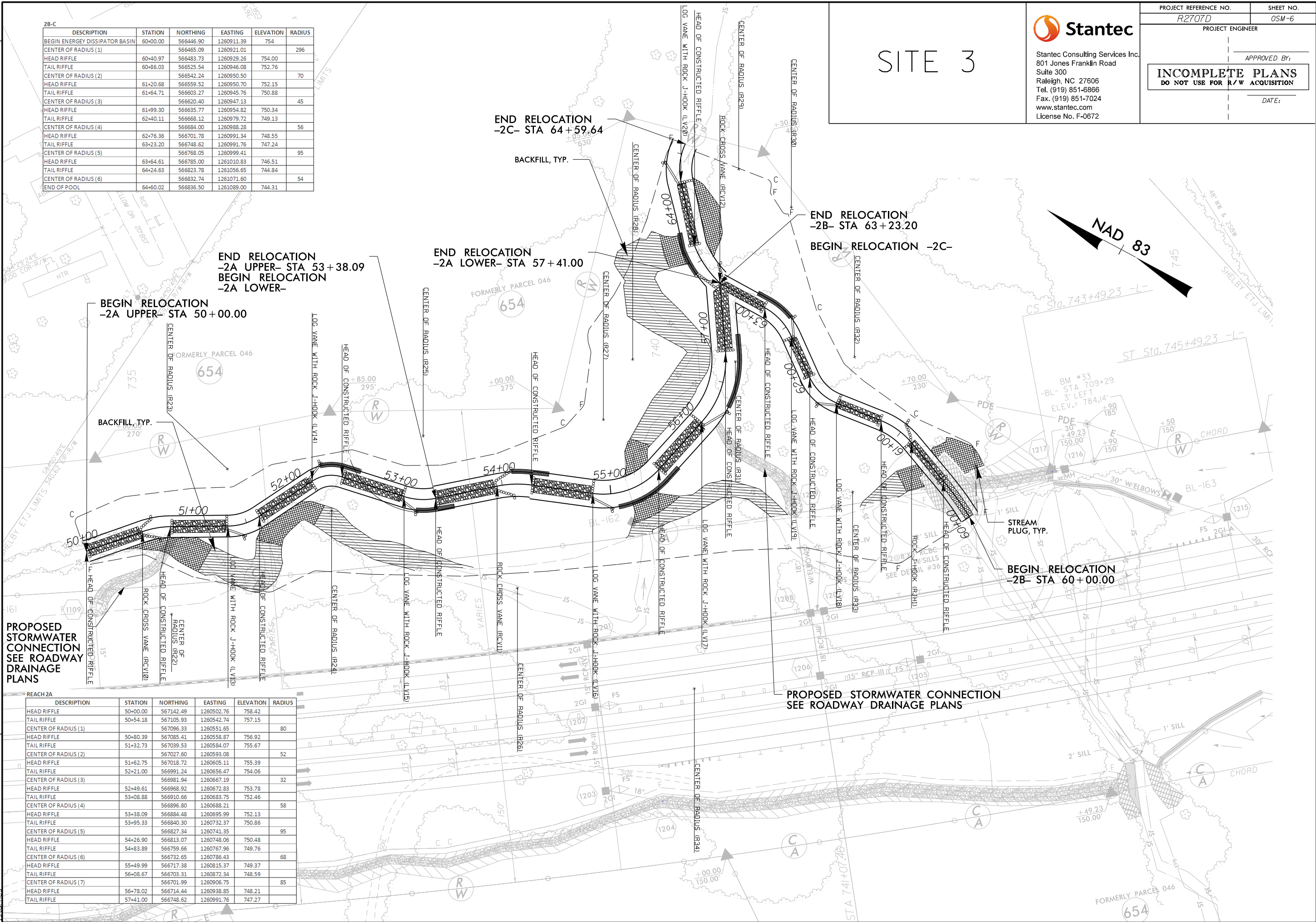
REACH 2A	DESCRIPTION	STATION	NORTHING	EASTING	ELEVATION	RADIUS
	HEAD RIFFLE	50+00.00	567142.49	1260502.76	758.42	
	TAIL RIFFLE	50+54.18	567105.93	1260542.74	757.15	
	CENTER OF RADIUS (1)		567096.33	1260551.65		80
	HEAD RIFFLE	50+80.39	567085.41	1260558.87	756.92	
	TAIL RIFFLE	51+32.73	567039.53	1260584.07	755.67	
	CENTER OF RADIUS (2)		567027.60	1260593.08		52
	HEAD RIFFLE	51+62.75	567018.72	1260605.11	755.39	
	TAIL RIFFLE	52+21.00	566991.24	1260656.47	754.06	
	CENTER OF RADIUS (3)		566981.94	1260667.19		32
	HEAD RIFFLE	52+49.61	566968.92	1260672.83	753.78	
	TAIL RIFFLE	53+08.88	566910.66	1260683.75	752.46	
	CENTER OF RADIUS (4)		566896.80	1260688.21		58
	HEAD RIFFLE	53+38.09	566884.48	1260695.99	752.13	
	TAIL RIFFLE	53+95.33	566840.30	1260732.37	750.86	
	CENTER OF RADIUS (5)		566827.34	1260741.35		95
	HEAD RIFFLE	54+26.90	566813.07	1260748.06	750.48	
	TAIL RIFFLE	54+83.89	566759.66	1260767.96	749.76	
	CENTER OF RADIUS (6)		566732.65	1260786.43		68
	HEAD RIFFLE	55+49.99	566717.38	1260815.37	749.37	
	TAIL RIFFLE	56+08.67	566703.31	1260872.34	748.59	
	CENTER OF RADIUS (7)		566701.99	1260906.75		85
	HEAD RIFFLE	56+78.02	566714.44	1260938.85	748.21	
	TAIL RIFFLE	57+41.00	566748.62	1260991.76	747.27	

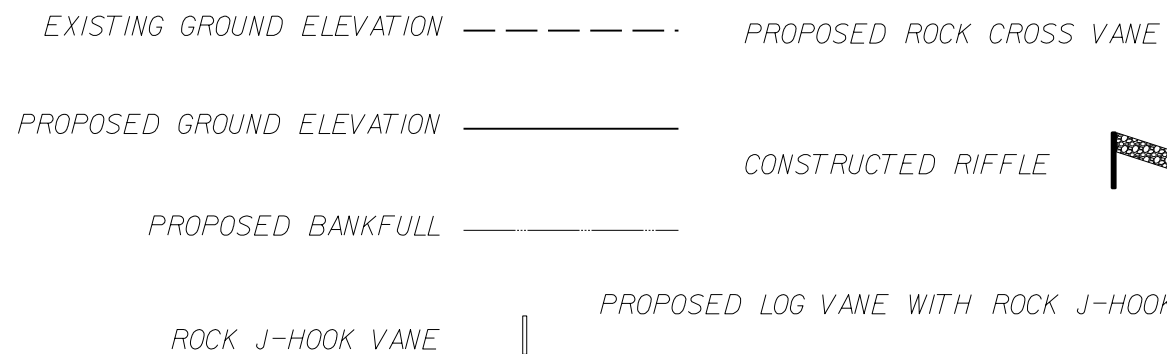
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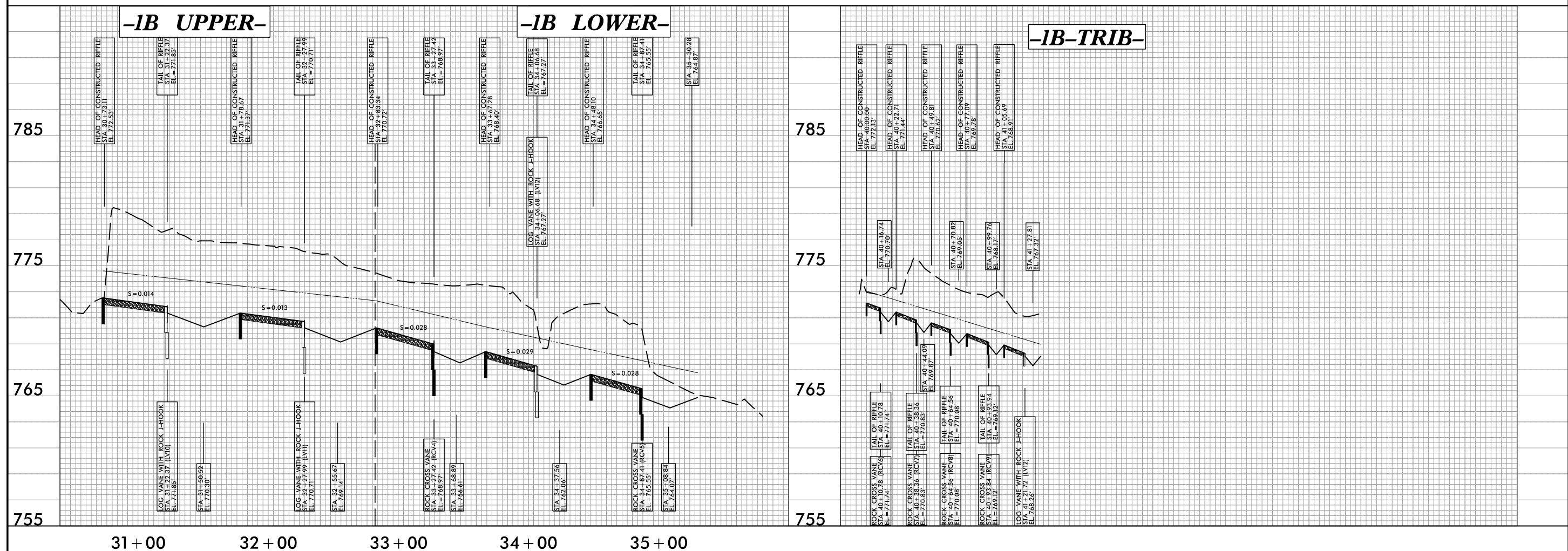
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PROJECT REFERENCE NO.	SHEET NO.
R2707D	OSM-6
PROJECT ENGINEER	
APPROVED BY:	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DATE:	





SITE 2 PROFILES



LEGEND

EXISTING GROUND ELEVATION — — — — —. PROPOSED ROCK CROSS VANE

PROPOSED GROUND ELEVATION _____ CONSTRUCTED RIFFLE

PROPOSED BANKFULL _____

ROCK J-HOOK VANE PROPOSED LOG VANE WITH ROCK J-HOOK

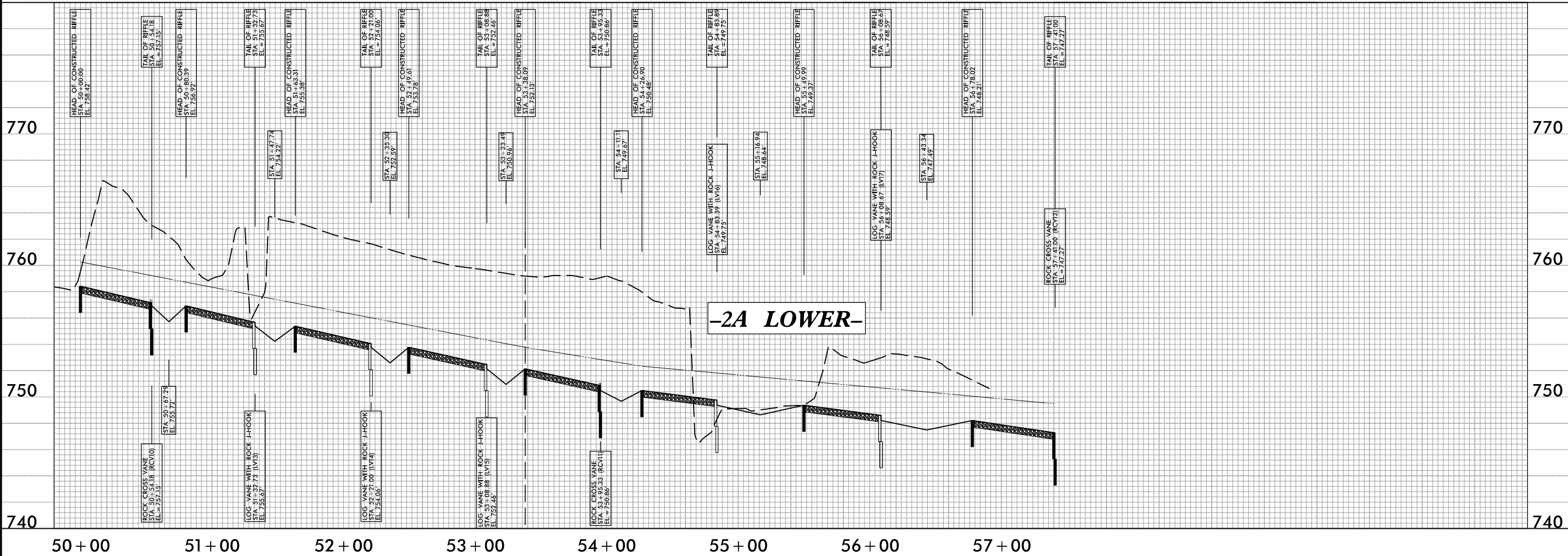
SITE 3
PROFILE



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R2707D	OSM-9
PROJECT ENGINEER	
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-2A UPPER-



-2A LOWER-

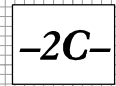
LEGEND

EXISTING GROUND ELEVATION - - - - - PROPOSED ROCK CROSS VANE

PROPOSED GROUND ELEVATION _____ CONSTRUCTED RIFFLE

PROPOSED BANKFULL PROPOSED LOG VANE WITH ROCK J-HOOK

ROCK J-HOOK VANE



EXISTING GROUND ELEVATION — — — — —

PROPOSED GROUND ELEVATION —————

PROPOSED BANKFULL

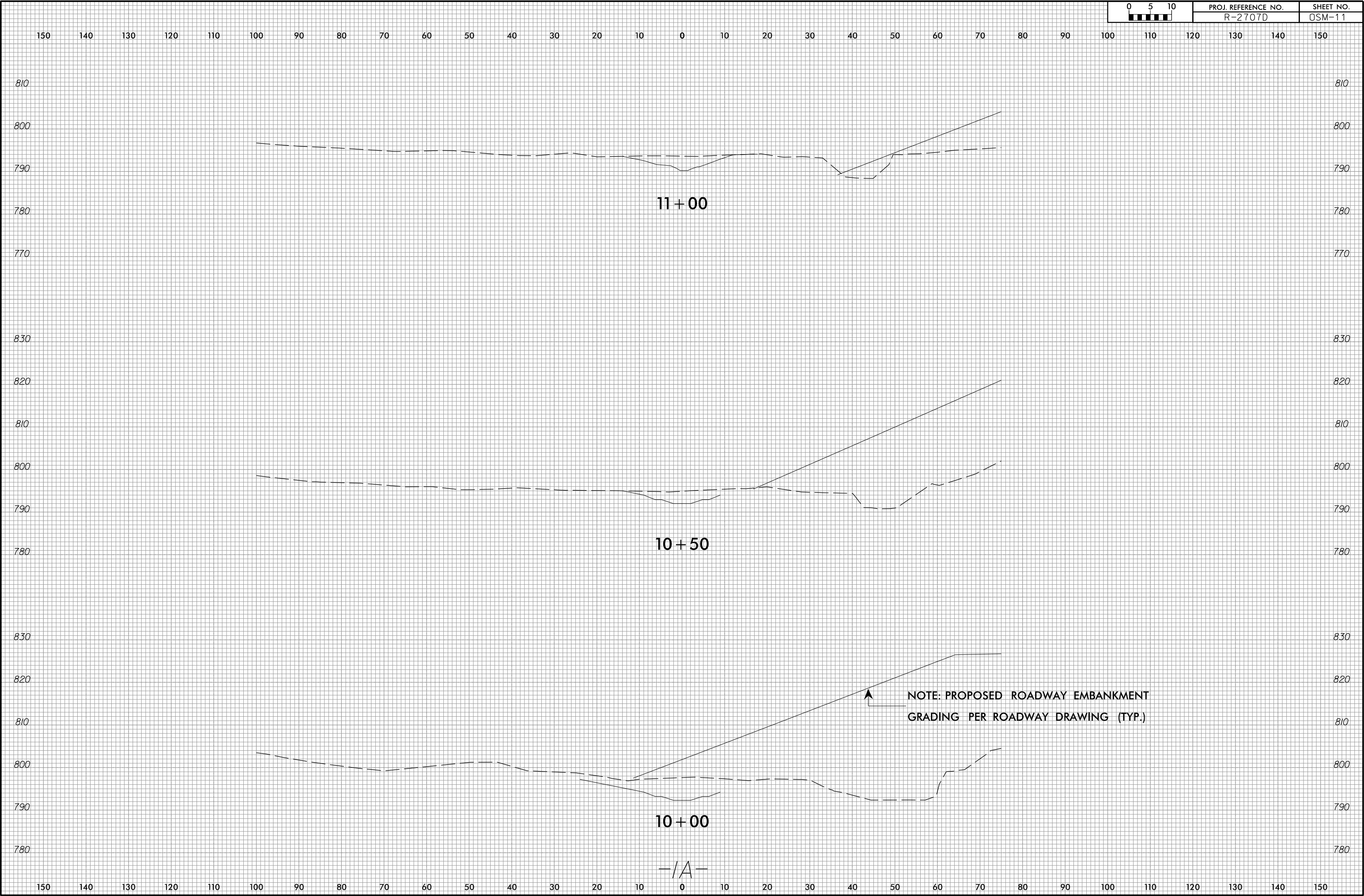
CONSTRUCTED RIFFLE

PROPOSED LOG VANE WITH ROCK J-HOOK

ROCK J-HOOK VANE

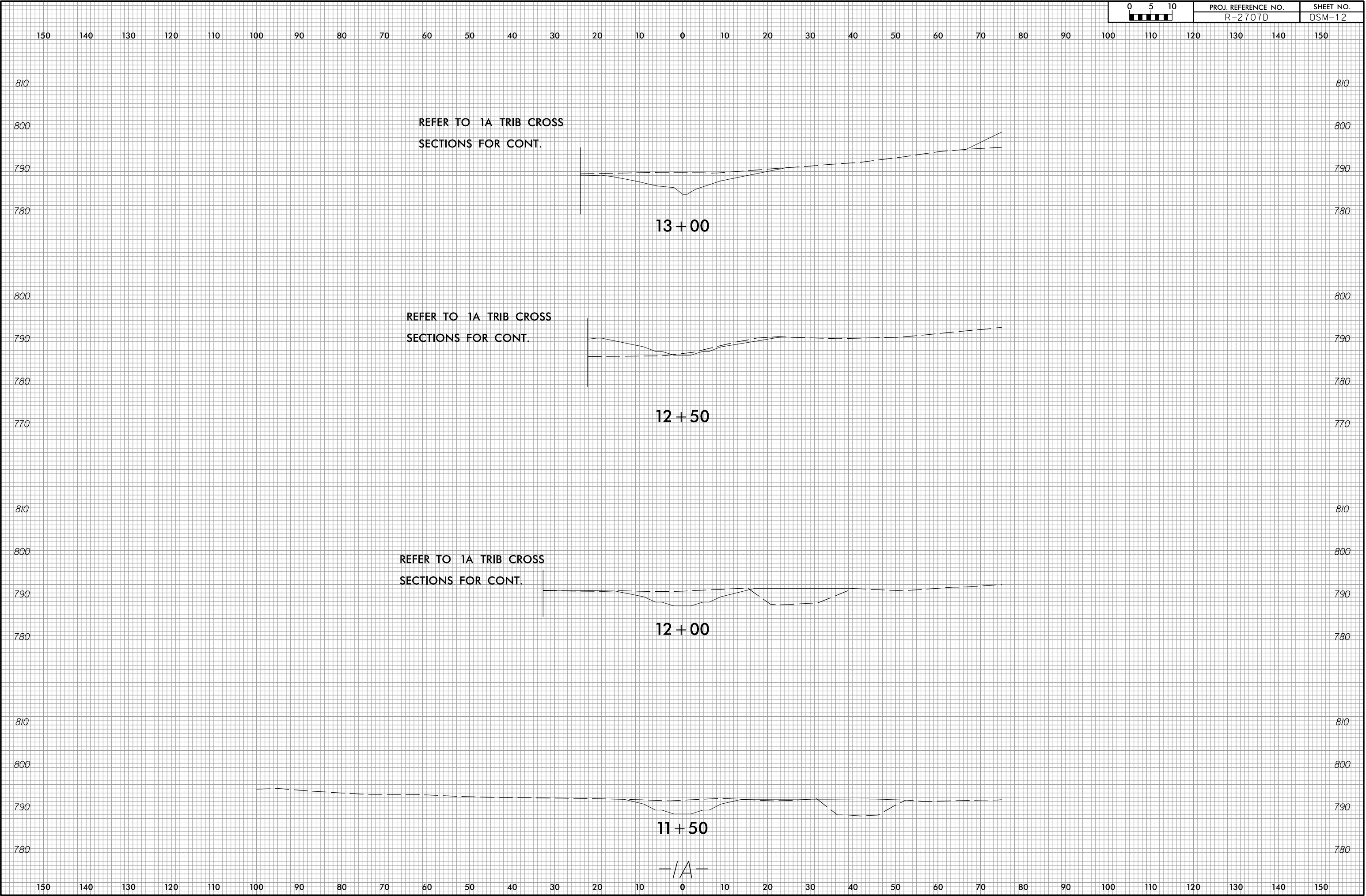
6/23/16

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	R-2707D	OSM-11



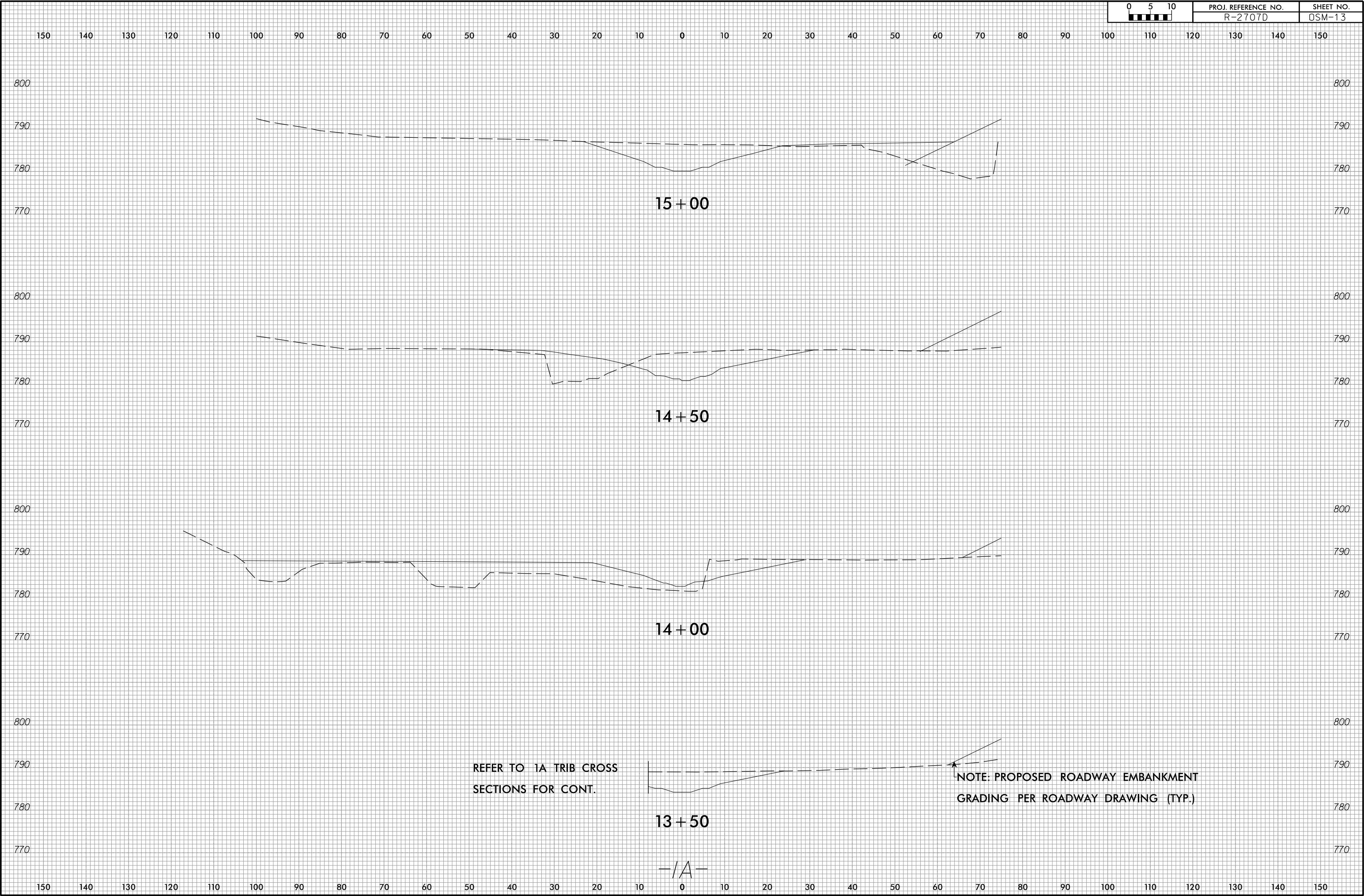
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6/23/16

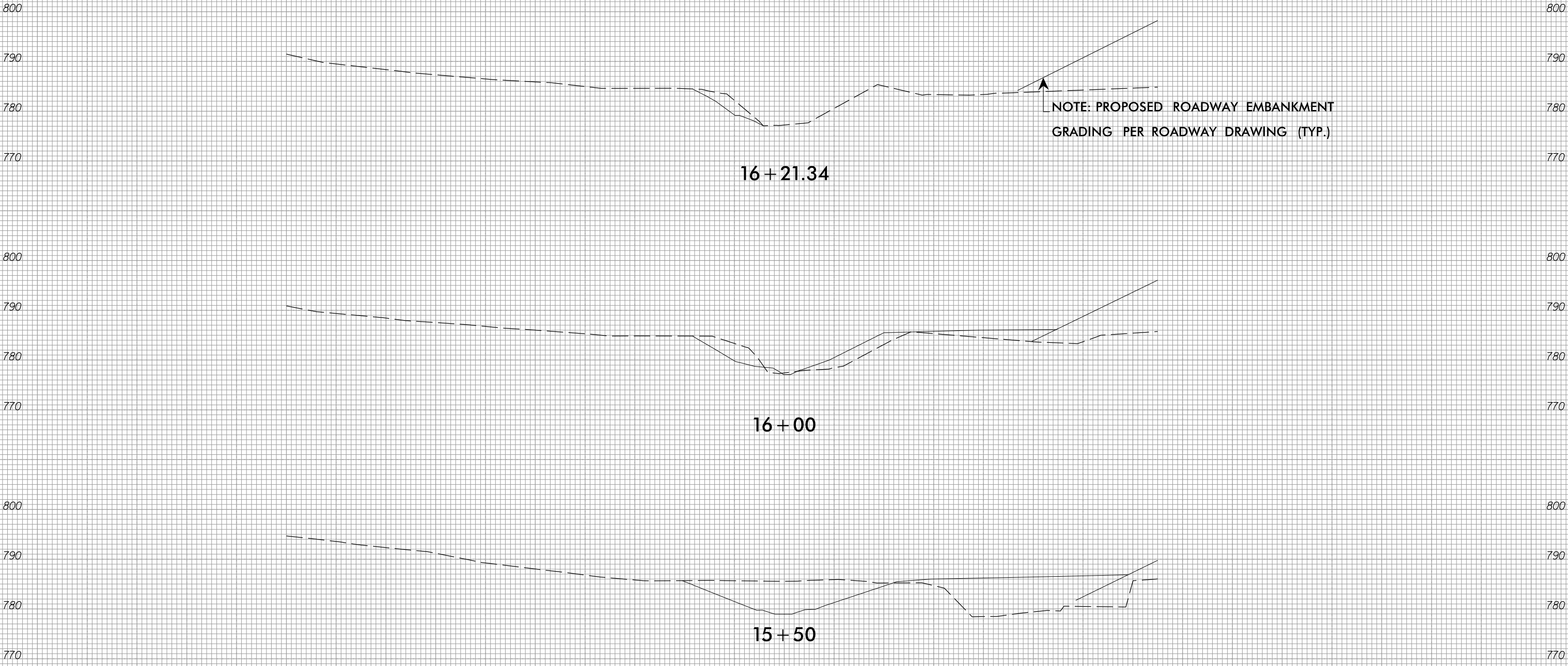
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6/23/16

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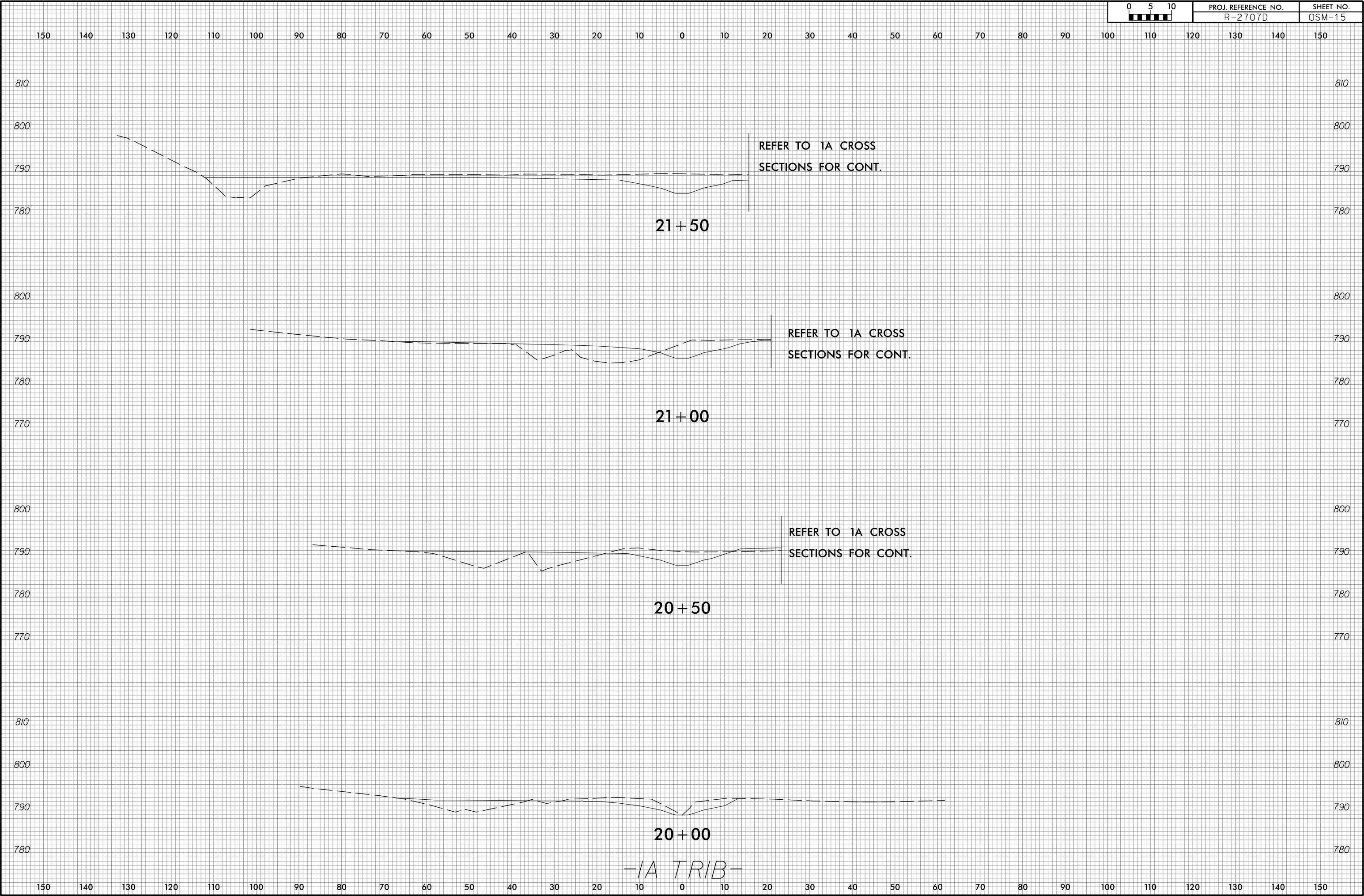
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-1A-

6/23/16

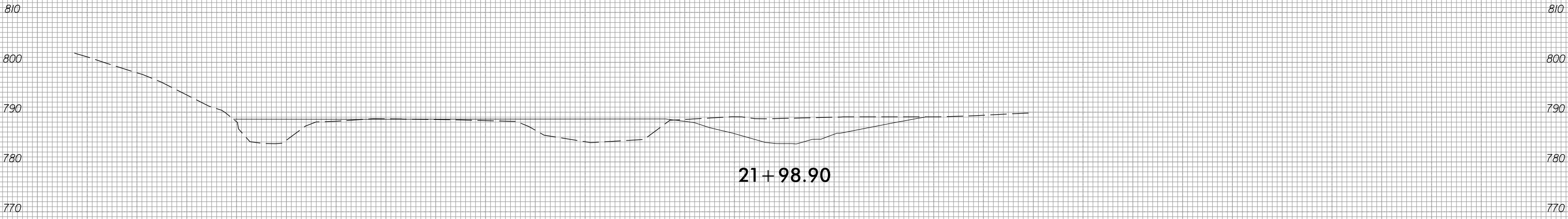
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6/23/16

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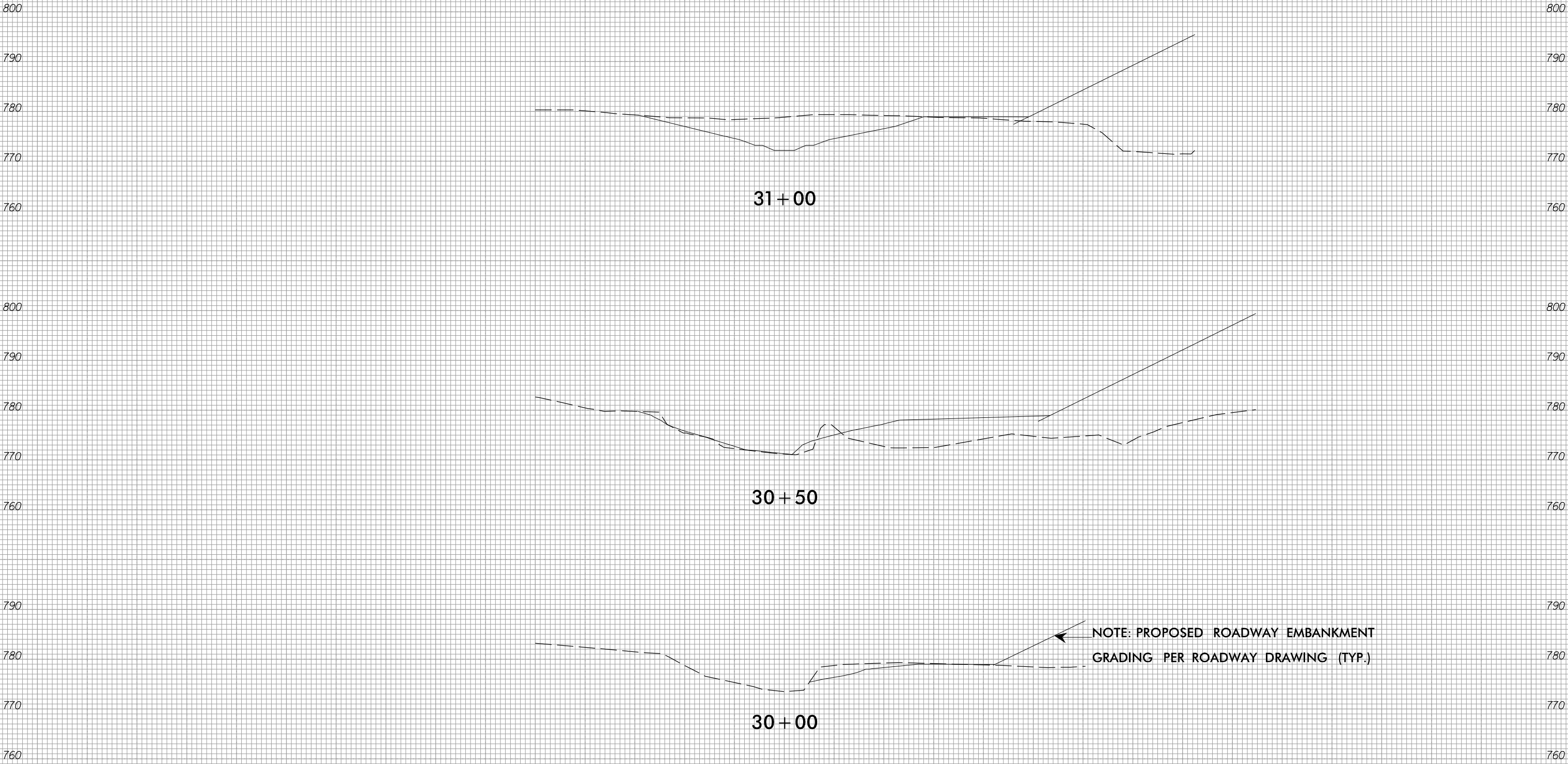
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7/24/2018
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6/23/16

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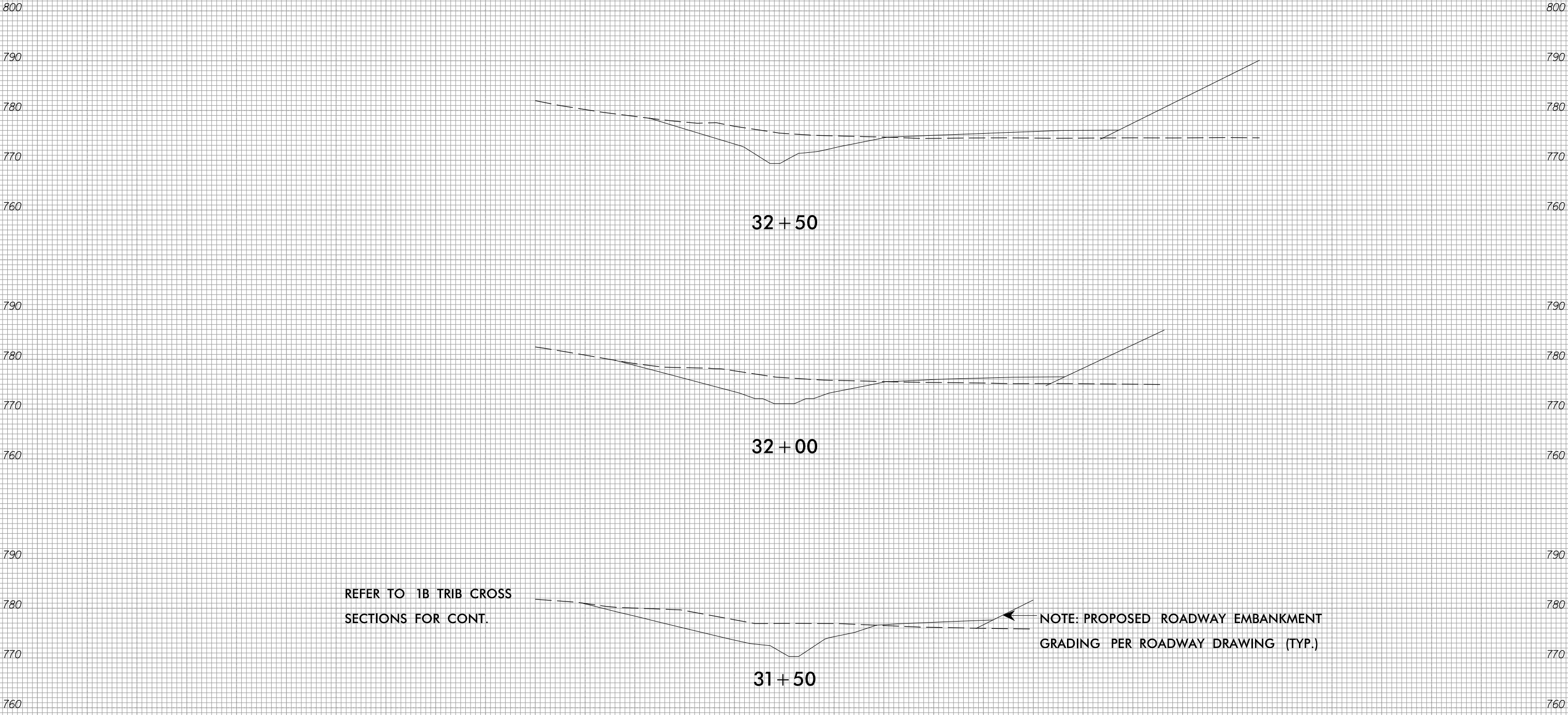


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6/23/16

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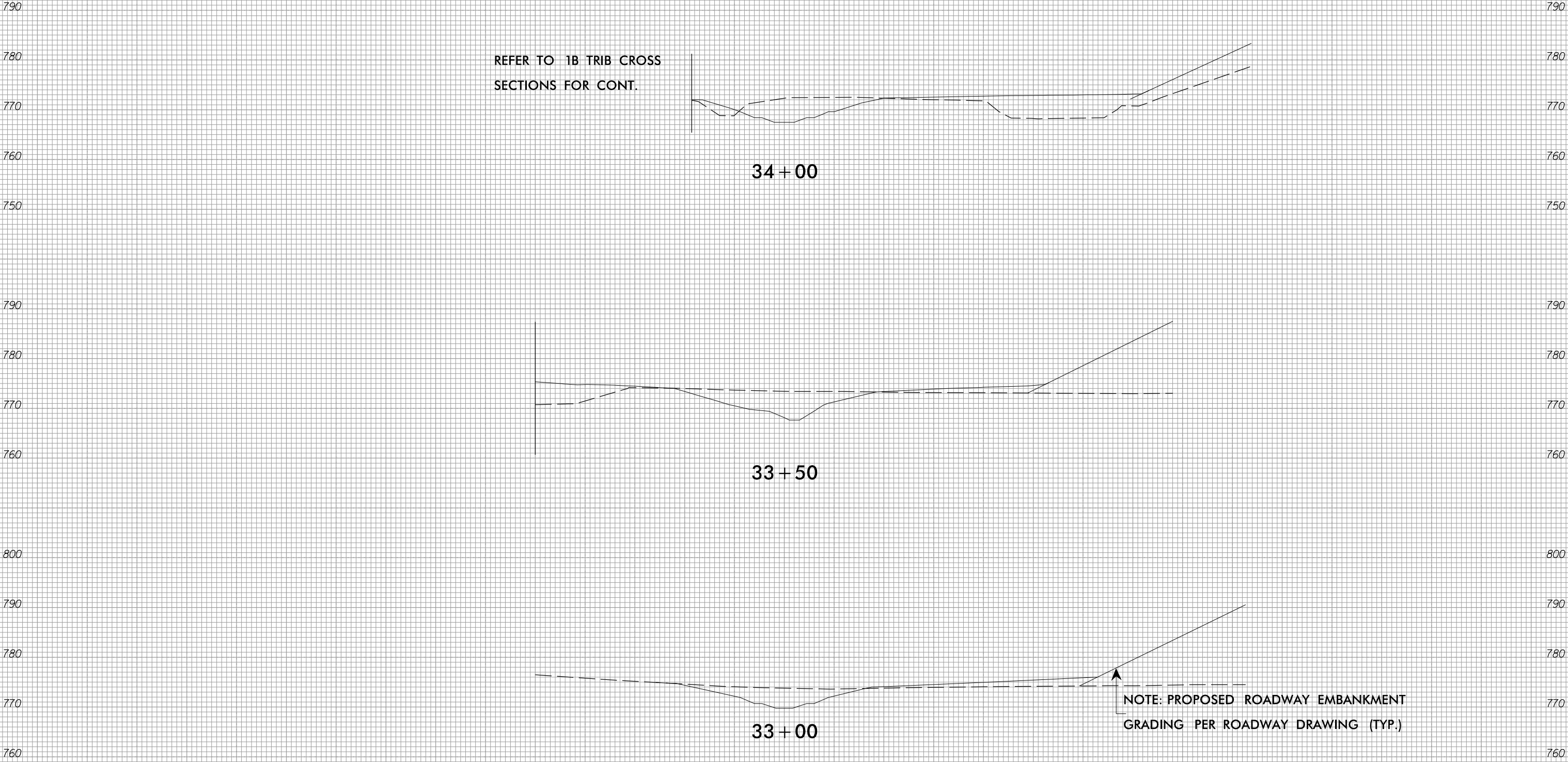


-1B UPPER-

6/23/16

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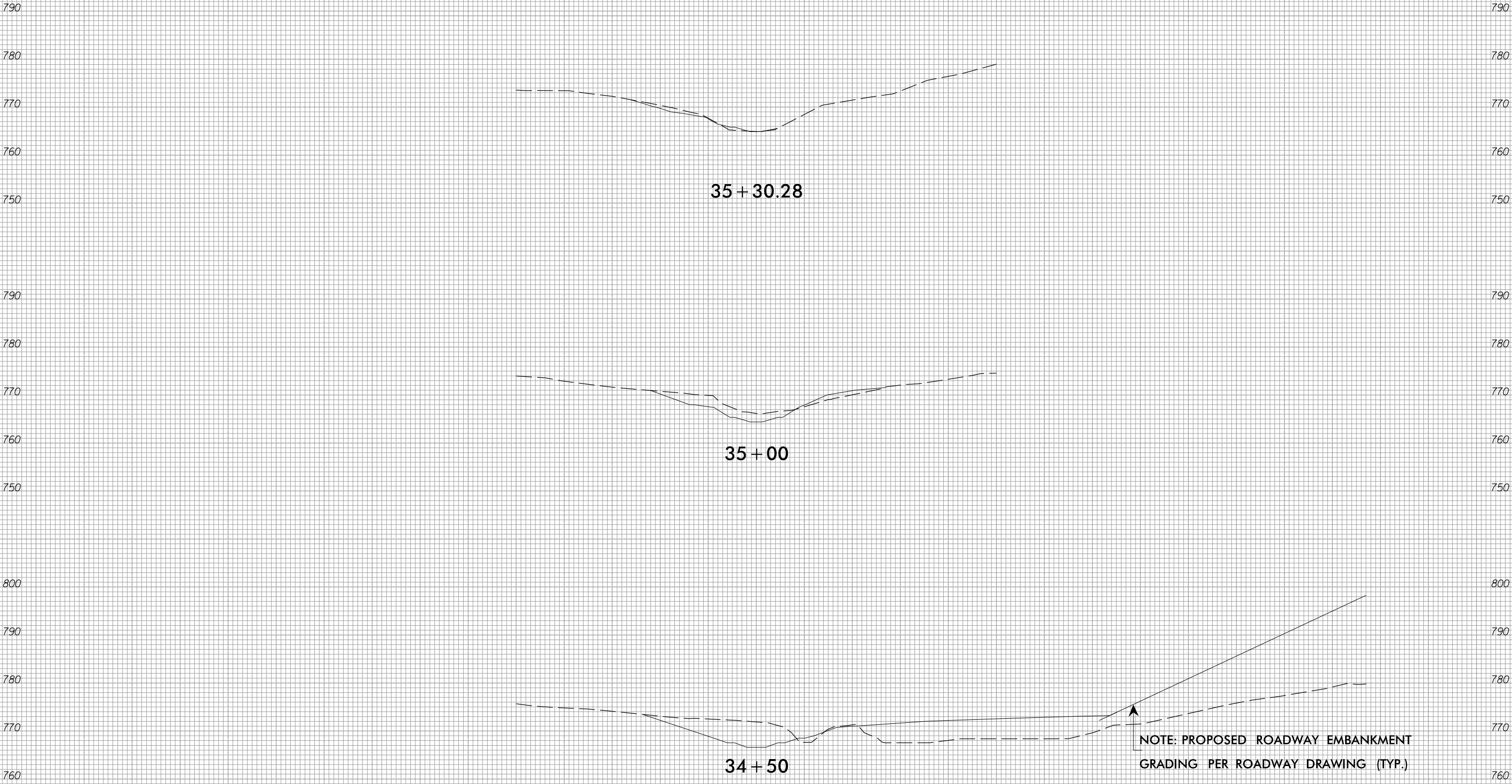


-1B LOWER-

6/23/16

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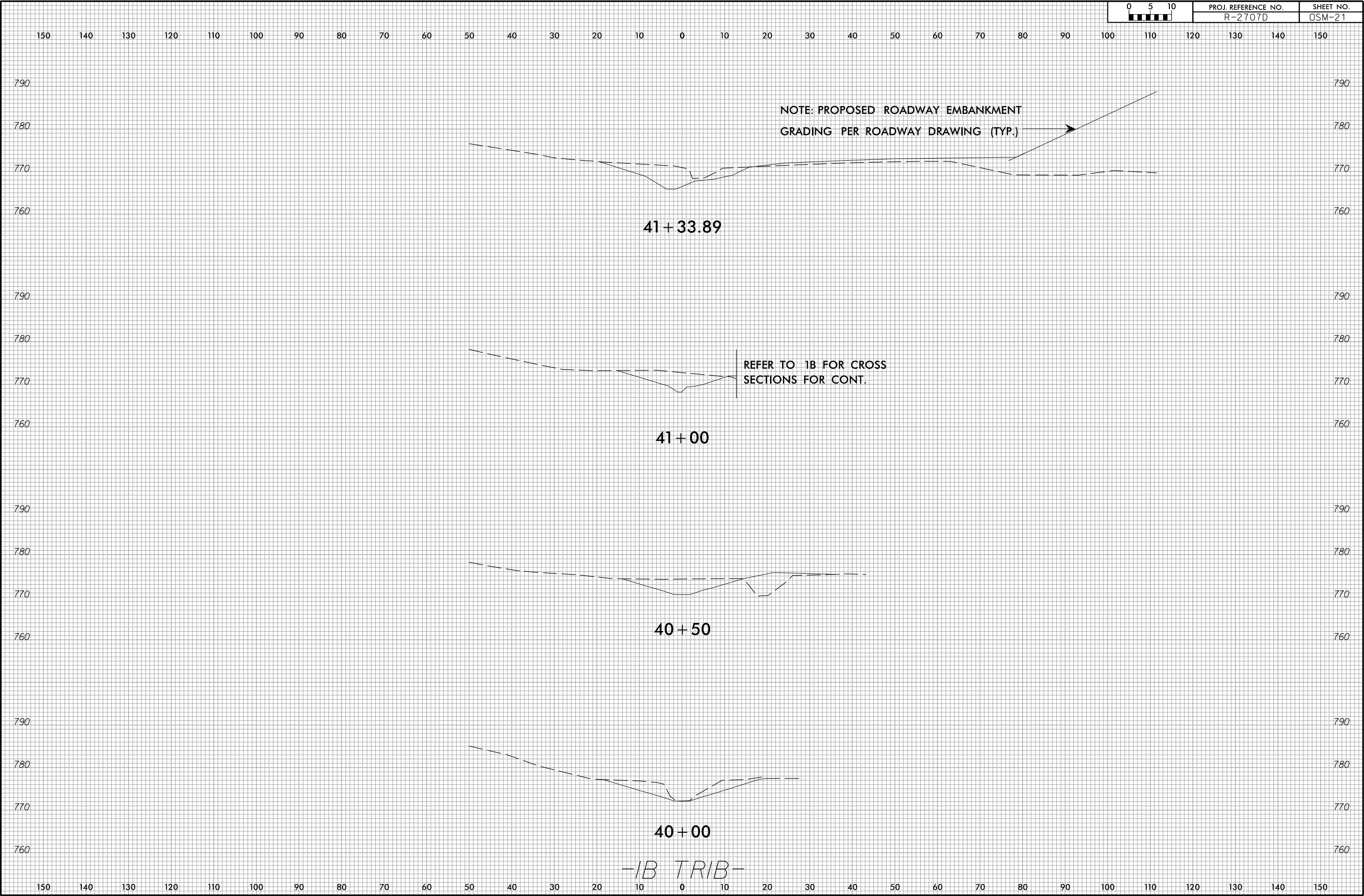
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-IB LOWER-

6/23/16

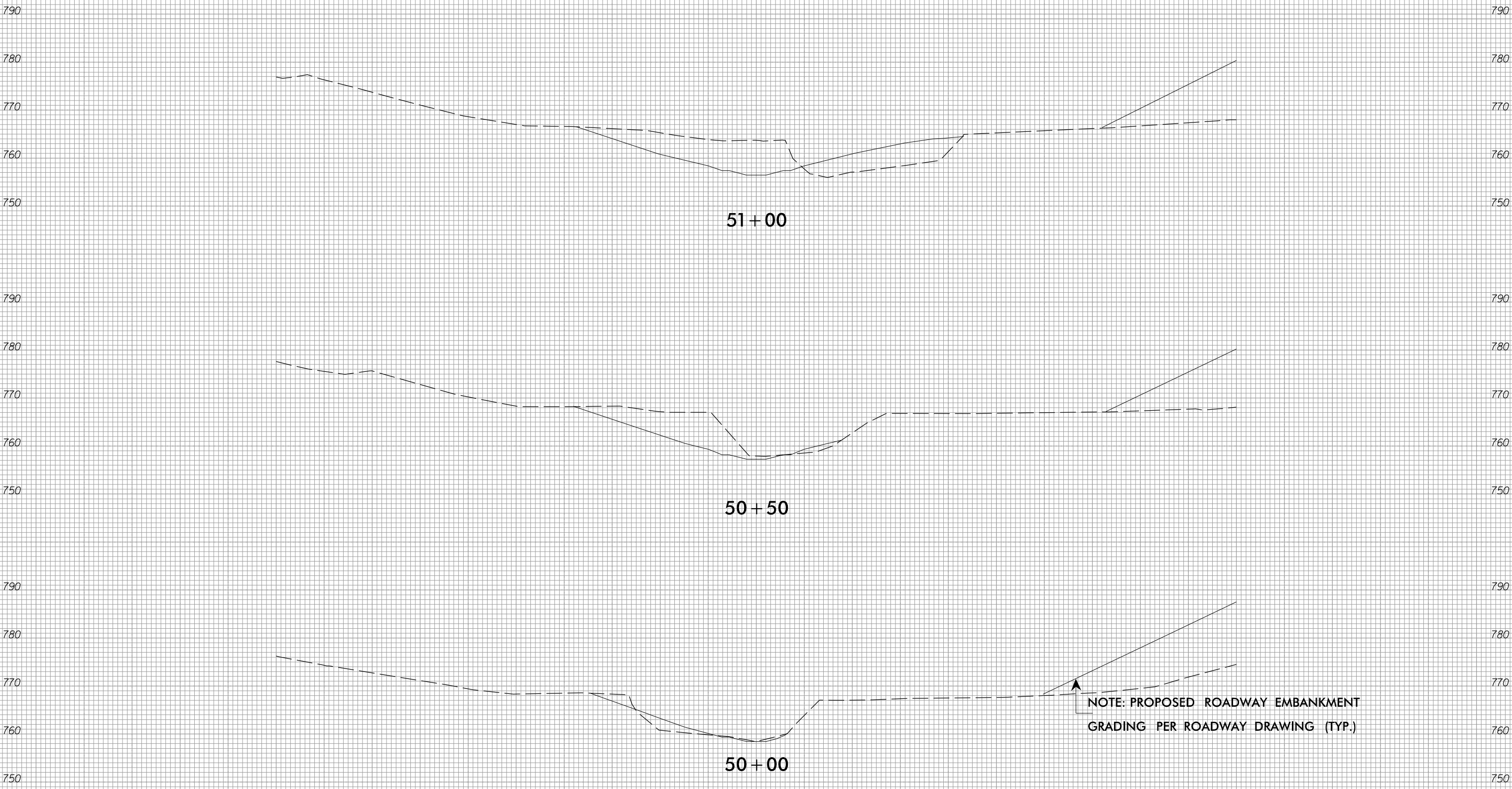
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	R-2707D	OSM-21



6/23/16

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51+00

50+50

50+00

NOTE: PROPOSED ROADWAY EMBANKMENT
GRADING PER ROADWAY DRAWING (TYP.)

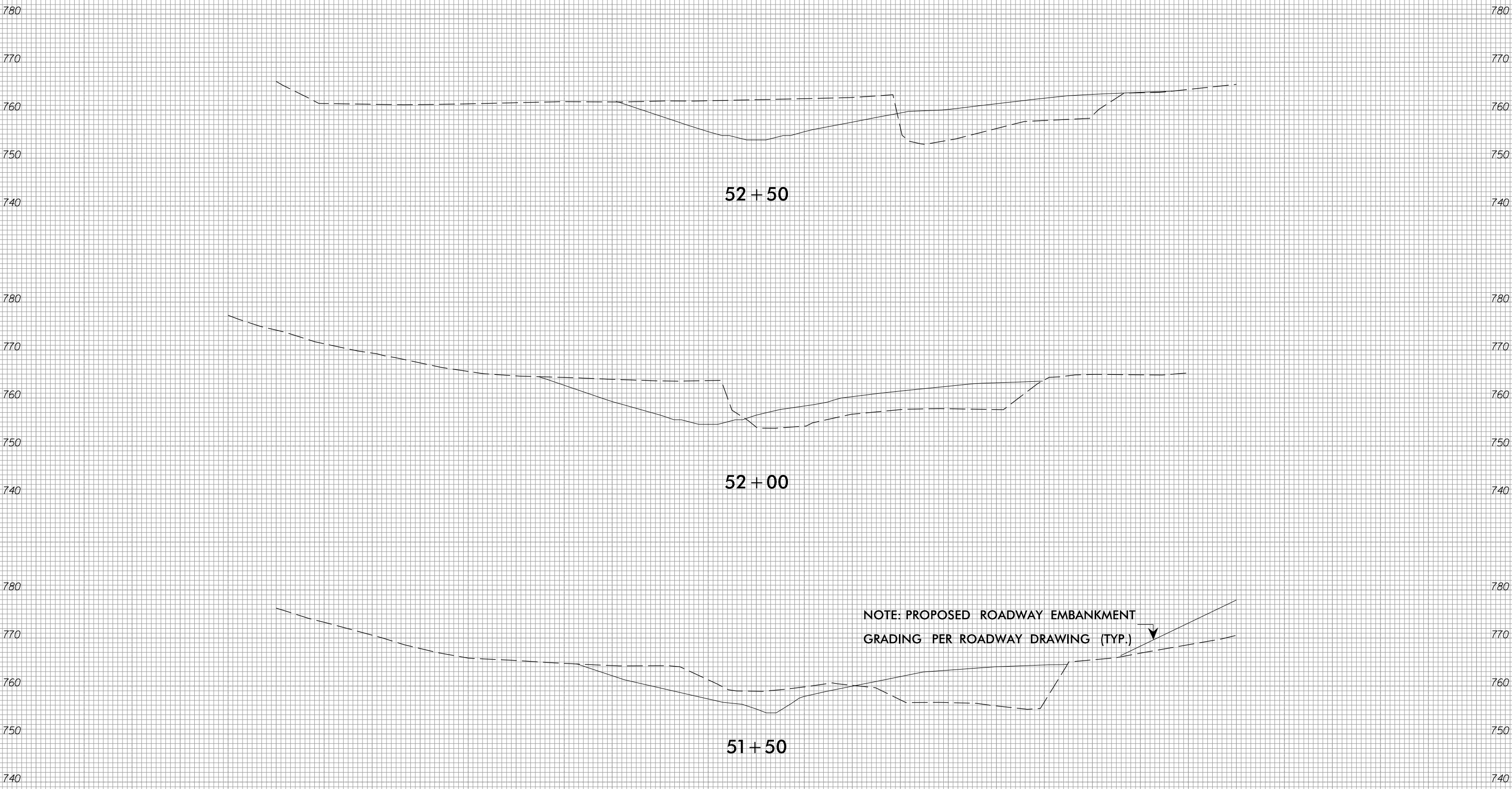
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7/24/2018
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52+50

52+00

51+50

NOTE: PROPOSED ROADWAY EMBANKMENT
GRADING PER ROADWAY DRAWING (TYP.)



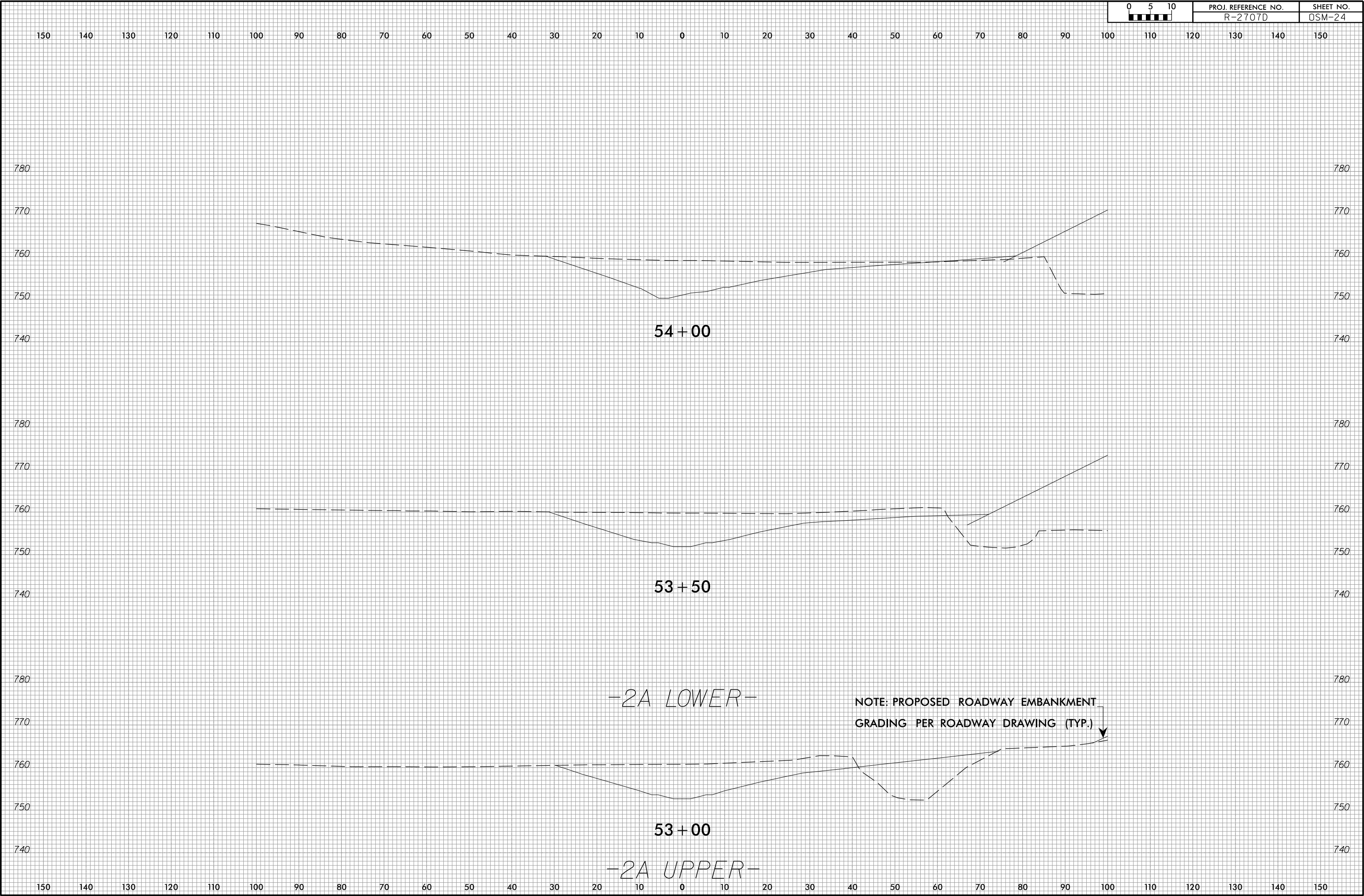
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Joe Jackson

6/23/16

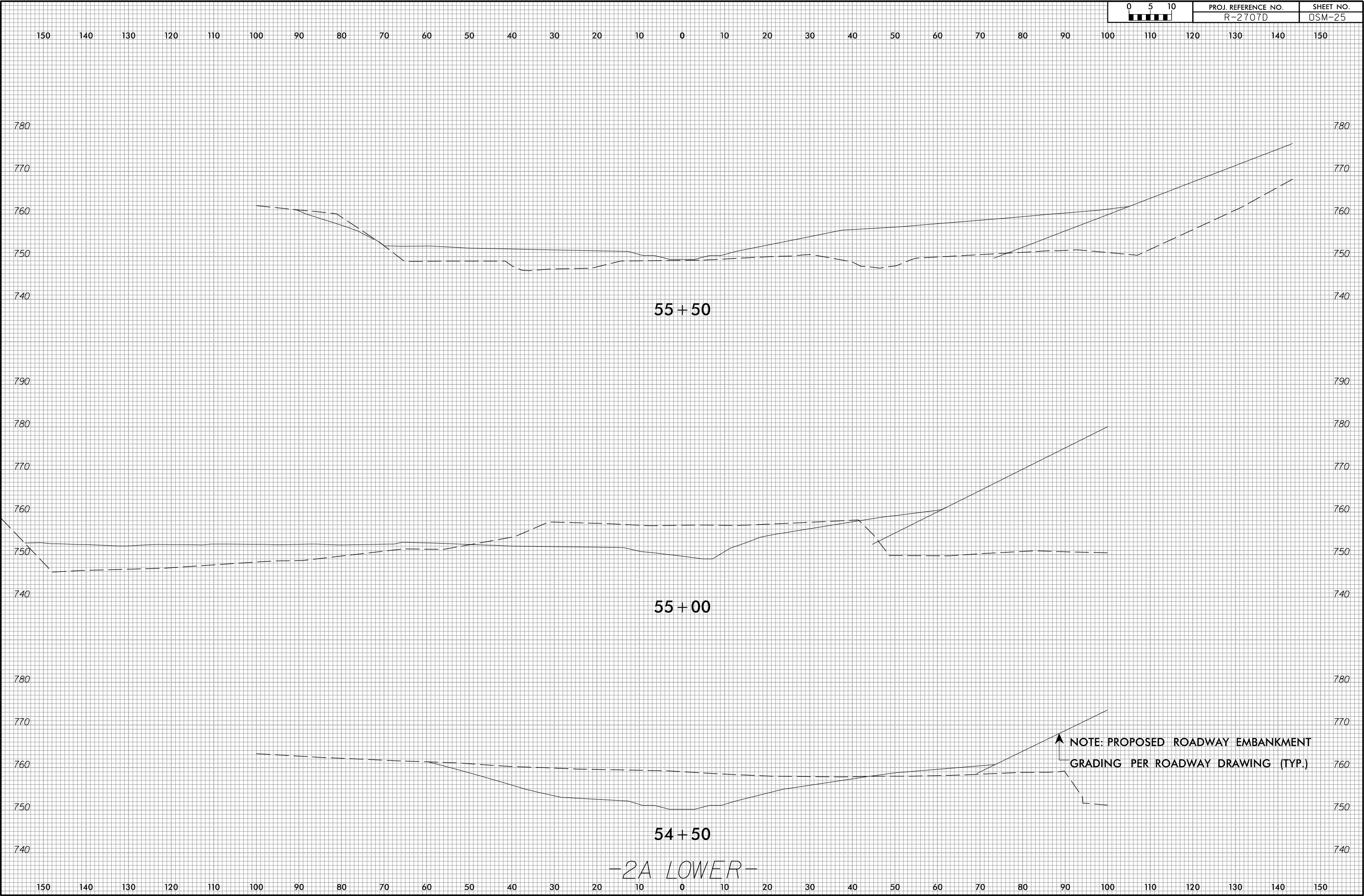
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Joe Jackson

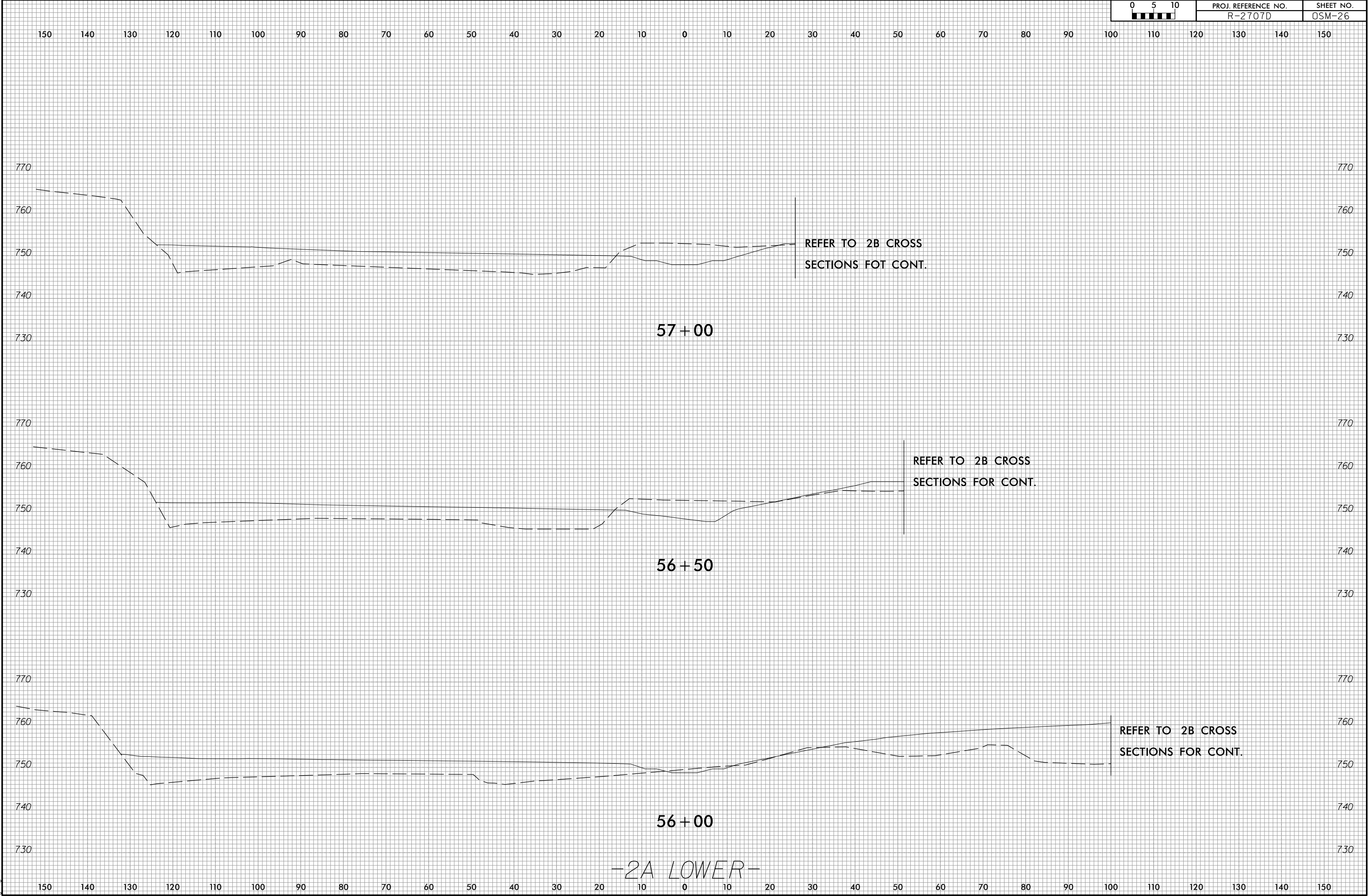
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6/23/16

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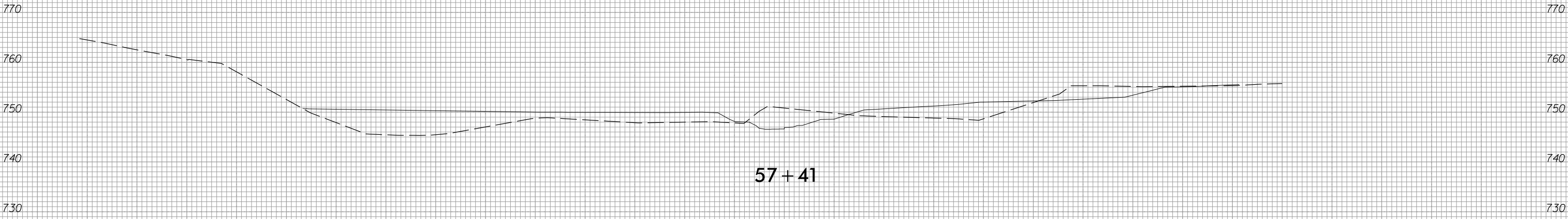




6/23/16

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57+41

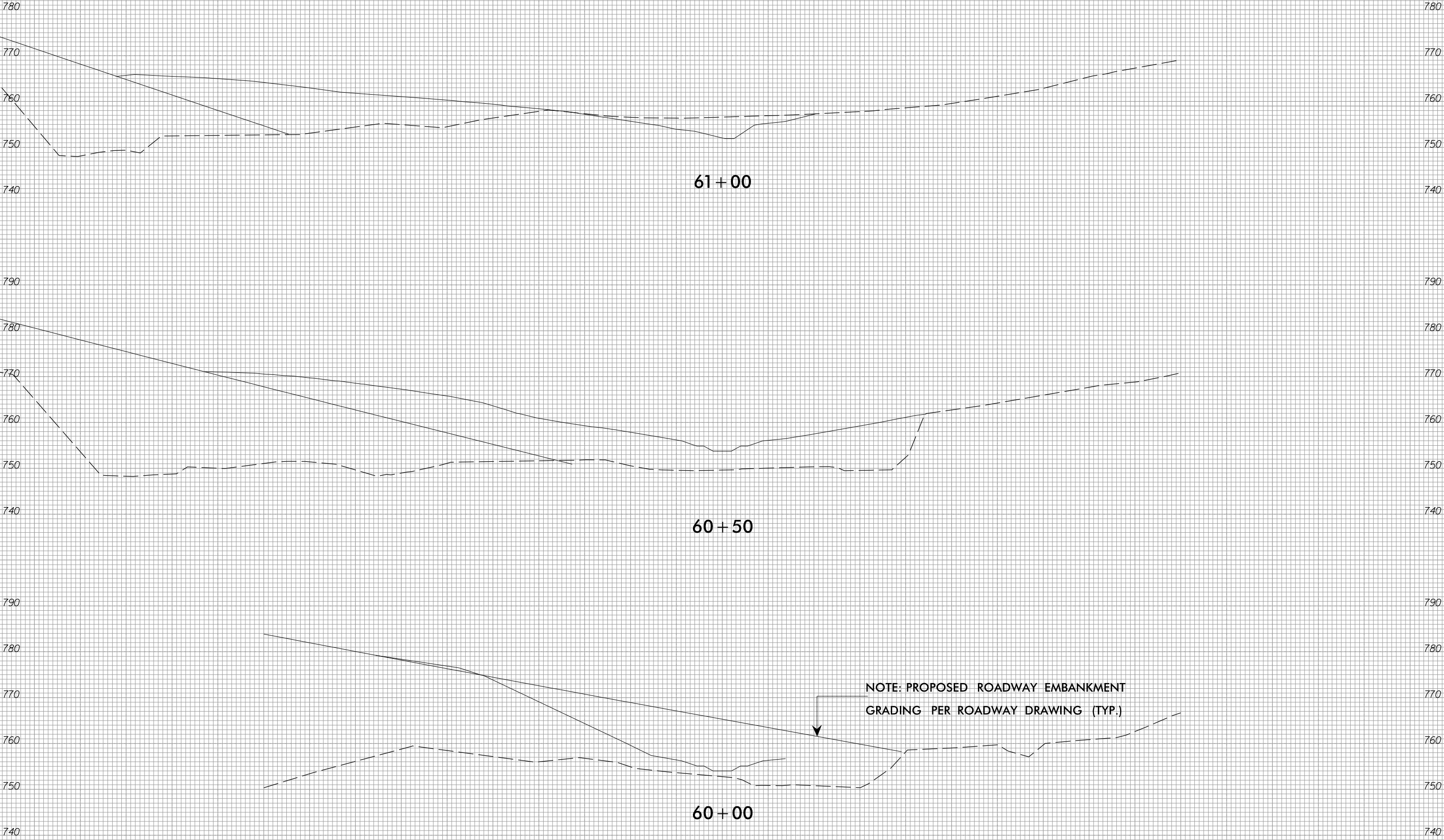
-2A LOWER-

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log Jackson

6/23/16

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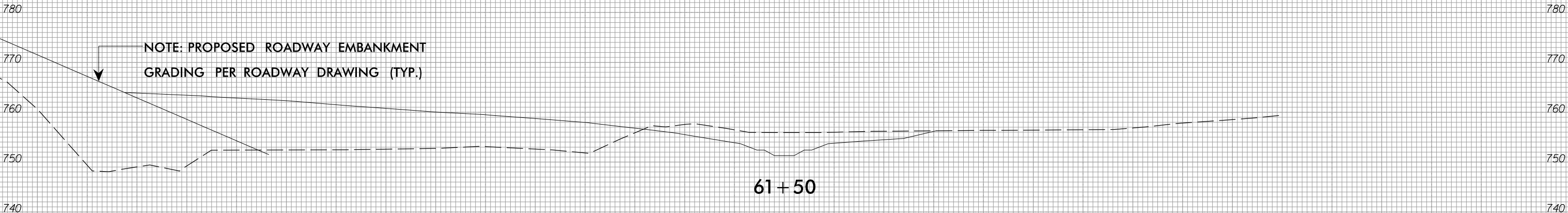
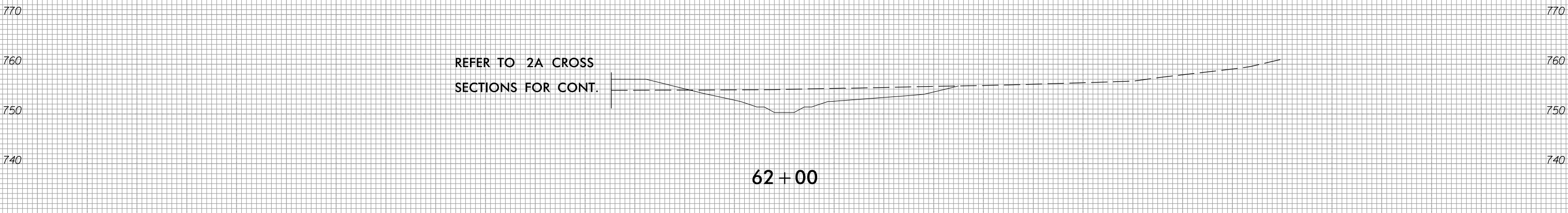
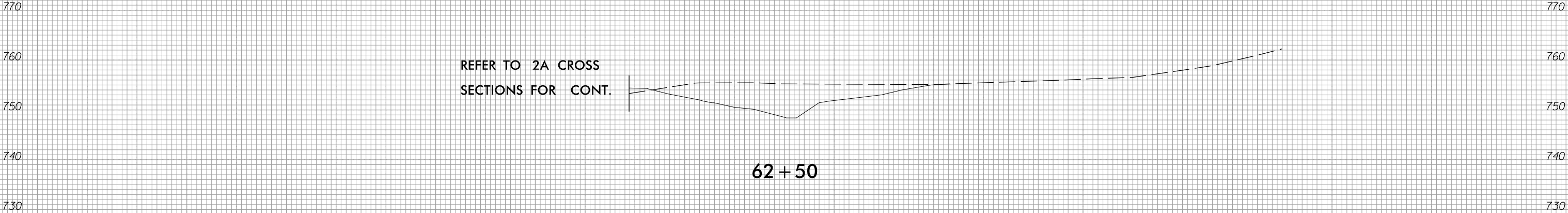
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6/23/16

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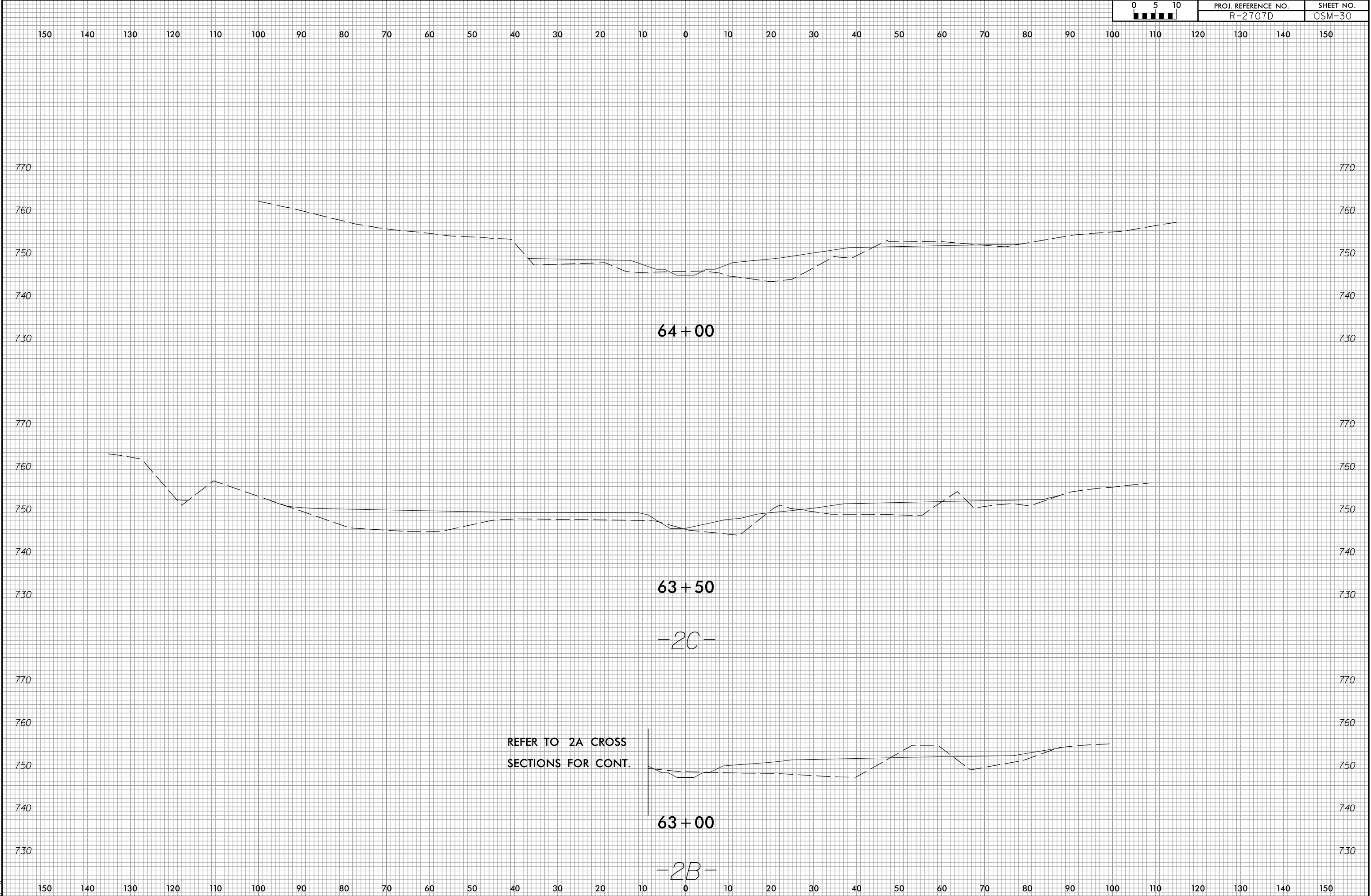
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-2B-

6/23/16

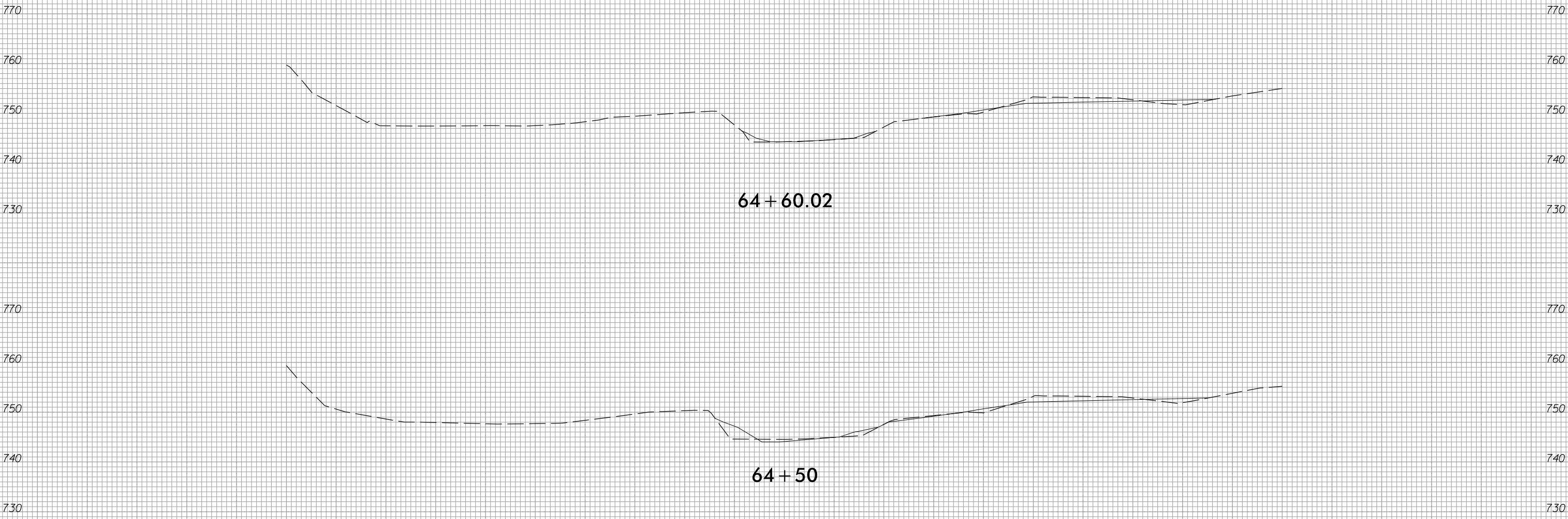
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6/23/16

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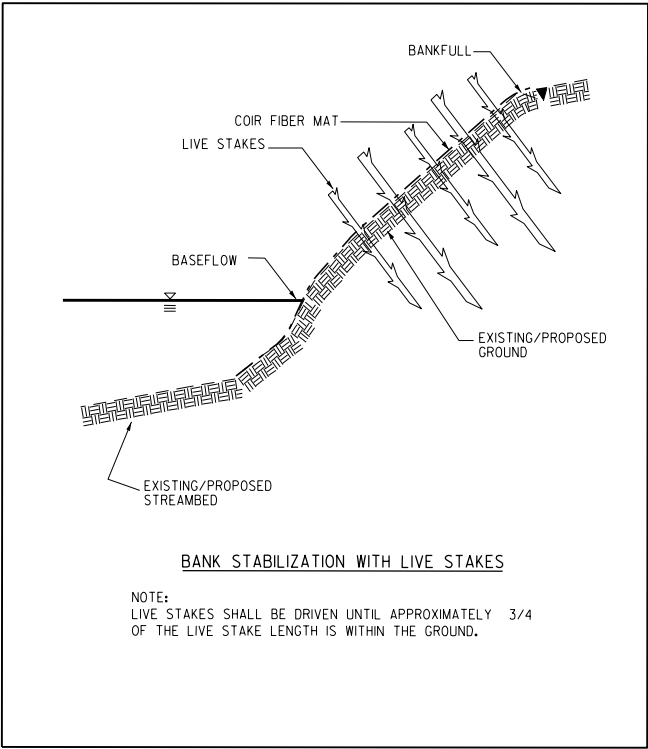
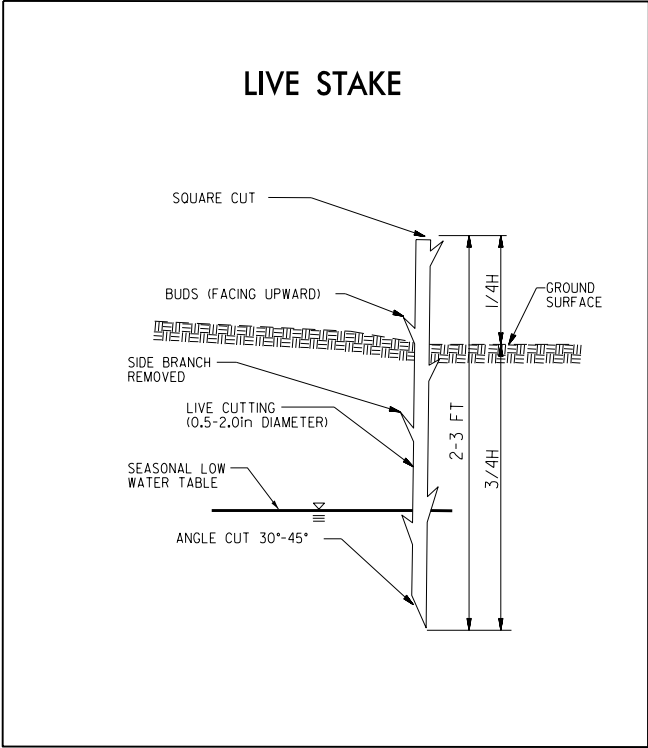
64+60.02

64+50

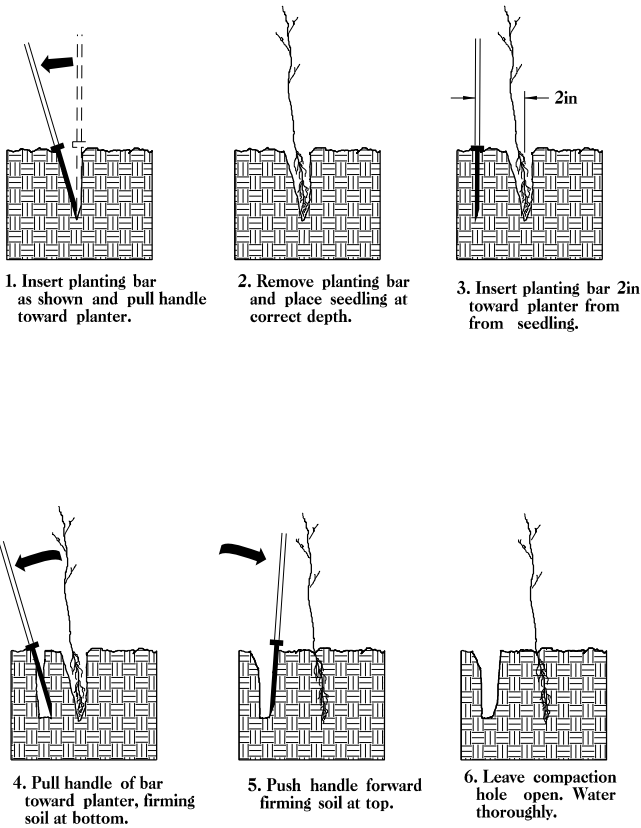
-20-

PLANTING DETAILS

LIVE STAKES PLANTING DETAIL



BAREROOT PLANTING DETAIL
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



PLANTING NOTES:

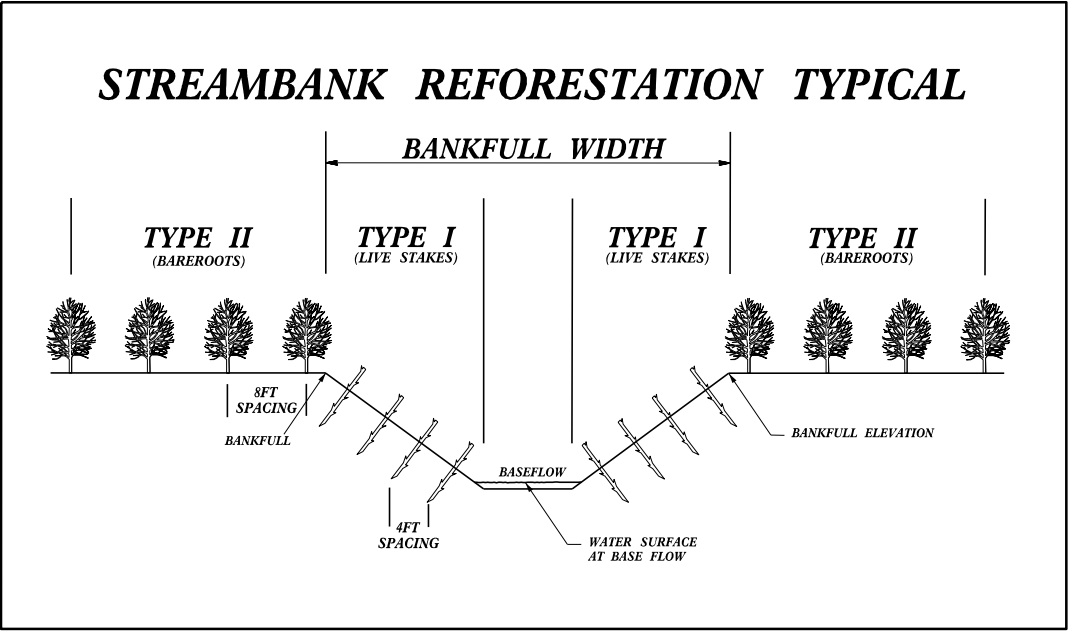
PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

K3C PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12in long, 4in wide and 1in thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10in below the root collar.



- ☐ TYPE 1 STREAM REFORESTATION SHALL INCLUDE PLANTING LIVE STAKES ALONG THE STREAMBANK FOR BASE FLOW TO BANKFULL ELEVATION AND BE PLANTED 3FT TO 5FT ON CENTER, RANDOM SPACING, AVERAGING 4FT ON CENTER, APPROXIMATELY 2,723 PLANTS PER ACRE.
- ☐ TYPE 2 STREAM REFORESTATION SHALL INCLUDE PLANTING BARERROOTS IN THE RIPARIAN ZONE ABOVE BANKFULL ELEVATION AND BE PLANTED 6FT TO 10FT ON CENTER, RANDOM SPACING, AVERAGING 8FT ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- ☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1

50%	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	2FT to 3FT LIVE STAKES
50%	CORNUS AMOMUM	SILKY DOGWOOD	2FT to 3FT LIVE STAKES

TYPE 2

20%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12in - 18in BARERROOTS
20%	PLATANUS OCCIDENTALIS	SYCAMORE	12in - 18in BARERROOTS
20%	FRAXINUS PENNSYLVANICA	GREEN ASH	12in - 18in BARERROOTS
20%	QUERCUS PHELLOS	WILLOW OAK	12in - 18in BARERROOTS
20%	BETULA NIGRA	RIVER BIRCH	12in - 18in BARERROOTS

- ☐ SEE STREAM REFORESTATION PLAN SHEETS FOR AREAS TO BE PLANTED

STREAM REFORESTATION
DETAIL SHEET 1 OF 2



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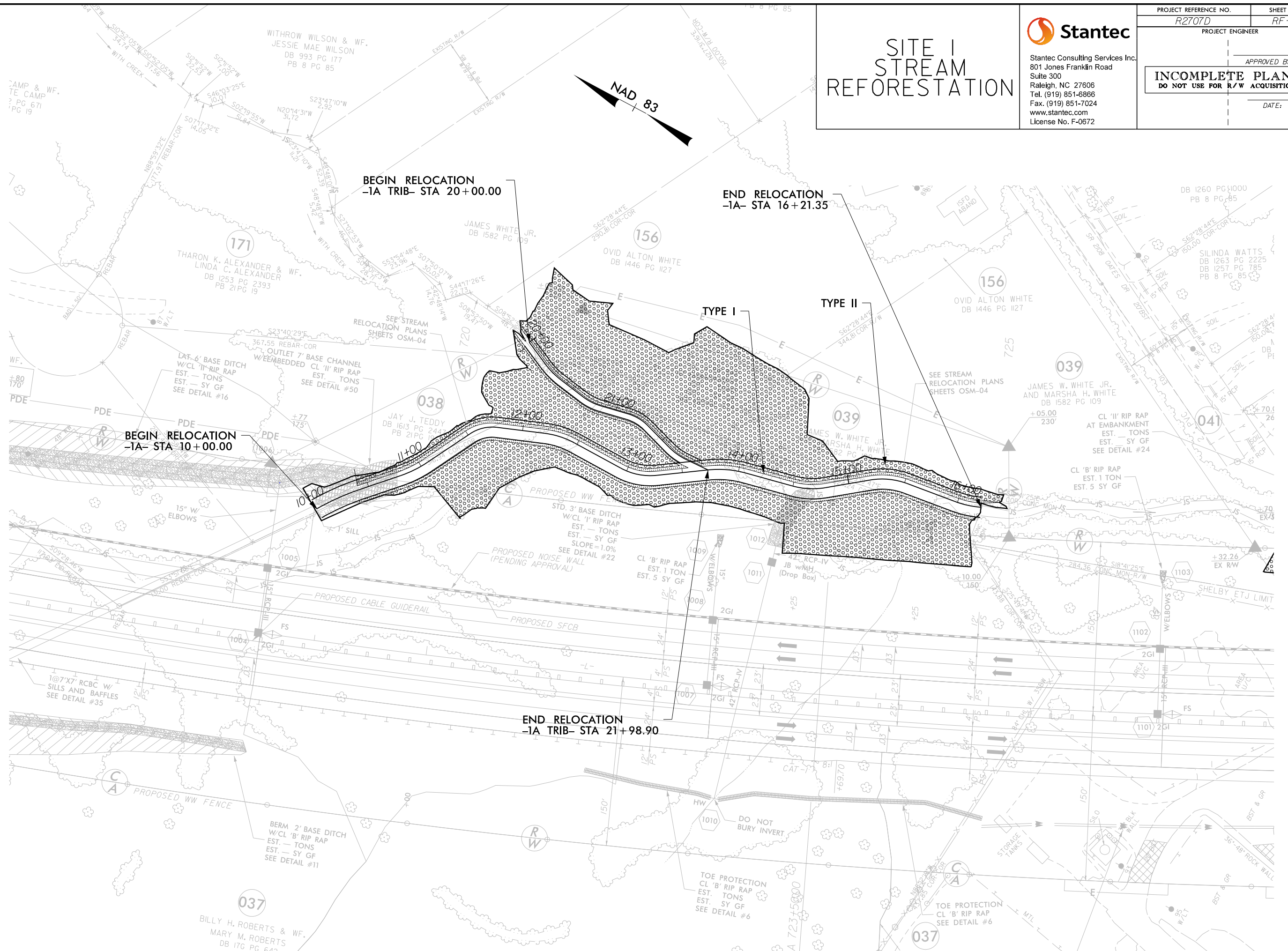
RF-1

PROJECT ENGINEER

APPROVED BY:

DATE:

SITE 1 STREAM REFORESTATION

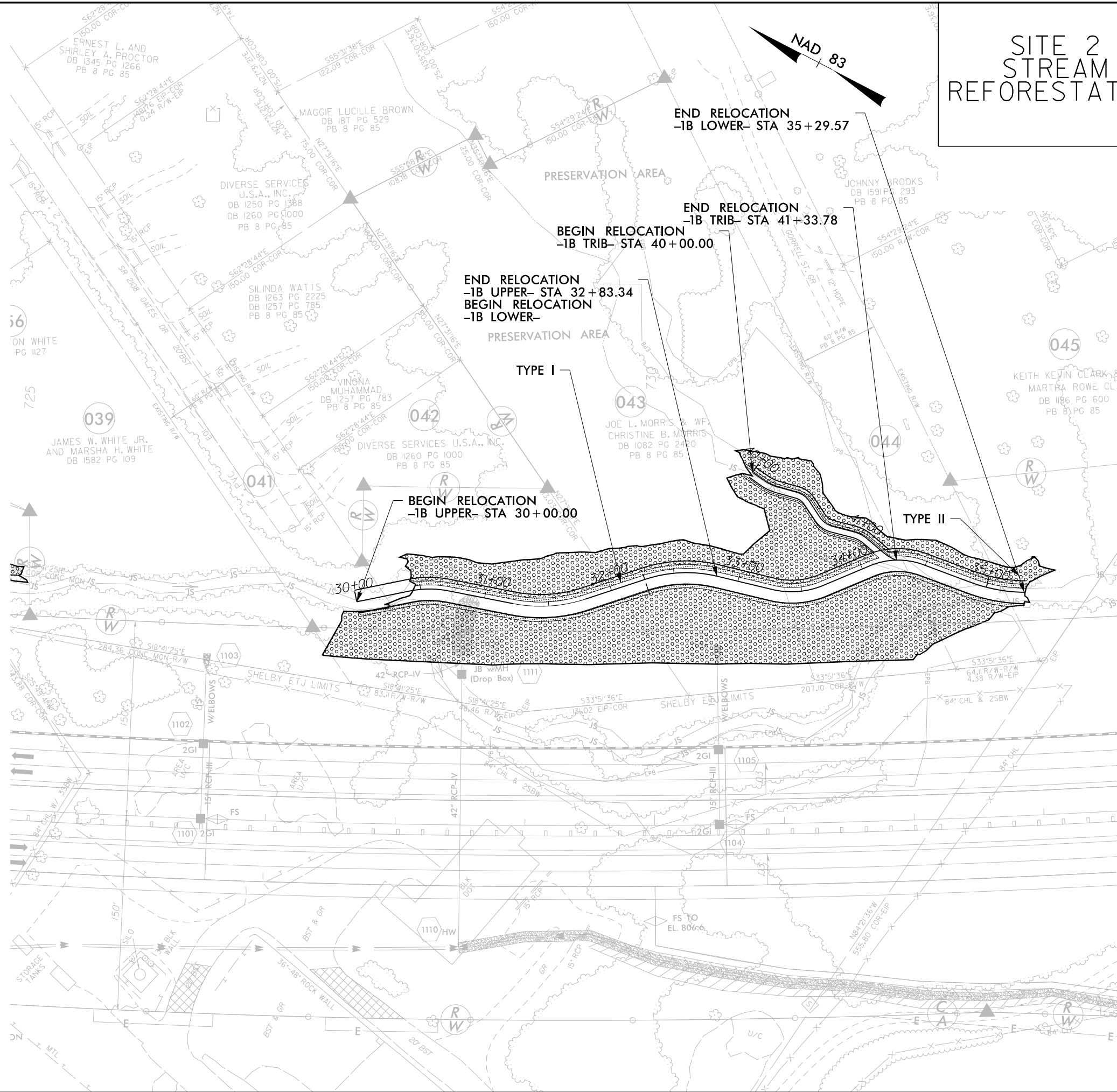


REVISIONS

8/17/99

REVISIONS

1/24/2018
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Joe Jackson



SITE 2 STREAM REFORESTATION



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