INDEX OF REPAIR RETROFIT BRIDGE STANDARDS

STANDARD	DESCRIPTION
1031	RETROFIT BARRIER RAIL DETAILS
1031C	RETROFIT BARRIER RAIL DETAILS
1031D	RETROFIT BARRIER RAIL DETAILS
1031E	RETROFIT BARRIER RAIL DETAILS
1031F	RETROFIT BARRIER RAIL DETAILS
1031T	RETROFIT BARRIER RAIL DETAILS
1038	DECK REPAIR - QUANTITIES
1038R	DECK RE-OVERLAY REPAIR - QUANTITIES
1039s1	DECK REPAIR - NOTES (VOID 03-2017)
1039s2	DECK REPAIR - NOTES (VOID 03-2017)
1040	DECK REPAIR DETAILS AND RAISED EXPANSION PLATES
1040R	DECK RE-OVERLAY REPAIR DETAILS
1042	DECK REPAIR - APPROACH PAVEMENT
1045	CONCRETE REPAIRS
1055	CONCRETE BEAM REPAIR DETAILS
1057s1	CONCRETE BEAM FIBER REINFORCED POLYMER (FRP) REPAIR DETAILS
1057s2	CONCRETE BEAM FIBER REINFORCED POLYMER (FRP) REPAIR DETAILS

REVISED 03-2017 - ISSUED STANDARD SHEETS 1055, 1057s1 AND 1057s2. STANDARD SHEETS 1039s1 & 1039s2 NOW VOID.
ENGLISHREPAIRRETROFITBRIDGES.DGN - 100-RR - THIS SHEET ISSUED 02-10.

INDEX OF REPAIR STANDARDS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	INDEX OF REPAIR RETROFIT BRIDGE STANDARDS	STANDARD SHEET 100-RR	COUNTY	PROJECT NUMBER	SHEET NUMBER

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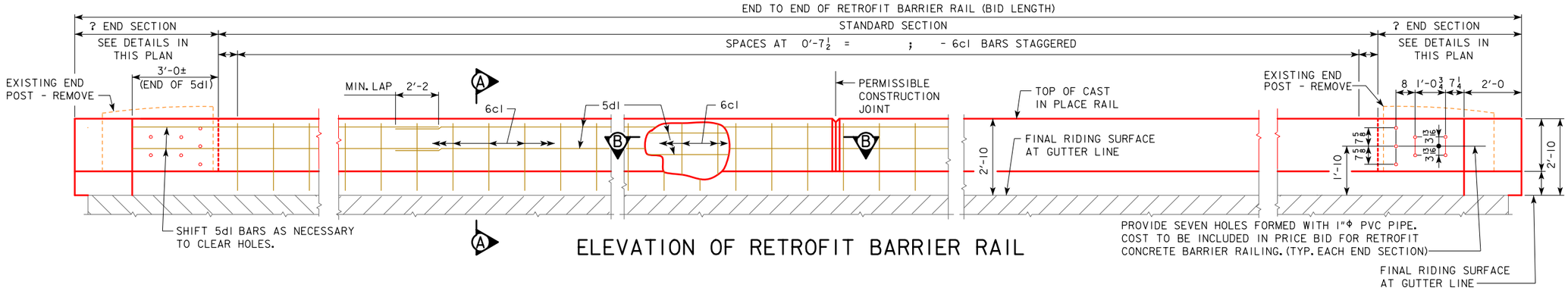
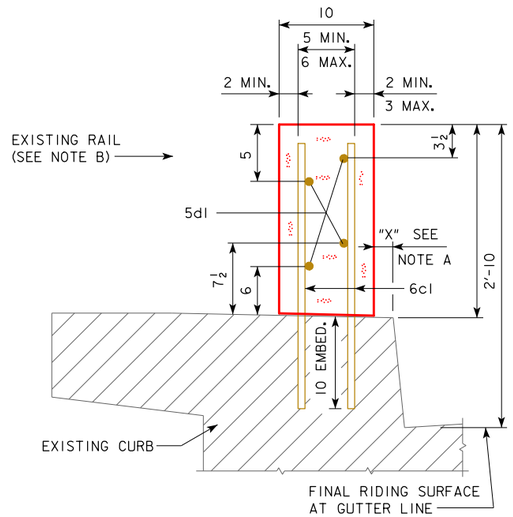


ELEVATION OF RETROFIT BARRIER RAIL

EPOXY REINFORCING STEEL-? RAIL

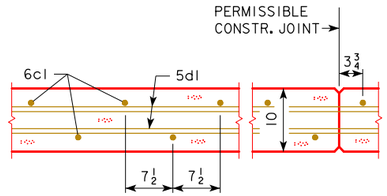
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6cl	STANDARD RAIL, VERT.	—			
5dl	STANDARD RAIL, LONGIT.	—			
				TOTAL (LBS.)	



SECTION A-A

NOTE A: (SEE STANDARD SHEET 1031T IN THESE PLANS).

NOTE B:
EXISTING RAIL IS TO BE REMOVED. ANCHOR BOLTS WHICH ARE NOT STAINLESS STEEL SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW CURB SURFACE AND THE REMAINING EXPOSED ENDS PAINTED WITH 2 COATS OF ZINC RICH PAINT. IF THE EXISTING ANCHOR BOLTS ARE STAINLESS STEEL THEY MAY BE LEFT IN POSITION AT THE CONTRACTOR'S OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER.



SECTION B-B
(SHOWING 6cl PLACEMENT)

SEE STANDARD SHEET 1031T IN THESE PLANS FOR:
- RAIL JOINT DETAILS
- DOWEL SETTING NOTE
- RETROFIT BARRIER RAIL NOTES
- CONCRETE PLACEMENT SUMMARY
- ESTIMATED QUANTITIES BOX

RETROFIT BARRIER RAIL DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	STANDARD SHEET 1031		COUNTY	PROJECT NUMBER	SHEET NUMBER

REVISED: 05-15 - REFERENCE TO "1"Φ PVC PIPE" WAS CHANGED FROM "1"Φ PLASTIC CONDUIT".
ENGLISHREPAIRRETROFITBRIDGES.DGN 1031 - THIS SHEET REDRAWN 2-26-90.

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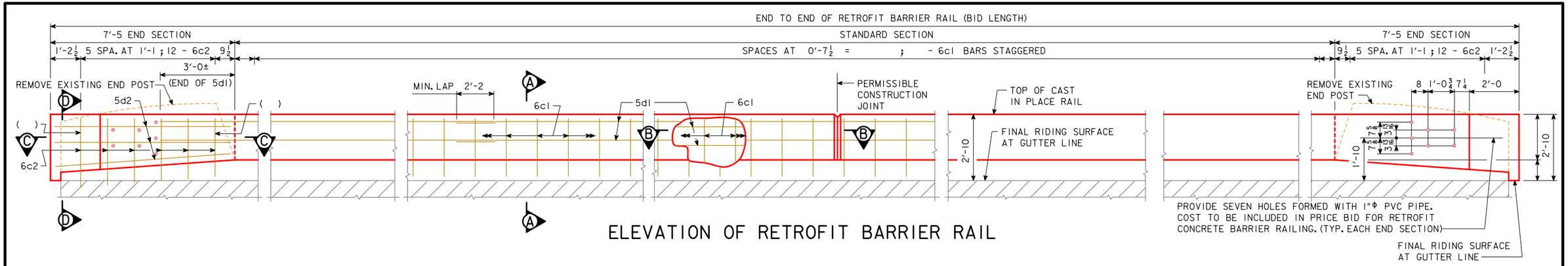
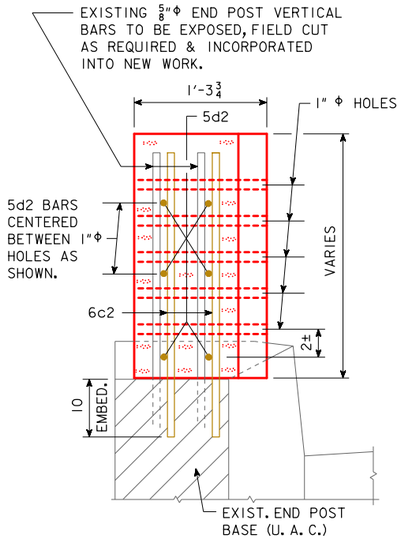
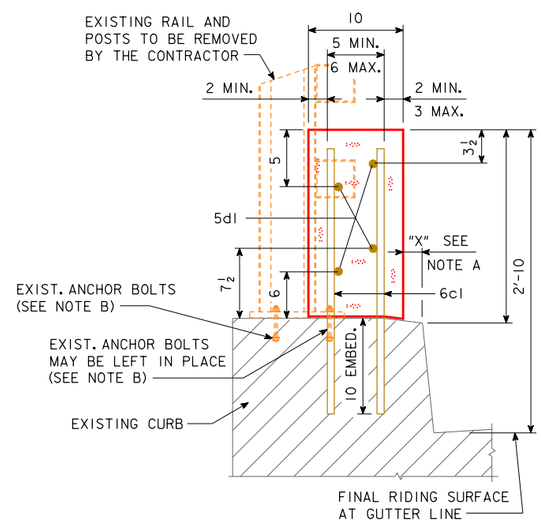


ELEVATION OF RETROFIT BARRIER RAIL



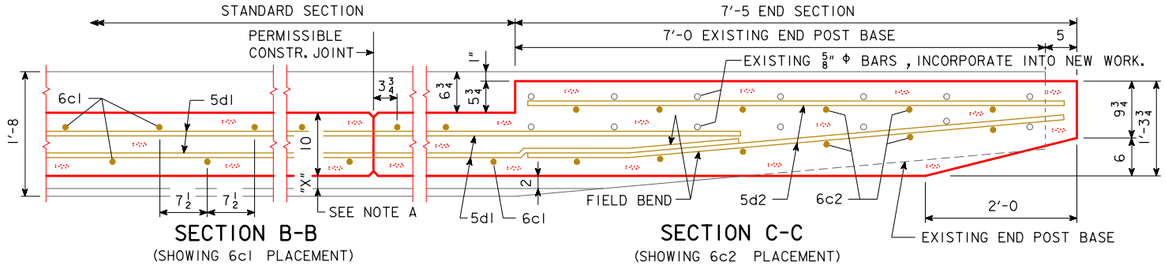
SECTION D-D



SECTION A-A

NOTE A: (SEE STANDARD SHEET 1031T IN THESE PLANS).

NOTE B:
EXISTING RAIL IS TO BE REMOVED. ANY ANCHOR BOLTS THAT WILL HAVE AT LEAST 2" OF CONCRETE COVER WHEN ENCOMPASSED BY THE NEW BARRIER RAIL MAY BE LEFT IN PLACE AT THE CONTRACTORS OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER. ANY ANCHOR BOLTS NOT HAVING THE 2" MIN. COVER SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW THE TOP OF CURB AND ENDS OF NON STAINLESS STEEL BOLTS PAINTED WITH TWO COATS OF ZINC RICH PAINT.
STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL MAY BE LEFT IN PLACE AT CONTRACTORS OPTION SUBJECT TO APPROVAL OF THE ENGINEER. STAINLESS STEEL BOLTS NEED NOT BE PAINTED.
NON STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW TOP OF CURB SURFACE AND THE REMAINING EXPOSED ENDS PAINTED WITH TWO COATS OF ZINC RICH PAINT.



SECTION B-B
(SHOWING 6c1 PLACEMENT)

SECTION C-C
(SHOWING 6c2 PLACEMENT)

EPOXY REINFORCING STEEL-? RAIL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	STANDARD RAIL, VERT.	—			
6c2	END SECTION, VERTICAL	—		SHOWN	
5d1	STANDARD RAIL, LONGIT.	—			
5d2	END SECTION, LONGIT.	—		7'-1	
				TOTAL (LBS.)	

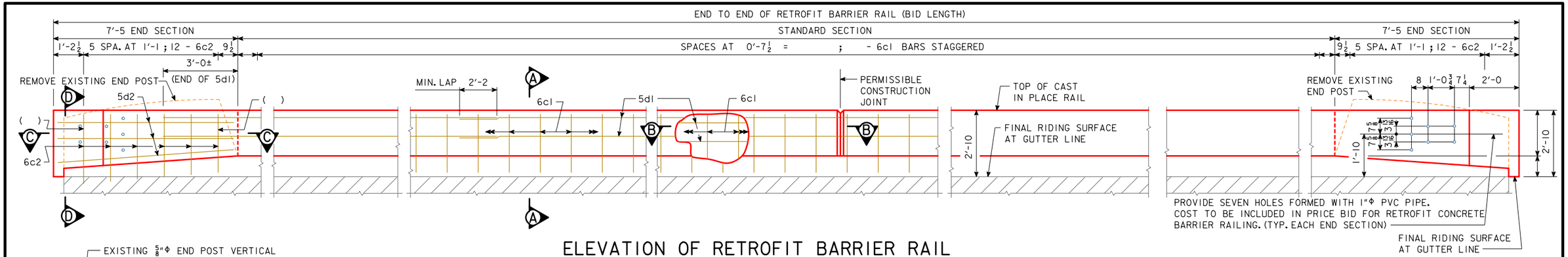
SEE STANDARD SHEET 1031T IN THESE PLANS FOR:
- RAIL JOINT DETAILS
- DOWEL SETTING NOTE
- RETROFIT BARRIER RAIL NOTES
- CONCRETE PLACEMENT SUMMARY
- ESTIMATED QUANTITIES BOX

RETROFIT BARRIER RAIL DETAILS

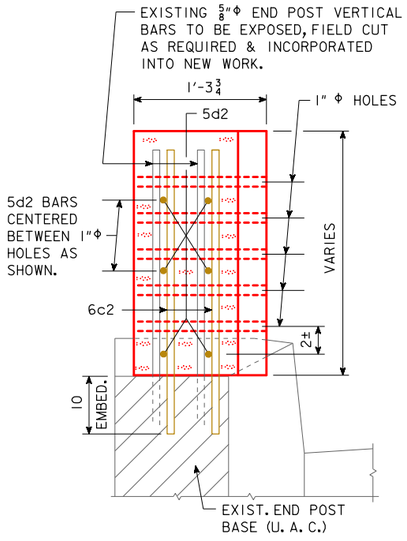
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	STANDARD SHEET 1031 C	COUNTY	PROJECT NUMBER	SHEET NUMBER

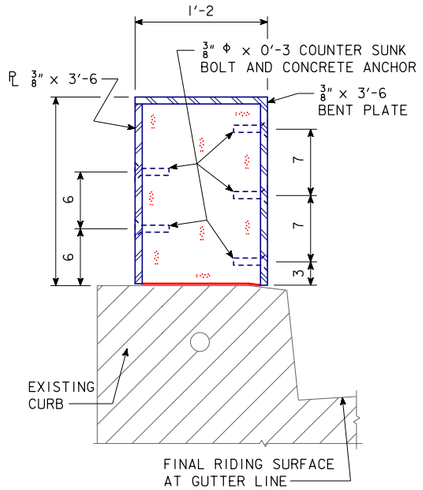
REVISED: 05-15 - REFERENCE TO "1"Φ PVC PIPE" WAS CHANGED FROM "1"Φ PLASTIC CONDUIT". ENGLISHREPAIRRETROFITBRIDGES.DGN 1031C - THIS SHEET REDRAWN 11-3-88.



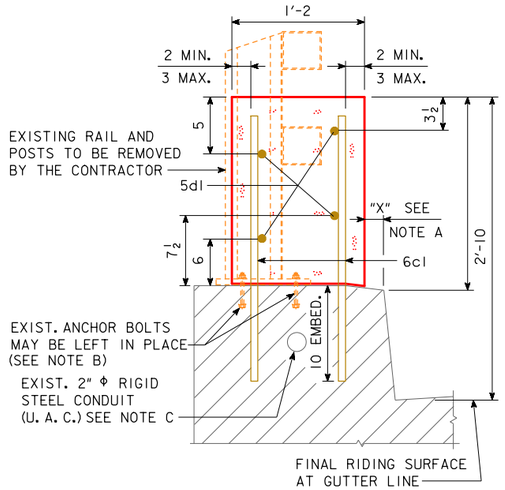
ELEVATION OF RETROFIT BARRIER RAIL



SECTION D-D



SECTION E-E



SECTION A-A

EPOXY REINFORCING STEEL-? RAIL					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	STANDARD RAIL, VERT.	—			
6c2	END SECTION, VERTICAL	—		SHOWN	
5d1	STANDARD RAIL, LONGIT.	—			
5d2	END SECTION, LONGIT.	—		7'-1	
				TOTAL (LBS.)	

NOTE A:
SEE STANDARD SHEET 1031T IN THESE PLANS.

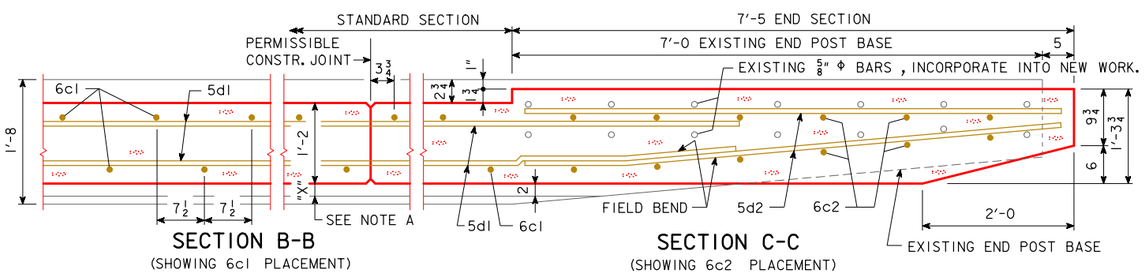
NOTE B:
EXISTING RAIL IS TO BE REMOVED. ANY ANCHOR BOLTS THAT WILL HAVE AT LEAST 2" OF CONCRETE COVER WHEN ENCOMPASSED BY THE NEW BARRIER RAIL MAY BE LEFT IN PLACE AT THE CONTRACTORS OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER. ANY ANCHOR BOLTS NOT HAVING THE 2" MIN. COVER SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW THE TOP OF CURB AND ENDS OF NON STAINLESS STEEL BOLTS PAINTED WITH TWO COATS OF ZINC RICH PAINT.
STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL MAY BE LEFT IN PLACE AT CONTRACTORS OPTION SUBJECT TO APPROVAL OF THE ENGINEER. STAINLESS STEEL BOLTS NEED NOT BE PAINTED.
NON STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW TOP OF CURB SURFACE AND THE REMAINING EXPOSED ENDS PAINTED WITH TWO COATS OF ZINC RICH PAINT.

NOTE C:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE EXISTING CONDUIT IN THE BRIDGE CURBS. IN ORDER TO ENSURE THE EXISTING CONDUITS AND/OR ELECTRICAL SERVICE (IF PRESENT) ARE NOT DAMAGED DURING PLACEMENT OF THE RETROFIT CONCRETE BARRIER RAILING, THE CONTRACTOR SHALL BE REQUIRED TO DO THE FOLLOWING:

1. PHYSICALLY LOCATE THE CONDUIT AT APPROXIMATELY 50 FOOT INTERVALS PRIOR TO DRILLING ANY HOLES FOR ¾" DIAMETER DOWEL BARS.
2. AFTER COMPLETION OF DRILLING FOR THE ¾" DOWEL BARS AND PRIOR TO PLACEMENT OF THE DOWELS, PROVE TO THE INSPECTOR BY A REASONABLE METHOD THE USABILITY OF THE CONDUIT HAS NOT BEEN COMPROMISED.

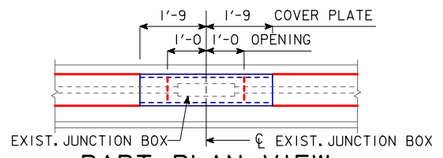
COST OF THESE OPERATIONS WILL BE CONSIDERED INCIDENTAL TO THE COST OF THE RETROFIT CONCRETE BARRIER RAILING. ANY DAMAGE TO THE CONDUIT OR WIRING BY THE CONTRACTOR WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE.

SEE STANDARD SHEET 1031T IN THESE PLANS FOR:
- RAIL JOINT DETAILS
- DOWEL SETTING NOTE
- RETROFIT BARRIER RAIL NOTES
- CONCRETE PLACEMENT SUMMARY
- ESTIMATED QUANTITIES BOX

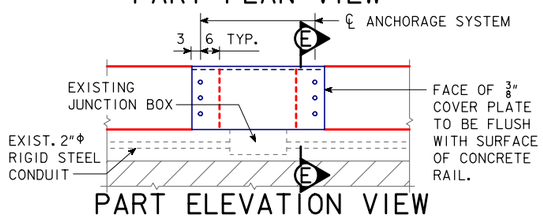


SECTION B-B
(SHOWING 6c1 PLACEMENT)

SECTION C-C
(SHOWING 6c2 PLACEMENT)



PART PLAN VIEW



PART ELEVATION VIEW

THE RETROFIT RAIL SHALL BE GAPPED AT EXISTING JUNCTION BOXES AS DETAILED. THE VERTICAL BARS SHALL BE SHIFTED AS REQUIRED AND THE LONGITUDINAL BARS SHALL BE FIELD CUT AS REQUIRED. CUT ENDS OF LONGITUDINAL BARS SHALL BE PATCHED WITH EPOXY. A ⅜" GALVANIZED PLATE SHALL FIT OVER THE GAPPED AREA IN THE RAIL AND SHALL BE HELD IN PLACE WITH COUNTERSUNK BOLTS AND CONCRETE ANCHORS. THE COST OF THE GALVANIZED PLATES AND ANCHORAGE SYSTEM SHALL BE INCIDENTAL TO THE COST OF THE RETROFIT RAIL.
REQUIRED AT ??? EXISTING JUNCTION BOXES.

RETROFIT BARRIER RAIL DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED: 05-15 - REFERENCE TO "1"Φ PVC PIPE" WAS CHANGED FROM "1"Φ PLASTIC CONDUIT". ENGLISHREPAIRRETROFITBRIDGES.DGN 1031D - THIS SHEET REDRAWN 11-3-88.

DESIGN TEAM	STANDARD SHEET 1031 D		COUNTY	PROJECT NUMBER	SHEET NUMBER

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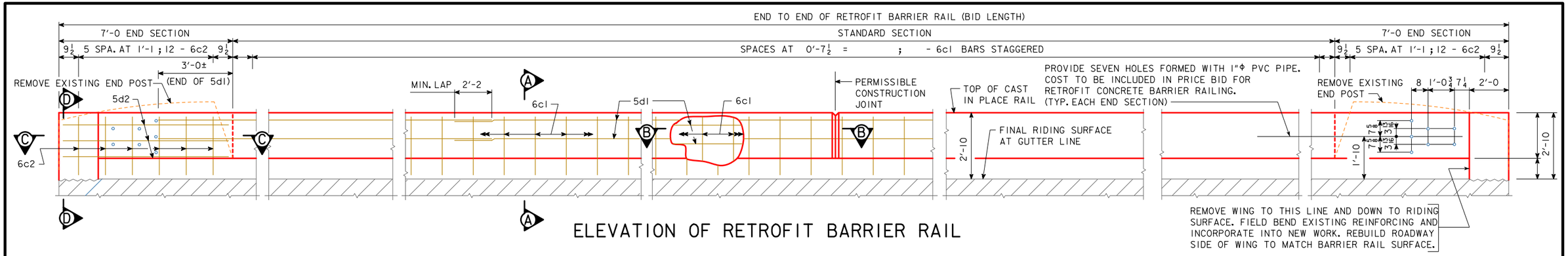
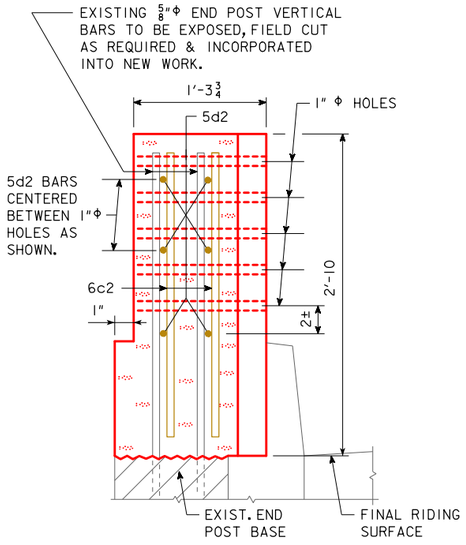
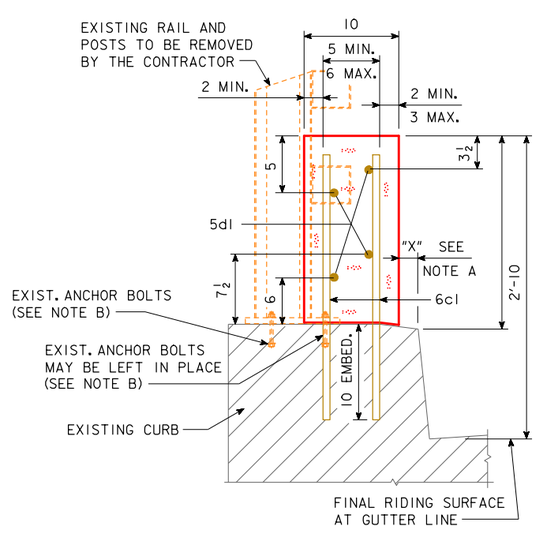


ELEVATION OF RETROFIT BARRIER RAIL



SECTION D-D



SECTION A-A

NOTE A:
SEE STANDARD SHEET 1031T IN THESE PLANS.

NOTE B:
EXISTING RAIL IS TO BE REMOVED. ANY ANCHOR BOLTS THAT WILL HAVE AT LEAST 2" OF CONCRETE COVER WHEN ENCOMPASSED BY THE NEW BARRIER RAIL MAY BE LEFT IN PLACE AT THE CONTRACTORS OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER. ANY ANCHOR BOLTS NOT HAVING THE 2" MIN. COVER SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW THE TOP OF CURB AND ENDS OF NON STAINLESS STEEL BOLTS PAINTED WITH TWO COATS OF ZINC RICH PAINT.
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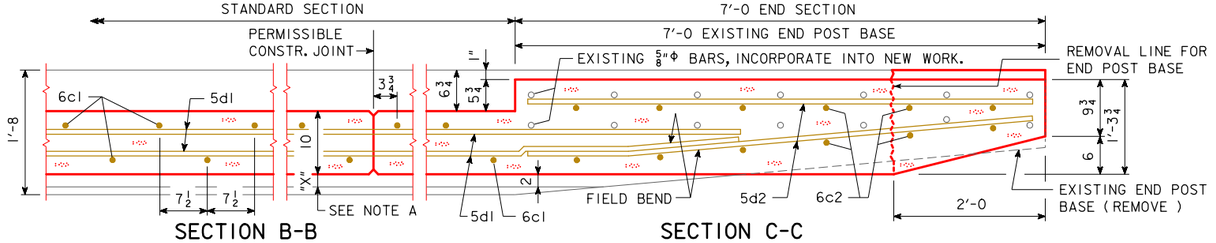
NON STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW TOP OF CURB SURFACE AND THE REMAINING EXPOSED ENDS PAINTED WITH TWO COATS OF ZINC RICH PAINT.

EPOXY REINFORCING STEEL-? RAIL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	STANDARD RAIL, VERT.				
6c2	END SECTION, VERTICAL			SHOWN	
5d1	STANDARD RAIL, LONGIT.				
5d2	END SECTION, LONGIT.			6'-8	
				TOTAL (LBS.)	



SECTION B-B
(SHOWING 6c1 PLACEMENT)

SECTION C-C
(SHOWING 6c2 PLACEMENT)

SEE STANDARD SHEET 1031T IN THESE PLANS FOR:
- RAIL JOINT DETAILS
- DOWEL SETTING NOTE
- RETROFIT BARRIER RAIL NOTES
- CONCRETE PLACEMENT SUMMARY
- ESTIMATED QUANTITIES BOX

RETROFIT BARRIER RAIL DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	STANDARD SHEET 1031E	COUNTY	PROJECT NUMBER	SHEET NUMBER

REVISED: 05-15 - REFERENCE TO "1"Φ PVC PIPE" WAS CHANGED FROM "1"Φ PLASTIC CONDUIT". ENGLISHREPAIRRETROFITBRIDGES.DGN 1031E - THIS SHEET ISSUED 5-25-99.

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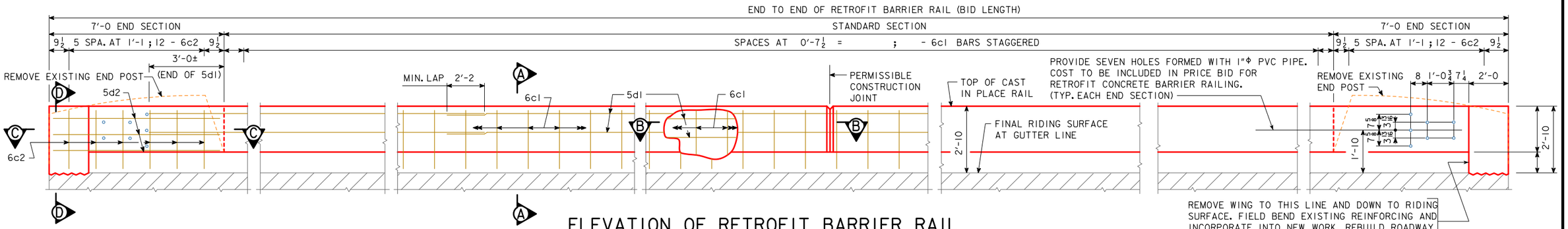
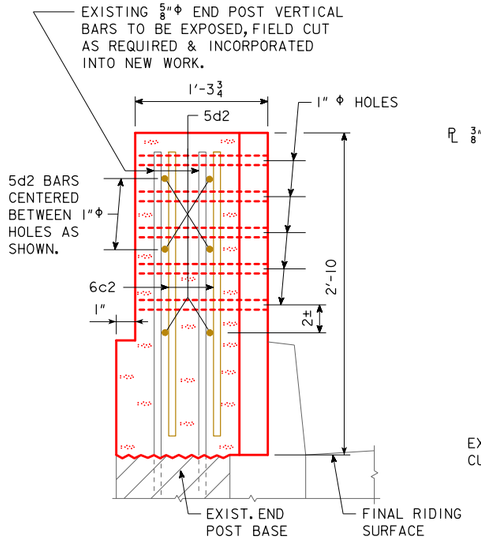
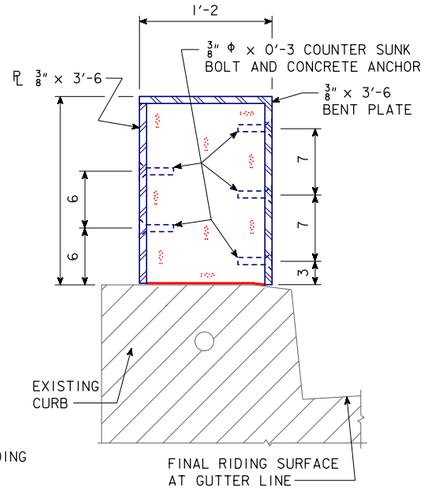


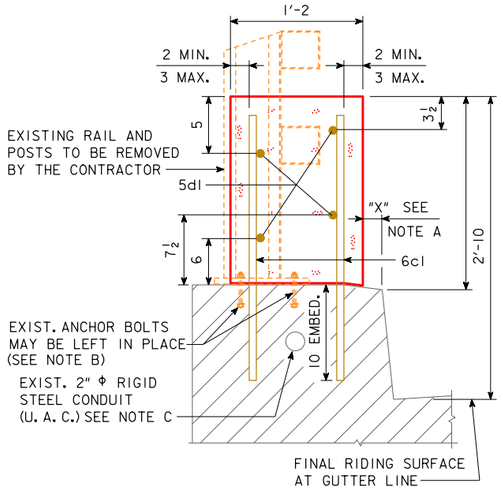
ELEVATION OF RETROFIT BARRIER RAIL



SECTION D-D

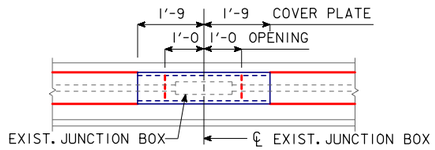


SECTION E-E

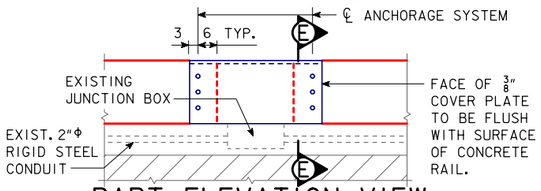


SECTION A-A

SEE STANDARD SHEET 1031T IN THESE PLANS FOR:
- RAIL JOINT DETAILS
- DOWEL SETTING NOTE
- RETROFIT BARRIER RAIL NOTES
- CONCRETE PLACEMENT SUMMARY
- ESTIMATED QUANTITIES BOX

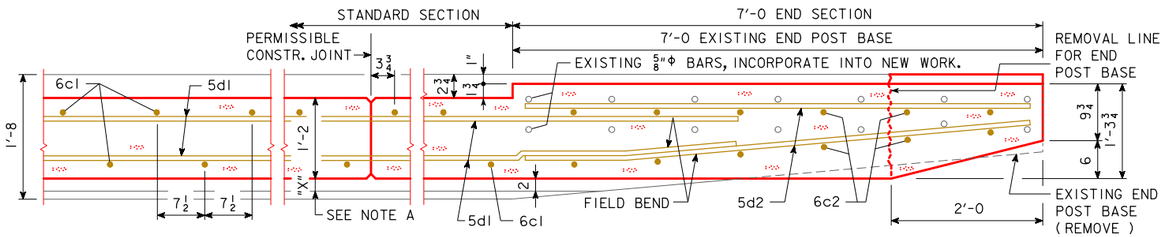


PART PLAN VIEW



PART ELEVATION VIEW

THE RETROFIT RAIL SHALL BE GAPPED AT EXISTING JUNCTION BOXES AS DETAILED. THE VERTICAL BARS SHALL BE SHIFTED AS REQUIRED AND THE LONGITUDINAL BARS SHALL BE FIELD CUT AS REQUIRED. CUT ENDS OF LONGITUDINAL BARS SHALL BE PATCHED WITH EPOXY. A ⅜" GALVANIZED PLATE SHALL FIT OVER THE GAPPED AREA IN THE RAIL AND SHALL BE HELD IN PLACE WITH COUNTERSUNK BOLTS AND CONCRETE ANCHORS. THE COST OF THE GALVANIZED PLATES AND ANCHORAGE SYSTEM SHALL BE INCIDENTAL TO THE COST OF THE RETROFIT RAIL.
REQUIRED AT ?? EXISTING JUNCTION BOXES.



SECTION B-B
(SHOWING 6c1 PLACEMENT)

SECTION C-C
(SHOWING 6c2 PLACEMENT)

EPOXY REINFORCING STEEL-? RAIL

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	STANDARD RAIL, VERT.				
6c2	END SECTION, VERTICAL			SHOWN	
5d1	STANDARD RAIL, LONGIT.				
5d2	END SECTION, LONGIT.			6'-8	
				TOTAL (LBS.)	

NOTE A:
SEE STANDARD SHEET 1031T IN THESE PLANS.

NOTE B:
EXISTING RAIL IS TO BE REMOVED. ANY ANCHOR BOLTS THAT WILL HAVE AT LEAST 2" OF CONCRETE COVER WHEN ENCOMPASSED BY THE NEW BARRIER RAIL MAY BE LEFT IN PLACE AT THE CONTRACTORS OPTION SUBJECT TO THE APPROVAL OF THE ENGINEER. ANY ANCHOR BOLTS NOT HAVING THE 2" MIN. COVER SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW THE TOP OF CURB AND ENDS OF NON STAINLESS STEEL BOLTS PAINTED WITH TWO COATS OF ZINC RICH PAINT.
STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL MAY BE LEFT IN PLACE AT CONTRACTORS OPTION SUBJECT TO APPROVAL OF THE ENGINEER. STAINLESS STEEL BOLTS NEED NOT BE PAINTED.
NON STAINLESS STEEL ANCHOR BOLTS OUTSIDE THE AREA OF NEW BARRIER RAIL SHALL BE CUT OFF FLUSH WITH OR SLIGHTLY BELOW TOP OF CURB SURFACE AND THE REMAINING EXPOSED ENDS PAINTED WITH TWO COATS OF ZINC RICH PAINT.

NOTE C:
THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE EXISTING CONDUIT IN THE BRIDGE CURBS. IN ORDER TO ENSURE THE EXISTING CONDUITS AND/OR ELECTRICAL SERVICE (IF PRESENT) ARE NOT DAMAGED DURING PLACEMENT OF THE RETROFIT CONCRETE BARRIER RAILING, THE CONTRACTOR SHALL BE REQUIRED TO DO THE FOLLOWING:

1. PHYSICALLY LOCATE THE CONDUIT AT APPROXIMATELY 50 FOOT INTERVALS PRIOR TO DRILLING ANY HOLES FOR ¾" DIAMETER DOWEL BARS.
2. AFTER COMPLETION OF DRILLING FOR THE ¾" DOWEL BARS AND PRIOR TO PLACEMENT OF THE DOWELS, PROVE TO THE INSPECTOR BY A REASONABLE METHOD THE USABILITY OF THE CONDUIT HAS NOT BEEN COMPROMISED.

COST OF THESE OPERATIONS WILL BE CONSIDERED INCIDENTAL TO THE COST OF THE RETROFIT CONCRETE BARRIER RAILING. ANY DAMAGE TO THE CONDUIT OR WIRING BY THE CONTRACTOR WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE.

RETROFIT BARRIER RAIL DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	STANDARD SHEET 1031F	COUNTY	PROJECT NUMBER	SHEET NUMBER

REVISED: 05-15 - REFERENCE TO "1"Φ PVC PIPE" WAS CHANGED FROM "1"Φ PLASTIC CONDUIT".
HE1031F.SOI - THIS SHEET ISSUED 5-25-99

REVISED 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 03-2017 - MODIFIED CONSTRUCTION: STANDARD SPECIFICATIONS BRIDGE CONSTRUCTION, SERIES TO
ENGLISHREPAIRETROFITBRIDGES.DGN 1031T - THIS SHEET ISSUED 01-01.

ESTIMATED BRIDGE RAIL RETROFIT QUANTITIES

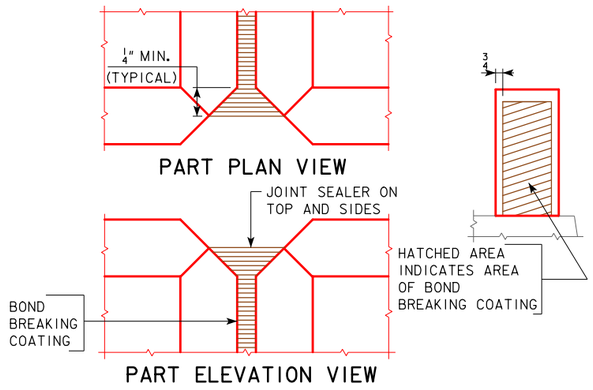
QUANTITIES NEEDED
RETROFIT CONCRETE BARRIER RAILING
REMOVAL OF EXISTING HANDRAIL AND END POSTS

DOWEL SETTING NOTE :

THE _____ BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. EITHER OF THE FOLLOWING SYSTEMS MAY BE USED AS A BONDING AGENT FOR VERTICAL DOWELS, BUT ONLY SYSTEM "A" MAY BE USED FOR HORIZONTAL DOWELS:

A. POLYMER GROUT SYSTEM SHALL BE IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.
B. HYDRAULIC CEMENT GROUT SYSTEMS. DRILLED HOLES ARE TO BE 2½ TIMES THE DOWEL DIAMETER AND ARE TO BE BLOWN CLEAN WITH COMPRESSED AIR IMMEDIATELY PRIOR TO PLACING GROUT. THE HYDRAULIC CEMENT GROUT SHALL BE ONE OF THOSE APPROVED IN MATERIALS I.M. 491.13 AND SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

NOTE A: (SEE SECTION A-A ON BARRIER RAIL LAYOUT SHEET).
ON EACH RAIL OF BRIDGE, DIMENSION "X" SHALL BE A MINIMUM OF 1" AND A MAXIMUM OF 3", BUT MUST BE CONSTANT FOR FULL LENGTH OF BRIDGE, HOWEVER APPROXIMATELY 10 LINEAR FEET AT EITHER END OF STANDARD RAIL SECTION SHALL BE TRANSITIONED TO 2" AT END SECTION AS SHOWN.



RETROFIT BARRIER RAIL JOINT DETAILS

SPECIFICATIONS:

DESIGN: AASHTO SERIES OF 2002.
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.
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DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 8, f'c = 4.0 KSI.

RETROFIT BARRIER RAILING NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

ALL DIMENSIONS AND DETAILS SHOWN IN THESE PLANS PERTINENT TO NEW CONSTRUCTION IN RELATION TO EXISTING PORTIONS OF THE STRUCTURE SHALL BE VERIFIED IN THE FIELD BY THE BRIDGE CONTRACTOR BEFORE STARTING CONSTRUCTION.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5a1 IS $\frac{5}{8}$ INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

COST OF JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE RETROFIT BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF RETROFIT BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR RETROFIT CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL (INCLUDING REINF. STEEL AND 1"Φ PVC PIPE) PLUS ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

ALL RETROFIT BARRIER RAIL CONCRETE IS TO BE EITHER CLASS BR MIX OR CLASS C MIX.

CLASS BR CONCRETE SHALL BE USED FOR THE SLIP FORMING METHOD.

CLASS C CONCRETE SHALL BE USED FOR THE CAST-IN-PLACE METHOD. THE PRICE BID FOR THE CAST-IN-PLACE METHOD SHALL INCLUDE THE FORMWORK.

ALL REINFORCING STEEL IS TO BE GRADE 60 AND EPOXY COATED.

THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

THE PRICE BID FOR "REMOVAL OF EXISTING HANDRAIL AND END POSTS" SHALL INCLUDE ALL COSTS ASSOCIATED WITH DISMANTLING THE EXISTING ____ HANDRAIL (APPROX. ____ L.F. AND ____ POSTS). THE RAILS AND POSTS ARE TO BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE SITE BY THE CONTRACTOR. THE BID ITEM SHALL ALSO INCLUDE ALL COSTS ASSOCIATED WITH THE REMOVAL OF THE EXISTING CONCRETE END POSTS AND THE CUTTING OFF AND PAINTING OF THE EXISTING RAIL POST ANCHOR BOLTS IF REQUIRED.

ANY REMOVALS REQUIRED SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO OTHER PORTIONS OF THE EXISTING STRUCTURE NOT NOTED FOR REMOVAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE STATE.

EXISTING BRIDGE RAIL IS NOT TO BE REMOVED UNTIL AUTHORIZED BY THE ENGINEER.

CONCRETE PLACEMENT SUMMARY

SECTION		TOTAL
STANDARD SECTION	___ AT ___ CU. YDS. PER LIN. FT	
END SECTIONS	___ AT ___ CU. YDS. PER SECTION	
	TOTAL (CU. YDS.)	

DESIGN HISTORY AT THIS SITE
(INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
X	X
X	X
X	X
X	X
X	X

RETROFIT BARRIER RAIL DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	RETROFIT BARRIER RAIL DETAILS	STANDARD SHEET 1031T	COUNTY	PROJECT NUMBER	SHEET NUMBER

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REVISED 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 03-2017 - MODIFIED CONSTRUCTION: STANDARD SPECIFICATIONS BRIDGE CONSTRUCTION, SERIES TO 2015, (WAS 2012).
ENGLISHREPAIRRETROFITBRIDGES.DGN 1038 - THIS SHEET REDRAWN 9-8-88.

SITUATION PLAN

SPECIFICATIONS:

DESIGN: AASHTO SERIES OF 2002.
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.
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DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 8, f'c = 3,500 PSI.

NOTE:
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

DESIGN HISTORY AT THIS SITE
(INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
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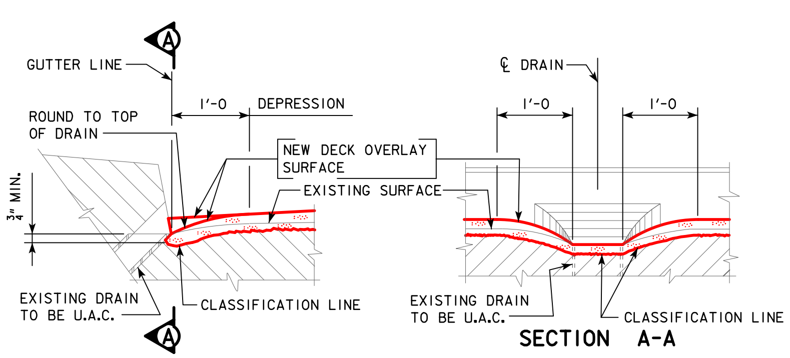
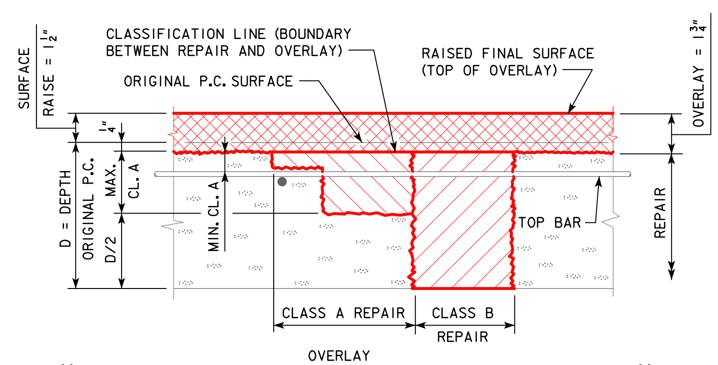
X	X
X	X
X	X
X	X

LOCATION:

MAINTENANCE NO.



DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)



REPAIR AND OVERLAY DEFINITION

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ___ OF ___ FILE NO. ________ DESIGN NO. ________

DESIGN TEAM	DECK REPAIR - QUANTITIES	STANDARD SHEET 1038	COUNTY	PROJECT NUMBER	SHEET NUMBER

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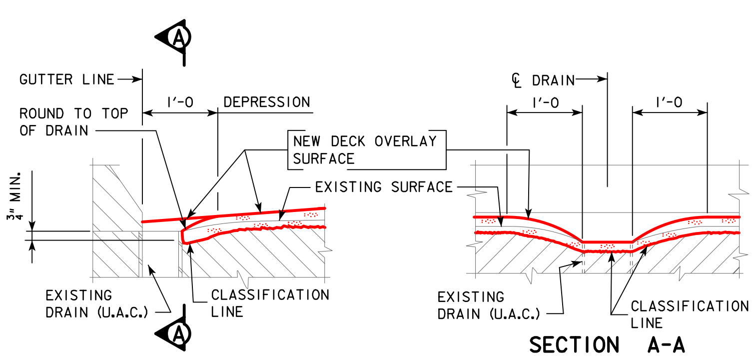

DECK REPAIR DETAIL AT DRAIN
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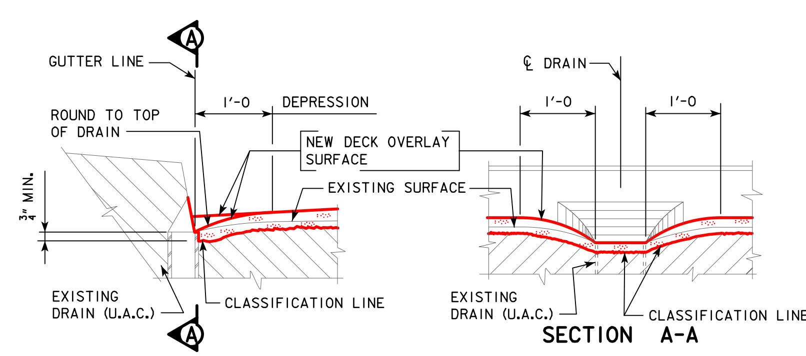
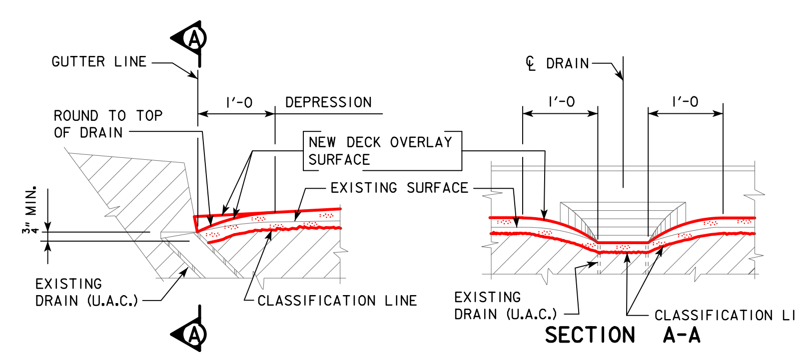


DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)



DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)

REVISED 11-15 - MODIFIED "DESIGN HISTORY" TABLE TO STATE "(INCLUDES THIS DESIGN)".
REVISED 03-2017 - MODIFIED CONSTRUCTION: STANDARD SPECIFICATIONS BRIDGE CONSTRUCTION, SERIES TO 2015, (WAS 2012).
ENGLISHREPAIRRETROFITBRIDGES.DGN 1038R - THIS SHEET ISSUED 10-12.

SITUATION PLAN

SPECIFICATIONS:

DESIGN: AASHTO SERIES OF 2002.
CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.
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DESIGN STRESSES:

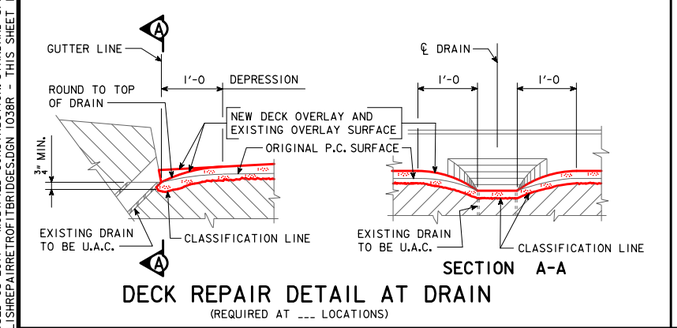
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002.
REINFORCING STEEL IN ACCORDANCE WITH SECTION 8, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 8, f'c = 3,500 PSI.

NOTE:
ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

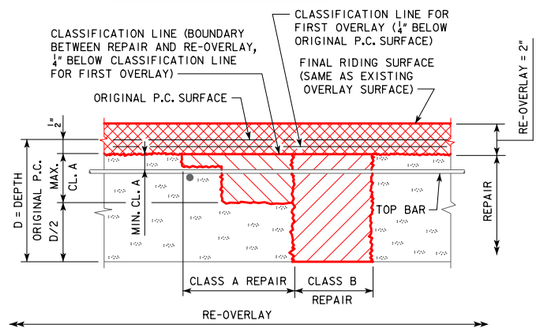
DESIGN HISTORY AT THIS SITE
(INCLUDES THIS DESIGN)

DES. NO.	TYPE OF WORK
X	X
X	X
X	X
X	X
X	X

LOCATION:
MAINTENANCE NO.



DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)



REPAIR AND RE-OVERLAY DEFINITION

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	RE-OVERLAY DECK REPAIR - QUANTITIES	STANDARD SHEET 1038R	COUNTY	PROJECT NUMBER	SHEET NUMBER

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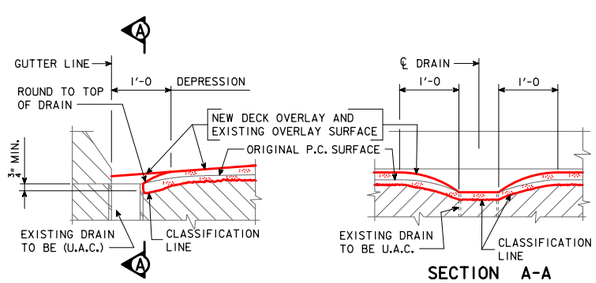
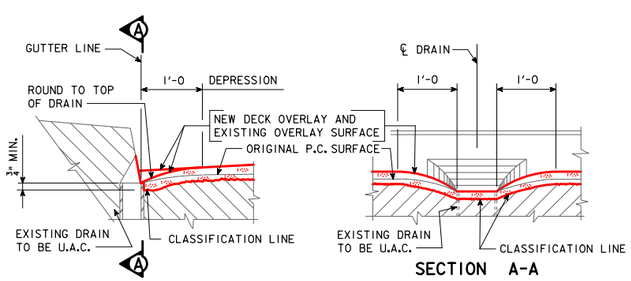
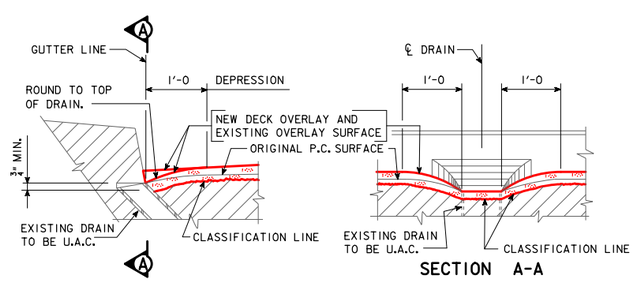


DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)



DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)



DECK REPAIR DETAIL AT DRAIN
(REQUIRED AT ___ LOCATIONS)

E400A PLAN QUANTITY OF FLOOR REPAIR IS BASED ON THE "SURVEY PLOT" AS SHOWN IN THESE PLANS. HATCHED PORTIONS REPRESENT CLASS A BRIDGE FLOOR REPAIR. CROSS HATCHED PORTIONS, IF SHOWN, REPRESENT CLASS B BRIDGE FLOOR REPAIR. ACTUAL SPALLED AND HOLLOW AREAS, AS DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION, SHALL BE REPAIRED.

E400B NO PRELIMINARY FLOOR SURVEY IS SHOWN. THE PLAN QUANTITY FOR "CLASS A BRIDGE FLOOR REPAIR" IS ESTIMATED AS _____ OF THE TOTAL FLOOR AREA. THE ACTUAL QUANTITY IS DETERMINED BY THE ENGINEER AFTER THE H.M.A. SURFACING HAS BEEN REMOVED. ACTUAL SPALLED AND HOLLOW AREAS AS DETERMINED BY THE ENGINEER SHALL BE REPAIRED.

E400C PLAN QUANTITY OF FLOOR REPAIR IS BASED ON TWO TIMES THE SHADED AREAS PLUS THE BOUNDED AREAS SHOWN ON THE "SURVEY PLOT" IN THESE PLANS. SHADED AREAS REPRESENT CLASS A BRIDGE FLOOR REPAIR FOUND BY DELAMTECT PLOT. BOUNDED AREAS INCLUDE H.M.A. PATCH OR SPALLED AREAS NOT RECORDED BY THE DELAMTECT AND/OR THE SQUARING UP OF THE REPAIR AREAS. ACTUAL SPALLED AND HOLLOW AREAS AS DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION SHALL BE REPAIRED.

E400D PLAN QUANTITY OF FLOOR REPAIR IS BASED ON TWO TIMES THE SHADED AREAS SHOWN ON THE "SURVEY PLOT" IN THESE PLANS. SHADED AREAS REPRESENT CLASS A BRIDGE FLOOR REPAIR FOUND BY SOUNDING THE BRIDGE DECK. ACTUAL SPALLED AND HOLLOW AREAS AS DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION, SHALL BE REPAIRED.

E410A PRESENT FLOOR THICKNESS IS ABOUT _____ INCHES. THE CONTRACTOR SHALL EXERCISE CARE IN REMOVING CONCRETE IN ORDER TO PREVENT UNNECESSARY UNBONDING OF REINFORCING STEEL.

E410B PRESENT FLOOR THICKNESS IS ABOUT _____ INCHES. THE CONTRACTOR SHALL EXERCISE CARE IN ORDER TO PREVENT UNNECESSARY REMOVAL OF CONCRETE BELOW THE TOP OF THE TOP REINFORCING. THE ENERGY OF HAND TOOLS SHALL BE RESTRICTED NEAR THE BOTTOM OF THE DESIGNATED CLASS A REPAIR AREAS IN ORDER TO PREVENT UNBONDING OF REINFORCING. NO CONCRETE SHALL BE REMOVED BELOW THE TOP OF THE TOP LONGITUDINAL REINFORCING WITHOUT PRIOR PERMISSION FROM THE BRIDGE ENGINEER.

E410C PRESENT FLOOR THICKNESS IS ABOUT _____ INCHES. THE FLOOR REINFORCING IS QUITE SHALLOW FOR A PORTION OF THE FLOOR AREA. IN THOSE AREAS WHERE REINFORCING IS LESS THEN $\frac{1}{4}$" CLEAR BELOW THE ORIGINAL FINISHED SURFACE, THE BOTTOM LIMIT OF BRIDGE FLOOR OVERLAY WILL BE CONSIDERED AS THE TOP OF THE TOP REINFORCING. UNSOUND CONCRETE BELOW THE TOP OF THE TOP REINFORCING SHALL BE REPAIRED AS CLASS A BRIDGE FLOOR REPAIR. THE CONTRACTOR WILL BE REQUIRED TO CAREFULLY REGULATE SCARIFYING DEPTH AND EMPLOY HAND METHODS AS NECESSARY IN ORDER TO PREVENT DAMAGE OR UNBONDING OF REINFORCING.

E410D PRESENT FLOOR THICKNESS IS ABOUT _____ INCHES, INCLUDING EXISTING OVERLAY. THE CONTRACTOR SHALL EXERCISE CARE IN REMOVING CONCRETE IN ORDER TO PREVENT UNNECESSARY UNBONDING OF REINFORCING STEEL.

E410E PRESENT FLOOR THICKNESS IS ABOUT _____ INCHES, INCLUDING EXISTING OVERLAY. THE CONTRACTOR SHALL EXERCISE CARE IN ORDER TO PREVENT UNNECESSARY REMOVAL OF CONCRETE BELOW THE TOP OF THE TOP REINFORCING. THE ENERGY OF HAND TOOLS SHALL BE RESTRICTED NEAR THE BOTTOM OF THE DESIGNATED CLASS A REPAIR AREAS IN ORDER TO PREVENT UNBONDING OF REINFORCING. NO CONCRETE SHALL BE REMOVED BELOW THE TOP OF THE TOP LONGITUDINAL REINFORCING WITHOUT PRIOR PERMISSION FROM THE BRIDGE ENGINEER.

E411 THE MINIMUM DEPTH FOR CLASS A REPAIR IS TO BE $1\frac{1}{2}$ INCHES IN AREAS WHERE TOP REINFORCING IS NOT PRESENT.

E412 THE BRIDGE FLOOR IS COVERED WITH A _____ INCH THICK PORTLAND CEMENT CONCRETE OVERLAY. THE CONTRACTOR SHALL NOTE THE REDEFINING OF THE CLASSIFICATION LINE (BOUNDARY BETWEEN REPAIR AND OVERLAY) FOR THIS PROJECT DUE TO THE EXISTING _____ INCH OVERLAY. THE CLASSIFICATION LINE WILL BE DEFINED AS _____ INCHES BELOW THE TOP OF EXISTING OVERLAY. THIS WILL NECESSITATE THE REMOVAL OF THE EXISTING BRIDGE FLOOR OVERLAY BEFORE PLACING THE PROPOSED NEW BRIDGE FLOOR OVERLAY.

ALL COSTS ASSOCIATED WITH THE REMOVAL OF THE EXISTING OVERLAY SHALL BE INCLUDED IN THE BID ITEM "REMOVAL OF EXISTING P.C. OVERLAY". REMOVAL OF EXISTING OVERLAY SHALL BE COMPUTED IN SQUARE YARDS FROM THE MEASUREMENT OF AREAS REMOVED. THE CONTRACTOR WILL BE PAID THE CONTRACT PRICE PER SQUARE YARD FOR FURNISHING ALL EQUIPMENT AND LABOR NECESSARY TO REMOVE THE CONCRETE TO WITHIN $\frac{1}{4}$ INCH ABOVE THE CLASSIFICATION LINE. ALL COSTS, INCLUDING FURNISHING EQUIPMENT AND LABOR, ASSOCIATED WITH REMOVAL OF THE NEXT $\frac{1}{4}$ INCH OF CONCRETE (TO THE CLASSIFICATION LINE) SHALL BE INCLUDED IN THE BID ITEM "BRIDGE FLOOR OVERLAY".

UPON COMPLETION OF THE REMOVAL OF CONCRETE DOWN TO THE CLASSIFICATION LINE, THE ENGINEER SHALL DETERMINE THE AREAS OF BRIDGE DECK TO BE REPAIRED AS "CLASS A BRIDGE FLOOR REPAIR". ACTUAL HOLLOW AREAS, AS DETERMINED BY THE ENGINEER, SHALL BE REPAIRED.

E420 CONSTRUCTION SHALL BE DONE IN STAGES WITH AT LEAST ONE LANE TRAFFIC MAINTAINED AT ALL TIMES IN ACCORDANCE WITH "TRAFFIC CONTROL PLAN" NOTE.

E421 CONSTRUCTION STAGES I & II AS DETAILED ON THESE PLANS MAY BE REVERSED AT THE CONTRACTOR'S OPTION SUBJECT TO THE ENGINEER'S APPROVAL.

E422 BEFORE PROCEEDING WITH BRIDGE FLOOR OVERLAY AND BRIDGE FLOOR REPAIR THE CONTRACTOR MAY COMPLETE ALL STAGES OF OTHER CONSTRUCTION. ANY CONSTRUCTION SHALL HAVE STAGE LIMITS, TEMPORARY BARRIER RAIL AND TRAFFIC CONTROL AS DETAILED ON THESE PLANS. TEMPORARY BARRIER RAIL AND TRAFFIC CONTROL MAY BE ADJUSTED TO FIT THE ACTUAL WORK AND STORAGE AREA. WHEN BACKWALLS AND/OR APPROACH SECTIONS ARE TO BE REBUILT TO A RAISED SURFACE, AND WHEN FLOOR OVERLAY IS NOT A PART OF THE SAME STAGE, THE CONTRACTOR SHALL PROVIDE FOR PROFILE TRANSITION WITH H.M.A. SURFACING. PROFILE TRANSITION SHALL BE TAPERED AT A RATE OF 25' FOR $1\frac{1}{2}$ INCHES OF RAISE. THE H.M.A. TRANSITION MATERIAL SHALL BE A COMMERCIAL GRADE HOT SURFACING MIX OR A MIX APPROVED BY THE ENGINEER. H.M.A. MAY BE PLACED BY HAND METHODS AND MAY BE COMPACTED BY ANY APPROVED METHOD. ALL COSTS FOR ADDITIONAL TRAFFIC CONTROL, REPOSITIONING OF BARRIER AND H.M.A. SURFACING SHALL BE BORNE BY THE CONTRACTOR.

E430 THIS DESIGN IS FOR REPAIRS TO THE EXISTING ___.
COPIES OF ORIGINAL DESIGN PLANS WILL BE MADE AVAILABLE TO THE CONTRACTOR. CONTACT THE OFFICE OF CONTRACTS - HIGHWAY DIVISION - IOWA D.O.T. - AMES.
REPAIR SHALL CONSIST OF:

1. _____
2. _____

E431 AREAS OF CURB INDICATED ON THE "SURVEY PLOT" OR DESIGNATED BY THE ENGINEER ARE TO BE REPAIRED USING CONCRETE REPAIR NOTES AND DETAILS INCLUDED IN THESE PLANS.

E432 SCREED EXTENSION OR OVERLAY BEYOND THE LONGITUDINAL CONSTRUCTION JOINT MAY BE LESS THAN THE 6 INCHES REQUIRED BY ARTICLE 2413.03, A, 4, OF THE STANDARD SPECIFICATIONS. THE ENGINEER MAY REQUIRE ADDITIONAL VIBRATION OR SPECIAL FINISHING PROCEDURES ADJACENT TO THE LONGITUDINAL CONSTRUCTION JOINT.

E433 SURFACE RAISE, AS SHOWN ON THE PLANS, SHALL BE CONSIDERED A MINIMUM. IN ORDER TO LIMIT THE ADDITIONAL DEAD LOAD SURFACE RAISE SHALL BE RESTRICTED TO A MAXIMUM OF $\frac{1}{2}$" MORE THAN SHOWN ON THE PLANS. PROFILE MAY BE ADJUSTED TO THE EXTENT POSSIBLE WITHIN THESE LIMITS.

E434 ALL DIMENSIONS AND DETAILS SHOWN ON THESE PLANS PERTINENT TO NEW CONSTRUCTION SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.

E435 ALL DIMENSIONS REQUIRED TO FABRICATE NEW STRUCTURAL STEEL SHALL BE FIELD VERIFIED BY THE CONTRACTOR.

E436 FAINT LINES ON PLANS INDICATE EXISTING PORTIONS OF THE BRIDGE.

E437 MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

E438 IN ADDITION TO THE REQUIREMENTS OF ARTICLE 2413.03, G, OF THE STANDARD SPECIFICATIONS, BOTH ABUTMENT BRIDGE SEATS SHALL HAVE AN APPLICATION OF CONCRETE SEALER IN ACCORDANCE WITH ARTICLE 2403.03, P, 3, OF THE STANDARD SPECIFICATIONS.

E440 THE LUMP SUM BID FOR "REMOVALS, AS PER PLAN" SHALL INCLUDE ALL COSTS ASSOCIATED WITH REMOVING THE _____.
REMOVAL OF SCHEDULED ITEMS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS. ANY DAMAGE TO ANY STEEL OR CONCRETE NOT TO BE REMOVED SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE.

E441A THE BID ITEM "REMOVAL OF EXISTING HANDRAIL + END POST" SHALL INCLUDE ALL COSTS ASSOCIATED WITH DISMANTLING THE EXISTING _____ HANDRAIL (APPROXIMATELY _____ L.F. AND _____ POSTS).
THE HANDRAILS ARE TO BECOME THE PROPERTY OF THE CONTRACTOR.

E441B THE BID ITEM "HAULING AND STORING EXISTING HANDRAIL" SHALL INCLUDE ALL COSTS ASSOCIATED WITH THE DISMANTLING, HAULING AND STORING OF BOTH OF THE HANDRAILS (APPROXIMATELY _____ L.F. OF RAIL AND _____ POSTS). THE RAILS, POSTS AND HARDWARE ARE TO BE HAULED TO THE IOWA D.O.T. MAINTENANCE YARD AT _____. ANCHOR BOLTS NEED NOT BE SALVAGED.

E442 THE PRICE BID FOR "REMOVAL OF ASPHALT CEMENT CONCRETE SURFACING" SHALL BE CONSIDERED FULL COMPENSATION FOR REMOVAL OF THE EXISTING H.M.A. OVERLAY TO THE LIMITS SHOWN. THE REMOVED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

E450 THE CONTRACTOR SHALL CONSTRUCT NEW BRIDGE APPROACH PAVEMENT AS NOTED AND SHOWN. THE PRICE BID FOR "BRIDGE APPROACH SECTION, REINFORCED AS PER PLAN" SHALL BE FULL COMPENSATION FOR FURNISHING AND INSTALLING P.C. CONCRETE APPROACH PAVEMENT, INCLUDING EXCAVATION, REINFORCING STEEL, AND JOINT MATERIAL REQUIRED.

E451 THE CONTRACTOR SHALL PLACE PORTLAND CEMENT CONCRETE OVERLAY ON THE BRIDGE APPROACH PAVEMENT AS NOTED AND SHOWN ON STANDARD ROAD PLAN RK-17. PAYMENT FOR THIS WORK SHALL BE NOTED ON STANDARD ROAD PLAN RK-17.

VOID

THIS SHEET VOID 03-01-2017
SEE BRIDGE DESIGN MANUAL
FOR CURRENT REPAIR NOTES.

VOID

DECK REPAIR NOTES

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISION 11-10 - SEVERAL OF THE NOTES WERE UPDATED TO AGREE WITH CURRENT SPECIFICATIONS.
REVISION 03-2017 - THIS SHEET VOID, SEE BRIDGE DESIGN MANUAL FOR CURRENT NOTES.
ENGLISHREPAIRRETROFITBRIDGES.DGN 1039s1 - THIS SHEET REISSUED 8-23-96.

DESIGN TEAM	DECK REPAIR - NOTES (1 OF 2)	STANDARD 1039s1		COUNTY	PROJECT NUMBER	SHEET NUMBER

2/27/2017 2:49:18 PM bkloss W:\Highway\Bridge\Standards\Bridges\EnglishRepairRetrofitBridges.dgn 1039s1_VOID 11x17_pdf.pltcfg

E461 THE TOP OF THE ABUTMENT BACKWALLS AS SHOWN SHALL BE CONSTRUCTED USING STRUCTURAL CONCRETE CLASS C. PROMPTLY AFTER THE CONCRETE HAS BEEN PLACED AND VIBRATED AS PROVIDED IN ARTICLES 2403.03, C, AND 2403.03, D, OF THE STANDARD SPECIFICATIONS, IT SHALL BE HAND FINISHED TO PROVIDE A SMOOTH SURFACE WITH THE PROPER CROWN. THE CONTRACTOR MAY ELECT TO USE FORMWORK WHICH IS MARKED OR TRIMMED TO THE CORRECT ELEVATION AND CROWN TO PROVIDE THE LIMITS FOR THE HAND FINISHING.

E462 IT WILL BE NECESSARY TO SUPPORT THE EARTH AND/OR GRANULAR MATERIAL BEHIND THE ABUTMENT DURING RECONSTRUCTION OF THE ABUTMENT BACKWALLS BY SOME METHOD APPROVED BY THE ENGINEER. ALL COSTS FOR SUPPORTING THE EARTH AND/OR GRANULAR MATERIAL SHALL BE INCLUDED IN THE PRICE BID FOR "CLASS 20 EXCAVATION".

E463 THE TOP AND INTERIOR FACES OF THE EXISTING CONCRETE RAILING ARE TO BE CLEANED AND SEALED IN ACCORDANCE WITH ARTICLE 2403.03, P, OF THE STANDARD SPECIFICATIONS. IF NEW SECTIONS OF RAIL ARE CONSTRUCTED, THE NEW SECTIONS SHALL NOT BE SEALED. ALL COSTS ASSOCIATED WITH CLEANING AND SEALING OF THE CONCRETE RAILS SHALL BE INCLUDED IN THE UNIT PRICE BID ITEM "_____".

E470 SURFACES OF EXISTING EXPANSION DEVICE ARE TO BE CLEANED OF EXISTING CORROSION AND PAINT IN PREPARATION FOR FIELD WELDING. THE $1\frac{1}{2}$" THICK RAISE PLATES FOR THE EXPANSION DEVICE ARE TO BE CLEANED AND PAINTED AFTER FIELD WELDING TO THE EXISTING EXPANSION DEVICE. THE CLEANING IS TO BE BY VACUUM BLAST OR BY A NON-BLASTING METHOD AND IS TO COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL SPECIFICATIONS SSPC-SP3. THE EXPOSED TOP SURFACES OF THE COMPLETED EXPANSION DEVICE ARE TO BE GIVEN ONE COAT OF RUST-OLEUM PRIMER AND ONE COAT OF RUST-OLEUM FINAL COAT OR AN APPROVED EQUAL PRIMER AND FINAL COAT. THE COLOR OF THE DRY PAINT SHOULD APPROXIMATE THE COLOR OF CONCRETE. ONLY THE EXPOSED SURFACES OF THE EXPANSION DEVICE AND RAISE PLATES ARE TO BE PAINTED. NO PAINTING OF OTHER STEEL IS REQUIRED. BECAUSE OF THE SMALL QUANTITY, ALL COST ASSOCIATED WITH CLEANING AND PAINTING OF THE EXPANSION DEVICE AS NOTED IS TO BE INCLUDED IN THE BID ITEM "PAINTING STRUCTURAL STEEL".

THE BID ITEM "STRUCTURAL STEEL" SHALL INCLUDE ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING RAISE PLATE ON EXPANSION DEVICE AS SHOWN EXCEPT ITEMS INCLUDED IN THE BID ITEM "PAINTING STRUCTURAL STEEL" AND THE BID ITEM "CONTAINMENT".

E471 SURFACES OF EXISTING EXPANSION DEVICE AS DETAILED IN THESE PLANS ARE TO BE CLEANED OF EXISTING CORROSION AND PAINT IN PREPARATION FOR FIELD WELDING. THE NEW STEEL EXTRUSION TO BE PAINTED SHALL BE CLEANED AND PAINTED AFTER FIELD WELDING TO THE EXISTING EXPANSION DEVICE. THE CLEANING IS TO BE BY VACUUM BLAST OR BY A NON-BLASTING METHOD AND IS TO COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL SPECIFICATIONS SSPC-SP3. THE EXPOSED SURFACES OF THE COMPLETED EXPANSION DEVICE ARE TO BE GIVEN ONE COAT OF RUST-OLEUM PRIMER AND ONE COAT OF RUST-OLEUM FINAL COAT OR APPROVED EQUAL PRIMER AND FINAL COAT. THE COLOR OF THE DRY PAINT SHOULD APPROXIMATE THE COLOR OF CONCRETE. ONLY THOSE SURFACES OF THE EXPANSION DEVICE NOTED TO BE PAINTED ARE TO BE PAINTED. NO PAINTING OF OTHER STRUCTURAL STEEL IS REQUIRED. BECAUSE OF THE SMALL QUANTITY, ALL COST ASSOCIATED WITH CLEANING AND PAINTING OF THE EXPANSION DEVICE AS NOTED IS TO BE INCLUDED IN THE BID ITEM "PAINTING STRUCTURAL STEEL".

THE BID ITEM "STEEL EXTRUSION JOINT WITH NEOPRENE" SHALL INCLUDE ALL COSTS ASSOCIATED WITH FURNISHING AND INSTALLING THE EXPANSION DEVICE AS SHOWN, EXCEPT ITEMS INCLUDED IN THE BID ITEM "PAINTING STRUCTURAL STEEL" AND THE BID ITEM "CONTAINMENT".

E480 A SCRAPE SAMPLE WAS TAKEN FROM AN AREA OF THIS BRIDGE TO GET AN INDICATION OF THE EXISTENCE OF AND LEVEL OF TOTAL CHROMIUM AND TOTAL LEAD. ANALYSIS OF TOTAL LEAD ON THIS SAMPLE WAS _____ PARTS PER MILLION (PPM). ANALYSIS OF TOTAL CHROMIUM ON THIS SAMPLE WAS _____ PPM. THESE ANALYSES SHOW THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS. LEVELS INDICATED BY THESE TESTS COULD CREATE CONDITIONS ABOVE REGULATORY LIMITS FOR HEALTH AND SAFETY REQUIREMENTS. NO OTHER CONSTITUENTS WERE ANALYZED. THE BIDDER SHOULD NOT RELY ON THE DEPARTMENT'S TESTING AND ANALYSIS FOR ANY PURPOSE OTHER THAN AS AN INDICATION OF THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS.

E481 THE CONTRACTOR SHALL CONDUCT THEIR OPERATIONS IN SUCH A MANNER THAT ANY PAINT REMOVED DURING DEMOLITION IS CONTAINED, COLLECTED, AND DISPOSED OF IN ACCORDANCE WITH SECTION 2508, OF THE STANDARD SPECIFICATIONS, AND ALL FEDERAL AND STATE REGULATIONS. BEFORE DELIVERY OF ANY SCRAP STEEL THE CONTRACTOR SHALL PROVIDE A WRITTEN NOTICE TO THE RECEIVING FACILITY. THIS NOTICE SHALL AT A MINIMUM INCLUDE:

1. A NOTICE THAT THE SCRAP STEEL IS COATED WITH PAINT THAT HAS REGULATED MATERIALS AT LEVELS WHICH COULD BE HAZARDOUS TO EMPLOYEES OR THE ENVIRONMENT.

2. A COPY OF THE SCRAPE SAMPLE PROVIDED IN THE CONTRACT DOCUMENTS.

3. A SIGNATURE BLOCK FOR THE RECEIVING FACILITY TO CONFIRM THEIR RECEIPT OF THIS INFORMATION.

A COPY OF THIS NOTICE, SIGNED BY THE RECEIVING FACILITY, SHALL BE RETURNED TO THE ENGINEER BEFORE ANY SCRAP STEEL IS REMOVED FROM THE PROJECT.

E490 THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE EXISTING CONDUIT IN THE BRIDGE CURBS. IN ORDER TO ENSURE THE EXISTING CONDUITS ARE NOT DAMAGED DURING PLACEMENT OF THE CAST-IN-PLACE BARRIER RAIL, THE CONTRACTOR SHALL BE REQUIRED TO DO THE FOLLOWING:

1. PHYSICALLY LOCATE THE CONDUIT AT APPROXIMATELY 50 FOOT INTERVALS PRIOR TO DRILLING ANY HOLES FOR $\frac{3}{4}$" DIAMETER DOWEL BARS.

2. AFTER COMPLETION OF DRILLING FOR THE $\frac{3}{4}$" DOWEL BARS AND PRIOR TO PLACEMENT OF THE DOWELS, PROVE TO THE INSPECTOR BY A REASONABLE METHOD THE USABILITY OF THE CONDUIT HAS NOT BEEN COMPROMISED.

COST OF THESE OPERATIONS WILL BE CONSIDERED INCIDENTAL TO THE COST OF THE CAST-IN-PLACE BARRIER RAIL. ANY DAMAGE TO THE CONDUIT OR WIRING BY THE CONTRACTOR WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND REPAIRED AT NO EXTRA COST TO THE STATE.

VOID

VOID

THIS SHEET VOID 03-01-2017
SEE BRIDGE DESIGN MANUAL
FOR CURRENT REPAIR NOTES.

REVISION 01-12 - E461 NOTE WAS CHANGED TO USE CLASS C CONCRETE INSTEAD OF CLASS D.
REVISION 03-2017 - THIS SHEET VOID, SEE BRIDGE DESIGN MANUAL FOR CURRENT NOTES.
ENGLISHREPAIRRETROFITBRIDGES.DGN 1039s2 - THIS SHEET REISSUED 8-23-96.

DECK REPAIR NOTES

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	DECK REPAIR - NOTES (2 OF 2)	STANDARD 1039s2	COUNTY	PROJECT NUMBER	SHEET NUMBER

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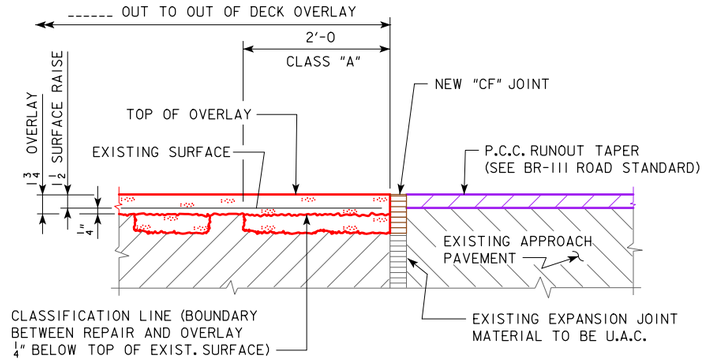
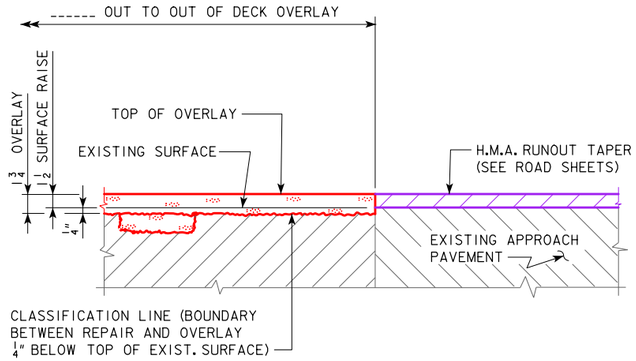
REVISED 10-12 - ADDED 2'-0 CLASS A REPAIR AT JOINTS SHOWN & BORDERED NOTE. ADDED REPAIR DETAIL AND REPAIR DETAILS FROM VOIDED 1041 STANDARD.
REVISED 03-2017 - CHANGED REFERENCE TO ROAD STANDARD BR-111. (WAS RK-17). CHANGED NOTE STATING "EXISTING 4" RESILIENT JOINT FILLER TO BE U.A.C." (WAS PREFORMED JOINT FILLER).
ENGLISHREPAIRRETROFITBRIDGES.DGN 1040 - THIS SHEET REDRAWN 9-8-88.



PART LONGITUDINAL SECTION ALONG ROADWAY

------ ABUTMENT



PART LONGITUDINAL SECTION ALONG ROADWAY

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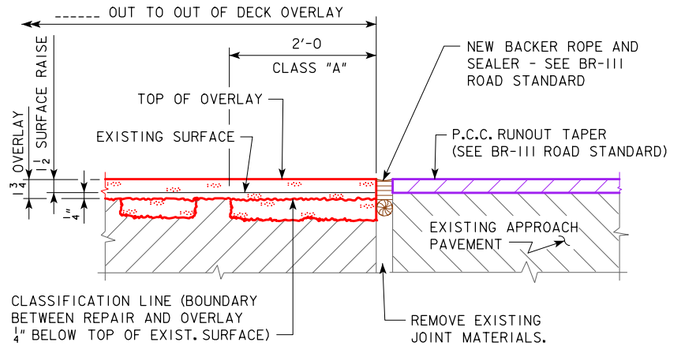

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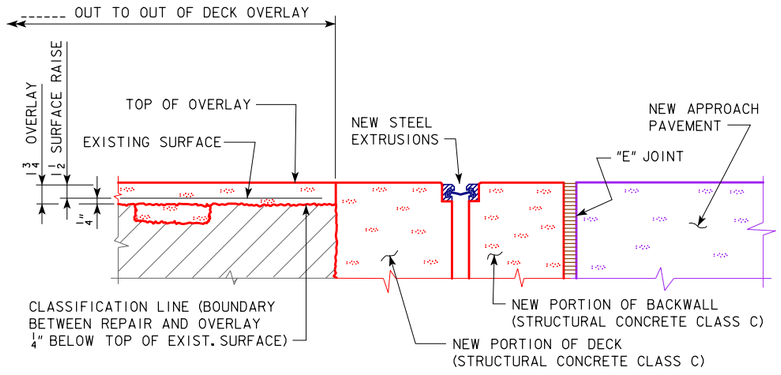

PART LONGITUDINAL SECTION ALONG ROADWAY

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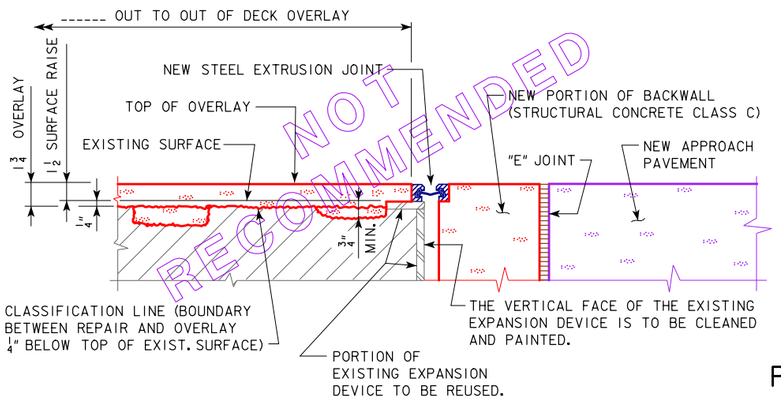

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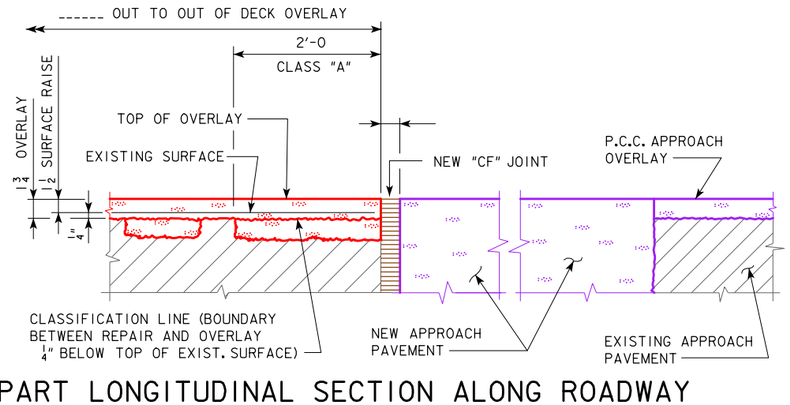

PART LONGITUDINAL SECTION ALONG ROADWAY

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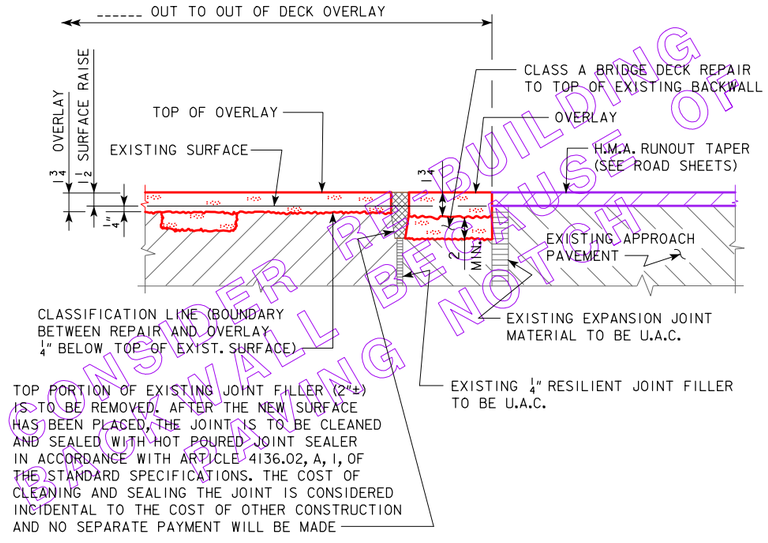

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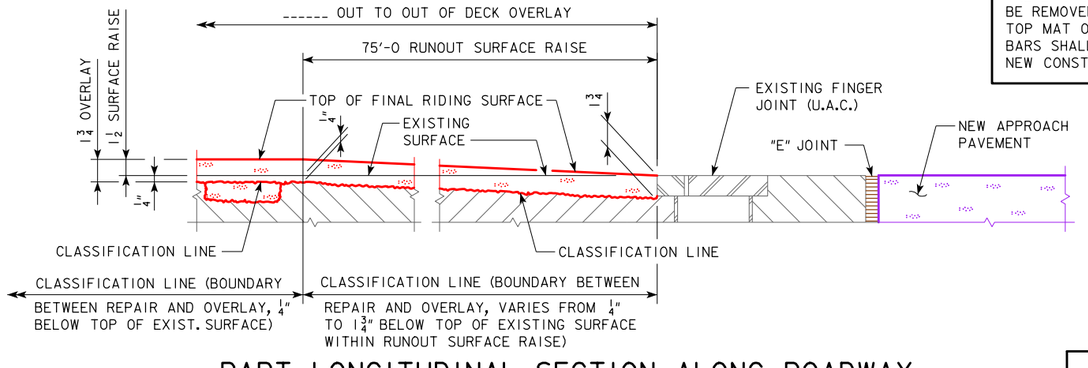

PART LONGITUDINAL SECTION ALONG ROADWAY

------ ABUTMENT

NOTE:
THE 2'-0 CLASS "A" REPAIR AREA SHOWN AT THE JOINT SHALL BE REMOVED TO A MINIMUM DEPTH 1 INCH BELOW THE EXISTING TOP MAT OF REINFORCING. THE EXISTING BRIDGE DECK REINFORCING BARS SHALL BE CAREFULLY EXPOSED AND INCORPORATED INTO THE NEW CONSTRUCTION WORK.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	DECK REPAIR DETAILS	STANDARD SHEET 1040	COUNTY	PROJECT NUMBER	SHEET NUMBER

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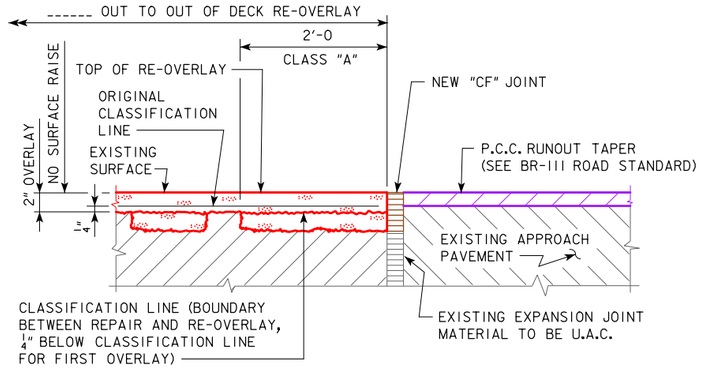

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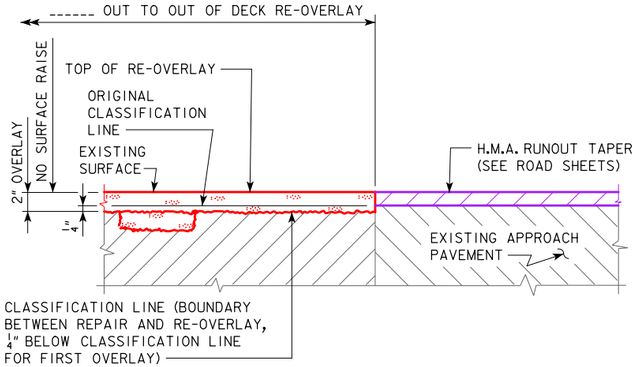

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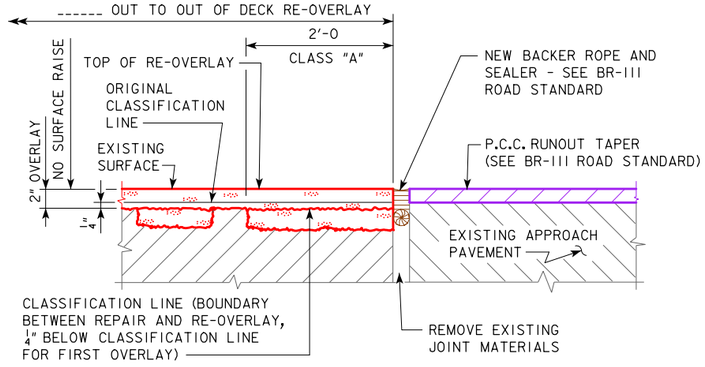

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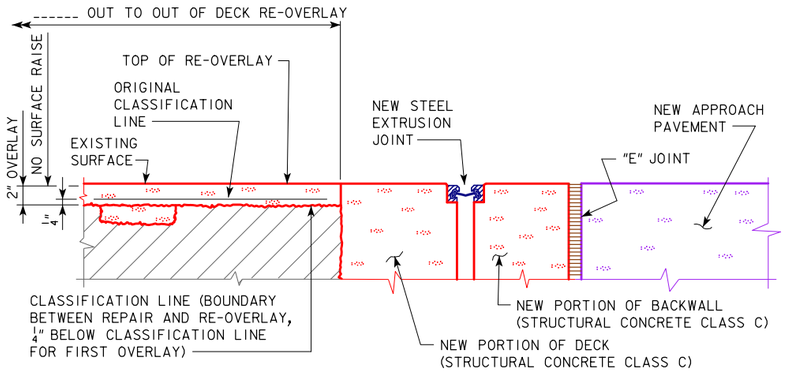

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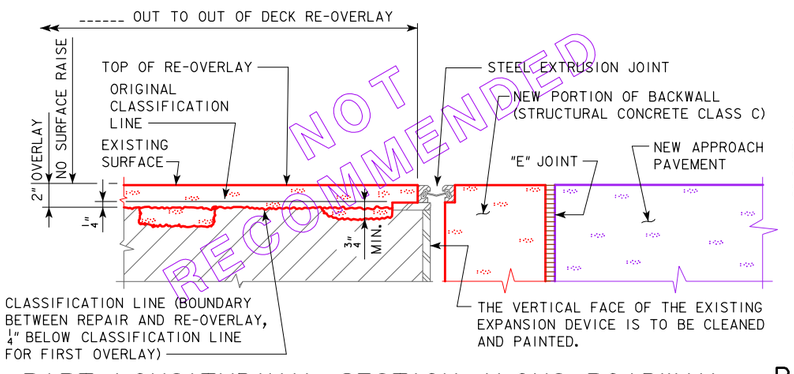

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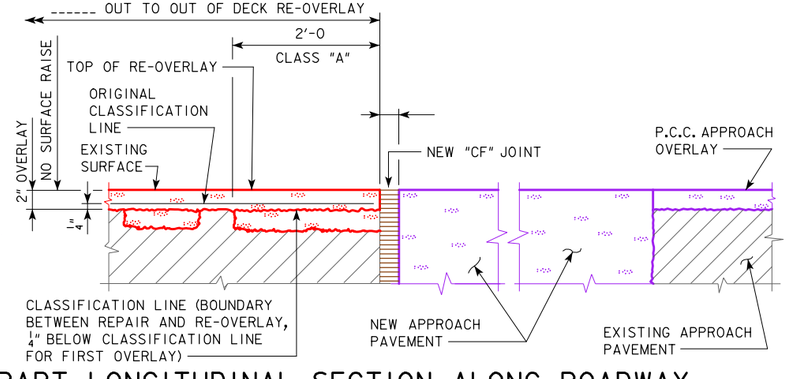

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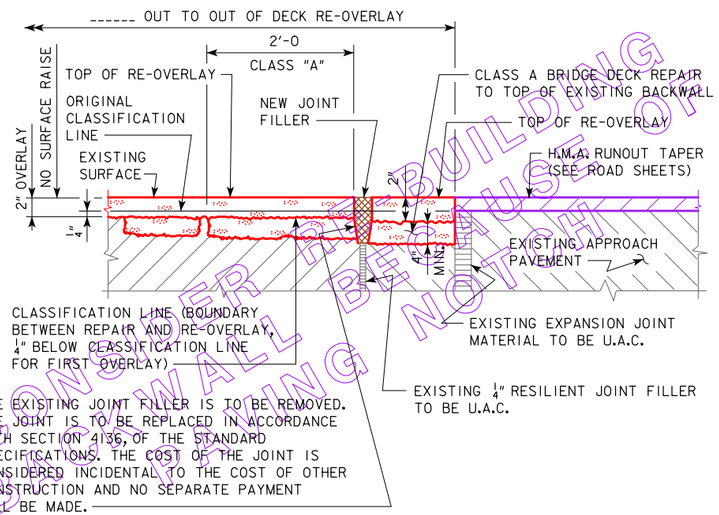

PART LONGITUDINAL SECTION ALONG ROADWAY

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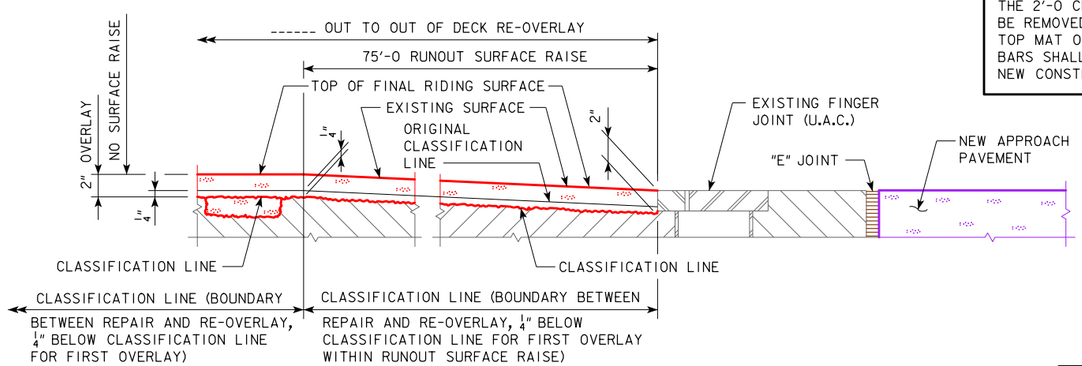

PART LONGITUDINAL SECTION ALONG ROADWAY

TYPICAL BOTH ABUTMENTS

NOTE:
THE 2'-0 CLASS "A" REPAIR AREA SHOWN AT THE JOINT SHALL BE REMOVED TO A MINIMUM DEPTH 1 INCH BELOW THE EXISTING TOP MAT OF REINFORCING. THE EXISTING BRIDGE DECK REINFORCING BARS SHALL BE CAREFULLY EXPOSED AND INCORPORATED INTO THE NEW CONSTRUCTION WORK.

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 03-2017 - CHANGED REFERENCE TO ROAD STANDARD BR-111. (WAS RK-17). CHANGED NOTE STATING "EXISTING 1/4" RESILIENT JOINT FILLER TO BE U.A.C." (WAS PREFORMED JOINT FILLER).
ENGLISHREPAIRRETROFITBRIDGES.DGN 1040R - THIS SHEET ISSUED 10-12.

DESIGN TEAM	RE-OVERLAY DECK REPAIR DETAILS	STANDARD SHEET 1040R	COUNTY	PROJECT NUMBER	SHEET NUMBER

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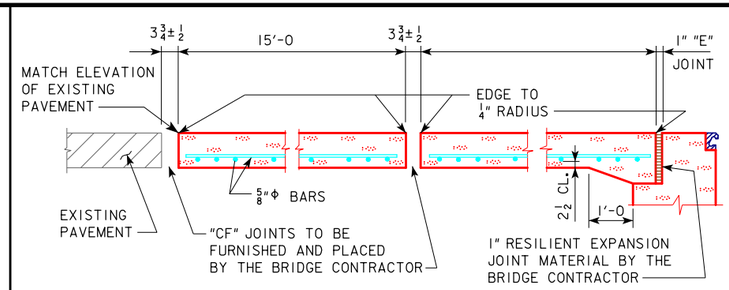
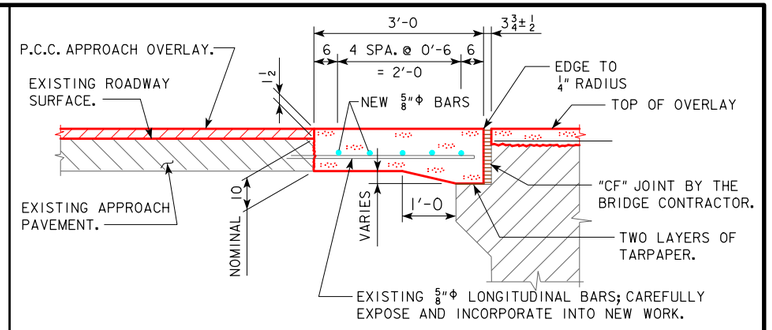
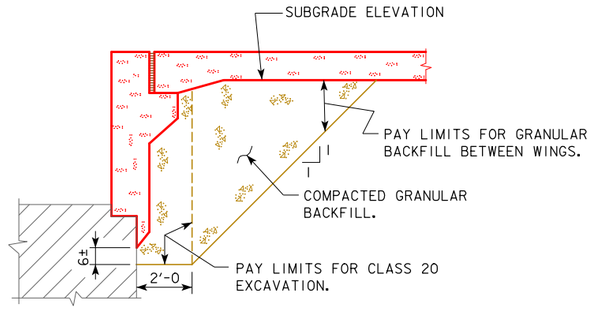
REVISED: ROAD STANDARD DESIGNATION DELETED FROM NOTES. ARCH. TAPE NO. 9 DATED 7-12-89.
REVISED 03-2017 - CHANGED NOTE STATING "1" RESILIENT EXPANSION JOINT MATERIAL BY THE BRIDGE CONTRACTOR" (WAS PREFORMED EXPANSION JOINT FILLER).
ENGLISHREPAIRRETROFITBRIDGES.DGN 1042 - THIS SHEET REDRAWN 9-8-88.



PART LONGITUDINAL SECTION THRU APPROACH PAVEMENT



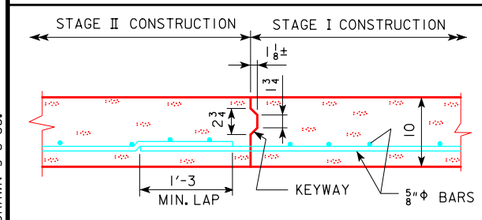
SECTION B-B



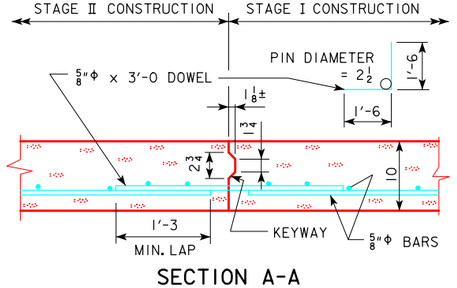
GRANULAR BACKFILL DETAILS

APPROACH PAVEMENT DETAILS

REQUIRED AT



SECTION A-A



SECTION A-A

NOTE:
THE 5/8"Φ x 3'-0 DOWEL SHALL BE FABRICATED AS A BENT BAR. AFTER STAGE II PAVEMENT REMOVAL THE 5/8"Φ DOWEL SHALL BE STRAIGHTENED TO LAP WITH THE 5/8"Φ TRANSVERSE BARS.

APPROACH PAVEMENT QUANTITIES

LOCATION	QUANTITY
ABUTMENT - STAGE I	
ABUTMENT - STAGE II	
TOTAL (SQ. YD.)	

NOTE:
ALL APPROACH PAVEMENT REINFORCING IS TO BE #5 BARS. APPROACH PAVEMENT REINFORCING AND JOINT MATERIAL TO BE INCLUDED IN PRICE BID FOR "BRIDGE APPROACH SECTION REINFORCED AS PER PLAN".

THE "E" JOINTS SHALL BE SEALED AS DIRECTED BY THE ENGINEER. THE SEALER SHALL BE AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

THE CONCRETE USED FOR THE APPROACH PAVEMENT SHALL BE PAVEMENT MIX AND PLACED IN ACCORDANCE WITH THE CURRENT SPECIFICATIONS FOR CONCRETE PAVING, INCLUDING VIBRATION.

SEE THE FOLLOWING IOWA D.O.T. ROAD STANDARDS FOR DETAILS OF JOINT MATERIALS:

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	DECK REPAIR - APPROACH PAVEMENT	STANDARD SHEET 1042	COUNTY	PROJECT NUMBER	SHEET NUMBER

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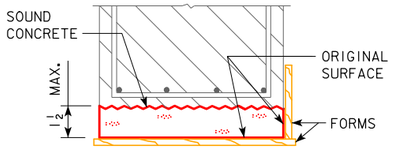
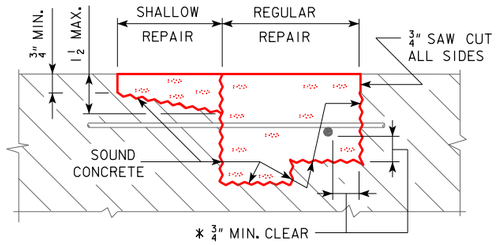
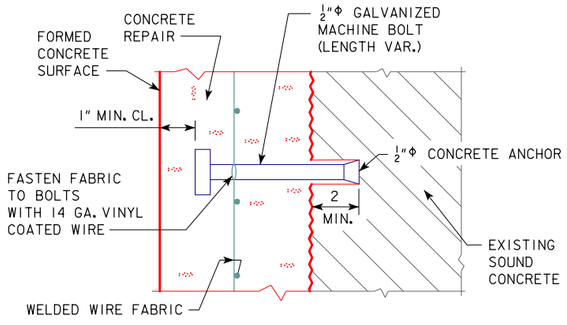


SHALLOW REPAIR BOTTOM SURFACE



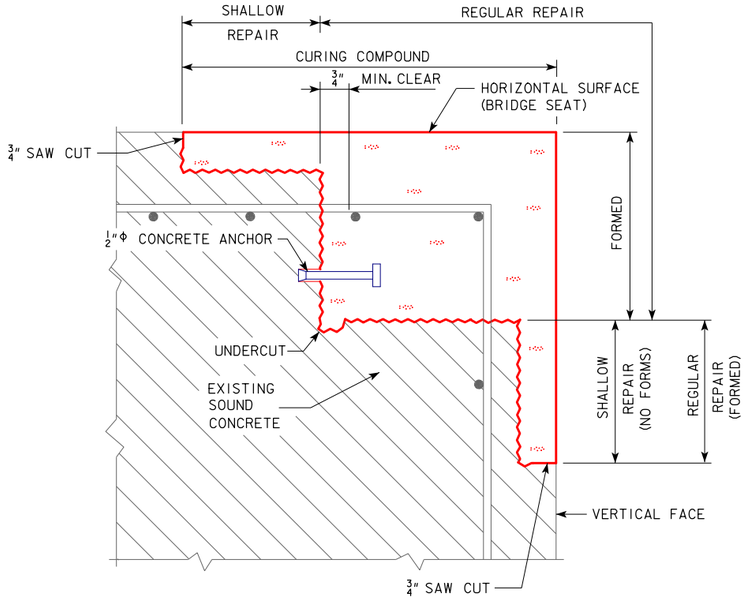
REPAIR DEFINITION

* INDICATES CLEARANCE FOR AN UN-BONDED REBAR.

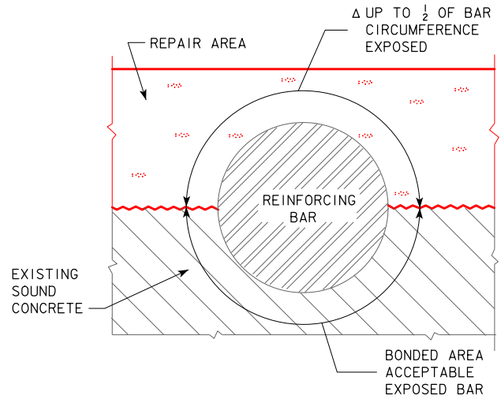


ANCHOR DETAIL

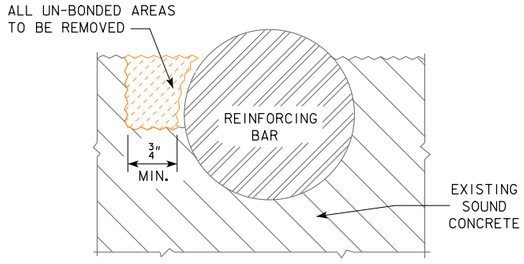
FOR SPACING AND USE OF CONCRETE ANCHORS AND WWF SEE THE REPAIR NOTES.



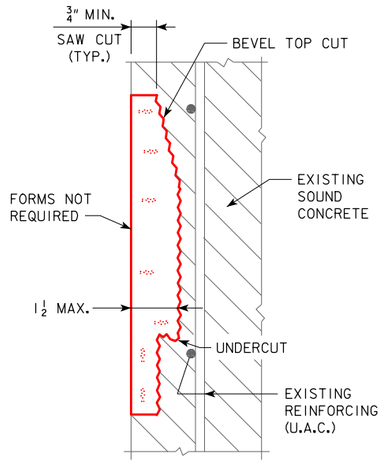
CORNER REPAIR



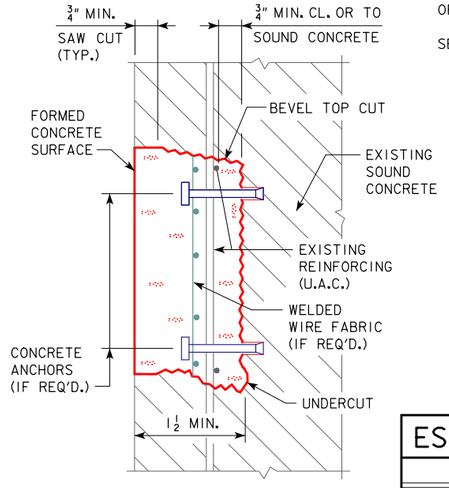
Δ IF MORE THAN 1/2 OF THE REBAR IS EXPOSED IT SHALL BE TREATED AS AN UN-BONDED REBAR.



CONCRETE REMOVAL ADJACENT TO REINFORCING



SHALLOW REPAIR VERTICAL FACE



REGULAR REPAIR VERTICAL FACE

REPAIR NOTES:

THE SPALLED AND HOLLOW AREAS OF THIS BRIDGE AS NOTED AND SHOWN IN THESE PLANS SHALL BE REPAIRED AS FOLLOWS:

ALL THE COSTS OF EQUIPMENT AND MATERIALS REQUIRED TO REPAIR THE SPALLED AND HOLLOW AREAS OF THIS BRIDGE SHALL BE INCLUDED IN THE PRICE BID FOR "CONCRETE REPAIR".

THE PRICE BID FOR "CONCRETE REPAIR" SHALL INCLUDE THE COST OF ALL CONCRETE ANCHORS AND WELDED WIRE FABRIC REQUIRED BY THE PLANS.

THE ENGINEER SHALL DETERMINE AND OUTLINE BY VISUAL AND AUDIBLE INSPECTION THE ACTUAL AREAS OF THE CONCRETE REPAIRS. THE CONTRACTOR SHALL BE PAID FOR THE ACTUAL AMOUNT OF REPAIRS MADE ON A SQUARE FOOT BASIS BASED ON THE PRICE BID PER SQUARE FOOT.

ALL EXISTING REINFORCING BARS THAT ARE EXPOSED BY CONCRETE REMOVAL SHALL BE CLEANED AND CAREFULLY INCORPORATED INTO THE NEW WORK, EXCEPT BADLY DETERIORATED EXISTING REINFORCING WHICH SHALL BE REPLACED AS DIRECTED BY THE ENGINEER.

THE CONCRETE ANCHORS REQUIRED SHALL HAVE A MINIMUM PULL OUT OF 5000 LBS. BASED ON 4000 PSI CONCRETE. AN ANCHOR MEETING THE REQUIREMENTS OF IOWA D.O.T. MATERIALS I.M. 453.09 AND THE PULL OUT LOAD ABOVE IS REQUIRED. THE ANCHORS SHALL BE GALVANIZED AND SHALL BE INSTALLED ACCORDING TO RECOMMENDATIONS OF THE MANUFACTURER. THE COST OF FURNISHING AND INSTALLING THE CONCRETE ANCHORS SHALL BE INCLUDED IN THE PRICE BID FOR "CONCRETE REPAIR".

THE WELDED WIRE FABRIC SHALL BE ASTM A185 AND GALVANIZED AS PER ASTM A-641. THE WWF WIRES SHALL BE SPACED 3 x 3 OR 4 x 4 AND THE WIRES SHALL HAVE A NOMINAL AREA OF 0.014 TO 0.029 SQUARE INCHES INCLUSIVE, EXAMPLE "WWF 3 x 3 - W1.4 x W2.9".

WHERE REINFORCEMENT HAS BEEN EXPOSED AND CLEARANCE AROUND THE PERIPHERY OF THE EXISTING BAR IS PROVIDED NO SUPPLEMENTAL REINFORCING IS REQUIRED, EXCEPT WHERE EXISTING REINFORCEMENT DENSITY AND PATTERN ARE SUCH THAT INDIVIDUAL OPEN SPACES BETWEEN BARS ARE OF 1.5 SQUARE FOOT OR LARGER. FOR THIS CONDITION 1/2"Φ CONCRETE ANCHORS AND WELDED WIRE FABRIC SHALL BE INSTALLED AT THE RATE OF ONE CONCRETE ANCHOR WITH WWF PER EACH 1.5 SQUARE FEET OF AREA WITHIN EACH OPEN SPACE.

REPAIRING THE STRUCTURAL CONCRETE SHALL BE IN ACCORDANCE WITH SECTION 2426, OF THE STANDARD SPECIFICATIONS.

CONCRETE PLACEMENT QUANTITIES

MARK	TYPE	UNITS	QUANTITY
(1)	SHALLOW REPAIR	SQ. FT.	
(2)	REGULAR REPAIR	SQ. FT.	
	TOTAL (SQ. FT.)		

ESTIMATED CONCRETE REPAIR QUANTITIES

DESCRIPTION	UNITS	AMOUNT
CONCRETE REPAIR	SQ. FT.	

CONCRETE REPAIRS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

REVISED 10-14 - DELETED ALL REFERENCES TO GROUT. SECTION 2426 COVERS THIS REQUIREMENT AND DOESN'T NEED TO STATED ON THE PLANS.
ENGLISHREPAIRRETROFITBRIDGES.DGN 1045 - THIS SHEET REDRAWN 9-27-90.

DESIGN TEAM	STANDARD SHEET 1045	COUNTY	PROJECT NUMBER	SHEET NUMBER

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BEAM END REPAIR NOTES:

IT IS ESTIMATED THAT ????? BEAM END WILL BE REPAIRED. THE FINAL QUANTITY AND LIMITS OF BEAM END AREAS SHALL BE DETERMINED BY THE ENGINEER.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN CONCRETE REMOVALS ARE COMPLETE BY EACH LOCATION TO ALLOW INSPECTION BY THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE OR REPAIR MORTAR.

THE CONTRACTOR SHALL REPORT TENDON OR REINFORCING BAR SECTION LOSS, EXPOSED DURING REMOVAL WORK, TO THE ENGINEER PRIOR TO PERFORMING ANY REPAIR WORK. THE ENGINEER SHALL BE GIVEN ADEQUATE TIME (7 DAYS MAX.) TO DETERMINE WHETHER BEAM REINFORCING IS REQUIRED. THE CONTRACTOR SHALL INCORPORATE THIS TIME INTO THE CONSTRUCTION SCHEDULE WITH WORK IN OTHER AREAS OF THE PROJECT IN ORDER TO NOT DELAY THE PROJECT.

REMOVAL TOOLS SHALL BE LIMITED TO 15 LB. CHIPPING HAMMERS AND TO HAND TOOLS WITHOUT POWER.

THE CONTRACTOR SHALL PERFORM THE CONCRETE REPAIR WORK IN ACCORDANCE WITH THE FOLLOWING PROCEDURES AND/OR AS DIRECTED BY THE ENGINEER:

1. INITIATE REMOVAL OF UNSOUND CONCRETE WITH $\frac{1}{2}$" SAW CUTS AT PERIMETER. DO NOT CROSS CUT AT CORNERS. STOP SAW CUTS SHORT OF CORNERS AND REMOVE CONCRETE BY HAND. ADJUST DEPTH OF SAW CUT AS REQUIRED TO PREVENT CUTTING OF EXISTING REINFORCING STEEL OR STRANDS. EXTREME CARE SHALL BE EXERCISED DURING CONCRETE REMOVAL SO THAT EXPOSED STRANDS AND REINFORCING BARS ARE NOT DAMAGED. ANY DAMAGE DONE TO THE STRANDS OR BARS BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE STATE.

2. REMOVE DETERIORATED AREAS TO SOUND CONCRETE AND CHIP SQUARE. BOUNDARIES TO BE SQUARE WITH NO FEATHERED EDGES. SANDBLAST CONCRETE SURFACES IN THE REPAIR AREA AND THE EXPOSED STEEL TO BARE METAL. REMOVE ALL DUST AND DEBRIS RESULTING FROM CHIPPING AND BLASTING BY USING CLEAN COMPRESSED AIR.

3. IF CONCRETE REMOVAL RESULTS IN MORE THAN HALF THE DIAMETER OF ANY REINFORCING BAR OR PRESTRESSING STRAND BEING EXPOSED, THEN REMOVAL SHALL CONTINUE TO A MINIMUM OF $\frac{3}{4}$" BEHIND THE FIRST INTERIOR STRAND. IF REMOVALS COULD EXCEED THE 5" MAXIMUM HORIZONTAL DEPTH, CONTACT THE ENGINEER PRIOR TO REMOVAL.

4. REPORT TO THE ENGINEER, PRIOR TO REPAIR, SECTION LOSS OF TENDONS OR REINFORCING STEEL EXPOSED DURING REMOVALS.

5. APPLY TWO COATS OF PROTECTIVE COATING/BONDING AGENT (PRODUCTS ARE LISTED IN THE TABLE ON THIS SHEET) TO EXPOSED PRESTRESSING STRANDS AND REINFORCING BARS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

6. APPLY PATCHING MATERIAL. TYPE OF MATERIAL AND APPLICATION OF MATERIAL DEPENDS UPON THE EXTENT OF CONCRETE REMOVAL AND THE TWO TYPES OF REPAIR ARE TO BE AS FOLLOWS:

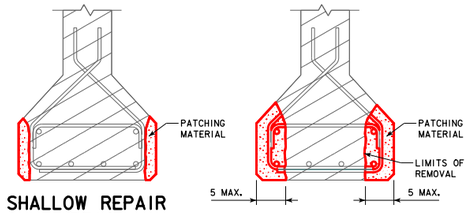
A. SHALLOW REPAIR:
SHALLOW REPAIR AREAS ARE THOSE WHERE CONCRETE REMOVAL DID NOT RESULT IN REINFORCING BARS OR PRESTRESSING STRANDS BEING EXPOSED FOR MORE THAN HALF THEIR DIAMETERS. PATCHING MATERIAL SHALL BE AS LISTED IN THE TABLE ON THIS SHEET. PATCHING MATERIALS CONTAIN CORROSION INHIBITORS. APPLY PATCHING MATERIAL TO MATCH ORIGINAL BEAM SURFACE. PATCH NEED NOT BE FORMED. FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR MIXING, PLACING AND CURING.

B. REGULAR REPAIR:
REGULAR REPAIR AREAS ARE THOSE WHERE CONCRETE REMOVAL EXTENDED BEHIND THE REINFORCING BARS AND/OR PRESTRESSING STRANDS. THESE AREAS ARE TO BE PLACED USING FORMS TO MATCH THE ORIGINAL BEAM SURFACE. PATCHING MATERIAL SHALL BE ONE OF THE GROUTS AS LISTED IN THE TABLE ON THIS SHEET. PATCHING MATERIALS CONTAIN CORROSION INHIBITORS. FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR MIXING, PLACING AND CURING. FORMS ARE TO REMAIN IN PLACE FOR SEVEN DAYS.

7. SANDBLAST 6 FEET OF THE ENDS OF THE REPAIRED BEAMS AS SHOWN ON THIS SHEET. THE SANDBLASTING SHALL BE A LIGHT BLAST JUST ENOUGH TO EXPOSE THE FINE AGGREGATES. DO NOT SANDBLAST PATCHING MATERIAL. ALL COSTS ASSOCIATED WITH SANDBLASTING ARE TO BE INCLUDED IN THE PRICE BID FOR "REPAIR BEAM ENDS".

8. APPLY CONCRETE SEALER TO SANDBLASTED PORTIONS OF BEAMS ENDS. DO NOT SEAL PATCHING MATERIAL.

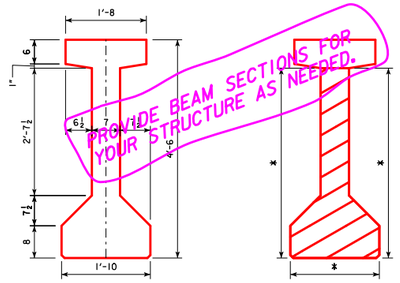
ALL COSTS INCLUDE EQUIPMENT AND MATERIALS REQUIRED TO REPAIR DETERIORATED BEAM ENDS AS DETAILED IN THESE PLANS. THESE DETAILS SHALL BE INCLUDED IN THE PRICE BID FOR "REPAIR BEAM ENDS". THE ENGINEER WILL COUNT EACH END OF EACH BEAM PROPERLY REPAIRED, AND THE CONTRACTOR WILL BE PAID THE CONTRACT UNIT PRICE PER EACH REPAIR.



SHALLOW REPAIR AREAS

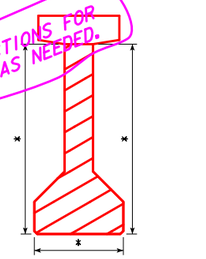
REGULAR REPAIR AREAS

NOTE: THE REPAIR AREAS SHOWN ARE SCHEMATIC ONLY. THE ACTUAL AREA TO BE REPAIRED WILL BE DETERMINED BY THE ENGINEER. FOR LOCATION OF BEAM ENDS TO BE REPAIRED SEE BEAM LAYOUT BELOW.



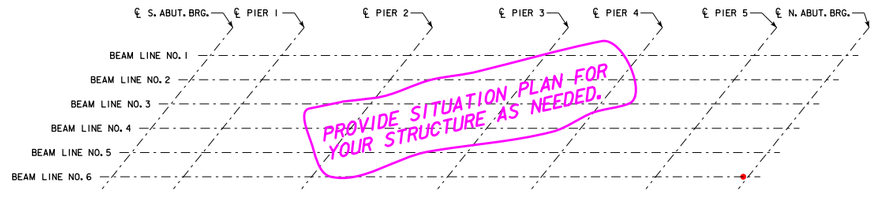
BEAM SECTION

PROVIDE BEAM SECTIONS FOR YOUR STRUCTURE AS NEEDED.



LIMITS OF SANDBLASTING

* SANDBLAST THE SURFACES OF THE BOTTOM FLANGE AND WEB WITHIN THE LIMITS SHOWN TO 6 FEET OF THE BEAM ENDS.



PROVIDE SITUATION PLAN FOR YOUR STRUCTURE AS NEEDED.

● - REGULAR BEAM END REPAIR LOCATIONS

S - SHALLOW BEAM END REPAIR LOCATIONS

BEAM LAYOUT

PROVIDE PRODUCT AND MANUFACTURERS AS NEEDED.

TABLE OF MANUFACTURERS			
MANUFACTURER	BONDING AGENT	SHALLOW REPAIR	REGULAR REPAIR
BASF	MASTEREMACO P 124	MASTEREMACO N 350 CI	MASTEREMACO S 477CI
EUCLID	DURALPREP A.C.	VERTICOAT SUPREME	EUCOREPAIR SCC
SIKA	SIKA ARMATEC 110 EPOCEM	SIKATOP 123 PLUS	SIKATOP 111 PLUS

BEAM END REPAIR DTLS. & NOTES

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRESTRESSED CONCRETE BEAM END REPAIR DETAILS	STANDARD SHEET 1055	COUNTY	PROJECT NUMBER	SHEET NUMBER

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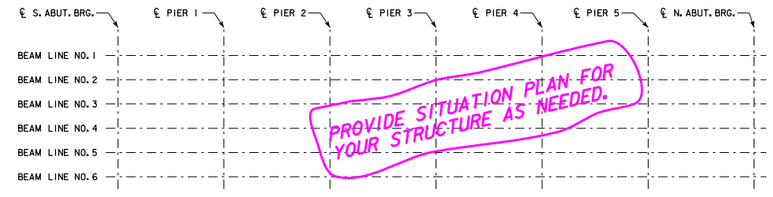
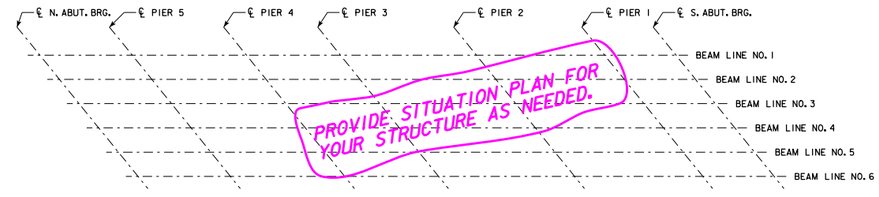


PROVIDE SITUATION PLAN FOR YOUR STRUCTURE AS NEEDED.



PROVIDE SITUATION PLAN FOR YOUR STRUCTURE AS NEEDED.

BEAM REPAIR NOTES:

REFER TO ARTICLE 2426 OF THE STANDARD SPECIFICATIONS FOR MATERIALS AND CONSTRUCTION METHODS THAT ARE ADEQUATE FOR STRUCTURAL CONCRETE REPAIR OF THE DAMAGED BEAMS. BONDING GROUT WILL NOT BE REQUIRED.

REFER TO ARTICLE 2426.03, B OF THE STANDARD SPECIFICATION FOR SURFACE PREPARATION REQUIREMENTS WHEN THE REINFORCING STEEL HAS BEEN EXPOSED AS A RESULT OF CONCRETE SPALLING OR REMOVAL OF LOOSE AND UNSOUND CONCRETE.

PREPARE THE SURFACE OF THE OLD CONCRETE BY REMOVING ALL LOOSE, DISINTEGRATED OR UNSOUND CONCRETE FROM THE BEAM AS SHOWN ON THESE PLANS AND AS DESIGNATED BY THE ENGINEER. ALL CONCRETE REMOVALS SHALL BE COMPLETE BEFORE COMMENCING PLACEMENT OF NEW CONCRETE. EDGE OF REPAIR AREA SHALL BE SAWCUT $\frac{3}{4}$" DEEP.

WHEN SURFACE PREPARATION AND CLEANING IS COMPLETE THE NECESSARY FORMS ARE TO BE INSTALLED. FORMS SHALL BE POSITIVELY HELD IN THE PROPER POSITION TO RESTORE BEAM TO ORIGINAL DIMENSIONS.

PRIOR TO CONCRETE PLACEMENT TRAFFIC ON ???? SHALL BE SHIFTED TO ONE LANE AWAY FROM THE BEAM(S) UNDER REPAIR. TRAFFIC SHALL BE MAINTAINED IN ONE LANE FOR A 24 HOUR CONCRETE CURING PERIOD. RESTORATION OF THE BEAM CROSS-SECTION SHALL BE DONE IN TWO STAGES ON THE ?? BOUND ???? BRIDGE TO SHIFT LIVE LOAD AWAY FROM THE BEAM(S) UNDER REPAIR FOR THE 24 HOURS OF CONCRETE CURING.

ALL CONCRETE SHALL BE CLASS "O" STRUCTURAL CONCRETE.

THE COARSE AGGREGATE SHALL BE AS DESCRIBED IN ARTICLE 4115.05 OF THE STANDARD SPECIFICATIONS ($\frac{1}{2}$" MAXIMUM SIZE).

THE REPAIRED SURFACES SHALL BE CURED BY LEAVING THE FORMS IN PLACE AND ANY EXPOSED CONCRETE COVERED WITH WET BURLAP FOR AT LEAST 7 DAYS.

SPECIFICATIONS FOR FIBER REINFORCED POLYMER (FRP) REPAIR OF BEAMS ARE INCLUDED IN THE DEVELOPMENTAL SPECIFICATIONS FOR "FIBER REINFORCED POLYMER REPAIR FOR CONCRETE CONTAINMENT OF COLLISION DAMAGED PRETENSIONED PRESTRESSED CONCRETE BEAMS". THE MANUFACTURER OF FRP LAMINATES SHOULD BE PRESENT TO ADVISE THE BRIDGE CONTRACTOR ON APPLICATION AND PLACEMENT OF FRP LAMINATES.

ALL COSTS ASSOCIATED WITH THE FOLLOWING SHALL BE INCLUDED IN THE PRICE BID FOR "BEAM REPAIR, AS PER PLAN":

A. REMOVAL OF UNSOUND OR LOOSE CONCRETE, PREPARING, AND CLEANING REPAIR AREAS.

B. REMOVAL OF EXISTING DAMAGED FRP LAMINATES.

C. RESTORING BEAM TO ITS ORIGINAL CROSS SECTIONAL DIMENSIONS WITH CONCRETE AS NOTED AND SHOWN IN THE PLANS.

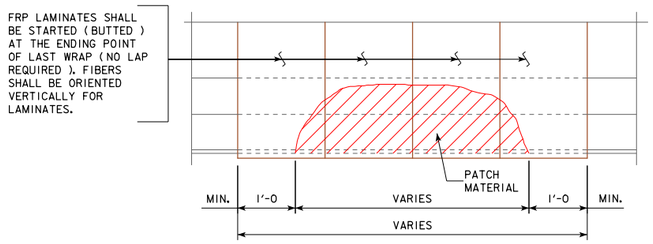
D. APPLICATION OF FIBER REINFORCED POLYMER LAMINATES TO THE BEAM AS SHOWN IN THE PLANS AND DEVELOPMENTAL SPECIFICATIONS FOR "FIBER REINFORCED POLYMER REPAIR FOR CONCRETE CONTAINMENT OF COLLISION DAMAGED PRETENSIONED PRESTRESSED CONCRETE BEAMS."

EPOXY INJECTION OF CRACKS DUE TO BEAM COLLISION DAMAGE WILL BE DONE BY IOWA D.O.T. PERSONNEL. COORDINATION WILL BE REQUIRED WITH IOWA D.O.T. PERSONNEL TO ALLOW FOR THE EPOXY INJECTION OF CRACKS AFTER THE CONCRETE PATCH HAS CURED AND BEFORE APPLICATION OF FRP LAMINATES.

FRP LAMINATE REPLACEMENT

THE PORTIONS OF DAMAGED FRP LAMINATE ON BEAM #?? ?? BOUND ???? SHALL BE REMOVED BY GRINDING. CARE SHALL BE TAKEN DURING GRINDING SO CONCRETE SURFACE OF BEAMS IS NOT DAMAGED. REMOVAL SHALL BE TO STRAIGHT LINES PARALLEL TO THE LONGITUDINAL OR TRANSVERSE AXIS OF THE BEAM. LIMITS OF REMOVAL SHALL BE A MINIMUM OF 6 INCHES BEYOND WHERE DAMAGE IS DETECTED. WHERE OVERLAP OF THE FRP LAMINATES ARE NECESSARY, THE EXISTING FRP LAMINATE TO RECEIVE THE LAP SHALL HAVE ALL PAINT REMOVED AND FRP LAMINATE ROUGHENED WITHIN THE LIMITS OF THE LAP. THE SURFACE PREPARATION AND FRP LAMINATE APPLICATION SHALL CONFORM TO THE REQUIREMENTS OF THE DEVELOPMENTAL SPECIFICATIONS FOR "FIBER REINFORCED POLYMER REPAIR FOR CONCRETE CONTAINMENT OF COLLISION DAMAGED PRETENSIONED PRESTRESSED CONCRETE BEAMS". ALL COSTS ASSOCIATED WITH THE FRP LAMINATE REPLACEMENT SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "BEAM REPAIR, AS PER PLAN".

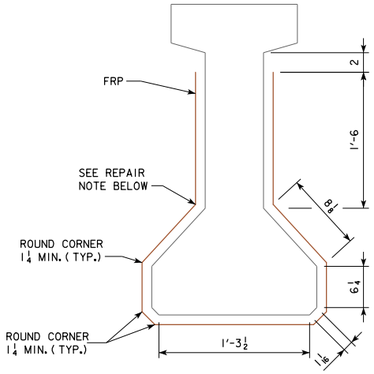
THE CURE TIME FOR THE REPAIRS SHALL FOLLOW WHAT IS RECOMMENDED BY THE FRP MANUFACTURER.



IMPACT AREA REPAIR DETAIL

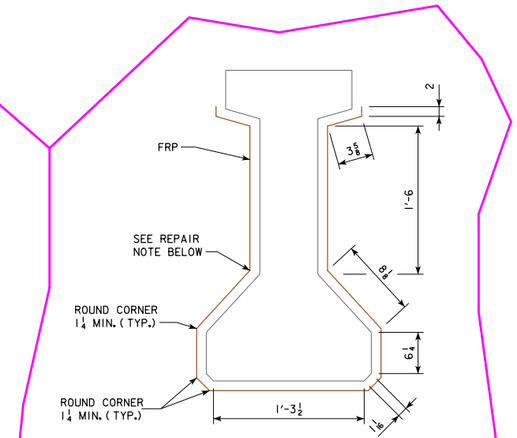
(TYPICAL)

SEE ADDITIONAL DETAIL OUTSIDE OF SHEET BORDER.



TYPICAL SECTION THRU WRAPPED BEAM

REPAIR NOTE:
ALL INTERIOR CORNERS SHALL BE GROUND SMOOTH TO ENSURE PROPER ADHESION BETWEEN THE FRP LAMINATE AND CONCRETE SURFACE.



TYPICAL SECTION THRU WRAPPED BEAM

REPAIR DETAILS FOR BEAM NO. ??, ??, ?? AND ?? ON ?? BOUND ???? AND NO. ?? ON ?? BOUND ????

FRP = FIBER REINFORCED POLYMER

BEAM FRP REPAIR DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRESTRESSED CONCRETE BEAM FRP REPAIR DETAILS	STANDARD SHEET 1057s1	COUNTY	PROJECT NUMBER	SHEET NUMBER

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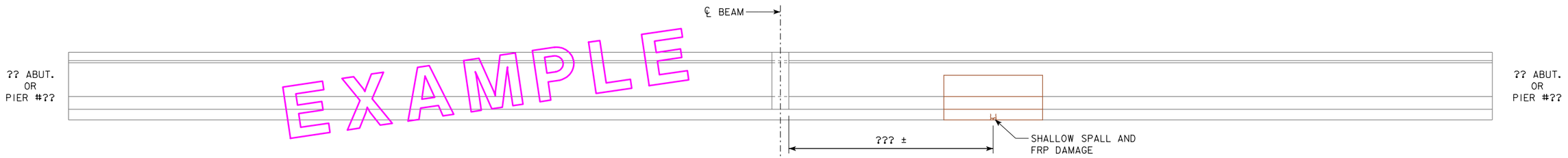
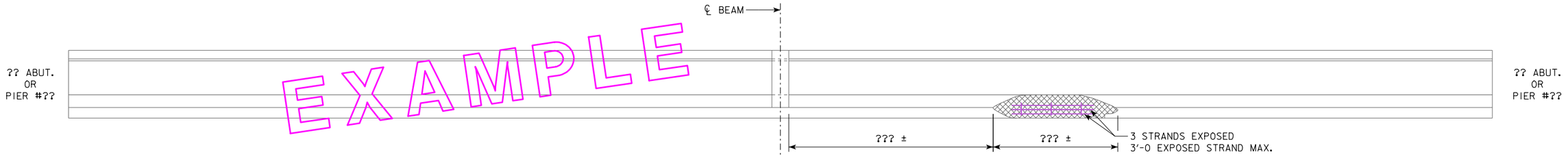
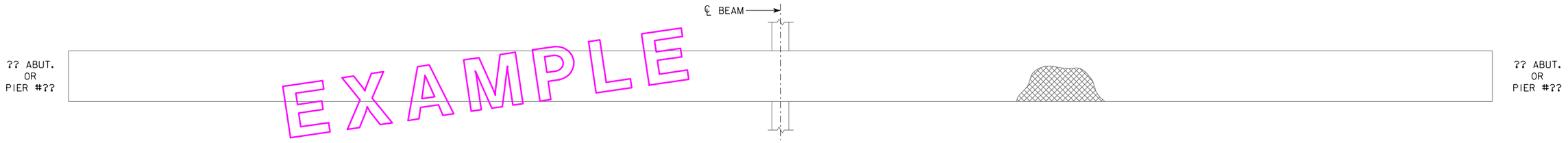


?? BOUND ???? BEAM #?? LOOKING NORTH



?? BOUND ???? BEAM #?? LOOKING NORTH



?? BOUND ???? BEAM #?? BOTTOM VIEW

HOLLOW CONCRETE

SPALLED CONCRETE

FRP = FIBER REINFORCED POLYMER

BEAM FRP REPAIR DETAILS

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	PRESTRESSED CONCRETE BEAM FRP REPAIR DETAILS	STANDARD SHEET 1057s2	COUNTY	PROJECT NUMBER	SHEET NUMBER

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