

TAMA CO.
RCB CULVERT REPLACEMENT - SINGLE BOX
STPN-008-1(16)--2J-86

LETTING DATE
 1-19-2022

LEGEND

INTERSTATE HIGHWAY	
PRIMARY HIGHWAY-DIVIDED	
PRIMARY HIGHWAY	
PORTLAND CEMENT CONCRETE ROAD	
ASPHALT ROAD	
BITUMINOUS ROAD	
GRAVEL ROAD	
EARTHEN ROAD	
INTERSTATE HIGHWAY	
UNITED STATES HIGHWAY	
STATE HIGHWAY	
COUNTY HIGHWAY	
RAILROAD	
PIPELINE	
AIRPORT	
HYDROLOGY	
BRIDGE	
STATE BOUNDARY	
COUNTY BOUNDARY	
CORPORATE BOUNDARY	
TOWNSHIP LINE	
SECTION LINE	
ROAD NAMES	
UNINCORPORATED PLACE	
	ABBEY ROAD
	ELWOOD



TRANSPORTATION DEVELOPMENT DIVISION

PLANS OF PROPOSED IMPROVEMENT ON THE
PRIMARY ROAD SYSTEM
TAMA COUNTY
RCB CULVERT REPLACEMENT - SINGLE BOX
 Rock Creek 0.4 mi W of W Jct IA 21

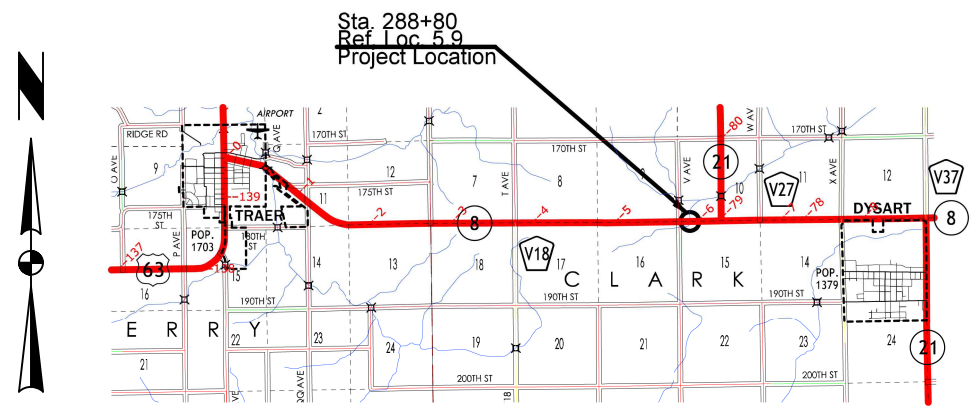
SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.
 Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

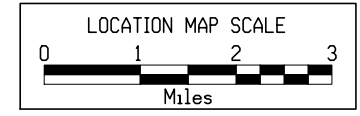
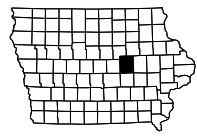


REVISIONS	TOTAL 47
PROJECT IDENTIFICATION NUMBER	20-86-008-020
PROJECT NUMBER	STPN-008-1(16)--2J-86
R.O.W. PROJECT NUMBER	STPN-008-1(17)--2J-86

INDEX	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 121
2 - 5	CAST IN PLACE CULVERT
6	DES. 121 CAST IN PLACE CULVERT
6	ESTIMATE SHEET - DESIGN 121
6 - 9	PRECAST CULVERT ALTERNATIVE
6 - 9	DES. 121 PRECAST CULVERT ALTERNATIVE
SPS.1	SOILS SHEET
C.1	ESTIMATE SHEET FOR ROADWAY
RC.2	ESTIMATE SHEET FOR EROSION CONTROL
A.1 - W.3	ROADWAY SHEETS



Detour Map on Sheet J.2.



DESIGN DATA RURAL			
2018 AADT	1,930	V.P.D.	
20-- AADT	--	V.P.D.	
20-- DHV	--	V.P.H.	
TRUCKS	--	%	
Total			
Design ESALs	--		

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
1	David Booher	Structural Design
A.1	David Booher	Roadway Design
SPS.1	Mark A. Dell	Soils Design
CS.1	Mark A. Dell	Soils Design

STRUCTURAL DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: *D. Booher* Date: 10-21-2021
 Printed or Typed Name: David Booher
 My license renewal date is December 31, 2022

Pages or sheets covered by this seal: 1-9

ESTIMATED CAST IN PLACE CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2107-3825025	GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN	CY	66.00	
2	2210-0475290	MACADAM STONE BASE	CY	164.00	
3	2401-6750001	REMOVALS, AS PER PLAN	LS	1	
4	2402-2720000	EXCAVATION, CLASS 20	CY	410.00	
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	112.5	
6	2404-7775000	REINFORCING STEEL	LB	21,462	
7	2533-4980005	MOBILIZATION	LS	1	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2107-3825025	GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN Includes all costs to install a 1-foot thick granular blanket below the bottom of culvert consisting of material in accordance with section 4118 of the Standard Specifications, (gradation No. 3, but the No. 200 restriction does apply).
2	2210-0475290	MACADAM STONE BASE Refer to Sheet SPS.1
3	2401-6750001	REMOVALS, AS PER PLAN Includes all work for removal and off-site disposal of an 12' x 4' x 49.3' RCB Culvert and headwalls. Removal of these scheduled items shall be in accordance with Section 2401, of the Standard Specifications. Any damage to material not to be removed shall be the responsibility of the Contractor and repaired at no extra cost to the state.
4	2402-2720000	EXCAVATION, CLASS 20 Includes 229 cu.yd.for core-out.
5	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT) - -
6	2404-7775000	REINFORCING STEEL - -
7	2533-4980005	MOBILIZATION - -

NOTE:
ROADWAY QUANTITIES SHOWN
ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW
**12' X 4' X 80' REINFORCED
 CONCRETE BOX CULVERT**
 QUANTITIES
 STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
 DESIGN SHEET NO. 1 OF 4 FILE NO. 32094 DESIGN NO. 222

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT AN 12' x 4' x 80'-0 REINFORCED CONCRETE BOX CULVERT, SKEWED 0° UNDER IA 8 AT STATION 288+80.00.

ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON ORIGINAL DESIGN PLANS FA822A.

THE RCB CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 5 FEET.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE.

UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

"REMOVALS AS PER PLAN" INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE ORIGINAL CULVERT AND DROP ENTRY. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 240I, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO OTHER PORTIONS OF THE EXISTING STRUCTURE NOT NOTED FOR REMOVAL SHALL BE THE RESPONSIBILITY OF THE BRIDGE CONTRACTOR AND SHALL BE REPAIRED AT NO EXTRA COST TO THE STATE.

WHEN DE-WATERING PRESENTS A PROBLEM FOR PLACING THE CURTAIN WALLS AS DETAILED, ALTERNATE METHODS SUCH AS STEEL SHEET PILE AND PRECAST CONCRETE WALLS MAY BE APPROVED BUT AT NO ADDITIONAL COST. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER FOR APPROVAL COMPLETE DRAWINGS OF THE PROPOSED CURTAIN WALL ALTERNATE BEFORE BEGINNING CONSTRUCTION.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

A WORKING BLANKET 2-FOOT DEEP CORE-OUT FOR PLACING GRANULAR BACKFILL SHALL BE INSTALLED PRIOR TO PLACING THE BOX SECTION.

** GRANULAR MATERIAL SHALL CONSIST OF:
2.5' LAYER OF MACADAM STONE (GRADATION NO. 13 WITHOUT CHOKER COURSE).
CAPPED WITH 1.0' LAYER OF GRANULAR MATERIAL FOR BLANKET.
REFER SHEET SPS.1

STANDARDS: FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:		
STANDARD	ISSUED	REVISED
RCB-G1-20	7-20	--
RCB-G2-20	7-20	--
RCB-G3-20	7-20	--
RCB 12-4-20	7-20	--
PWH 0-1-20	7-20	--
PWH 0-2-20	7-20	--
PWH 0-3-20	7-20	--
PWH 0-4-20	7-20	--
PWH 0-7-20	7-20	--

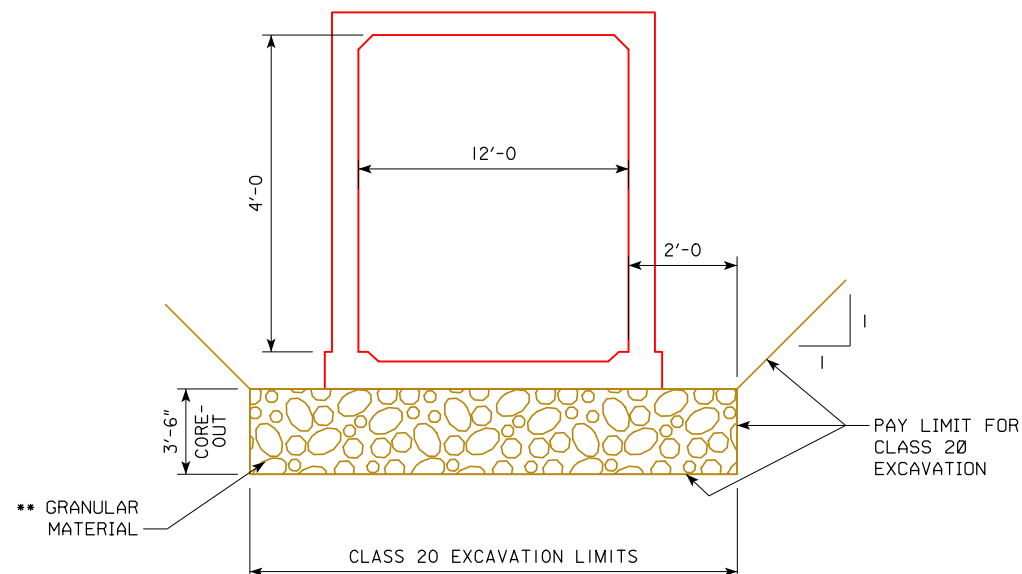
SUMMARY OF REINFORCING STEEL		
LOCATION	QUANTITY	TOTAL
HEADWALL 0° SKEW (2 REQ'D.)	2 @ 1972	3,944
29'-0 BARREL SECTIONS (2 REQ'D.)	2 @ 6282	12,564
22'-0 BARREL SECTIONS (1 REQ'D.)	1 @ 4766	4,766
Δ5r1 BARS (4 SETS REQ'D.)	4 AT 47	188
TOTAL (LBS.)		21,462

Δ ONE SET 5r1 BARS INCLUDES 13-#5 BARS x 3'-6 = 47 LBS.

CONCRETE PLACEMENT QUANTITIES				
LOCATION	SLAB	FLOOR	WALLS	TOTAL
HEADWALL 0° SKEW (2 REQ'D.)*	2 @ 10.7 = 21.4	2 @ 1.6 = 3.2	2 @ 2.4 = 4.8	29.4
29'-0 BARREL SECTIONS (2 REQ'D.)	2 @ 10.6 = 21.2	2 @ 13.6 = 27.2	2 @ 5.9 = 11.8	60.2
22'-0 BARREL SECTIONS (1 REQ'D.)	1 @ 8.1 = 8.1	1 @ 10.3 = 10.3	1 @ 4.4 = 4.4	22.9
TOTAL (CU. YDS.)	50.7	40.7	21.0	112.5

* INCLUDES PARAPET AND TOP OF WINGWALL

DESIGN HISTORY AT THIS SITE (INCLUDES THIS DESIGN)	
DES. NO.	TYPE OF WORK
FA 822A	ORIGINAL DESIGN (49.3')
222	THIS DESIGN

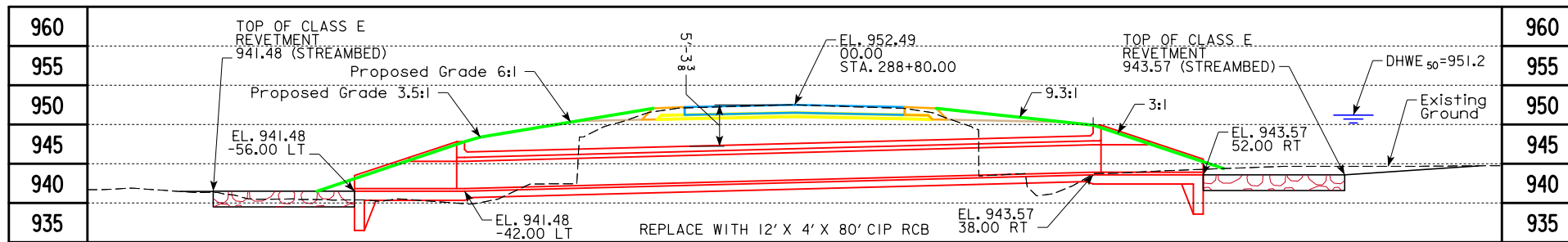


CLASS 20 EXCAVATION DETAIL

CORE-OUT SHALL TERMINATE 3'-0 SHORT OF THE CURTAIN WALL.

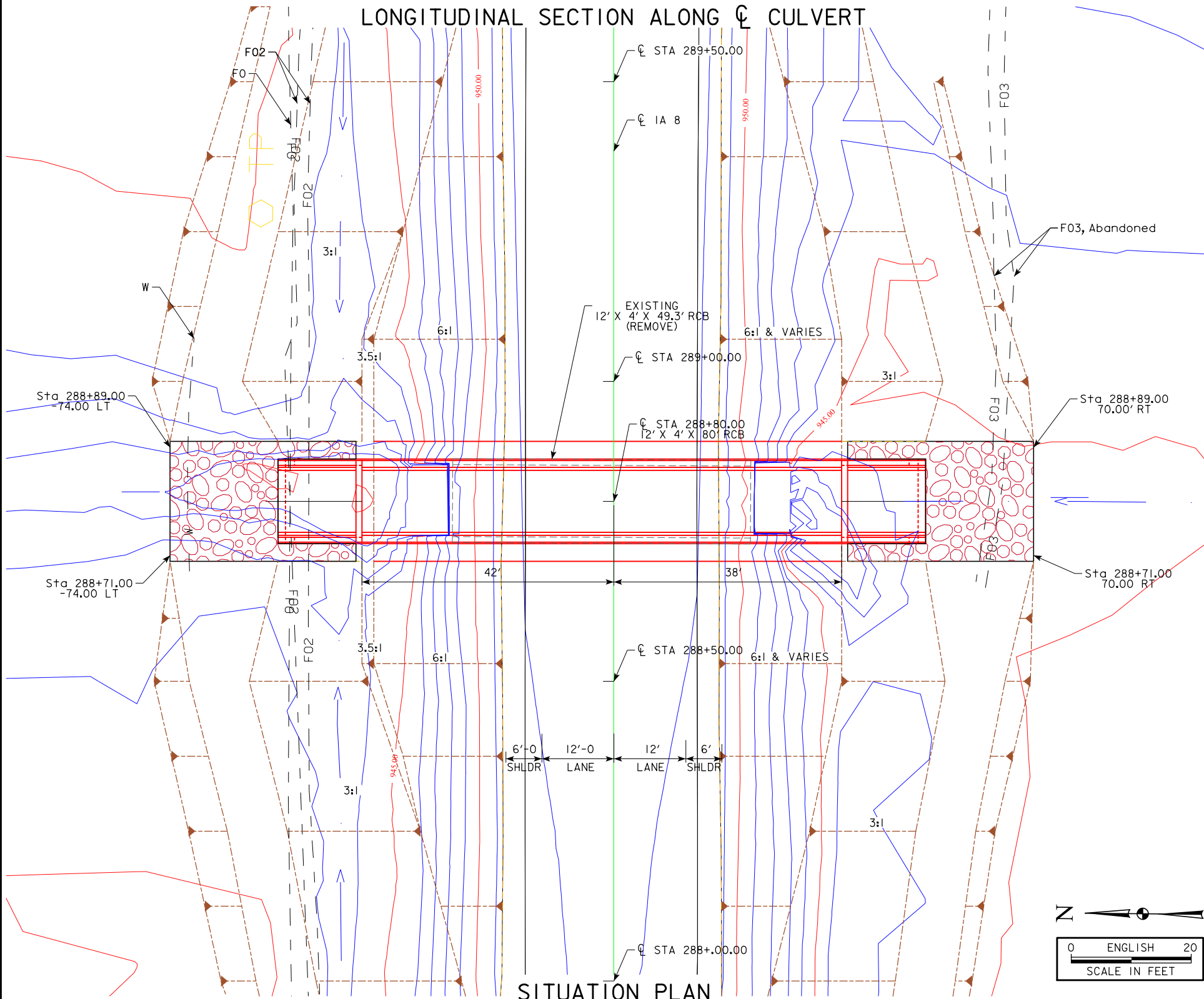
TRAFFIC CONTROL PLAN
THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW
12' X 4' X 80' REINFORCED CONCRETE BOX CULVERT
NOTES AND QUANTITIES
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 2 OF 4 FILE NO. 32094 DESIGN NO. 222



BENCH MARK NO. CPIO1 7903946.871, 19624474.293, 947.498
FOUND CONCRETE MONUMENT (4" EXP.)

LONGITUDINAL SECTION ALONG ϕ CULVERT

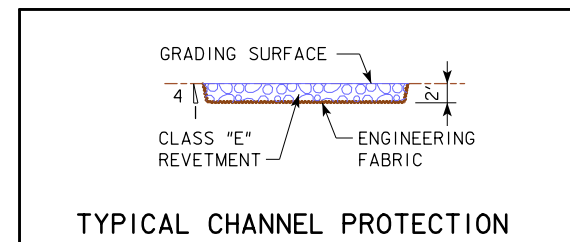


TWO 0° PARALLEL WING HDWL

HYDRAULIC DATA

DRAINAGE AREA = 870.4 ACRES (1.36 SQ. MI.)
Q₅₀ = 480 CFS (IOWA RUNOFF CHART)
HW ELEV. = 951.20

NOTE:
REMOVE EXISTING 12' X 4' X 49.3' RCB



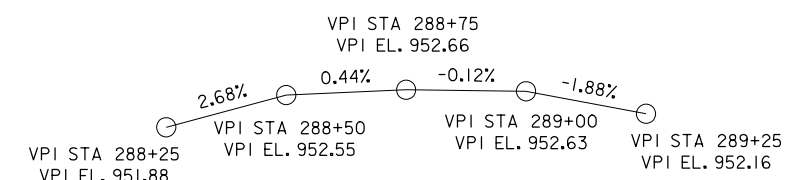
TRAFFIC ESTIMATE

2018 AADT	1930	V.P.D.
2038 AADT	-	V.P.D.
2020 DHV	-	V.P.H.
TRUCKS	11	%
TOTAL DESIGN ESALS	-	-

ESTIMATED REVELTMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVELTMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET 288+80.00	65.48	75.04	32.74
OUTLET 288+80.00	65.48	75.04	32.74
TOTALS	130.96	150.08	65.48

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.



PRELIMINARY UTILITIES LEGEND:

- F0-- Farmers Cooperative Telephone Company
- F02-- Mediacom Communications Corporation
- F03-- Centurylink
- W-- Poweshiek Water Association

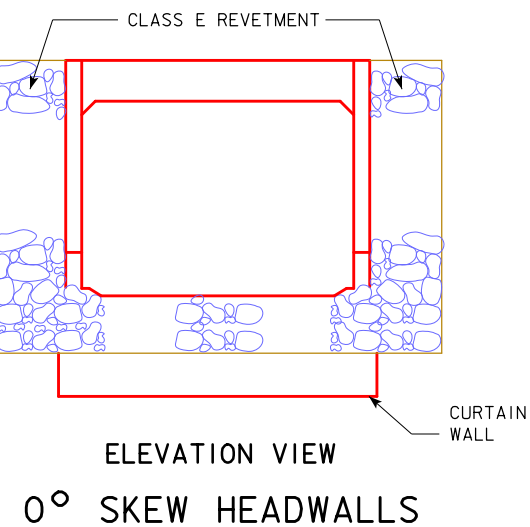
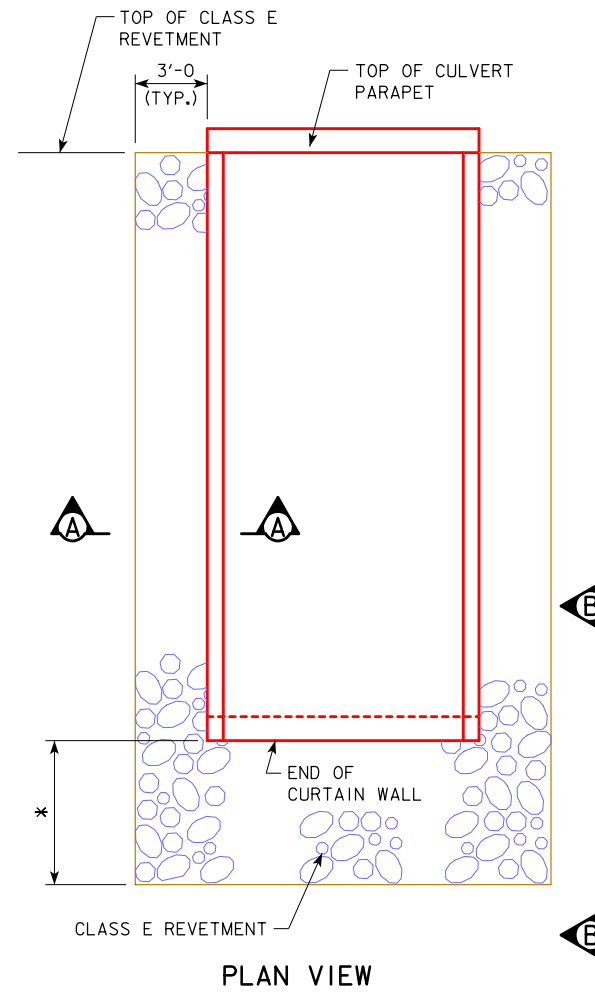
UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

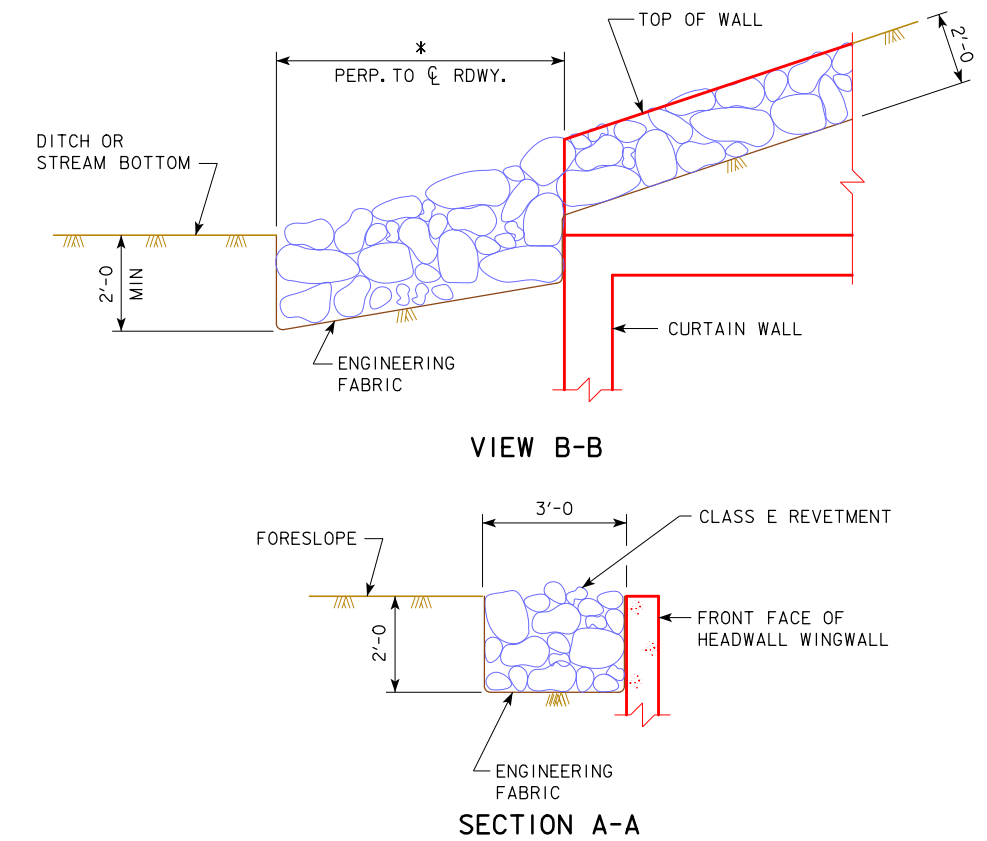
T-85N R-13W
SECTION 10 & 15
CLARK TOWNSHIP
TAMA COUNTY
LATITUDE 40.1281248°
LONGITUDE -96.8125941°
ASSET ID: 900280

DESIGN FOR 0° SKEW
12' X 4' X 80' REINFORCED CONCRETE BOX CULVERT
SITUATION PLAN
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 3 OF 4 FILE NO. 32094 DESIGN NO. 222

* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



TYPICAL DETAILS

CONSTRUCTION NOTES:

CLASS E REVETMENT SHALL BE USED AND PLACED ACCORDING TO ARTICLE 2507.03, OF THE STANDARD SPECIFICATIONS.
 THE ENGINEERING FABRIC SHALL MEET THE MATERIAL REQUIREMENTS IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

DESIGN FOR 0° SKEW
12' X 4' X 80' REINFORCED CONCRETE BOX CULVERT
REVETMENT PROTECTION DETAILS
 STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
 DESIGN SHEET NO. 4 OF 4 FILE NO. 32094 DESIGN NO. 222

ESTIMATED PRECAST CULVERT QUANTITIES - ALTERNATE

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2102-0425071	SPECIAL BACKFILL	CY	33.00	
2	2210-0475290	MACADAM STONE BASE	CY	130.00	
3	2107-3825025	GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN	CY	65.00	
4	2401-6750001	REMOVALS, AS PER PLAN	LS	1	
5	2402-2720000	EXCAVATION, CLASS 20	CY	425.00	
6	2415-2111204	PRECAST CONCRETE BOX CULVERT, 12 FT. X 4 FT.	LF	89.00	
7	2415-2201204	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 4 FT.	EACH	2	
8	2533-4980005	MOBILIZATION	LS	1	

ESTIMATE REFERENCE INFORMATION

ITEM NO.	ITEM CODE	DESCRIPTION
1	2102-0425071	SPECIAL BACKFILL Reclaimed asphalt pavement (RAP) and reclaimed HMA shall not be used for the special backfill.
2	2210-0475290	MACADAM STONE BASE Refer to Sheet SPS.1
3	2107-3825025	GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN Includes all costs to install a 1-foot thick granular blanket below the bottom of culvert consisting of material in accordance with section 4118 of the Standard Specifications, (gradation No. 3, but the No. 200 restriction does apply).
4	2401-6750001	REMOVALS, AS PER PLAN Includes all work for removal and off-site disposal of an 12' x 4' x 49.3' RCB Culvert and headwalls. Removal of these scheduled items shall be in accordance with Section 2401, of the Standard Specifications. Any damage to material not to be removed shall be the responsibility of the Contractor and repaired at no extra cost to the state.
5	2402-2720000	EXCAVATION, CLASS 20 Includes 227 cu.yd. for core-out.
6	2415-2110809	PRECAST CONCRETE BOX CULVERT, 12 FT. X 4 FT. Includes material and labor associated with providing and installing the culvert ties, lifting hole plugs, engineering fabric, joint material, and grout as required.
7	2415-2200809	PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION, 12 FT. X 4 FT. Includes material and labor associated with providing and installing the culvert ties, lifting hole plugs, engineering fabric, joint material, and grout as required. Includes 0° Skew 2 precast end sections, 2 precast lintel beams, and 2 precast curtain walls.
8	2533-4980005	MOBILIZATION --

NOTE:
ROADWAY QUANTITIES SHOWN
ELSEWHERE IN THESE PLANS.

DESIGN FOR 0° SKEW
**12' X 4' X 9' REINFORCED
PRECAST CONCRETE BOX CULVERT**

QUANTITIES
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 1 OF 4 FILE NO. 32094 DESIGN NO. 222

GENERAL NOTES:

IT IS THE INTENT OF THIS DESIGN TO REPLACE THE EXISTING 12' x 4' x 49.3'± WITH A 12' x 4' x 89' PRECAST REINFORCED CONCRETE BOX CULVERT. ELECTRONIC COPIES OF ORIGINAL DESIGN PLANS ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. DIMENSIONS SHOWN ON THESE PLANS ARE BASED ON ORIGINAL DESIGN PLANS FA822A.

FAINT LINES ON PLANS INDICATE EXISTING STRUCTURE. UTILITY COMPANIES AND MUNICIPALITIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE CONTRACTOR OF THE CONSTRUCTION STARTING DATE.

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 6-7 FEET.

THE PRECAST R.C.B. BARREL AND END SECTIONS SHALL CONFORM TO IOWA D.O.T. SINGLE PRECAST R.C.B. CULVERT STANDARDS. AT THE CONTRACTOR'S OPTION, PRECAST BARREL SECTIONS MAY CONFORM TO ASTM C1577.

EXCESS CLASS 20 EXCAVATION MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED AT THE CONSTRUCTION SITE, AS DIRECTED BY THE ENGINEER.

THE BID ITEM "REMOVAL OF EXISTING STRUCTURES" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE 12' x 4' x 49.3'± RCB WITH THE DROP INLET. REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS.

THE LENGTH IN LINEAR FEET OF PRECAST REINFORCED CONCRETE BOX CULVERT WILL BE BASED ON THE PLAN QUANTITY. FOR THE NUMBER OF LINEAR FEET GIVEN ON THE PLAN, THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER LINEAR FOOT. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, LABOR AND EQUIPMENT NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION", "CLASS 20 EXCAVATION", "GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN", "CLASS E REVETMENT", AND "SPECIAL BACKFILL".

FOR EACH PRECAST BOX CONCRETE CULVERT STRAIGHT END SECTION INSTALLED THE CONTRACTOR WILL BE PAID THE CONTRACT PRICE PER EACH. THE PAYMENT SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL (INCLUDING LINTEL BEAMS AND CURTAIN WALLS), LABOR AND EQUIPMENT NECESSARY TO COMPLETE THE WORK EXCEPT FOR BID ITEMS "PRECAST CONCRETE BOX CULVERT", "CLASS 20 EXCAVATION", "GRANULAR MATERIAL FOR BLANKET AND SUBDRAIN", "CLASS E REVETMENT", AND "SPECIAL BACKFILL".

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE 1 PARAPET SHALL BE PRECAST. THE CONTRACTOR SHALL FURNISH AND INSTALL CULVERT TIES FOR ALL JOINTS. THE MAIN SECTION JOINTS WILL HAVE ONE TIE ON EACH SIDE OF THE BARREL AND THE LAST BARREL SECTION WILL BE ATTACHED TO THE END SECTIONS WITH TWO TIES PER SIDE. THE END SECTION JOINTS WILL HAVE TWO TIES PER SIDE. CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS WILL BE 1 INCH DIAMETER STEEL AND SHALL MEET REQUIREMENTS OF ASTM A709 GRADE 36 OR EQUAL. CULVERT TIE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION. THE LIMITS FOR EXCAVATION FOR THE PRECAST CONCRETE BOX CULVERT SHALL BE AS SHOWN ON THE CLASS 20 EXCAVATION DETAIL.

A MINIMUM OF 6 INCHES OF SPECIAL BACKFILL WITH A MAXIMUM AGGREGATE SIZE OF 3/8 INCH SHALL BE USED AS BEDDING FOR THE PRECAST CONCRETE BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE. THE PRECAST BOX CULVERT SHALL BE BUILT TO THE DIMENSIONS AND SPECIFICATIONS SHOWN IN THESE PLANS.

THE CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED PRECAST CONCRETE BOX SECTIONS FOR THIS PROJECT. THE DETAILS SHALL INCLUDE THE FOLLOWING INFORMATION AS FOUND ON THE "SUBMITTAL SHOP DRAWING" STANDARD SHEET:

- A. A SITUATION PLAN DRAWING SHOWING THE BACK TO BACK PARAPET DIMENSION FOR THE LINE OF THE CULVERT SECTIONS.
- B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.
- C. A DETAIL OF THE PRECAST BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.
- D. A DETAIL OF THE PRECAST CONCRETE CULVERT END SECTION SHOWING A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC. SIMILAR TO THE END SECTION DETAILS SHOWN IN THE IDOT STANDARDS.

THE CONTRACTOR SHALL PROVIDE ALL INFORMATION SHOWN ON THE SUBMITTAL SHOP DRAWING SHEET. SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION:

(Paren).County.DesignNumber.SubmittalDescription.pdf

Example: (090).BlackHawk.Design915.DeckDrains.pdf

APPROVAL OF DETAILS IS NOT REQUIRED FOR THIS PROJECT. HOWEVER, THE DETAILS SHALL BE RECEIVED BY THE OFFICE OF BRIDGES AND STRUCTURES PRIOR TO THE START OF FABRICATION.

A WORKING BLANKET COMPOSED OF 6 INCHES OF SPECIAL BACKFILL AND 3-FOOT DEEP CORE-OUT FOR PLACING GRANULAR BACKFILL SHALL BE INSTALLED PRIOR TO PLACING THE PRECAST BOX SECTION.

* GRANULAR MATERIAL SHALL CONSIST OF: 2.0' LAYER OF MACADAM STONE (GRADATION NO.13 WITHOUT CHOKE STONE COURSE). CAPPED WITH 1.0' LAYER OF GRANULAR MATERIAL FOR BLANKET. REFER SHEET SPS.1

INSTALLATION NOTES:

PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE, AND THE SECTIONS SHALL BE TIGHTLY JOINED. CONCRETE TIES TO BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT. JOINT OPENINGS BETWEEN SECTIONS SHOULD BE AS TIGHT AS PRACTICABLE AND LIMITED TO A MAXIMUM OF 3/8 INCH OPENINGS. THE JOINT ON THE BOTTOM OF THE CULVERT SHALL BE SEALED WITH A FLEXIBLE WATER TIGHT 1 INCH BUTYL ROPE GASKET AS PER MATERIALS I.M. 491.09.

BUTYL ROPE GASKET SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND SHALL EXTEND VERTICALLY 6 INCHES ABOVE THE BOTTOM FILLET. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.

THE CONTRACTOR SHALL PLACE A 2 FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH 1 FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT DURING BACKFILLING OPERATIONS. ATTACHMENT METHODS SHALL BE APPROVED BY THE ENGINEER. ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCLUDED IN THE BID ITEMS "PRECAST CONCRETE BOX CULVERT" AND "PRECAST CONCRETE BOX CULVERT STRAIGHT END SECTION". THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

CLASS E REVETMENT WILL BE PLACED AROUND BOTH PRECAST CONCRETE BOX CULVERT END SECTIONS, AS SHOWN IN THESE PLANS.

DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADIUS OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

THE CONTRACTOR SHALL FURNISH AND INSTALL LIFTING HOLE PLUGS FOR EACH SECTION. LIFTING HOLES SHALL BE PLUGGED WITH A PRECAST CONCRETE PLUG OR PLASTIC PLUG APPROVED BY THE ENGINEER, SEALED AND COVERED WITH A 2'-0 x 2'-0 PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

SINCE PRECAST CONCRETE BOX CULVERT END SECTIONS HAVE THE FORESLOPE LOCATED AT THE BOTTOM OF THE PARAPET INSTEAD OF THE TOP (AS IN THE CASE OF CAST IN PLACE RCB CULVERTS) THE MAIN BARREL SECTION HAS BEEN LENGTHENED.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

NOTE:
ANY PRECAST BOX CULVERT DESIGNS SUBMITTED, THAT VARY FROM THE ASTM C 1577 OR IDOT STANDARDS, SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF IOWA. NONSTANDARD DESIGNS SHALL BE BASED ON THE DESIGN CRITERIA USED FOR THE IDOT STANDARDS. MINIMUM LAYING LENGTH SHALL BE 4'-0. MINIMUM CONCRETE STRENGTH, f'c, SHALL BE 5 KSI.

SHOP DRAWING SUBMITTALS	
SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)	
SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.	
SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION: (Paren).County.DesignNumber.SubmittalDescription.pdf Example: (090).BlackHawk.Design915.DeckDrains.pdf	
1	PRECAST RCB SHOP DRAWINGS

SPECIFICATIONS:

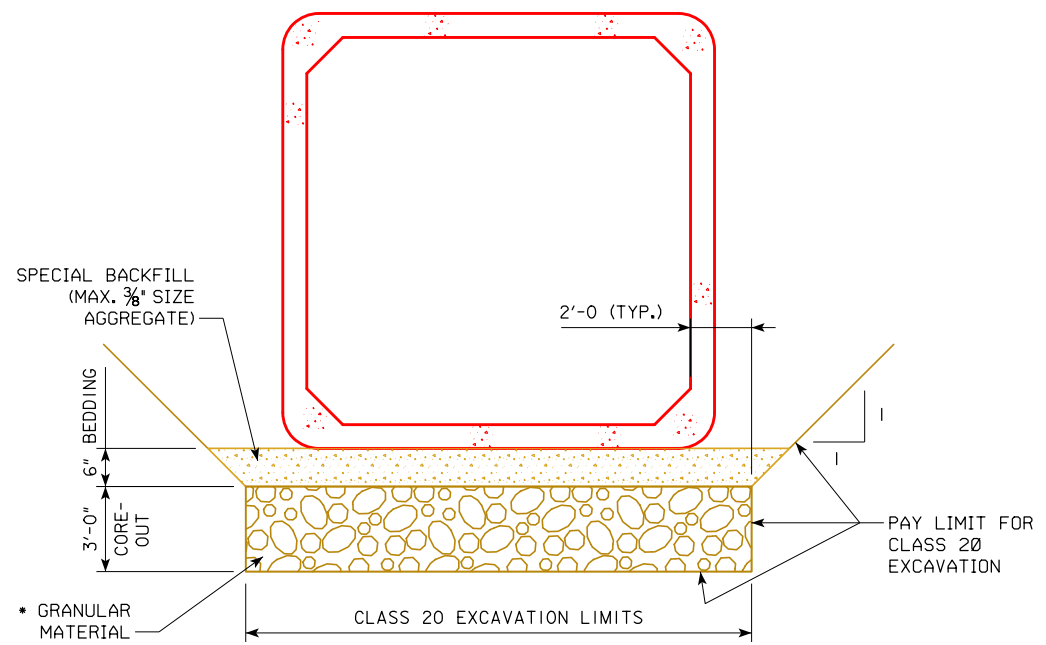
DESIGN:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH ED., SERIES OF 2017.

CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS.

DESIGN STRESSES:

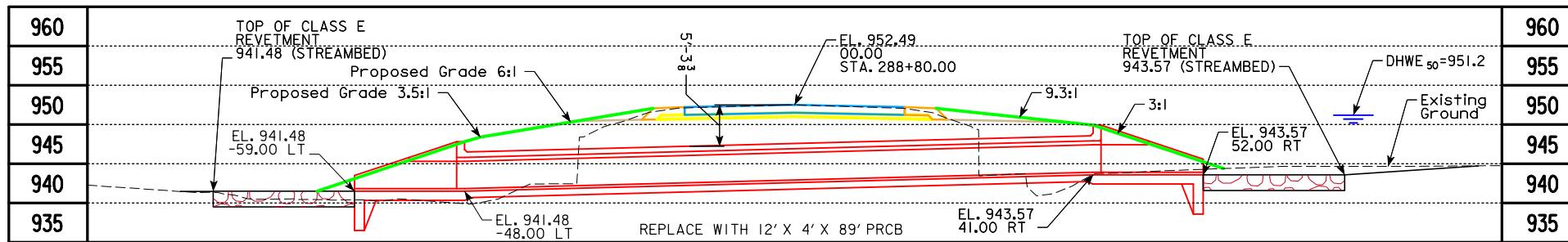
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH ED., SERIES OF 2017:
BAR REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
WELDED WIRE REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c FOR BARREL SECTIONS AS NOTED ON CULVERT BARREL DETAIL STANDARDS, FOR END SECTION DESIGN f'c = 5 KSI.

STANDARDS: FOR DETAILS AND NOTES NOT SHOWN REFER TO THE FOLLOWING IOWA D.O.T. - HIGHWAY STANDARDS:		
STANDARD	ISSUED	REVISED
PRCB G1-20	12-20	--
PRCB G2-20	12-20	--
PRCB I2-20	12-20	--
PES 1-20-T1	12-20	--
PES 2-20-T1	12-20	--
PES 1-20-T3	12-20	--
PES 2-20-T3	12-20	--
PES 9-20-T3	12-20	--
PES 10-20-T3	12-20	--
PES 11-20	12-20	--

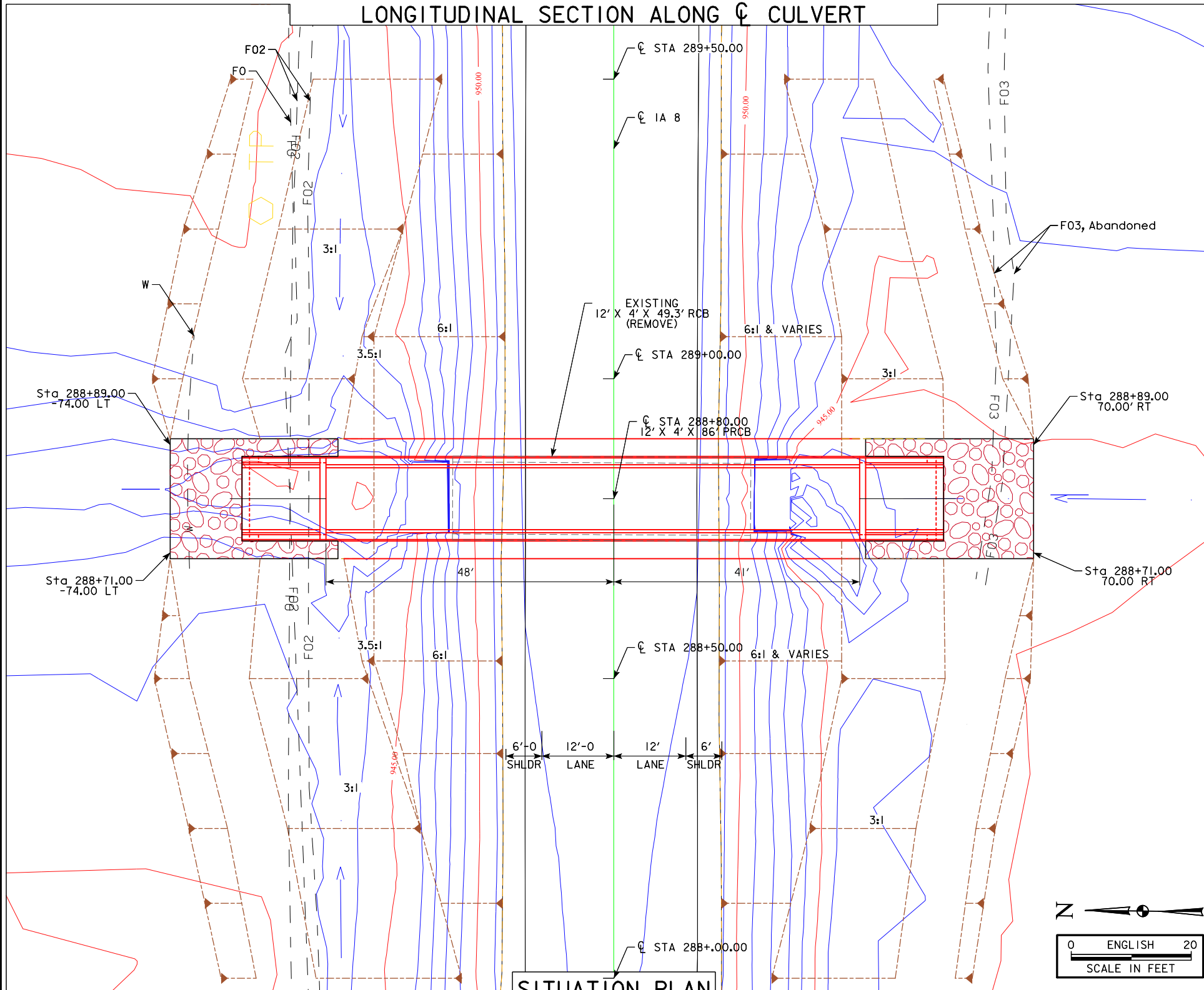


CLASS 20 EXCAVATION DETAIL
CORE OUT AND SPECIAL BACKFILL SHALL TERMINATE 3'-0 SHORT OF THE PRECAST CURTAIN WALL.

DESIGN FOR 0° SKEW
12' X 4' X 89' REINFORCED PRECAST CONCRETE BOX CULVERT
GENERAL NOTES AND QUANTITIES
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 2 OF 4 FILE NO. 32094 DESIGN NO. 222



BENCH MARK NO. CPI01 7903946.871, 19624474.293, 947.498
FOUND CONCRETE MONUMENT (4" EXP.)

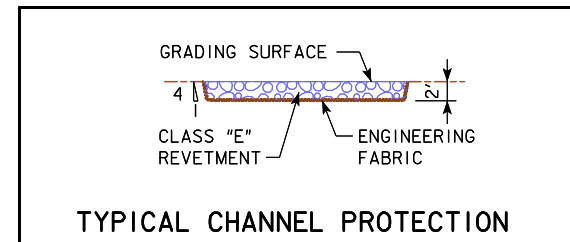


TWO 0° PARALLEL WING HDWL

HYDRAULIC DATA

DRAINAGE AREA = 870.4 ACRES (1.36 SQ. MI.)
Q₅₀ = 480 CFS (IOWA RUNOFF CHART)
HW ELEV. = 951.20

NOTE:
REMOVE EXISTING 12' X 4' X 49.3' RCB



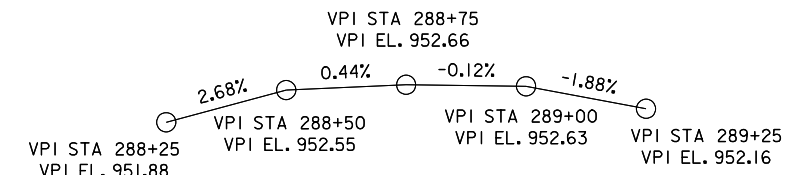
TRAFFIC ESTIMATE

2018 AADT	1930	V.P.D.
2038 AADT	-	V.P.D.
2020 DHV	-	V.P.H.
TRUCKS	11	%
TOTAL DESIGN ESALS	-	-

ESTIMATED REVETMENT QUANTITIES INCLUDED WITH ROAD PLANS

LOCATION	REVETMENT CL. "E" (TON)	ENGINEERING FABRIC (SY)	EXCAVATION (CY)
INLET 288+80.00	65.48	75.04	32.74
OUTLET 288+80.00	65.48	75.04	32.74
TOTALS	130.96	150.08	65.48

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE. QUANTITIES SHOWN FOR INFORMATION ONLY. SEE ROAD SHEETS.



PRELIMINARY UTILITIES LEGEND:

- F0-- Farmers Cooperative Telephone Company
- F02-- Mediacom Communications Corporation
- F03-- Centurylink
- W-- Poweshiek Water Association

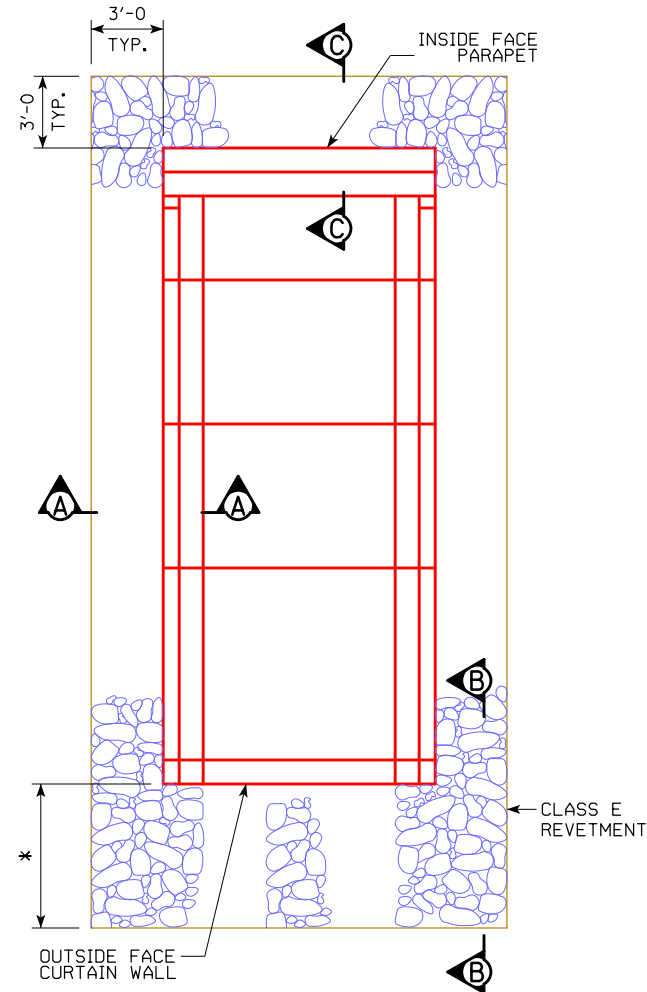
UTILITIES SHOWN ON THIS SHEET ARE FOR INFORMATION ONLY, SEE ROAD DESIGN SHEETS FOR FINAL UTILITY INFORMATION.

LOCATION

T-85N R-13W
SECTION 10 & 15
CLARK TOWNSHIP
TAMA COUNTY
LATITUDE 40.1281248°
LONGITUDE -96.8125941°
ASSET ID: 900280

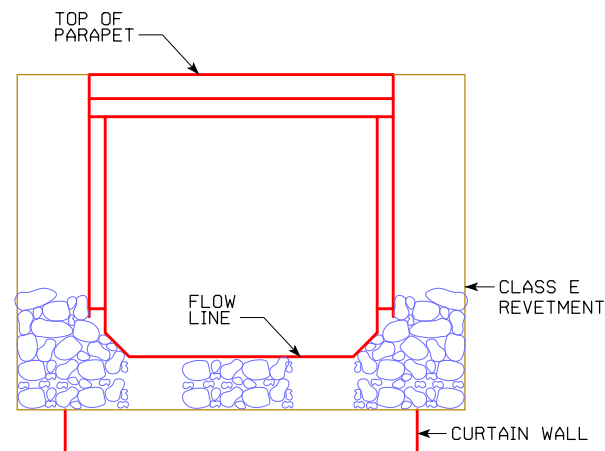
DESIGN FOR 0° SKEW
12' X 4' X 89' REINFORCED PRECAST CONCRETE BOX CULVERT

SITUATION PLAN
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 3 OF 4 FILE NO. 32094 DESIGN NO. 222

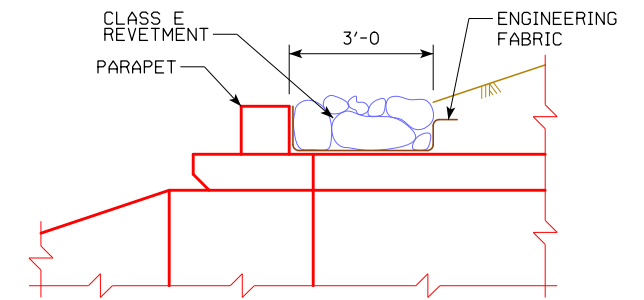


PLAN VIEW

* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.

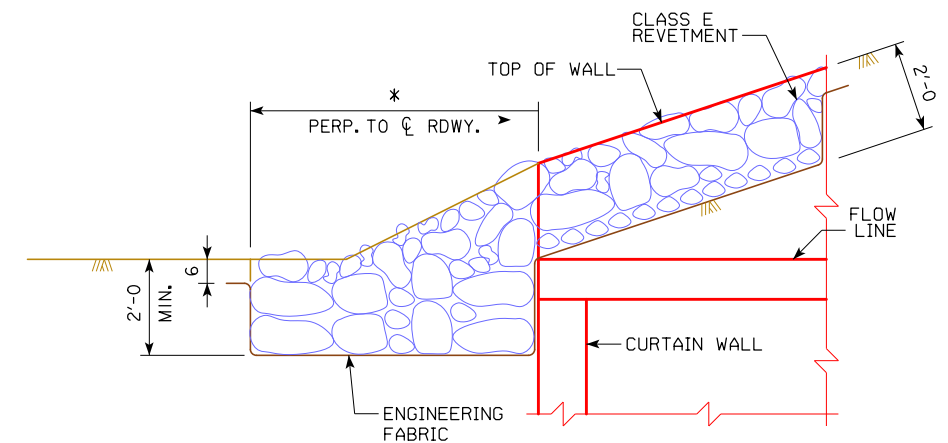


ELEVATION VIEW
NON-SKEW END SECTIONS

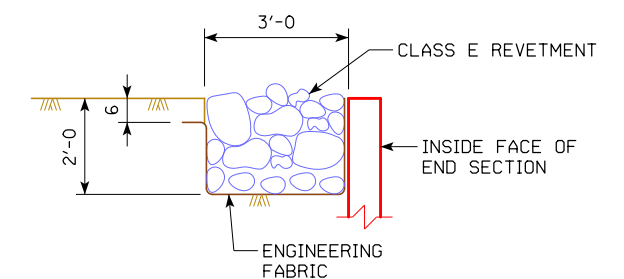


SECTION C-C

* = SEE CULVERT PLANS FOR LIMITS OF REVETMENT AND ENGINEERING FABRIC.



SECTION B-B



SECTION A-A
TYPICAL DETAILS

CONSTRUCTION NOTES:

CLASS E REVETMENT SHOULD BE USED AND PLACED ACCORDING TO ARTICLE 2507.03 OF THE STANDARD SPECIFICATIONS.
THE ENGINEERING FABRIC SHALL MEET THE MATERIAL REQUIREMENTS IN ACCORDANCE WITH ARTICLE 4196.01, B, 3 OF THE STANDARD SPECIFICATIONS.

DESIGN FOR 0° SKEW
**12' X 4' X 89' REINFORCED
PRECAST CONCRETE BOX CULVERT**
EMBANKMENT PROTECTION
STATION 288+80 SEPTEMBER 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 4 OF 4 FILE NO. 32094 DESIGN NO. 222

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

GEOTECHNICAL DESIGN



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

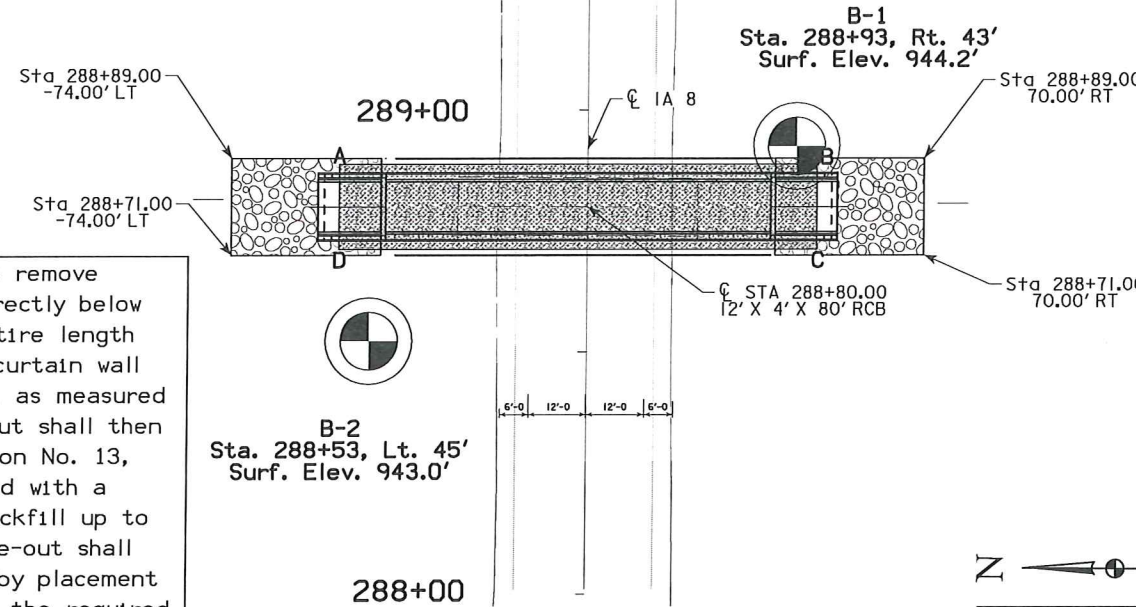
Signature: *Mark A. Dell* Date: *8/6/2021*

Printed or Typed Name: Mark A. Dell
My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SPS.1

Station	Offset
A 288+89	Lt. 51.8
B 288+89	Rt. 47.8
C 288+71	Rt. 47.8
D 288+71	Lt. 51.8

Perform a 3.5-foot thick core-out directly below the RCB culvert to remove the very dark gray fat clay soils anticipated to be encountered directly below the base of the proposed culvert. The core-out shall extend the entire length of the culvert barrel to within 3 feet of the outside face of the curtain wall and to a width of 2 feet beyond the sides of the proposed culvert, as measured from the inside wall face. The resulting excavation from the core-out shall then be backfilled with a 2.5-foot thick layer of Macadam Stone (Gradation No. 13, without choke stone course). The Macadam Stone shall then be capped with a 1-foot thick layer of Granular Material for Blanket to bring the backfill up to base-of-culvert elevation. With a precast culvert alternate, the core-out shall be backfilled with a 2-foot thick layer of Macadam Stone, followed by placement of a 1-foot thick layer of Granular Material for Blanket, capped by the required 6-inch bedding layer, all having the same plan limits stated above for the CIP RCB culvert. The core-out is not shown in profile view. Refer to the "Core-Out Coordinate Table" for approximate plan limits of the core-out.

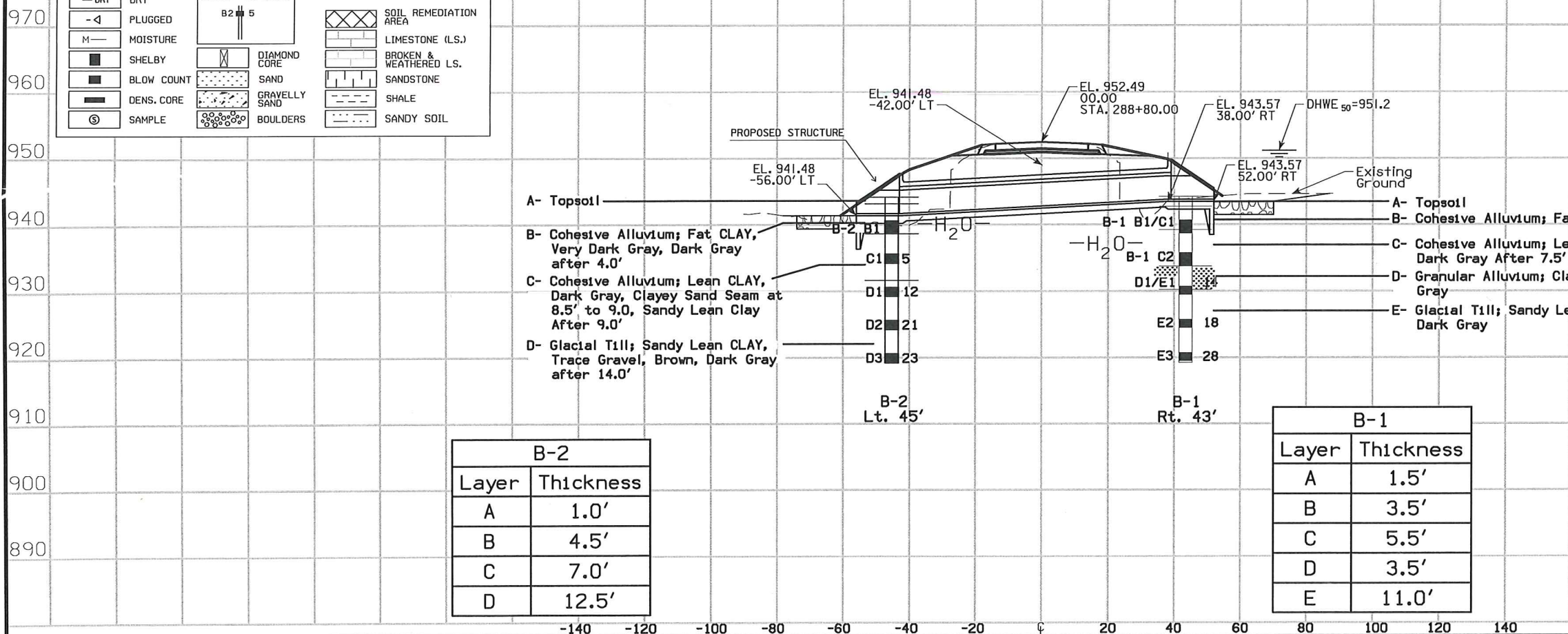


Boring No.	Date Drilled	Immediately after Drilling	After Drilling
B-1	10/21/2020	7.0	5.5 @ 0.125 Hrs
B-2	10/21/2020	4.0	3.3 @ 0.125 Hrs

SHELBY TUBE CORE DATA

CORE NO.	B-1 B1/C1	B-1 C2	B-2 B1
DEPTH IN FEET	3.5'-5.0'	8.5'-10.5'	3.5'-5.0'
CLASSIFICATION (AASHTO)	A-7-6(27)	A-6(3)	A-7-6(22)
COEFF. CONSOL. (SQ. FT / DAY)	0.098	0.440	0.141
TRIAxIAL COMPRESSION	--	--	--
COHESION - PSF	--	--	--
FRICTION COEFF.	--	--	--
MOISTURE CONTENT %	32.1	17.4	42.8
DRY DENSITY - PCF	90.5	110.7	76.6
CU-CONSOLIDATED UNDRAINED			
UU-UNCONSOLIDATED UNDRAINED			
UC-UNCONFINED COMPRESSION (c=1/2 Qu)			

-H ₂ O-	WATER	BLOW COUNT LAYER - NO. BLOWS	SOIL REMEDIATION AREA
-DRY-	DRY	B2 # 5	LIMESTONE (LS.)
-<-	PLUGGED	DIAMOND CORE	BROKEN & WEATHERED LS.
M-	MOISTURE	SAND	SANDSTONE
■	SHELBY	GRAVELLY SAND	SHALE
■	BLOW COUNT	BOULDERS	SANDY SOIL
■	DENS. CORE		
⊙	SAMPLE		



Layer	Thickness
A	1.0'
B	4.5'
C	7.0'
D	12.5'


Layer	Thickness
A	1.5'
B	3.5'
C	5.5'
D	3.5'
E	11.0'

LOCATION

T-85N R-13W
SECTION 10 & 15
CLARK TOWNSHIP
TAMA COUNTY
LATITUDE 40.1281248°
LONGITUDE -96.8125941°

DESIGN FOR 0° SKEW
12' X 4' X 80' REINFORCED CONCRETE BOX CULVERT
SOIL PROFILE SHEET
STATION 288+80 JULY 2021
TAMA COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY ADMINISTRATION
DESIGN SHEET NO. 1 OF 1 FILE NO. 32094 DESIGN NO. 222

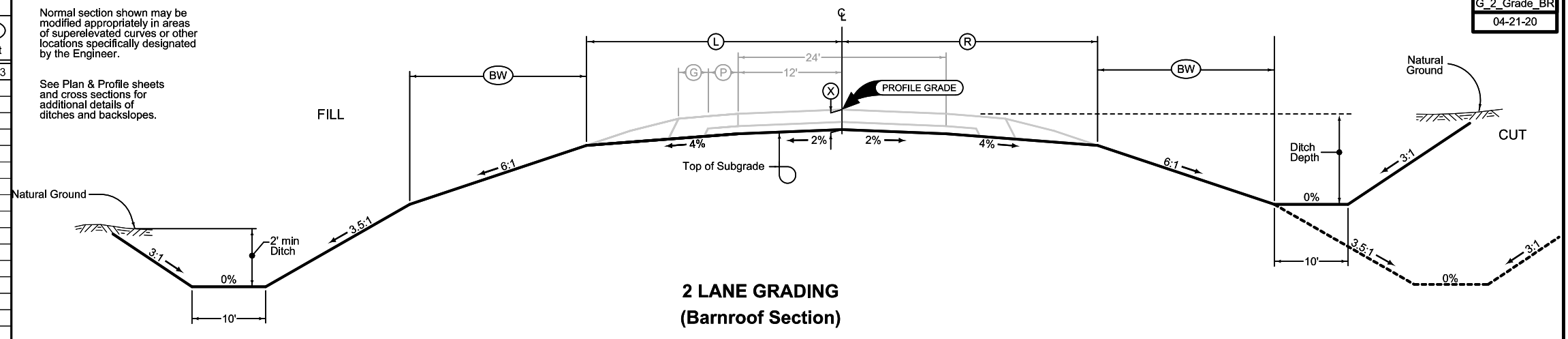
INDEX OF SHEETS	
No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Roadway Index
B Sheets	Typical Cross Sections and Details
B.1 - 2	Typical Cross Sections and Details
B.3	Pavement Replacement Over Box Culvert
B.4	As Built Typical
C Sheets	Quantities and General Information
C.1 - 3	Estimated Project Quantities and Reference Notes
C.4	Project Description
C.4	Standard Road Plans
C.4	Index of Tabulations
C.4 - 7	Tabulations (beg. with tab. of incidentals if needed)
CS Sheets	Soils Tabulations
CS.1 - 2	Soils Tabulations
D Sheets	Mainline Plan and Profile Sheets
* D.1	Plan & Profile Legend & Symbol Information Sheet
* D.2	Iowa 8
G Sheets	Survey Sheets
* G.1 - 2	Reference Ties and Bench Marks
* G.3	Horizontal Control Tabulation
G.4	Alignment Coordinates
H Sheets	Right-of-Way Sheets
* H.1	Iowa 8
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
* J.2 - 3	Detour Map
R Sheets	Erosion Control Sheets
RC.1 - 2	Erosion Control Tabulations and Quantities
* RR.1 - 3	Erosion Control Plan Sheets
T Sheets	Earthwork Quantity Sheets
* T.1A - 1B	Earthwork Legend Sheets
T.2 - 3	Earthwork Quantity Sheets
U Sheets	500 Series, Mod.Stds. and Detail Sheets
* U.1	Clearing and Grubbing Layout
W Sheets	Mainline Cross Sections
W.1-3	Mainline Cross Sections
	* Color Plan Sheets

ROADWAY DESIGN	
	<p>I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p>
	<p>Signature: <u>David Booher</u> Date: <u>10-21-2021</u></p> <p>Printed or Typed Name: <u>David Booher</u></p> <p>My license renewal date is December 31, 2022</p>
<p>Pages or sheets covered by this seal: <u>A.1, B.1-B.4, C.1-C.7, D.1-D.2, G.1-G.4, J.1-J.3, RC.1-RC.2, RR.1-RR.3, T.1A, T.1B, T.1-T.3, U.1 & W.1-W.3</u></p>	

LOCATION		DIMENSIONS			
ROAD IDENTIFICATION	STATION TO STATION	(L)	(R)	(X)	(BW)
		Feet	Feet	Inches	Feet
IA 8	287+65 289+90	27.7	27.7	IA 8	0-10.3

Normal section shown may be modified appropriately in areas of super-elevated curves or other locations specifically designated by the Engineer.

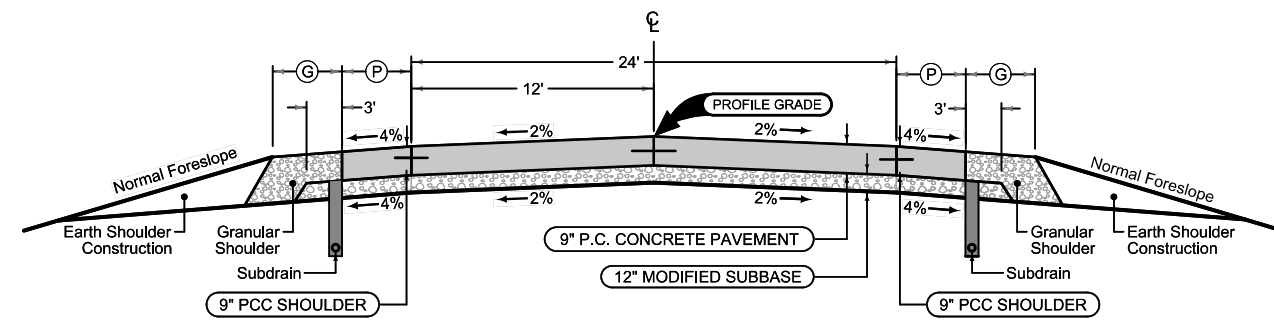
See Plan & Profile sheets and cross sections for additional details of ditches and backslopes.



Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

2_C_FullPCC_04-20-21			
STATION TO STATION		(P)	(G)
		Feet	Feet
288+46	289+14	2	4



Mainline Jointing:
Transverse joints: CD at 17' spacing
Longitudinal joint: L-2

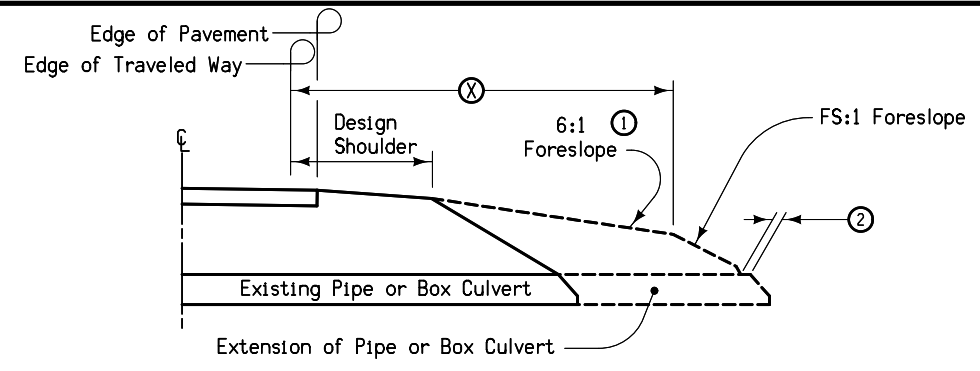
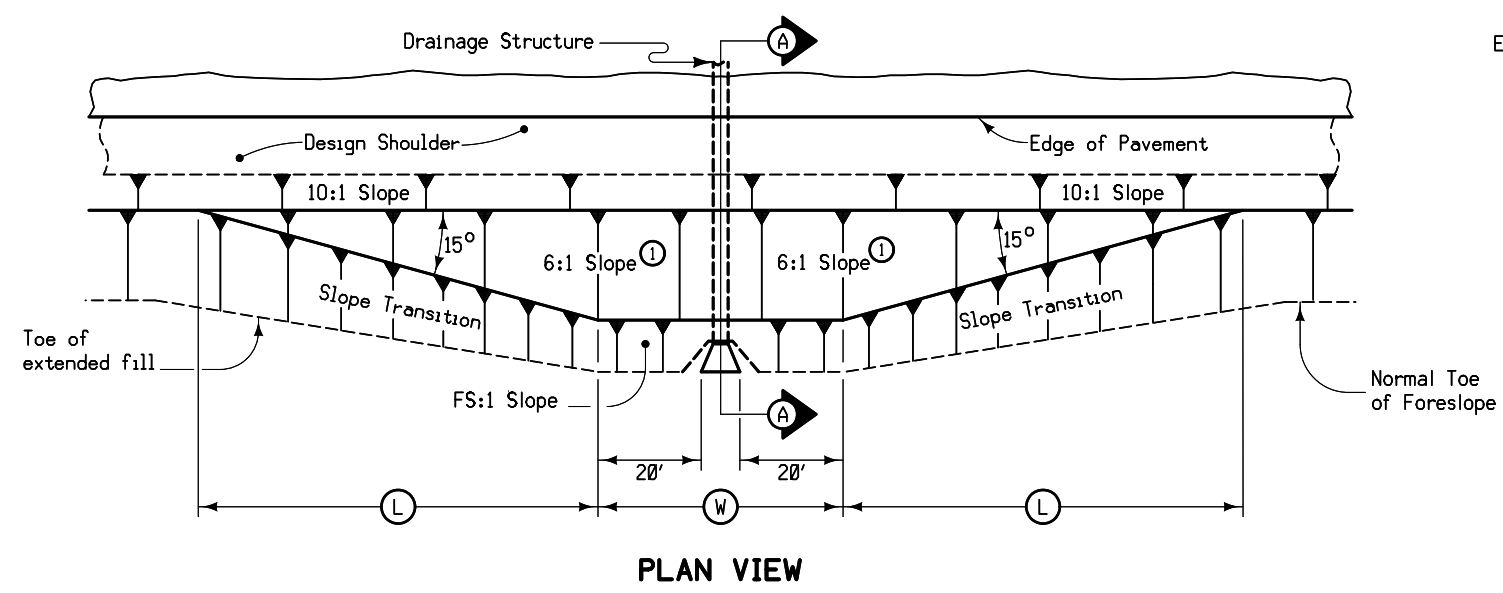
2P_04-21-20	
STATION TO STATION	
288+46	289+14

Full Depth PCC Combination Shoulder

Shoulder Jointing:
Longitudinal joint: BT-2, L-2 or KT-2
Transverse joints: C at 17' spacing

2_C_FullPCC_04-20-21			
STATION TO STATION		(P)	(G)
		Feet	Feet
288+46	289+14	2	4

IA 8
Culvert Replacement

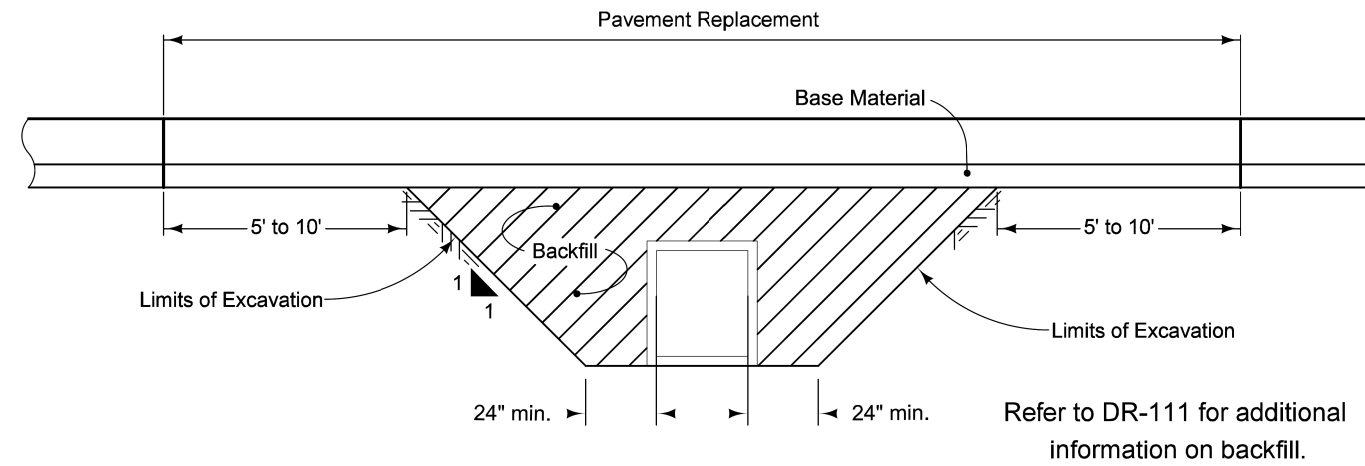


SECTION A-A

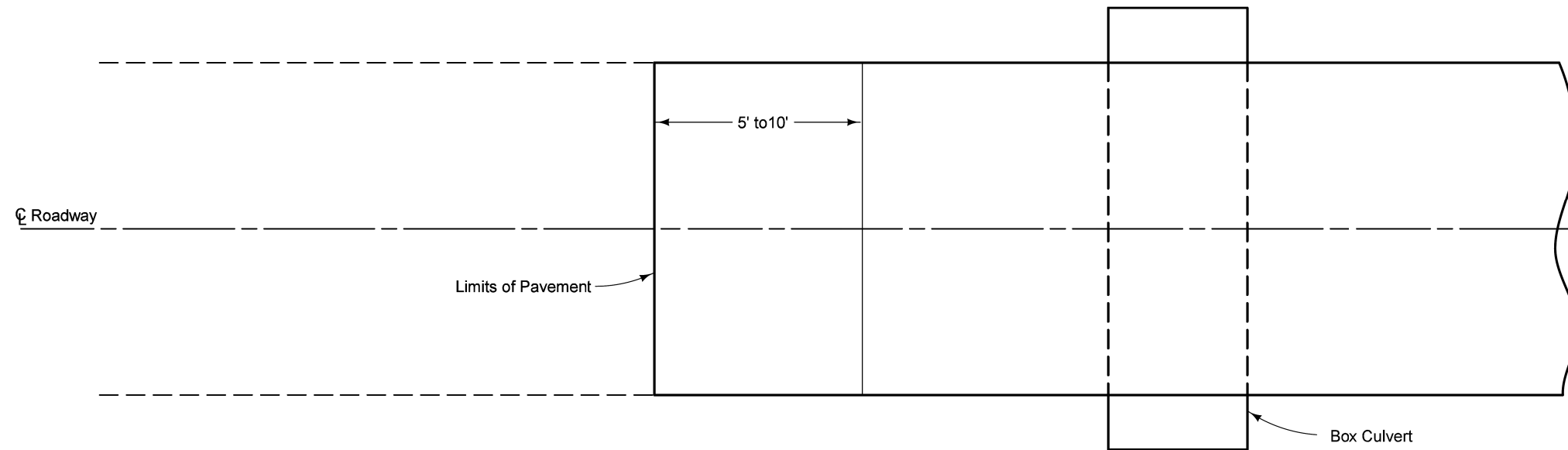
STRUCTURE LOCATION		W	L	X	FS
STATION	SIDE	Feet	Feet	Feet	
288+80	Both	68	76	26	3:1

- Notes:
- At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten the foreslope as indicated so as to cover the structure. Minimum earth cover is 6".
- ① Slope may be flatter than 6:1.
 - ② 6" Minimum for pipe installations or to top of headwall on R.C.B.
 - W = Pipe or R.C.B. opening width plus 20 feet each side.

**BARNROOF FORESLOPE
AT DRAINAGE STRUCTURE**



SECTION - TYPICAL INSTALLATION AT \mathcal{C}



PLAN - TYPICAL INSTALLATION

Pavement Replacement Over
Box Culvert

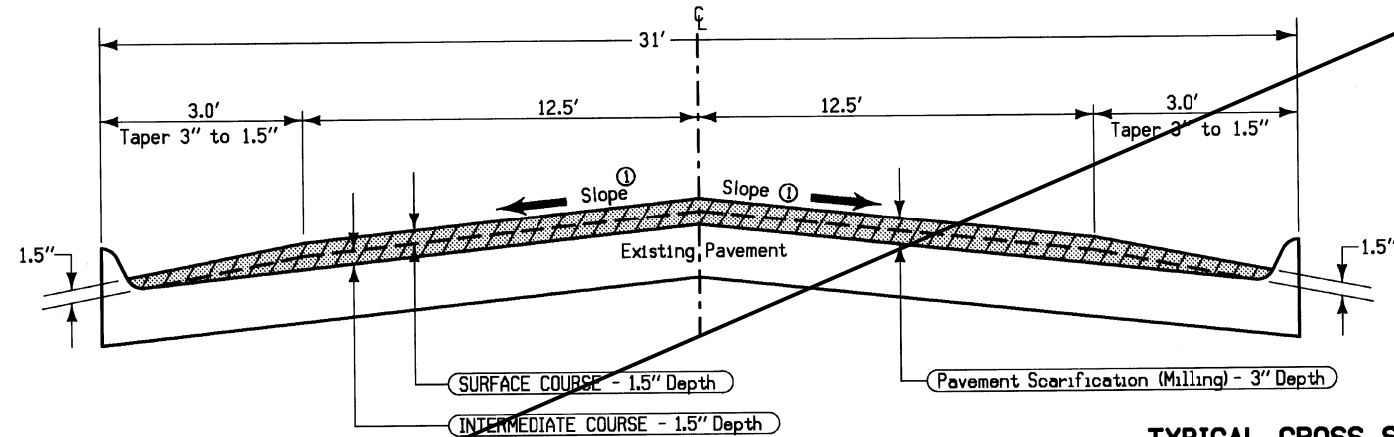
226
Special

DESIGN RATES	
ITEM	RATE
Surface Course	145 lbs./cu.ft
Intermediate Course	145 lbs./cu.ft
Tack Coat	0.05 gal./sq.yd.

Notes:
 ① Finished slope shall match existing pavement except that the maximum allowable slope is 3.0%, minimum allowable slope is 2.0%. Section may be modified as directed by the Engineer through areas of special shaping.
 Refer to tabulation listing of superelevated curves and Standard Road Plans for additional requirements through superelevated curves.

② Tack Coat estimated for 2 applications.

(A) EQUATION:
 Sta. 1000+00.0 (Bck) = Sta. 0+00.0 (Ahd)

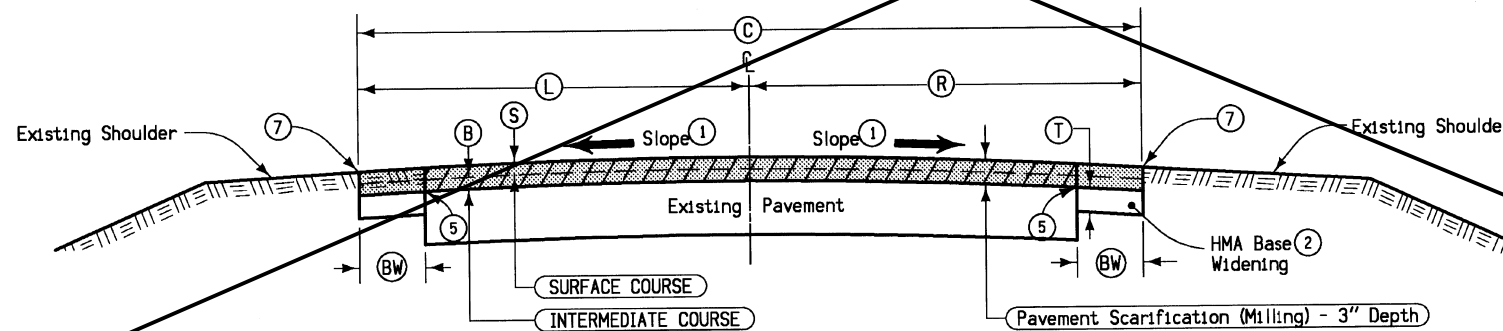


**TYPICAL CROSS SECTION
 With CURB and GUTTER
 HMA RESURFACING WITH MILLING**

TABLE OF DESIGN QUANTITIES Per Station							
LOCATION		TACK COAT	ASPHALT BINDER	HOT MIX ASPHALT		PAVEMENT SCARIFICATION	
ROAD IDENTIFICATION	STATION TO STATION	Gallons ②	Tons	SURFACE	INTERMEDIATE	Square Yards	
IA 8	975+92	33.14	3.11	27.04	24.85	331.45	

2695
Special

Design Rates	
Item	Rate
Surface Course	145 lbs./cu. ft.
Intermediate Course	145 lbs./cu. ft.
Tack Coat	0.05 gal./sq. yd.



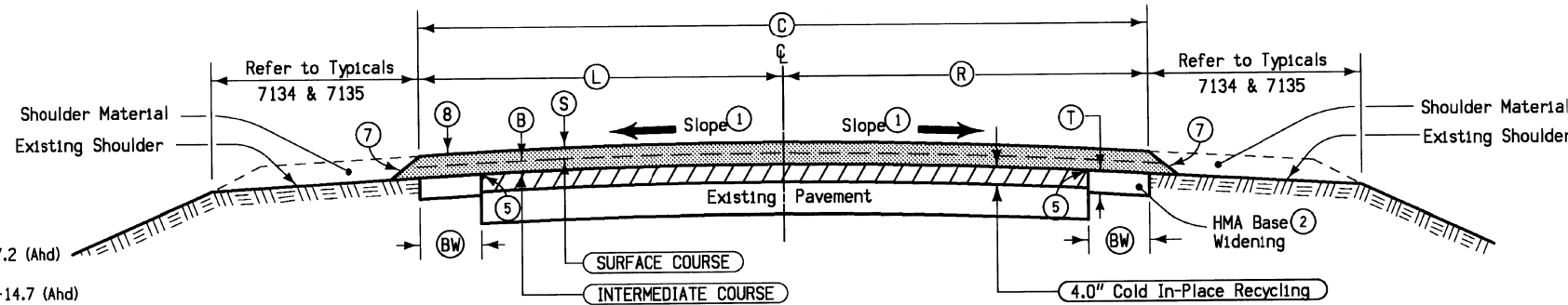
- ① Finished slope shall match existing pavement except that the maximum allowable slope is 3.0%, minimum allowable slope is 2.0%. Section may be modified as directed by the Engineer through areas of special shaping.
 Refer to tabulation listing of superelevated curves and Standard Road Plans for additional requirements through superelevated curves.
- ② Base Widening quantities are not included with Resurfacing quantities, see Standard Road Plan RG-8.
- ③ Tack Coat estimated for 2 applications.
- ④ Width includes 24' wide mainline pavement.
- ⑤ Provide a vertical edge. Incidental to Class 13 Excavation.
- ⑥ Rate estimated includes for both sides.
- ⑦ Granular Shoulder Repair, refer to Typical 7134 on sheet B.2
- ⑧ Quantity is per station.

Location	Station To Station	S	B	C	L	R	Resurfacing Quantities ② Per Station				T	BW	Class 13 Excavation ⑥ ⑧	Pavement Scarification ⑧	Remarks	
							Tack Coat ③	Asphalt Binder	Hot Mix Asphalt (Tons)							
Road Identification	Station To Station	Inches	Inches	Feet	Feet	Feet	Gallons	Tons	Surface	Intermediate	Inches	Feet	Cu. Yds.	Sq. Yds.		
IA 8	0+32	2+50	1.5	1.5	28.0	14.0	14.0	31.11	3.05	25.38	25.38	5.0	2.0	9.88	266.67	

**TYPICAL CROSS SECTION
 HMA RESURFACING WITH BASE WIDENING & MILLING**

2697
Special

Design Rates	
Item	Rate
Surface Course	145 lbs./cu. ft.
Intermediate Course	145 lbs./cu. ft.
Tack Coat	0.05 gal./sq. yd.



- ① Finished slope shall match existing pavement except that the maximum allowable slope is 3.0%, minimum allowable slope is 2.0%. Section may be modified as directed by the Engineer through areas of special shaping.
 Refer to tabulation listing of superelevated curves and Standard Road Plans for additional requirements through superelevated curves.
- ② Base Widening quantities are not included with Resurfacing quantities, see Standard Road Plan RG-8.
- ③ Tack Coat estimated for 2 applications.
- ④ Width includes 24' wide mainline pavement.
- ⑤ Provide a vertical edge. Incidental to Class 13 Excavation.
- ⑥ Rate estimated includes for both sides.
- ⑦ 1.7:1 Slope Ratio (Safety Edge)
- ⑧ Milled Shoulder Rumble Strip shall be constructed in Lt. Shoulder from Sta. 50+50 to Sta. 71+70.
- ⑨ Quantity is per station.

(A) EQUATION:
 Sta. 71+18.1 (Bck) = Sta. 71+47.2 (Ahd)
 (B) EQUATION:
 Sta. 385+97.1 (Bck) = Sta. 429+14.7 (Ahd)
 (C) BW on the left side = 6.0' and on the right side = 2.0'

Location	Station To Station	S	B	C	L	R	Resurfacing Quantities ② Per Station				T	BW	Class 13 Excavation ⑥ ⑨	Cold In-Place Recycle ⑨		Remarks	
							Tack Coat ③	Asphalt Binder	Hot Mix Asphalt (Tons)					Asphalt Pavement	Foamed Asphalt		
Road Identification	Station To Station	Inches	Inches	Feet	Feet	Feet	Gallons	Tons	Surface	Intermediate	Inches	Feet	Cu. Yds.	Sq. Yds.	Tons		
IA 8	5+50	50+50	2.0	2.0	28.0	14.0	14.0	32.06	4.15	34.25	34.93	4.0	2.0	9.88	266.67	1.17	
IA 8	50+50	71+70 (A)	2.0	2.0	32.0	18.0	14.0	36.56	4.73	39.09	39.78	4.0	(C)	19.75	266.67	1.17	
IA 8	71+70	435+00 (B)	2.0	2.0	28.0	14.0	14.0	32.06	4.15	34.25	34.93	4.0	2.0	9.88	266.67	1.17	

**TYPICAL CROSS SECTION
 HMA RESURFACING WITH BASE WIDENING & CIR**

ENGLISH IOWA DOT DESIGN TEAM **Tony Gustafson\Gary Mackey**

TAMA COUNTY PROJECT NUMBER **STPN-0-1(14)-2J-06 & STPN-03-5(46)-2J-06**

SHEET NUMBER **B.1**

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AS BUILT PLANS

FILE NO. ENGLISH DESIGN TEAM

QUIGG ENGINEERING, INC.

TAMA COUNTY PROJECT NUMBER **STPN-008-1(16)-2J-86**

SHEET NUMBER **B.4**

ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES

Roadway Items : Roadway Items

Item no.	Item Code	Item	Unit	Quantities		Estimate Reference Notes
				Estimated	Roadway Items	
1	2101-0850001	CLEARING AND GRUBBING	ACRE	0.3		Refer to Sheet U.1. All material generated as a result of Clearing and Grubbing shall become the property of the contractor and must be disposed off site. All wood material must be disposed of according to Iowa Department of Agriculture and Land Stewardship Emerald Ash Borer Quarantine Order. For more information see www.iowatrepests.com .
2	2102-2625000	EMBANKMENT-IN-PLACE	CY	1,126		Refer to T Sheets.
3	2102-2710070	EXCAVATION, CLASS 10, ROADWAY AND BORROW	CY	389.5		<p>Includes 310 cu. yds. of suitable material to be used in the roadway fill.</p> <p>Refer to T Sheets.</p> <p>Overhaul is incidental to roadway excavation on this project and will not be paid for separately.</p> <p>Includes 1464 cu. yds. of Contractor Furnished Borrow.</p> <p>Includes 223 cu. yds. of Class 10 to be wasted, according to Article 1106.07 of the Standard Specifications.</p> <p>Refer to Tab. 107-28 on Sheet T.2 and T.3</p> <p>Material shall be provided by the Contractor.</p> <p>Shrinkage is estimated at 30%.</p> <p>Overhaul will not be measured or paid for, but shall be considered incidental to excavation on this project. Contractor is notified that the excavation area is anticipated to be excessively wet and specilized equipment, blocking or mats may be required to complete the work as shown on the plans. All waste must be removed from the project site. If waste disposed in floodplain area waste shall not be more than 12 inches deep.</p> <p>Includes 14 CY of material excavation for removal of existing subdrain.</p> <p>See Sheet CS.2</p> <p>Includes 65.5 CY of material excavation for installation of Revetment mat at Box Culvert.</p> <p>See Sheets 4 or 8.</p>
4	2102-2710090	EXCAVATION, CLASS 10, WASTE	CY	223		All waste must be removed from the project site. Contractor is notified that the excavation area is anticipated to be excessively wet and specilized equipment, blocking or mats may be required to complete the work as shown on the plans. Overhaul will not be measured or paid for , but shall be considered incidental to excavation on this project.
5	2102-2712015	EXCAVATION, CLASS 12, BOULDERS OR ROCK FRAGMENTS	CY	5		<p>A. Refer to Tab. 103-7.</p> <p>B. Dispose of excess material according to Article 1106.07 of the current specifications.</p>

Item no.	Item Code	Item	Unit	Quantities		Estimate Reference Notes
				Estimated		
				Roadway Items		
6	2105-8425015	TOPSOIL, STRIP, SALVAGE AND SPREAD	CY	651		Refer to Tab. 103-10 and the T Sheets. Strip 12 inches of topsoil within the limits of grading. After excavating to the sub grade elevations, spread the stockpiled topsoil to an 8 inch depth across the grading area. Seed the disturbed topsoil stockpile area as per section 2601.05 of the standard specifications. Seeding of the stockpile areas shall be considered incidental to this bid item.
7	2107-0875100	COMPACTION WITH MOISTURE CONTROL	CY	1,364		Refer to Tab. 103-6 on Sheet CS.1. Cubic yards shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in the moisture control quantity.
8	2115-0100000	MODIFIED SUBBASE	CY	87.4		Refer to Typical on B.1 and refer to Tab. 100-24.
9	2121-7425010	GRANULAR SHOULDERS, TYPE A	TON	79.1		Refer to Tab. 112-9 on Sheet C.6.
10	2122-5190009	PAVED SHOULDER, P.C. CONCRETE, 9 IN.	SY	30.2		Refer to B Sheets and Tab. 112-9 in C Sheets.
11	2123-7450000	SHOULDER CONSTRUCTION, EARTH	STA	1.4		Refer to B Sheets and Tab. 112-9 in C Sheets for additional information.
12	2301-1033090	STANDARD OR SLIP FORM PORTLAND CEMENT CONCRETE PAVEMENT, CLASS C, CLASS 3 DURABILITY, 9 IN.	SY	181.3		Refer to B Sheets and Tab. 100-24 in C Sheets for location and details.
13	2401-6745650	REMOVAL OF EXISTING STRUCTURES	LS	1		Refer to Tab 110-2 on Sheet C.5 .
14	2402-0425040	FLOODED BACKFILL	CY	444		Refer to Tab. 104-4 in C Sheets.
15	2502-6745952	REMOVAL OF SUBDRAIN	LF	74		Refer to Sheet CS.2
16	2502-8212034	SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.	LF	316		
17	2502-8221306	SUBDRAIN OUTLET, DR-306	EACH	5		Refer to CS Sheets.
18	2507-3250005	ENGINEERING FABRIC	SY	497.6		Refer to Tab. 100-23 and on Sheets 4 and 8. Use material specified for embankment erosion control according to Article 4196.01, B, 3. Material will be measured in sq. yds. of actual area covered. Refer to details.
19	2507-6800061	REVETMENT, CLASS E	TON	370.6		Refer to Tab. 100-23 and Sheets 4 and 8.
20	2510-6745850	REMOVAL OF PAVEMENT	SY	211.6		A. Refer to Tabs.110-1 and 102-5 on C Sheet. B. Pavement removal includes 56' of full depth saw cut.
21	2526-8285000	CONSTRUCTION SURVEY	LS	1		--
22	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	1.6		Refer to Tab. 108-22 on C Sheet.
23	2528-2518000	SAFETY CLOSURE	EACH	2		Refer to Tab 108-13A on sheet C.4.

Item no.	Item Code	Item	Unit	Quantities		Estimate Reference Notes
				Estimated		
				Roadway Items		
24	2528-8445110	TRAFFIC CONTROL	LS	1		Refer to Traffic Control Plan on J Sheet. Item also includes furnishing, erecting, maintaining and removing all detour signs as per J sheets.
25	2528-9290050	PORTABLE DYNAMIC MESSAGE SIGN (PDMS)	CDAY	0		See Proposal.
26	2548-0000200	MILLED SHOULDER RUMBLE STRIPS, PCC SURFACE	STA	1.4		Refer to Tab. 112-10.
27	2548-0000320	MILLED CENTERLINE RUMBLE STRIPS, PCC SURFACE	STA	0.7		
28	2602-0000320	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE, 20 IN. DIA.	LF	560.3		Refer to Tab. 100-19. The tabulation includes estimated locations for placement of "Perimeter and Slope Sediment Control Device, 20 in. dia." to address erosion to be encountered during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements. Use Perimeter and Slope Sediment Control Devices fabricated using wood excelsior.
29	2602-0000351	REMOVAL OF PERIMETER AND SLOPE OR DITCH CHECK SEDIMENT CONTROL DEVICE	LF	560.3		Refer to Tab. 100-19 for details.
30	2602-0010010	MOBILIZATIONS, EROSION CONTROL	EACH	1		--
31	2602-0010020	MOBILIZATIONS, EMERGENCY EROSION CONTROL	EACH	1		

100-1D 10-18-05
PROJECT DESCRIPTION
This project consists of replacing a RCB Culvert located, Rock Creek 0.4 miles W. of W. Jct IA 21

111-25 10-18-11		
INDEX OF TABULATIONS		
Tabulation	Tabulation Title	Sheet No.
C Sheets		
	ESTIMATED PROJECT QUANTITIES AND REFERENCE NOTES	C.1 - 3
100-1D	PROJECT DESCRIPTION	C.4
100-24	PCC PAVEMENT	C.5
100-27	PROPOSED POSTED SPEED LIMIT	C.4
102-5	EXISTING PAVEMENT	C.5
104-4	ROADWAY ITEMS FOR DRAINAGE STRUCTURES	C.4
105-4	STANDARD ROADWAY PLANS	C.4
108-13A	SAFETY CLOSURES	C.4
108-22	PAVEMENT MARKING LINE TYPES	C.7
110-1	REMOVAL OF PAVEMENT	C.6
110-2	REMOVAL OF EXISTING STRUCTURES	C.7
110-17	CLEARING AND GRUBBING	C.7
111-25	INDEX OF TABULATION	C.4
112-9	SHOULDERS	C.6
112-10	MILLED RUMBLE STRIPS	C.6
262-5	UTILITIES (POINT 25)	C.4
CS Sheets		
103-6	EMBANKMENT WITH MOISTURE CONTROL	CS.1
103-7	SHRINKAGE DATA	CS.1
103-10	TOPSOIL STRIPPING AND PLACEMENT	CS.1
104-9	LONGITUDINAL SUBDRAIN SHOULDER AND BACKSLOPE	CS.1
T Sheets		
107-28	TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS	T.2 - 3

105-4 10-18-11		
STANDARD ROAD PLANS		
The following Standard Road Plans apply to construction work on this project.		
Number	Date	Title
DR-111	04-17-18	Box Culvert (Backfill)
DR-303	10-17-17	Subdrains (Longitudinal)
DR-306	10-16-18	Precast Concrete Headwall for Subdrain Outlets
PM-110	04-21-20	Line Types
PV-12	10-20-20	Milled Shoulder Rumble Strips
PV-101	04-21-20	Joints
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)
TC-202	10-19-21	Work Within 15 ft of Traveled Way
TC-252	04-21-20	Routes Closed to Traffic

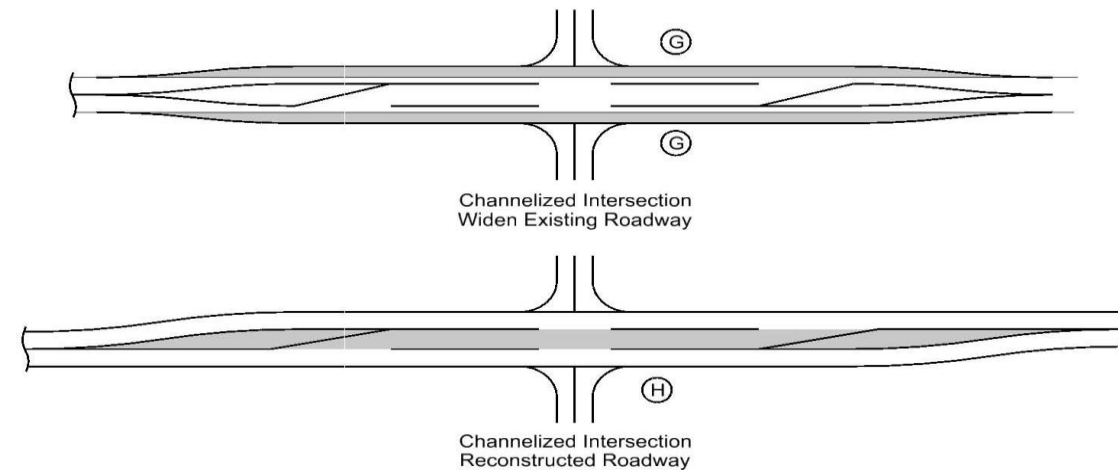
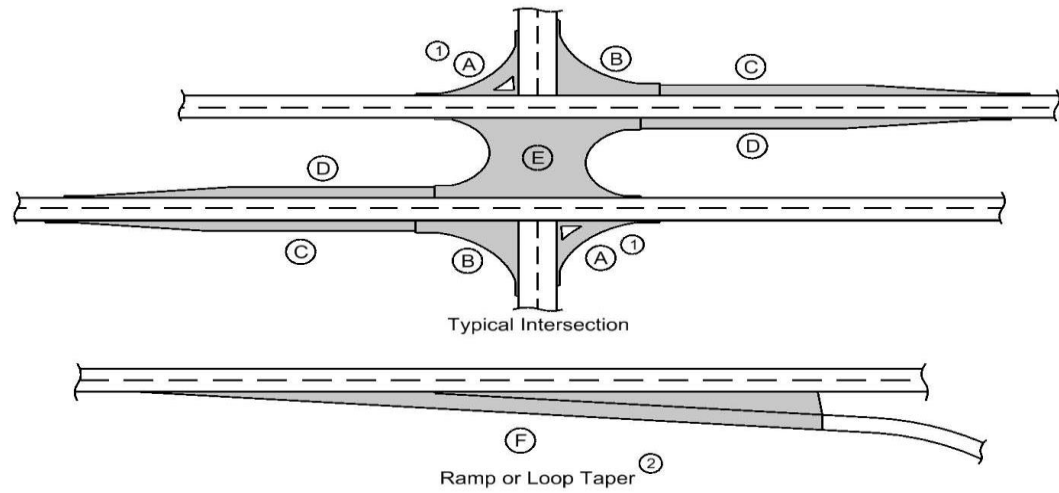
104-4 10-17-17																				
ROADWAY ITEMS FOR DRAINAGE STRUCTURES INSTALLED BY CULVERT CONTRACTOR																				
* Not a Bid Item																				
① Backfill according to DR-111																				
Location	Design Number	Size	Kind	By Road Contractor					Floodable* Backfill	Porous* Backfill	Flooded Backfill	Excavation	Revetment		Engineering Fabric	Remarks				
				Dike				Compacting Backfill Adjacent					Compaction w/Moisture Control	Compaction w/Moisture and Density			Type	Quantity	Type	Quantity
				Rt.	Location Station	Top. Elev.	Type													
288+80.00		12' X 9'	RCB							441.0	3.0	444.0	1)	1)	1)	1)				
1) Refer to Situation Plan elsewhere																				

262-5 10-18-05	
UTILITIES (POINT 25 PROJECT)	
This is a POINT 25 project and is subject to the provisions of IAC 761-115.25.	

100-27 04-17-18						
PROPOSED POSTED SPEED LIMIT						
Road Identification	Begin Station	End Station	Proposed Posted Speed Limit			Remarks
			35 or less	40 - 45	over 45	
IA 8	287+65.00	289+90.00			X	

108-13A 08-01-08			
SAFETY CLOSURES			
Refer to Section 2518 of the Standard Specifications			
Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
287+50.00	1		Iowa 8
290+00.00	1		Iowa 8

PCC PAVEMENT



- ① Does not include raised island area or curb. Refer to tabulation 112-4 for quantities.
- ② Refer to PV-410, PV-411, PV-412, and PV-414.
- ③ Quantity includes Pavement Header.

Road Identification	Location		Mainline			Area ③								Total Area By Pavement Thickness		Special Backfill	Modified Subbase	Granular Subbase	Remarks
	Direction of Travel	Station to Station	Width	Length	Area	A ①	B	C	D	E	F ②	G	H	9 IN	10% IN				
			FT	FT	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY	SY				
IA 8	Both	287+65.00 - 289+90.00	24.0	68.0	181.3									181.3			87.4	Modified Subbase includes value for shoulders.	
Total :											181.3		87.4						

EXISTING PAVEMENT

No.	Location					Year	Type	Project Number	Surface		Base		Subbase		Removal		Coarse Aggregate			Reinforcement	Remarks		
	County	Route	Dir. of Travel	Begin Ref. Loc. Sign	End Ref. Loc. Sign				Type	Depth	Type	Depth	Type	Depth	Type	Depth	Type	Depth	Source	Type		Durability Class	Type
1	TAMA	IA 8	EB & WB			1941		HMA	0.75	GSB	6												
2	TAMA	IA 8	EB & WB	0	7.88	2011	STPN-8-1(14)--2J-86	HMA COLD IN PLACE	2 4	GSB	6												

110-1
04-16-13

REMOVAL OF PAVEMENT

Refer to Tabulation 102-5

* Not a Bid Item

Begin Station	End Station	Side	Pavement Type	Area		Saw Cut*	Remarks
				SY	LF		
288+46.00	289+14.00	Both	HMA	211.6	56.0		
Total:				211.6	56.0		

112-10
10-20-20

MILLED RUMBLE STRIPS

See PV-12 and PV-13

* Calculated at 18" width for Shoulder.

Road Identification	Station to Station	Shoulder Pavement Type	Rumble Strip Type (Centerline, Rt or Lt Shoulder)	L	Installation Length		Fog Seal* (Milled Rumble Strip) Shoulder GAL	Effective Shoulder Width			Remarks	
					PCC	HMA		PCC Paved	HMA Paved	Granular\ Earth		
												IN
					IA 8	288+46.00		289+14.00	PCC	Left Shoulder		
IA 8	288+46.00	289+14.00	PCC	Right Shoulder		0.68		2.0		4.0		
						1.36						
IA 8	288+46.00	289+14.00	PCC	Centerline		0.68						

112-9
10-20-20

SHOULDERS

- ① Lane(s) to which the shoulder is adjacent.
- ② See Typ. 7156, 7157, or 7158.
- ③ Bid Item.
- ④ Applies only for Paved Shoulders constructed on project with existing granular shoulders.
- ⑤ Bid Item. Typ. 7156, 7157, or 7158.
- ⑥ Does not include shrink.

Calculations assume a HMA unit weight (lbs/cf) of 0, a Special Backfill unit weight (lbs/cf) of 140, and a Granular Shoulder unit weight (lbs/cf) of 140.

Road Identification	Direction Of Traffic	Location						Quantities														Remarks							
		Station to Station		Side	P Width	P _{SG} Width	G Width	L Length	Class 13 ^④ Excavation	Hot Mix Asphalt		Binder	Paved Shoulder	Paved Shoulder at Guardrail	Reinforced Paved Shoulder	Special Backfill				Modified Subbase	Granular Shoulder		Earth Shoulder Construction Alternates						
		FT	FT							TON	TON/STA					TONS	SY	SY	SY		HMA Alternate		PCC Alternate		CY	TON	TON/STA	STA	HMA
		FT	FT	TON	TON/STA	TONS	SY	SY	SY	TON	TON/STA	TON	TON/STA	TON	TON/STA	CY	TON	TON/STA	TON	TON/STA	CY		CY						
IA 8	EB	288+46.00	289+14.00	L	2.0		4.0	68.0											1)	39.413	45.829	0.7							
IA 8	EB	288+46.00	289+14.00	R	2.0		4.0	68.0											1)	40.262	46.816	0.7							
Total:												30.2												79.700	92.600	1.4			
1) Modified Subbase is included with PCC Pavement on Tab. 100-24																													

CLEARING AND GRUBBING

Location		Work and Material Type	Trees, Stumps, and Logs and Down Timber Material Diameters													All Other Materials		Estimated Quantities			Remarks
Station to Station or Ref. Loc. Sign to Ref. Loc. Sign or Description	Direction of Travel		3"-6"	>6"-9"	>9"-12"	>12"-15"	>15"-18"	>18"-24"	>24"-30"	>30"-36"	>36"-42"	>42"-48"	>48"-60"	>60"-72"	>72"	Length FT	Width FT	Units	Area	Herbicide Application	
			Units	Acres	Each																
287+65.00	EB	Brush - Clearing																0.1			
289.90.00	WB	Brush - Clearing																0.1			
																		0.3			

REMOVAL OF EXISTING STRUCTURES

Location	Description	Remarks
288+80.38	12.0' x 4.0' x 49.71' RCB	

PAVEMENT MARKING LINE TYPES

See PM-110

*BCY4 - Place on the same side of the roadway to match existing markings near the project.

***MNY4 - Factor of 1.00 as value includes number of 4-inch passes to cover median nose area.

**NPY4 - For estimating purposes only. No Passing Zone Lines will be located in the field.

BCY4: Broken Centerline (Yellow) @ 0.25

DCY4: Double Centerline (Yellow) @ 2.00

NPY4: No Passing Zone Line (Yellow) @ 1.25

BLW4: Broken Lane Line (White) @ 0.25

ELW4: Edge Line Right (White) @ 1.00

ELY4: Edge Line Left (Yellow) @ 1.00


Location				Length by Line Type (Unfactored)																Remarks		
Road ID	Station to Station		Dir. of Travel	Marking Type	Side			BCY4*	DCY4	NPY4**	BLW4	ELW4	ELY4									
	L	C			R	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA	STA		STA	STA
IA 8	288+46.00	289+14.00	EB	Waterborne/Solvent Paint	X							0.68										
IA 8	288+46.00	289+14.00	WB	Waterborne/Solvent Paint			X					0.68										
IA 8	288+46.00	289+14.00	Both	Waterborne/Solvent Paint		X		0.68														
				Factored Total: Waterborne/Solvent Paint				0.17	-	-	-	1.36	-	-	-	-	-	-	-	-	-	
				Bid Quantity: Painted Pavement Markings, Waterborne or Solvent-Based								1.53										

SHRINKAGE DATA		
103-7 08-01-08		
Material	%	Remarks
Topsoil	40%	
Boulders		5 CY

103-6 10-17-17
EMBANKMENT WITH MOISTURE CONTROL
Moisture Control is required for all Class 10 fill placed in all locations and depths. Stability berms placed outside the normal foreslope template and topsoil will not require Moisture Control.

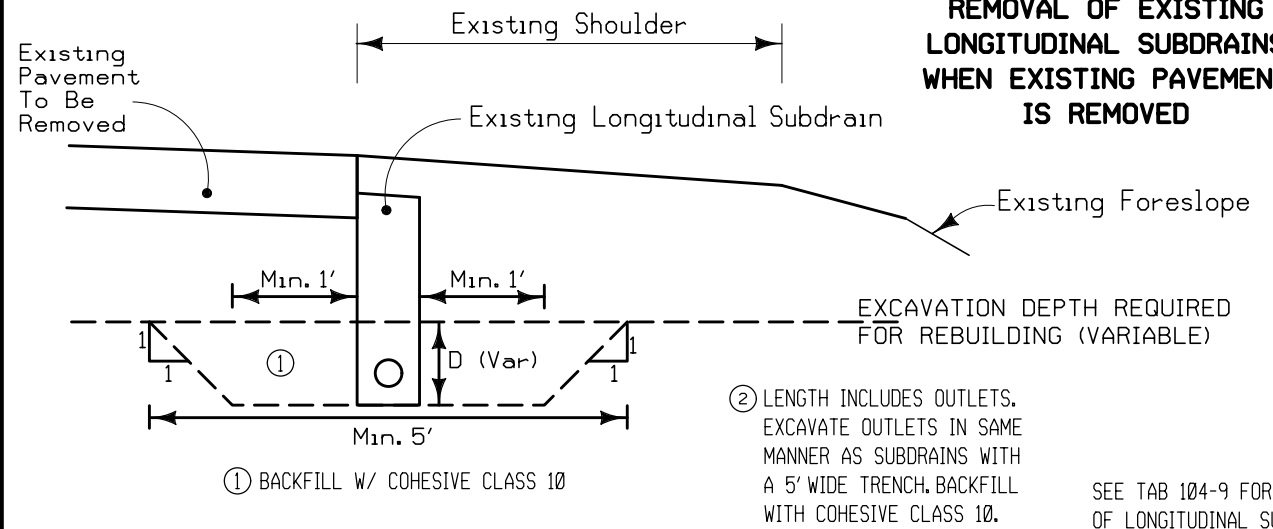
103-10 04-18-17						
TOPSOIL STRIPPING AND PLACEMENT						
Location				Topsoil Stripping Thickness	Topsoil Placement Thickness	Remarks
Road Identification	Dir. of Traffic	Begin Station	End Station	IN	IN	
IA 8		287+65.00	289+90.00	12.0	8.0	

104-9 10-17-17																	
LONGITUDINAL SUBDRAIN SHOULDER AND BACKSLOPE																	
Refer to Soils Sheets																	
* Not a bid item. Bridge berm quantities assume a trench depth of 24 inches.																	
Line No.	Road or Lane Identification	Location		Side	Longitudinal Subdrain (DR-303)							Subdrain Outlet		Porous* Backfill CY	Class "A" Crushed Stone CY	Remarks	
		Station to Station	Depth D		Shoulder		Backslope		Bridge Berm (EW-203 or EW-204)			DR-303, DR-305 or DR-306					
					Size IN	Length FT	Size IN	Length FT	Standard Road Plan and Type	Size IN	Length FT	Station	Standard Road Plan and Type				
1	IA 8 EBL	288+46.00	288+46.00	RT	42.0	4.0	60.0						288+46.00	DR-306	5.6	0.2	INSTALL NEW OUTLET ONTO EXISTING SUBDRAIN
2	IA 8 EBL	288+46.00	289+14.00	RT	24.0	4.0	128.0						288+46.00	DR-306	5.9	0.2	
													289+14.00	DR-306		0.2	
3	IA 8 WBL	288+46.00	289+14.00	LT	24.0	4.0	128.0						288+46.00	DR-306	5.9	0.2	
													289+14.00	DR-306		0.2	
Totals							316.0		0.0					DR-306 = 5	17.4	1.0	
NOTE: ALL LONGITUDINAL SUBDRAINS ARE TYPE 7 WITH PCC OR TYPE 8 WITH HMA (ACC) UNLESS OTHERWISE NOTED IN REMARKS COLUMN.																	
NOTE: ALL LONGITUDINAL SUBDRAINS MAY BE ADJUSTED BOTH VERTICALLY AND HORIZONTALLY IN THE FIELD AS NECESSARY																	

GEOTECHNICAL DESIGN	
	I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
	<i>Mark A Dell</i> 9/22/21 Signature Date
	Mark A. Dell Printed or Typed Name My license renewal date is December 31, 20 21
	Pages or sheets covered by this seal: CS.1 & CS.2

REMOVAL OF EXISTING LONGITUDINAL SUBDRAINS WHEN EXISTING PAVEMENT IS REMOVED

RLS-2



ROAD IDENTIFICATION	LOCATION			② LENGTH	① DEPTH	EXCAVATION QUANTITY (CY)	REMARKS
	STATION TO	STATION	SIDE				
IA 8	288+46.00	289+00.00	RT	74	1.0'	14	CUT INTO EXISTING LONGITUDINAL SUBDRAIN
TOTALS				74		14	

* NOTE: IF ADDITIONAL GRANULAR MATERIAL IS ENCOUNTERED AT THE REQUIRED DEPTH OF EXCAVATION, THEN EXCAVATE DEEPER UNTIL ALL GRANULAR MATERIAL IS REMOVED.

SURVEY SYMBOLS

- CP Control Point
- SCR Section Corner
- BL Topo Breakline
- D Centerline Draw or Stream (Down)
- GR Ground Shot
- DU Centerline Draw or Stream (Up)
- PRO Profile Shot
- CUL Culvert
- SNP Unpaved Shoulder
- ENT Centerline BL of Entrance
- ENU Edge Unpaved Entrance & Parking
- TILE Tile Line
- EP Edge of Paved Roads (ML or SR)
- C Centerline BL of Road (ML or SR)
- FO FO1D Farmers Co-Op Telephone Fiber Optic - Quality D
- W WL1D Poweshiek Water Association - Quality D
- TPD Telephone Pedestal
- FO2 FO2D Mediacom Fiber Optic - Quality D
- FO3 FO3D CenturyLink Fiber Optic - Quality D
- REF Reference Tie Point

UTILITY LEGEND

This is NOT a POINT 25 Project and is not subject to the provisions of IAC 761-115.25.

- FO - Farmers Cooperative Telephone Company
Dick Baker
332 Main
Dysart, IA 52224
(319) 476-7800
fctdysart@netins.net
- FO2 - Mediacom Communications Corporation
Tim Adreon
225 S Dayton Road
Ames, IA 50010-6499
(515) 233-4646
tadreon@mediacomcc.com
- FO3 - CenturyLink
Steve Parker
2103 E. University Ave.
Des Moines, IA 50317
(515) 265-0968
Steven.Parker4@lumen.com
- W - Poweshiek Water Association
Chad Coburn
125 Industrial Drive
Brooklyn, IA 52211
(641) 522-7416
chad@poweshiekwater.com

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING		
Design Color No.	Description	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	Description
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

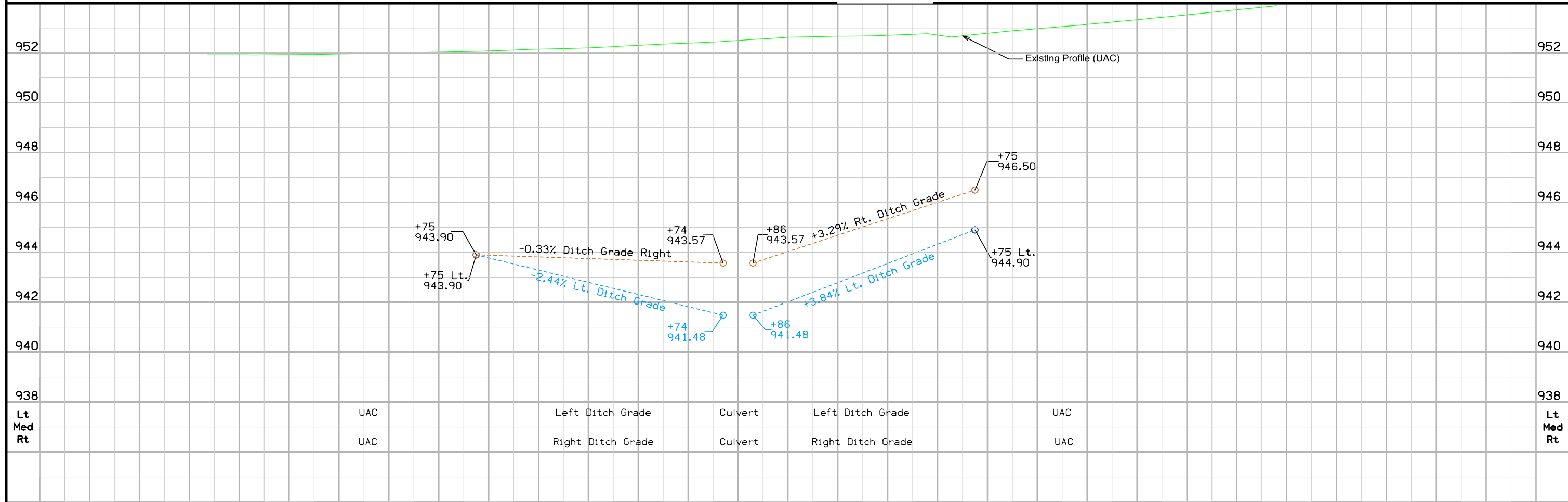
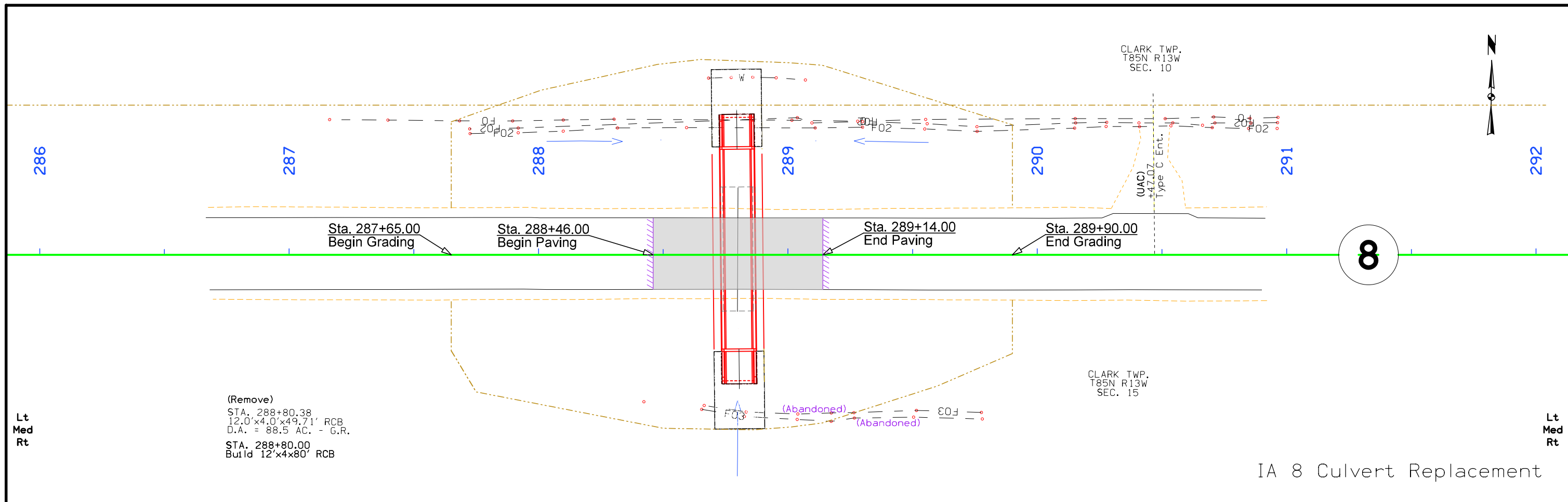
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control

PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



Survey Information

County: Tama
PIN: 20-86-008-020
Project Number: STPN-008-1(16)--2J-86
Location: In Sections 10 and 15, Township
85 North, Range 13 West of the 5th Principal
Meridian, Tama County, Iowa, on U.S. 8 at
station 288+80.38 (this survey).
Type of Work: Culvert replacement and
extension under Hwy 8.
Project Directory: 8600802020

General Information

Measurement units for this survey are U.S. survey feet. This survey was completed to assist in the design of a reinforced concrete box culvert replacement and extension under Hwy 8.

Vertical Control

The vertical datum for this survey is NAVD88. The vertical control for this project is relative to said datum, computed using GEOID 12b, and is dependent on the Iowa Real-Time Network (IaRTN) reference stations. Control point elevations were established by 5 redundantly averaged RTK GPS shots utilizing the IaRTN.

Horizontal Control

The horizontal project coordinate system basis for this survey is from the Iowa Regional Coordinate System Zone 9 projection. The Geodetic Datum is NAD83 (2011) EPOCH 2010.0. Control Point horizontal coordinate positions were established by 5 redundantly averaged RTK GPS shots utilizing the Iowa Real-Time Network.

Alignment Information

The horizontal centerline alignment for Ia8 is a retrace of A.C. resurfacing plan FN-822. Stationing was held at PI 281+70.00 and was ran ahead without equation.

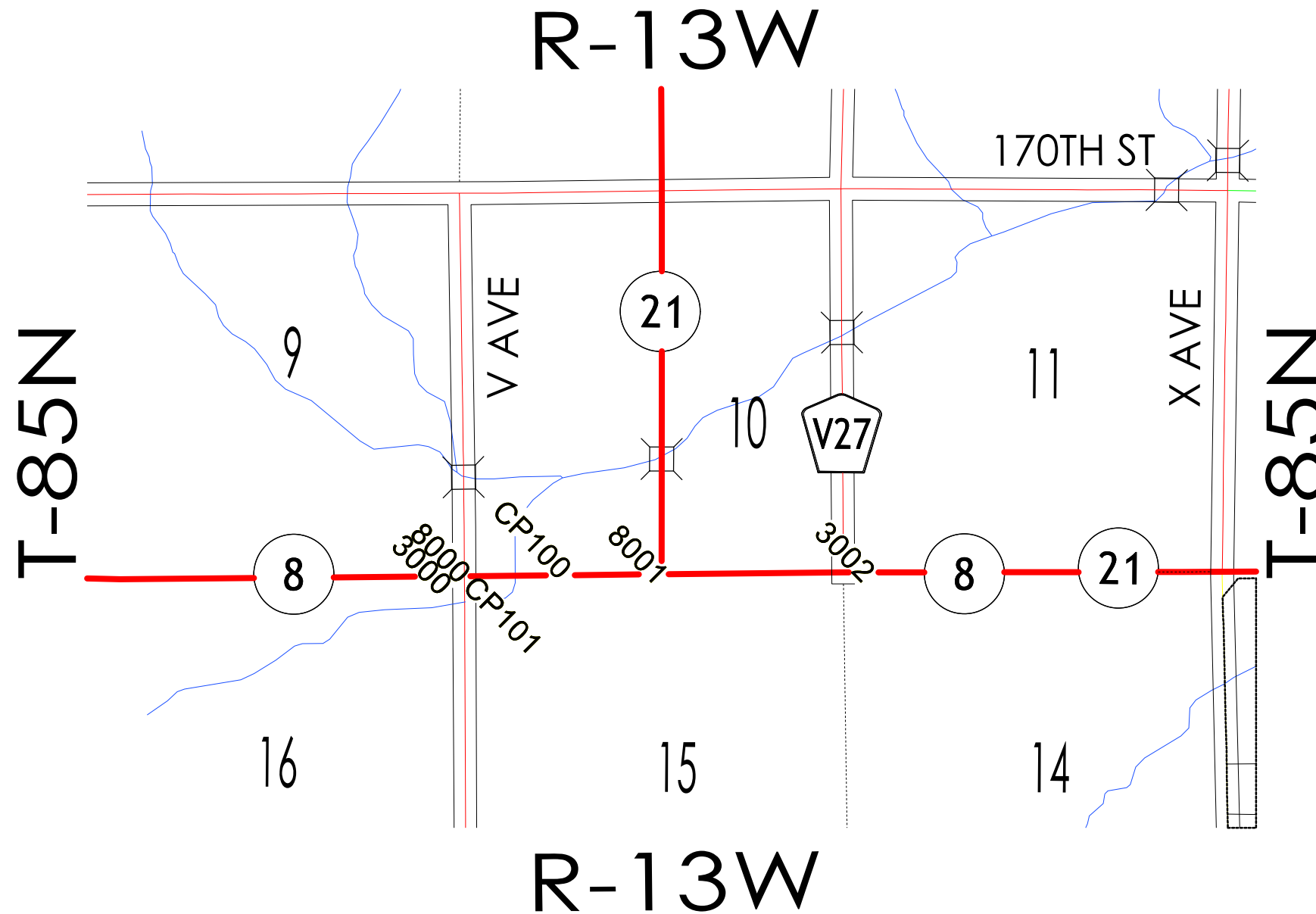
Survey stationing relates to as-built stationing as follows:

PI Sta. 281+70.00 (Plan FN-822) = PI Sta. 281+70.00 (this survey)
Found hinge nail

PI Sta. 337+30.80 (Plan FN-822) = PI Sta. 337+31.37 (this survey)
Found hinge nail

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points
 Primary control is for use with RTK base stations and for RTN validation.
 Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 9

Coordinate listing from next sheet will be used with 1aRTN for monument recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

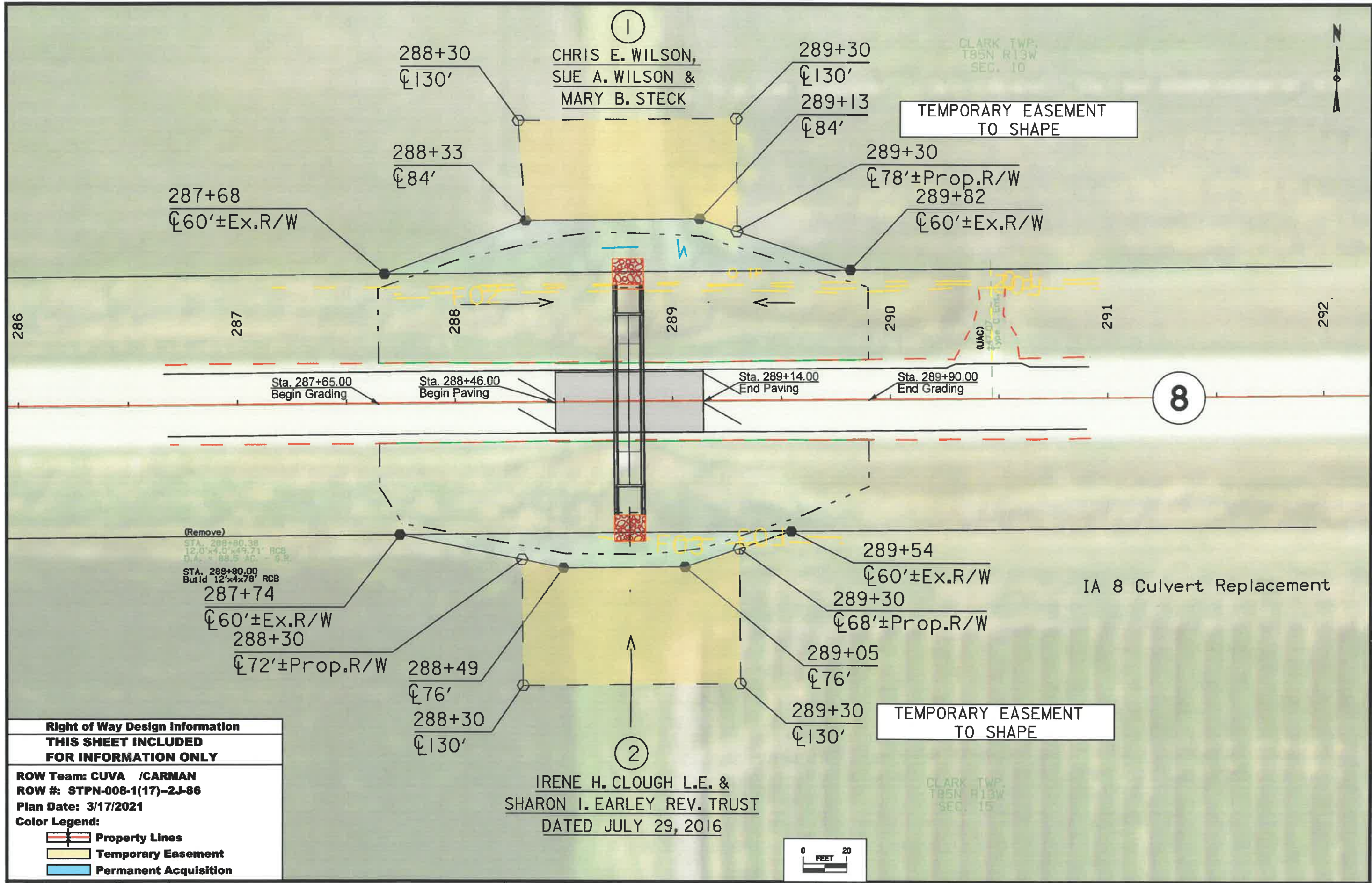
VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 9

<u>Point Name</u>	<u>Northing</u>	<u>Easting</u>	<u>Elevation</u>	<u>Description</u>
CP100	7904070.840	19625798.178	954.362	Set 5/8 Re-Rod (Flush)
CP101	7903946.871	19624474.293	947.498	Found Concrete Monument (4"Exp.)
3000	7904005.590	19624412.453		Found Hinge Nail (Flush)
3002	7904061.744	19629973.539		Found Hinge Nail (Flush)
8000	7904006.682	19624413.280		Found Mag Nail (Flush)
8001	7904031.538	19627086.314		Found Mag Nail (Flush)

ALIGNMENT COORDINATES

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
1	3000	281+70.00	7904005.59	19624412.45															
2	3002	337+30.80	7904061.74	19629973.54															



TEMPORARY EASEMENT TO SHAPE

8

IA 8 Culvert Replacement

TEMPORARY EASEMENT TO SHAPE

Right of Way Design Information
THIS SHEET INCLUDED
FOR INFORMATION ONLY

ROW Team: CUVA /CARMAN
 ROW #: STPN-008-1(17)-2J-86
 Plan Date: 3/17/2021

Color Legend:
 [Red line] Property Lines
 [Yellow box] Temporary Easement
 [Blue box] Permanent Acquisition

IRENE H. CLOUGH L.E. &
 SHARON I. EARLEY REV. TRUST
 DATED JULY 29, 2016



108-23A
08-01-08

TRAFFIC CONTROL PLAN

IA 8 will be closed. Traffic shall be maintained by an off-site detour during project via. IA 21, County Road D65, and US 63.

See detour map and signs on J.2 sheet, contractor shall provide, install, maintain, and remove all detour signs. The maximum height of said signs would be the dimension of the Detour Route Marker signs added to the minimum height by MUTCD.

Detour Route Marker signs shall be installed to the right of existing Route Marker signs as shown on location of said plans when possible.

The proposed Detour signing maybe modified to meet field conditions and prevent obstructions.

Provide two PDMS boards to be placed on Iowa 8 in advance of the road closure per TC-252.

111-01
04-17-12

COORDINATED OPERATIONS

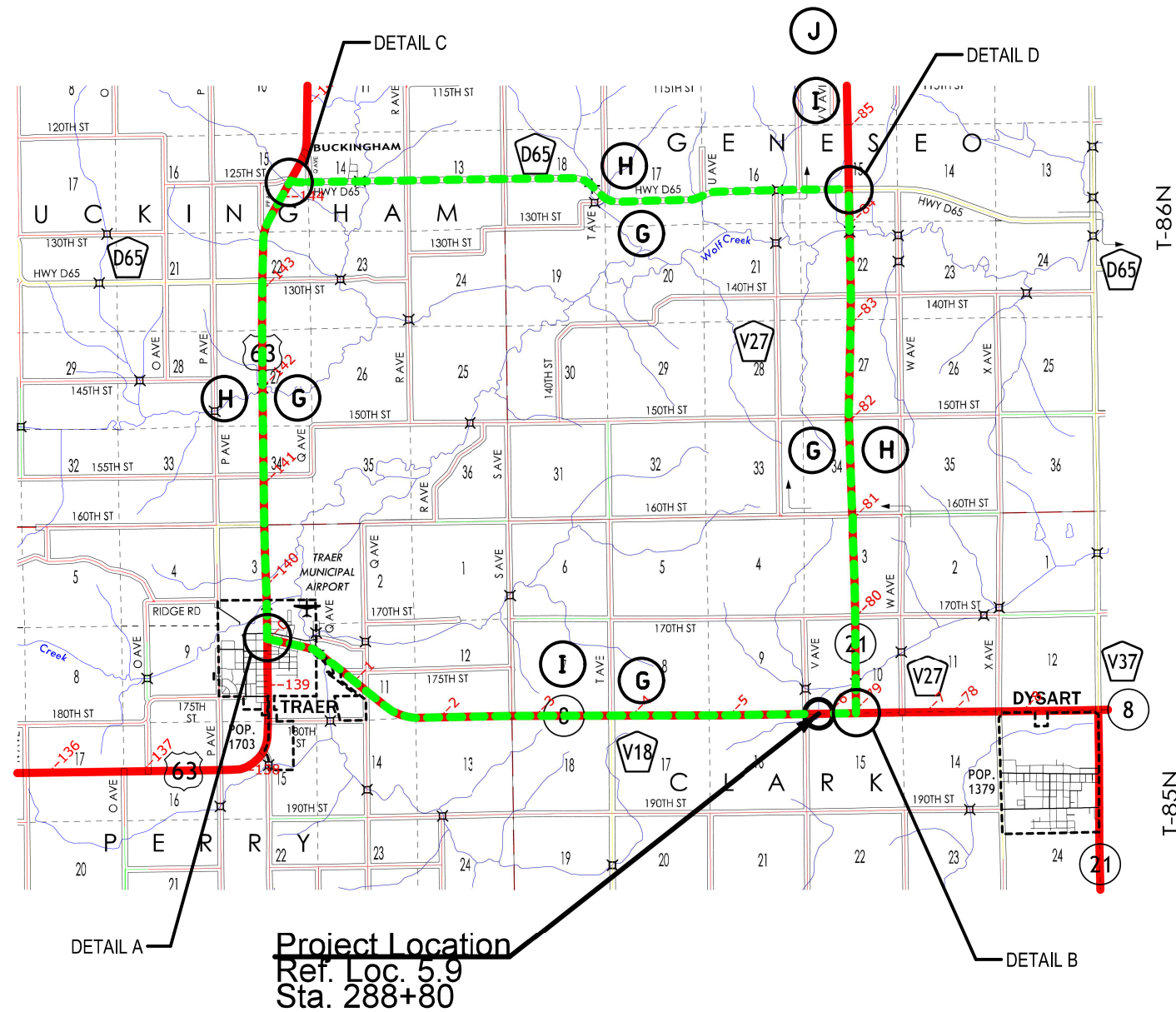
Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

Project	Type of Work
NHSX-063-5(72)--3H-86	PCC Overlay
NHSX-063-5(66)--3H-86 / STP-096-2(6)--2C-08	PCC Rubblization / HMA Overlay
MP-063-1(710)120--76-86	PCC Patching

108-25
10-21-14

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			No Restrictions anticipated									



I ROAD CLOSED
MILES AHEAD
LOCAL TRAFFIC ONLY R11-3A
2 MILES AHEAD

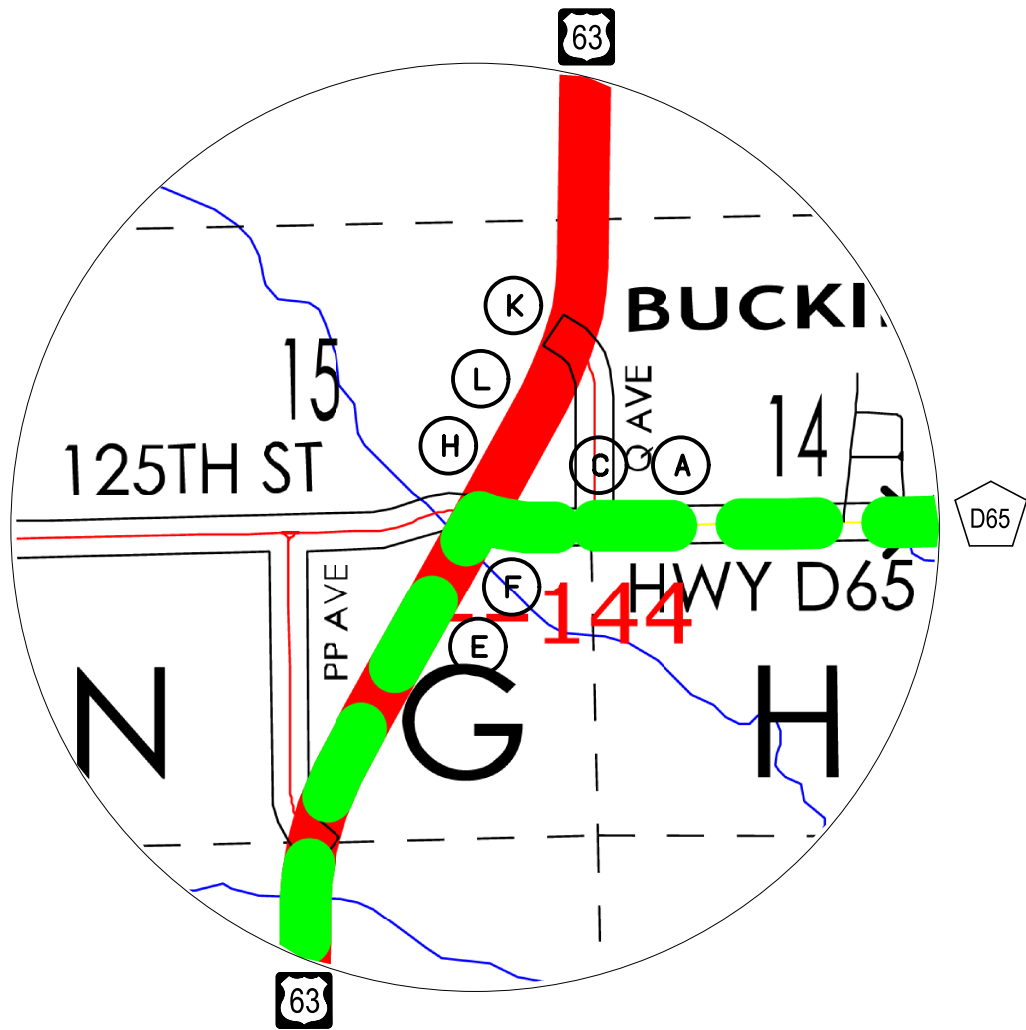
J ROAD CLOSED
MILES AHEAD
LOCAL TRAFFIC ONLY R11-3A
15 MILES AHEAD

G	DETOUR	M4-8	H	DETOUR	M4-8
	EAST	M1-6		WEST	M3-1
	8	M3-3		8	M3-3
	↑	M6-3		↑	M6-3

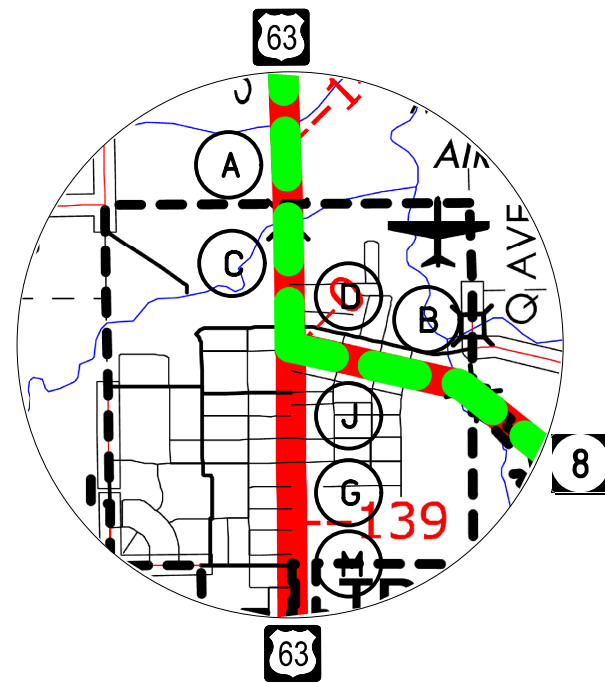
----- Detour Route



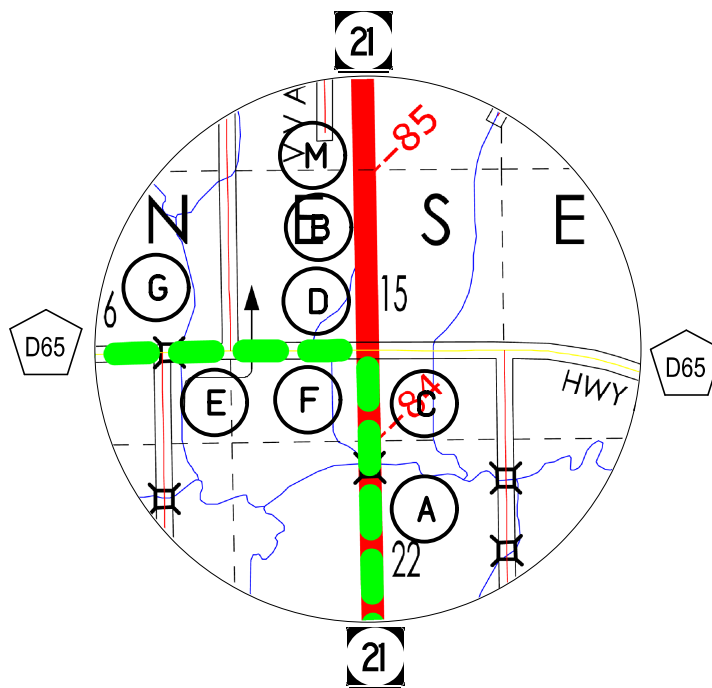
Detour Map
Tama County
STPN-008-1(16)--2J-86



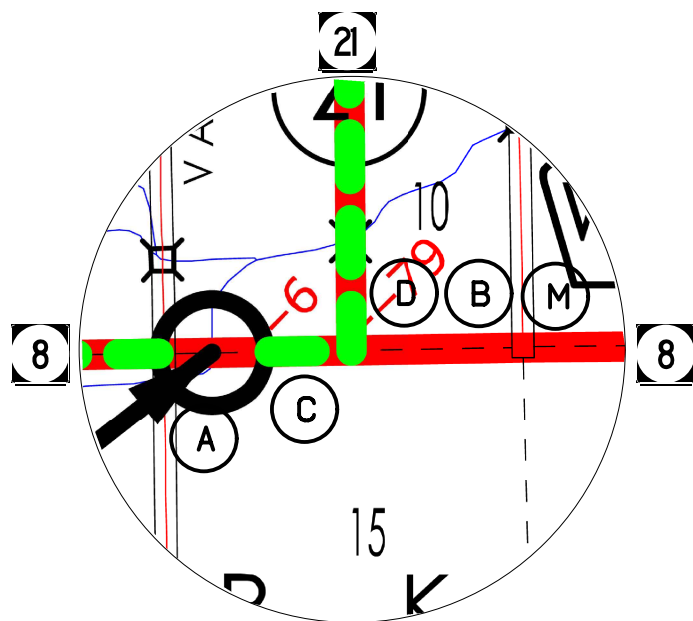
DETAIL C



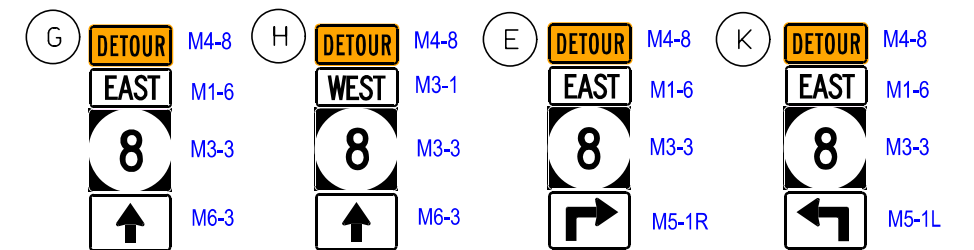
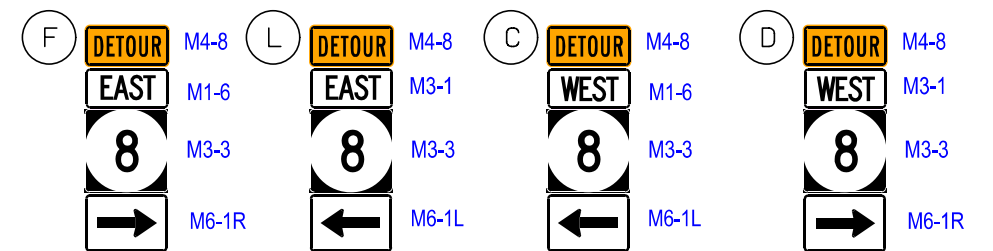
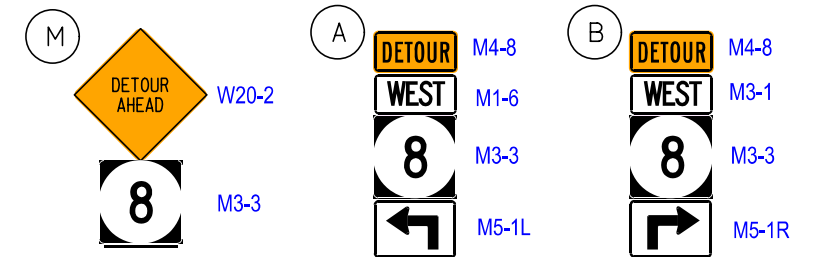
DETAIL A



DETAIL D



DETAIL B



Detour Map
Tama County
STPN-008-1(16)--2J-86

INDEX OF TABULATIONS		
Tabulation	Tabulation Title	Sheet No.
111-25 10-18-11		
RC Sheets		
100-19	PERIMETER AND SLOPE SEDIMENT CONTROL DEVICE	RC.2
100-23	ROCK EROSION CONTROL	RC.2
100-34	STORMWATER DRAINAGE BASIN AND STORAGE	RC.2
105-4	STANDARD ROAD PLAN	RC.1
111-25	INDEX OF TABULATION	RC.1
232-3A	EROSION CONTROL (RURAL SEEDING)	RC.1
232-3C	EROSION CONTROL (NATIVE GRASS SEEDING)	RC.1
232-11	EROSION CONTROL (STABILIZING CROP SEEDING)	RC.1
281-1	SECTION 404 PERMIT AND CONDITIONS	RC.1
281-3	STROM WATER BEST MANAGEMENT PRACTICES	RC.1

STANDARD ROAD PLANS		
105-4 10-18-11		
The following Standard Road Plans apply to construction work on this project.		
Number	Date	Title
EC-204	10-19-21	Perimeter, Slope and Ditch Check Sediment Control Devices
EC-301	10-18-16	Rock Erosion Control (REC)
EC-303	10-19-21	Stabilized Construction Entrance
EC-502	04-21-15	Seeding in Rural Areas

232-3A
04-16-19

EROSION CONTROL (RURAL SEEDING)

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed, fertilizer, and mulch on the disturbed area lying 8 feet adjacent to shoulder and median as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,3 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are all incidental to mobilization and will not be paid for separately.

232-11
04-16-19

EROSION CONTROL (STABILIZING CROP SEEDING)

If outside of permanent seeding dates in Section 2601 of the Standard Specifications, or if required by a storm water permit, place stabilizing crop, fertilizer, and mulch on the disturbed area as follows:

Place seed and fertilize according to the requirements of Article 2601.03,C,1 and Section 4169 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed, fertilizer, and mulch are incidental to mobilization and will not be paid for separately.

232-3C
04-16-19

EROSION CONTROL (NATIVE GRASS SEEDING)

Following the completion of work in a disturbed area and according to the seeding dates in Section 2601 of the Standard Specifications, place seed and mulch on the disturbed area lying 8 feet or more beyond the shoulder as follows:

SEED MIX:

Big bluestem (Andropogon gerardii)	6 lbs. PLS/Acre (7.0 kg/ha)
Indiangrass (Sorghastrum nutans)	6 lbs. PLS/Acre (7.0 kg/ha)
Little bluestem (Schizachyrium scoparium)	6 lbs. PLS/Acre (7.0 kg/ha)
Partridge Pea (Chamaecrista fasciculata)	4 lbs. PLS/Acre (4.5 kg/ha)
Sideoats grama (Bouteloua curtipendula)	4 lbs. PLS/Acre (4.5 kg/ha)
Canada wildrye (Elymus canadensis)	2 lbs. PLS/Acre (2.2 kg/ha)
Switchgrass (Panicum virgatum)	1 lbs. PLS/Acre (1.1 kg/ha)
Oats (Avena sativa)	32 lbs./Acre (36.0 kg/ha)

Furnish Big bluestem, Indiangrass, Canada wildrye and Little bluestem that is debarbed or equal to facilitate the application of seed.

Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa. Oats are excluded from this requirement.

Place seed according to the requirements of Article 4169.02 of the Standard Specifications.

Place mulch according to the requirements of Articles 2601.03,E,2,a and 4169.07,A of the Standard Specifications.

Preparing the seedbed, furnishing and applying seed and mulch are incidental to mobilization and will not be paid for separately.

281-1
10-18-16

SECTION 404 PERMIT AND CONDITIONS

Construct this project according to the requirements of U.S. Army Corps of Engineers national Permit 14, Permit No. 2012-1020. A copy of this permit is available from the Iowa DOT website (<http://www.envpermits.iowadot.gov/>). The U.S. Army Corps of Engineers reserves the right to visit the site without prior notice.

281-3
10-17-17

STORM WATER BEST MANAGEMENT PRACTICES

When the following best management practices are used, they are intended to account for disturbed areas where storage volume cannot be provided:

Rock Splash Basin (EC-301)
Perimeter and Slope Sediment Control Devices (EC-204)

STORMWATER DRAINAGE BASIN AND STORAGE

Refer to EC Standards and 570s Details.

Drainage Basin Location						Summary of Stormwater Storage							Remarks
Basin No.	Station to Station		Side	Discharge Point		Total Disturbed Area Acres	Disturbed Area with Storage Provided Acres	Disturbed Area without Storage Provided Acres	Best Management Practice	Total Storage Volume Provided CF	Total Storage Volume Required CF	Storage Volume Met? Yes/No	
	Station	Station		Side	Side								
1	287+65.00	289+90.00	Rt.	288+80.00	Rt.	0.3	0.0	0.3	(1)	0.0	0.0	No	
2	287+65.00	289+90.00	Lt.	288+80.00	Rt.	0.3	0.0	0.3	(1)	0.0	0.0	No	
(1) Perimeter and Slope Sediment Control Devices (EC-204) and Rock Erosion Control (EC-301)													

ROCK EROSION CONTROL

Refer to EC-301 and Detail 570-8





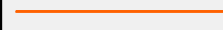
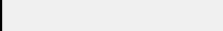
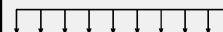
Location				Rock Erosion Control (REC)					Material Bid Quantities			Remarks		
Road Identification	Begin Station	End Station	Side	L	W	Type 1	Type 2	Type 3	Type 4	Type 5	Eng. Fabric		Class E Revetment	Erosion Stone
						Rock Ditch Check	Rock Ditch	Rock Flume	Rock Splash Basin	Rock Slope Protection	SY		TON	TON
						Lt./Rt.	FT	FT						
Ia. 8	287+65.40	288+69.94	Rt.	104.5	6		X				89.2	61.5		
Ia. 8	288+89.92	289+89.20	Rt.	99.3	6		X				84.7	58.4		
Ia. 8	287+65.30	288+69.92	Lt.	104.6	6		X				89.3	61.6		
Ia. 8	288+89.92	289+88.70	Lt.	98.8	6		X				84.3	58.1		
Totals:											347.5	239.6		

PERIMETER, SLOPE AND DITCH CHECK SEDIMENT CONTROL DEVICES






Possible Standards: EC-204



Location			Perimeter and Slope			Ditch Check		Remarks
Begin Station	End Station	Side	Length of Installation			Length of Installation		
			9 inch Dia	12 inch Dia	20 inch Dia	12 inch Dia	20 inch Dia	
			LF	LF	LF	LF	LF	
287+65.40	289+89.20	Rt.					223.8	
287+65.30	289+89.70	Lt.					224.4	
Subtotal							448.2	
+25%							112.1	(10' increments)
Bid							560.3	

LINE STYLE LEGEND OF EROSION CONTROL SHEETS








-  Silt Fence
-  Perimeter and Slope Sediment Control Device (9")
-  Perimeter and Slope Sediment Control Device (12")
-  Perimeter and Slope Sediment Control Device (20")
-  Open-Throat Curb Intake Sediment Filter
-  Concentrated Flow
-  Sheet Flow

PLAN VIEW COLOR LEGEND OF EROSION CONTROL SHEETS

















LINWORK	Design Color No.	
Green	(2)	 Existing Topographic Features and Labels
Blue	(1)	 Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	 Existing Utilities
Black	(0)	 Permanent Erosion Control Features
Blaze Orange	(222)	 Temporary Erosion Control Features

SHADING	Design Color No.		Transparency
Citron	(234)	 Mulching, All Types	50%
Light Brown	(238)	 Special Ditch Control, Wood Excelsior Mat	0%

CELL LEGEND OF EROSION CONTROL SHEETS

-  Temporary Sediment Control basin
-  Erosion Control for Circular Intake or Manhole Well
-  Erosion Control for Rectangular Intake or Manhole Well
-  Grate Intake Sediment Filter Bag
-  Silt Basin
-  Silt Fence Tail
-  Stormwater Drainage Basin Discharge Point

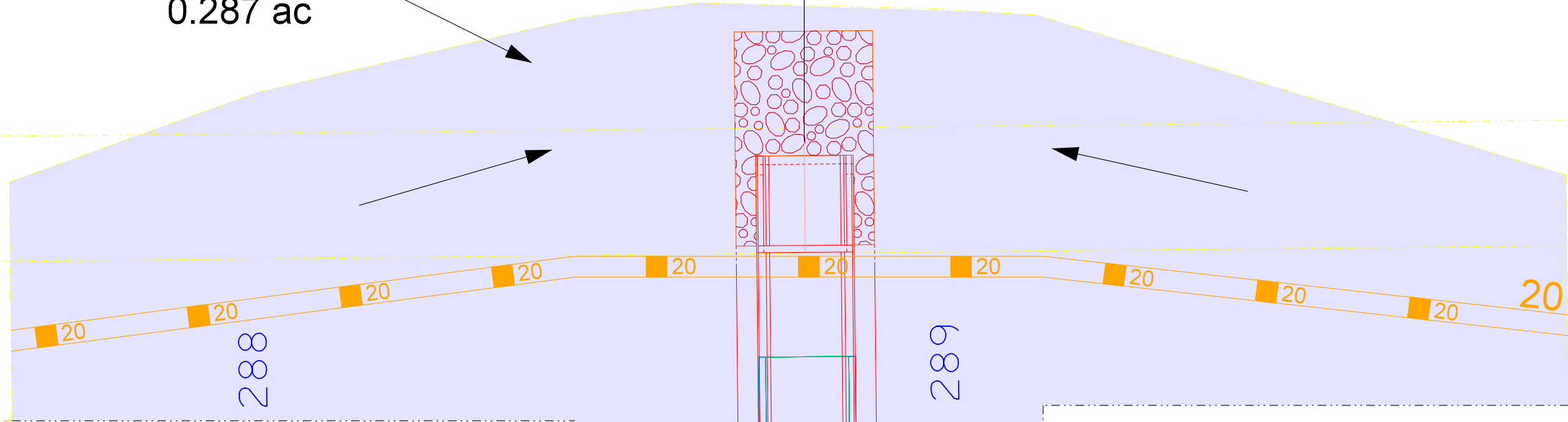
PATTERN LEGEND OF EROSION CONTROL SHEETS

-  Seeding and Fertilizing
-  Seeding and Fertilizing (Rural)
-  Seeding and Fertilizing (Urban)
-  Native Grass Seeding
-  Salt Tolerant Seeding
-  Wetland Grass Seeding
-  Wildflower Seeding
-  Sodding
-  Turf Reinforcement Mat Type 1
-  Turf Reinforcement Mat Type 2
-  Turf Reinforcement Mat Type 3
-  Turf Reinforcement Mat Type 4
-  Slope Protection, Wood Excelsior Mat
-  Transition Mat
-  Rock Features, Permanent
-  Rock Features, Temporary

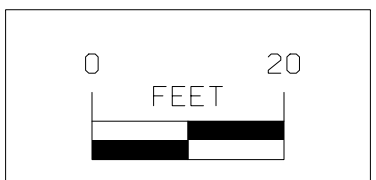
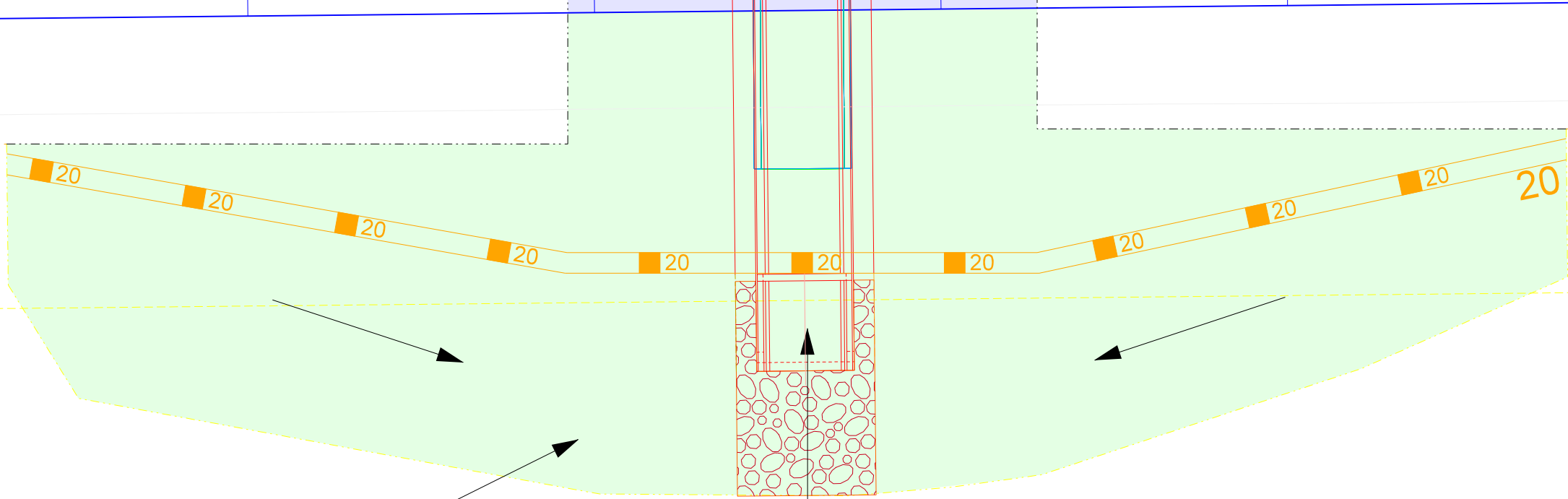
EROSION CONTROL LEGEND AND SYMBOL INFORMATION SHEET

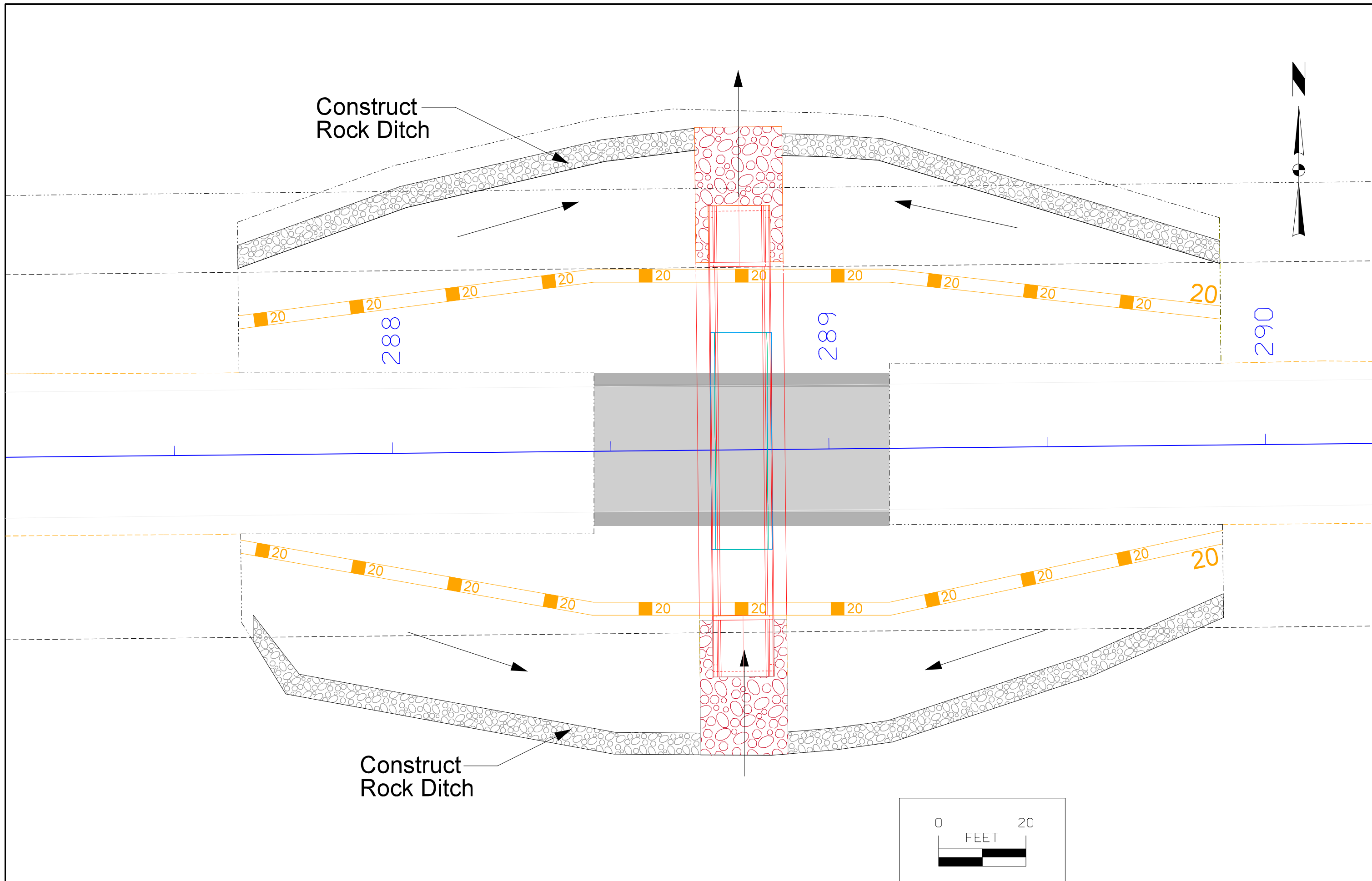
(COVERS SHEET SERIES R)

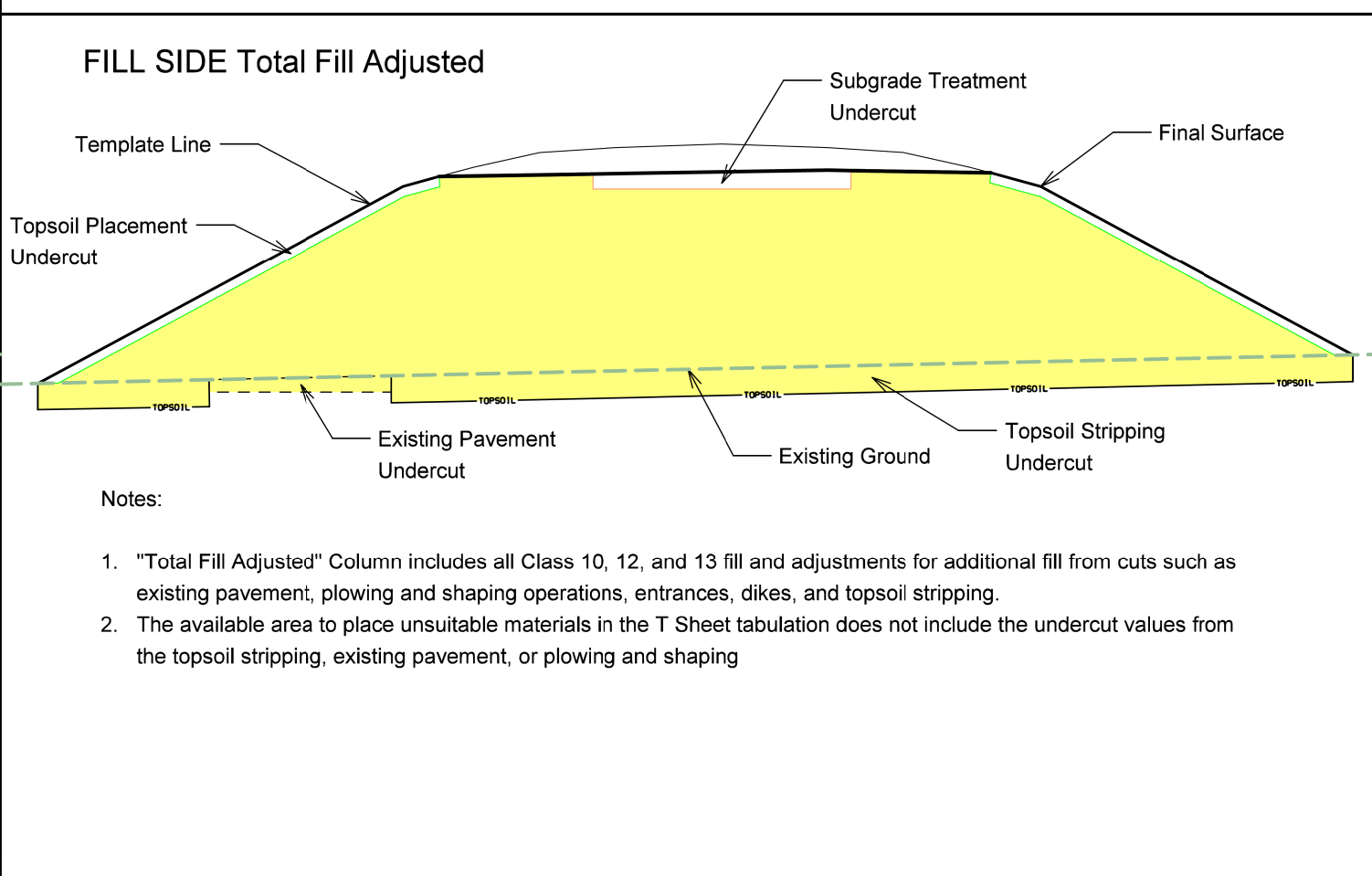
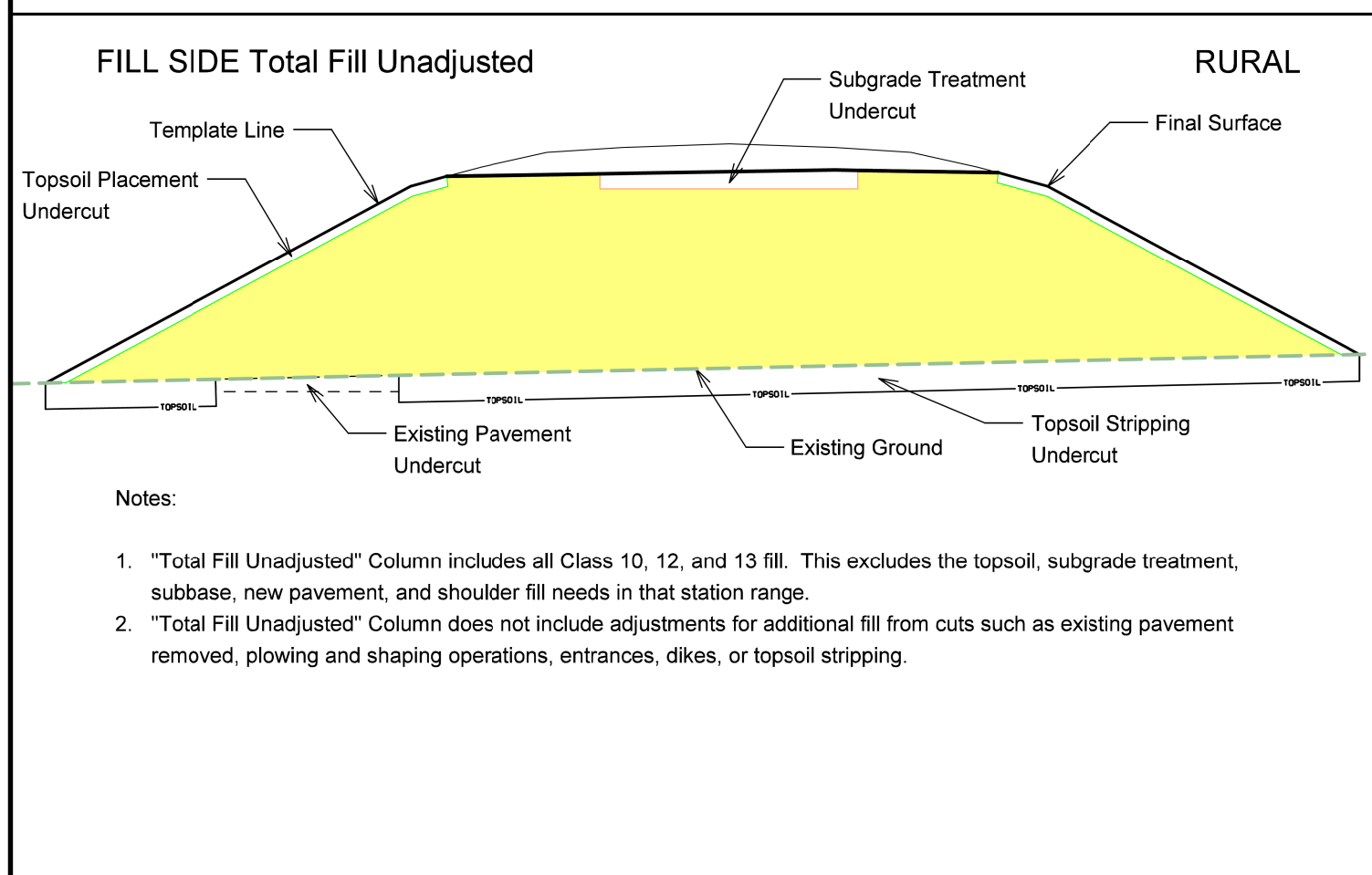
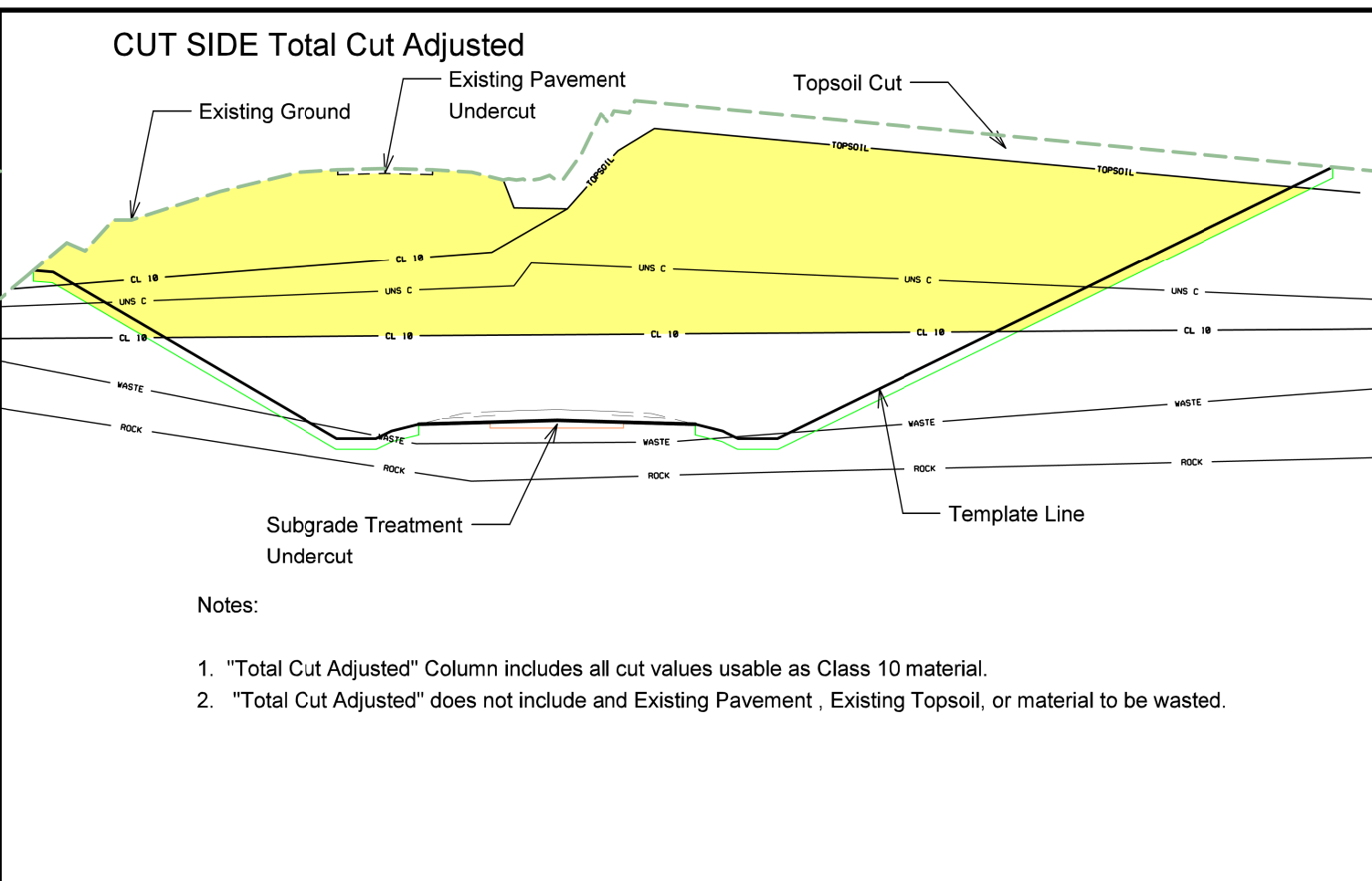
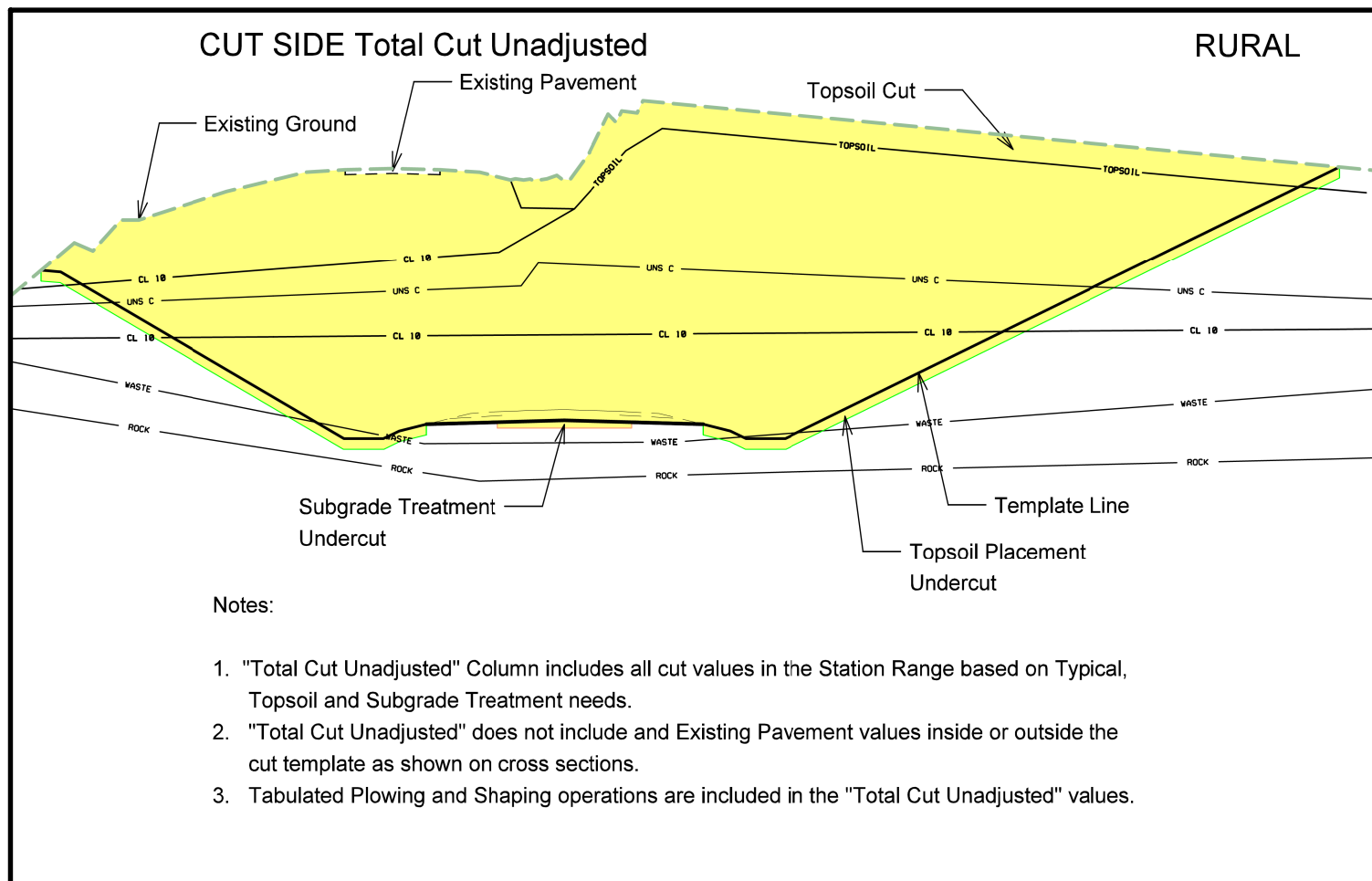
Basin 1
0.287 ac

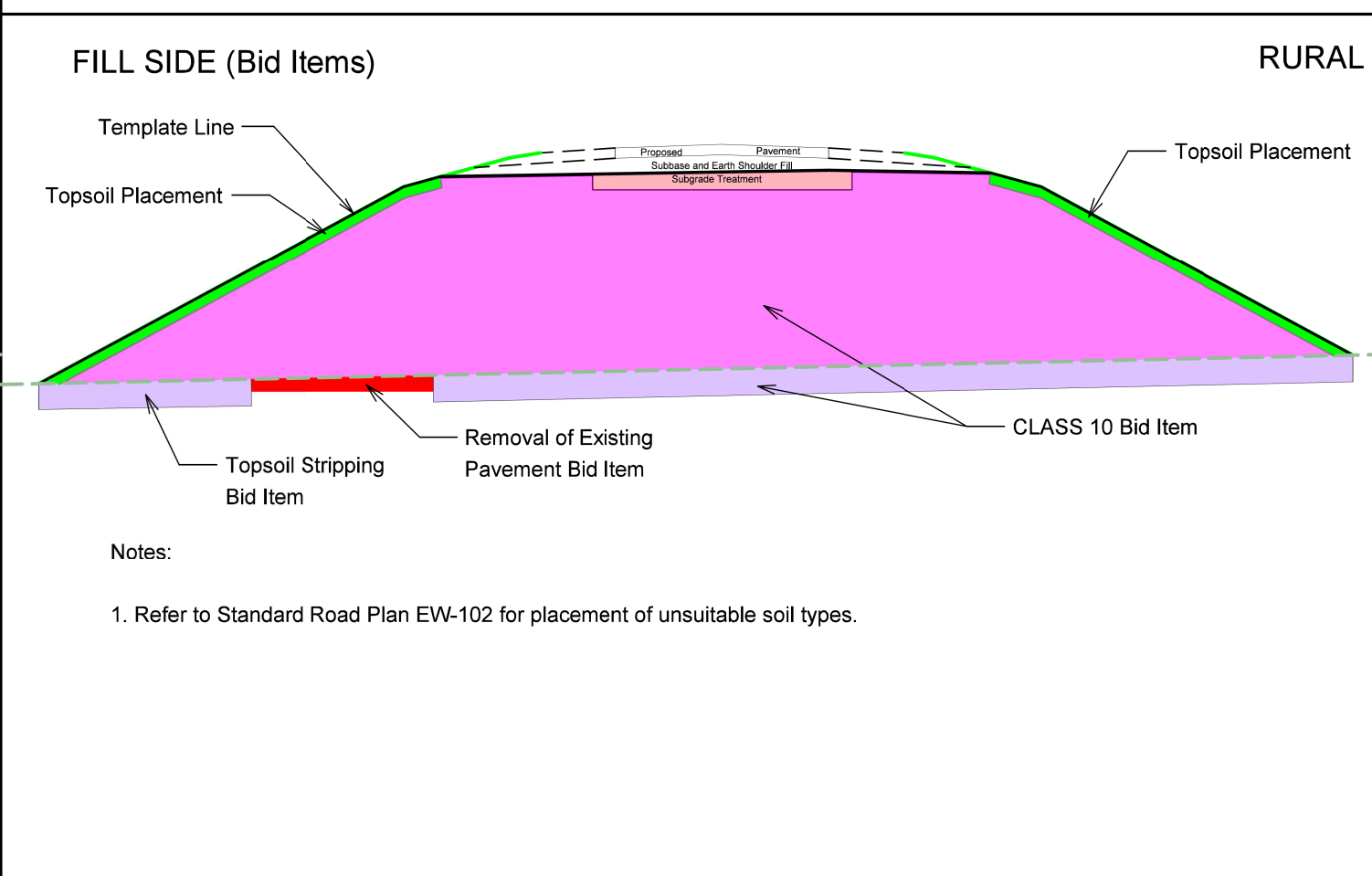
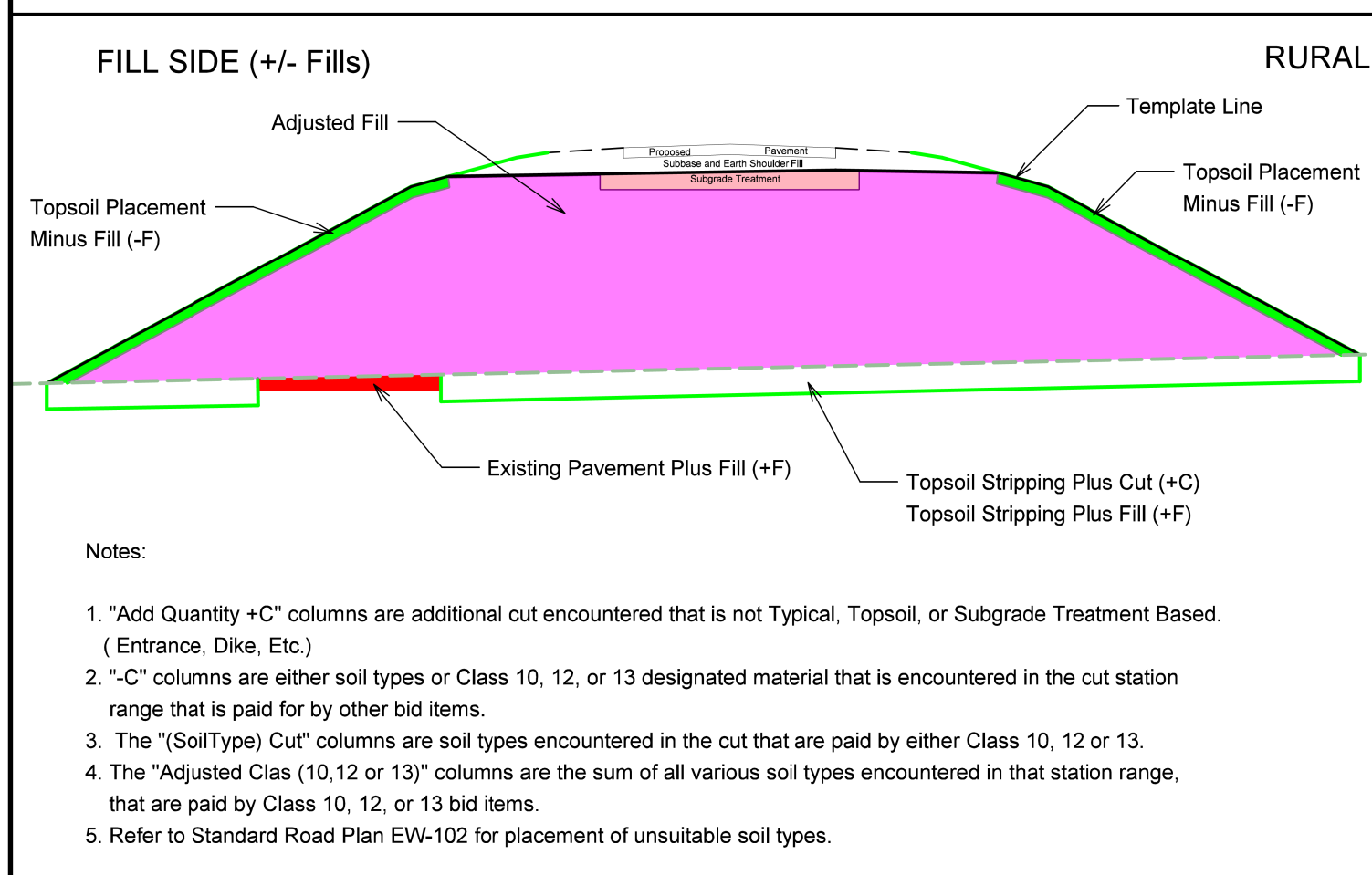
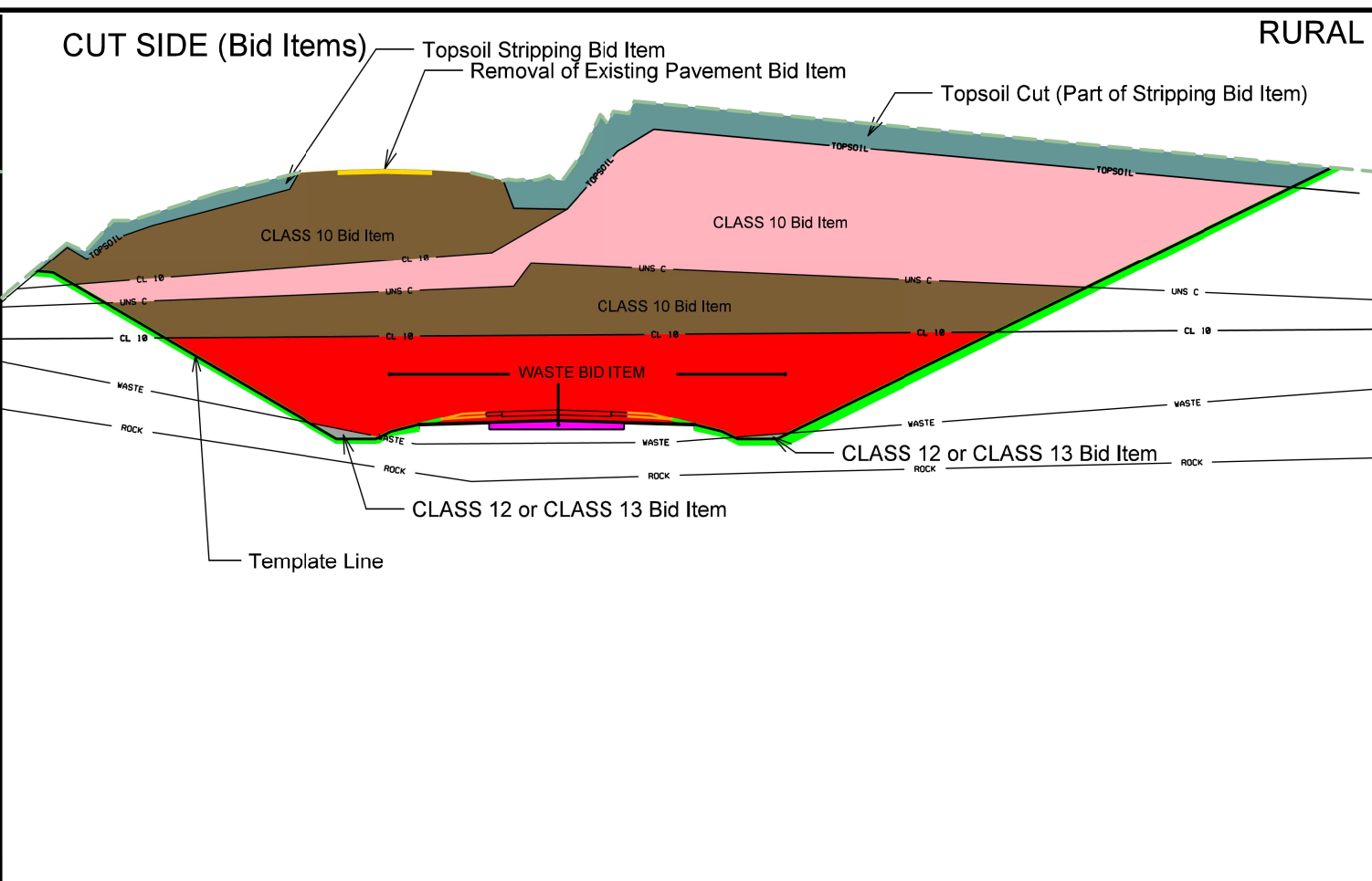
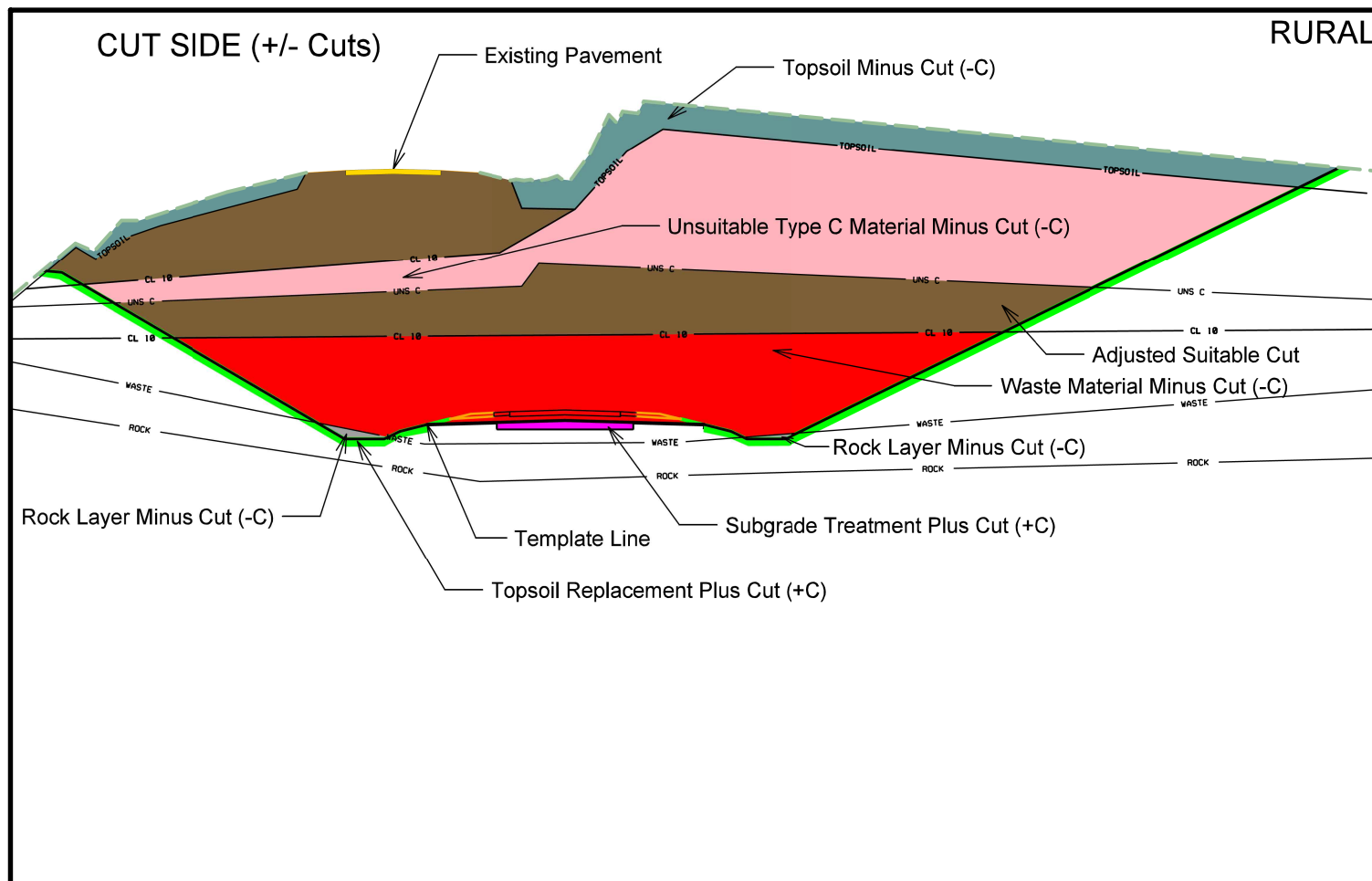


Basin 2
0.249 ac









TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

Station	Cut				Fill						Checks (EW-102)		Topsoil				[18]	[19]	[20]	[21]	[22]			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]							
	Total Cut Unadjusted Volume	Total Class 10 Unadjusted Volume	Topsoil Cut Volume	Template Waste Volume	Total Cut Adjusted	Total Fill Unadjusted Volume	Existing Topsoil Stripping Undercut (+ Fill)	Existing Pavement Undercut (+Fill)	Total Fill Adjusted	Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor	Total Cut Adjusted Minus Fill w/ Shrink	Approx. Fill Vol. Below 5' & Above 20' w/ Shrink	Approx. Fill Volume Below 3' w/ Shrink	Topsoil Stripping Undercut Volume	Topsoil Placement Undercut Volume	Topsoil Placement With 1.4 Shrink Factor	Topsoil Stripping Minus Topsoil Placement w/Shrink							
ML008																								
287+75.00	120	0	78	42	0	41	78		119	155	-155	0	0	78	51	71	7							
288+00.00	140	0	85	55	0	59	85		144	187	-187	0	0	85	56	78	7							
288+25.00	169	51	87	31	51	100	87		187	243	-192	0	0	87	57	80	7							
288+50.00	375	207	168	0	207	262	168	53	483	628	-421	0	0	168	110	154	14							
289+00.00	166	52	86	27	52	106	86		192	250	-198	0	0	86	56	78	8							
289+25.00	126	0	82	44	0	62	82		144	187	-187	0	0	82	54	76	7							
289+50.00	89	0	65	24	0	30	65		95	124	-124	0	0	65	42	59	6							
289+75.00																								
ML008																								
Totals:	1,185	310	651	223	310	660	651	53	1,364	1,774	-1,464	0	0	651	426	597	55							

TABULATION OF TEMPLATE QUANTITIES AND ADJUSTMENTS

Station	Cut				Fill							Checks (EW-102)		Topsoil				[18]	[19]	[20]	[21]	[22]		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]							
	Total Cut Unadjusted Volume	Total Class 10 Unadjusted Volume	Topsoil Cut Volume	Template Waste Volume	Total Cut Adjusted	Total Fill Unadjusted Volume	Existing Topsoil Stripping Undercut (+ Fill)	Existing Pavement Undercut (+Fill)	Total Fill Adjusted	Total Fill Adjusted w/ Weighted Average 1.3 Shrink Factor	Total Cut Adjusted Minus Fill w/ Shrink	Approx. Fill Vol. Below 5' & Above 20' w/ Shrink	Approx. Fill Volume Below 3' w/ Shrink	Topsoil Stripping Undercut Volume	Topsoil Placement Undercut Volume	Topsoil Placement With 1.4 Shrink Factor	Topsoil Stripping Minus Topsoil Placement w/Shrink							
Summary:																								
ML008	1,185	310	651	223	310	660	651	53	1,364	1,774	-1,464	0	0	651	426	597	55							
Project Totals:	1,185	310	651	223	310	660	651	53	1,364	1,774	-1,464	0	0	651	426	597	55							
	Totals:																							
					Class 10, Roadway and Borrow:	310	[5]																	
					Class 10, Waste:	223	[4]																	
					Embankment-In-Place:	1,126	[11]/1.3																	
					Topsoil Strip, Salvage and Spread:	651	[14]																	
					Compaction With Moisture Control:	1,364	[9]																	

Clearing and Grubbing



288

289

290

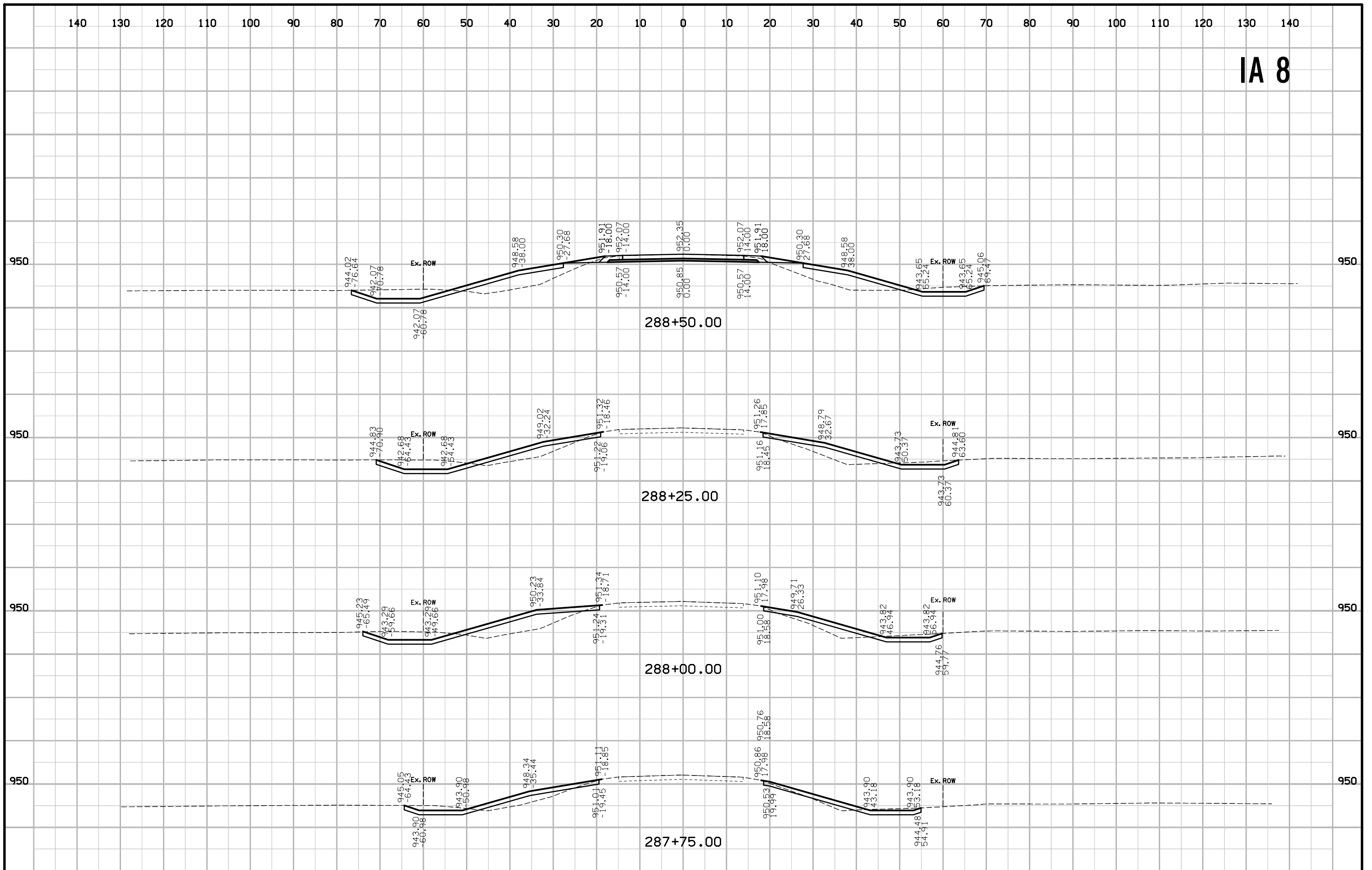
Sta. 287+65.00
Begin Grading

Sta. 289+90.00
End Grading

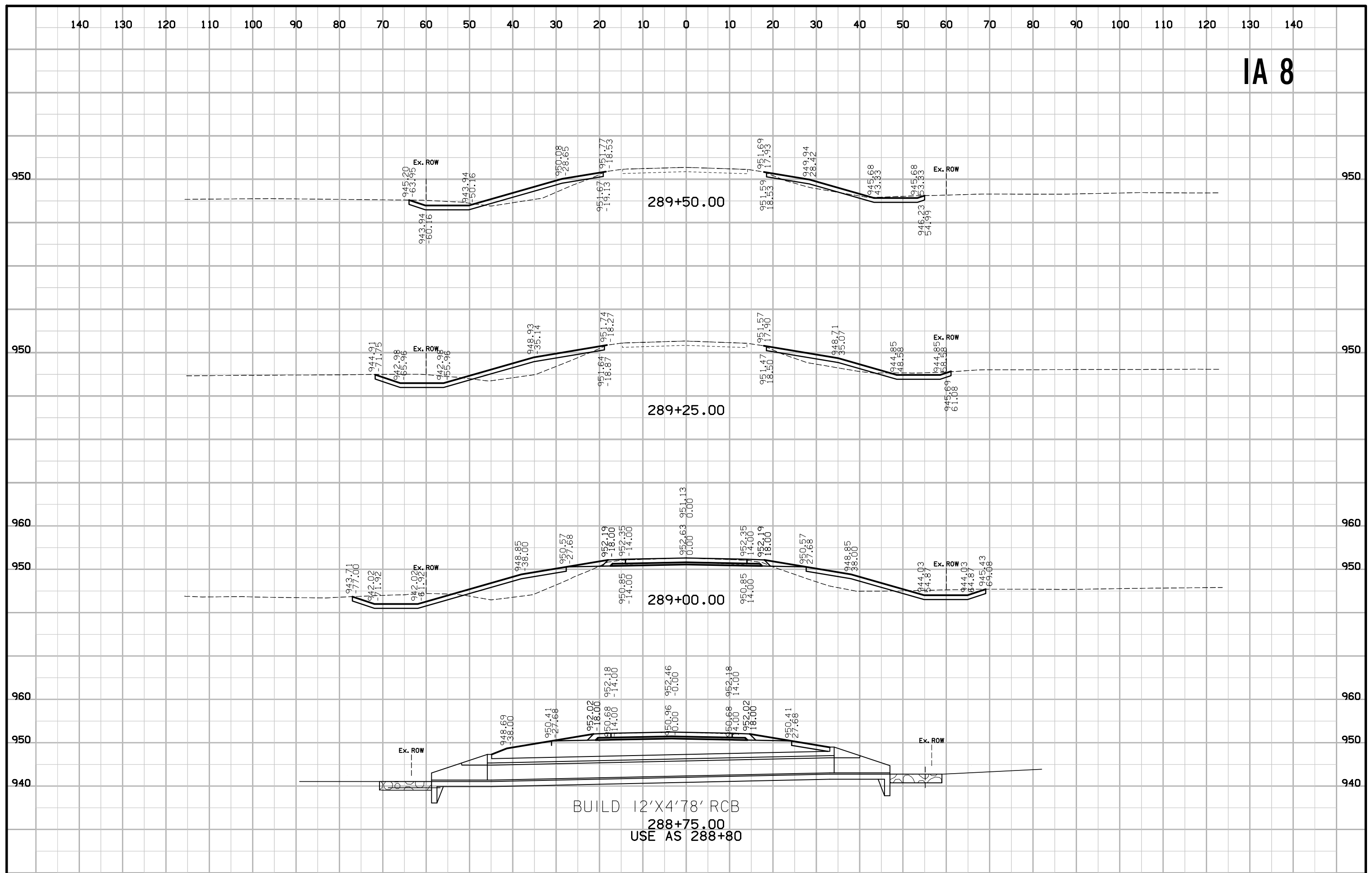


Clearing and Grubbing
Layout

IA 8



IA 8



140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

IA 8

950

950

Ex. ROW
945.78
-57.09
944.90
-54.45

944.90
-44.45

951.27
-22.15
951.75
-19.28

951.85
-18.68

289+75.00

951.78
-18.14
951.68
-18.74

946.50
-39.47

Ex. ROW

140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140