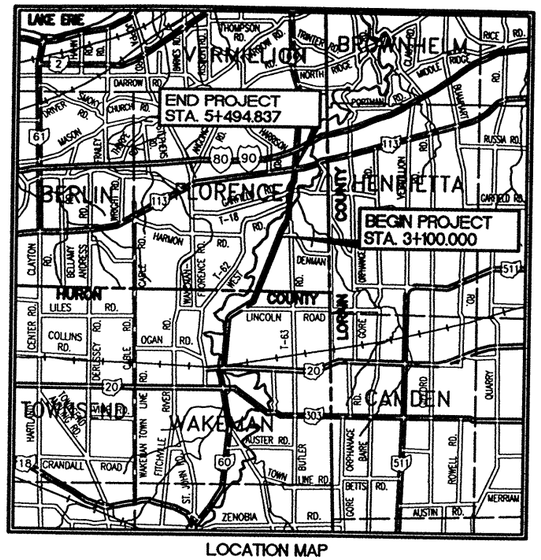

LOCATION MAP

LATITUDE: N 41°19'15" LONGITUDE: W 82°21'45"

0 10 20 30 40

SCALE IN KILOMETERS

PORTION TO BE IMPROVED _ _ _ _ _ _ _ _

STATE & FEDERAL ROUTES _ _ _ _ _ _ _ _

OTHER ROADS _ _ _ _ _ _ _ _ _ _ _ _ _

DESIGN DESIGNATION

CURRENT YEAR A.D.T. (2000)	2730
DESIGN YEAR A.D.T. (2020)	4110
DESIGN HOURLY VOLUME (2020)	411
DIRECTIONAL DISTRIBUTION	55%
TRUCKS (24 HOUR B & C)	4%
DESIGN SPEED	90 KM/H SOUTH OF WEST RD. 70 KM/H NORTH OF WEST RD.
LEGAL SPEED	55 MPH SOUTH OF WEST RD. 40 MPH NORTH OF WEST RD.
DESIGN FUNCTIONAL CLASSIFICATION	RURAL MAJOR COLLECTOR

DESIGN EXCEPTIONS NONE REQUIRED

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

ERI-60-3.100

FLORENCE TOWNSHIP
ERIE COUNTY

INDEX OF SHEETS:

metric units

PROJECT DESCRIPTION

RECONSTRUCTION AND RELOCATION OF 2.40 KILOMETERS OF S.R. 60 SOUTH OF THE INTERSECTION WITH S.R. 113, INCLUDING RELOCATION OF THE EXISTING BRIDGE WITH A NEW BRIDGE OVER THE VERMILION RIVER WEST OF THE PRESENT LOCATION; CONSTRUCTION OF THREE RETAINING WALLS AT EACH END OF THE NEW BRIDGE; REPLACEMENT OF EXISTING CULVERT WITH A NEW CULVERT NORTH OF GARFIELD ROAD; REALIGNMENT OF SEVERAL LOCAL ROADS; AND INSTALLATION OF NECESSARY SIGNING AND PAVEMENT MARKING.

1997 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

MAINTENANCE OF TRAFFIC ENDORSEMENT

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE PART TIME CLOSING OF THE HIGHWAY TO TRAFFIC, AS NOTED ON SHEET 15, DURING WHICH TIME DETOURS WILL BE PROVIDED AS SHOWN HERE ON. PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

UNDER AUTHORITY OF SECTION 4511.21, DIVISION (1) OF THE OHIO REVISED CODE, THE REVISED PRIMA FACIE SPEED LIMITS AS INDICATED HEREIN ARE DETERMINED TO BE REASONABLE AND SAFE, AND ARE HEREBY ESTABLISHED FOR THE DURATION OF THIS PROJECT. THE PRIMA FACIE SPEED LIMIT OR LIMITS HEREBY ESTABLISHED SHALL BECOME EFFECTIVE WHEN APPROPRIATE SIGNS GIVING NOTICE THEREOF ARE ERECTED.

STRUCTURE PLANS
APPROVED FOR CONSTRUCTION
03-26-02

UNDERGROUND UTILITIES
TWO WORKING DAYS
BEFORE YOU DIG
CALL 1-800-362-2764 (TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

Plan Prepared By:

M-E CIVIL ENGINEERING, INC.
635 Brooksedge Boulevard
Westerville, Ohio 43081

ENGINEERS SEAL:

SIGNED: _____

DATE: _____

SPECIAL PROVISIONS
WATER WAY PERMIT NWP# DATE:

STANDARD CONSTRUCTION DRAWINGS	SUPPLEMENTAL SPECIFICATIONS
AS-1-81 M 10-25-94	
EXJ-4-87 M 02-18-97	
GSD-1-96 M 11-21-97	

APPROVED _____
DATE _____ DISTRICT DEPUTY DIRECTOR

APPROVED _____
DATE _____ DIRECTOR, DEPARTMENT OF TRANSPORTATION

FEDERAL PROJECT NO.

PID NO. 8070

CONSTRUCTION PROJECT NO.

RAILROAD INVOLVEMENT NONE

ERI-60-3.100

1
56

STATIONS AND ELEVATIONS IN PARENTHESIS ARE ENGLISH

END APPR. SLAB STA 3+680.006 (STA 119+71.98)

℄ REAR ABUTMENT STA 3+650.000 (STA 119+35.07)

℄ PIER 1 STA 3+712.00 (STA 121+78.48)

℄ CONSTRUCTION S.R. 60

STA. 3+760.000 S.R.60
STA. 0+763.128℄ DRIVE

CRUSHED AGGREGATE SLOPE PROTECTION

CONST. LIMITS

REFERENCE CHORD**

MATCH LINE STA. 3+760 SEE SHEET 2/18

NOTES:

1. FOR PROPOSED STRUCTURE BLOCK, LEGEND AND HYDRAULIC INFORMATION, SEE SHEET 3/18

2. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.

PLAN

BRIDGE LIMITS = 346.75 m

420.000m VC
PVI STA = 3+580
PVI ELEV = 249.310

(1377.95' VC)
(PVI STA = 117+45.41)
(PVI ELEV = 817.95)

PVI STA 3+580
ELEV. 249.310

STA 3+649.06

1.88% -7.080% 7.600m APPR. SLAB -7.080%

TOP OF SLOPE EL. 238.387m

BOTTOM OF FOOTING EL. 236.860m

DRILLED SHAFT

CRUSHED AGGREGATE SLOPE PROTECTION

3.658m DIA DRILLED SHAFT

APPROXIMATE TOP OF GRAYSHALE, EL. 217.100m EXTENDED 12.192m BELOW

PROP. SLOPE ELEVATIONS

EXISTING GROUND ELEVATIONS

242.263 241.843 241.402 240.939 240.455 239.950 239.423 238.875 238.306 237.715 237.103 236.470

243.778 238.280 233.319 231.900 229.490 228.621

235.85 234.72

255 250 245 240 235 230 225

3+680 **PROFILE ALONG ℄ CONSTRUCTION S.R. 60** 3+720 3+780

SITE PLAN
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

1/18

2/56

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M.E. Companies
635 Brooker Rd. Eastwood
Phone: 419-698-4000

DATE 11/08/01
REVIEWED PAR
STRUCTURE FILE 2202476
DRAWN AEL
REVISED -
DESIGNED ENB
CHECKED TAB

ERIE COUNTY
STA 3+649.06
STA 3+995.76

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STATIONS AND ELEVATIONS IN PARENTHESIS ARE ENGLISH

MATCH LINE STA. 3+760 SEE SHEET 1/18

MATCH LINE STA. 3+890 SEE SHEET 3/18

STA. 3+760.000 S.R.60
STA. 0+763.128, DRIVE

CONST. LIMITS

B-211

B-206

B-207

B-208

S-1

S-2

S-3

REFERENCE CHORD**

PC=0+777.966

PT=0+915.002

℄ PIER 2
STA.3+789.5
(STA 124+32.74)

℄ PIER 3
STA 3+867.00
(STA 126+87.01)

℄ CONSTRUCTION S.R. 60

PC = 3+820.649

3+800

3+840

3+880

2:1

8%

12.916 m O/O

6.0 m

.458 m

227.5

217.5

PC=0+811.056

PROP. DRIVE

EX. FENCE

VERMILION RIVER

R/W

PLAN

PROFILE ALONG ℄ CONSTRUCTION S.R. 60

235.815 | 235.139 | 234.442 | 233.734 | 232.318 | 231.626 | 230.965 | 230.337 | 229.739 | 229.174 | 228.640 | 228.138

BRIDGE LIMITS = 346.75 m

420.000m VC (1377.95' VC)
PVI STA = 3+580 (PVI STA = 117+45.41)
PVI ELEV = 249.310 (PVI ELEV = 817.95)

240.000m VC (787.40' VC)
PVI STA = 3+940 (PVI STA = 129+26.51)
PVI ELEV = 223.822 (PVI ELEV = 734.32)

-7.080%

100 YR. WATER SURFACE ELEV. 219.29

25 YR. WATER SURFACE ELEV. 218.50

EXP

FIX

3.658m DIA DRILLED SHAFT

APPROXIMATE TOP OF GRAYSHALE, EL. 210.6m EXTENDED 10.668m BELOW

APPROXIMATE TOP OF GRAYSHALE, EL. 210.0m EXTENDED 4.572m BELOW

227.456 | 226.968 | 223.167 | 222.292 | 215.467

245 240 235 225 220 215

3+760 3+800 3+840 3+880 3+890

HORIZONTAL CURVE DATA		
	ENGLISH	METRIC
P.I. =	STA 129+45.62	STA 3+945.826
△ =	11°26'14"	11°26'14"
R =	4101.05'	1250m
T =	410.69'	125.177m
L =	818.64'	249.522m

NOTES:

1. FOR PROPOSED STRUCTURE BLOCK, LEGEND AND HYDRAULIC INFORMATION, SEE SHEET 3/18

2. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.

BENCHMARK ELEV. 217.879
"X" CUT ON NORTHWEST CORNER OF SANDSTONE WINGWALL
STA 3+960, 18 m RT.
STA 129+92.13, 59.06' RT.

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M+E Companies
635 Brookside Boulevard
Amherst, OH 44001
Phone 440-988-4600

DESIGNED ENB | DRAWN AEL | REVIEWED PAR | DATE 11/08/01
CHECKED TAB | REVISED - | STRUCTURE FILE 2202476

ERIE COUNTY
STA 3+649.06
STA 3+995.76

SITE PLAN

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

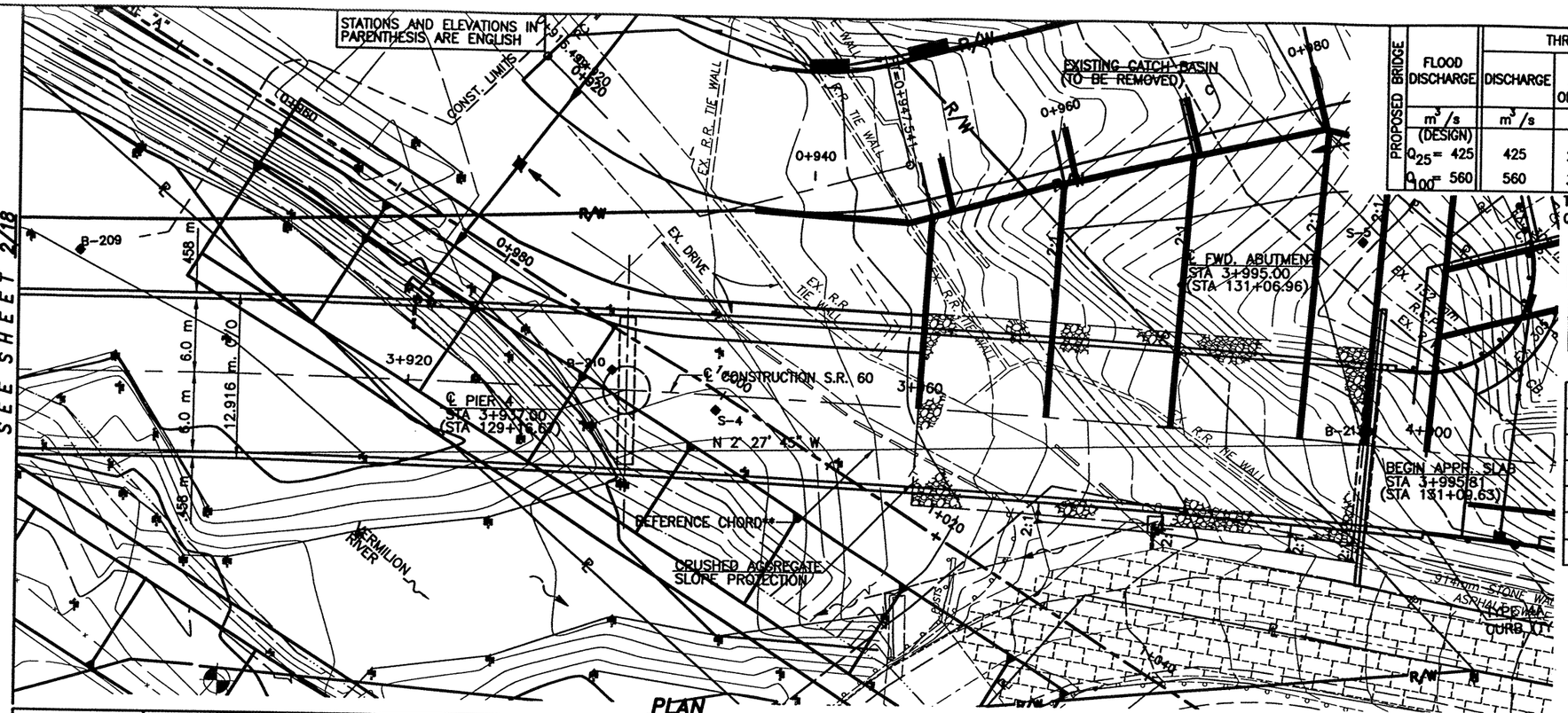
ERI-60-3.100

2/18

3/56

MATCH LINE STA 3+890
SEE SHEET 2/18

STATIONS AND ELEVATIONS IN PARENTHESIS ARE ENGLISH



PLAN

PROPOSED BRIDGE	FLOOD DISCHARGE	THROUGH BRIDGE DISCHARGE	THROUGH BRIDGE NET AREA OF FLOW	THROUGH BRIDGE MEAN VELOCITY	THROUGH BRIDGE WATER SURFACE ELEVATION	OVER ROADWAY DISCHARGE	OVER ROADWAY MEAN VELOCITY	UPSTREAM BACKWATER ELEVATION
	m^3/s	m^3/s	m^2	m/s	m	m^3/s	m/s	m
	(DESIGN)							
	Q_{25} = 425	425	268.0	1.76	218.50	0	0	218.51
	Q_{100} = 560	560	330.0	1.97	219.29	0	0	219.31

THE LOWEST ELEV. OF THE SUPERSTRUCTURE BOTTOM CLEARS Q25 DESIGN YEAR WATER SURFACE ELEV. BY 4.86 METERS.

BENCHMARK ELEV. 217.879
"X" CUT ON NORTHWEST CORNER OF SANDSTONE WINGWALL
STA 3+960, 18 m RT.
STA 129+92.13, 59.06' RT.

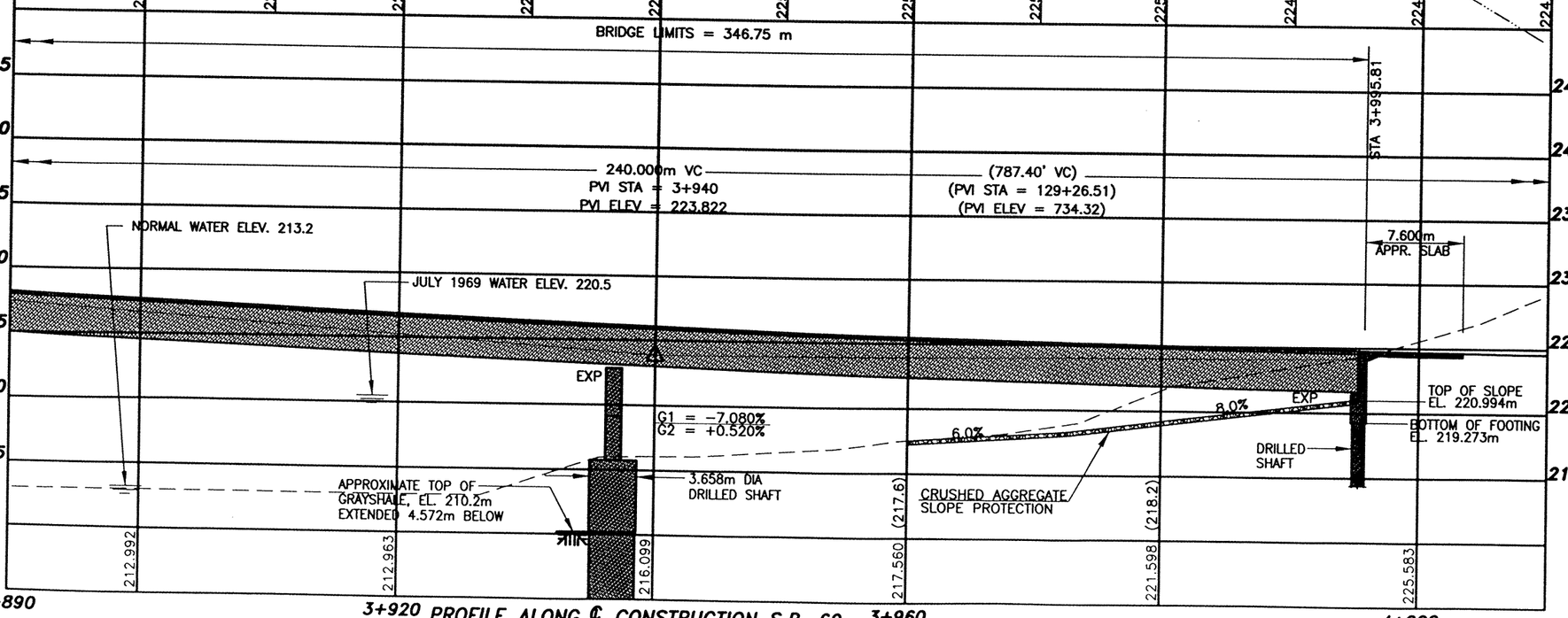
DRAINAGE AREA = 531 km^2

HORIZONTAL CURVE DATA	ENGLISH	METRIC
P.I. =	STA 129+45.62	STA 3+945.826
△ =	11°26'14"	11°26'14"
R =	4101.05'	1250m
T =	410.69'	125.177m
L =	818.64'	249.522m

LEGEND:
- ⊕ – SOIL BORING LOCATION
- S – BORINGS COMPLETED 4/1998
- B – BORINGS COMPLETED 8/2001 AND 9/2001

** – CHORD BETWEEN ℄ ABUTMENT BEARINGS
EXP – EXPANSION BEARING
FIX – FIXED BEARING

NOTES:
1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.



3+890 3+920 PROFILE ALONG ℄ CONSTRUCTION S.R. 60 3+960 4+000

EXISTING STRUCTURE
(LOCATED DOWNSTREAM– TO BE REMOVED)
TYPE: 3 SPAN SIMPLE STEEL BEAMS WITH TIMBER DECK WITH CAPPED PILE ABUTMENTS AND PIERS
SPAN: 15 018 –15 176 –15 018
ROADWAY: 9601 F/F RAILING
LOADING: CF = 130(NOT POSTED)
SKEW: NONE
ALIGNMENT: TANGENT
SUPERELEVATION: NONE
WEARING SURFACE: BITUMINOUS
APPROACH SLABS: NONE
DATE BUILT: 1970
STRUCTURE FILE NO.: 2202468

PROPOSED STRUCTURE
TYPE: 5 SPAN CONTINUOUS COMPOSITE STEEL (A588) GIRDERS, WITH REINFORCED CONCRETE SLAB AND SPILL THROUGH ABUTMENTS AND T-TYPE PIERS ON DRILLED SHAFTS
SPAN: 62.038m–77.548m–77.286m–69.701m–58.077m (MEASURED ALONG REFERENCE CHORD)
ROADWAY: 12.000 m T/T BARRIER
LOADING: MS22.5, CASEII AND THE ALTERNATE MILITARY LOADING
SKEW: VARIES WITH RESPECT TO THE REFERENCE CHORD
ALIGNMENT: CURVE RIGHT(RADIUS = 1250 m)
SUPERELEVATION: VARIES
WEARING SURFACE: MONOLITHIC CONCRETE
APPROACH SLABS: AS-1-81M (7.600 m LONG)
LATITUDE: N 41° 19' 11"
LONGITUDE: W 82° 21' 48"

TRAFFIC DATA
CURRENT ADT (2000) = 2730
DESIGN YEAR ADT (2020) = 4110
DESIGN YEAR ADTT (2000) = 164

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M.E. Companies
635 Brookedge Boulevard
Westerville, OH 43081
Phone 614-818-4900

DESIGNED ENB | DRAWN AEL | CHECKED TAB | REVISED –
REVIEWED PAR | DATE 11/08/01 | STRUCTURE FILE 2202476

ERIE COUNTY
STA 3+649.06
STA 3+995.76

SITE PLAN
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

3/18
4/56

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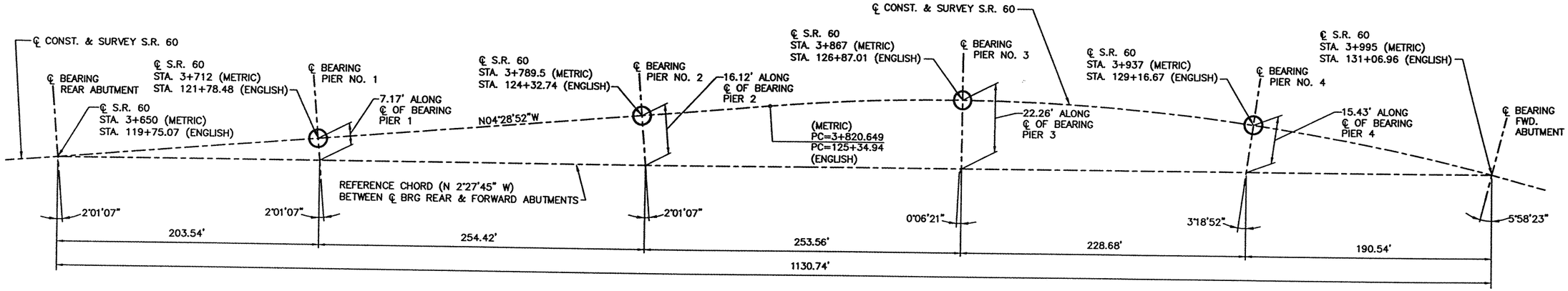


GEOMETRIC LAYOUT PLAN
NOT TO SCALE

HORIZONTAL CURVE DATA		
	ENGLISH	*METRIC*
P.I. =	STA 129+45.62	*STA 3+945.826*
△ =	11°26'14"	*11°26'14"*
R =	4101.05'	*1250m*
T =	410.69'	*125.177m*
L =	818.64'	*249.522m*

DESIGN AGENCY
M.E. Companies
635 Brooker Dr., Elyria
Phone 877-810-4600
M E COMPANIES

DESIGNED	DRAWN	REVIEWED	DATE
AGW	AGW	PAR	JAN. 2002
CHECKED	REVISED	STRUCTURE FILE	
TAB	-	2202476	

GEOMETRIC LAYOUT PLAN
BRIDGE NO. ERI-60-0364
OVER VERMILION RIVER

ERI-60-3.100

3A/18

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

4A / 56

D:\ERIE-60\DWG\APROFDRCONST\GEOMLAY.DWG bykwkoppes on 11/04/2004 @ 03:16:24 pm - for M-E Companies, Inc.

NOTE TO CONTRACTOR

ALTHOUGH THIS IS A METRIC JOB, THE STANDARD DRAWINGS AND BRIDGE DETAILS ARE IN ENGLISH, THE ESTIMATED QUANTITIES ARE IN METRIC AND THE SITE PLAN IS IN DUAL UNITS.

REFERENCE:

REFERENCE SHALL BE MADE TO ODOT STANDARD DRAWING(S):

AS-1-81	REVISED	04-20-01	BR-1	REVISED	01-06-99
GSD-1-96	REVISED	04-20-01			

AND TO ODOT SUPPLEMENTAL SPECIFICATION(S):

816	DATED	04-21-97	899	DATED	10-21-98
842	DATED	01-06-99	910	DATED	07-11-00
844	DATED	01-06-99	911	DATED	07-10-97
863	DATED	10-12-99	954	DATED	09-09-97
864	DATED	07-11-00			

DESIGN SPECIFICATIONS

THIS STRUCTURE CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996, INCLUDING THE 1997, 1998, 1999 AND 2000 INTERIM SPECIFICATIONS, AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN LOADING

HS25, CASE II AND THE ALTERNATE MILITARY LOADING.
FUTURE WEARING SURFACE (FWS) OF 60 LBS/FT^2.

DESIGN DATA:

HIGH PERFORMANCE CONCRETE HPC SS 844 FOR SUPERSTRUCTURE
COMPRESSIVE STRENGTH 4500 P.S.I.
REINFORCING STEEL – ASTM A615, A616, A617
GRADE 60 MINIMUM YIELD STRENGTH 60,000 P.S.I.
STRUCTURAL STEEL – ASTM A588
GRADE 50W MINIMUM YIELD STRENGTH 50,000 P.S.I.

DECK PROTECTION METHOD:

EPOXY COATED REINFORCING STEEL
2½" CONCRETE COVER
SEALING OF CONCRETE SURFACES
HIGH PERFORMANCE CONCRETE

MONOLITHIC WEARING SURFACE:

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 1 INCH THICK.

REMOVAL OF EXISTING STRUCTURE:

WHEN NO LONGER NEEDED TO MAINTAIN TRAFFIC THE EXISTING STRUCTURE SHALL BE REMOVED UPON RECEIVING PERMISSION FROM THE ENGINEER. (STRUCTURAL STEEL SHALL BE CAREFULLY DISMANTLED AND STORED ALONG THE RIGHT-OF-WAY FOR DISPOSAL BY THE STATE'S FORCES.

ITEM 863 STRUCTURAL STEEL, MISC. LEVEL: MODULAR EXPANSION JOINT, AS PER PLAN

A. DESCRIPTION

THIS ITEM SHALL CONSIST OF FURNISHING ALL MATERIALS, SERVICES, LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO DESIGN, FABRICATE, INSPECT, TEST AND INSTALL MODULAR EXPANSION JOINTS IN ACCORDANCE WITH THE PLANS AND THESE NOTES. ALL REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 863, MISCELLANEOUS LEVEL FABRICATION APPLY, UNLESS MODIFIED BY THESE NOTES.

B. DESIGN

THE DESIGN SHALL BE PREPARED BY AND CHECKED UNDER THE AUTHORITY OF A OHIO REGISTERED PROFESSIONAL ENGINEER AND BEAR HIS OR HER PROFESSIONAL ENGINEER SEAL.

1. THE DESIGN CALCULATIONS SHALL BE INCLUDED WITH THE CONTRACTOR'S SUBMISSION OF SHOP DRAWINGS PER SS 863.08.

2. THE SHOP DRAWINGS SHALL CONTAIN A DETAILED INSTALLATION PROCEDURE AND INCLUDE ANY SPECIFIC MANUFACTURER'S NOTES NECESSARY FOR COMPLETION OF THE WORK AND CONSTRUCTION PHASING.

3. THE MODULAR JOINT COMPONENTS, JOINT ARMOR AND ANCHORAGE SHALL BE DESIGNED AND TESTED ACCORDING TO THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT #402 APPENDIX A AND B.

4. TEMPORARY AND FIELD CONNECTIONS TO THE BRIDGE SHALL BE DESIGNED TO ACCOMMODATE ADJUSTMENTS FOR ROADWAY GEOMETRY AND VARYING TEMPERATURE.

5. THE MODULAR JOINT SHALL ACCOMMODATE THE PLAN SPECIFIED MOVEMENT FOR A COLD CLIMATE AS SPECIFIED BY 1996 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES SECTION 3.16.

6. SUPPORT BAR BEARINGS SHALL BE A D.S. BROWN BEARING CONSISTING OF URETHANE, PREFORMED FABRIC AND PTFE BONDED INTO A SINGLE UNIT.

7. ELASTOMERIC EQUALIZATION SPRINGS WHICH WORK COUNTER TO THE COMPRESSION FORCES OF THE SEALING ELEMENTS SHALL BE USED TO MAINTAIN EQUALIZATION EXPANSION PROPERTIES FOR EACH ELEMENT ACROSS THE JOINT. ALL SPRINGS SHALL BE MECHANICALLY CONNECTED TO THE JOINT.

8. ELASTOMERIC CONTROL SPRINGS WHICH WORK LONGITUDINALLY SHALL BE USED TO MAINTAIN EQUIDISTANT SPACING BETWEEN TRANSVERSE SEPARATION BEAMS.

9. SEPARATION BEAMS/TRANSVERSE DIVIDERS. SHALL BE SUPPLIED AS NEEDED.

10. THE SEAL SHALL BE A STRIP SEAL TYPE CONNECTED TO MATCHING RETAINERS. EACH INDIVIDUAL STRIP SEAL SHALL NOT EXCEED 3.15 INCHES OF TOTAL HORIZONTAL MOVEMENT

11. THE NEOPRENE SEALS, SUPPORT BAR BEARINGS AND EQUALIZATION SPRINGS SHALL BE REMOVABLE AND REPLACEABLE.

12. THE SEALS AND RETAINERS SHALL BE SET ⅛" LOWER THAN THE ROADWAY SURFACE.

13. THE MODULAR EXPANSION JOINT SHALL BE DESIGNED AND FABRICATED AS A CONTINUOUS FULL LENGTH JOINT WITHOUT FIELD SPLICES.

14. A SLIDING STEEL COVER PLATE WILL BE DESIGNED AT SIDEWALKS.

C. MATERIALS

1. STRUCTURAL STEEL SHALL BE ASTM A709 GRADE 50. CENTER BEAMS, EDGE BEAMS AND JOINT ARMOR SHALL BE CHARPY V NOTCH IMPACT TESTED PER ASTM A709 TABLE S1.2 ZONE 2 TEMPERATURE RANGE. TUBE SECTIONS SHALL BE ASTM A501 OR A500 GRADE B.

2. STAINLESS STEEL SHALL BE ASTM A240 TYPE 304, NO. 8 FINISH WITH A MINIMUM THICKNESS OF 13 GAGE.

3. ELASTOMERIC, PTFE, URETHANE AND PREFORMED FABRIC MATERIALS SHALL BE TESTED AND REPORTED BY THE MANUFACTURER OR AN INDEPENDANT TESTING LABORATORY FOR EACH BEARING AND SPRING TYPE. THE SUBMISSION OF MATERIAL CERTIFICATION AND TESTING DATA SHALL BE PER 863.09.

4. STRIP SEALS SHALL BE EXTRUDED POLYCHLOROPRENE CONFORMING TO ASTM D2628. THE RECOVERY TEST IS NOT APPLICABLE, DUE TO CONFIGURATION OF THE SEAL. PHYSICAL PROPERTIES OF THE STRIP SEAL SHALL CONFORM TO TABLE "A". THE MANUFACTURER OR AN ACCREDITED LABORATORY SHALL TEST EACH LOT AS SPECIFIED AND SUBMIT CERTIFIED TEST DATA PER 863.09. THE SEAL AND RETAINER ARE AN INTEGRAL SYSTEM SUPPLIED BY ONE MANUFACTURER.

TABLE A (PHYSICAL PROPERTIES OF SEAL ELEMENT)

PROPERTY	REQUIREMENT	ASTM METHOD
TENSILE STRENGTH, MIN. PSI	2000	D412
ELONGATION @ BREAK, MIN. PSI	250	D412
HARDNESS, TYPE A DUROMETER, POINTS	60 ±5	D2240 (MODIFIED)
OVEN AGING, 70 HR @ 212 °F, TENSILE STRENGTH LOSS, MAX.	20%	D573
ELONGATION, LOSS, MAX.	30%	
HARDNESS, TYPE A DUROMETER, POINTS CHANGE	0 TO +10	D2240(MODIFIED)
OIL SWELL, ASTM OIL 3, 70 HR @ 104 °F, WEIGHT CHANGE MAX.	45%	D471
OZONE RESISTANCE 20% STRAIN, 300 PPHM IN AIR, 70 HR @ 104 °F (WIPED WITH TOLUENE TO REMOVE SURFACE CONTAMINATION)	NO CRACKS	D1149
LOW TEMPERATURE STIFFENING 7 DAYS@ 14 °F,		D2240
HARDNESS, TYPE A DUROMETER, POINTS CHANGE	0 TO +15	D2240(MODIFIED)
COMPRESSION SET, 70 HR @ 212 °F, MAX.	40%	D395 METHOD B

5. SEAL RETAINERS: EXTRUDE, HOT ROLL OR MACHINE, STEEL RETAINERS INTO A SOLID SHAPE. RETAINERS MANUFACTURED FROM BENT PLATE OR BUILT UP PIECES ARE NOT ACCEPTABLE. THE INTERNAL DIMENSIONS OF THE RETAINER SHALL BE SPECIFIED BY THE MANUFACTURER TO ACHIEVE POSITIVE SEAL ANCHORAGE.

6. CENTER BEAMS SHALL BE A SOLID, NON WELDED MACHINED OR EXTRUDED STEEL SECTION.

7. LUBRICANT – ADHESIVE. ONE PART MOISTURE CURING POLYURETHANE COMPOUND MEETING THE REQUIREMENTS OF ASTM D4070 AND AS SPECIFIED BY THE SEAL MANUFACTURER.

8. HARDWARE SHALL BE ASTM 325 TYPE ONE, GALVANIZED.

D. FABRICATION

1. THE MODULAR JOINTS SHALL BE FABRICATED ACCORDING TO SS863.

2. THE MODULAR JOINT SHALL BE SHOP ASSEMBLED WITH ALL COMPONENTS EXCEPT, NEOPRENE SEALS, PER SS863.26.

3. JOINTS IN STRIP SEALS: NO JOINTS ARE ALLOWED, UNLESS APPROVED BY THE DIRECTOR.

4. JOINTS IN RETAINERS: WELDS ARE WATER TIGHT, PARTIAL PENETRATION WELDS AROUND THE OUTER PERIPHERY OF THE ABUTTING SURFACES. SPLICES SHALL ONLY BE MADE IN THE COMPRESSION ZONE OF THE CENTER BEAM. GRIND FLUSH ALL WELDS IN CONTACT WITH THE SEAL AND JOINT ARMOR. DO NOT USE SHORT PIECES OF RETAINERS LESS THAN 6'-0" LONG, UNLESS REQUIRED AT CURBS OR SIDEWALKS. DO NOT PROVIDE ADDITIONAL SPLICES IN RETAINERS AT CURB OR SIDEWALK SECTIONS OTHER THAN REQUIRED FOR GEOMETRY.

5. SHOP OR FIELD WELDS OF CENTER BEAMS AND JOINT ARMOR, SHALL BE COMPLETE PENETRATION WELDS, GROUND TO PROVIDE SMOOTH TRANSITIONS AND BE 100% ULTRASONICALLY TESTED PER AWS D1.5-95 BRIDGE WELDING CODE, WITH ACCEPTANCE CRITERIA PER TABLE 9.1, WITNESSED BY THE DEPARTMENT.

6. THE CENTER BEAM TO SUPPORT BAR CONNECTIONS SHALL BE COMPLETE PENETRATION WELDS, GROUND TO PROVIDE SMOOTH TRANSITIONS AND BE 100% ULTRASONICALLY TESTED PER AWS D1.5 BRIDGE WELDING CODE, WITH ACCEPTANCE CRITERIA PER TABLE 9.1, WITNESSED BY THE DEPARTMENT.

7. TEMPORARY SUPPORTS: FABRICATOR DESIGNED AND INSTALLED SUPPORTS ARE REQUIRED TO SUPPORT SHIPPING, ERECTION AND CONSTRUCTION FORCES WITHOUT DAMAGE TO THE STEEL ARMOR OR COATINGS. THESE SUPPORTS SHALL BE ADJUSTABLE FOR FIELD TEMPERATURE SETTING.

E. COATING

1. ALL STEEL SURFACES AND COMPONENTS, EXCEPT AT STAINLESS STEEL AND PTFE SLIDING SURFACES SHALL BE GALVANIZED OR METALIZED. THESE COATING MAY BE MIXED ON ONE ASSEMBLY, IF ALL SIMILAR COMPONENTS OF THE ASSEMBLY HAVE THE SAME COATING TYPE.

2. THE GALVANIZED COATING SHALL BE PER ASTM A123, WITH A MINIMUM THICKNESS OF 4 MILS. THE FABRICATOR WILL CLEAN EXCESSIVE GALVANIZING AS NECESSARY TO ACHIEVE MECHANICAL MOVEMENT AND SEAL INSTALLATION.

3. SURFACE PREPARATION AND METALIZED COATING SHALL BE PERFORMED ACCORDING TO THE SOCIETY FOR PROTECTIVE COATINGS (SSPC) INTERIM SPECIFICATION SSPC-CS23.00(I) FOR THERMAL SPRAY METALLIC COATINGS. THE COATING SHALL BE A MINIMUM OF 8 MILS THICK. THE METALIZING WIRE SHALL BE 100% ZINC. AREAS OF STRUCTURAL STEEL THAT ARE IN CONTACT WITH CAST-IN-PLACE CONCRETE SHALL HAVE AN ADDITIONAL COATING. THE COATING SHALL BE THE EPOXY INTERMEDIATE COAT SPECIFIED IN SUPPLEMENT 910. THE COATING THICKNESS WILL COVER ALL PEAKS, VALLEYS AND SURFACE ROUGHNESS ATTRIBUTED TO METALIZING.

4. COATING REPAIRS: DAMAGED COATINGS SHALL BE REPAIRED BY ASTM A780, ANNEX "A1. REPAIR USING ZINC BASED ALLOYS". THE PROCEDURE SHALL BE AS FOLLOWS: REMOVE SURFACE CONTAMINATES, PREHEAT TO 600 °F , APPLY ZINC COATING BY RUBBING WITH A PURE ZINC STICK OR SPRINKLING ZINC POWDER ON THE PREHEATED SURFACE, TO ACHIEVE A MINIMUM COATING THICKNESS OF 6 MILS.

5. THE GALVANIZED OR METALIZED COATINGS SHOULD NOT BE FIELD PAINTED, EXCEPT FOR AREAS DAMAGED BY CONNECTION TO PAINTED SUPERSTRUCTURE STEEL MEMBERS. THESE AREAS SHALL BE PAINTED USING THE SAME SYSTEM SPECIFIED FOR THE SUPERSTRUCTURE.

6. PRIOR TO SHIPPING RETAINER GROOVES SHALL BE PROTECTED FROM CONSTRUCTION DEBRIS BY THE INSTALLATION OF BACKER RODS OR OTHER EFFECTIVE MASKING TECHNIQUES.

F. INSTALLATION

1. THE JOINT MANUFACTURER'S TECHNICAL REPRESENTATIVE SHALL PHYSICALLY OVERSEE THE FABRICATION, INSTALLATION, ADJUSTMENT AND TESTING DURING ALL OPERATIONS. WHERE SPECIAL INSTRUCTIONS ARE NOT CONTAINED HEREIN OR ELSEWHERE IN THESE NOTES, DIRECTION FOR THE INSTALLATION SHALL BE ACCORDING TO THE RECOMMENDATIONS OF THE TECHNICAL REPRESENTATIVE.

2. THE CONTRACTOR SHALL COORDINATE AND SCHEDULE THE TECHNICAL REPRESENTATIVE.

3. THE SUPERSTRUCTURE SUPPORTING UNITS SHALL BE IN PLACE BEFORE INSTALLING THE MODULAR JOINT. THE JOINT SHALL BE POSITIONED TO MATCH ROADWAY GEOMETRY, SUPERSTRUCTURE CONNECTIONS AND TEMPERATURE OPENING. CARE SHALL BE TAKEN TO MAINTAIN EXACT ALIGNMENT OF ADJACENT ENDS OF THE ARMOR AND CENTER BEAMS FOR FIELD WELDED UNITS. TEMPORARY SUPPORTS SHALL BE PROVIDED AS DIRECTED BY THE MANUFACTURER TO MAINTAIN THE PROPER POSITIONING. FOR PHASED CONSTRUCTION, THE CONTRACTOR'S METHODS FOR INSTALLATION AND TEMPORARY SUPPORTS SHALL ACHIEVE SEPARATION OF THE PHASES AND UNRESTRICTED TEMPERATURE MOVEMENT.

4. THE CONTRACTOR'S METHODS OF CONCRETE PLACEMENT SHALL INCLUDE VIBRATION AND HAND WORK AS NECESSARY TO ACHIEVE CONSOLIDATION AND ELIMINATE AIR VOIDS.

5. PLACE THE DECK CONCRETE FIRST AND ALLOW TO CURE. CHECK THE ABUTMENT OR ADJACENT SPAN SIDE OF THE MODULAR JOINT FOR ALIGNMENT AND TEMPERATURE ADJUSTMENT. TEMPERATURE SHALL BE MEASURED AT THE UNDERSIDE OF THE CONCRETE DECK AT EACH END AND MID-SPAN TO ACHIEVE THE AVERAGE SUPER STRUCTURE TEMPERATURE. PLACE THE BACKWALL OR ADJACENT SPAN CONCRETE SECOND. THE MANUFACTURER'S REPRESENTATIVE SHALL CHECK THAT TEMPERATURE MOVEMENT HAS NOT CAUSED ANY DAMAGE TO THE BOND BETWEEN THE JOINT AND THE CONCRETE.

6. EXAMINE SEAL RETAINERS FOR SOIL OR DEFECTS THAT CAN DAMAGE THE SEAL. REPAIR ANY DEFECTS AS DIRECTED BY THE MANUFACTURER'S REPRESENTATIVE.

7. THE NEOPRENE SEAL ELEMENTS AND THE RETAINER GROOVES SHALL BE SOLVENT CLEANED TO REMOVE OIL, GREASE OR OTHER SOIL IMMEDIATELY PRIOR TO INSTALLING THE SEALS. THE SEALS SHALL BE INSTALLED WITH THE RECOMMENDED ADHESIVE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE BONDING SURFACES SHALL BE CLEAN, DRY AND WARMER THAN 450 °F.

DESIGN AGENCY
M.E. Companies
4300 Kenny Road, Suite 200
Columbus, OH 43220
Phone 614-326-4000
M-E COMPANIES

DESIGNED	DRAWN	REVIEWED	DATE
ENB	ENB	PAR	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
TAB	-	2202476	

SUPERSTRUCTURE GENERAL NOTES
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

STRUCTURE PLANS
APPROVED FOR CONSTRUCTION
03-26-02

ITEM 863, STRUCTURAL STEEL, MISC. LEVEL MODULAR EXPANSION JOINT, AS PER PLAN (CONTINUED FROM SHEET 4/18

8. THE COMPLETE, INSTALLED EXPANSION DEVICE SHALL BE TESTED FOR WATERTIGHTNESS, BY FLOODING THE TOTAL EXPANSION JOINT LENGTH WITH WATER FOR A PERIOD OF NOT LESS THAN ONE HOUR. THE ENTIRE JOINT SYSTEM SHALL BE COVERED EITHER BY PONDING OR FLOWING WATER. SHOULD THE JOINT SYSTEM EXHIBIT ANY EVIDENCE OF WATER LEAKAGE, THE CONTRACTOR SHALL LOCATE THE POINTS OF LEAKAGE AND SHALL TAKE ANY AND ALL MEASURES NECESSARY TO STOP THE LEAKAGE. THIS WORK SHALL BE DONE AT THE CONTRACTOR'S EXPENSE. AFTER ALL REPAIRS HAVE BEEN MADE AN ADDITIONAL TEST FOR WATERTIGHTNESS SHALL BE PERFORMED.

G. METHOD OF MEASUREMENT

THE LUMP SUM PRICE BID SHALL INCLUDE THE COST OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO DESIGN, SUPPLY, INSTALL AND TEST A MODULAR EXPANSION JOINT ACCORDING TO THE PLAN DIMENSION AND THESE NOTES.

H. BASIS OF PAYMENT

PAYMENT WILL BE MADE AT CONTRACT PRICES FOR:
ITEM UNIT DESCRIPTION
863 LUMP SUM 863 STRUCTURAL STEEL, MISC. LEVEL: MODULAR EXPANSION JOINT, AS PER PLAN.

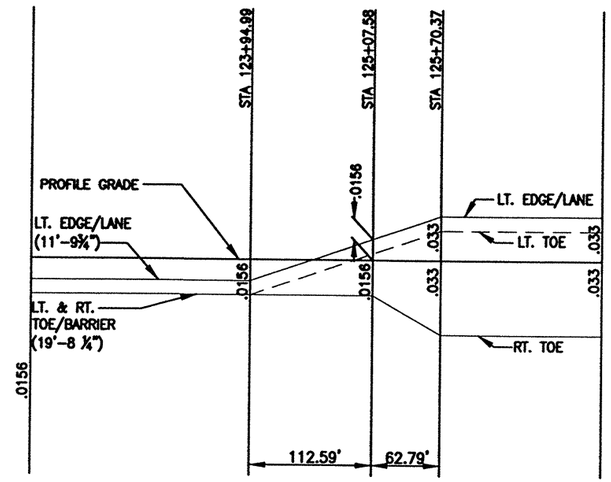
THE D.S. BROWN MODULAR JOINT HAS BEEN SELECTED AT THE REQUEST OF THE CONTRACTOR. 2/28/02

REMOVALS OVER WATER:

REASONABLE CARE SHALL BE USED BY THE CONTRACTOR TO PREVENT REMOVED MATERIALS FROM FALLING INTO THE WATER. ANY MATERIALS DROPPED SHALL BE IMMEDIATELY RECOVERED AND DISPOSED OF AWAY FROM THE SITE.

ABBREVIATIONS

℄ =	CENTERLINE	MAX =	MAXIMUM
C/C =	CENTER TO CENTER	MIN =	MINIMUM
CL =	CLEAR	NF =	NEAR FACE
CONST. JT. =	CONSTRUCTION JOINT	O.C. =	ON CENTER
DIA. =	DIAMETER	O/O =	OUT TO OUT
EF =	EACH FACE	PEJF =	PREFORMED EXPANSION JOINT FILLER
EL =	ELEVATION	RA =	REAR ABUTMENT
EX. =	EXISTING	RT. =	RIGHT
F/F =	FACE TO FACE	STA =	STATION
FA =	FORWARD ABUTMENT	T/T =	TOE TO TOE
F.F. =	FAR FACE	TYP =	TYPICAL
LT. =	LEFT		



SUPERELEVATION TRANSITION DIAGRAM

QUANTITIES CALCULATED BY: KMH – 12/2001

ESTIMATED QUANTITIES SUPERSTRUCTURE (ENGLISH)

QUANTITIES CHECKED BY: ENB – 12/2001

ITEM	ITEM EXT.	TOTAL	UNIT	DESCRIPTION	ABUTMENT	PIER	SUPERSTR.	GENERAL	AS PER PLAN SHEET
202	11002	LUMP	SUM	STRUCTURE REMOVED, OVER 20 FOOT SPAN				LUMP	
516	44101	5	EACH	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (2.73" x 24" x 33" ELASTOMERIC PAD WITH 40" x 25" x 3.4" STEEL LOAD PLATE), AS PER PLAN **		5			7
516	46500	10	EACH	BEARING, PTFE (TEFLON)	10				
601	20000	1872	SQ YARD	CRUSHED AGGREGATE SLOPE PROTECTION	1872				
816	00600	LUMP	SUM	FIELD PAINTING OF NEW STEEL, INTERMEDIATE AND FINISH COAT, SYSTEM IZEU			LUMP		
844	48000	1297	CU YARD	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (DECK)			1297		
844	48020	262	CU YARD	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (PARAPET)			262		
863	10280	3,015,064	POUND	STRUCTURAL STEEL MEMBERS, LEVEL FOUR (4) FABRICATION (A588)			3,015,064		
863	20000	8801	EACH	WELDED STUD SHEAR CONNECTOR			8801		
863	95030	15	EACH	STRUCTURAL STEEL, MISC. LEVEL: BEARING, PTFE (TEFLON), AS PER PLAN		15			7
863	95020	LUMP	SUM	STRUCTURAL STEEL, MISC. LEVEL: MODULAR EXPANSION JOINT, AS PER PLAN			LUMP		4, 5, 16
864	10100	2789	SQ YARD	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)			2789		

QUANTITIES CALCULATED BY: KMH – 12/2001

ESTIMATED QUANTITIES SUPERSTRUCTURE (METRIC)

QUANTITIES CHECKED BY: ENB – 12/2001

ITEM	ITEM EXT.	TOTAL	UNIT	DESCRIPTION	ABUTMENT	PIER	SUPERSTR.	GENERAL	AS PER PLAN SHEET
202	11002	LUMP	SUM	STRUCTURE REMOVED, OVER 6 METER SPAN				LUMP	
516	44101	5	EACH	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE) (70mm x 610mm x 838mm ELASTOMERIC PAD WITH 1016mm x 635mm x 87mm STEEL LOAD PLATE), AS PER PLAN **		5			7
516	46500	10	EACH	BEARING, PTFE (TEFLON)	10				
601	20000	1565	SQ METER	CRUSHED AGGREGATE SLOPE PROTECTION	1565				
816	00600	LUMP	SUM	FIELD PAINTING OF NEW STEEL, INTERMEDIATE AND FINISH COAT, SYSTEM IZEU			LUMP		
844	48000	992	CU METER	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (DECK)			992		
844	48020	200	CU METER	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (PARAPET)			200		
863	10280	1,367,610	KILOGRAM	STRUCTURAL STEEL MEMBERS, LEVEL FOUR (4) FABRICATION (A588M)			1,367,610		
863	20000	8801	EACH	WELDED STUD SHEAR CONNECTOR			8801		
863	95030	15	EACH	STRUCTURAL STEEL, MISC. LEVEL: BEARING, PTFE (TEFLON), AS PER PLAN		15			7
863	95020	LUMP	SUM	STRUCTURAL STEEL, MISC. LEVEL: MODULAR EXPANSION JOINT, AS PER PLAN			LUMP		4, 5, 16
864	10100	2332	SQ METER	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)			2332		

FOR ABUTMENT QUANTITIES SEE SHEET 20/56

FOR PIER QUANTITIES SEE SHEET 34/56

** – SEE PROPOSAL NOTE

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M-E Companies
635 Brooker Blvd
Bowling Green, KY 42101
Phone: 270-843-9000

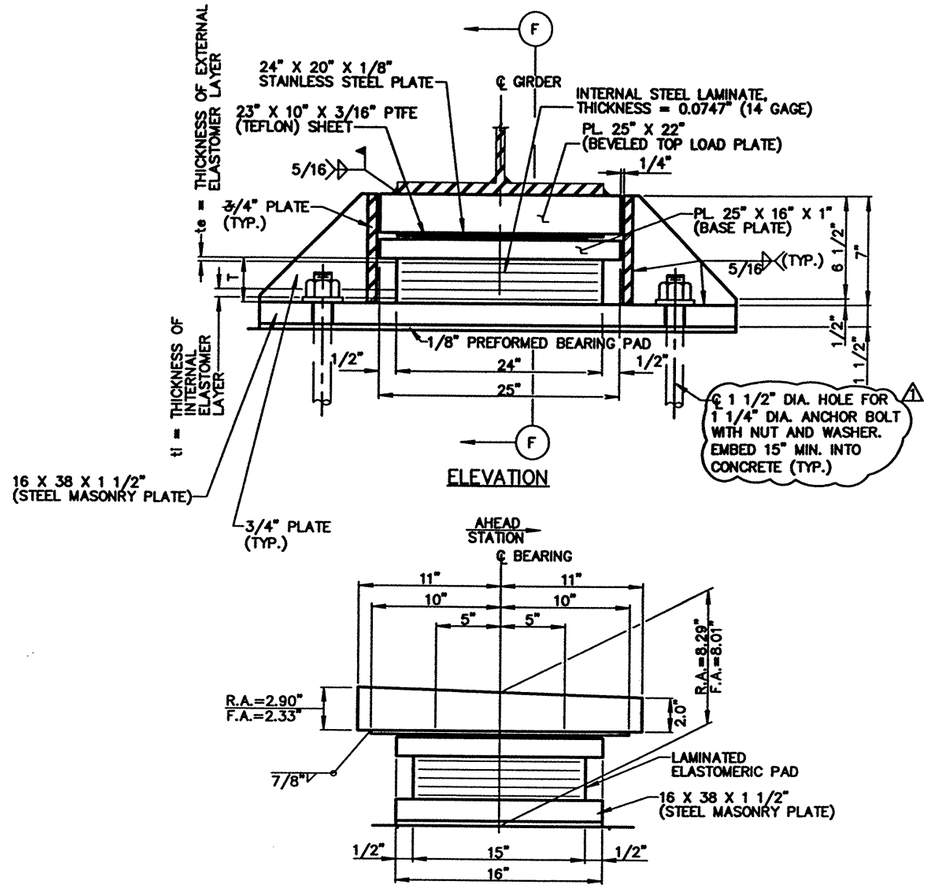
DESIGNED KMH | DRAWN ENB | REVIEWED PAR | DATE 11/30/01
CHECKED TAB | REVISED - | STRUCTURE FILE 2202476

SUPERSTRUCTURE GENERAL NOTES AND ESTIMATED QUANTITIES
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

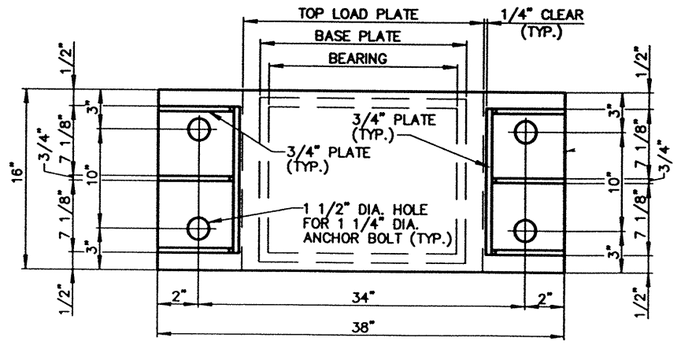
5/18

6/56



SECTION F-F

DIMENSIONS SHOWN FOR A TEMP. OF 60° F



MASONRY PLATE PLAN

PTFE BEARINGS:

SLIDING BEARINGS: ABUTMENT NO.'S 1 & 2, PIER NO.'S 1, 2, & 4

A. THE PTFE MATERIAL CONSISTING OF AN UNFILLED SHEET, STAINLESS STEEL MATING SURFACE AND MANUFACTURING PROCESSES SHALL CONFORM TO THE REQUIREMENTS GIVEN IN ARTICLE 18.8, DIVISION II, CONSTRUCTION OF THE AASHTO STANDARD SPECIFICATIONS.

B. TESTING

1. ELASTOMERIC PORTION OF THESE BEARINGS SHALL BE TESTED PER AASHTO, SECTION 18.2 (DESIGN METHOD B).

2. TWO SLIDING BEARINGS SHALL BE SELECTED AT RANDOM FOR TESTING.

a) FRICTION TESTS SHALL BE CONDUCTED AT THE MAXIMUM WORKING STRESS FOR THE BEARING WITH THE LOAD APPLIED CONTINUOUSLY FOR 12 HOURS PRIOR TO MEASURING THE FRICTION. MAXIMUM WORKING STRESS SHALL BE DETERMINED BY DIVIDING THE MAXIMUM VERTICAL FORCE (OBTAINED FROM THE PLANS) BY THE AREAS OF PTFE.

b) THE STATIC AND DYNAMIC COEFFICIENT OF FRICTION SHALL BE DETERMINED. A SLIDING SPEED OF LESS THAN 1 INCH PER MINUTE SHALL BE USED. THE COEFFICIENT OF FRICTION THUS DETERMINED SHALL NOT EXCEED 0.04.

c) TEST BEARINGS SHALL BE LOADED TO 150 PERCENT OF THE BEARINGS RATED DESIGN CAPACITY AND SIMULTANEOULSY SUBJECTED TO A ROTATIONAL RANGE OF 0.02 RADIANS OR DESIGN ROTATION, WHICHEVER IS GREATER, FOR A PERIOD OF ONE (1) HOUR. THE BEARING WILL BE VISUALLY EXAMINED BOTH DURING THE TEST AND UPON DISASSEMBLY AFTER THE TEST. ANY RESULTANT VISUAL DEFECTS, SUCH AS EXTRUDED OR DEFORMED ELASTOMER OR PTFE OR CRACKED STEEL SHALL BE CAUSE FOR REJECTION OF THE LOT.

d) ADHESION BETWEEN THE PTFE AND SUBSTRATE SHALL BE TESTED ON A TEST SPECIMEN IN ACCORDANCE WITH ASTM D429, METHOD B. THE MINIMUM PEEL STRENGTH SHALL BE 40 lbs./in. THIS TEST IS IN ADDITION TO ADHESION DETERMINED UNDER (b) AND (c) ABOVE.

e) TEST RESULTS SHALL BE PRESENTED IN A REPORT SHOWING RAW TEST DATA, REDUCED TEST DATA, SAMPLE CALCULATIONS, AND FINAL RESULTS ALONG WITH PHOTOGRAPHS AND CONCLUSIONS.

C. FABRICATION

1. PTFE SHEET SHALL BE RECESSED INTO AND BONDED TO A STEEL SUBSTRATE.
2. PTFE SHALL BE RECESSED FOR ONE HALF ITS THICKNESS.
3. THE BONDING SURFACE OF THE STEEL SHALL BE CLEANED OF RUST, SCALE, OIL AND GREASE BY BLAST CLEANING AND THEN WIPED CLEAN WITH A CLEANING SOLVENT. BLAST CLEANING SHALL BE PERFORMED WITHIN A MAXIMUM OF FOUR HOURS PRIOR TO BONDING.
4. THE ADHESIVE MATERIAL AND THE BONDING PROCEDURES TO BE USED SHALL BE SUBMITTED TO THE DIRECTOR FOR APPROVAL PRIOR TO PERFORMANCE OF THE BONDING OPERATION. THE BONDING OPERATION SHALL THEN BE PERFORMED UNDER CONTROLLED CONDITIONS AND IN ACCORDANCE WITH THESE APPROVED PROCEDURES.
5. AFTER COMPLETION OF THE BONDING OPERATION, THE PTFE SURFACE SHALL BE SMOOTH AND FREE OF BUBBLES.

BASIS OF PAYMENT FOR ABUTMENT BEARINGS

THE UNIT BID PRICE FOR THE BEARINGS SHALL INCLUDE ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO FURNISH AND INSTALL THE BEARINGS ACCORDING TO THE PLAN DIMENSIONS, THE NOTES ON THIS SHEET, AND NOTES 1 THRU 5 ON SHEET 7/18 . PAYMENT WILL BE MADE AT THE CONTRACT PRICE FOR ITEM 516 BEARING, PTFE (TEFLON)

REFERENCE
FOR FRAMING PLAN, SEE SHEET 8/18 .

BEARING LOCATION	BEARING TYPE	DEAD LOAD (KIPS)	LIVE LOAD (KIPS)	TOTAL LOAD (DL+LL) (KIPS)	ti	NO. OF tiS	te (2 EACH)	NUMBER OF INTERNAL LAMINATES (14 GAGE)	T
REAR ABUTMENT	EXPANSION	168	104	272	0.40"	5	0.28"	6	3.00"
FORWARD ABUTMENT	EXPANSION	160	99	259	0.40"	5	0.28"	6	3.00"

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

REVISED 4/11/02

DESIGNED	DRAWN	REVIEWED	DATE
CMD	AGW	PAR	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
TAB	-	2202476	

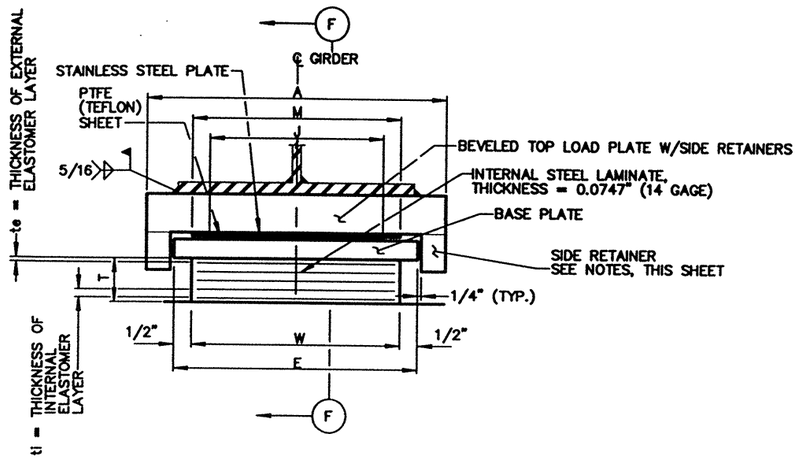
DESIGN AGENCY
M.E. Companies
626 Enquirer Building, Cincinnati, Ohio 45202
Phone 614-414-4000
COMPANIES

ABUTMENT BEARING DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

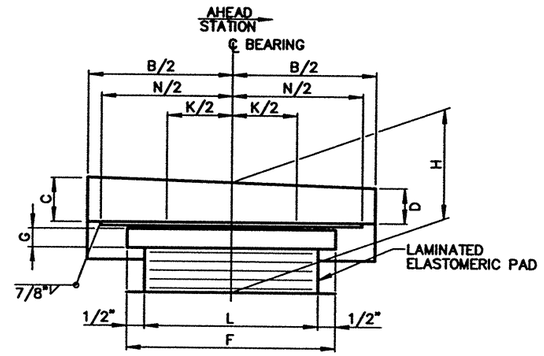
6/18

7/56



ELEVATION

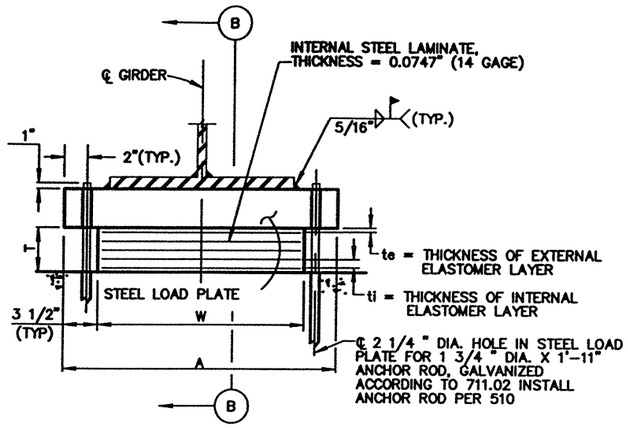
LAMINATED ELASTOMERIC EXPANSION BEARING



SECTION F–F

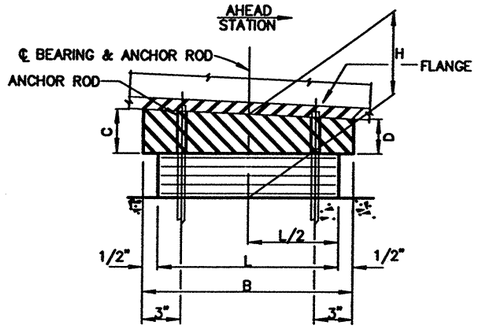
DIMENSIONS SHOWN FOR A TEMP. OF 60° F

LAMINATED ELASTOMERIC EXPANSION BEARING



ELEVATION

LAMINATED ELASTOMERIC FIXED BEARING



SECTION B–B

LAMINATED ELASTOMERIC FIXED BEARING

NOTES:

1. ELASTOMERIC BEARINGS SHALL COMPLY WITH ITEM 516 AND AASHTO STANDARD SPECIFICATION FOR HIGHWAY BRIDGES, SECTION 18, BEARING DEVICES, DIVISION II, CONSTRUCTION, ATRICLES 18.4.5.1 AND 18.5.6.2. BEARINGS SHALL BE GRADE 3, 60 DUROMETER ELASTOMER, AND SHALL SUBJECT TO THE LOAD TESTING REQUIRMENTS DEFINED IN ARTICLE 18.7.4.5 OF THE AASHTO DOCUMENT LISTED ABOVE. BEARINGS WERE DESIGNED UNDER SECTION 14.6.6 OF SECTION 14, BEARINGS, DIVISION I, DESIGN.

2. IF THE STEEL IS ERECTED AT AN AMBIENT TEMPERATURE HIGHER THAN 80°F OR LOWER THAN 40°F, AND THE BEARING SHEAR DEFLECTION EXCEEDS ONE SIXTH OF THE BEARING HEIGHT AT 60°F ± 10°F, THE GIRDER SHALL BE RAISED TO ALLOW THE BEARINGS TO RETURN TO THEIR UNDEFORMED SHAPE AT 60°F.

3. STEEL FOR LOAD PLATES, BASE PLATES, AND MASONRY PLATES TO BE A588. ALL STEEL SURFACES EXPOSED TO THE ATMOSPHERE, EXCEPT STAINLESS STEEL SURFACES, SHALL BE SHOP PRIME COATED IN ACCORDANCE WITH ITEM 514, SYSTEM IZEU. THE PRIME COAT SHALL BE 708.17. THE TOP COAT COLOR SHALL CLOSELY APPROACH FEDERAL STANDARD NO. 595A–20045 OR 20059 (THE COLOR OF WEATHERING STEEL). STAINLESS STEEL SHALL NOT BE PAINTED.

4. WELDING OF THE LOAD PLATE TO THE GIRDER FLANGE SHALL BE CONTROLLED SO THAT THE PLATE TEMPERATURE AT THE ELASTOMERIC BONDED SURFACE DOES NOT EXCEED 300°F AS DETERMINED BY USE OF PYROMETRIC STICKS OR OTHER TEMPERATURE MONITORING DEVICES.

5. THE STEEL BASE PLATE, LOAD PLATE, AND/OR MASONRY PLATE, AND THE ELASTOMER SHALL BE BONDED BY VULCANIZATION DURING THE MOLDING PROCESS.

6. BEARING ANCHOR RODS: AT THE OPTION OF THE CONTRACTOR, THE BEARING ANCHOR RODS (OR FORMED HOLES), LOCATED AND SUPPORTED BY TEMPLATES, MAY BE CAST–IN–PLACE. IF ANCHOR RODS ARE NOT CAST– IN–PLACE, THEY SHALL BE GROUTED IN ACCORDANCE WITH SP 853.

7. ANCHOR RODS SHALL BE GALVANIZED AS PER CMS 711.02. ANCHOR RODS SHALL EXTEND 1" ABOVE THE LOAD PLATE (PIER 3 BEARINGS).

BASIS OF PAYMENT FOR PIER NO. 3 BEARINGS

THE UNIT BID PRICE FOR THE BEARINGS SHALL INCLUDE ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO FURNISH AND INSTALL THE BEARINGS ACCORDING TO THE PLAN DIMENSIONS & NOTES 1 THRU 7, THIS SHEET. PAYMENT WILL BE MADE AT THE CONTRACT PRICE FOR ITEM 516 ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE.

ITEM 863 STRUCTURAL STEEL, MISC. LEVEL: BEARING, PTFE (TEFLON), AS PER PLAN, SHALL INCLUDE THE BEARINGS AT PIERS 1, 2 AND 4. THESE BEARINGS SHALL BE IN ACCORDANCE WITH APPLICABLE ITEMS OF SS 863, NOTES 1 THRU 5, THIS SHEET, NOTES ON SHEET 6/18, AND THE FOLLOWING:

THE CONTRACTOR HAS THE OPTION OF WELDING OR MACHINING THE SIDE RETAINER TO THE TOP LOAD PLATE. IF THE WELDING OPTION IS SELECTED, A COMPLETE PENETRATION WELD (CP) SHALL BE DESIGNATED AND ULTRASONIC TESTING SHALL BE PERFORMED ON THE WELDS PER SS 863. IF THE CONNECTION IS MACHINED, IT SHALL BE CAPABLE OF RESISTING A MINIMUM LATERAL FORCE OF 10% OF THE VERTICAL DEAD LOAD + LIVE LOAD.

METHOD OF MEASUREMENT

THE UNIT PRICE BID, EACH, SHALL INCLUDE THE COST OF ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO DESIGN, SUPPLY, INSTALL AND TEST THE BEARINGS ACCORDING TO THE PLAN DIMENSIONS AND THESE NOTES.

BASIS OF PAYMENT FOR PIER NO.'S 1, 2, & 4 BEARINGS

PAYMENT WILL BE MADE AT UNIT PRICE BID FOR: ITEM 863 STRUCTURAL STEEL, MISC. LEVEL: BEARING, PTFE(TEFLON), AS PER PLAN.

REFERENCE

FOR FRAMING PLAN, SEE SHEET 8 18 .
7

BEARING LOCATION	BEARING TYPE	DEAD LOAD (KIPS)	LIVE LOAD (KIPS)	TOTAL LOAD (DL+LL) (KIPS)	L	W	ti	NO. OF tiS	te (2 EACH)	NUMBER OF INTERNAL LAMINATES (14 GAGE)	T	TOP LOAD PLATE (INCHES)				BASE PLATE (INCHES)			3/16" PTFE (TEFLON) SHEET		1/8" STAINLESS STEEL PLATE		H
												A	B	C	D	E	F	G	J	K	M	N	
PIER 1	EXPANSION	596	247	843	30"	30"	0.60"	4	0.42"	5	3.61"	36"	37"	4.22"	2.22"	31"	31"	1.00"	29"	29"	30"	36"	8.05"
PIER 2	EXPANSION	602	259	861	30"	30"	0.60"	4	0.42"	5	3.61"	36"	34"	4.66"	2.26"	31"	31"	1.00"	29"	29"	30"	33"	8.29"
PIER 3	FIXED	560	250	810	24"	33"	0.55"	3	0.39"	4	2.73"	40"	25"	4.17"	2.77"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.20"
PIER 4	EXPANSION	531	232	763	28"	28"	0.60"	4	0.42"	5	3.61"	34"	32"	3.21"	2.13"	29"	29"	1.00"	27"	27"	28"	31"	7.50"

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03–26–02

DESIGN AGENCY: M-E Companies, 501 Avenue, Oregon, Phone 419-698-4000

DESIGNED	DRAWN	REVIEWED	DATE
CMD	AGW	PAR	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
TAB	-	2202476	

PIER BEARING DETAILS

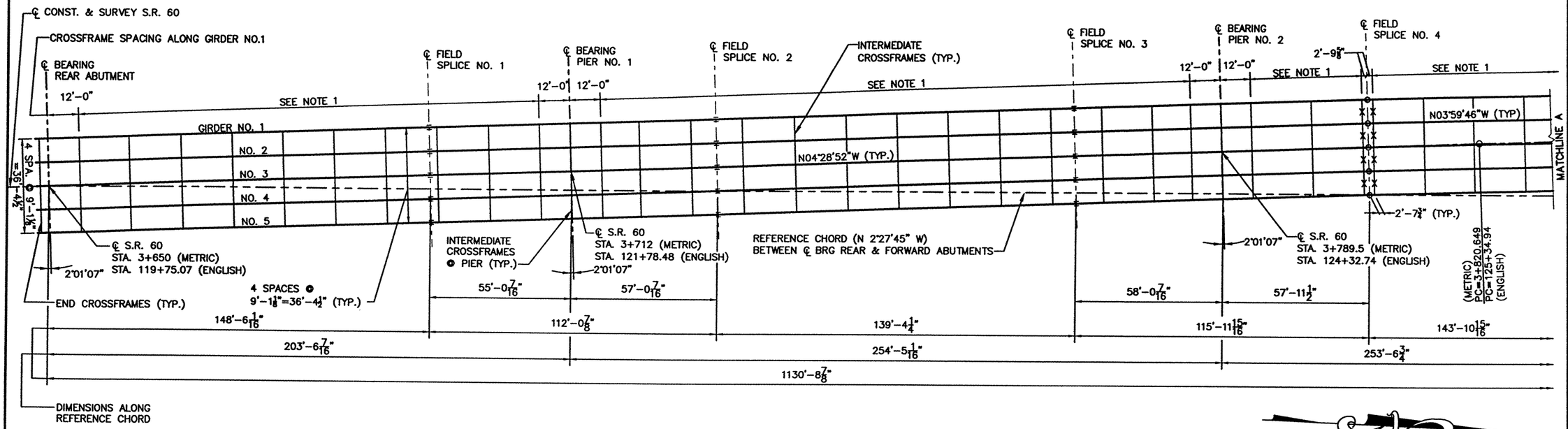
BRIDGE NO. ERI–60–03649

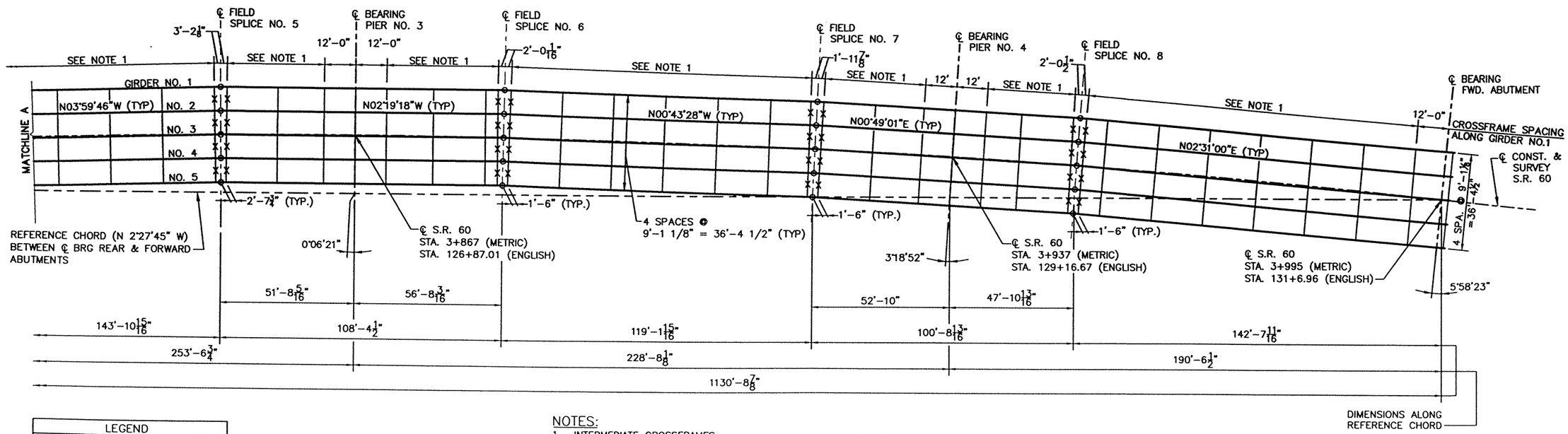
OVER VERMILLION RIVER

ERI–60–3.100

7/18

8/56





LEGEND

FIELD SPLICE	BENT FIELD SPLICE
INTERMEDIATE CROSSFRAME W/ADDITIONAL TOP ANGLE MEMBER	

NOTES:

1. INTERMEDIATE CROSSFRAMES SPACING @ 20'-0" MAXIMUM.
2. FOR BEARING DETAILS, SEE SHEET ~~6/18~~ AND ~~7/18~~
3. FOR CROSSFRAME DETAILS, SEE SHEET ~~10/18~~ AND ~~13/18~~
4. FOR SPLICE DETAILS, SEE SHEET 10/18
5. FOR CAMBER DETAILS, SEE SHEET 11/18 AND 12/18
6. PARTIAL PAINTING OF A588/A709 GR50 STEEL: A 10 FOOT LENGTH FROM THE ENDS OF GIRDERS ADJACENT TO ABUTMENTS (ON BOTH SIDES OF INTERMEDIATE EXPANSION JOINTS) AND ALL CROSS FRAMES AND OTHER STEEL WITHIN THESE LIMITS SHALL BE PAINTED. PAINT SHALL BE SYSTEM IZEU. THE PRIME COAT SHALL BE 708.17. THE TOP COAT COLOR SHALL CLOSELY APPROACH FEDERAL STANDARD NO. 595a-20045 OR 20059 (THE COLOR OF WEATHERING STEEL).

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M.E. Companies
435 Riverview Boulevard
Bowling Green, OH 43402
Phone: 419-419-4600

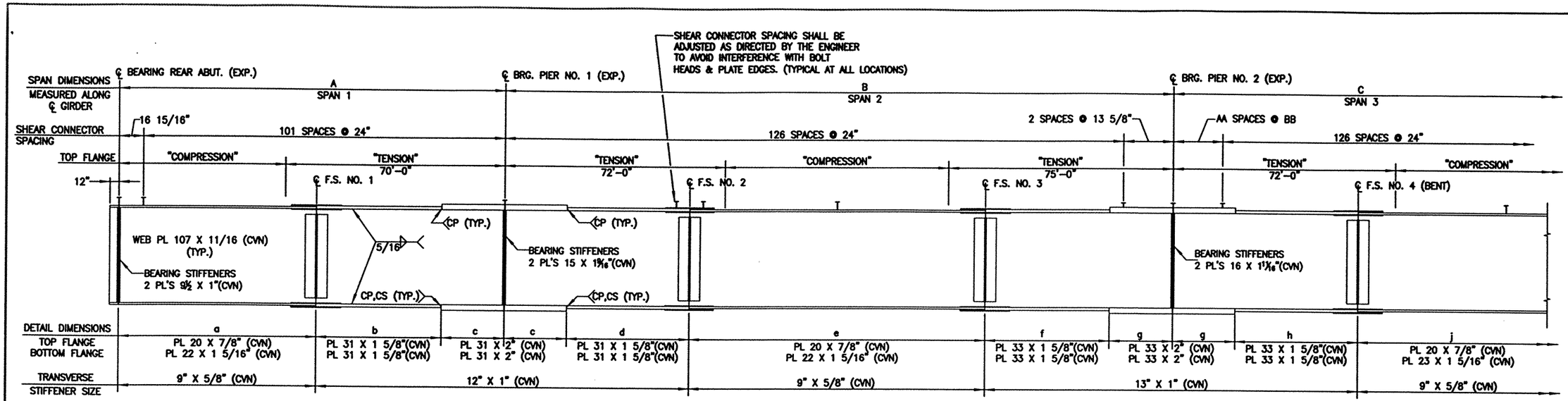
DESIGNED TAB | DRAWN AGW | CHECKED CMD | REVIEWED PAR | DATE 11/08/01 | REVISED - | STRUCTURE FILE 2202476

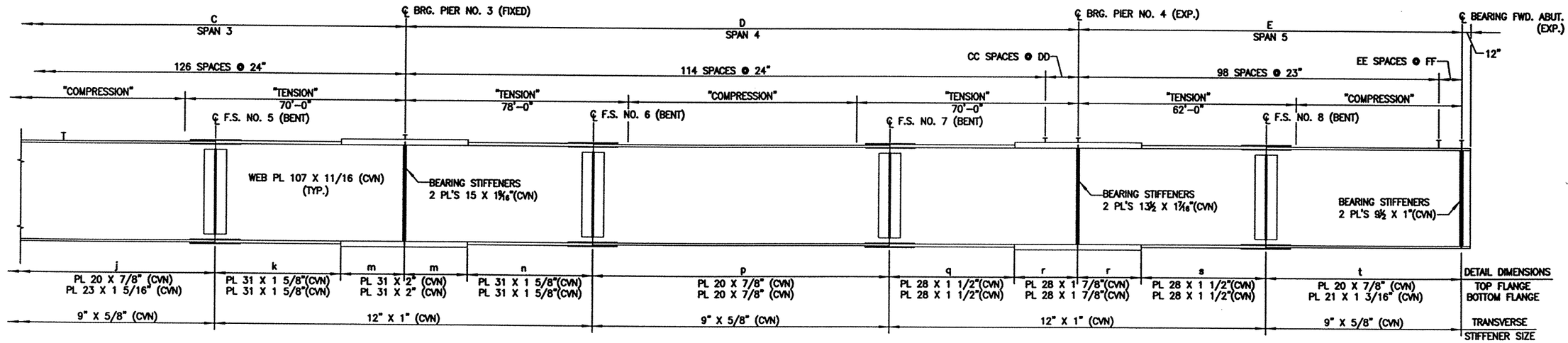
FRAMING PLAN
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

8/18

9/56

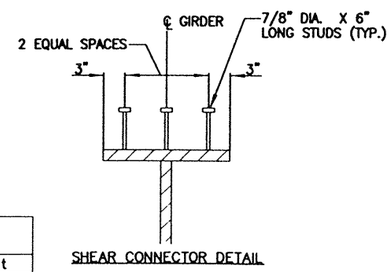




	GIRDER SPAN DIMENSIONS (FEET)				
GIRDER NO	A	B	C	D	E
1	203.41	254.27	254.93	230.67	190.81
2	203.41	254.27	254.60	230.16	190.55
3	203.41	254.27	254.26	229.65	190.29
4	203.41	254.27	253.92	229.14	190.02
5	203.41	254.27	253.58	228.63	189.76

	SHEAR STUD SPACES AND SPACING					
GIRDER NO	AA	BB	CC	DD	EE	FF
1	2	17 9/16"	2	16 1/16"	2	17 7/8"
2	2	15 5/8"	2	13"	2	16 5/16"
3	2	13 9/16"	1	19 13/16"	2	14 3/4"
4	1	23 1/16"	1	13 11/16"	2	13 1/8"
5	1	18"	1	7 9/16"	1	23 1/8"

	GIRDER DETAIL DIMENSIONS (FEET)																
GIRDER NO	a	b	c	d	e	f	g	h	j	k	m	n	p	q	r	s	t
1	148.41	30.00	25.00	32.00	139.27	33.00	25.00	33.08	144.60	27.25	25.00	32.26	120.15	28.25	25.00	23.26	142.56
2	148.41	30.00	25.00	32.00	139.27	33.00	25.00	33.04	144.43	27.13	25.00	32.13	119.90	28.13	25.00	23.13	142.42
3	148.41	30.00	25.00	32.00	139.27	33.00	25.00	33.00	144.26	27.00	25.00	32.00	119.65	28.00	25.00	23.00	142.29
4	148.41	30.00	25.00	32.00	139.27	33.00	25.00	32.96	144.09	26.87	25.00	31.87	119.41	27.87	25.00	22.87	142.15
5	148.41	30.00	25.00	32.00	139.27	33.00	25.00	32.92	143.92	26.74	25.00	31.73	119.16	27.74	25.00	22.74	142.02



SHEAR CONNECTOR DETAIL

NOTES:

1. WHERE A SHAPE OR PLATE IS DESIGNATED (CVN) THE MATERIAL SHALL MEET SPECIFIED MINIMUM NOTCH TOUGHNESS REQUIREMENTS AS SPECIFIED IN 711.01.
2. WELDED ATTACHMENT OF SUPPORTS FOR CONCRETE DECK FINISHING MACHINE MAY BE MADE TO AREAS OF THE FACIA STRINGER FLANGES DESIGNATED "COMPRESSION". WELDING OF ATTACHMENTS, EITHER PERMANENT OR TEMPORARY, IS NOT ACCEPTABLE IN "TENSION" AREAS. FILLET WELDS TO COMPRESSION FLANGES SHALL BE NOT CLOSER THAN 1" FROM EDGE OF FLANGE, BE NOT MORE THAN 2" LONG, AND BE NOT SMALLER THAN ¼" FOR THICKNESS UP TO ¾" AND 5/16" FOR GREATER THAN ¾" THICK.
3. FOR ADDITIONAL DETAILS REFER TO STD. DWG. GSD-1-93.
4. FOR BEAM SPLICE DETAILS SEE SHEET 10/18
5. PARTIAL PAINTING OF A588/A709 Gr 50 STEEL: A 10 FOOT LENGTH FROM THE ENDS OF GIRDERS ADJACENT TO ABUTMENTS AND ALL CROSS FRAMES AND OTHER STEEL WITHIN THESE LIMITS SHALL BE PAINTED. PAINT SHALL BE SYSTEM IZEU. THE PRIME COAT SHALL BE 708.17. THE TOP COAT COLOR SHALL CLOSELY APPROACH FEDERAL STANDARD NO. 595A – 20045 OR 20059 (THE COLOR OF WEATHERING STEEL).

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

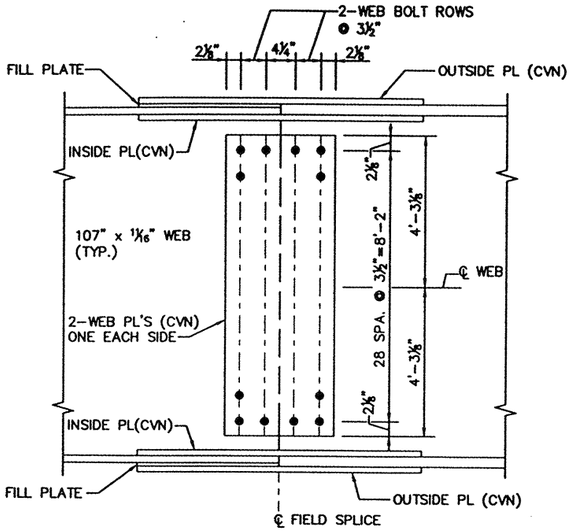
DESIGN AGENCY
M.E. Companies
DESIGNED TAB
DRAWN AGW
CHECKED CMD
REVIEWED PAR
DATE 11/08/01
STRUCTURE FILE 2202476
REVISED -

GIRDER ELEVATION
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

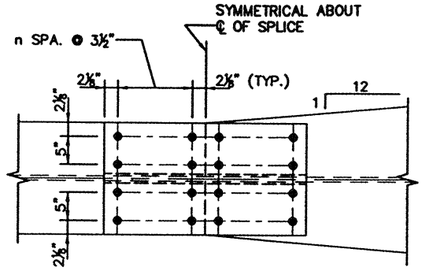
ERI-60-3.100

9/18

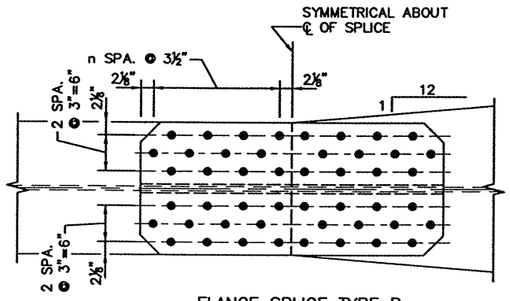
10/56



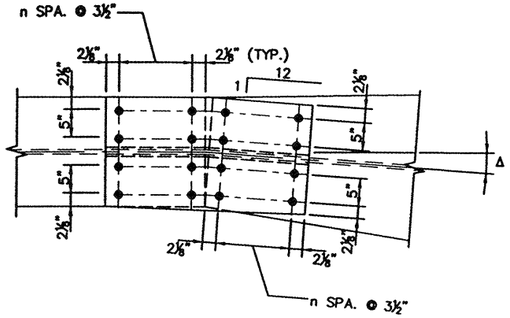
ELEVATION



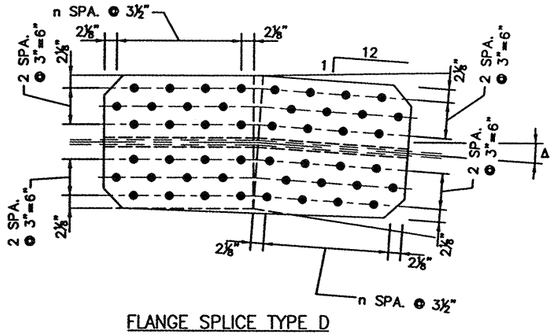
FLANGE SPLICE TYPE A



FLANGE SPLICE TYPE B



FLANGE SPLICE TYPE C



FLANGE SPLICE TYPE D

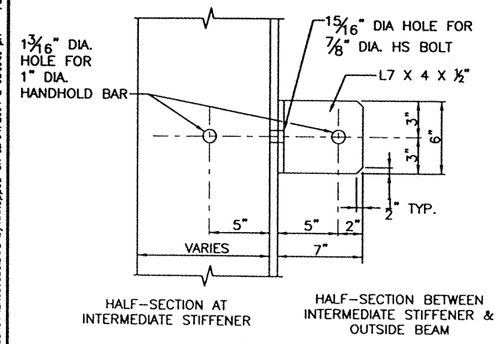
NOTES

1. ALL GIRDER FIELD SPLICES SHALL BE MADE WITH 1⅛" DIAMETER HIGH STRENGTH BOLTS, ASTM-A325. THE BOLTS SHALL BE PLACED WITH THEIR HEADS ON THE OUTSIDE FACE OF THE EXTERIOR GIRDER, ON THE BOTTOM OF THE BOTTOM FLANGE PLATES, AND THE TOP OF THE TOP FLANGE PLATES.
2. ALL SPLICE PLATES, EXCEPT FILL PLATES, SHALL BE DESIGNATED (CVN) AND SHALL MEET SPECIFIED MINIMUM NOTCH TOUGHNESS REQUIREMENTS AS SPECIFIED IN 711.01 OF CMS.
3. FOR FRAMING PLAN SEE SHEET ~~8/18~~
4. FOR ADDITIONAL DETAILS AND NOTES SEE SHEET ~~8/18~~
5. THE STEEL FOR THE HANDHOLD BAR AND SUPPORT ANGLES SHALL BE ASTM A588. PAYMENT FOR HANDHOLD BAR, SUPPORT ANGLES, BOLTS, ETC. SHALL BE INCLUDED WITH ITEM 863 STRUCTURAL STEEL MEMBERS, LEVEL FOUR (4) FABRICATION (A588).

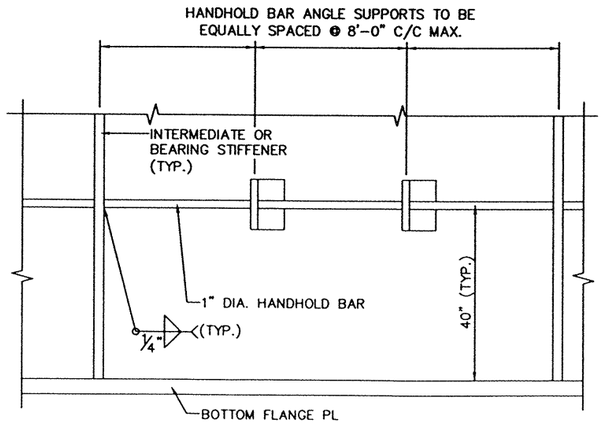
GIRDER SPLICE DATA

SPLICE NO.	Δ	WEB PLATES (2 REQ'D)	WEB BOLTS	TOP FLANGE						BOTTOM FLANGE					
				SPLICE TYPE	OUTSIDE PL (1 REQ'D)	INSIDE PL (2 REQ'D)	FILL PL	FLANGE BOLTS	n	SPLICE TYPE	OUTSIDE PL (1 REQ'D)	INSIDE PL (2 REQ'D)	FILL PL	FLANGE BOLTS	n
1	--	15½"x⅜"x8'-6¼"	116	A	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	B	22"x⅝"x4'-9½"	10¼"x⅝"x4'-9½"	22"x⅝"x2'-4¾"	48	7
2	--	15½"x⅜"x8'-6¼"	116	A	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	B	22"x⅝"x4'-9½"	10¼"x⅝"x4'-9½"	22"x⅝"x2'-4¾"	48	7
3	--	15½"x⅜"x8'-6¼"	116	A	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	B	22"x⅝"x4'-9½"	10¼"x⅝"x4'-9½"	22"x⅝"x2'-4¾"	48	7
4*	0°29'06"	15½"x⅜"x8'-6¼"	116	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	D	23"x⅝"x4'-9½"	10¾"x⅝"x4'-9½"	23"x⅝"x2'-4¾"	48	7
5*	1°40'28"	15½"x⅜"x8'-6¼"	116	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	D	23"x⅝"x4'-9½"	10¾"x⅝"x4'-9½"	23"x⅝"x2'-4¾"	48	7
6*	1°35'50"	15½"x⅜"x8'-6¼"	116	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x¾"x1'-2¾"	32	3
7*	1°32'29"	15½"x⅜"x8'-6¼"	116	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x⅝"x1'-2¾"	32	3	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x⅝"x1'-2¾"	32	3
8*	1°41'59"	15½"x⅜"x8'-6¼"	116	C	20"x⅜"x2'-5½"	9¼"x⅜"x2'-5½"	20"x⅝"x1'-2¾"	32	3	C	21"x½"x3'-0½"	9¾"x½"x3'-0½"	21"x⅝"x1'-6¼"	40	4

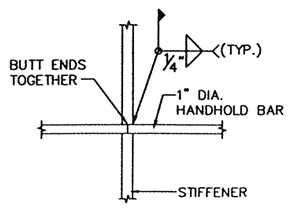
* INDICATES BENT FIELD SPLICE. FLANGE PLATE SIZES SHOWN ARE MINIMUM. ADJUST AS REQUIRED TO FIT BEND



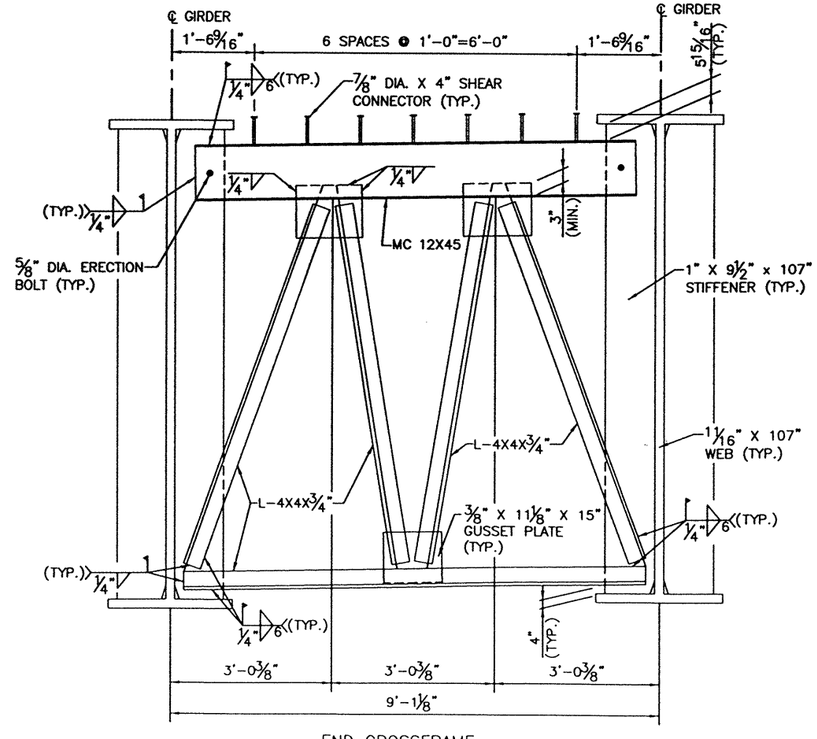
DETAIL A



HANDHOLD BAR DETAILS
SEE TRANSVERSE SECTIONS FOR ADDITIONAL DETAILS



FIELD SPLICE DETAIL



END CROSSFRAME

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY: M.E. Companies, 635 Brooksedge Boulevard, Westerville, Ohio 43081, Phone: 614-895-1800

DESIGNED	DRAWN	REVIEWED	DATE
TAB	AGW	PAR	11/08/01
CHECKED	REVISED	STRUCTURE FILE	
CMD	-	2202476	

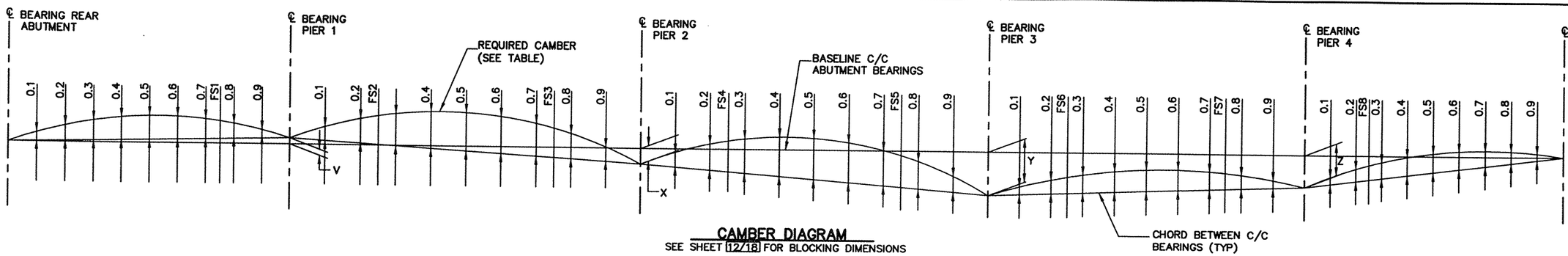
SUPERSTRUCTURE DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

10/18

11/56

D:\ERIE-60\DVG\PROFDRGNS\ER060303.DVG by Hknoppes on 11/04/2004 @ 03:00:01 pm - for M-E Companies, Inc.



CAMBER DIAGRAM

SEE SHEET 12/18 FOR BLOCKING DIMENSIONS

DEFLECTION AND CAMBER (INCHES)

SPAN LOCATION		SPAN 1										SPAN 2											SPAN 3										
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	FS1	0.8	0.9	0.1	0.2	FS2	0.3	0.4	0.5	0.6	0.7	FS3	0.8	0.9	0.1	0.2	FS4	0.3	0.4	0.5	0.6	0.7	FS5	0.8	0.9
BEAM 1	DEFLECTION DUE TO STEEL	0.420	0.766	0.987	1.059	0.984	0.788	0.525	0.449	0.268	0.074	0.128	0.418	0.500	0.758	1.020	1.107	0.989	0.707	0.464	0.369	0.097	0.153	0.480	0.590	0.869	1.190	1.333	1.252	0.972	0.600	0.584	0.222
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.965	1.766	2.291	2.483	2.342	1.921	1.330	1.153	0.724	0.241	0.162	0.672	0.825	1.307	1.820	2.009	1.810	1.293	0.840	0.663	0.160	0.332	1.000	1.218	1.779	2.409	2.677	2.500	1.929	1.186	1.151	0.431
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	1.446	2.569	3.369	3.846	3.999	3.829	3.336	2.997	2.520	1.380	2.116	3.727	4.031	4.832	5.433	5.528	5.119	4.204	3.351	2.785	1.335	−0.940	−1.880	−2.229	−2.761	−3.696	−4.047	−4.442	−4.436	−4.076	−3.942	−2.230
	REQUIRED SHOP CAMBER	2.831	5.101	6.647	7.389	7.325	6.538	5.191	4.599	3.511	1.695	2.405	4.816	5.356	6.897	8.272	8.644	7.918	6.205	4.656	3.816	1.592	−0.454	−0.401	−0.422	−0.113	−0.097	−0.037	−0.689	−1.535	−2.289	−2.207	−1.578
BEAM 2	DEFLECTION DUE TO STEEL	0.420	0.766	0.987	1.059	0.984	0.788	0.525	0.449	0.268	0.074	0.128	0.418	0.500	0.758	1.020	1.107	0.989	0.707	0.464	0.369	0.097	0.153	0.480	0.590	0.869	1.190	1.333	1.252	0.972	0.600	0.584	0.222
	DEFLECTION DUE TO REMAINING DEAD LOAD	1.083	1.982	2.572	2.788	2.629	2.156	1.493	1.292	0.813	0.270	0.181	0.753	0.924	1.466	2.040	2.252	2.029	1.450	0.942	0.743	0.180	0.372	1.122	1.367	1.996	2.703	3.004	2.805	2.165	1.331	1.291	0.483
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	1.446	2.569	3.369	3.846	3.999	3.829	3.336	2.997	2.520	1.380	2.146	3.786	4.098	4.921	5.552	5.677	5.297	4.412	3.580	3.022	1.504	−0.999	−1.999	−2.334	−3.029	−4.197	−4.815	−5.135	−4.873	−4.047	−3.910	−2.323
	REQUIRED SHOP CAMBER	2.949	5.318	6.928	7.693	7.612	6.774	5.354	4.738	3.600	1.724	2.454	4.956	5.522	7.144	8.612	9.036	8.315	6.569	4.986	4.134	1.780	−0.474	−0.397	−0.377	−0.164	−0.303	−0.478	−1.077	−1.735	−2.116	−2.035	−1.618
BEAM 3	DEFLECTION DUE TO STEEL	0.420	0.766	0.987	1.059	0.984	0.788	0.525	0.449	0.268	0.074	0.128	0.418	0.500	0.758	1.020	1.107	0.989	0.707	0.464	0.369	0.097	0.153	0.480	0.590	0.869	1.190	1.333	1.252	0.972	0.600	0.584	0.222
	DEFLECTION DUE TO REMAINING DEAD LOAD	1.083	1.982	2.572	2.788	2.629	2.156	1.493	1.292	0.813	0.270	0.181	0.753	0.925	1.466	2.040	2.252	2.029	1.450	0.942	0.743	0.180	0.372	1.122	1.367	1.996	2.703	3.004	2.805	2.165	1.331	1.291	0.483
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	1.446	2.569	3.369	3.846	3.999	3.829	3.336	2.997	2.520	1.380	2.260	4.014	4.353	5.264	6.008	6.248	5.982	5.211	4.462	3.935	2.155	−1.352	−2.704	−3.108	−4.087	−5.606	−6.621	−6.813	−6.177	−4.910	−4.741	−2.777
	REQUIRED SHOP CAMBER	2.949	5.318	6.928	7.693	7.612	6.774	5.354	4.738	3.600	1.724	2.568	5.185	5.778	7.487	9.068	9.607	9.000	7.368	5.868	5.047	2.431	−0.827	−1.102	−1.151	−1.222	−1.713	−2.284	−2.755	−3.040	−2.979	−2.866	−2.072
BEAM 4	DEFLECTION DUE TO STEEL	0.420	0.766	0.987	1.059	0.984	0.788	0.525	0.449	0.268	0.074	0.128	0.418	0.500	0.758	1.020	1.107	0.989	0.707	0.464	0.369	0.097	0.153	0.480	0.590	0.869	1.190	1.333	1.252	0.972	0.600	0.584	0.222
	DEFLECTION DUE TO REMAINING DEAD LOAD	1.083	1.982	2.572	2.788	2.629	2.156	1.493	1.292	0.813	0.270	0.181	0.753	0.925	1.466	2.040	2.252	2.029	1.450	0.942	0.743	0.180	0.372	1.122	1.367	1.996	2.703	3.004	2.805	2.165	1.331	1.291	0.483
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	1.446	2.569	3.369	3.846	3.999	3.829	3.336	2.997	2.520	1.380	2.260	4.014	4.353	5.264	6.008	6.248	5.982	5.223	4.462	3.935	2.155	−1.162	−2.325	−2.641	−3.561	−5.625	−7.290	−7.586	−6.803	−5.104	−5.120	−3.005
	REQUIRED SHOP CAMBER	2.949	5.318	6.928	7.693	7.612	6.774	5.354	4.738	3.600	1.724	2.568	5.185	5.788	7.487	9.068	9.607	9.000	7.380	5.868	5.047	2.431	−0.637	−0.723	−0.684	−0.696	−1.731	−2.953	−3.528	−3.666	−3.173	−3.245	−2.300
BEAM 5	DEFLECTION DUE TO STEEL	0.420	0.766	0.987	1.059	0.984	0.788	0.525	0.449	0.268	0.074	0.128	0.418	0.500	0.758	1.020	1.107	0.989	0.707	0.464	0.369	0.097	0.153	0.480	0.590	0.869	1.190	1.333	1.252	0.972	0.600	0.584	0.222
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.965	1.766	2.291	2.483	2.342	1.921	1.330	1.153	0.724	0.241	0.162	0.672	0.826	1.307	1.820	2.009	1.810	1.293	0.840	0.663	0.160	0.332	1.000	1.218	1.779	2.409	2.677	2.500	1.929	1.186	1.151	0.431
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	1.446	2.569	3.369	3.846	3.999	3.829	3.336	2.997	2.520	1.380	2.260	4.014	4.353	5.264	6.008	6.248	5.982	5.211	4.462	3.935	2.155	−0.972	−1.945	−2.176	−3.035	−5.643	−7.963	−8.359	−7.429	−5.500	−5.498	−3.234
	REQUIRED SHOP CAMBER	2.831	5.101	6.647	7.389	7.325	6.538	5.191	4.599	3.511	1.695	2.549	5.104	5.678	7.329	8.848	9.363	8.781	7.212	5.766	4.967	2.412	−0.487	−0.465	−0.368	−0.387	−2.043	−3.953	−4.607	−4.527	−3.714	−3.763	−2.581

REVISED 4/11/02

DESIGNED	DRAWN	REVIEWED	DATE
KMH	KMH	TAB	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
ENB	–	2202476	

DESIGN AGENCY

M.E. Companies
635 Brookedge Boulevard
Westerville, OH 43081
Phone 614-818-4900

CAMBER DIAGRAM AND TABLE

BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

11/18

12/56

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DEFLECTION AND CAMBER (INCHES)

SPAN LOCATION		SPAN 4											SPAN 5									
		0.1	0.2	FS6	0.3	0.4	0.5	0.6	0.7	FS7	0.8	0.9	0.1	0.2	FS8	0.3	0.4	0.5	0.6	0.7	0.8	0.9
BEAM 1	DEFLECTION DUE TO STEEL	-0.010	0.114	0.205	0.301	0.480	0.568	0.531	0.383	0.249	0.191	0.038	0.100	0.285	0.404	0.512	0.728	0.878	0.924	0.847	0.651	0.355
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.003	0.273	0.467	0.664	1.018	1.172	1.063	0.733	0.454	0.330	0.032	0.270	0.729	1.014	1.274	1.780	2.122	2.216	2.023	1.548	0.842
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	-2.711	-4.876	-5.905	-6.511	-7.266	-7.481	-7.307	-6.429	-5.599	-4.917	-2.780	-1.878	-3.382	-4.042	-4.456	-4.921	-5.014	-4.803	-4.148	-3.121	-1.773
	REQUIRED SHOP CAMBER	-2.719	-4.489	-5.238	-5.545	-5.768	-5.740	-5.713	-5.313	-4.896	-4.396	-2.710	-1.508	-2.368	-2.625	-2.671	-2.413	-2.015	-1.664	-1.278	-0.922	-0.577
BEAM 2	DEFLECTION DUE TO STEEL	-0.010	0.114	0.205	0.301	0.480	0.568	0.531	0.383	0.249	0.191	0.038	0.100	0.285	0.404	0.512	0.728	0.878	0.924	0.847	0.651	0.355
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.003	0.306	0.517	0.745	1.141	1.314	1.192	0.822	0.477	0.370	0.035	0.303	0.819	1.138	1.430	1.998	2.382	2.488	2.271	1.738	0.946
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	-2.701	-4.741	-5.588	-6.340	-7.312	-7.625	-7.354	-6.343	-5.315	-4.748	-2.730	-1.860	-3.267	-3.799	-4.360	-5.073	-5.334	-5.175	-4.528	-3.428	-1.899
	REQUIRED SHOP CAMBER	-2.708	-4.322	-4.866	-5.294	-5.691	-5.743	-5.632	-5.138	-4.589	-4.188	-2.657	-1.458	-2.162	-2.257	-2.418	-2.347	-2.074	-1.764	-1.409	-1.039	-0.599
BEAM 3	DEFLECTION DUE TO STEEL	-0.010	0.114	0.205	0.301	0.480	0.568	0.531	0.383	0.249	0.191	0.038	0.100	0.285	0.404	0.512	0.728	0.878	0.924	0.847	0.651	0.355
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.003	0.306	0.517	0.745	1.141	1.314	1.192	0.822	0.477	0.370	0.035	0.303	0.819	1.136	1.430	1.998	2.382	2.488	2.271	1.738	0.946
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	-2.733	-4.802	-5.585	-6.341	-7.341	-7.681	-7.355	-6.369	-5.322	-4.796	-2.731	-1.887	-3.319	-3.877	-4.394	-5.132	-5.415	-5.242	-4.617	-3.536	-2.000
	REQUIRED SHOP CAMBER	-2.739	-4.383	-4.863	-5.295	-5.720	-5.799	-5.632	-5.164	-4.596	-4.236	-2.658	-1.485	-2.215	-2.335	-2.452	-2.406	-2.156	-1.831	-1.498	-1.147	-0.700
BEAM 4	DEFLECTION DUE TO STEEL	-0.010	0.114	0.205	0.301	0.480	0.568	0.531	0.383	0.249	0.191	0.038	0.100	0.285	0.404	0.512	0.728	0.878	0.924	0.847	0.651	0.355
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.003	0.306	0.517	0.745	1.141	1.314	1.192	0.822	0.477	0.370	0.035	0.303	0.819	1.138	1.430	1.998	2.382	2.488	2.271	1.738	0.946
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	-2.764	-4.863	-5.583	-6.342	-7.372	-7.737	-7.356	-6.395	-5.329	-4.845	-2.732	-1.904	-3.349	-3.871	-4.395	-5.146	-5.440	-5.241	-4.626	-3.554	-1.999
	REQUIRED SHOP CAMBER	-2.771	-4.444	-4.861	-5.296	-5.750	-5.854	-5.633	-5.190	-4.603	-4.285	-2.659	-1.501	-2.245	-2.329	-2.453	-2.420	-2.181	-1.830	-1.508	-1.165	-0.699
BEAM 5	DEFLECTION DUE TO STEEL	-0.010	0.114	0.205	0.301	0.480	0.568	0.531	0.383	0.249	0.191	0.038	0.100	0.285	0.404	0.512	0.728	0.878	0.924	0.847	0.651	0.355
	DEFLECTION DUE TO REMAINING DEAD LOAD	0.003	0.273	0.462	0.664	1.018	1.172	1.063	0.733	0.454	0.330	0.032	0.270	0.729	1.014	1.274	1.780	2.122	2.216	2.023	1.548	0.842
	ADJUSTMENT REQ'D FOR HORIZ & VERT CURVE	-2.795	-4.925	-5.580	-6.342	-7.401	-7.792	-7.356	-6.421	-5.336	-4.894	-2.733	-1.920	-3.379	-3.865	-4.395	-5.159	-5.465	-5.240	-4.636	-3.572	-1.998
	REQUIRED SHOP CAMBER	-2.802	-4.538	-4.913	-5.377	-5.902	-6.051	-5.762	-5.304	-4.633	-4.374	-2.664	-1.550	-2.365	-2.447	-2.610	-2.651	-2.466	-2.101	-1.766	-1.374	-0.802

BLOCKING DIMENSIONS (FEET)

BEAM	V	X	Y	Z
1	0.52	2.49	6.13	4.87
2	0.55	2.45	6.18	4.90
3	0.64	2.34	6.33	4.98
4	0.68	2.26	6.37	5.00
5	0.72	2.17	6.41	5.03

SEE SHEET 11/18 FOR CAMBER DIAGRAM.

DESIGN AGENCY
M-E COMPANIES
M.E. Companies
435 Brookside Parkway
Hartford, OH 43027
Phone 614-873-4600

DESIGNED KMH | DRAWN KMH | CHECKED ENB | REVIEWED TAB | REVISED - | DATE 11/30/01

STRUCTURE FILE 2202476

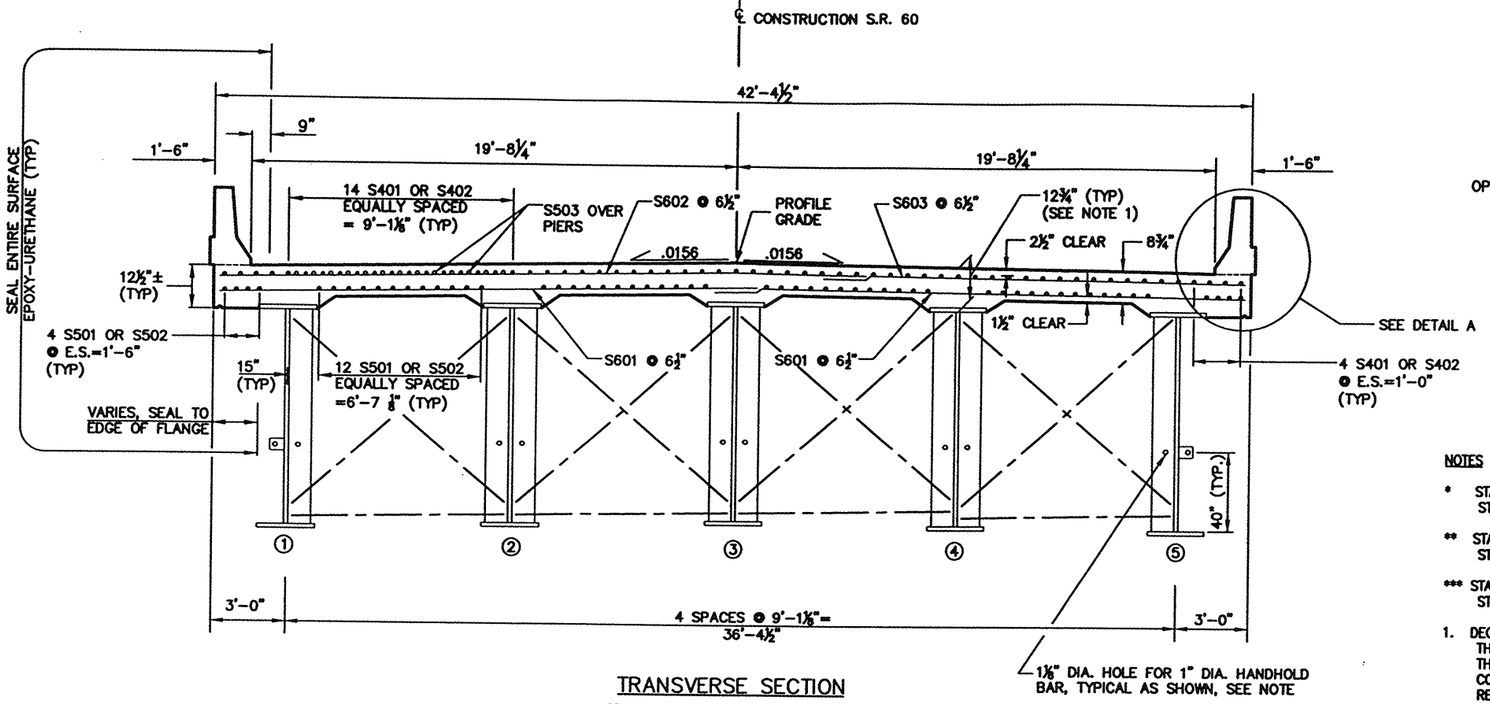
CAMBER TABLE
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

12/18

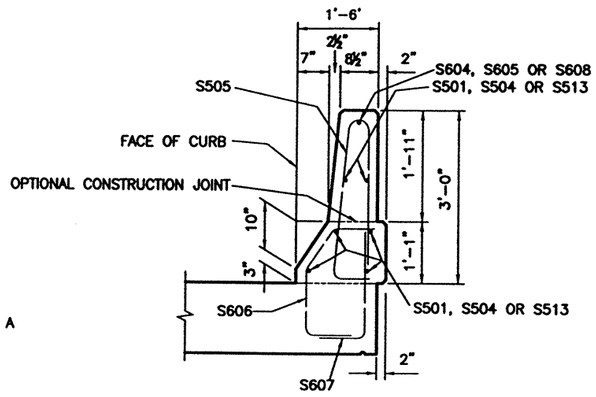
13/56

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02



TRANSVERSE SECTION

STA 119+75.07 TO STA 123+94.99



DETAIL A

NOTES

* STA 123+94.99 TO STA 125+70.37 CROSS SLOPE VARIES .0156 TO .0417 MAX.
STA 125+70.37 TO STA 131+06.96 CROSS SLOPE = .0417 MAX.

** STA 125+07.58 TO STA 125+70.37 CROSS SLOPE VARIES .0156 TO .033 MAX.
STA 125+70.37 TO STA 131+06.96 CROSS SLOPE = .033 MAX.

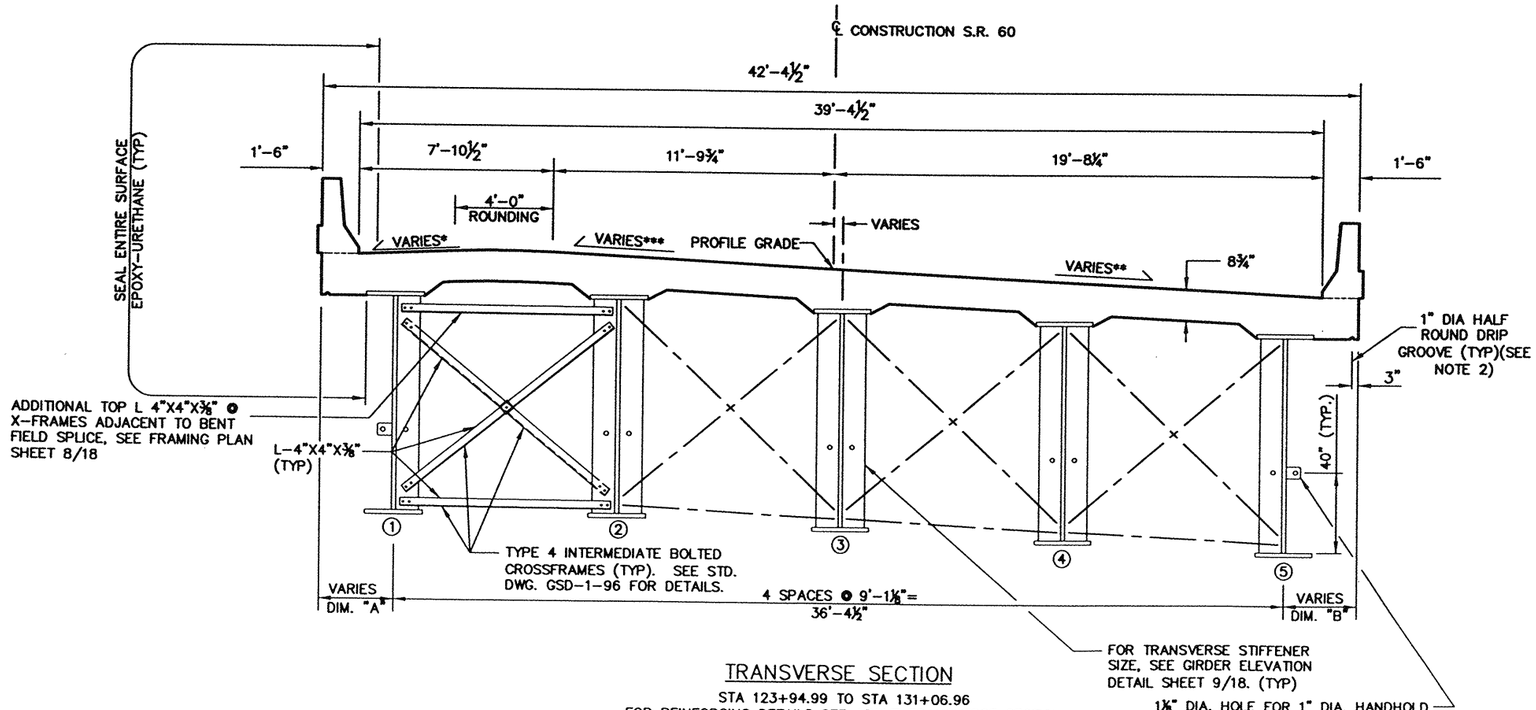
*** STA 123+94.99 TO STA 125+70.37 CROSS SLOPE VARIES −.0156 TO .033 MAX.
STA 125+70.37 TO STA 131+06.96 CROSS SLOPE = .033 MAX.

1. DECK SLAB DEPTH FOR CONCRETE QUANTITY: THE DIMENSION SHOWN FROM THE TOP OF THE CONCRETE DECK TO THE BOTTOM OF THE TOP FLANGE, MINUS THE DESIGN HAUNCH THICKNESS OF 4 INCHES, HAS BEEN USED FOR COMPUTING THE DECK CONCRETE QUANTITIES. CONCRETE REQUIRED TO FILL THE HAUNCHES, INCLUDING ADDITIONAL OR LESS MATERIAL REQUIRED DUE TO HAUNCH CONSTRUCTION TOLERANCES, SHALL BE CONSIDERED AS INCIDENTAL AND WILL NOT BE INCLUDED IN THE QUANTITY CALCULATIONS FOR PAYMENT.

   A HAUNCH WIDTH OF 9 INCHES SHALL BE USED. HOWEVER, THE HAUNCH WIDTH MAY VARY BETWEEN 6 INCHES AND 12 INCHES.

2. DRIP GROOVES SHALL TERMINATE 2'-6" FROM FACE OF ABUTMENTS.

3. 1" DIA. HANDHOLD BAR SHALL BE PLACED AS SHOWN BEGINING AT FIELD SPLICE 1 AND ENDING AT FIELD SPLICE 8, FAR ADDITIONAL DETAILS, SEE SHEET 10/18.



TRANSVERSE SECTION

STA 123+94.99 TO STA 131+06.96
FOR REINFORCING DETAILS SEE ABOVE TRANSVERSE SECTION

DECK OFFSET TABLE			
LOCATION	DIM "A"	LOCATION	DIM "B"
BEAM 1 AT PIER 2	3.00	BEAM 5 AT PIER 2	3.00
0.10PT	3.00	0.10PT	3.00
0.20PT	3.00	0.20PT	3.00
BEAM 1 AT FS4	3.00	BEAM 5 AT FS4	3.00
0.30PT	3.15	0.30PT	2.84
0.40PT	3.37	0.40PT	2.63
0.50PT	3.51	0.50PT	2.49
0.60PT	3.49	0.60PT	2.51
0.70PT	3.32	0.70PT	2.69
BEAM 1 AT FS5	3.00	BEAM 5 AT FS5	3.00
0.80PT	3.01	0.80PT	2.98
0.90PT	3.27	0.90PT	2.73
BEAM 1 AT PIER3	3.36	BEAM 5 AT PIER3	2.64
0.10PT	3.31	0.10PT	2.69
0.20PT	3.13	0.20PT	2.87
BEAM 1 AT FS6	3.00	BEAM 5 AT FS6	3.00
0.30PT	3.16	0.30PT	2.84
0.40PT	3.36	0.40PT	2.64
0.50PT	3.44	0.50PT	2.56
0.60PT	3.38	0.60PT	2.62
0.70PT	3.20	0.70PT	2.80
BEAM 1 AT FS7	3.00	BEAM 5 AT FS7	3.00
0.80PT	3.08	0.80PT	2.92
0.90PT	3.26	0.90PT	2.74
BEAM 1 AT PIER4	3.31	BEAM 5 AT PIER4	2.69
0.10PT	3.25	0.10PT	2.75
0.20PT	3.11	0.20PT	2.89
BEAM 1 AT FS8	3.00	BEAM 5 AT FS8	3.00
0.30PT	3.15	0.30PT	2.85
0.40PT	3.39	0.40PT	2.61
0.50PT	3.55	0.50PT	2.45
0.60PT	3.61	0.60PT	2.39
0.70PT	3.59	0.70PT	2.41
0.80PT	3.48	0.80PT	2.52
0.90PT	3.28	0.90PT	2.71
BEAM 1 AT FWD ABT	3.00	BEAM 5 AT FWD ABT.	3.00

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M-E COMPANIES
M.E. Companies
635 Brookedge Boulevard
Westerville, Ohio 43081
Phone 614-818-4900

DESIGNED	DRAWN	REVIEWED	DATE
KMH	ENB	TAB	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
CMD	-	2202476	

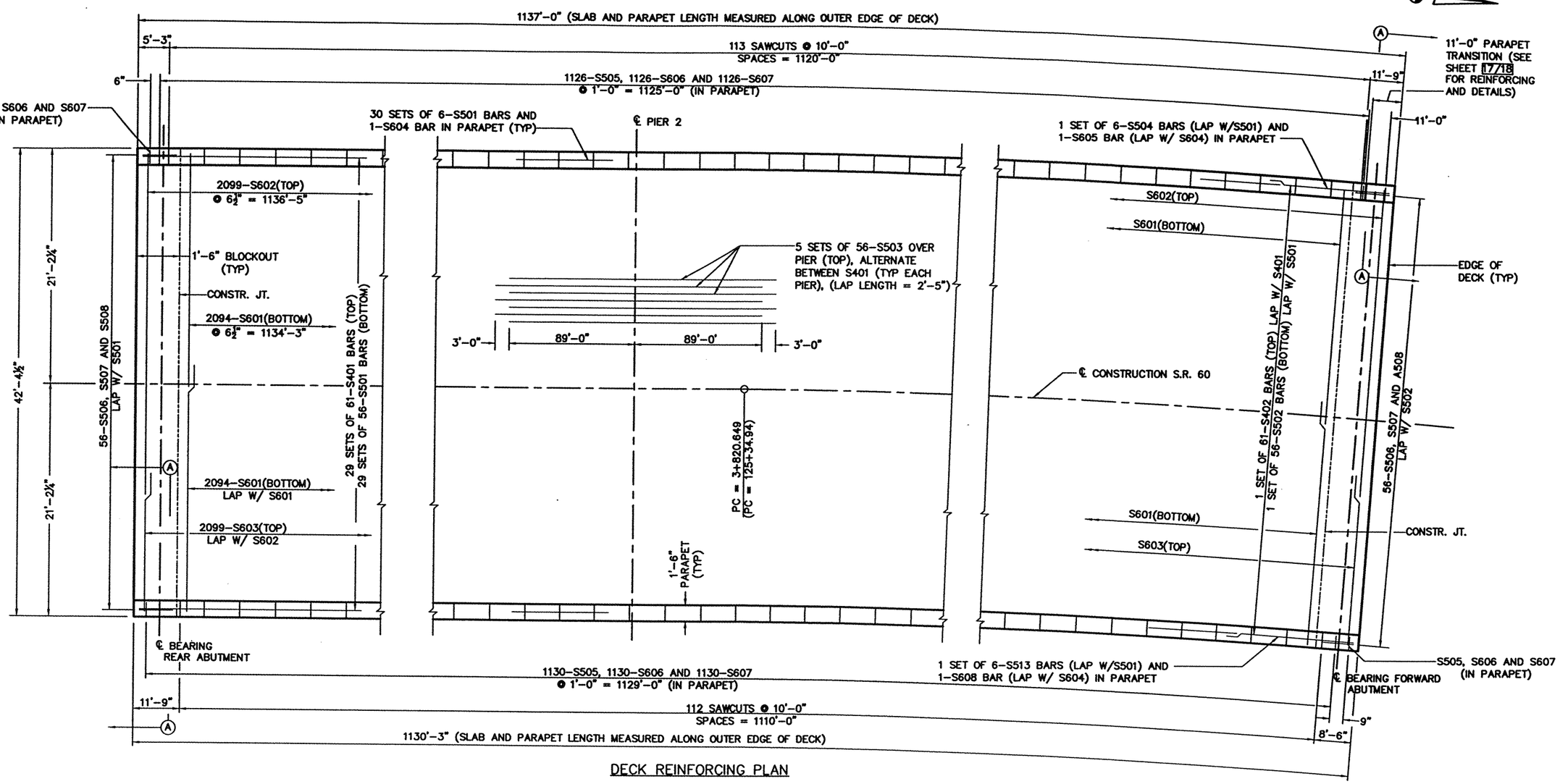
TRANSVERSE SECTION
BRIDGE NO. ERI-60-0.3649
OVER VERMILLION RIVER

ERI-60-3.100

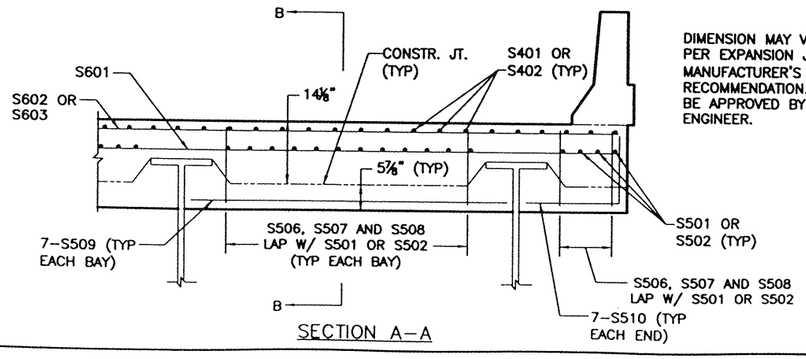
13/18

14/56

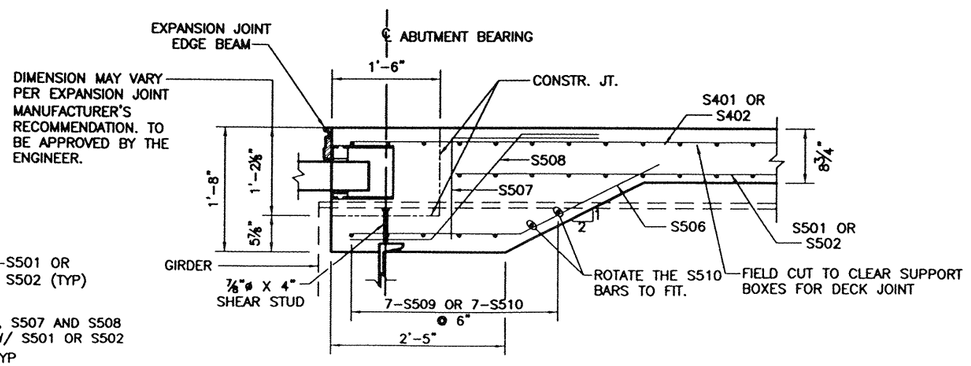
D:\ERI-60\DWG\APPROFORCONST\ERI06S04.DWG by:tmkoppe on 11/04/2004 @ 03:56:52 pm ~ for M-E Companies, Inc.



DECK REINFORCING PLAN



SECTION A-A



SECTION B-B

NOTES:

1. MINIMUM LAP LENGTHS
   (UNLESS STATED OTHERWISE):
   #4 BARS = 1'-11"
   #5 BARS
   DECK = 1'-11"
   PARAPET = 3'-5"
   #6 BARS
   DECK = 2'-4"
   PARAPET = 3'-5"
2. SEE STD. DWG. BR-1 FOR SAWCUT DETAILS
3. TRANSVERSE REINFORCING STEEL SHALL BE PLACED RADIALLY AFTER THE PC.
4. TRANSVERSE CONST. JT. SHALL NOT BE PERMITTED IN DECK SLAB.
5. FOR ADDITIONAL EXPANSION JOINT DETAILS SEE SHEET 16/18

STRUCTURE PLANS
APPROVED FOR CONSTRUCTION
03-26-02

DESIGN AGENCY
M.E. Companies
437 Bridge St., Elyria, Ohio 44035
Phone 877-818-4600
M-E COMPANIES

DESIGNED	DRAWN	REVIEWED	DATE
KMH	ENB	TAB	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
ENB	-	2202476	

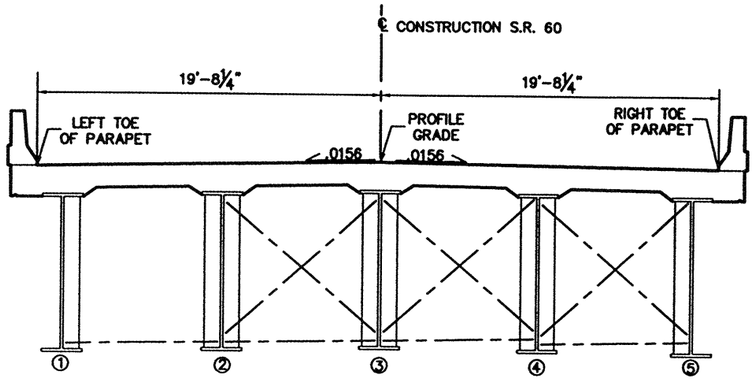
DECK PLAN
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

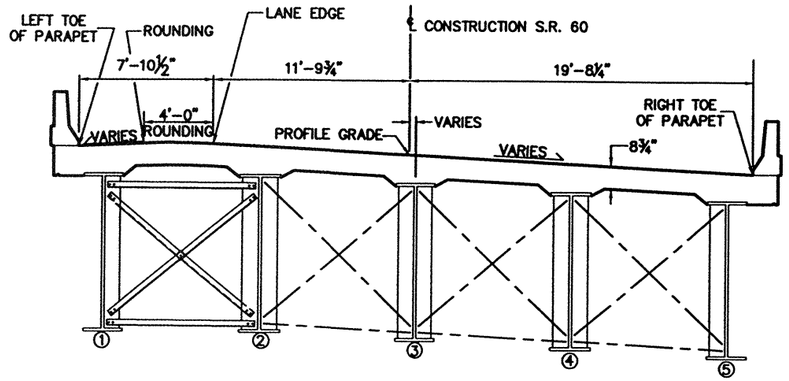
ERI-60-3.100

14/18

15/56

D:\ERIE-60\DMC\PROFORCONST\ERI60SS03.DWG by tmkoppas on 11/04/2004 @ 04:08:46 pm ~ for M-E Companies, Inc.





TRANSVERSE SECTION
STA 119+75.07 TO STA 123+94.99

SCREED ELEVATIONS TABLE (FEET)

	LEFT TOE	BEAM 1	ROUNDING	LANE EDGE	BEAM 2	BEAM 3	BEAM 4	BEAM 5	RT TOE
CL BRG REAR ABUT	794.52	794.55	---	---	794.69	794.83	794.69	794.55	794.52
0.10 PT	793.76	793.78	---	---	793.93	794.07	793.93	793.78	793.76
0.20 PT	792.95	792.97	---	---	793.13	793.28	793.13	792.97	792.95
0.30 PT	792.09	792.12	---	---	792.28	792.42	792.28	792.12	792.09
0.40 PT	791.18	791.21	---	---	791.37	791.52	791.37	791.21	791.18
0.50 PT	790.22	790.24	---	---	790.41	790.55	790.41	790.24	790.22
0.60 PT	789.20	789.22	---	---	789.39	789.53	789.39	789.22	789.20
0.70 PT	788.14	788.17	---	---	788.32	788.46	788.32	788.17	788.14
FIELD SPLICE 1	787.83	787.85	---	---	788.01	788.15	788.01	787.85	787.83
0.80 PT	787.06	787.08	---	---	787.23	787.37	787.23	787.08	787.06
0.90 PT	785.95	785.98	---	---	786.12	786.26	786.12	785.98	785.95
CL PIER 1	784.85	784.88	---	---	785.02	785.16	785.02	784.88	784.85
0.10 PT	783.47	783.49	---	---	783.63	783.78	783.63	783.49	783.47
0.20 PT	782.07	782.09	---	---	782.24	782.38	782.24	782.09	782.07
FIELD SPLICE 2	781.73	781.75	---	---	781.90	782.04	781.90	781.75	781.73
0.30 PT	780.64	780.66	---	---	780.82	780.96	780.82	780.66	780.64
0.40 PT	779.16	779.18	---	---	779.34	779.48	779.34	779.18	779.16
0.50 PT	777.60	777.63	---	---	777.79	777.93	777.79	777.63	777.60
0.60 PT	775.98	776.00	---	---	776.16	776.30	776.16	776.00	775.98
0.70 PT	774.28	774.31	---	---	774.46	774.60	774.46	774.31	774.28
FIELD SPLICE 3	773.04	773.06	---	---	773.21	773.36	773.21	773.06	773.04
0.80PT	772.54	772.56	---	---	772.71	772.85	772.71	772.56	772.54
0.90PT	770.80	770.82	770.86	770.93	770.96	771.07	770.93	770.78	770.76
CL BRG PIER 2	769.09	769.12	769.17	769.23	769.24	769.29	769.14	769.00	768.98
0.10PT	767.39	767.43	767.49	767.54	767.54	767.52	767.38	767.23	767.21
0.20PT	765.72	765.77	765.84	765.89	765.86	765.78	765.64	765.49	765.46
FIELD SPLICE 4	765.25	765.30	765.37	765.42	765.39	765.29	765.16	765.00	764.98
0.30PT	764.06	764.12	764.19	764.24	764.20	764.05	763.90	763.74	763.72
0.40PT	762.38	762.45	762.53	762.58	762.50	762.29	762.09	761.85	761.83
0.50PT	760.72	760.80	760.88	760.92	760.83	760.55	760.27	759.97	759.94
0.60PT	759.03	759.11	759.20	759.24	759.13	758.83	758.53	758.20	758.17
0.70PT	757.35	757.43	757.52	757.55	757.45	757.14	756.84	756.51	756.47
FIELD SPLICE 5	755.77	755.84	755.94	755.96	755.87	755.57	755.27	754.96	754.91
0.80PT	755.70	755.76	755.86	755.89	755.80	755.50	755.20	754.89	754.84
0.90PT	754.13	754.20	754.29	754.31	754.21	753.91	753.61	753.30	753.26

TRANSVERSE SECTION
STA 123+94.99 TO STA 131+06.96

SCREED ELEVATIONS TABLE (FEET)

	LEFT TOE	BEAM 1	ROUNDING	LANE EDGE	BEAM 2	BEAM 3	BEAM 4	BEAM 5	RIGHT TOE
CL BRG PIER 3	752.63	752.71	752.80	752.81	752.71	752.41	752.11	751.81	751.77
0.10PT	751.38	751.46	751.54	751.56	751.46	751.16	750.85	750.55	750.51
0.20PT	750.20	750.27	750.36	750.38	750.28	749.98	749.67	749.37	749.32
FIELD SPLICE 6	749.64	749.70	749.81	749.83	749.74	749.44	749.14	748.83	748.78
0.30PT	749.07	749.14	749.23	749.25	749.16	748.86	748.56	748.25	748.21
0.40PT	748.00	748.07	748.16	748.18	748.08	747.78	747.48	747.16	747.12
0.50PT	746.96	747.04	747.13	747.14	747.04	746.73	746.43	746.11	746.08
0.60PT	745.93	746.01	746.11	746.12	746.02	745.72	745.42	745.11	745.07
0.70PT	744.96	745.03	745.13	745.14	745.05	744.74	744.44	744.13	744.09
FIELD SPLICE 7	744.30	744.36	744.47	744.48	744.39	744.09	743.79	743.49	743.44
0.80PT	744.03	744.09	744.19	744.21	744.11	743.81	743.50	743.20	743.15
0.90PT	743.14	743.21	743.31	743.32	743.22	742.92	742.62	742.32	742.28
CL BRG PIER 4	742.34	742.41	742.50	742.52	742.42	742.12	741.82	741.52	741.47
0.10PT	741.74	741.81	741.89	741.92	741.82	741.52	741.22	740.91	740.87
0.20PT	741.19	741.26	741.34	741.37	741.28	740.98	740.67	740.36	740.32
FIELD SPLICE 8	740.91	740.98	741.07	741.10	741.01	740.71	740.41	740.10	740.06
0.30PT	740.67	740.74	740.83	740.87	740.77	740.47	740.17	739.86	739.81
0.40PT	740.20	740.28	740.35	740.39	740.29	739.99	739.69	739.37	739.33
0.50PT	739.74	739.83	739.89	739.94	739.83	739.53	739.23	738.91	738.88
0.60PT	739.30	739.39	739.44	739.50	739.39	739.09	738.79	738.47	738.44
0.70PT	738.87	738.96	739.01	739.07	738.96	738.66	738.36	738.03	738.00
0.80PT	738.45	738.53	738.59	738.64	738.54	738.24	737.93	737.62	737.58
0.90PT	738.04	738.12	738.19	738.23	738.13	737.83	737.53	737.22	737.18
CL BRG FWD ABUT	737.66	737.73	737.83	737.84	737.74	737.45	737.15	736.85	736.80

NOTES

1. SCREED ELEVATIONS SHOWN ARE FOR THE DECK SLAB SURFACE PRIOR TO CONCRETE PLACEMENT. ALLOWANCE HAS BEEN MADE FOR ANTICIPATED CALCULATED DEAD LOAD DEFLECTIONS.
2. SEE TRANSVERSE SECTION ON SHEET 13/18 FOR CROSS SLOPE VARIATION.

⚠ REVISED SCREED TABLE 6/19/02 BY: AGW

DESIGNED KMH | DRAWN KMH | REVIEWED TAB | DATE 11/30/01 | DESIGN AGENCY M-E Companies 635 Brookridge, Amherst Phone: 877-671-0900

CHECKED ENB | REVISED - | STRUCTURE FILE 2202476

SCREED TABLES
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

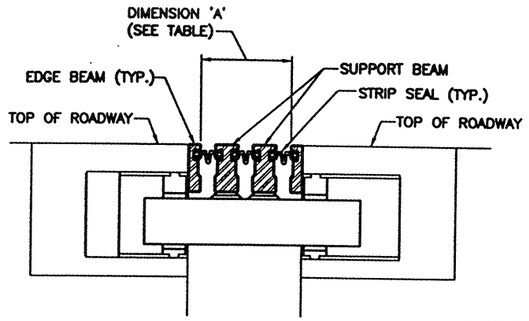
ERI-60-3.100

15/18

16/56

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

D:\ERI-60\DWG\APROFORCONST\ER06M03A.DWG by:kmkoppa on 11/04/2004 @ 04:06:43 pm ~ for M-E Companies, Inc.



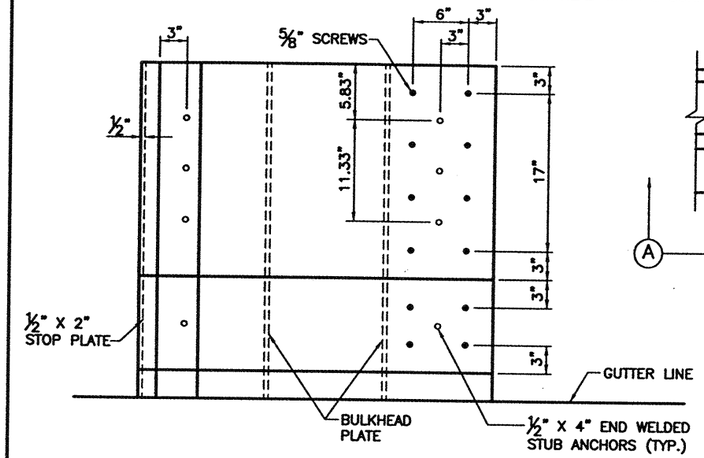
JOINT OPENING DETAIL

DIMENSION 'A'						
LOCATION	40°F	50°F	60°F	70°F	80°F	90°F
REAR ABUTMENT	13⅜"	12¾"	12¼"	11⅝"	11⅛"	10⅝"
FORWARD ABUTMENT	8 ¾"	8½"	8⅛"	7¾"	7½"	7⅛"

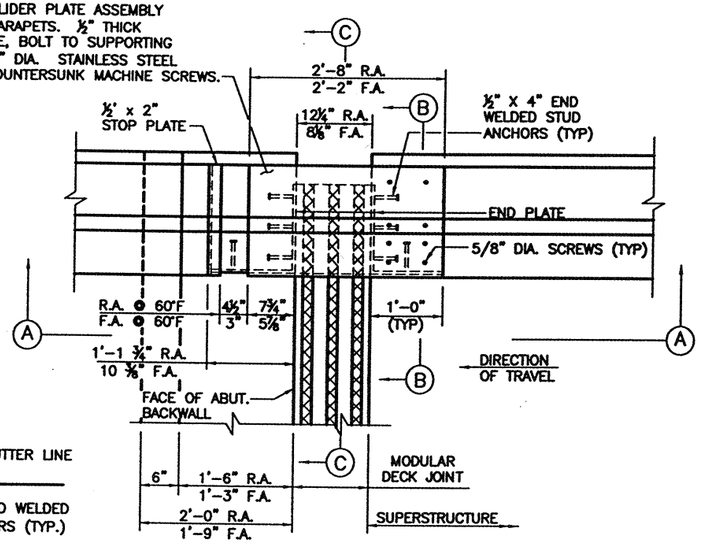
NOTES:

1. JOINT WIDTH BASED ON D.S. BROWN D-240 JOINT SYSTEM FOR REAR ABUTMENT AND D-160 JOINT SYSTEM FOR FORWARD ABUTMENT
2. ALL PLATES, AHCHORS, SCREWS, AND MISC. ITEMS ASSOCIATED WITH THE JOINT SHALL BE INCLUDED WITH ITEM 863 STRUCTURAL STEEL, MISC LEVEL; MODULAR EXPANSION JOINT, AS PER PLAN.

THE D.S. BROWN MODULAR JOINT HAS BEEN SELECTED AT THE REQUEST OF THE CONTRACTOR. 2/28/02

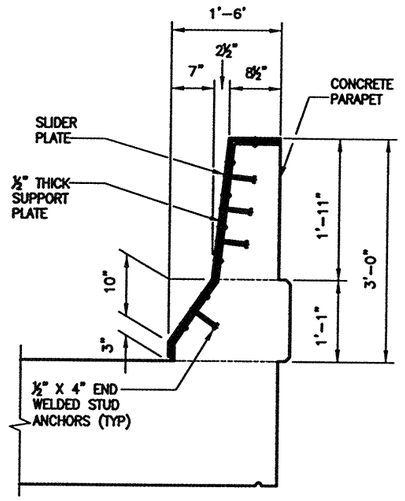


VIEW A-A

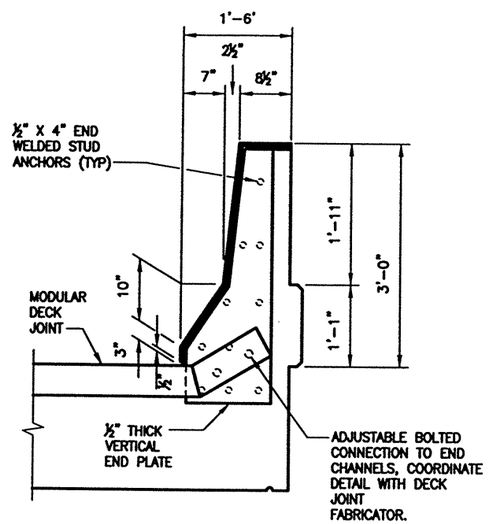


PLAN

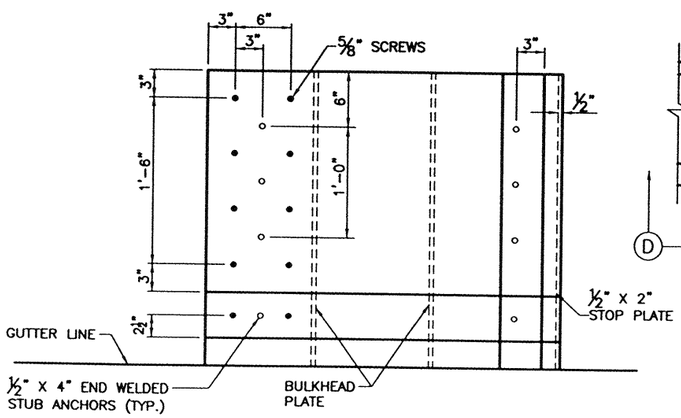
PARAPET SLIDER PLATE
(REAR ABUTMENT LEFT & RIGHT SIDE
FORWARD ABUTMENT RIGHT SIDE)



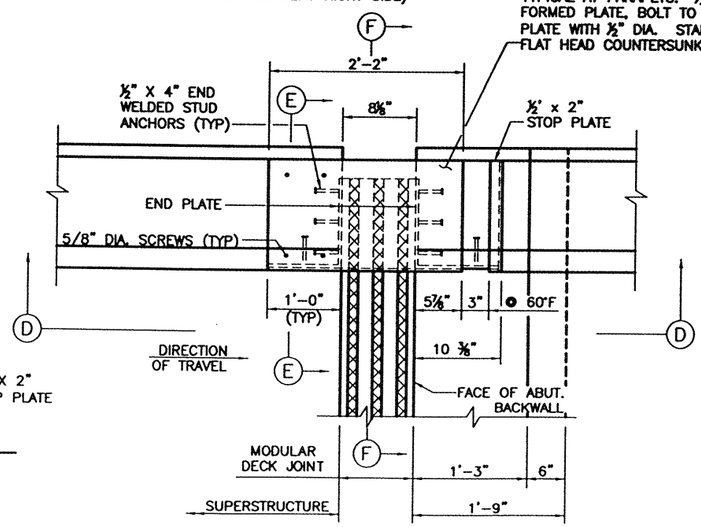
SECTION B-B



SECTION C-C

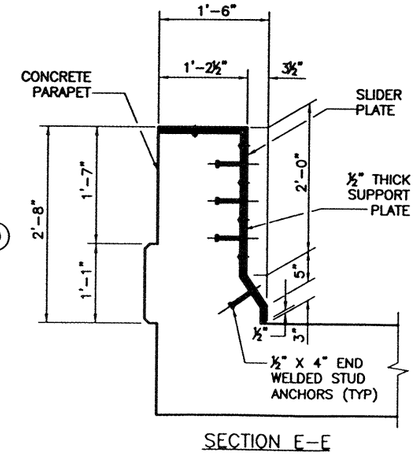


VIEW D-D

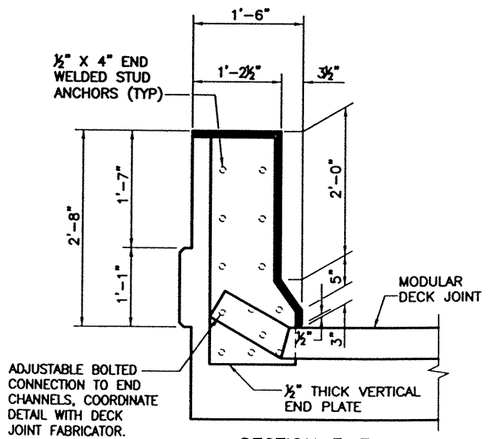


PLAN

PARAPET SLIDER PLATE
(FORWARD ABUTMENT LEFT SIDE)



SECTION E-E



SECTION F-F

DESIGN AGENCY
M.E. Companies
428 Broadway, Oregon
Phone: 419-410-4000

DESIGNED	DRAWN	CHECKED
ENB	ENB	CMD

REVIEWED	DATE
TAB	11/30/01

STRUCTURE FILE
2202476

REVISED
-

EXPANSION JOINT DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

16/18

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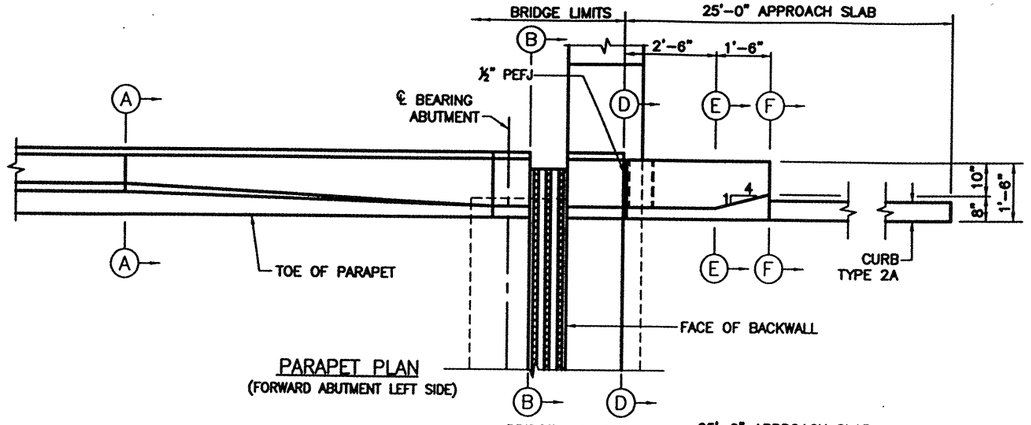
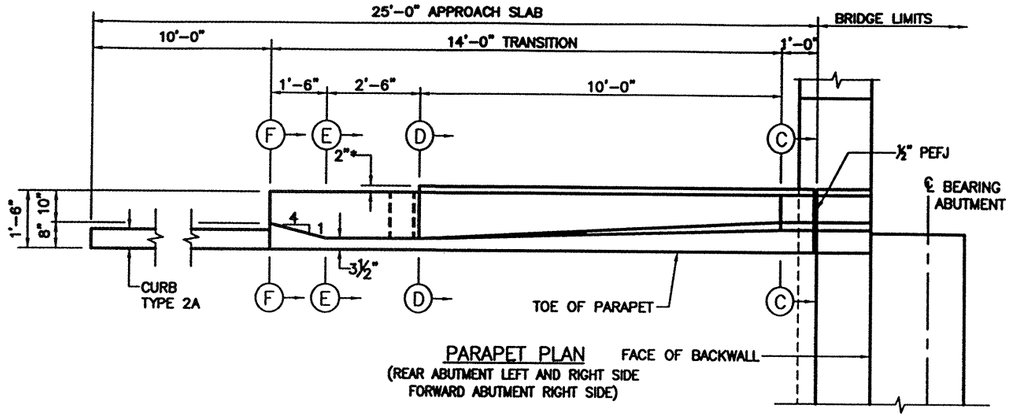
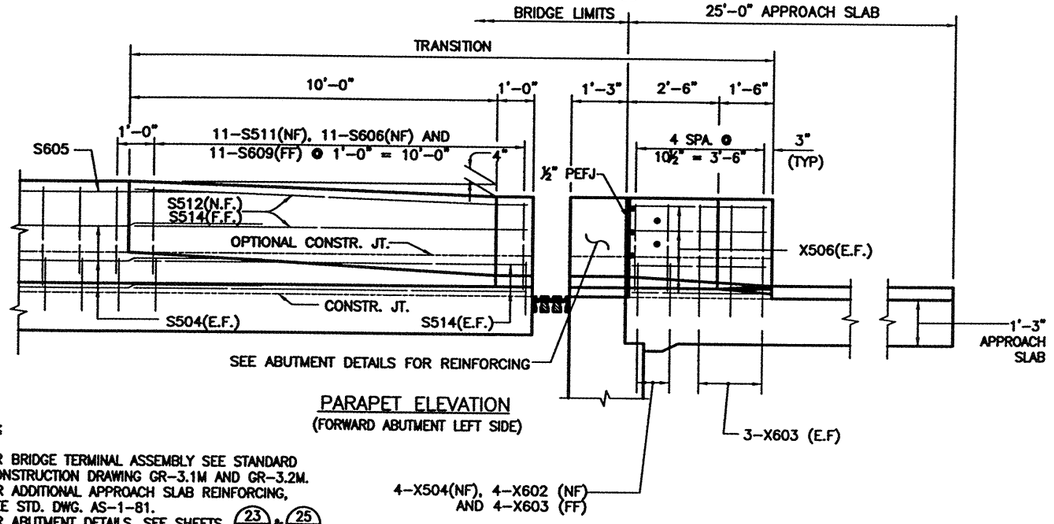
STRUCTURE PLANS
APPROVED FOR CONSTRUCTION
03-26-02



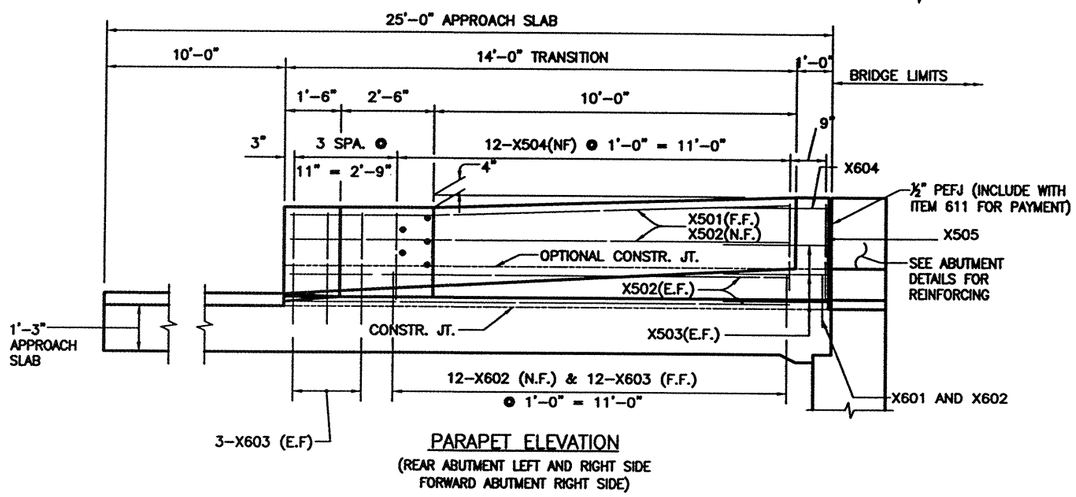
PARAPET PLAN
(FORWARD ABUTMENT LEFT SIDE)



PARAPET PLAN
(REAR ABUTMENT LEFT AND RIGHT SIDE
FORWARD ABUTMENT RIGHT SIDE)



PARAPET ELEVATION
(FORWARD ABUTMENT LEFT SIDE)



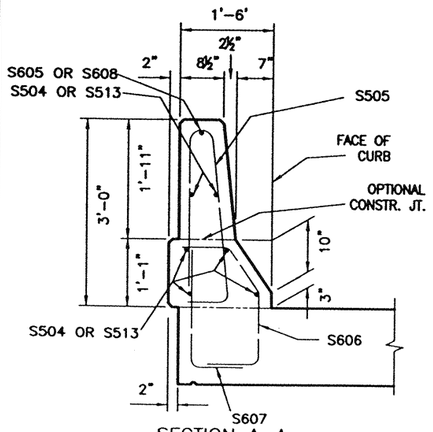
PARAPET ELEVATION
(REAR ABUTMENT LEFT AND RIGHT SIDE
FORWARD ABUTMENT RIGHT SIDE)

NOTES:

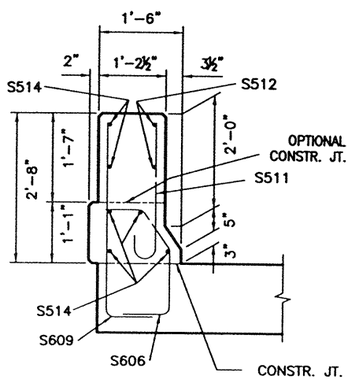
1. FOR BRIDGE TERMINAL ASSEMBLY SEE STANDARD CONSTRUCTION DRAWING GR-3.1M AND GR-3.2M.
2. FOR ADDITIONAL APPROACH SLAB REINFORCING, SEE STD. DWG. AS-1-81.
3. FOR ABUTMENT DETAILS, SEE SHEETS (23/56) & (25/56)

* THERE WILL BE NO 2" HAUNCH AT THE REAR ABUTMENT.

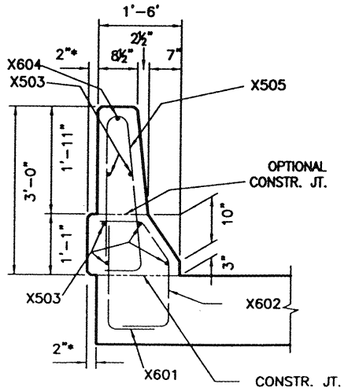
#5 AND #6 BAR LAP LENGTH = 3'-5"



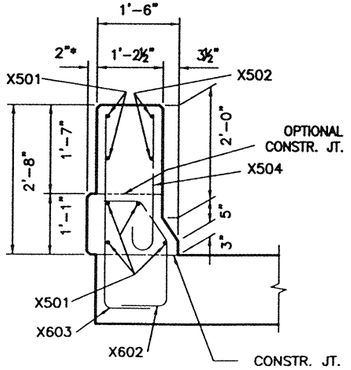
SECTION A-A



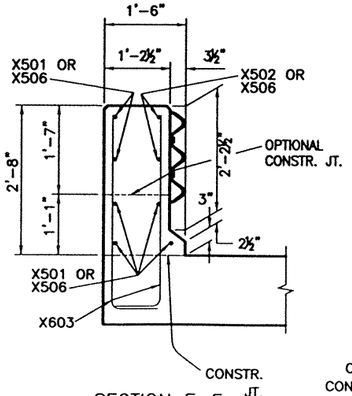
SECTION B-B



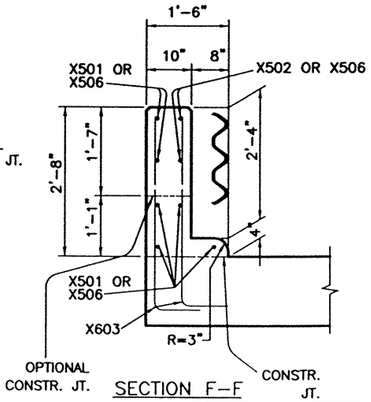
SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

DESIGN AGENCY
M.E. Companies
4350 Glendale-Milford Road
Blue Ash, Ohio 45242
Phone 614-818-4900

DESIGNED	DRAWN	REVIEWED	DATE
ENB	ENB	TAB	11/30/01
CHECKED	REVISED	STRUCTURE FILE	
CMD	-	2202476	

PARAPET TRANSITION
BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

17/18

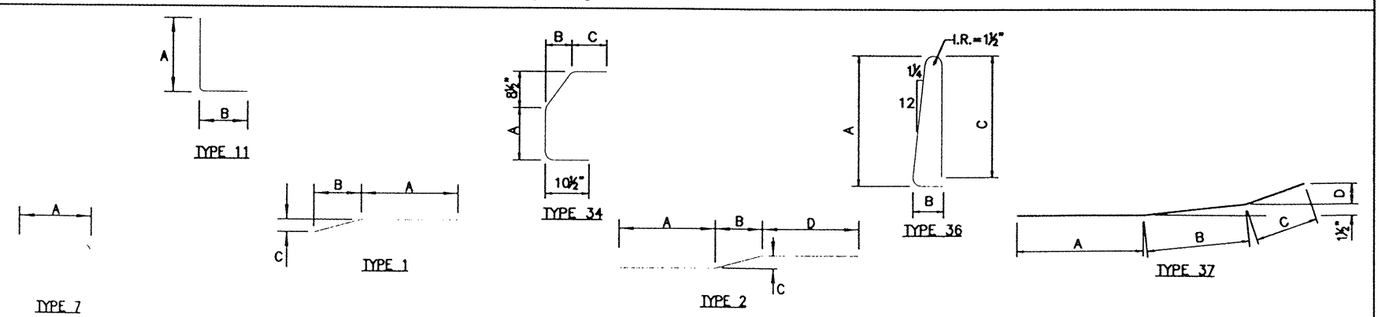
18/56

STRUCTURE PLANS
APPROVED FOR CONSTRUCTION
03-26-02

MARK	NUMBER TOTAL	LENGTH	WEIGHT (LBS.)	TYPE	DIMENSIONS A	B	C	D	INC.
SUPERSTRUCTURE REINFORCEMENT									
S401	1769	40'-0"	47268	STR					
S402	61	32'-3"	1315	STR					
S501	1984	40'-0"	82773	STR					
S502	56	29'-3"	1709	STR					
S503	1200	37'-9"	47248	STR					
S504	6	32'-0"	200	STR					
S505	2258	6'-0"	14131	36	2'-9"	8"	2'-6"		
S506	112	4'-4"	506	1	2'-4"	1'-10½"	1 1/2"		
S507	112	3'-4"	389	11	2'-1"	1'-4"			
S508	112	6'-0"	798	2	2'-1"	1'-4"	1'-4"	2'-1"	
S509	56	8'-8"	507	STR					
S510	28	3'-8"	107	11	2'-6"	1'-3"			
S511	11	3'-1"	35	7	2'-6"				
S512	2	10'-9"	23	1	10'-0"	9"	1 1/2"		
S513	6	32'-6"	202	STR					
S514	6	10'-9"	67	STR					
S601	4188	22'-2"	139458	STR					
S602	2099	26'-8"	84083	STR					
S603	2099	17'-8"	55709	STR					
S604	60	40'-0"	3605	STR					
S605	1	32'-0"	48	STR					
S606	2269	3'-0"	10225	34	10"	6"	9"		
S607	2258	2'-0"	6783	11	11"	1'-3"			
S608	1	32'-6"	49	STR					
S609	11	3'-9"	62	11	11"	3'-0'			
		TOTAL =	497300						

MARK	NUMBER TOTAL	LENGTH	WEIGHT (LBS.)	TYPE	DIMENSIONS A	B	C	D	INC.
PARAPET TRANSITION REINFORCEMENT									
X501	18	13'-10"	260	STR					
X502	6	13'-10"	87	37	10'-0"	2'-5"	1'-5"	5"	
X503	18	4'-5"	83	STR					
X504	40	3'-0"	126	7	2'-5"				
X505	3	6'-0"	19	36	2'-9"	8"	2'-6"		
X506	8	3'-8"	31	STR					
X601	3	2'-6"	12	11	11"	1'-9"			
X602	43	3'-6"	227	34	1'-4"	6"	9"		
X603	55	4'-3"	352	11	11"	3'-6"			
X604	3	4'-5"	20	STR					
		TOTAL =	1217						

BENDING DIAGRAMS



NOTES:

1. THE REINFORCING STEEL LIST IS FOR INFORMATION ONLY.
2. BAR DIMENSIONS SHOWN ARE OUT TO OUT UNLESS OTHERWISE INDICATED.
3. "STR" WRITTEN IN THE TYPE COLUMN INDICATES A STRAIGHT BAR.
4. ALL REINFORCING STEEL TO BE EPOXY COATED.
5. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST TWO DIGITS INDICATE THE BAR SIZE NUMBER. FOR EXAMPLE A 501 IS A #5 BAR.

STRUCTURE PLANS APPROVED FOR CONSTRUCTION 03-26-02

DESIGN AGENCY
M-E COMPANIES
M.E. Companies
635 Brooksedge Boulevard
Westerville, Ohio
Phone 614-891-2732

DESIGNED ENB | DRAWN ENB | REVIEWED PAR | DATE 11/30/01
CHECKED CMD | REVISED - | STRUCTURE FILE 2202476

REINFORCING STEEL LIST

BRIDGE NO. ERI-60-03649
OVER VERMILLION RIVER

ERI-60-3.100

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ESTIMATED QUANTITIES - ABUTMENTS

CALCULATED JDB DATED 3/02
CHECKED ALP DATED 3/02

ITEM	ITEM EXT.	ENGLISH TOTAL	ENGLISH UNIT	METRIC TOTAL	METRIC UNIT	DESCRIPTION	ABUTMENTS REAR	ABUTMENTS FWD.	GEN'L	SEE SHEET
503	11100	LUMP		LUMP		COFFERDAMS, CRIBS AND SHEETING			LUMP	
503	21331	LUMP		LUMP		UNCLASSIFIED EXCAVATION, INCLUDING ROCK AND SHALE, AS PER PLAN	LUMP	LUMP		1/8
516	13600	80	SQ. FT.	7.4	SQ. METER	1" PREFORMED EXPANSION JOINT FILLER	80	0		
518	21231	LUMP		LUMP		POROUS BACKFILL WITH FILTER FABRIC, AS PER PLAN	LUMP	LUMP		1/8
518	40000	135	LIN. FT.	41.2	METER	6" PERFORATED CORRUGATED PLASTIC PIPE	65	70		
518	40010	176	LIN. FT.	53.4	METER	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS	41	135		
842	44101	217	CU. YD.	166	CU. METER	CLASS C CONCRETE, ABUTMENT NOT INCLUDING FOOTING, AS PER PLAN	118	99		1/8
842	46501	129	CU. YD.	99	CU. METER	CLASS C CONCRETE, FOOTING, AS PER PLAN	55	74		1/8
864	10100	230	SQ. YD.	193	SQ. METER	SEALING OF CONCRETE SURFACES (EPOXY - URETHANE)	119	111		1/8

REFERENCE SHALL BE MADE TO THE FOLLOWING STANDARD DRAWINGS:

NONE

AND THE FOLLOWING SUPPLEMENTAL SPECIFICATIONS:

842 (DATED 01-06-99)
864 (DATED 07-11-00)
899 (DATED 10-21-98)

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996 INCLUDING THE 1997, 1998, 1999, AND 2000 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA:

CONCRETE CLASS C - COMPRESSIVE STRENGTH 4000 PSI (SUBSTRUCTURE)
REINFORCING STEEL - ASTM A615, A616, OR A617
- GRADE 60 WITH THE MINIMUM YIELD STRESS OF 60 KSI.
- REINFORCING STEEL SHALL BE EPOXY COATED PER MATERIAL SPECIFICATIONS 709.00
- SPLICES INDICATED FOR GRADE 60 STEEL

FOOTINGS SHALL EXTEND A MINIMUM OF 3 INCHES INTO BEDROCK OR TO THE ELEVATION SHOWN, WHICHEVER IS LOWER. ANY OVER EXCAVATION OF BEDROCK AROUND FOOTING SHALL BE BACKFILLED WITH CONCRETE.

FOUNDATION BEARING PRESSURE:

REAR ABUTMENT FOOTINGS, AS DESIGNED, PRODUCE A MAXIMUM BEARING PRESSURE OF 7.6 KSF, THE ALLOWABLE BEARING PRESSURE IS 8.0 KSF. FORWARD ABUTMENT FOOTINGS, AS DESIGNED, PRODUCE A MAXIMUM BEARING PRESSURE OF 8.0 KSF, THE ALLOWABLE BEARING PRESSURE IS 12.0 KSF.

ITEM 503, UNCLASSIFIED EXCAVATION INCLUDING ROCK AND SHALE, AS PER PLAN:

UNCLASSIFIED EXCAVATION SHALL BE IN ACCORDANCE WITH 503 EXCEPT THAT THE BACKFILL MATERIAL BEHIND THE ABUTMENTS SHALL BE 203 MATERIAL PLACED IN 6 INCH LIFTS.

ITEM 518, POROUS BACKFILL WITH FILTER FABRIC, AS PER PLAN:

THE MATERIAL SHALL BE NO. 57 GRAVEL.

ITEM 842, CLASS C CONCRETE, ABUTMENT NOT INCLUDING FOOTING, AS PER PLAN:
ITEM 842, CLASS C CONCRETE, FOOTING, AS PER PLAN:

THE AGGREGATE SHALL CONSIST OF NO. 8 LIMESTONE.

SURVEY REFERENCE POINT ON STRUCTURE:

TWO STAINLESS STEEL THREADED RODS SHALL BE PLACED ON TOP OF THE BRIDGE SEATS ON THE REAR AND FORWARD ABUTMENTS. THE PERMANENT REFERENCE POINTS SHALL CONSIST OF A 5/8 INCH DIAMETER BY 3 INCH LONG STAINLESS STEEL ROD WITH 11 THREADS PER INCH (UNC). THE RODS SHALL EXTEND 1 INCH ABOVE THE CONCRETE SURFACE AND BE CAPPED WITH A GREASED STAINLESS STEEL NUT FOR PROTECTION. THE RODS SHALL BE PLACED IN THE SURFACE OF THE FRESH CONCRETE OR SET IN NON-SHRINK, NON-METALLIC GROUT (705.20) IN A MINIMUM 1 1/4 INCH DIAMETER HOLE CORED 2 1/2 INCHES INTO THE CONCRETE.

THE COST OF THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CLASS C CONCRETE, ABUTMENT NOT INCLUDING FOOTING, AS PER PLAN BID ITEM.

ITEM 864, SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)

ALL EXPOSED SUBSTRUCTURE SURFACES SHALL BE COMPLETELY SEALED TO THE FINISHED GROUNDLINE WITH EPOXY-URETHANE. BRIDGE SEATS SHALL BE SEALED EXCEPT WITHIN THE FOOTPRINT OF THE BEARINGS.

ENGINEERS SEAL:

STATE OF OHIO · DEAN A. PALMER E-37475 REGISTERED PROFESSIONAL ENGINEER

SIGNED: Dean Palmer
DATE: 3-26-02

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED JDB | DRAWN CAR | REVIEWED DAP | DATE 3/7/02
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

ABUTMENT GENERAL NOTES AND ESTIMATED QUANTITIES

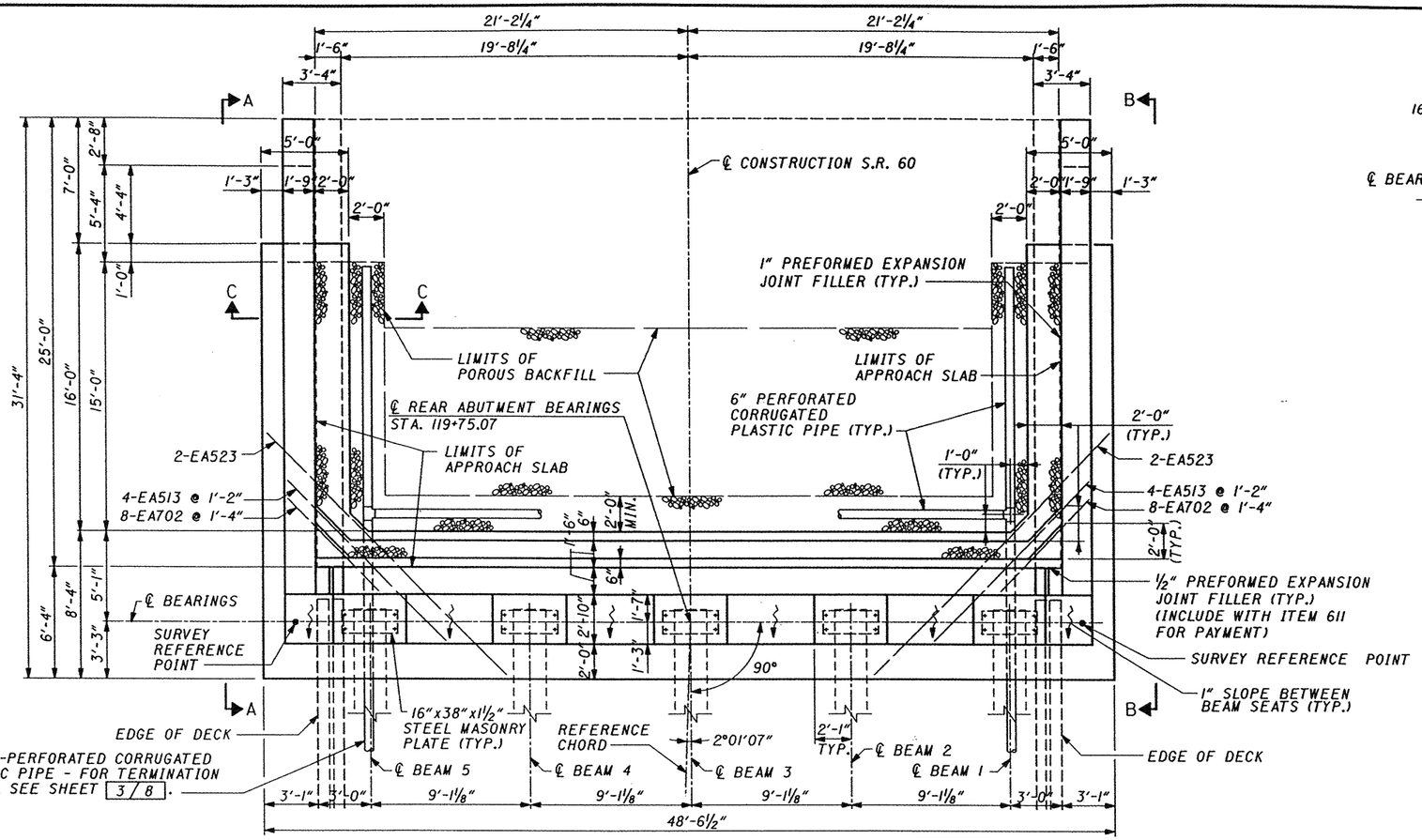
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

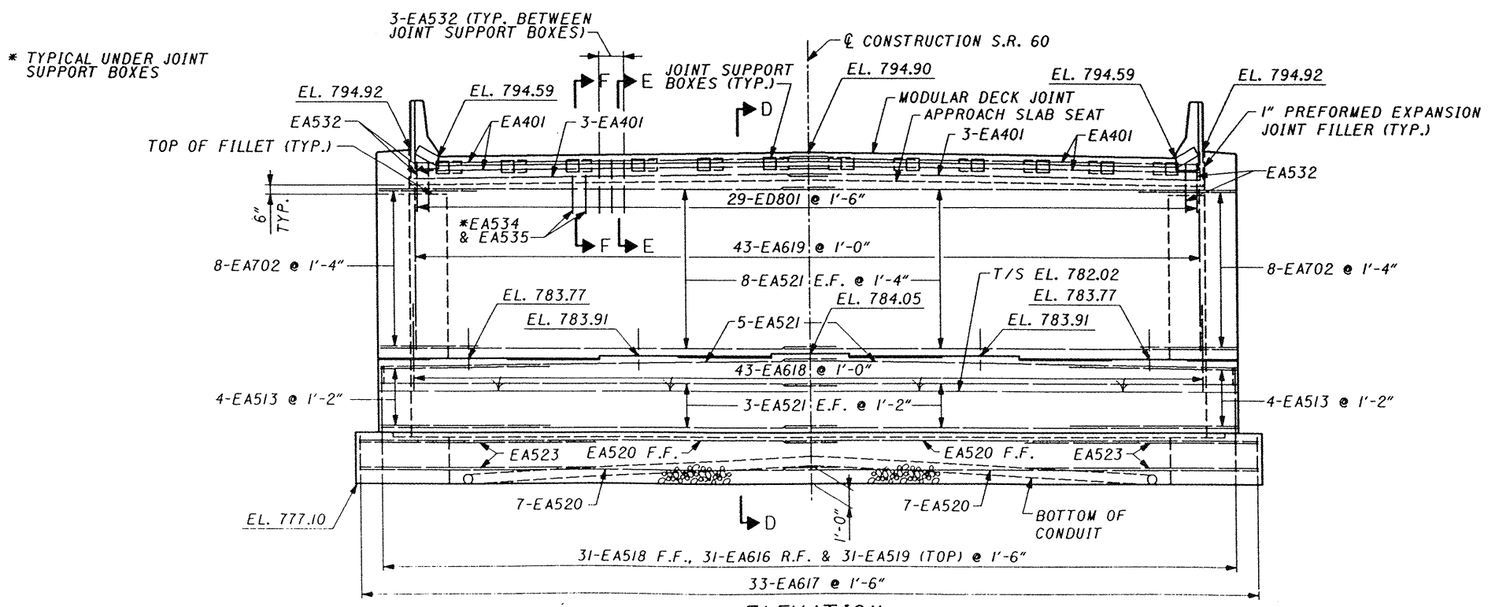
1/8

20/56

2235MF.DGN 03/07/02 JLS

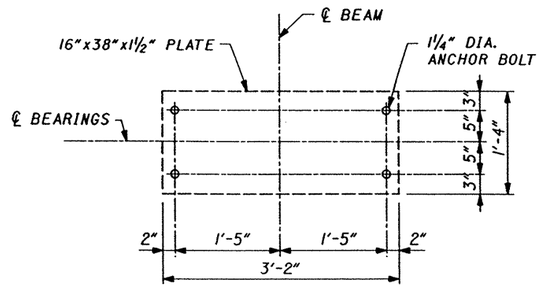


PLAN



ELEVATION

(ELEVATIONS SHOWN ARE AT THE FRONT FACE OF ABUTMENT BACKWALL)



STEEL MASONRY PLATE DETAIL

NOTES

REINFORCING STEEL SPLICE LENGTHS SHALL BE 2'-3" FOR HORIZONTAL #4 BARS, 2'-9" FOR HORIZONTAL #5 BARS AND 2'-5" FOR VERTICAL #6 BARS.

BRIDGE SEAT REINFORCING: REINFORCING STEEL IN THE VICINITY OF THE BRIDGE SEAT SHALL BE ACCURATELY PLACED TO AVOID INTERFERENCE WITH THE DRILLING OF ANCHOR DOWEL HOLES OR THE PRE-SETTING OF BEARING ANCHORS.

VIEW A-A & B-B: SEE SHEET 4/8.

SECTION C-C: SEE SHEET 4/8.

SECTIONS D-D, E-E & F-F: SEE SHEET 3/8.

NOTATION: F.F. - FRONT FACE
R.F. - REAR FACE
E.F. - EACH FACE

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED JDB | DRAWN KH | REVIEWED DAP | DATE 3/7/02
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

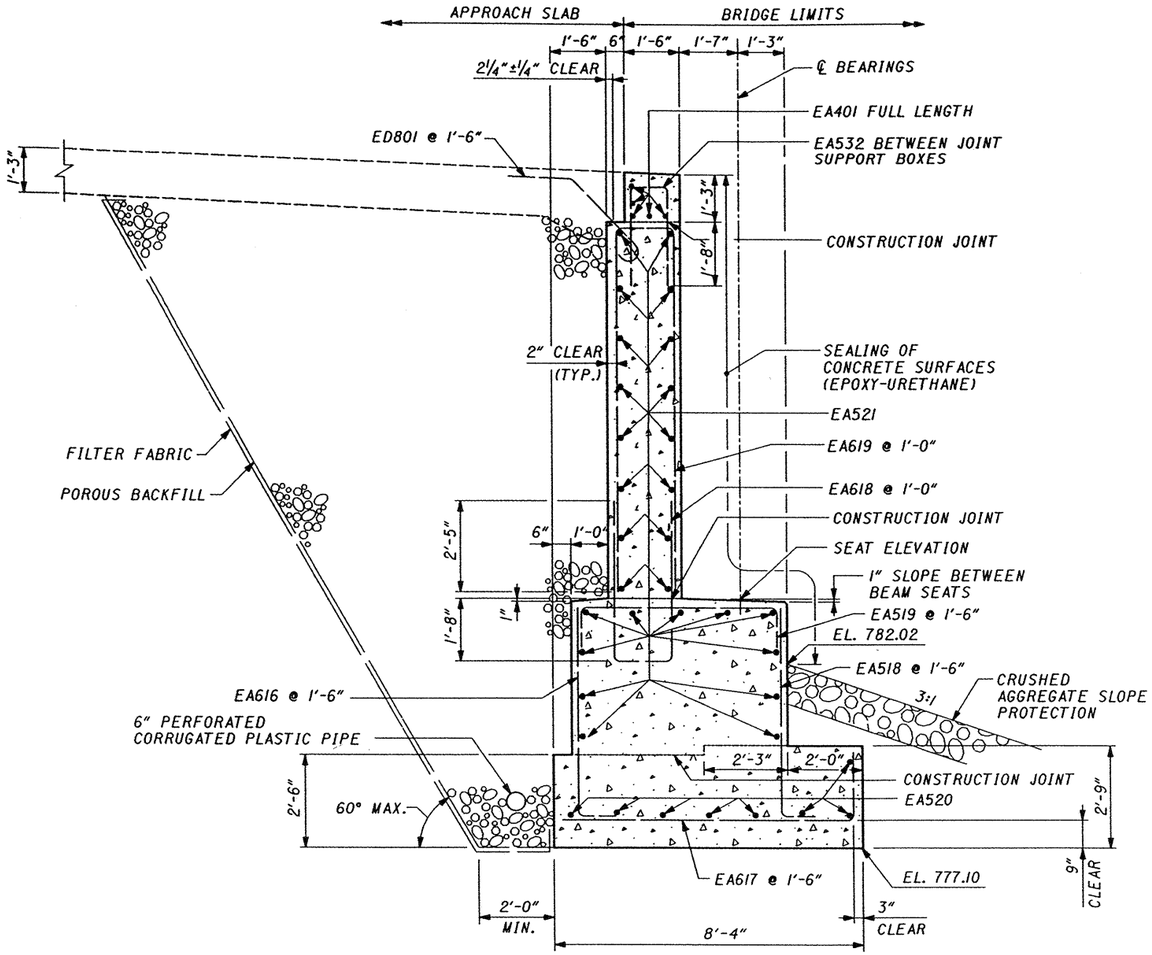
REAR ABUTMENT
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

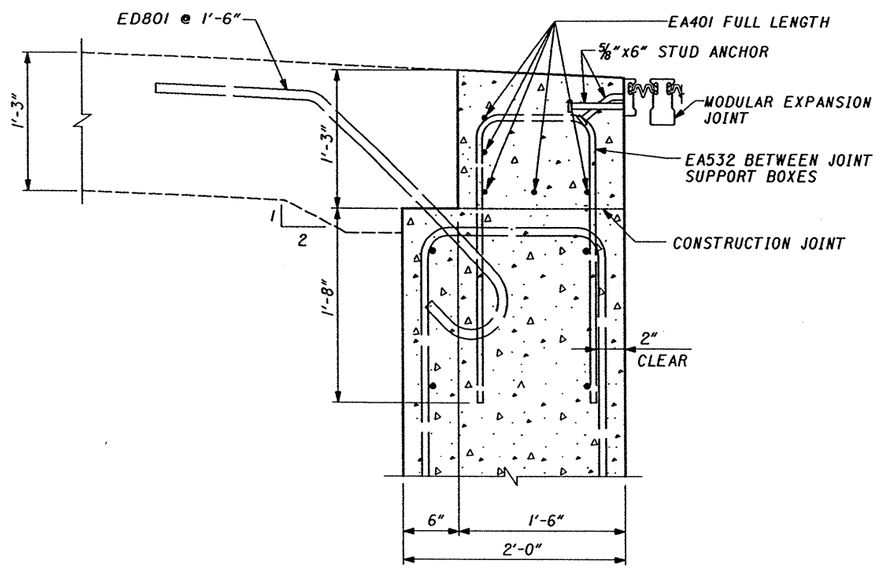
2/8

21/56

223SAN.DGN 03/23/02 JLS

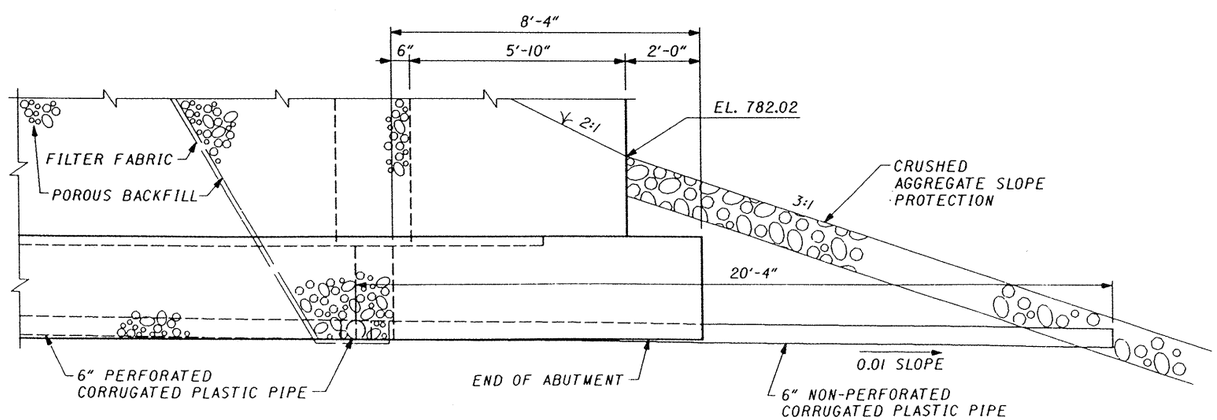


SECTION D-D



SECTION E-E

SECTION F-F



TERMINATION OF 6" NON-PERFORATED CORRUGATED PLASTIC PIPE

NOTES

SECTIONS D-D, E-E & F-F: FOR LOCATIONS SEE SHEET 2/8.

223SAL.DGN 03/23/02 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
JDB	KH	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

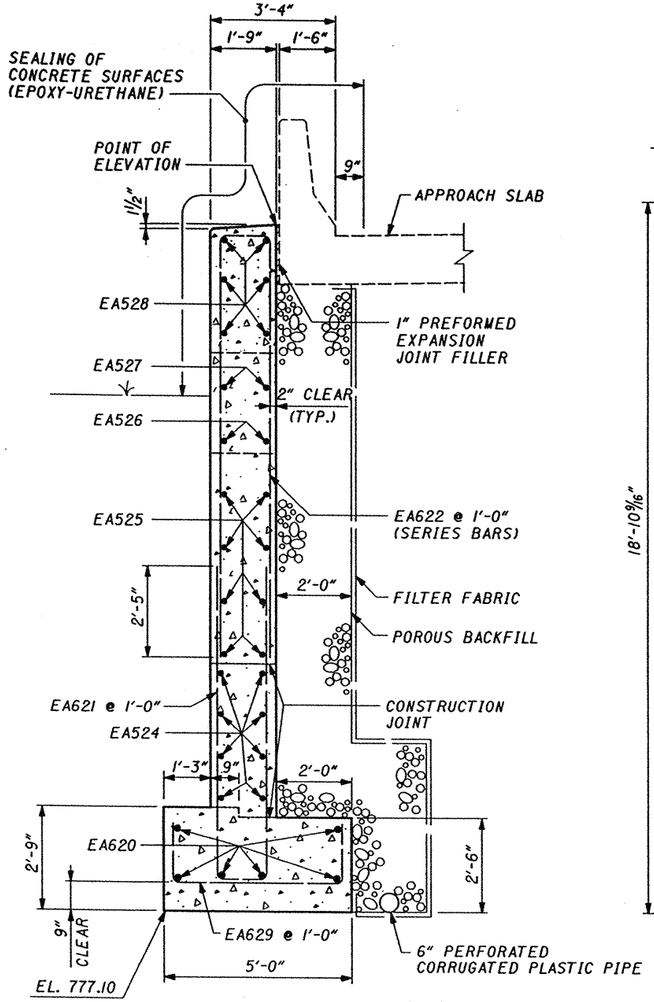
REAR ABUTMENT DETAILS - 1

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

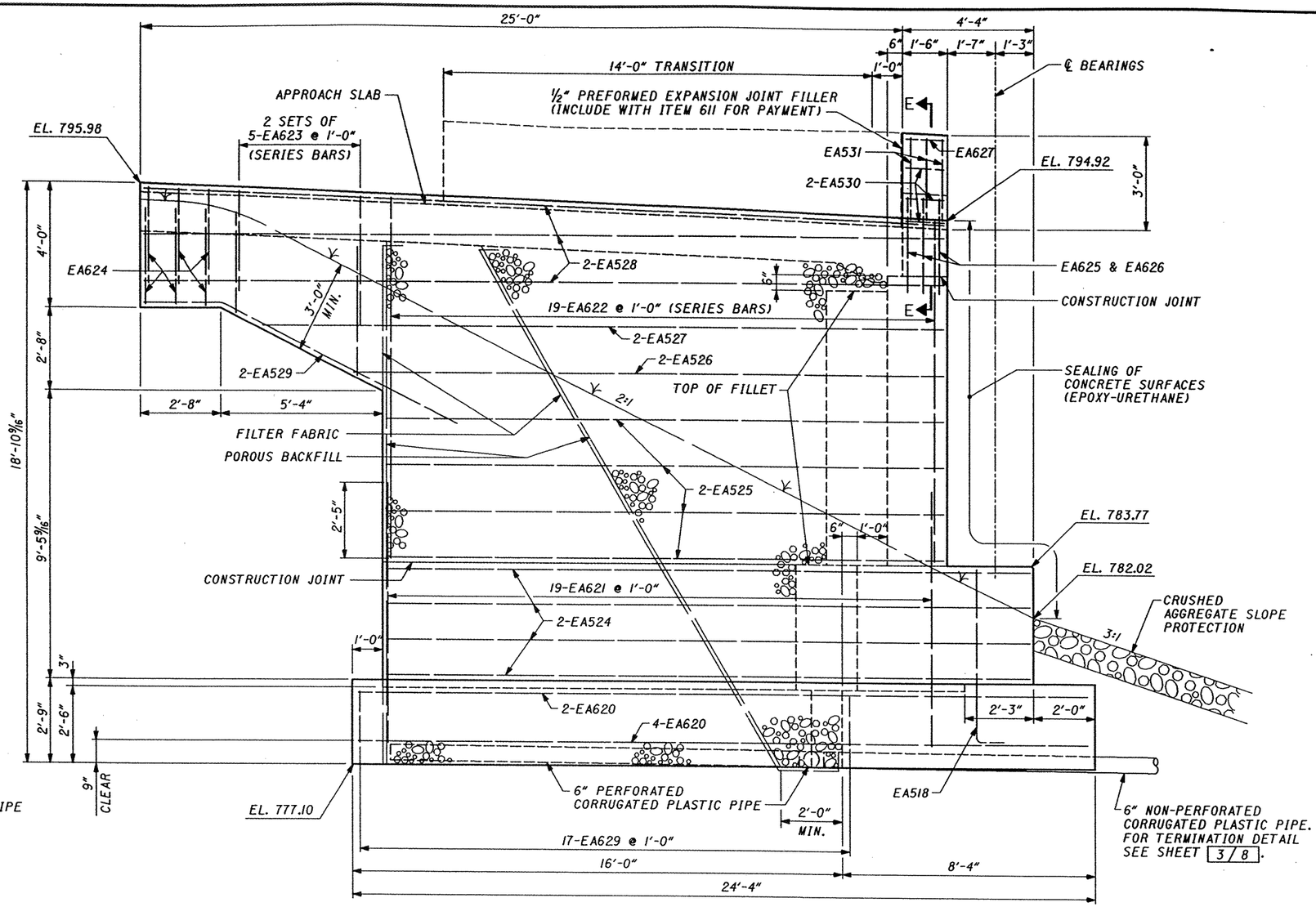
ERI-60-3.100

3/8

22/56



SECTION C-C

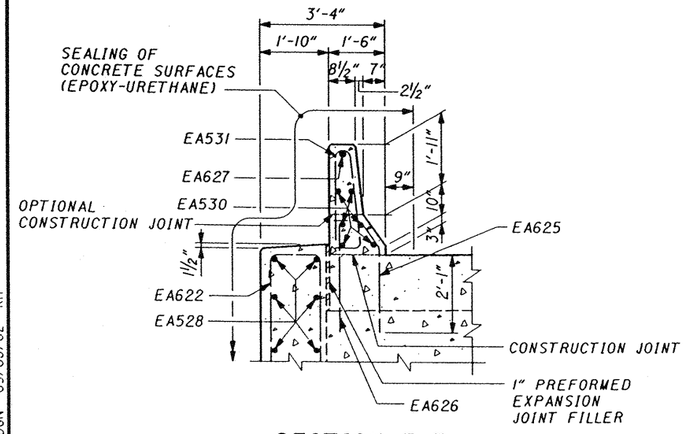


VIEW A-A

(AS SHOWN)

VIEW B-B

(OPPOSITE HAND)



SECTION E-E

NOTES

VIEW A-A & B-B: FOR LOCATIONS SEE SHEET 2/8.

SECTION C-C: FOR LOCATION SEE SHEET 2/8.

223SAL.DGN 03/08/02 KH

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED JDB | DRAWN KH | REVIEWED DAP | DATE 3/7/02
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

REAR ABUTMENT DETAILS - 2

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

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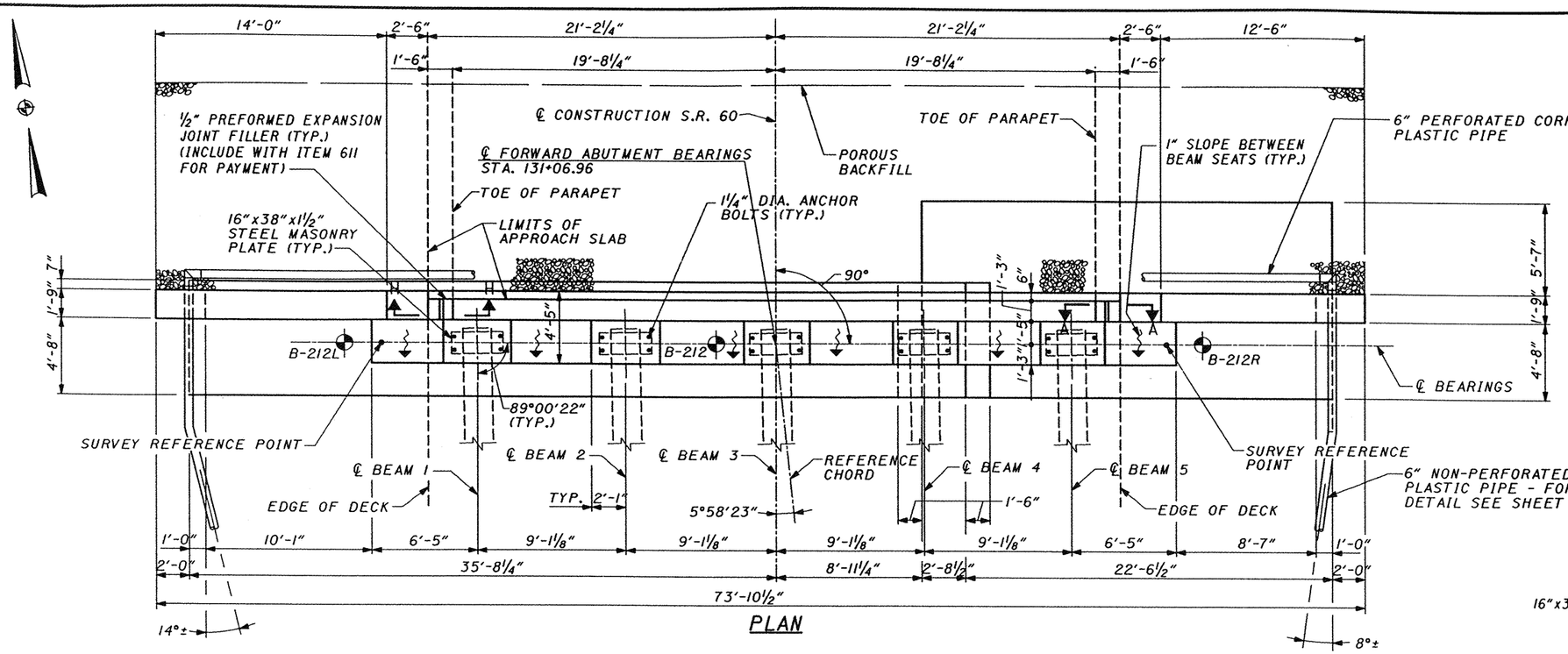
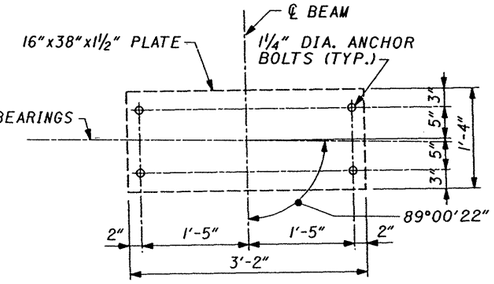
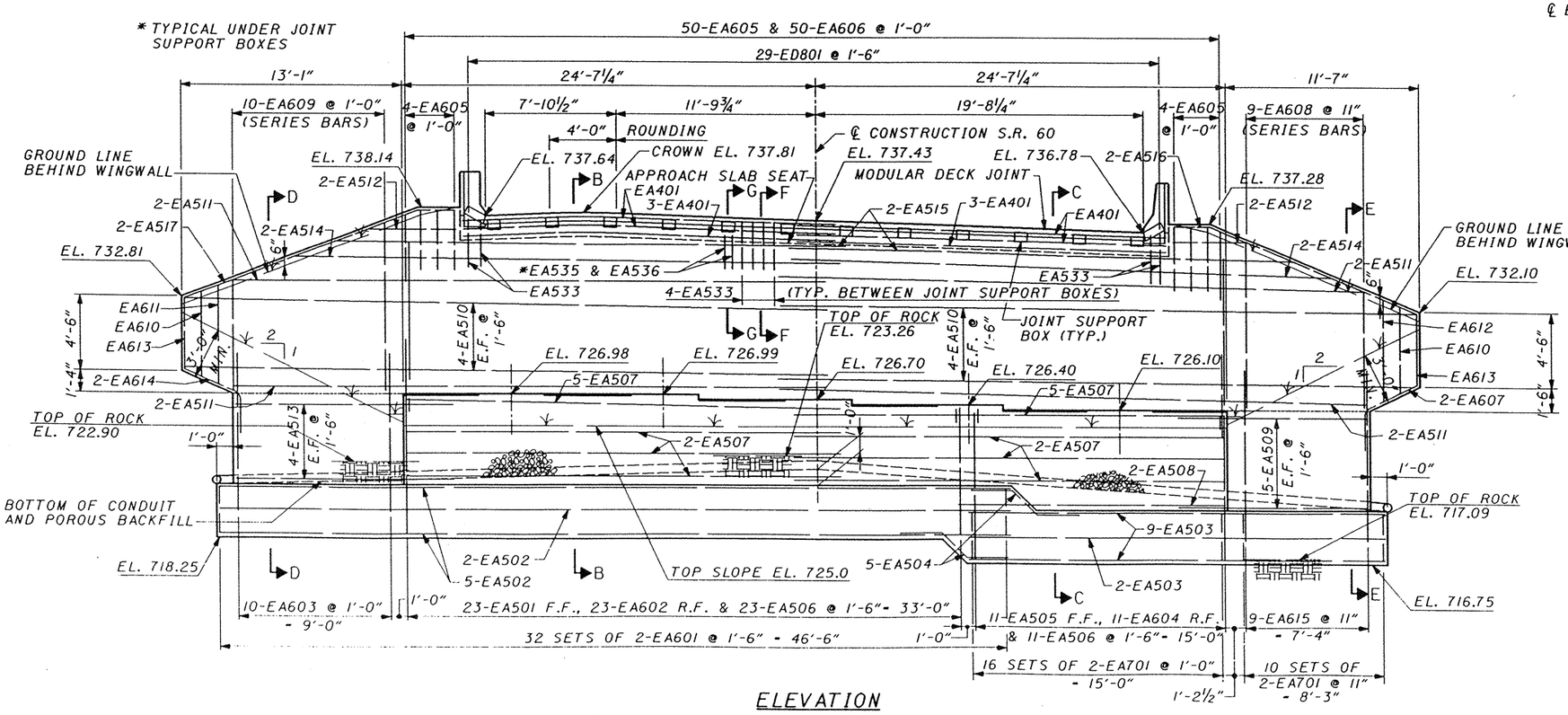




STEEL MASONRY PLATE DETAIL



ELEVATION

(ELEVATIONS SHOWN ARE AT THE FRONT FACE OF ABUTMENT BACKWALL)

NOTES

REINFORCING STEEL SPLICE LENGTHS SHALL BE 2'-9" FOR HORIZONTAL #5 BARS AND 2'-5" FOR VERTICAL #6 BARS.

BRIDGE SEAT REINFORCING: REINFORCING STEEL IN THE VICINITY OF THE BRIDGE SEAT SHALL BE ACCURATELY PLACED TO AVOID INTERFERENCE WITH THE DRILLING OF ANCHOR DOWEL HOLES OR THE PRE-SETTING OF BEARING ANCHORS.

SECTIONS A-A, B-B, C-C & H-H: SEE SHEET 6/8.

SECTIONS D-D, E-E, F-F, & G-G: SEE SHEET 7/8.

NOTATION: F.F. - FRONT FACE
R.F. - REAR FACE
E.F. - EACH FACE

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

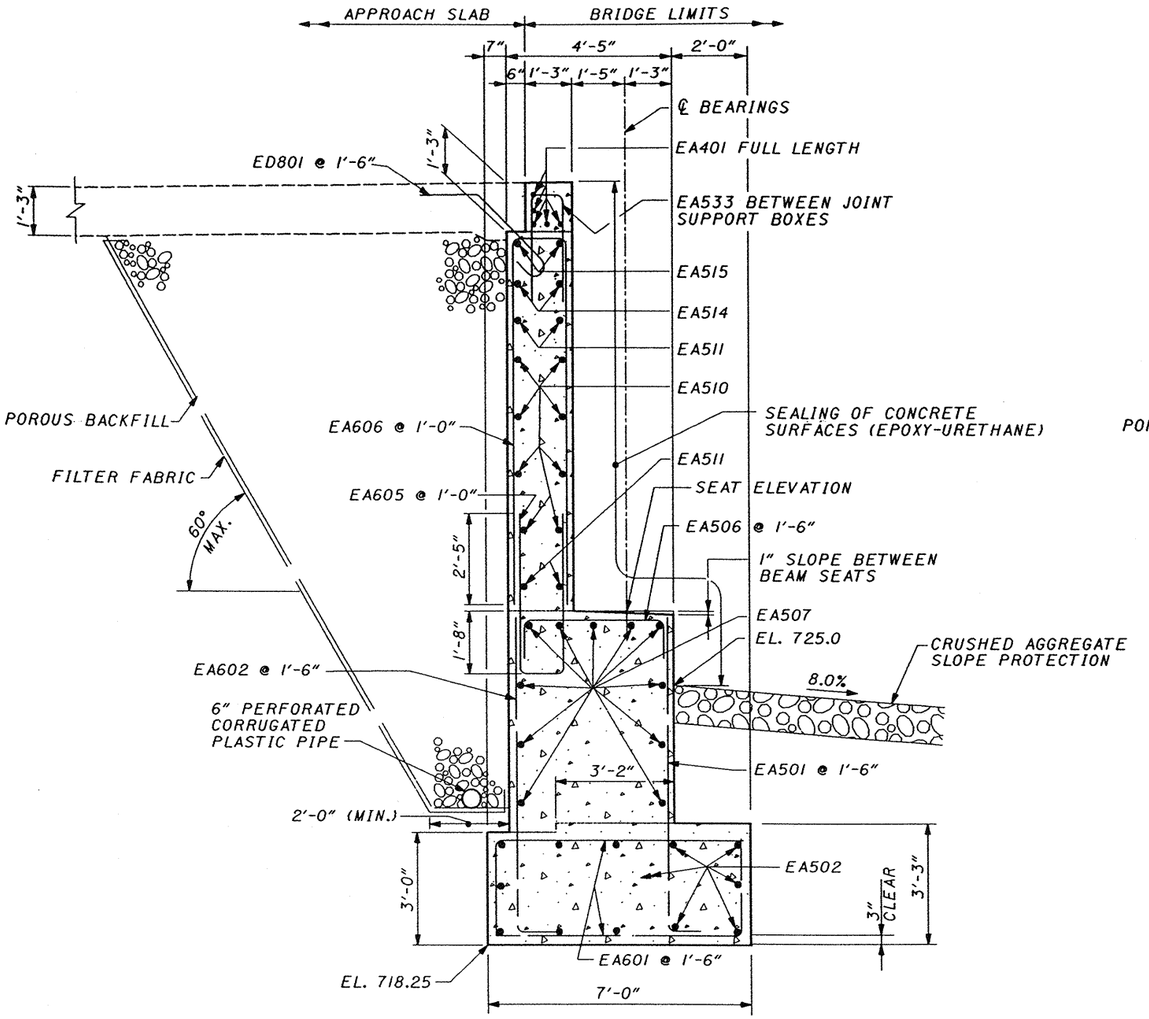
DESIGNED JDB | DRAWN JLS | CHECKED KAX | REVIEWED DAP | DATE 3/7/02 | REVISED | STRUCTURE FILE NUMBER 2202476

FORWARD ABUTMENT
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

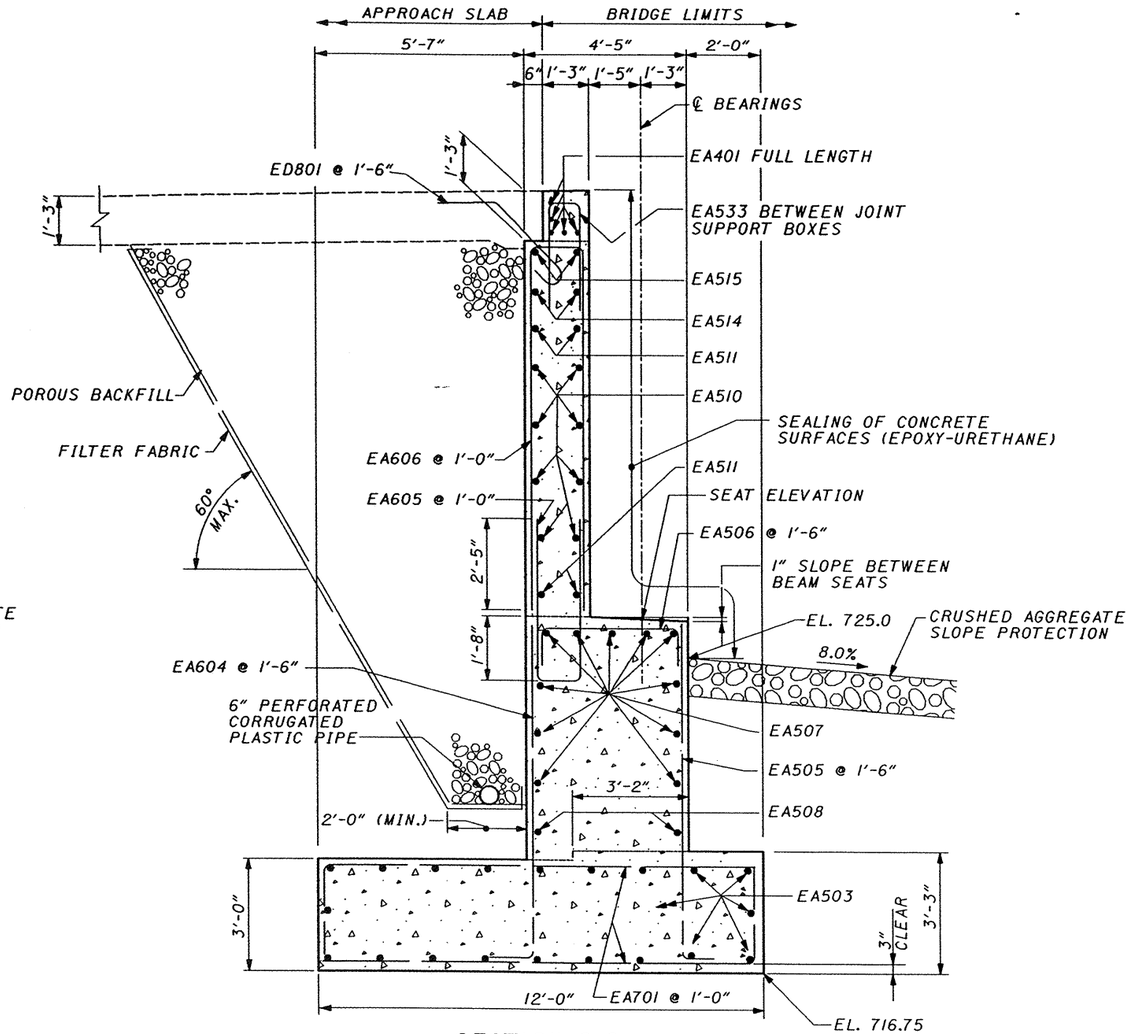
ERI-60-3.100

5/8

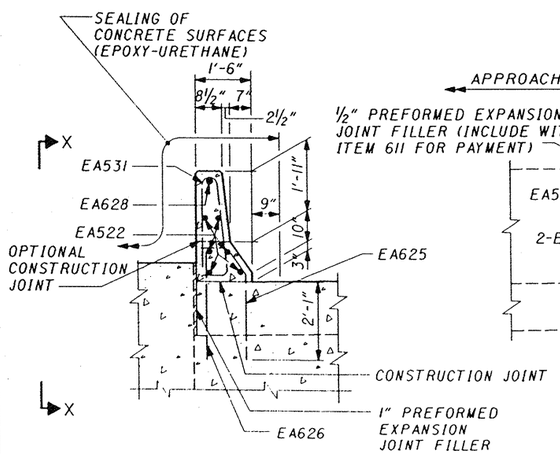
24/56



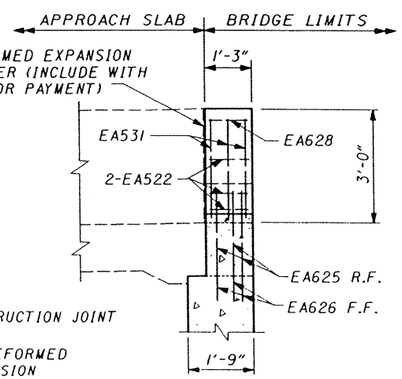
SECTION B-B



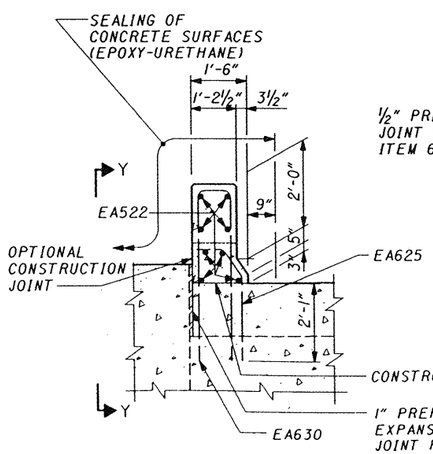
SECTION C-C



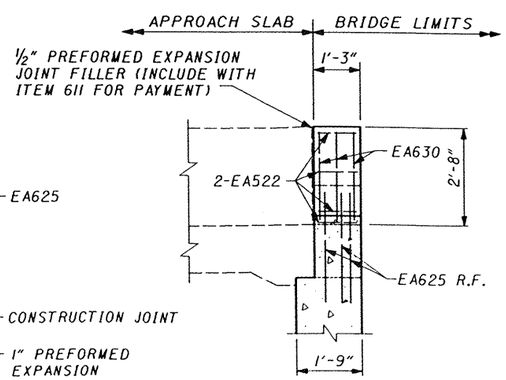
SECTION A-A



VIEW X-X



SECTION H-H



SECTION Y-Y

NOTES

SECTIONS A-A, B-B, C-C & H-H: FOR LOCATIONS SEE SHEET 5/8.

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
JDB	JLS	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

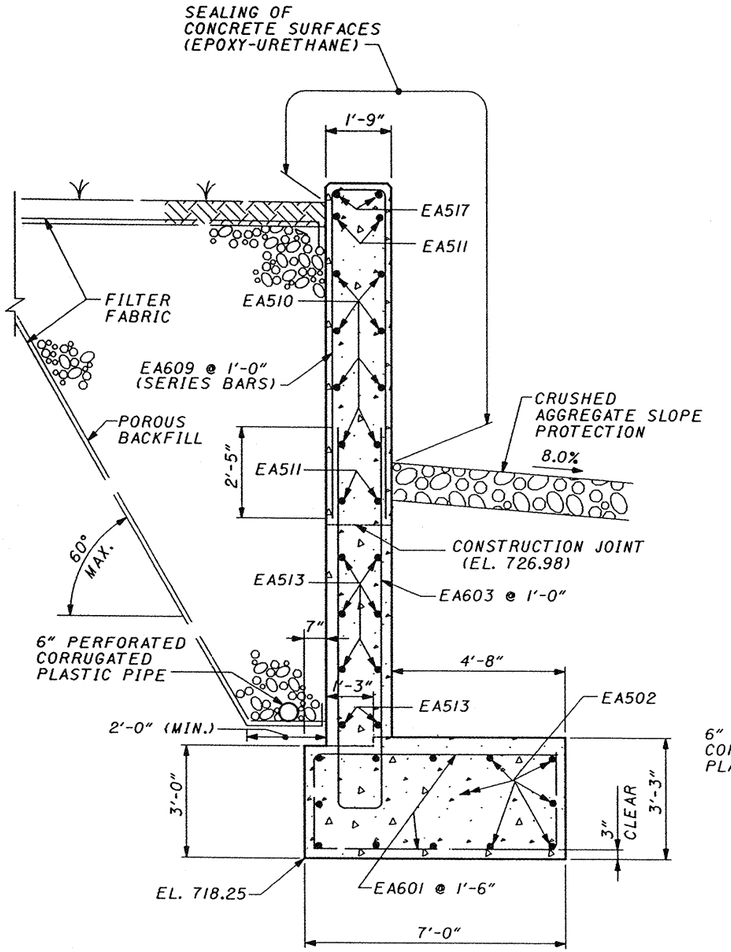
FORWARD ABUTMENT DETAILS - 1
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

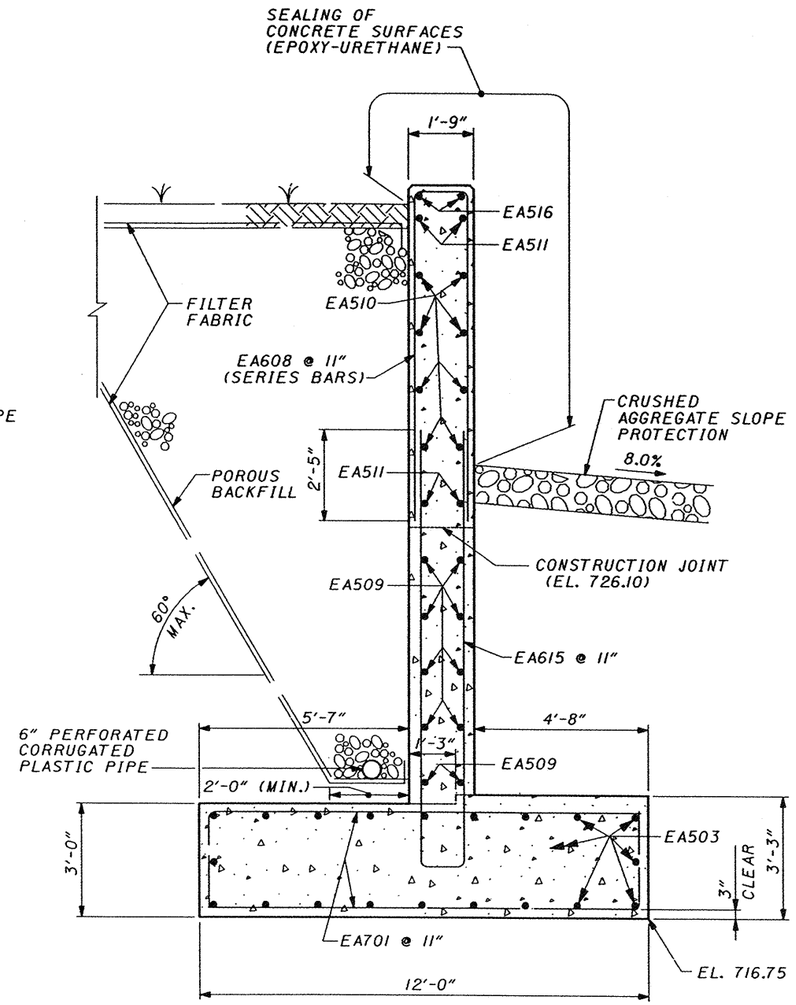
6/8

25
56

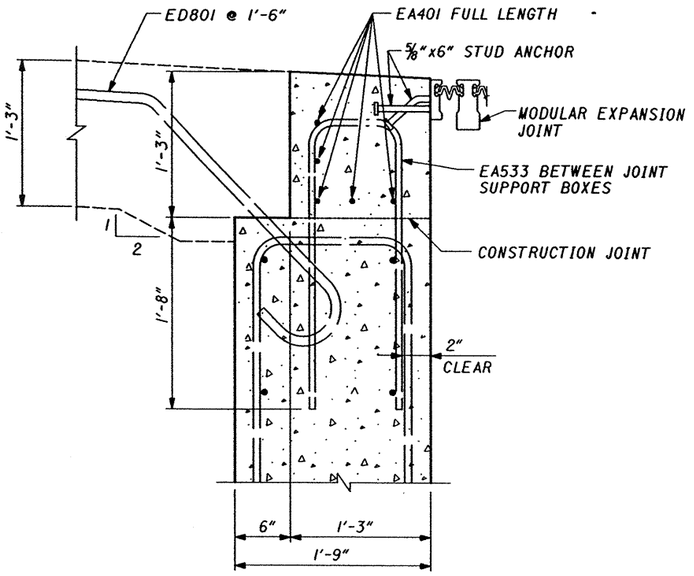
2235AD.DGN 03/23/02 JLS



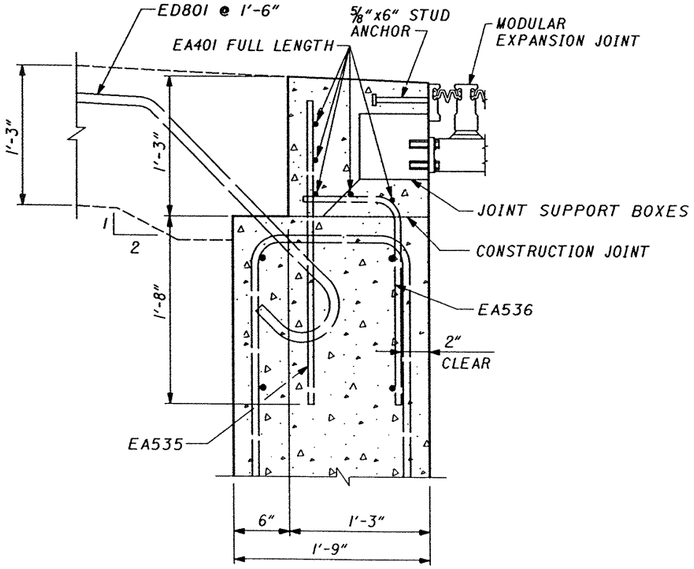
SECTION D-D



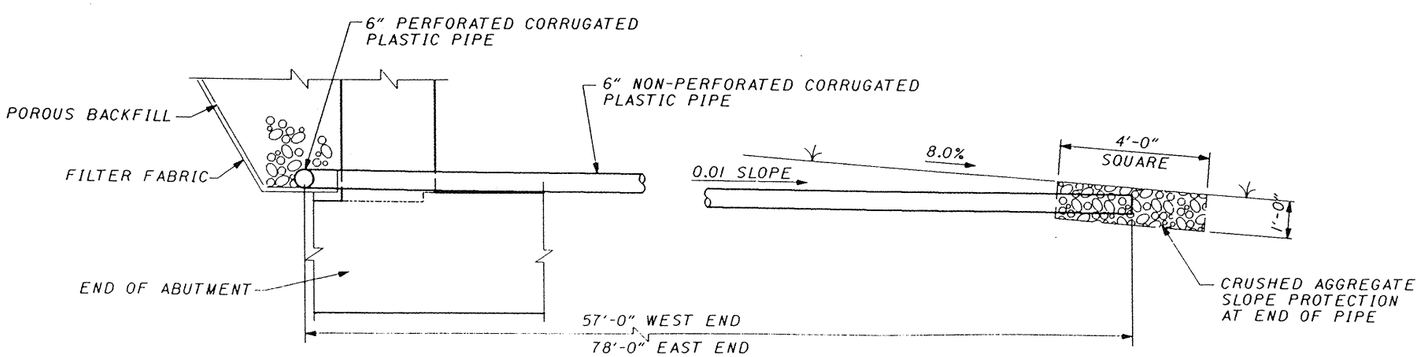
SECTION E-E



SECTION F-F



SECTION G-G



TERMINATION OF 6" NON-PERFORATED CORRUGATED PLASTIC PIPE

NOTES

SECTIONS D-D, E-E, F-F & G-G: FOR LOCATIONS SEE SHEET 5/8.

DETAIL "B": FOR LOCATIONS SEE SHEET 6/8.

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED JDB | DRAWN JLS | REVIEWED DAP 3/7/02 | DATE
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

FORWARD ABUTMENT DETAILS - 2

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

7/8

26/56

223SAF.DGN 03/23/02 JLS

ABUTMENTS

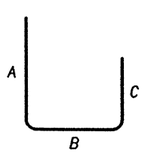
CALCULATED KH DATE 02/02
CHECKED JDB DATE 03/02

MARK	REAR	FWD.	TOTAL	LENGTH	TYPE	A	B	C	INC.
EA401	10	10	20	22'-2"	STR.				
EA501		23	23	8'-5"	1	7'-8½"	10"	0	
EA502		12	12	47'-0"	STR.				
EA503		20	20	25'-0"	STR.				
EA504		10	10	7'-7"	2	2'-9"	2'-2"	2'-9"	
EA505		11	11	9'-8"	1	8'-11"	10"	0	
EA506		34	34	7'-4"	1	1'-9"	4'-1"	1'-9"	
EA507		22	22	25'-10"	STR.				
EA508		2	2	15'-6"	STR.				
EA509		10	10	11'-2"	STR.				
EA510		16	16	38'-2"	STR.				
EA511		8	8	35'-2"	STR.				
EA512		4	4	4'-6"	STR.				
EA513	8	8	16	12'-8"	STR.				
EA514		4	4	32'-5"	STR.				
EA515		4	4	30'-0"	STR.				
EA516		2	2	15'-6"	3	2'-3"	13'-4"	4.99	
EA517		2	2	16'-2"	3	2'-3"	14'-0"	4.59	
EA518	33		33	6'-6"	1	5'-9"	10½"	0	
EA519	31		31	7'-9"	1	1'-3"	5'-6"	1'-3"	
EA520	16		16	25'-5"	STR.				
EA521	54		54	24'-3"	STR.				
EA522		14	14	0'-11"	STR.				
EA523	4		4	19'-2"	STR.				
EA524	16		16	21'-0"	STR.				
EA525	16		16	18'-2"	STR.				
EA526	4		4	19'-3"	STR.				
EA527	4		4	22'-3"	STR.				
EA528	12		12	26'-2"	STR.				
EA529	4		4	11'-0"	3	2'-6"	8'-7"	6	
EA530	12		12	1'-2"	STR.				
EA531	6	3	9	6'-0"	4				
EA532	37		37	6'-1"	1	2'-7"	1'-2"	2'-7"	
EA533		48	48	6'-4"	1	2'-7"	11"	2'-7"	
EA534	24		24	2'-11"	1	1'-10½"	1'-2"	0	
EA535	24	24	48	2'-9"	STR.				
EA536		24	24	3'-5"	1	2'-7½"	11"	0	

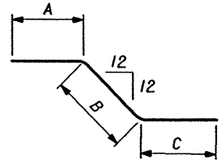
ABUTMENTS

CALCULATED KH DATE 02/02
CHECKED JDB DATE 03/02

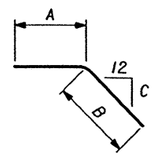
MARK	REAR	FWD.	TOTAL	LENGTH	TYPE	A	B	C	INC.
EA601		64	64	9'-1"	1	2'-7"	6'-8"	0	
EA602		23	23	9'-2"	1	8'-4"	1'-0"	0	
EA603		10	10	21'-1"	1	10'-0"	1'-5"	10'-0"	
EA604		11	11	9'-9"	1	8'-11"	1'-0"	0	
EA605		58	58	10'-1"	1	4'-6"	1'-5"	4'-6"	
EA606		50	50	19'-5"	1	9'-2"	1'-5"	9'-2"	
EA607		2	2	5'-9"	3	2'-5"	3'-5"	24	
EA608		1 SER.OF 9	1 SER.OF 9	15'-1" TO 21'-1"	1	7'-0" TO 10'-0"	1'-5"	7'-0" TO 10'-0"	4½"
EA609		1 SER.OF 10	1 SER.OF 10	14'-6" TO 21'-3"	1	6'-8½" TO 10'-1"	1'-5"	6'-8½" TO 10'-1"	4½"
EA610		2	2	11'-5"	1	5'-2"	1'-5"	5'-2"	
EA611		1	1	12'-11"	1	5'-11"	1'-5"	5'-11"	
EA612		1	1	13'-3"	1	6'-1"	1'-5"	6'-1"	
EA613		2	2	9'-7"	1	4'-3"	1'-5"	4'-3"	
EA614		2	2	5'-7"	3	2'-5"	3'-4"	27	
EA615		9	9	22'-3"	1	10'-7"	1'-5"	10'-7"	
EA616	31		31	6'-6"	1	5'-8"	1'-0"	0	
EA617	33		33	9'-6"	1	7'-10"	1'-10"	0	
EA618	43		43	10'-4"	1	4'-6"	1'-8"	4'-6"	
EA619	43		43	19'-8"	1	9'-2"	1'-8"	9'-2"	
EA620	12		12	23'-10"	STR.				
EA621	38		38	18'-1"	1	8'-6"	1'-5"	8'-6"	
EA622	2 SER.OF 19		2 SER.OF 19	22'-9" TO 24'-3"	1	10'-10" TO 11'-7"	1'-5"	10'-10" TO 11'-7"	½"
EA623	4 SER.OF 5		4 SER.OF 5	7'-3" TO 9'-3"	1	3'-1" TO 4'-1"	1'-5"	3'-1" TO 4'-1"	3"
EA624	12		12	7'-3"	1	3'-1"	1'-5"	3'-1"	
EA625	6	6	12	3'-8"	5				
EA626	6	3	9	3'-0"	STR.				
EA627	2		2	1'-2"	STR.				
EA628		1	1	0'-11"	STR.				
EA629	34		34	7'-4"	1	1'-7"	4'-6"	4'-6"	
EA630		3	3	9'-6"	1	4'-6"	10"	4'-6"	
EA701		52	52	14'-1"	1	2'-7"	11'-8"	0	
EA702	16		16	7'-4"	STR.				
ED801	29	29	58	4'-10"	6	2'-7"			



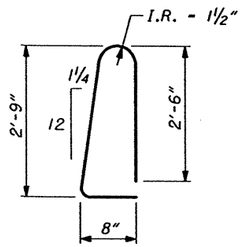
TYPE 1



TYPE 2



TYPE 3



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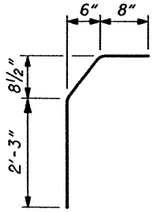
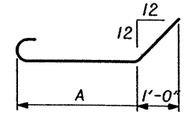


TYPE 5



TYPE 6

NOTES:

EPOXY COATED *REINFORCING STEEL IS INDICATED BY THE LETTER PREFIX "E".*

BAR SIZE *IS INDICATED IN THE BAR MARK. THE FIRST LETTERS IDENTIFY BAR LOCATION, THE NEXT DIGIT INDICATES THE BAR SIZE DESIGNATION, THE REMAINING DIGITS STATE THE SEQUENCE NUMBER.*

EXAMPLE: A511
A - LOCATION OF THE BAR IN STRUCTURE (ABUTMENT)
5 - BAR SIZE DESIGNATION
11 - SEQUENCE NUMBER

BAR DIMENSIONS SHOWN ARE OUT TO OUT UNLESS OTHERWISE INDICATED. R INDICATES INSIDE RADIUS, UNLESS OTHERWISE NOTED.

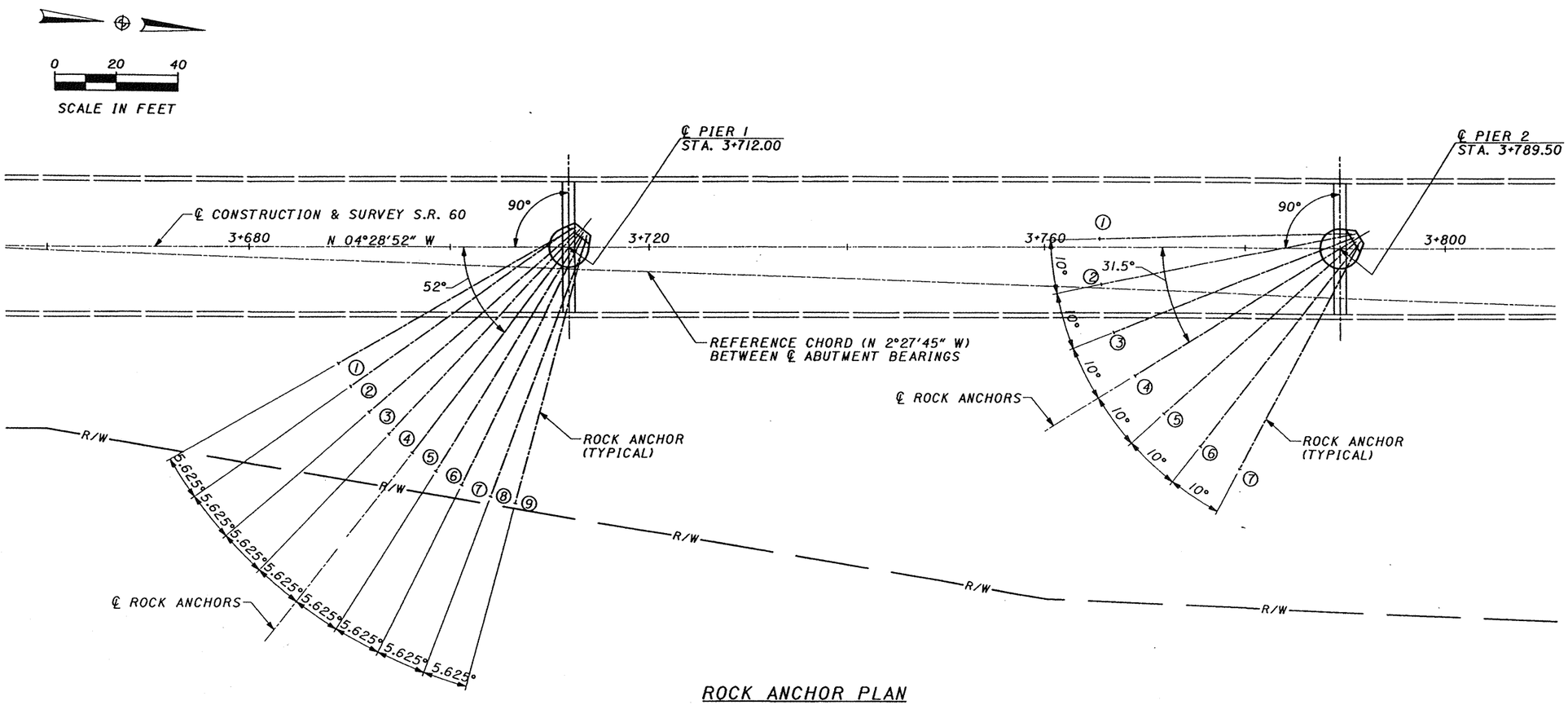
RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED JDB | DRAWN JLS | CHECKED KAK | REVIEWED DAP | DATE 3/7/02 | REVISED | STRUCTURE FILE NUMBER 2202476

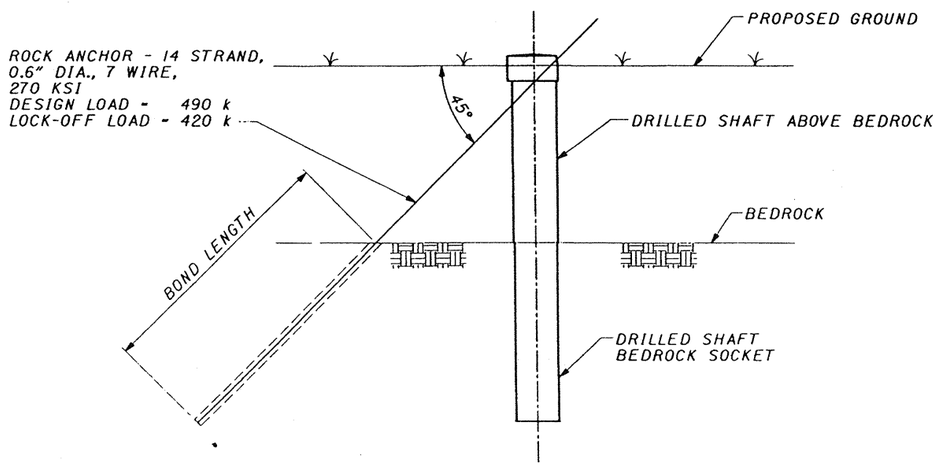
ABUTMENT REINFORCING STEEL LIST

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100



ROCK ANCHOR PLAN



ROCK ANCHOR SCHEMATIC

ENGINEERS SEAL:
STATE OF OHIO
DEAN A. PALMER
E-37475
REGISTERED
PROFESSIONAL ENGINEER
SIGNED: Dean Palmer
DATE: 3-26-02

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

33SPA.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB	DRAWN JLS	REVIEWED DT	DATE 12/10/01
CHECKED K.A.K	REVISED	STRUCTURE FILE NUMBER 2202476	

PLAN

PIERS 1 & 2 ROCK ANCHOR PLAN

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

1/23

28/56

REFERENCE SHALL BE MADE TO THE FOLLOWING STANDARD DRAWINGS:

AND THE FOLLOWING SUPPLEMENTAL SPECIFICATIONS:

842	(DATED 01-06-99)
844	(DATED 01-06-99)
864	(DATED 07-11-00)
899	(DATED 10-21-98)
954	(DATED 09-09-97)

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996 INCLUDING THE 1997, 1998, 1999, AND 2000 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA:

CONCRETE CLASS C - COMPRESSIVE STRENGTH 4000 PSI
(SUBSTRUCTURE - ABOVE DRILLED SHAFTS)
⚠1 HIGH STRENGTH MASS CONCRETE - COMPRESSIVE STRENGTH 5000 PSI
(SUBSTRUCTURE - DRILLED SHAFTS)
REINFORCING STEEL - ASTM A615, A616, OR A617
- GRADE 60 WITH THE MINIMUM YIELD STRESS OF 60 KSI. SPIRAL REINFORCEMENT MAY BE PLAIN BARS, ASTM A82 OR A615
- REINFORCING STEEL SHALL BE EPOXY COATED WHERE NOTED PER MATERIAL SPECIFICATIONS 709.00
- SPLICES INDICATED FOR GRADE 60 STEEL

STEEL "H" PILES - AS NOTED IN PLANS: ASTM A36, GRADE 36 WITH MINIMUM YIELD STRESS OF 36 KSI; ASTM A572, GRADE 50 WITH MINIMUM YIELD STRESS OF 50 KSI
ROCK ANCHOR MATERIALS - SEE SHEETS 3/23 AND 4/23.

PIER 1 & 2 SEQUENCE OF CONSTRUCTION:

THE FOLLOWING SEQUENCE OF CONSTRUCTION IS REQUIRED TO BE PERFORMED IN THE LISTED ORDER TO PROVIDE FOR PROPER LOADING AND CONTROLLED DEFLECTION OF PIERS 1 & 2:

1. CONSTRUCT DRILLED SHAFT TO CONSTRUCTION JOINT BELOW ROCK ANCHOR SLEEVES.

⚠2 1A. GROUT SPACE BETWEEN STEEL CASING AND GROUND.

2. PLACE REINFORCING STEEL FOR UPPER PORTION OF DRILLED SHAFT.
3. CAREFULLY PLACE AND ALIGN SLEEVES FOR ROCK ANCHORS. CUT REINFORCING AS NEEDED TO PLACE SLEEVES.
4. PLACE REMAINDER OF REINFORCING STEEL IN DRILLED SHAFT CAP AND PLACE CONCRETE DRILLED SHAFT CAP.
5. CONSTRUCT PIER STEM.
6. DRILL AND INSTALL ROCK ANCHORS.
7. WAIT 28 DAYS AFTER PLACING CONCRETE DRILLED SHAFT CAP.
8. TENSION ROCK ANCHORS IN TWO CYCLES IN A SEQUENCE THAT BEGINS NEAREST THE CENTERLINE OF THE ANCHORAGE AND PROCEEDS ALTERNATELY TO THE SIDES. SEE ITEM SPECIAL, STRUCTURE, MISC.: PERMANENT ROCK ANCHORS NOTE PARAGRAPH 6.0 ON SHEET 5/23 FOR DETAILS.
9. CONSTRUCT PIER CAP.

ITEM 524, DRILLED SHAFTS, MISC.:

DRILLED SHAFT CONSTRUCTION METHOD ON THIS PROJECT SHALL PROCEED PER 524.04(d) PERMANENT CASING CONSTRUCTION METHOD FOR DRILLED SHAFT CONSTRUCTION ABOVE BEDROCK.

⚠2 VOIDS BETWEEN THE PERMANENT CASING AND THE GROUND AT PIERS 1 AND 2 DUE TO DRILLING METHODS SHALL BE GROUTED FULL WITH CEMENTITOUS MATERIAL. THE GROUT SHALL BE PLACED AND CURED PRIOR TO TENSIONING THE ROCK ANCHORS. THE CONTRACTOR SHALL SUBMIT METHODS AND MATERIALS FOR APPROVAL BY THE ENGINEER.

⚠1 CONCRETE FOR DRILLED SHAFTS SHALL BE IN ACCORDANCE WITH THE "HIGH STRENGTH MASS CONCRETE, 5000 PSI COMPRESSIVE STRENGTH" GENERAL NOTE SHEET 2A/23.

THE DESIGN LOAD TO BE SUPPORTED BY EACH PIER DRILLED SHAFT IS RESISTED BY SHAFT ADHESION WITHIN A PORTION OF THE BEDROCK SOCKET AND END BEARING. THE ALLOWABLE BEDROCK SOCKET ADHESION IS 4.3 TONS PER SQUARE FOOT. THE ALLOWABLE END BEARING PRESSURE IS 20 TONS PER SQUARE FOOT.

INCLINOMETER TUBES:

INCLINOMETER TUBES SHALL BE 2.75 INCH OUTSIDE DIAMETER QC (QUICK CONNECT) SINCO PART NUMBER 5115021O MANUFACTURED BY SLOPE INCLINOMETER CO., TELEPHONE 800-966-1791. THE INCLINOMETER TUBES SHALL HAVE A PROTECTIVE 4 INCH GALVANIZED STEEL PIPE AND LOCKING CAP TOP HOUSING, BOTTOM PLUG AND TOP CAP. INCLINOMETER TUBES SHALL BE TIED IN PLACE PRIOR TO PLACING CONCRETE IN THE DRILLED SHAFTS. THE INCLINOMETER TUBES SHALL BE SUPPORTED FROM THE REINFORCING STEEL AND THE STEEL H PILE SHAPES.

THE COST OF THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE DRILLED SHAFT BID ITEM.

ITEM 842, CLASS C CONCRETE, PIER ABOVE FOOTINGS, AS PER PLAN:

THE AGGREGATE SHALL CONSIST OF NO. 8 LIMESTONE.

ITEM 842, CONCRETE, MISC.: DRILLED SHAFT CAP:

⚠2 CONCRETE FOR DRILLED SHAFT CAPS SHALL BE IN ACCORDANCE WITH THE "HIGH STRENGTH MASS CONCRETE, 5000 PSI COMPRESSIVE STRENGTH" GENERAL NOTE SHEET 2A/23.

SURVEY REFERENCE POINT ON STRUCTURE:

A STAINLESS STEEL THREADED ROD SHALL BE PLACED ON THE TOP SURFACE OF THE DRILLED SHAFT CAP ON EACH OF THE 4 PIERS. THE PERMANENT REFERENCE POINTS SHALL CONSIST OF A 5/8 INCH DIAMETER BY 3 INCH LONG STAINLESS STEEL ROD WITH 11 THREADS PER INCH (UNC). THE RODS SHALL EXTEND 1 INCH ABOVE THE CONCRETE SURFACE AND BE CAPPED WITH A GREASED STAINLESS STEEL NUT FOR PROTECTION. THE RODS SHALL BE PLACED IN THE SURFACE OF THE FRESH CONCRETE OR SET IN NON-SHRINK, NON-METALLIC GROUT (705.20) IN A MINIMUM 1 1/4 INCH DIAMETER HOLE CORED 2 1/2 INCHES INTO THE CONCRETE.

THE COST OF THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE DRILLED SHAFT CAP BID ITEM.

ITEM 864, SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)

ALL EXPOSED SUBSTRUCTURE SURFACES SHALL BE COMPLETELY SEALED TO THE FINISHED GROUNDLINE WITH EPOXY-URETHANE. BRIDGE SEATS SHALL BE SEALED EXCEPT WITHIN THE FOOTPRINT OF THE BEARINGS.

GENERAL NOTES CONTINUED: SEE SHEET 2A/23

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

⚠2 REVISED 3/7/02
⚠1 REVISED 2/5/02

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
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PIER GENERAL NOTES
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

HIGH STRENGTH MASS CONCRETE, 5000 PSI COMPRESSIVE STRENGTH:

HIGH STRENGTH MASS CONCRETE FOR THE DRILLED SHAFTS AND DRILLED SHAFT CAPS SHALL MEET THE REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 899 CONCRETE - GENERAL, 844 HIGH PERFORMANCE CONCRETE, AND 842 - CONCRETE FOR STRUCTURES, EXCEPT AS MODIFIED HEREIN.

DEVELOP CONCRETE MIX DESIGNS CONFORMING TO ACI 301, SECTION 4, AND AS MODIFIED IN THIS SPECIFICATION. SUBMIT TEST DATA FROM A CERTIFIED LABORATORY THAT VERIFIES THE CONCRETE MIX DESIGN MEETS THIS SECTION. PROVIDE THE DATA TO THE OFFICE OF MATERIALS MANAGEMENT (OMM).

THE CERTIFIED LABORATORY WILL PERFORM THE TRIAL BATCHING, SAMPLE PREPARATION AND TESTING OF THE SAMPLES (ACI 301, 4.2.3.4.b). BATCHING AND SAMPLING MAY BE PERFORMED BY AN ACI GRADE I TECHNICIAN WITH THE LABORATORY ONLY WITNESSING THE PROCESS. THE CERTIFIED LABORATORY WILL PERFORM THE COMPRESSIVE STRENGTH AND PERMEABILITY TESTING.

DETERMINE THE REQUIRED AVERAGE COMPRESSIVE STRENGTH (f'cr) ACCORDING TO ACI 301, SECTION 4.2.3. IF THERE IS NO FIELD DATA AVAILABLE, SELECT THE OVER-DESIGN OF THE MIX FROM ACI 301, TABLE 4.2.3.3b. FOLLOW ACI 301 SECTION 4.2.3.4.a, OR 4.2.3.4.b WHEN USING FIELD OR LABORATORY DATA, RESPECTIVELY, TO ESTABLISH A MIX DESIGN. USE FIELD TEST DATA FROM PREVIOUS ODOT PROJECTS UNDER THIS SPECIFICATION OR OTHER SOURCES APPROVED BY THE OFFICE OF MATERIALS MANAGEMENT.

IF THE LABORATORY TRIAL MIX PROCEDURE IS USED TO SUPPORT THE MIX DESIGN, A SINGLE MIX CAN BE PREPARED, BUT IT MUST MEET ALL OF THE REQUIREMENTS OF THIS SPECIFICATION. USE AN AIR CONTENT FOR THE TRIAL MIX WITHIN 0.5 PERCENT OF THE DESIGN AIR CONTENT. PRODUCE THE TRIAL MIX USING A SLUMP WITHIN ¾ INCH OF THE CONTRACTOR'S MAXIMUM ALLOWABLE DESIGN SLUMP. PRODUCE THAT SLUMP BY INCLUDING THE MAXIMUM WATER TO BE USED AND ALL ADMIXTURES REQUIRED TO ACHIEVE THE MAXIMUM PLACEMENT SLUMP.

USE A CEMENT OR CEMENTITIOUS CONTENT MEETING THE MINIMUMS GIVEN IN TABLE 3.

TABLE 1 - CONCRETE MIX DESIGN REQUIREMENTS

CONCRETE USE	SPECIFIED COMPRESSIVE STRENGTH (f'c) PSI	DESIGN PERMEABILITY COULOMBS	PLASTIC AIR CONTENT %
DRILLED SHAFTS AND DRILLED SHAFT CAPS	5000 (AT 28 DAYS)	NOT APPLICABLE	TABLE 2

TABLE 2

COARSE AGGREGATE SIZE NUMBER	DESIGN AIR CONTENT (A_D)	REJECTABLE PERCENT AIR **
#8, #7, #78	7%	5%
#67, #57	6%	4%
#467, #357	5%	3%

BLENDING COARSE AGGREGATE IS ACCEPTABLE. REPORT THE PRODUCTION BLEND.

△2 ** NO AIR REQUIRED IN DRILLED SHAFTS BELOW GROUND

TABLE 3 - CONCRETE MIX DESIGN LIMITATIONS

MINIMUM CEMENTITIOUS CONTENT *	565 LBS/YD^3 (335 kg/m^3)
FLY ASH	UP TO 50%
GROUND GRANULATED SLAG	UP TO 50%
MICRO-SILICA	UP TO 10%
THE TOTAL COMBINATION OF POZZOLANIC MATERIALS SHALL NOT EXCEED THEIR INDIVIDUAL PERCENTAGE NOR TOTAL MORE THAN 50% OF THE TOTAL CEMENTITIOUS CONTENT.	

*THE CEMENTITIOUS CONTENT SHOWN ABOVE IS A MINIMUM. THE CONTRACTOR IS RESPONSIBLE FOR PROPORTIONING A MIX THAT IS WORKABLE AND MEETS ALL OF THE REQUIREMENTS OF THIS SPECIFICATION. TO ACCOMPLISH THIS, QUANTITIES ABOVE THE MINIMUM SHOWN MAY BE REQUIRED.

THE MAXIMUM COARSE AGGREGATE SIZE SHALL BE 2 INCHES. TYPE III CEMENT (701.05) AND ACCELERATING ADMIXTURES SHALL NOT BE USED.

WHEN MIXED, ALL CONCRETE SHALL HAVE A TEMPERATURE OF NOT MORE THAN 50° F.

CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE ARE PROHIBITED.

THE CONCRETE SHALL BE PROPORTIONED OF MATERIALS SPECIFIED IN 844.02 AND 899.02 TO PROVIDE A MINIMUM CYLINDER STRENGTH OF 5000 PSI IN 28 DAYS, AS DETERMINED BY TESTING A GROUP OF CYLINDERS COMPRISED OF AT LEAST TWO INDIVIDUAL CYLINDERS. EACH GROUP OF CYLINDERS SHALL HAVE AN AVERAGE STRENGTH OF NOT LESS THAN 5000 PSI AND NO INDIVIDUAL CYLINDER SHALL HAVE LESS THAN 95 PERCENT OF THE SPECIFIED STRENGTH. AT LEAST THREE 6"x12" CYLINDERS SHALL BE MADE FROM BOTH THE FIRST AND LAST LOADS BEING POURED PER DAY. IF MORE THAN 100 CUBIC YARDS IS BEING PLACED ON THE SAME DAY, AT LEAST THREE ADDITIONAL CYLINDERS SHALL BE MADE FOR EACH ADDITIONAL 100 CUBIC YARDS OR FRACTIONAL THEREOF. THE SAMPLE LOCATION FOR THE ADDITIONAL CYLINDERS SHALL BE GENERALLY IN THE MIDDLE OF THE PRODUCTION.

THE ENGINEER HAS THE OPTION TO REQUIRE ADDITIONAL CYLINDERS SAMPLES AT ANY LOCATION THAT DOES NOT APPEAR IN CONFORMATION WITH MIX DESIGN OR PLACEMENT REQUIREMENTS. THOSE ADDITIONAL CYLINDERS SHALL BE INCLUDED IN THE GROUP OF CYLINDERS FOR DETERMINING STRENGTH.

PRIOR TO PRODUCTION OF ANY CONCRETE, CONCRETE MIX DESIGNS SHALL BE SUBMITTED TO THE OMM WITH TEST DATA VALIDATING THE MIX'S CAPABILITY TO ACHIEVE THE REQUIRED 28 DAY STRENGTH. THE MIX DESIGN AND ACTUAL TRIAL BATCH TEST RESULTS FOR STRENGTH SHALL BE PERFORMED BY A CERTIFIED LABORATORY, AND DOCUMENTATION OF THE STANDARD DEVIATION (IF AVAILABLE) USED FOR THE PROPOSED MIX SHALL BE SUBMITTED TO THE OMM FOR APPROVAL. COMPRESSION TESTING SHALL CONFORM TO THE APPLICABLE ASTM SPECIFICATION.

THE CONTRACTOR SHALL PROVIDE THE FOLLOWING FOR THE DRILLED SHAFT AND DRILLED SHAFT CAP MASS CONCRETE:

1.) ANALYSIS OF THE ANTICIPATED THERMAL DEVELOPMENTS IN THE MASS CONCRETE FOR EXPECTED PROJECT TEMPERATURE RANGES OF 50° F TO 150° F USING THE PROPOSED MIX DESIGN, PLACING PROCEDURES, AND MATERIALS.

2.) DESCRIPTION OF THE MEASURES AND PROCEDURES INTENDED FOR USE TO MAINTAIN A TEMPERATURE DIFFERENTIAL OF 35° F OR LESS BETWEEN THE INTERIOR AND EXTERIOR PORTIONS OF THE DESIGNATED MASS CONCRETE ELEMENTS DURING CURING; AND A MAXIMUM TEMPERATURE OF 120° F. AUXILIARY INTERIOR COOLING MAY BE REQUIRED.

3.) SUBMIT BOTH THE MASS CONCRETE MIX DESIGN AND THE PROPOSED PLAN TO MONITOR AND CONTROL THE TEMPERATURE DIFFERENTIAL CONCURRENTLY TO THE OMM FOR APPROVAL A MINIMUM OF TEN WORKING DAYS PRIOR TO CONCRETE PLACEMENT.

4.) PROVIDE EMBEDDED TEMPERATURE MONITORING DEVICES APPROVED BY THE ENGINEER TO RECORD TEMPERATURE DEVELOPMENT BETWEEN THE INTERIOR AND EXTERIOR PORTIONS OF THE ELEMENTS AT POINTS APPROVED BY THE ENGINEER.

5.) THE CONTRACTOR SHALL READ THE MONITORING DEVICES AND RECORD THE READING AT NOT GREATER THAN 6 HOUR INTERVALS, AS APPROVED BY THE ENGINEER, BEGINNING WHEN PLACING IS COMPLETE AND CONTINUE UNTIL THE MAXIMUM TEMPERATURE DIFFERENTIAL IS REACHED AND BEGINS DROPPING. IF MONITORING INDICATES THAT 35° F DIFFERENTIAL HAS BEEN EXCEEDED, THE CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO RETARD FURTHER GROWTH IN THE TEMPERATURE DIFFERENTIAL AND MAKE THE NECESSARY REVISIONS TO THE APPROVED PLAN TO MAINTAIN THE 35° F OR LESS DIFFERENTIAL ON ANY REMAINING PLACEMENTS. THE CONTRACTOR SHALL OBTAIN THE ENGINEER'S APPROVAL OF REVISIONS TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION.

BASIS OF PAYMENT - THE COST OF DESIGNING THE CONCRETE MIX, TESTING, SAMPLING, COOLING AND TEMPERATURE MONITORING SHALL BE INCLUDED AS INCIDENTAL TO THE BID ITEM:

ITEM 524 - DRILLED SHAFTS, MISC.: 138" DIAMETER INTO BEDROCK.
ITEM 524 - DRILLED SHAFTS, MISC.: 144" DIAMETER ABOVE BEDROCK.
ITEM 842 - CONCRETE, MISC.: DRILLED SHAFT CAP.

△2 APPROVED MIX DESIGN (AS BUILT)

MATERIAL	BRAND	MIX DESIGN WEIGHT (LB/CY)
CEMENT	CEMEX	250
GGBFS	ESSROC	250
LIMESTONE #57	WAGNER	1450
LIMESTONE #8	WAGNER	300
NATURAL SAND	BAKER	1395
ADJUSTED WATER		277
TOTAL BATCH WEIGHT		3922

WATER/CEMENT RATIO - 0.55
TARGETED AIR AT BATCHING - 2.5 %
ADMIXTURE - WATER REDUCER - POLYHEED 997 - 60 OZ/CY

GENERAL NOTES CONTINUED: SEE SHEET 3/23

FOR PIER FOUNDATION CONSTRUCTION
2/5/02

△2 REVISED 3/25/02
△1 ADDED SHEET 2/5/02

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	CAR	DT	2/5/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
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PIER GENERAL NOTES - 2A
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

223SMA.DGN 2/5/02 JLS

ITEM SPECIAL, STRUCTURE, MISC.: PERMANENT ROCK ANCHORS

1.0 DESCRIPTION

THIS WORK CONSISTS OF FURNISHING, INSTALLING AND TESTING PERMANENT CEMENT GROUTED ROCK ANCHORS TO BE CONSTRUCTED IN ACCORDANCE WITH THIS SPECIFICATION AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN, AND DIMENSIONS SHOWN ON THE PLANS OR ESTABLISHED BY THE ENGINEER.

THE ROCK ANCHORS TO BE INSTALLED SHALL COMPLY WITH THE CONTENTS OF THE LATEST EDITION OF "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS", PUBLISHED BY THE POST TENSIONING INSTITUTE LOCATED AT 1717 WEST NORTHERN AVE., PHOENIX, ARIZONA, 85021 (TELEPHONE 602-870-7540) EXCEPT AS MODIFIED HEREIN.

1.1 DESIGN REQUIREMENTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING AND SUBMITTING A DESIGN PROPOSAL DESCRIBING THE ROCK ANCHOR SYSTEM INTENDED FOR THE PROJECT. THE DESIGN PROPOSAL SHALL INCLUDE:

A. DESCRIPTION OF THE ROCK ANCHOR INSTALLATION (INCLUDING DRILLING, GROUTING AND STRESSING INFORMATION).
B. ESTIMATED ROCK ANCHOR CAPACITY.
C. ROCK ANCHOR TENDON TYPE AND CAPACITY.
D. ROCK ANCHOR ANCHORAGE TYPE AND BEARING PLATE DESIGN.
E. ROCK ANCHOR MINIMUM BONDED LENGTHS, MINIMUM UNBONDED LENGTHS, TOTAL ROCK ANCHOR LENGTHS, ANGLES OF INSTALLATION AND LOCATIONS.
F. CORROSION PROTECTION DETAILS FOR ROCK ANCHORS AND HARDWARE.
G. DETAILED PLANS FOR PROOF, CREEP, PERFORMANCE AND LIFT-OFF TESTING OF ROCK ANCHORS SHOWING LOADING AND MEASURING DEVICES TO BE USED, TEST LOCATIONS, AND TESTING PROCEDURES TO BE FOLLOWED.
H. CALCULATIONS AND CONSTRUCTION DRAWINGS PREPARED, STAMPED AND SIGNED BY AN ENGINEER REGISTERED AS A PROFESSIONAL ENGINEER IN THE STATE OF OHIO. THESE DRAWINGS MUST SHOW EXPLICIT DETAILS TO ALLOW EXPEDITIOUS REVIEW OF THE PROPOSED DESIGN AND CONSTRUCTION PROCEDURE. THE CONTRACTOR SHALL SUBMIT THREE (3) COPIES OF THE PLANS AND TWO (2) COPIES OF THE DESIGN CALCULATIONS TO THE DIRECTOR, AT LEAST FIFTEEN (15) DAYS PRIOR TO BEGINNING WORK, AND SHALL RECEIVE APPROVAL BEFORE STARTING.

2.0 QUALIFICATIONS OF ROCK ANCHOR CONTRACTOR

2.1 QUALIFICATIONS.

THE ROCK ANCHOR WORK SHALL BE PERFORMED BY A CONTRACTOR OR SUBCONTRACTOR (1) WHO HAS BEEN PREQUALIFIED BY THE OHIO DEPARTMENT OF TRANSPORTATION AS PER THE OHIO REVISED CODE 5525.02 THRU 5525.09 AND (2) WHO CAN PROVIDE THE LEVEL OF EXPERTISE AS SPECIFIED BELOW:

A. A REGISTERED PROFESSIONAL ENGINEER HAVING AT LEAST ONE YEAR OF EXPERIENCE IN THE CONSTRUCTION OF PERMANENT ROCK ANCHORS USING MULTI-STRAND TENDONS WITH UNBONDED LENGTH, SHALL BE IN CHARGE OF OVERSEEING THE CONSTRUCTION OF THE ROCK ANCHOR WORK. THE REGISTERED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR CERTIFYING THE RESULTS OF THE ROCK ANCHOR TESTING.

B. A FULL-TIME FOREMAN HAVING COMPLETED THE GENERAL SUPERVISION OF AT LEAST TWO PERMANENT ROCK ANCHOR TENDON PROJECTS (INCLUDING SIGNIFICANT UNBONDED LENGTH) WHICH WERE SUCCESSFULLY COMPLETED WITHIN THE PAST THREE YEARS SHALL BE IN CHARGE OF SUPERVISING THE CONSTRUCTION.

C. EACH DRILLING OPERATOR SHALL HAVE SUCCESSFULLY INSTALLED AT LEAST 50 PERMANENT TENDON TYPE ROCK ANCHORS WITHIN THE PAST TWO YEARS.

2.2 WORK EXPERIENCE

THE FOLLOWING INFORMATION SHALL BE FURNISHED BY THE CONTRACTOR WHEN REQUESTING APPROVAL OF THE PERSONNEL HE PROPOSED TO UTILIZE TO PERFORM THE ROCK ANCHOR WORK:

A. RESUMES FOR THE REQUIRED PERSONNEL DEFINED IN SECTION 2.1 QUALIFICATIONS.

B. THE PROJECT LOCATIONS AND THE NUMBER OF TENDON TYPE ROCK ANCHORS WHICH HAVE BEEN COMPLETED DURING THE PAST FOUR YEARS ALONG WITH THE NAMES AND ADDRESSES OF THE OWNERS, CONTRACTORS, OR ARCHITECT - ENGINEERS FOR WHICH THE ROCK ANCHOR SERVICES WERE PROVIDED.

C. A DETAILED DESCRIPTION OF ALL TYPES OF ROCK ANCHORS WHICH HAVE BEEN INSTALLED DURING THE PAST FOUR YEARS.

D. A DESCRIPTION OF THE TYPE OF ROCK ANCHOR EQUIPMENT THAT HAS BEEN USED ON PREVIOUS PROJECTS AND OF THE ROCK ANCHOR EQUIPMENT THAT IS TO BE USED ON THIS PROJECT.

THE INFORMATION REQUESTED IN SECTION 2.2 SHALL BE FURNISHED TO THE ENGINEER PRIOR TO BEGINNING THE TIEBACK WORK. NON COMPLIANCE BY THE CONTRACTOR MUST BE RECTIFIED PRIOR TO BEGINNING THE ROCK ANCHOR WORK.

3.0 DEFINITIONS

3.1 ALIGNMENT LOAD:

THE NOMINAL LOAD MAINTAINED ON THE ROCK ANCHOR DURING TESTING TO ASSURE THAT THE TESTING EQUIPMENT REMAINS IN PROPER POSITION.

3.2 ANCHOR GROUT (PRIMARY GROUT):

MATERIAL THAT IS INJECTED INTO THE ROCK ANCHOR HOLE TO COVER THE BOND LENGTH OF THE TENDON AND PROVIDE THE MEDIUM FOR TRANSMITTING THE TENDON TENSILE FORCE TO THE BEDROCK ALONG THE BOND LENGTH.

3.3 ANCHOR LENGTH (TENDON BOND LENGTH):

THE LENGTH OF THE ROCK ANCHOR SYSTEM WHERE THE TENSILE FORCE IN THE TENDON IS TRANSFERRED TO THE GROUND.

3.4 ANCHORAGE:

THE ROCK ANCHOR HEAD AND BEARING PLATE WHICH TRANSFER THE TENSILE FORCE IN THE TENDON FROM THE BOND LENGTH TO THE ANCHOR STRUCTURE.

3.5 CAPSULE:

PLASTIC TUBE INTO WHICH THE ROCK ANCHOR GROUT, TENDON, SPACERS AND CENTRALIZERS ARE POSITIONED AND THEN GROUTED INTO PLACE.

3.6 CREEP CURVE:

A SEMI LOGARITHMIC PLOT OF THE CREEP MOVEMENT VS TIME, WITH THE UNITS OF TIME PLOTTED ON THE LOGARITHMIC AXIS.

3.7 CREEP MOVEMENT:

THE TIME-DEPENDENT MOVEMENTS OF THE ROCK ANCHOR AT A CONSTANT LOAD.

3.8 CREEP RATE:

THE SLOPE OF THE CREEP CURVE PER LOG CYCLE OF TIME.

3.9 CREEP TEST:

THE LOADING AND UNLOADING INCREMENTS FOR THIS TEST ARE THE SAME AS USED FOR A PERFORMANCE TEST. THE MOVEMENT OF THE TENDON IS RECORDED AT EACH LOADING AND UNLOADING INCREMENT AND THE MOVEMENT OF THE TENDON IS ALSO RECORDED FOR A DEFINED EXTENDED TIME PERIOD WHILE MAINTAINING CERTAIN LOAD INCREMENTS.

3.10 JACKING LENGTH:

THE LENGTH OF THE PRESTRESSING TENDON WHICH IS LOCATED ON THE JACKING SIDE OF THE FINAL ANCHORAGE POSITION AND TENSIONED DURING THE STRESSING OF THE TENDON.

3.11 PERFORMANCE TEST:

THIS LOAD TEST REQUIRES THE APPLICATION OF DEFINED INCREMENTAL LOADING AND UNLOADING OF THE ROCK ANCHOR TENDON. THE MOVEMENT OF THE TENDON IS RECORDED AT EACH LOADING AND UNLOADING INCREMENT. THE MAXIMUM LOAD APPLIED DURING THIS TEST IS MAINTAINED CONSTANT FOR A DEFINED TIME PERIOD WHILE MOVEMENTS ARE RECORDED.

3.12 PROOF LOAD (TEST LOAD):

THE LARGEST LOAD APPLIED TO A ROCK ANCHOR WHEN POST-TENSIONING A ROCK ANCHOR DURING A LOAD TEST. THIS LOAD IS GENERALLY A DEFINED PERCENTAGE INCREASE IN THE ROCK ANCHOR DESIGN LOAD.

3.13 PROOF TEST:

A ROCK ANCHOR LOAD TEST THAT REQUIRES THE APPLICATION OF DEFINED INCREMENTAL LOADS TO THE ANCHOR TENDON. THE MOVEMENT OF THE TENDON IS RECORDED AT EACH LOAD INCREMENT.

3.14 ROCK ANCHOR:

A STRUCTURAL SYSTEM WHICH CONSISTS OF CEMENT GROUTED STEEL STRAND TENDONS EMBEDDED INTO BEDROCK THEREBY DEVELOPING RESISTANCE TO AN APPLIED TENSILE FORCE.

THE ROCK ANCHOR IS COMPOSED OF A MULTIPLE STRAND TYPE TENDON, GROUT, ANCHOR HEAD, BEARING PLATE, TRUMPET, SPACERS, CENTRALIZERS, AND CORROSION PROTECTION SYSTEM.

3.15 ROCK ANCHOR DESIGN LOAD:

THE DESIGN LOAD (DL) IS 490 KIPS PER ROCK ANCHOR.

3.16 SECONDARY GROUT:

MATERIAL THAT IS INJECTED INTO THE ROCK ANCHOR HOLE TO COVER THE UNBONDED LENGTH OF THE TENDON TO PROVIDE CORROSION PROTECTION. GENERALLY THE SAME MATERIAL AS USED FOR THE PRIMARY GROUT.

3.17 TENDON:

THE PRESTRESSING STEEL STRANDS AND ANCHORAGE AND ALSO THE SHEATHING.

3.18 TRANSFER LOAD (LOCK-OFF READING):

THE LOAD CARRIED BY THE TENDON AFTER COMPLETION OF TESTING AND/OR STRESSING OF THE ROCK ANCHOR.

3.19 UNBONDED LENGTH:

THE LENGTH OF THE ROCK ANCHOR SYSTEM WHICH IS FREE TO ELONGATE AND IS LOCATED BETWEEN THE ROCK ANCHOR HEAD AND TENDON BOND LENGTH.

3.20 UNBONDED TESTING LENGTH (STRESSING LENGTH):

THE SUM OF THE UNBONDED LENGTH AND THE JACKING LENGTH WHICH IS EQUAL TO THE LENGTH OF THE TENDON THAT IS FREE TO ELONGATE ELASTICALLY DURING STRESSING.

4.0 ROCK ANCHOR MATERIALS

THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO ACQUIRE THE ROCK ANCHOR SYSTEM, STEEL TENDONS, AND ALL NECESSARY INCIDENTALS FOR CONSTRUCTION OF THE PROPOSED ROCK ANCHORS. (REFER TO THE SECTION OF THE PROPOSAL CONCERNING STEEL PRODUCED IN THE UNITED STATES.)

4.1 STEEL

PRESTRESSING STEEL FOR TENDONS SHALL BE 7-WIRE STRAND, GRADE 270, STRESS RELIEVED OR LOW RELAXATION STEEL, ASTM A416.

ALL ANCHORAGES SHALL DEVELOP AT LEAST 95 PERCENT OF THE MINIMUM SPECIFIED ULTIMATE STRENGTH OF THE PRESTRESSING STEEL, WHEN TESTED IN AN UNBONDED STATE, WITHOUT EXCEEDING ANTICIPATED SET. TENDONS SHALL BE PREFABRICATED FOR THE TOTAL LENGTH REQUIRED WITHOUT THE USE OF COUPLERS.

THE STEEL USED FOR CONSTRUCTION OF THE ANCHORAGE SYSTEM SHALL CONFORM TO THE REQUIREMENTS OF ITEM 711.

BEARING PLATES AND TIE PLATES SHALL BE FABRICATED FROM STEEL CONFORMING TO AASHTO M270 (ASTM A709) GRADE 36, OR BE A DUCTILE IRON CASTING CONFORMING TO ASTM A536.

TRUMPETS USED TO PROVIDE A TRANSITION FROM THE ANCHORAGE TO THE UNBONDED LENGTH CORROSION PROTECTION SHALL BE FABRICATED FROM A STEEL PIPE OR TUBE CONFORMING TO THE REQUIREMENTS OF ASTM A53 FOR PIPE OR ASTM A-500 FOR TUBING. MINIMUM WALL THICKNESS SHALL BE 0.20 INCHES.

ANCHORAGE COVERS USED TO ENCLOSE EXPOSED ANCHORAGES SHALL BE FABRICATED FROM STEEL, STEEL PIPE, STEEL TUBE, OR DUCTILE CAST IRON CONFORMING TO THE REQUIREMENTS OF AASHTO M270 (ASTM A709) GRADE 36 FOR STEEL, ASTM A53 FOR PIPE, ASTM A500 FOR TUBING, AND ASTM A536 FOR DUCTILE CAST IRON. MINIMUM THICKNESS SHALL BE 0.10 INCHES.

BEARING PLATES, TIE PLATES AND ANCHORAGE COVERS SHALL BE GALVANIZED PER 711.02.

STRUCTURE, MISC.: PERMANENT ROCK ANCHORS CONTINUED: SEE SHEET 4 /23

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

ROCK ANCHOR GENERAL NOTES - 1
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

ITEM SPECIAL, STRUCTURE, MISC.: PERMANENT ROCK ANCHORS (CONTINUED)

4.2 GROUT

CEMENT SHALL BE TYPE I, II, OR III PORTLAND CEMENT CONFORMING TO AASHTO M85. CEMENT USED FOR GROUTING SHALL BE FRESH AND SHALL NOT CONTAIN ANY LUMPS OR OTHER INDICATIONS OF HYDRATION OR "PACK SET."

AGGREGATE SHALL CONFORM TO THE REQUIREMENTS FOR FINE AGGREGATE DESCRIBED IN AASHTO M6.

THE GROUT SHALL CONFORM TO ALL APPLICABLE REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 899. WATER FOR MIXING GROUT SHALL BE POTABLE, CLEAN AND FREE OF INJURIOUS QUANTITIES OF SUBSTANCES KNOWN TO BE HARMFUL TO PORTLAND CEMENT OR PRESTRESSING STEEL.

ADMIXTURES CAN BE USED IN THE GROUT ONLY WHEN APPROVED BY THE ENGINEER. PREFERENCE SHALL BE GIVEN TO NOT USING ANY ADMIXTURES IN THE GROUT. EXPANSIVE ADMIXTURES MAY ONLY BE ADDED TO GROUT WHICH IS USED FOR FILLING SEALED ENCAPSULATIONS, TRUMPETS AND ANCHORAGE COVERS. ACCELERATORS SHALL NOT BE USED. CHEMICAL ADDITIVES WHICH CAN CONTROL BLEED AND/OR RETARD SET MAY BE USED IN THE ANCHOR GROUT.

4.3 CENTRALIZERS

CENTRALIZERS SHALL BE FABRICATED FROM A STEEL OR PLASTIC MATERIAL THAT IS NONDETRIMENTAL TO THE PRESTRESSING STEEL.

4.4 SPACERS

SPACERS SHALL BE FABRICATED FROM A STEEL OR PLASTIC MATERIAL THAT IS NONDETRIMENTAL TO THE PRESTRESSING STEEL.

4.5 CAPSULE

THE ENCAPSULATION MATERIAL SHALL BE CORRUGATED PLASTIC TUBE. THE CAPSULE SHALL BE:

A. RESISTANT TO CHEMICAL ATTACK FROM AGGRESSIVE ENVIRONMENTS, GROUT, OR GREASE.

B. FABRICATED FROM MATERIALS NONDETRIMENTAL TO THE TENDON.

C. CAPABLE OF WITHSTANDING ABRASION, IMPACT, AND BENDING DURING HANDLING AND INSTALLATION.

D. FREE OF FLAWS WHICH WOULD PERMIT WATER TO ENTER INTO THE TIEBACK SYSTEM.

E. CAPABLE OF TRANSFERRING STRESSES FROM THE GROUT INSIDE THE CAPSULE TO THE GROUT OUTSIDE THE CAPSULE.

4.6 CORROSION PROTECTION ELEMENTS

CORROSION INHIBITING GREASE INSIDE THE SHEATH FOR THE UNBONDED LENGTH SHALL CONFORM TO THE REQUIREMENTS OF THE POST TENSIONING INSTITUTE'S "SPECIFICATIONS FOR UNBONDED SINGLE STRAND TENDONS," SECTION 3.2.5. THE CORROSION INHIBITOR SHALL FILL ALL SPACE BETWEEN THE STRAND WIRES AND BETWEEN THE STRAND AND THE SHEATH.

SHEATH FOR THE UNBONDED LENGTH OF THE TENDON SHALL CONSIST OF ONE OF THE FOLLOWING:

(1) SEAMLESS POLYETHYLENE (PE) TUBE HAVING A MINIMUM WALL THICKNESS OF 60 MILS PLUS OR MINUS 10 MILS. THE POLYETHYLENE SHALL BE CELL CLASSIFICATION 334413 BY ASTM D3350.

(2) SEAMLESS POLYPROPYLENE TUBE HAVING A MINIMUM WALL THICKNESS OF 60 MILS PLUS OR MINUS 10 MILS. THE POLYPROPYLENE SHALL BE CELL CLASSIFICATION PP210B55542-11 BY ASTM D4101.

(3) HEAT SHRINKABLE TUBE CONSISTING OF A RADIATION CROSS LINKED POLYOLEFIN TUBE INTERNALLY COATED WITH AN ADHESIVE SEALANT. THE MINIMUM TYPE WALL THICKNESS BEFORE SHRINKING SHALL BE 24 MILS. THE MINIMUM ADHESIVE SEALANT THICKNESS SHALL BE 20 MILS.

(4) CORRUGATED POLYVINYL CHLORIDE (PVC) TUBE HAVING A MINIMUM WALL THICKNESS OF 30 MILS.

ENCAPSULATION FOR THE TENDON UNBONDED AND BOND LENGTH SHALL CONSIST OF ONE OF THE FOLLOWING:

(1) CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) TUBE HAVING A MINIMUM WALL THICKNESS OF 30 MILS AND CONFORMING TO AASHTO M252 REQUIREMENTS.

(2) CORRUGATED POLYVINYL CHLORIDE (PVC) TUBE HAVING A MINIMUM WALL THICKNESS OF 30 MILS.

4.7 MISCELLANEOUS ELEMENTS

BONDBREAKER FOR A TENDON SHALL CONSIST OF A SMOOTH PLASTIC TUBE OR PIPE THAT IS RESISTANT TO AGING BY ULTRA-VIOLET LIGHT AND THAT IS CAPABLE OF WITHSTANDING ABRASION, IMPACT AND BENDING DURING HANDLING AND INSTALLATION.

SPACERS FOR SEPARATION OF ELEMENTS OF MULTI-ELEMENT TENDON SHALL PERMIT THE FREE FLOW OF GROUT. THEY SHALL BE FABRICATED FROM PLASTIC, STEEL OR MATERIAL WHICH IS NOT DETRIMENTAL TO THE PRESTRESSING STEEL. WOOD SHALL NOT BE USED.

CENTRALIZERS SHALL BE FABRICATED FROM PLASTIC, STEEL OR MATERIAL WHICH IS NOT DETRIMENTAL TO EITHER THE PRESTRESSING STEEL OR ANY ELEMENT OF THE TENDON CORROSION PROTECTION. WOOD SHALL NOT BE USED. THE CENTRALIZER SHALL BE ABLE TO MAINTAIN THE POSITION OF THE TENDON SO THAT A MINIMUM OF 0.5 INCHES OF GROUT COVER IS OBTAINED ON THE TENDONS.

5.0 ROCK ANCHOR FABRICATION

TENDONS FOR ROCK ANCHORS MAY BE EITHER SHOP OR FIELD FABRICATED FROM MATERIALS CONFORMING TO THE REQUIREMENTS OF SECTION 4.1. TENDONS SHALL BE FABRICATED AS SHOWN ON THE PLANS. THE TENDON SHALL BE SIZED SO THAT THE MAXIMUM TEST LOAD DOES NOT EXCEED 80 PERCENT OF THE MINIMUM GUARANTEED ULTIMATE STRENGTH OF THE TENDON.

5.1 BOND LENGTH AND TENDON BOND LENGTH

THE BOND LENGTH SHALL BE SUFFICIENTLY LONG THAT THE STRESS AT THE ROCK-GROUT INTERFACE IN THE BONDED ZONE DOES NOT EXCEED AN AVERAGE OF 100 PSI AT 100 PERCENT OF THE GUARANTEED ULTIMATE TENSILE STRENGTH OF THE ANCHOR OR 60 PSI ALLOWABLE AT 60 PERCENT OF THE GUARANTEED ULTIMATE TENSILE STRENGTH.

CENTRALIZERS SHALL BE PLACED ALONG THE BOND LENGTH. THEY SHALL BE LOCATED AT 10 FOOT MAXIMUM CENTERS WITH THE UPPER ONE LOCATED A MAXIMUM OF 5 FEET FROM THE TOP OF THE BOND LENGTH AND THE LOWER ONE LOCATED ONE FOOT FROM THE BOTTOM OF THE BOND LENGTH. CENTRALIZERS ARE NOT REQUIRED ON TENDONS INSTALLED UTILIZING A HOLLOW-STEM AUGER IF IT IS GROUTED THROUGH THE AUGER AND THE DRILL HOLE IS MAINTAINED FULL OF A STIFF GROUT (9 INCH SLUMP OR LESS) DURING EXTRACTION OF THE AUGER.

5.2 TENDON

THE SIZE OF THE TENDON SHALL BE DESIGNED SO THAT (1) WHEN TENSIONED TO THE ROCK ANCHOR DESIGN LOAD, THE LOADING DOES NOT TENSION THE TENDON BEYOND 60 PERCENT OF THE GUARANTEED ULTIMATE TENSILE STRENGTH (GUTS) OF THE TENDON AND (2) WHEN TENSIONED TO THE MAXIMUM TEST LOAD (1.33 TIMES THE TIEBACK DESIGN LOAD), THE LOADING DOES NOT TENSION THE TENDON BEYOND 80 PERCENT OF GUTS.

5.3 ENCAPSULATION PROTECTED ANCHOR TENDON

THE TENDON BOND LENGTH SHALL BE ENCAPSULATED BY A GROUT-FILLED CORRUGATED PLASTIC TUBE. THE TENDON CAN BE GROUTED INSIDE THE ENCAPSULATION PRIOR TO INSERTING THE TENDON IN THE DRILL HOLE OR AFTER THE TENDON HAS BEEN PLACED IN THE DRILL HOLE. THE TENDON SHALL BE CENTRALIZED WITHIN THE ENCAPSULATION AND THE TUBE SIZED TO PROVIDE AN AVERAGE OF 0.50 INCHES OF GROUT COVER FOR THE PRESTRESSING STEEL.

5.4 CORROSION PROTECTION

CONTINUITY OF CORROSION PROTECTION SHALL BE PROVIDED AT THE TRANSITION FROM THE BONDED LENGTH TO UNBONDED LENGTH OF THE TENDON.

5.5 ANCHORAGE AND TRUMPET

THE TRUMPET SHALL BE WELDED TO THE BEARING PLATE. THE TRUMPET SHALL HAVE AN INSIDE DIAMETER EQUAL TO OR LARGER THAN THE HOLE IN THE BEARING PLATE. THE TRUMPET SHALL BE LONG ENOUGH TO ACCOMMODATE MOVEMENTS OF THE STRUCTURE DURING TESTING AND STRESSING.

TRUMPETS FILLED WITH CORROSION-INHIBITING GREASE SHALL HAVE A PERMANENT BUNA-N RUBBER OR APPROVED EQUAL SEAL PROVIDED BETWEEN THE TRUMPET AND THE UNBONDED LENGTH CORROSION PROTECTION. TRUMPETS FILLED WITH GROUT SHALL HAVE A TEMPORARY SEAL PROVIDED BETWEEN THE TRUMPET AND THE UNBONDED LENGTH CORROSION PROTECTION.

5.6 TENDON STORAGE AND HANDLING

TENDONS SHALL BE STORED AND HANDLED IN SUCH A MANNER AS TO AVOID DAMAGE OR CORROSION. DAMAGE TO TENDON PRESTRESSING STEEL AS A RESULT OF ABRASION, CUTS, NICKS, WELDS AND WELD SPLATTER WILL BE CAUSE FOR REJECTION BY THE ENGINEER. GROUNDING OF WELDING LEADS TO THE PRESTRESSING STEEL IS NOT PERMITTED. PRIOR TO INSERTING A TENDON INTO THE DRILLED HOLE, ITS CORROSION PROTECTION ELEMENTS SHALL BE EXAMINED FOR DAMAGE. ANY DAMAGE FOUND SHALL BE REPAIRED IN A MANNER APPROVED BY THE ENGINEER.

5.7 INSTALLATION

THE CONTRACTOR SHALL SELECT A DRILLING METHOD, A GROUTING PROCEDURE AND A GROUTING PRESSURE THAT IS EXPECTED TO PROVIDE THE BEST ROCK ANCHOR CAPACITY FOR THE SUBSURFACE CONDITIONS AT THIS PROJECT SITE.

5.8 DRILLING

EXCESSIVE AMOUNTS OF WATER SHALL NOT BE USED IN THE DRILLING OPERATION. DRILLING SHALL BE PERFORMED BY THE DUPLEX DRILLING METHOD WITH A CASING AND DRILL ROD USING AN INTERNAL FLUSH OF DRILLING WASTE. THE LOCATION, INCLINATION, AND ALIGNMENT OF THE DRILLED HOLE SHALL BE AS SHOWN ON THE PLANS. INCLINATION AND ALIGNMENT SHALL BE WITHIN PLUS OR MINUS 3 DEGREES OF THE PLAN ANGLE AT THE BEARING PLATE.

5.9 TENDON INSERTION

THE TENDON SHALL BE INSERTED INTO THE DRILLED HOLE TO THE DESIRED DEPTH WITHOUT DIFFICULTY. WHEN THE TENDON CANNOT BE COMPLETELY INSERTED IT SHALL BE REMOVED AND THE DRILL HOLE CLEANED OR REDRILLED TO PERMIT INSERTION. PARTIALLY INSERTED TENDONS SHALL NOT BE DRIVEN OR FORCED INTO THE HOLE.

5.10 ROCK ANCHOR ANGLE

THE ROCK ANCHOR TENDONS SHALL BE INSTALLED AT AN ANGLE OF 45 ± 3 DEGREES DOWN FROM HORIZONTAL.

5.11 GROUTING

A NEAT CEMENT GROUT OR SAND CEMENT GROUT CONFORMING TO SECTION 4.2 SHALL BE USED.

THE GROUTING EQUIPMENT SHALL PRODUCE A GROUT FREE OF LUMPS AND UNDISPERSED CEMENT. A POSITIVE DISPLACEMENT GROUT PUMP SHALL BE USED. THE PUMP SHALL BE EQUIPPED WITH A PRESSURE GAUGE TO MONITOR GROUT PRESSURES. THE PRESSURE GAUGE SHALL BE CAPABLE OF MEASURING PRESSURES OF AT LEAST 150 PSI OR TWICE THE ACTUAL GROUT PRESSURES USED, WHICHEVER IS GREATER. THE GROUTING EQUIPMENT SHALL BE SIZED TO ENABLE THE GROUT TO BE PUMPED IN ONE CONTINUOUS OPERATION. THE MIXER SHALL BE CAPABLE OF CONTINUOUSLY AGITATING THE GROUT.

THE GROUT SHALL BE INJECTED FROM THE LOWEST POINT OF THE DRILL HOLE. THE GROUT MAY BE PUMPED THROUGH GROUT TUBES, CASING, HOLLOW-STEM AUGERS OR DRILL RODS. THE GROUT MAY BE PLACED BEFORE OR AFTER INSERTION OF THE TENDON. THE QUANTITY OF THE GROUT AND THE GROUT PRESSURES SHALL BE RECORDED. THE GROUT PRESSURES AND GROUT TAKES SHALL BE CONTROLLED TO PREVENT EXCESSIVE HEAVE OF THE GROUND OR FRACTURING OF ROCK FORMATIONS.

EXCEPT WHERE INDICATED BELOW, THE GROUT ABOVE THE TOP OF THE BOND LENGTH MAY BE PLACED AT THE SAME TIME AS THE BOND LENGTH GROUT, BUT IT SHALL NOT BE PLACED UNDER PRESSURE.

THE GROUT AT THE TOP OF THE DRILL HOLE SHALL STOP SIX INCHES FROM THE BACK OF THE STRUCTURE OR FROM THE BOTTOM OF THE TRUMPET, WHICHEVER IS LOWEST.

PRESSURE GROUTING TECHNIQUES SHALL BE UTILIZED. PRESSURE GROUTING REQUIRES THAT THE DRILL HOLE BE SEALED AND THAT THE GROUT BE INJECTED UNTIL A 50 PSI GROUT PRESSURE CAN BE MAINTAINED ON THE GROUT WITHIN THE BOND LENGTH FOR A PERIOD OF FIVE MINUTES.

UPON COMPLETION OF GROUTING, THE GROUT TUBE MAY REMAIN IN THE DRILL HOLE PROVIDED IT IS FILLED WITH GROUT.

AFTER GROUTING, THE TENDON SHALL NOT BE LOADED FOR A MINIMUM OF THREE DAYS.

STRUCTURE, MISC.: PERMANENT ROCK ANCHORS CONTINUED: SEE SHEET 5 / 23

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

ROCK ANCHOR GENERAL NOTES - 2

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

STRUCTURE, MISC.: PERMANENT ROCK ANCHORS CONTINUED:

5.12 TRUMPET AND ANCHORAGE

THE CORROSION PROTECTION SURROUNDING THE UNBONDED LENGTH OF THE TENDON SHALL BE EXTENDED INTO THE TRUMPET A MINIMUM OF SIX INCHES BEYOND THE BOTTOM WATERTIGHT SEAL IN THE TRUMPET.

THE CORROSION PROTECTION SURROUNDING THE UNBONDED LENGTH OF THE TENDON SHALL NOT CONTACT THE BEARING PLATE OR THE ANCHORAGE DURING THE LOAD TESTING OR STRESSING.

THE BEARING PLATE AND ANCHORAGE SHALL BE PLACED PERPENDICULAR TO THE AXIS OF THE TENDON.

THE TRUMPET SHALL BE COMPLETELY FILLED WITH CORROSION INHIBITING GREASE OR GROUT. THE GREASE MAY BE PLACED ANY TIME DURING CONSTRUCTION. THE GROUT SHALL BE PLACED AFTER THE ROCK ANCHOR HAS BEEN LOAD TESTED AND ACCEPTED. THE CONTRACTOR SHALL DEMONSTRATE THAT THE PROCEDURES SELECTED FOR PLACEMENT OF EITHER GREASE OR GROUT WILL PRODUCE A COMPLETELY FILLED TRUMPET.

ANCHORAGES SHALL BE COVERED WITH A CORROSION INHIBITING GREASE.

6.0 ROCK ANCHOR TESTING AND STRESSING

EACH ROCK ANCHOR SHALL BE LOAD TESTED BY THE CONTRACTOR. A LOAD GREATER THAN 10 PERCENT OF THE DESIGN LOAD SHALL NOT BE APPLIED TO THE ROCK ANCHOR PRIOR TO LOAD TESTING. THE TEST LOAD SHALL BE SIMULTANEOUSLY APPLIED TO THE ENTIRE TENDON. ROCK ANCHORS SHALL BE LOADED IN A SEQUENCE THAT BEGINS NEAREST THE CENTERLINE OF THE ANCHORAGE AND PROCEEDS ALTERNATELY TO THE SIDES. AFTER LOADING ALL OF THE ROCK ANCHORS AT A PIER, A SECOND CYCLE OF LOADING AND CHECKING THE LIFT-OFF LOAD (SECTION 6.5) SHALL BE MADE IN A SEQUENCE THAT BEGINS NEAREST THE CENTERLINE OF THE ANCHORAGE AND PROCEEDS ALTERNATELY TO THE SIDES. ACCEPTED ROCK ANCHORS WILL NOT REQUIRE FURTHER TESTING OR LOADING.

6.1 TESTING EQUIPMENT

A DIAL GAUGE OR VERNIER SCALE CAPABLE OF MEASURING DISPLACEMENTS TO 0.001 INCHES SHALL BE USED TO MEASURE ROCK ANCHOR MOVEMENT. IT SHALL HAVE ADEQUATE TRAVEL SO TOTAL ROCK ANCHOR MOVEMENT CAN BE MEASURED WITHOUT RESETTING THE DEVICE.

A HYDRAULIC JACK AND PUMP SHALL BE USED TO APPLY THE TEST LOAD. THE JACK AND CALIBRATED PRESSURE GAUGE SHALL BE USED TO MONITOR THE APPLIED LOAD. THE APPLIED LOAD SHALL BE MEASURED BY AN ELECTRICAL RESISTANCE LOAD CELL AND READOUT INSTRUMENT. THE PRESSURE GAUGE SHALL BE GRADUATED IN 100 PSI INCREMENTS OR LESS. WHEN THE THEORETICAL ELASTIC ELONGATION OF THE TOTAL ROCK ANCHOR LENGTH AT THE MAXIMUM TEST LOAD EXCEEDS THE RAM TRAVEL OF THE JACK, THE PROCEDURE FOR RECYCLING THE JACK RAM SHALL BE PROVIDED. EACH INCREMENT OF TEST LOAD SHALL BE APPLIED IN ONE MINUTE OR LESS.

A CALIBRATED REFERENCE PRESSURE GAUGE SHALL BE AVAILABLE AT THE SITE. THE REFERENCE GAUGE SHALL BE CALIBRATED WITH THE TEST JACK AND PRESSURE GAUGE.

THE STRESSING EQUIPMENT SHALL BE PLACED OVER THE GROUND ANCHOR TENDON IN SUCH A MANNER THAT THE JACK, BEARING PLATES, LOAD CELL AND STRESSING ANCHORAGE ARE AXIALLY ALIGNED WITH THE TENDON AND THE TENDON IS CENTERED WITH THE EQUIPMENT.

6.2 PERFORMANCE TEST

THE FIRST FOUR ROCK ANCHORS INSTALLED AT EACH PIER SHALL BE PERFORMANCE TESTED IN ACCORDANCE WITH THE FOLLOWING PROCEDURES. THE REMAINING ROCK ANCHORS SHALL BE TESTED IN ACCORDANCE WITH THE PROOF TEST PROCEDURES.

THE PERFORMANCE TEST SHALL BE MADE BY INCREMENTALLY LOADING AND UNLOADING THE ROCK ANCHOR IN ACCORDANCE WITH THE FOLLOWING SCHEDULE UNLESS A DIFFERENT MAXIMUM TEST LOAD AND SCHEDULE ARE INDICATED ON THE PLANS. THE LOAD SHALL BE RAISED FROM ONE INCREMENT TO ANOTHER IMMEDIATELY AFTER RECORDING THE ROCK ANCHOR MOVEMENT. THE ROCK ANCHOR MOVEMENT SHALL BE MEASURED AND RECORDED TO THE NEAREST 0.001 INCHES WITH RESPECT TO AN INDEPENDENT FIXED REFERENCE POINT AT THE ALIGNMENT LOAD AND AT EACH INCREMENT OF LOAD. THE LOAD SHALL BE MONITORED WITH A PRESSURE GAUGE. A REFERENCE PRESSURE GAUGE SHALL BE PLACED IN SERIES WITH THE PRESSURE GAUGE DURING EACH PERFORMANCE TEST. IF THE LOAD DETERMINED BY THE REFERENCE PRESSURE GAUGE AND THE LOAD DETERMINED BY THE PRESSURE GAUGE DIFFER BY MORE THAN 10 PERCENT, THE JACK, PRESSURE GAUGE AND REFERENCE PRESSURE GAUGE SHALL BE RECALIBRATED. AT LOAD INCREMENTS OTHER THAN THE MAXIMUM TEST LOAD, THE LOAD SHALL BE HELD JUST LONG ENOUGH TO OBTAIN THE MOVEMENT READING.

PERFORMANCE TEST SCHEDULE

STEP	LOAD	STEP	LOAD
1	AL	15	AL
2	0.25DL*	16	0.25DL
3	AL	17	0.50DL
4	0.25DL	18	0.75DL
5	0.50DL*	19	1.00DL
6	AL	20	1.20DL*
7	0.25DL	21	AL
8	0.50DL	22	0.25DL
9	0.75DL*	23	0.50DL
10	AL	24	0.75DL
11	0.25DL	25	1.00DL
12	0.50DL	26	1.20DL
13	0.75DL	27	1.33DL* (MAX. TEST LOAD)
14	1.00DL*	28	REDUCE TO LOCK-OFF LOAD (SECTION 6.5)

WHERE: AL = ALIGNMENT LOAD
DL = DESIGN LOAD FOR ROCK ANCHOR
* = GRAPH REQUIRED. SEE LAST PARAGRAPH IN THIS SECTION 6.2

THE MAXIMUM TEST LOAD IN A PERFORMANCE TEST SHALL BE HELD FOR A MINIMUM OF ONE HOUR. THE JACK SHALL BE REPUMPED AS NECESSARY IN ORDER TO MAINTAIN A CONSTANT LOAD. THE LOAD-HOLD PERIOD SHALL START AS SOON AS THE MAXIMUM TEST LOAD IS APPLIED AND THE ROCK ANCHOR MOVEMENT SHALL BE MEASURED AND RECORDED AT 1 MINUTE, 2, 3, 4, 5, 6, 10, 15, 20, 25, 30, 45 AND 60 MINUTES.

A GRAPH SHALL BE CONSTRUCTED SHOWING A PLOT OF ROCK ANCHOR MOVEMENT VERSUS LOAD FOR EACH LOAD INCREMENT MARKED WITH AN ASTERISK (*) IN THE PERFORMANCE TEST SCHEDULE AND A PLOT OF THE RESIDUAL ROCK ANCHOR MOVEMENT OF THE TENDON AT EACH ALIGNMENT LOAD VERSUS THE HIGHEST PREVIOUSLY APPLIED LOAD. GRAPH FORMAT SHALL BE APPROVED BY THE ENGINEER PRIOR TO USE.

6.3 PROOF TEST

THE PROOF TEST SHALL BE PERFORMED BY INCREMENTALLY LOADING THE ROCK ANCHOR IN ACCORDANCE WITH THE FOLLOWING SCHEDULE UNLESS A DIFFERENT MAXIMUM TEST LOAD AND SCHEDULE ARE INDICATED ON THE PLANS. THE LOAD SHALL BE RAISED FROM ONE INCREMENT TO ANOTHER IMMEDIATELY AFTER RECORDING THE ROCK ANCHOR MOVEMENT. THE ROCK ANCHOR MOVEMENT SHALL BE MEASURED AND RECORDED TO THE NEAREST 0.001 INCHES WITH RESPECT TO AN INDEPENDENT FIXED REFERENCE POINT AT THE ALIGNMENT LOAD AND AT EACH INCREMENT OF LOAD. THE LOAD SHALL BE MONITORED WITH A PRESSURE GAUGE. AT LOAD INCREMENTS OTHER THAN THE MAXIMUM TEST LOAD, THE LOAD SHALL BE HELD JUST ALONG ENOUGH TO OBTAIN THE MOVEMENT READING.

PROOF TEST SCHEDULE

STEP	LOAD	STEP	LOAD
1	AL	5	1.00DL
2	0.25DL	6	1.20DL (MAX. TEST LOAD)
3	0.50DL	7	REDUCE TO LOCK-OFF LOAD (SECTION 6.5)
4	0.75DL		

WHERE: AL = ALIGNMENT LOAD
DL = DESIGN LOAD FOR ROCK ANCHOR

THE MAXIMUM TEST LOAD IN A PROOF TEST SHALL BE HELD FOR 10 MINUTES. THE JACK SHALL BE REPUMPED AS NECESSARY IN ORDER TO MAINTAIN A CONSTANT LOAD. THE LOAD-HOLD PERIOD SHALL START AS SOON AS THE MAXIMUM TEST LOAD IS APPLIED AND THE ROCK ANCHOR MOVEMENT SHALL BE MEASURED AND RECORDED AT 1 MINUTE 2, 3, 4, 5, 6 AND 10 MINUTES. IF THE ROCK ANCHOR MOVEMENT BETWEEN 1 MINUTE AND 10 MINUTES EXCEEDS 0.04 INCHES, THE MAXIMUM TEST LOAD SHALL BE HELD FOR AN ADDITIONAL 50 MINUTES. IF THE LOAD HOLD IS EXTENDED, THE ROCK ANCHOR MOVEMENT SHALL BE RECORDED AT 15 MINUTES, 20, 30, 45 AND 60 MINUTES. A GRAPH SHALL BE CONSTRUCTED SHOWING A PLOT OF ROCK ANCHOR MOVEMENT VERSUS LOAD FOR EACH LOAD INCREMENT IN THE PROOF TEST. GRAPH FORMAT SHALL BE APPROVED BY THE ENGINEER PRIOR TO USE.

6.4 ROCK ANCHOR LOAD TEST ACCEPTANCE CRITERIA

A PERFORMANCE-TESTED OR PROOF-TESTED ROCK ANCHOR WITH A 10 MINUTE LOAD HOLD IS ACCEPTABLE IF THE:

(1) ROCK ANCHOR RESISTS THE MAXIMUM TEST LOAD WITH LESS THAN 0.04 INCHES MOVEMENT BETWEEN 1 MINUTE AND 10 MINUTES; AND

(2) ELASTIC MOVEMENT AT THE MAXIMUM TEST LOAD EXCEEDS 80 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE UNBONDED LENGTH.

(3) TOTAL ELASTIC MOVEMENT FROM A PERFORMANCE TEST AT THE MAXIMUM TEST LOAD MAY NOT EXCEED THE THEORETICAL ELASTIC ELONGATION OF THE UNBONDED LENGTH PLUS 50 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE BONDED LENGTH.

A PERFORMANCE-TESTED OR PROOF-TESTED ROCK ANCHOR WITH A 60 MINUTE HOLD IS ACCEPTABLE IF THE :

(1) ROCK ANCHOR RESISTS THE MAXIMUM TEST LOAD WITH A CREEP RATE THAT DOES NOT EXCEED 0.08 INCHES IN THE LAST LOG CYCLE OF TIME; AND

(2) ELASTIC MOVEMENT AT THE MAXIMUM TEST LOAD EXCEEDS 80 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE UNBONDED LENGTH.

(3) TOTAL ELASTIC MOVEMENT FROM A PERFORMANCE TEST AT THE MAXIMUM TEST LOAD MAY NOT EXCEED THE THEORETICAL ELASTIC ELONGATION OF THE UNBONDED LENGTH PLUS 50 PERCENT OF THE THEORETICAL ELASTIC ELONGATION OF THE BONDED LENGTH.

6.5 LOCK OFF

UPON SUCCESSFUL COMPLETION OF THE LOAD TESTING, THE ROCK ANCHOR LOAD SHALL BE REDUCED TO THE LOCK-OFF LOAD WHICH IS EQUAL TO 0.86 DL (420 KIPS). THE ROCK ANCHOR LOAD SHOULD BE REDUCED TO THE AL JUST PRIOR TO APPLYING THE LOCK-OFF LOAD. AFTER TRANSFERRING THE LOAD AND PRIOR TO REMOVING THE JACK, A LIFT-OFF LOAD READING SHALL BE MADE. THE LIFT-OFF LOAD SHALL BE WITHIN 5 PERCENT OF THE SPECIFIED LOCK-OFF LOAD. IF THE LOAD IS NOT WITHIN 5 PERCENT OF THE SPECIFIED LOCK-OFF LOAD, THE ANCHORAGE SHALL BE RESET AND ANOTHER LIFT-OFF LOAD READING SHALL BE MADE. THIS PROCESS SHALL BE REPEATED UNTIL THE DESIRED LOCK-OFF LOAD IS OBTAINED.

7.0 FINAL REPORT OF ROCK ANCHOR INSTALLATIONS

THE CONTRACTOR SHALL FURNISH TO THE DIRECTOR THREE COPIES OF A BOUND AND TYPED REPORT CONTAINING THE FOLLOWING INFORMATION:

1. A TABULATION OF DATA FROM ALL ROCK ANCHOR TESTING
2. TYPE OF INSTRUMENTATION USED FOR CONDUCTING TESTING
3. TESTING PROCEDURES
4. PLATES OF ALL GRAPHICAL TEST DATA
5. CONTRACTOR'S GENERAL OPINION OF PLANS AND SPECIFICATIONS
6. CONSTRUCTION PROCEDURES
7. GROUTING RECORDS
8. CONSTRUCTION DIFFICULTIES AND/OR SPECIAL TECHNIQUES.

THE PREPARATION OF THIS REPORT IS CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE ROCK ANCHORS AND THEREFORE DOES NOT HAVE A SEPARATE PAYMENT ITEM.

8.0 MEASUREMENT AND PAYMENT

THE CONTRACT UNIT PRICE PAID FOR THE ROCK ANCHORS SHALL INCLUDE FULL COMPENSATION FOR FURNISHING ALL LABOR, MATERIALS, TOOLS, MOBILIZATION, EQUIPMENT, EXCAVATION, BACKFILL, AND INCIDENTALS, AND FOR DOING ALL THE WORK INVOLVED IN INSTALLING THE ROCK ANCHORS (INCLUDING TESTING), COMPLETE IN PLACE, AS SHOWN ON THE PLANS AND AS SPECIFIED IN THESE SPECIFICATIONS AND THE SPECIAL PROVISIONS, AND AS DIRECTED BY THE ENGINEER.

ITEM	UNIT	DESCRIPTION
SPECIAL	LUMP	STRUCTURE, MISC.: PERMANENT ROCK ANCHORS

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

ROCK ANCHOR GENERAL NOTES - 3
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

5 / 23

33
56

ERI60SNA.DGN 2/10/01 JLS

ESTIMATED QUANTITIES - PIER

CALCULATED JDB DATED 11/01
CHECKED KAK DATED 12/01

ITEM	ITEM EXT.	ENGLISH TOTAL	ENGLISH UNIT	METRIC TOTAL	METRIC UNIT	DESCRIPTION	ABUTS.	PIERS	GEN'L	SEE SHEET
503	11100	LUMP		LUMP		COFFERDAMS, CRIBS AND SHEETING			LUMP	
524	95000	105	LIN. FT.	32.0	METER	DRILLED SHAFTS, MISC.: 138" DIAMETER, INTO BEDROCK		105		2/23
524	95000	119	LIN. FT.	36.3	METER	DRILLED SHAFTS, MISC.: 144" DIAMETER, ABOVE BEDROCK		119		2/23
SPECIAL	53000200	LUMP		LUMP		STRUCTURE, MISC.: PERMANENT ROCK ANCHORS		LUMP		3/23
842	41001	318 2	CU. YD.	243 2	CU. METER	CLASS C CONCRETE, PIER ABOVE FOOTING, AS PER PLAN		318 2		2/23
1 842	1 71100	95	CU. YD.	72.6	CU. METER	CONCRETE, MISC.: DRILLED SHAFT CAP 1		95		2/23
864	10100	716 2	SQ. YD.	598 2	SQ. METER	SEALING OF CONCRETE SURFACES (EPOXY - URETHANE)		716 2		2/23

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

2 REVISED 3/7/02
1 REVISED 2/5/02

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

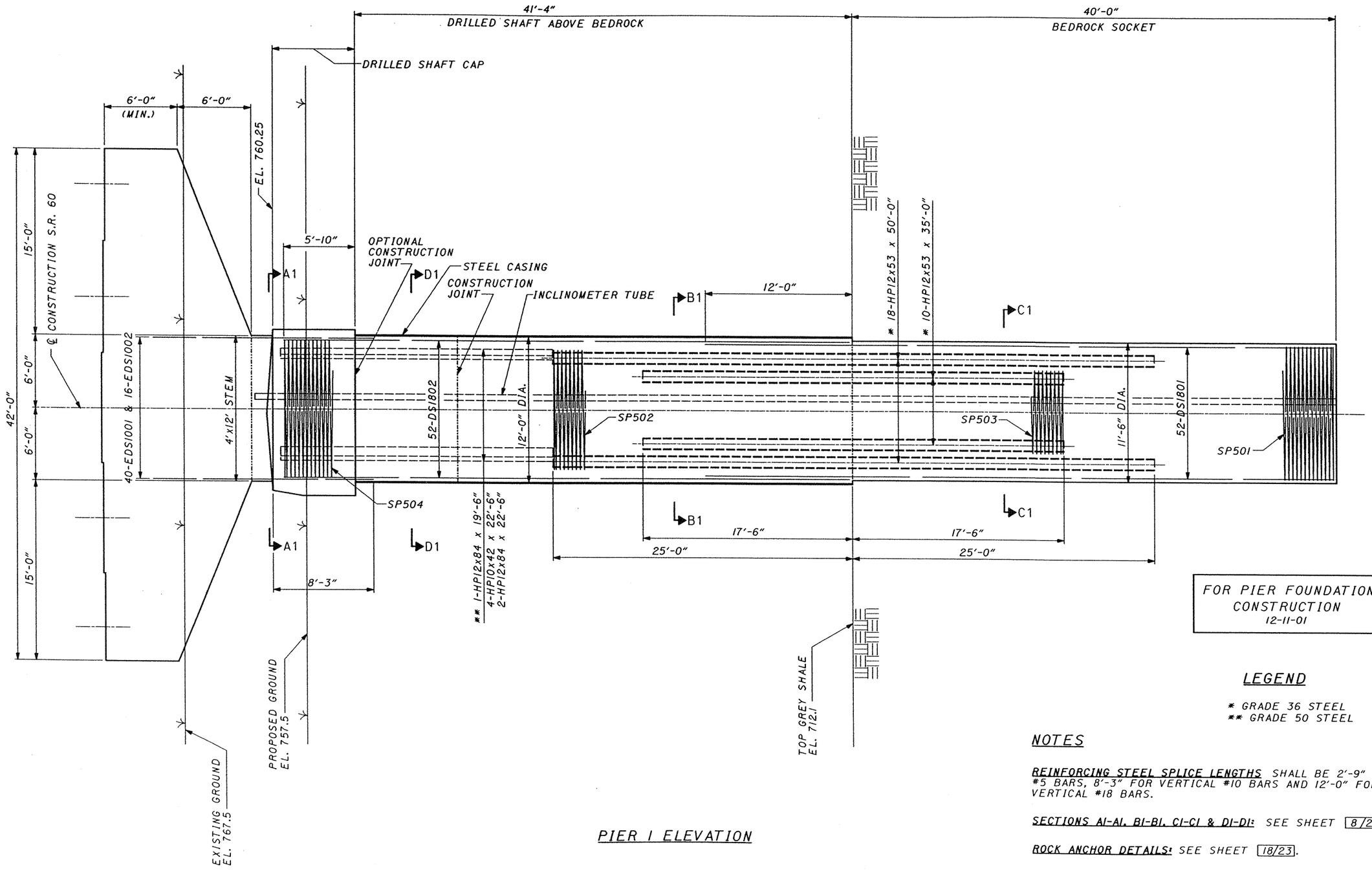
PIER ESTIMATED QUANTITIES
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

6/23

34/56

2235V6.DGN 3-7-02 JLS



PIER I ELEVATION

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

LEGEND

* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

REINFORCING STEEL SPLICE LENGTHS SHALL BE 2'-9" FOR #5 BARS, 8'-3" FOR VERTICAL #10 BARS AND 12'-0" FOR VERTICAL #18 BARS.

SECTIONS A1-A1, B1-B1, C1-C1 & D1-D1: SEE SHEET 8/23.

ROCK ANCHOR DETAILS: SEE SHEET 18/23.

INCLINOMETER TUBE: SEE GENERAL NOTE SHEET 2/23.

SURVEY REFERENCE POINT: SEE GENERAL NOTE SHEET 2/23.

2235BA.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

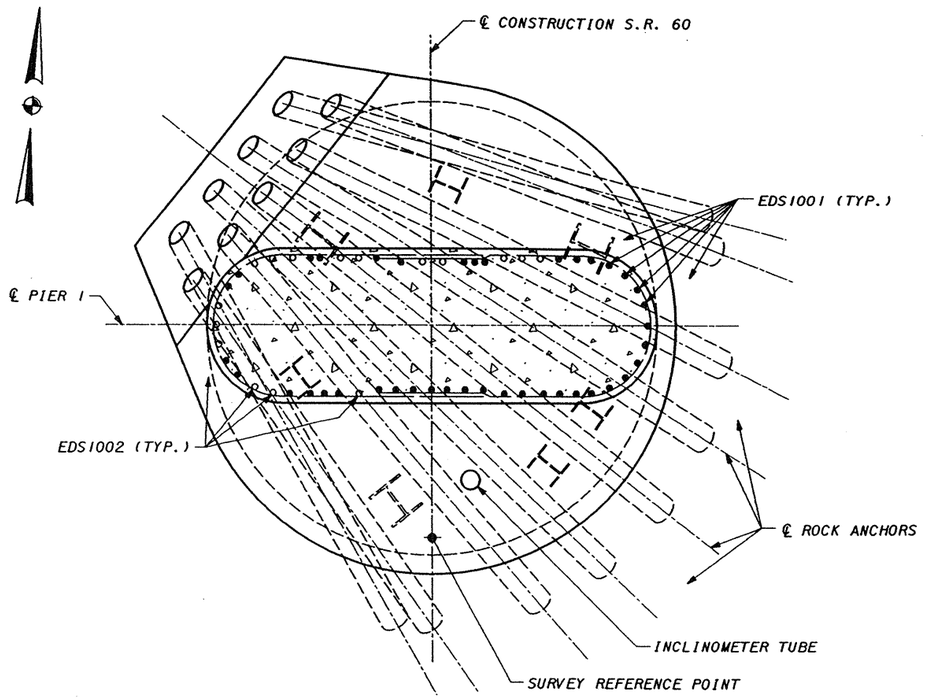
DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

PIER 1 ELEVATION
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

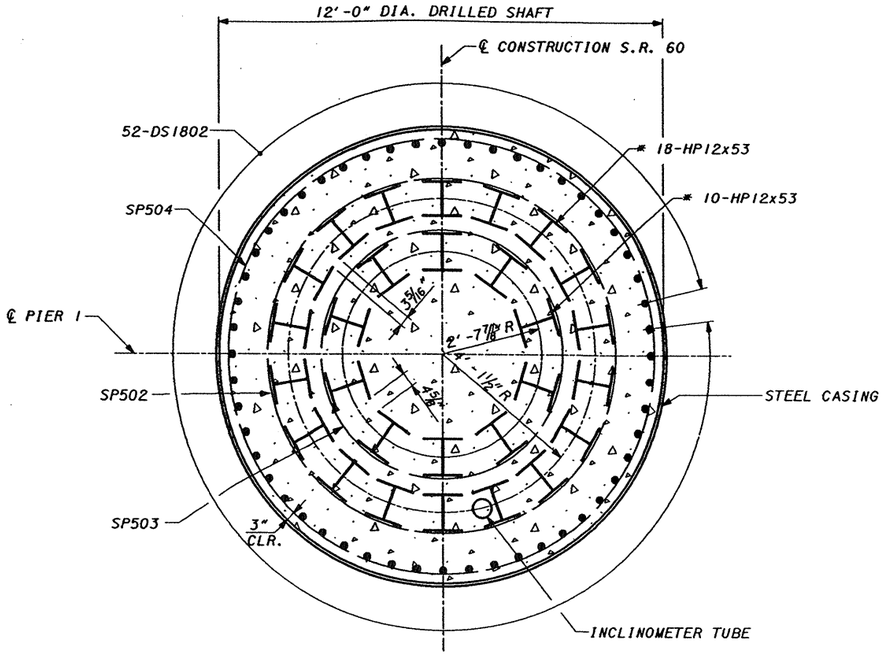
ERI-60-3.100

7/23

35/56



SECTION AI-AI



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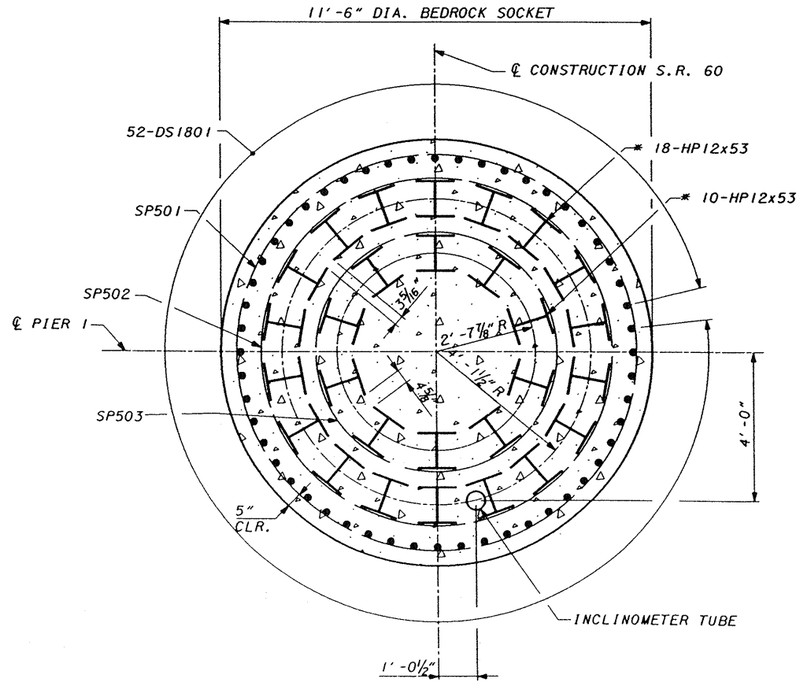
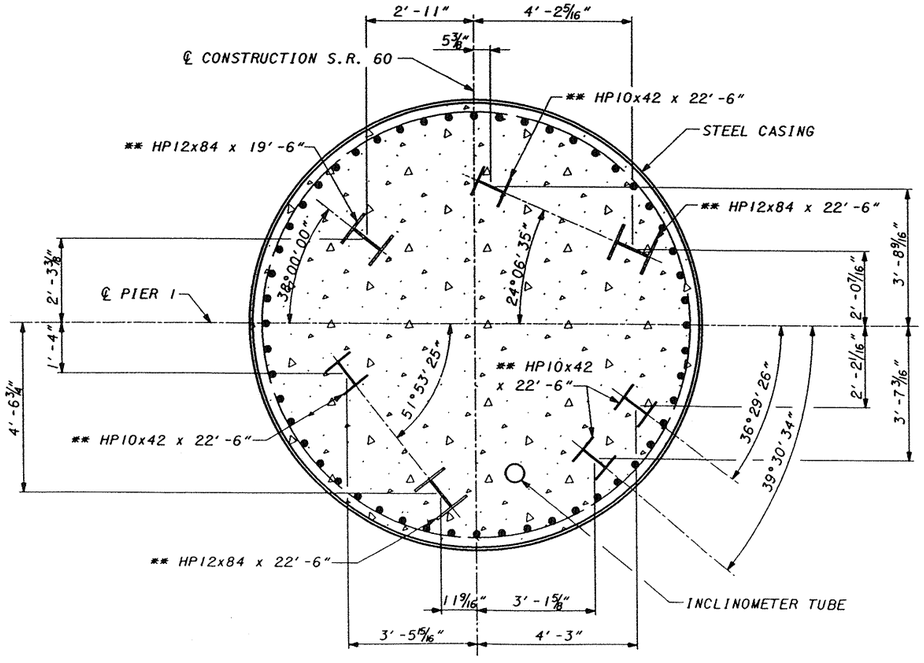


SECTION CI-CI



SECTION DI-DI

LEGEND

* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

ADDITIONAL NOTES: SEE SHEET 7/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
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KAK		2202476	

PIER 1 SECTIONS AND DETAILS

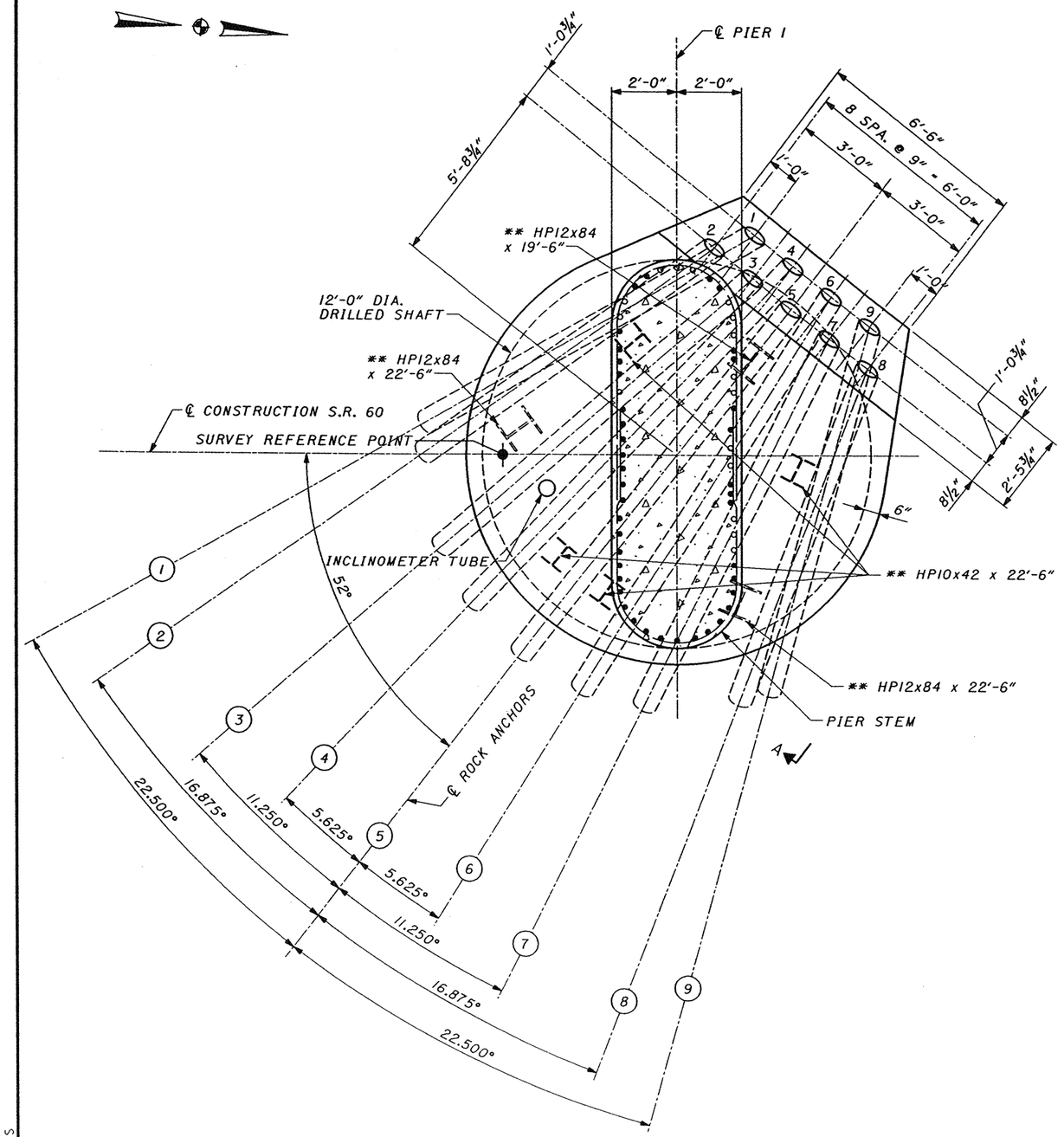
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

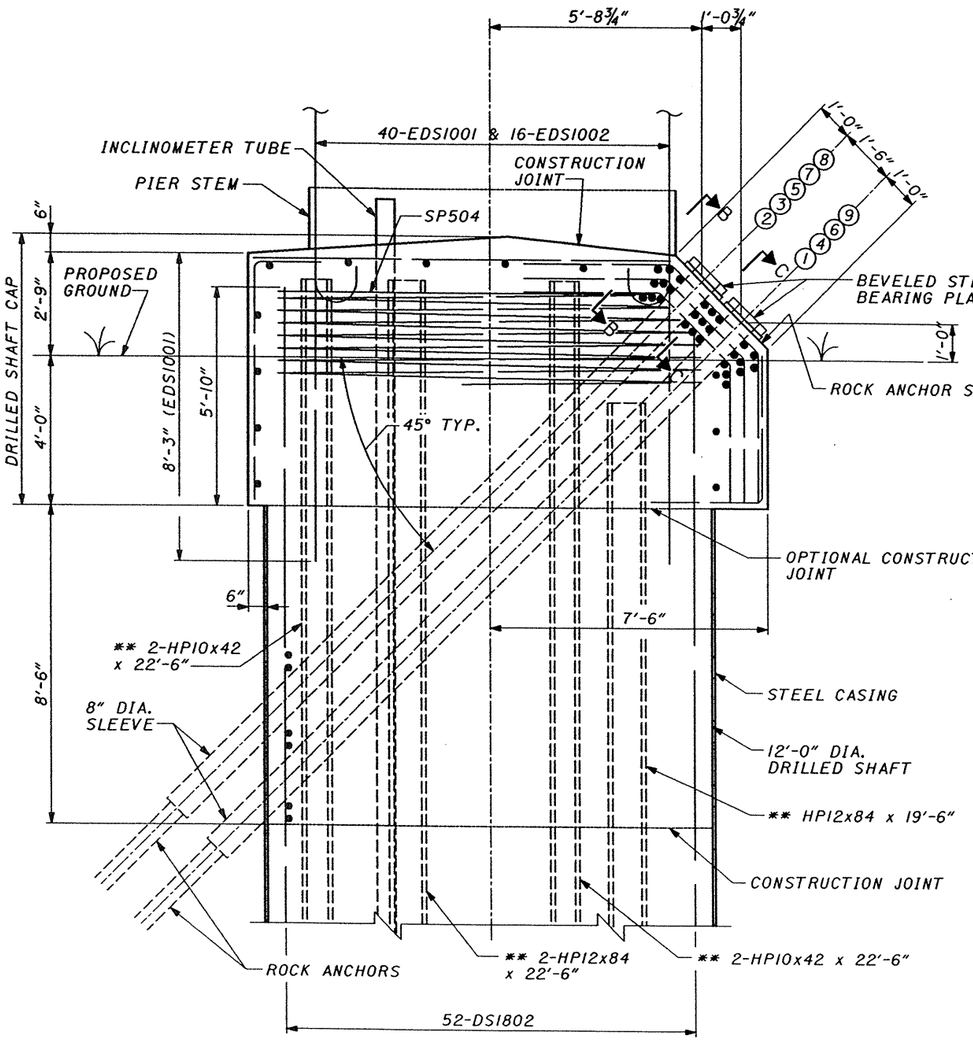
8/23

36/56

223SBC.DGN 12/10/01 JLS



ROCK ANCHOR PLAN



VIEW A-A

LEGEND

** GRADE 50 STEEL

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

NOTES

SECTIONS B-B & C-C: SEE SHEET 17/23.

SLEEVES SHALL BE SCHEDULE 40 PVC, ABS OR STEEL PIPE PER 707.46, 707.47, 707.51, OR 707.70.

2235BE.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

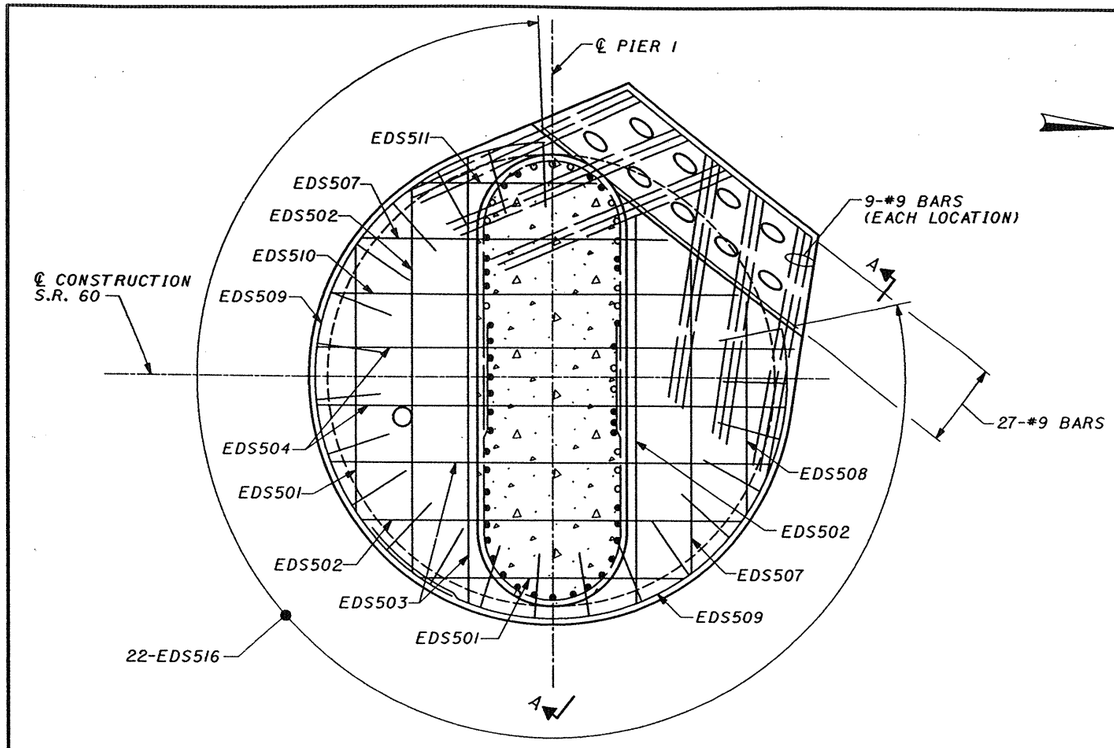
DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

PIER 1 - ROCK ANCHOR PLAN AND DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

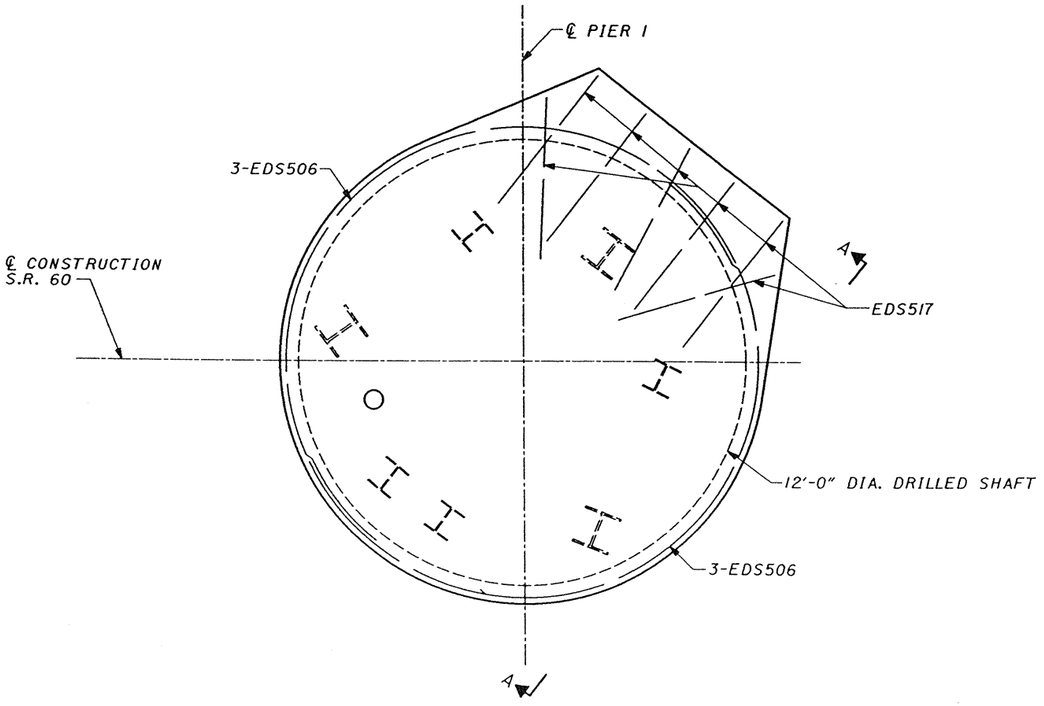
ERI-60-3.100

9/23

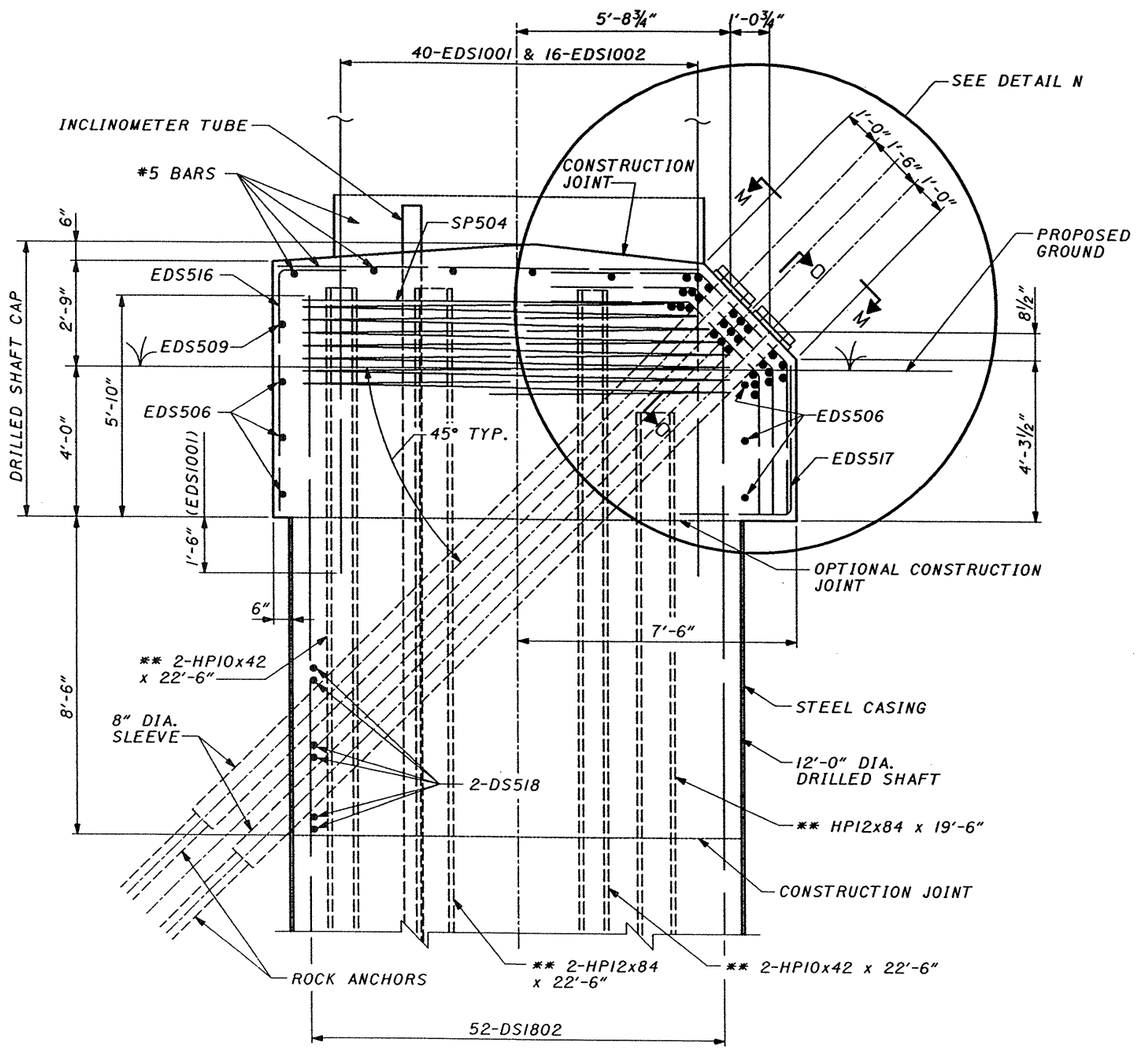
37/56



TOP REINFORCING PLAN



BOTTOM REINFORCING PLAN



VIEW A-A

LEGEND

** GRADE 50 STEEL

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

NOTES

VIEW M-M: SEE SHEET 11/23.
DETAIL N: SEE SHEET 11/23.
SECTION O-O: SEE SHEET 11/23.

223SBJ.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

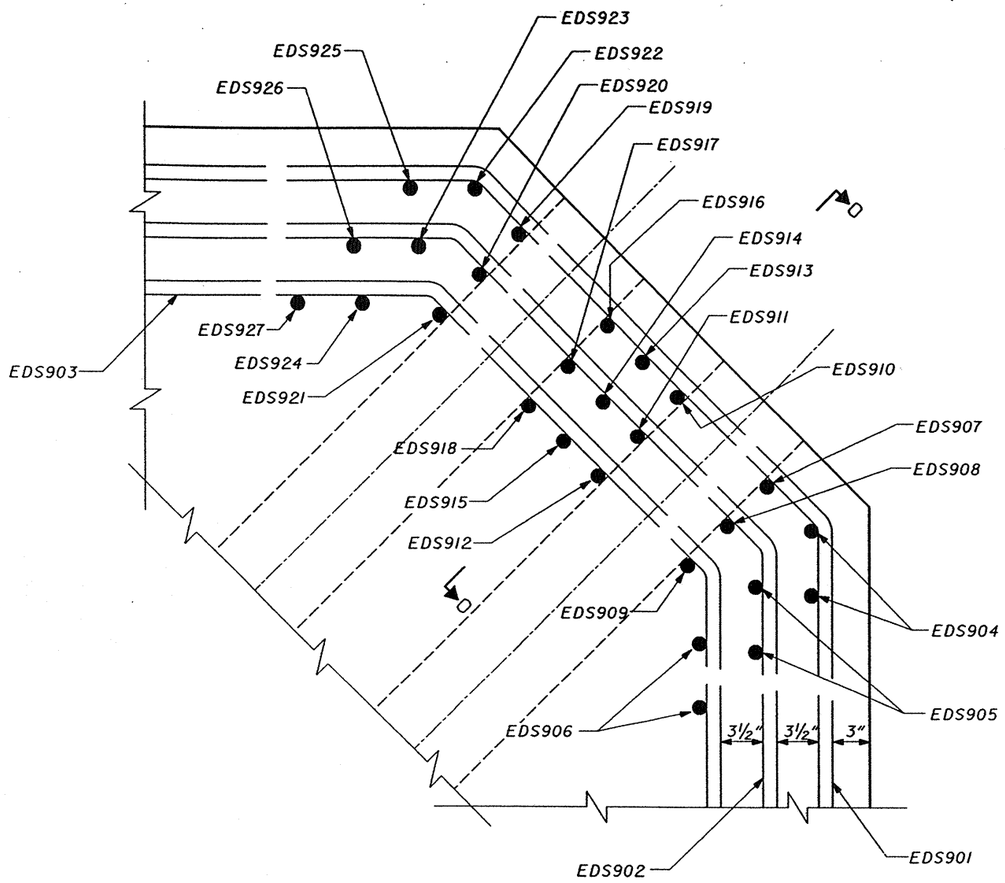
PIER 1 - DRILLED SHAFT CAP REINFORCING

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

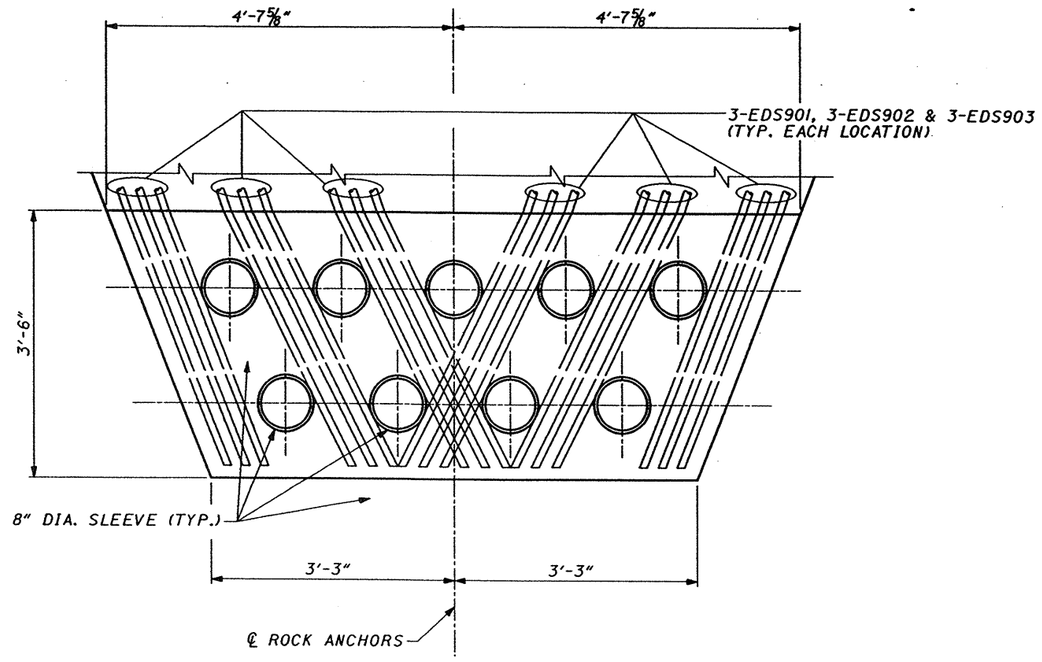
ERI-60-3.100

10/23

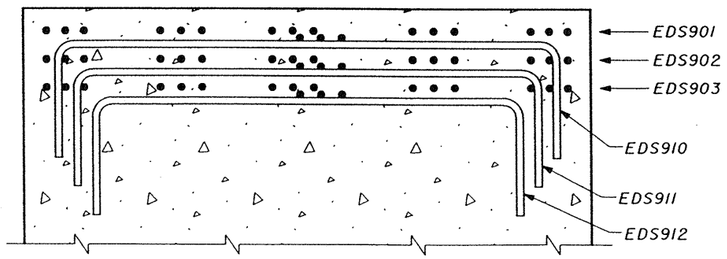
38/56



DETAIL N



VIEW M-M



SECTION O-O

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

2235BL.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB	DRAWN JLS	REVIEWED DT	DATE 12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER 2202476	

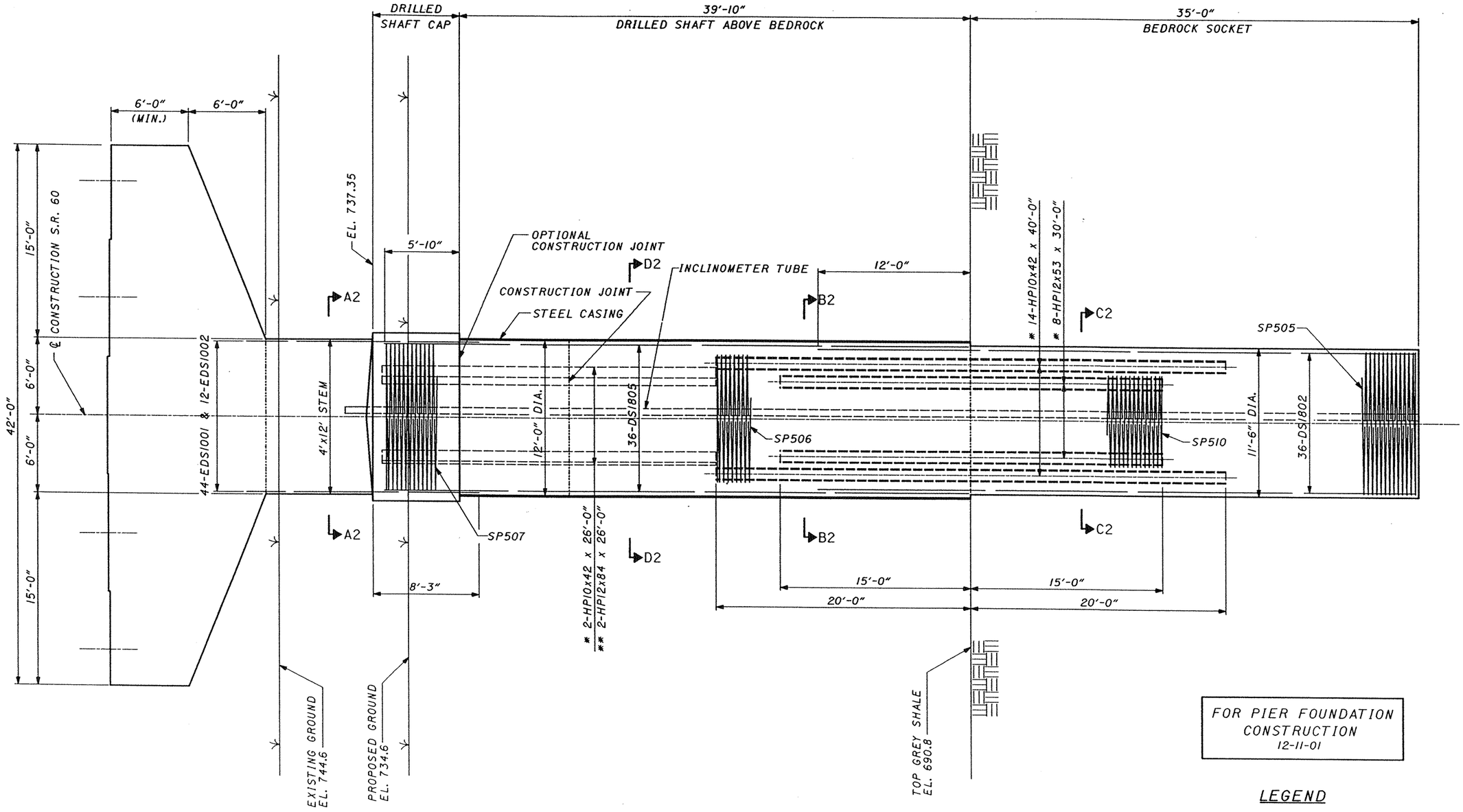
PIER 1 - DRILLED SHAFT CAP DETAILS

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

11/23

39/56



PIER 2 ELEVATION

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

LEGEND

* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

SECTIONS A2-A2, B2-B2, C2-C2 & D2-D2: SEE SHEET 13/23.

ROCK ANCHOR DETAILS: SEE SHEET 18/23.

ADDITIONAL NOTES: SEE SHEET 7/23.

2235BA.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

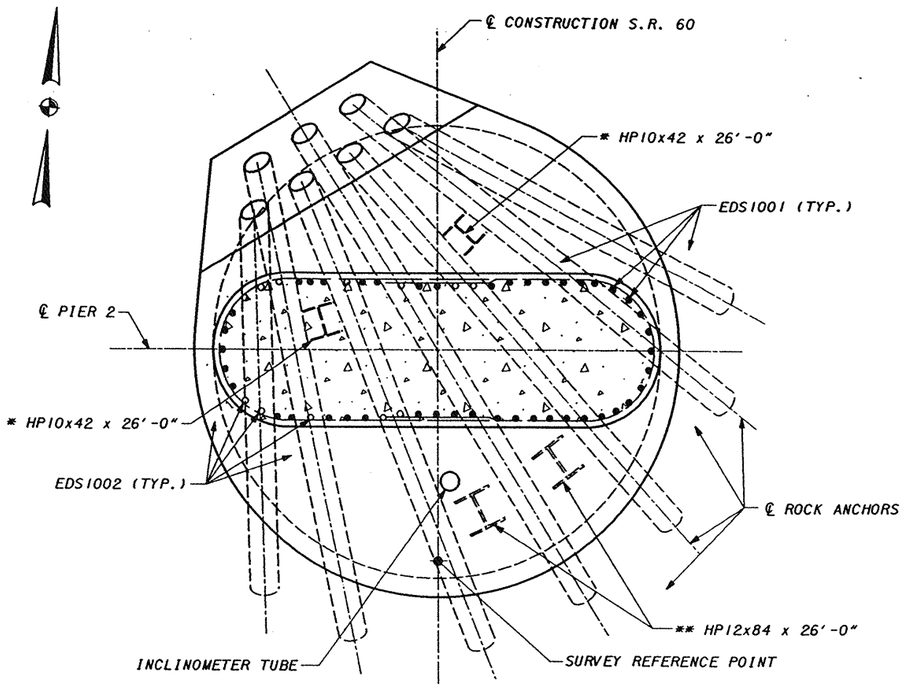
DESIGNED DAP/JDB	DRAWN JLS	REVIEWED DT	DATE 12/10/01
CHECKED KAK	REVISED		STRUCTURE FILE NUMBER 2202476

PIER 2 ELEVATION
BRIDGE NO. ERI-60-0364
OVER VERMILION RIVER

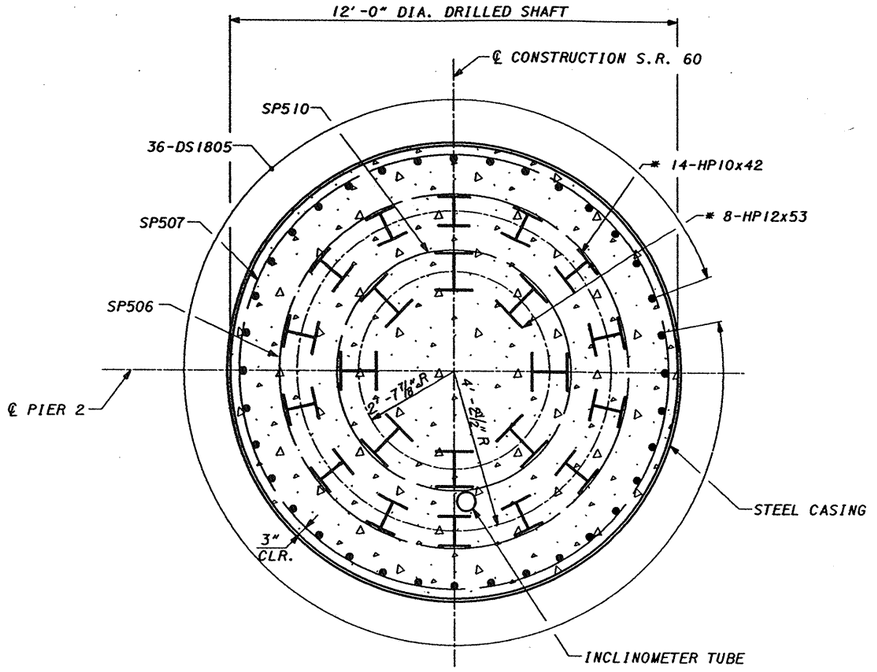
ERI-60-3.100

12/23

40/56



SECTION A2-A2



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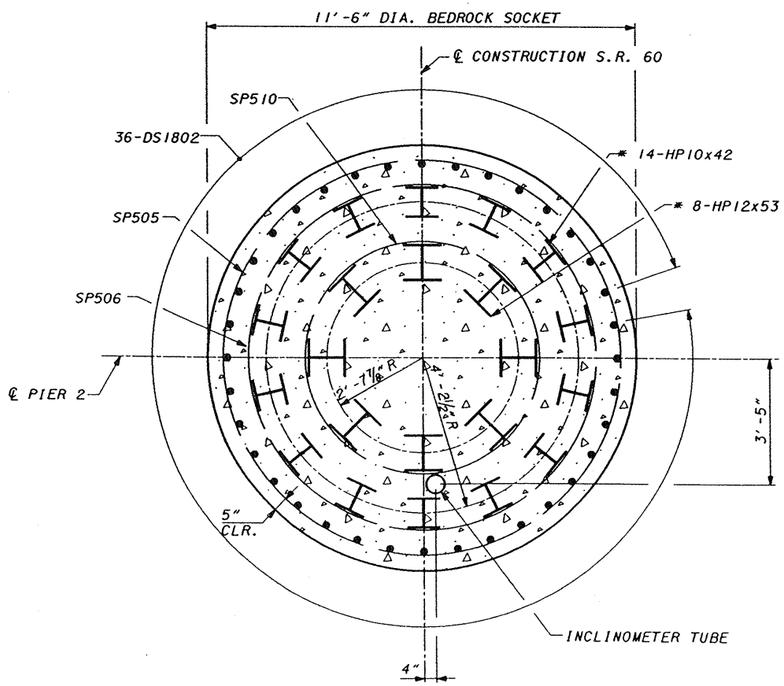
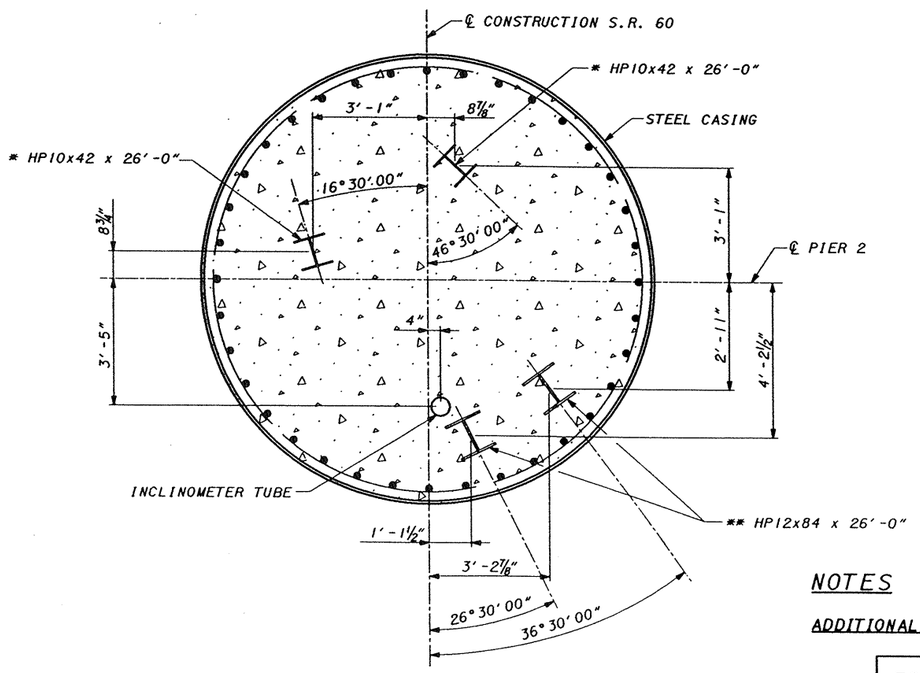


SECTION C2-C2



SECTION D2-D2

LEGEND

* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

ADDITIONAL NOTES: SEE SHEET 7/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
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CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

PIER 2 SECTIONS AND DETAILS

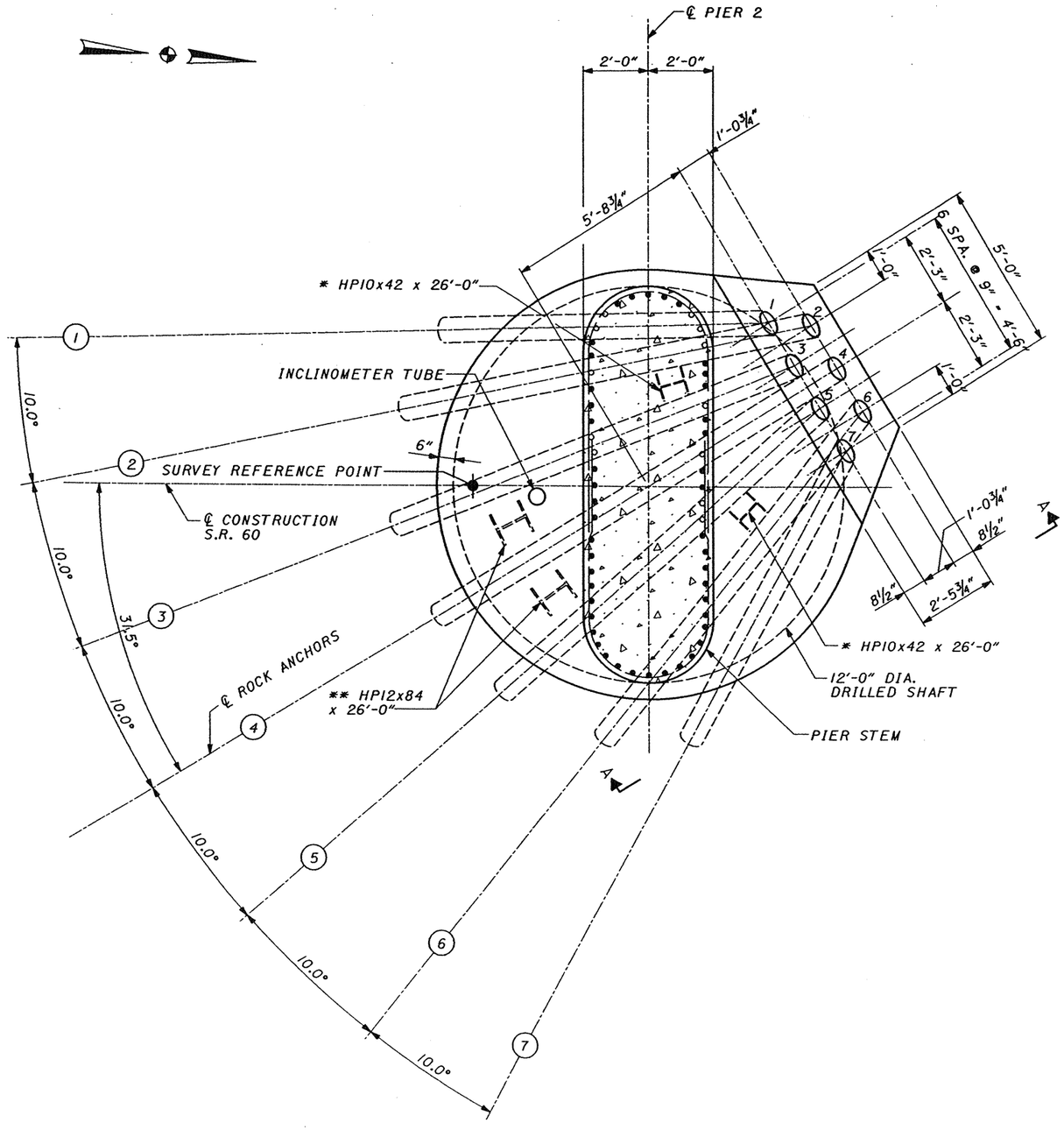
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

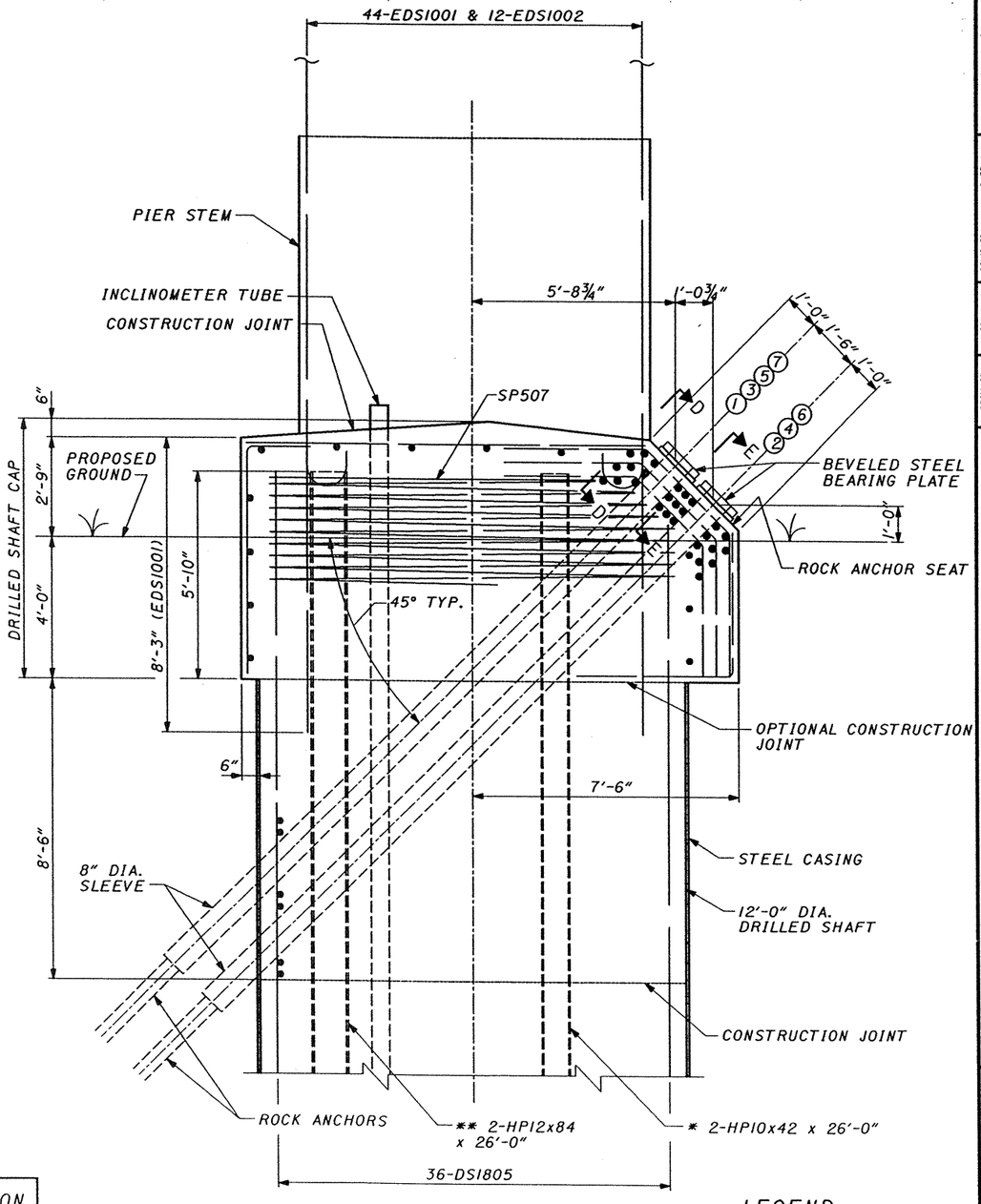
13/23

41/56

2235BC.DGN 12/11/01 JLS



ROCK ANCHOR PLAN



VIEW A-A

FOR PIER FOUNDATION
CONSTRUCTION
12-11-01

LEGEND

* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

SECTIONS D-D & E-E: SEE SHEET 17/23.

ADDITIONAL NOTES: SEE SHEET 9/23.

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

PLAN AND DETAILS

PIER 2 - ROCK ANCHOR PLAN

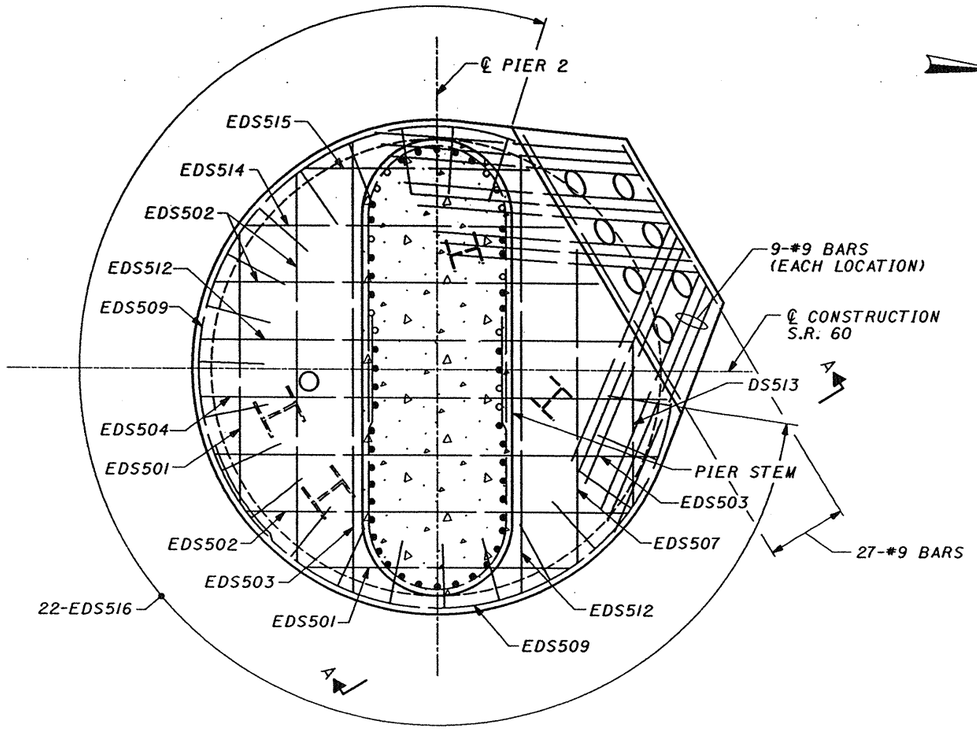
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

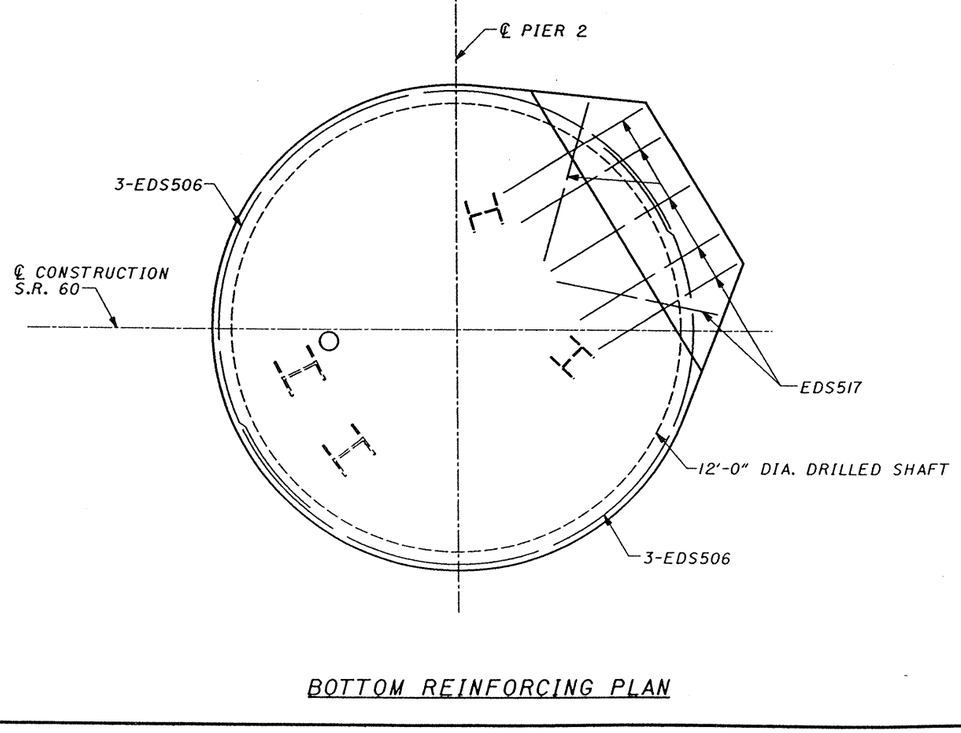
14/23

42/56

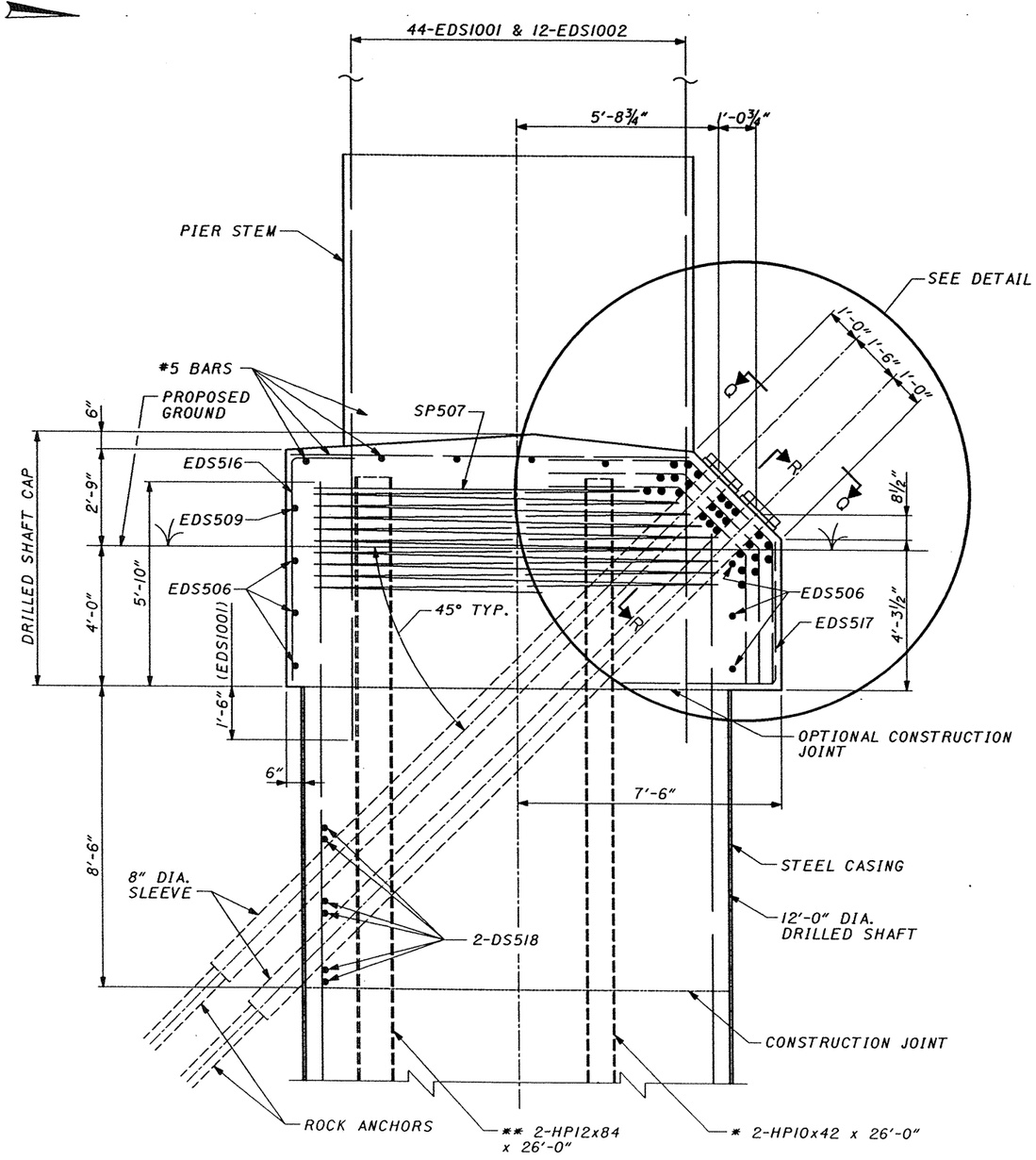
2235BF.DGN 12/10/01 JLS



TOP REINFORCING PLAN



BOTTOM REINFORCING PLAN



VIEW A-A

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

LEGEND

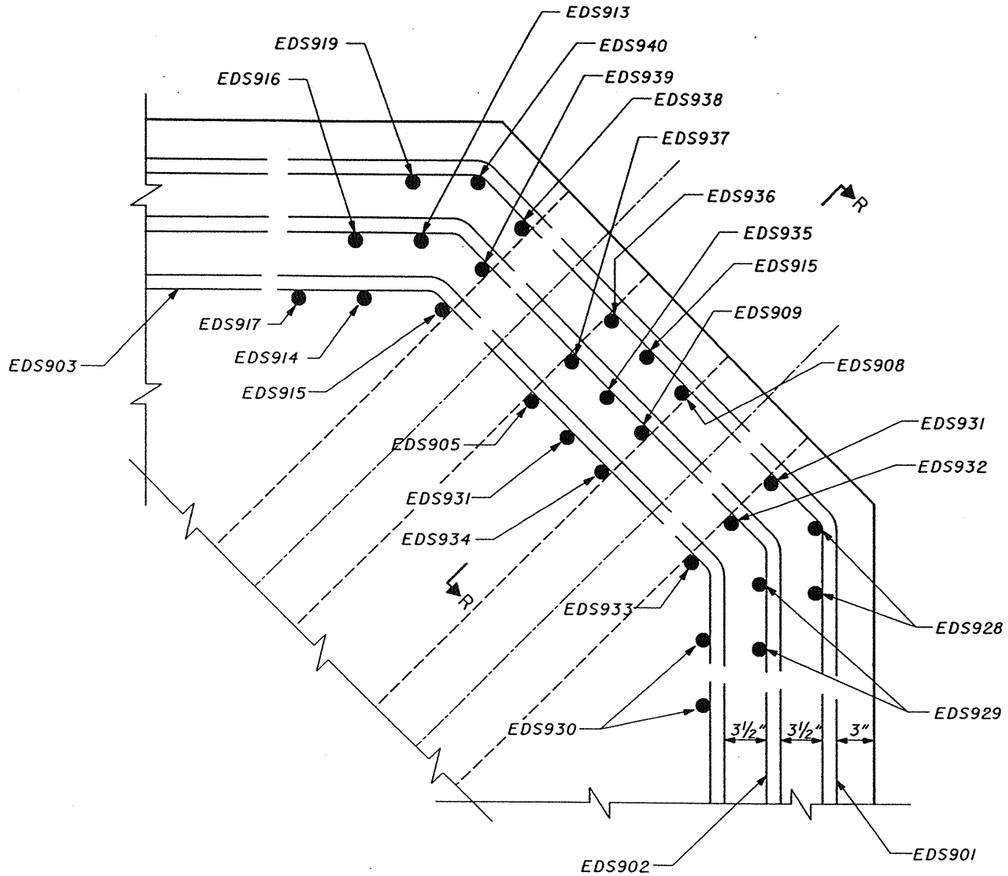
* GRADE 36 STEEL
** GRADE 50 STEEL

NOTES

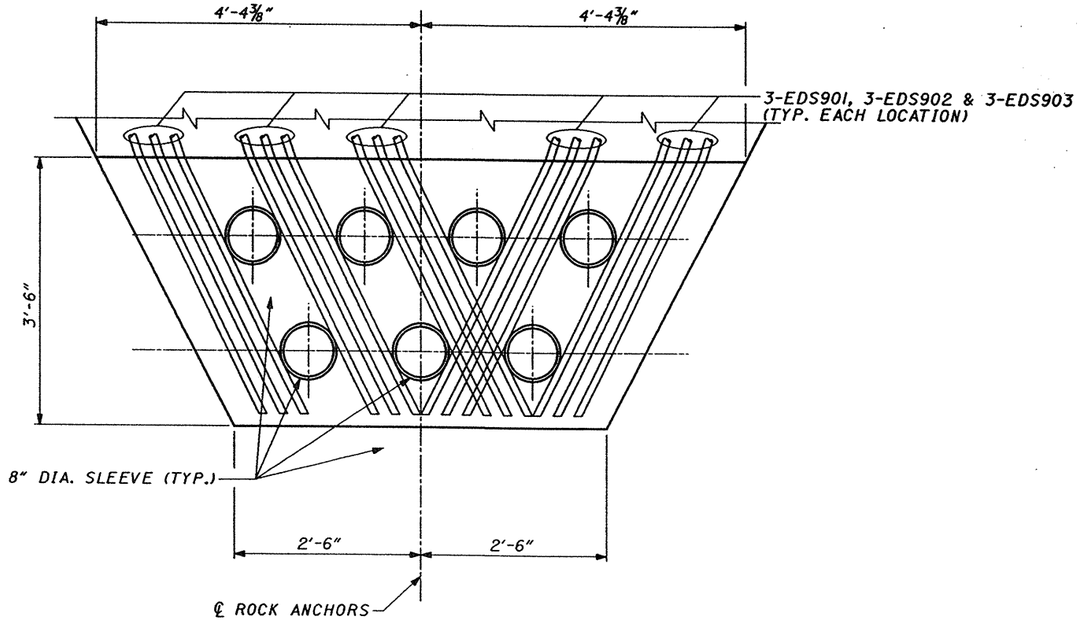
VIEW Q-Q: SEE SHEET 16/23.
DETAIL P: SEE SHEET 16/23.
SECTION R-R: SEE SHEET 16/23.

223SBK.DGN 12/6/01 JLS

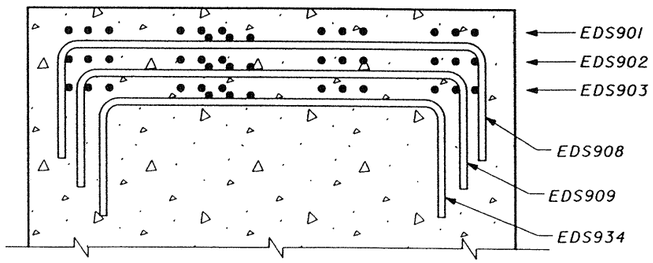
RICHLAND ENGINEERING LIMITED
FIEL 29 NORTH PARK STREET
DATE 12/10/01
REVIEWED DT
DRAWN JLS
DESIGNED DAP/JDB
PIER 2 - DRILLED SHAFT CAP REINFORCING
BRIDGE NO. EDI-60-03640
EDI-60-2.100
15/23
4



DETAIL P



VIEW Q-Q



SECTION R-R

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

223SBM.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
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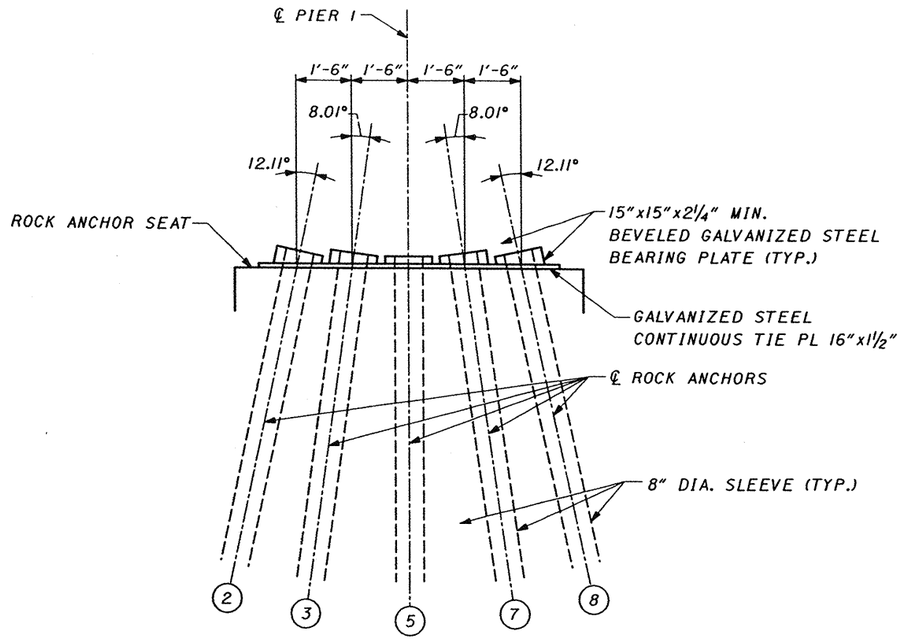
CHECKED	REVISED	STRUCTURE FILE NUMBER	2202476

PIER 2 - DRILLED SHAFT CAP DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

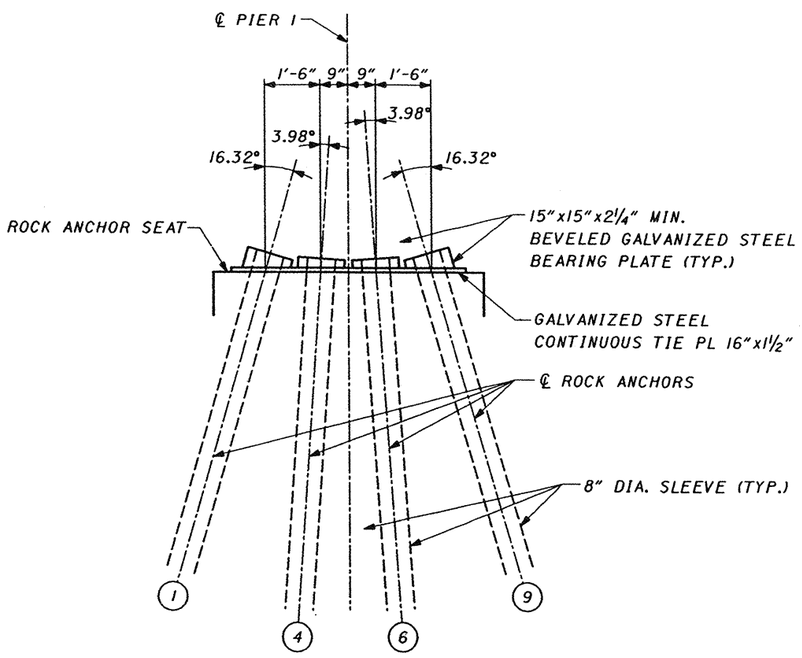
ERI-60-3.100

16/23

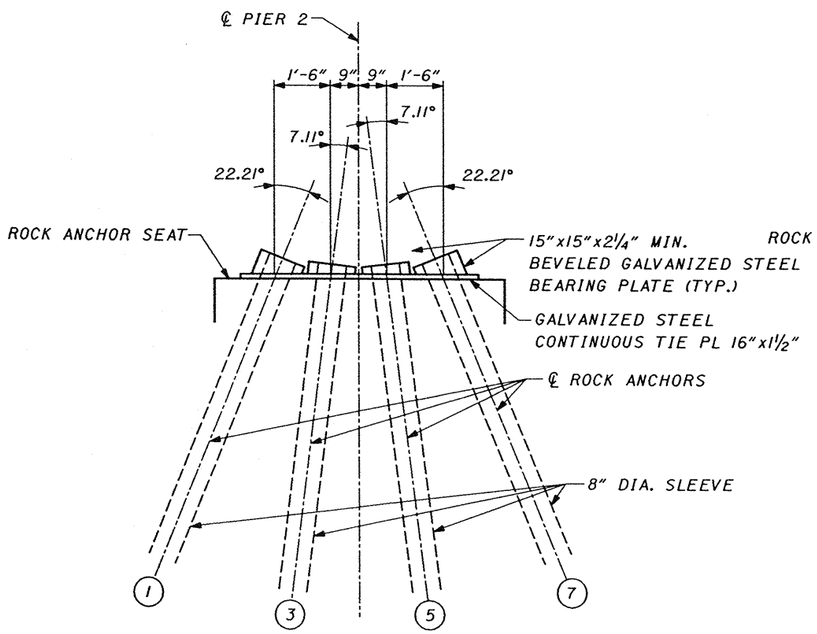
44/56



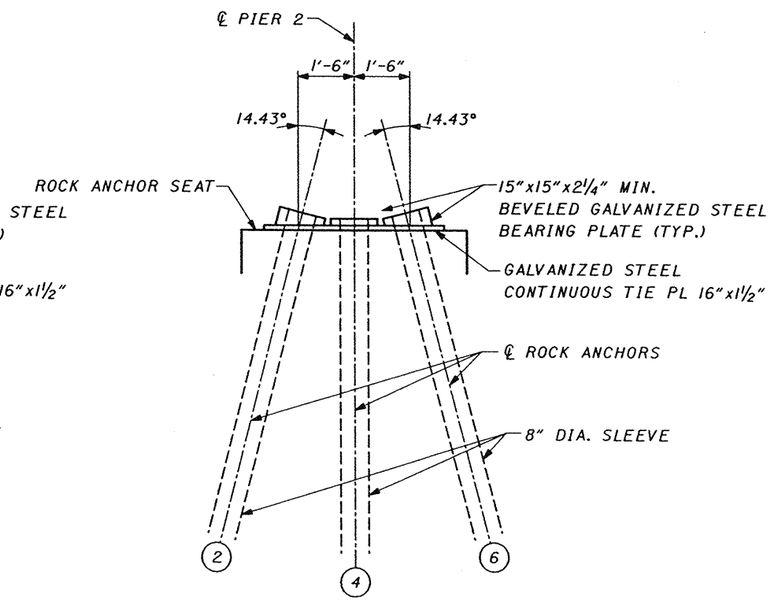
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

NOTES

BEARING PLATES AND CONTINUOUS TIE PLATES SHALL BE GALVANIZED PER 711.02.

BEARING PLATES SHALL BE DESIGNED TO TRANSFER THE ROCK ANCHOR LOAD TO THE DRILLED SHAFT CAP INCLUDING LATERAL FORCES DEVELOPED BY THE ANGLED ANCHORS AND BEVELED PLATES. ANCHOR RODS MAY BE REQUIRED. BEARING PLATES MAY BE COMBINED ON A SINGLE LOAD PLATE. SEE STRUCTURE MISC.: PERMANENT ROCK ANCHORS GENERAL NOTE SHEET 3/23.

SECTIONS B-B & C-C: FOR LOCATION SEE SHEET 9/23.

SECTIONS D-D & E-E: FOR LOCATION SEE SHEET 14/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

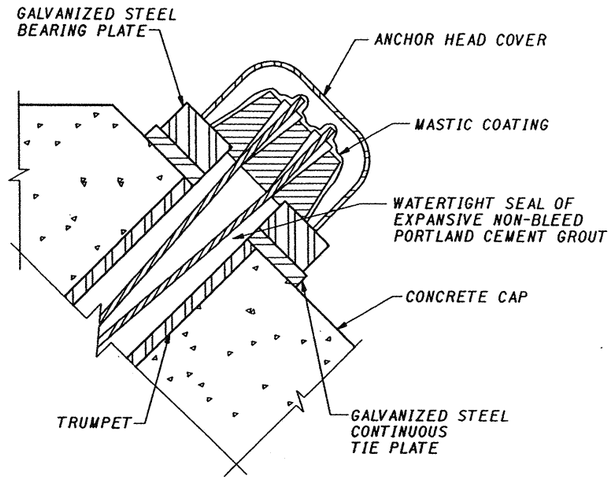
PIERS 1 & 2 - ROCK ANCHOR SECTIONS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

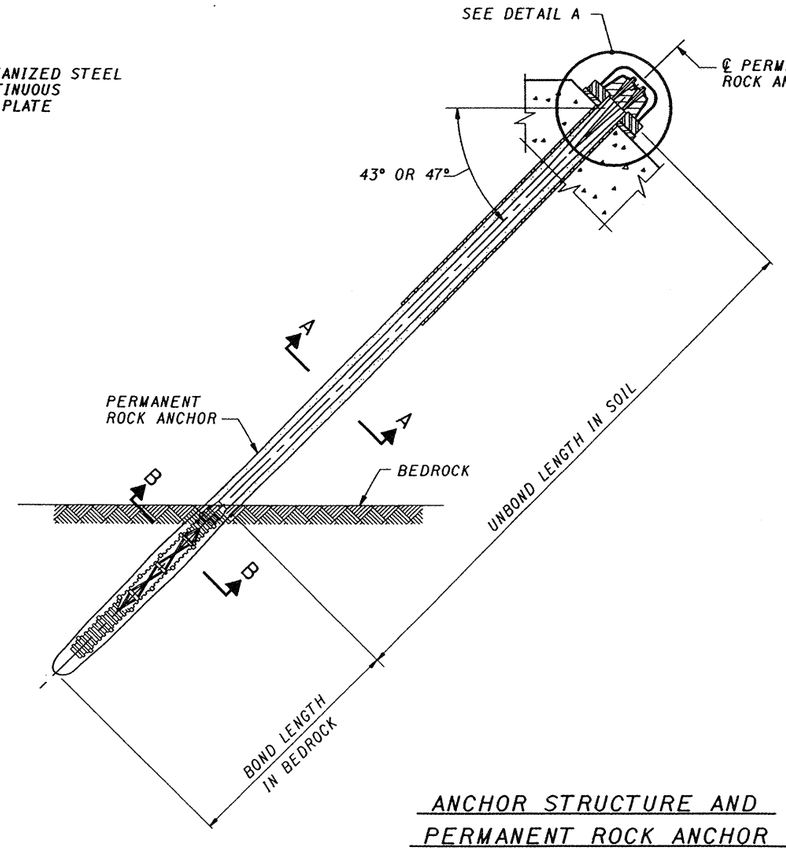
17/23

45/56

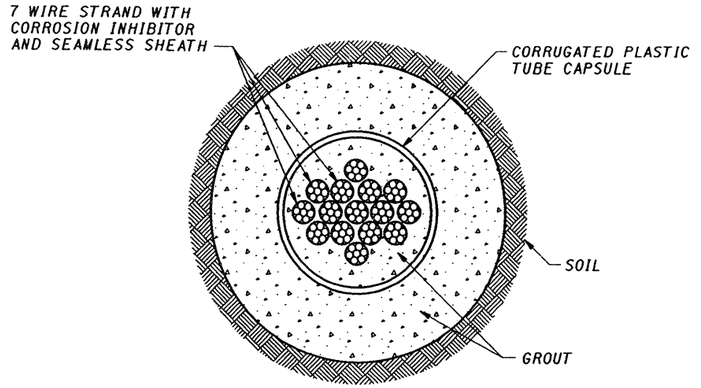
2235BG.DGN 12/10/01 JLS



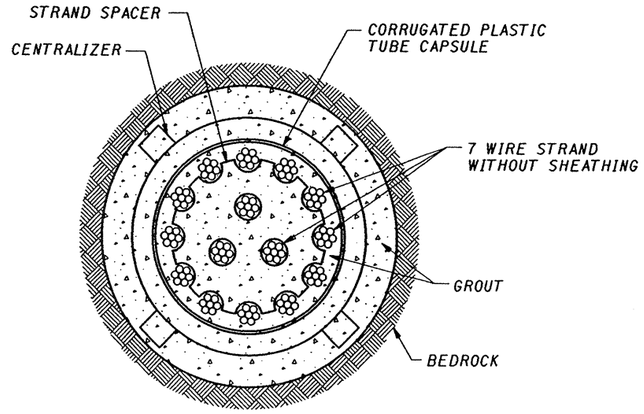
DETAIL A



ANCHOR STRUCTURE AND PERMANENT ROCK ANCHOR



SECTION A-A
UNBONDED LENGTH



SECTION B-B
BOND LENGTH

NOTES

STRUCTURE MISC.: PERMANENT ROCK ANCHORS:
SEE GENERAL NOTE SHEET 3/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

2235BH.DGN 12/10/01 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

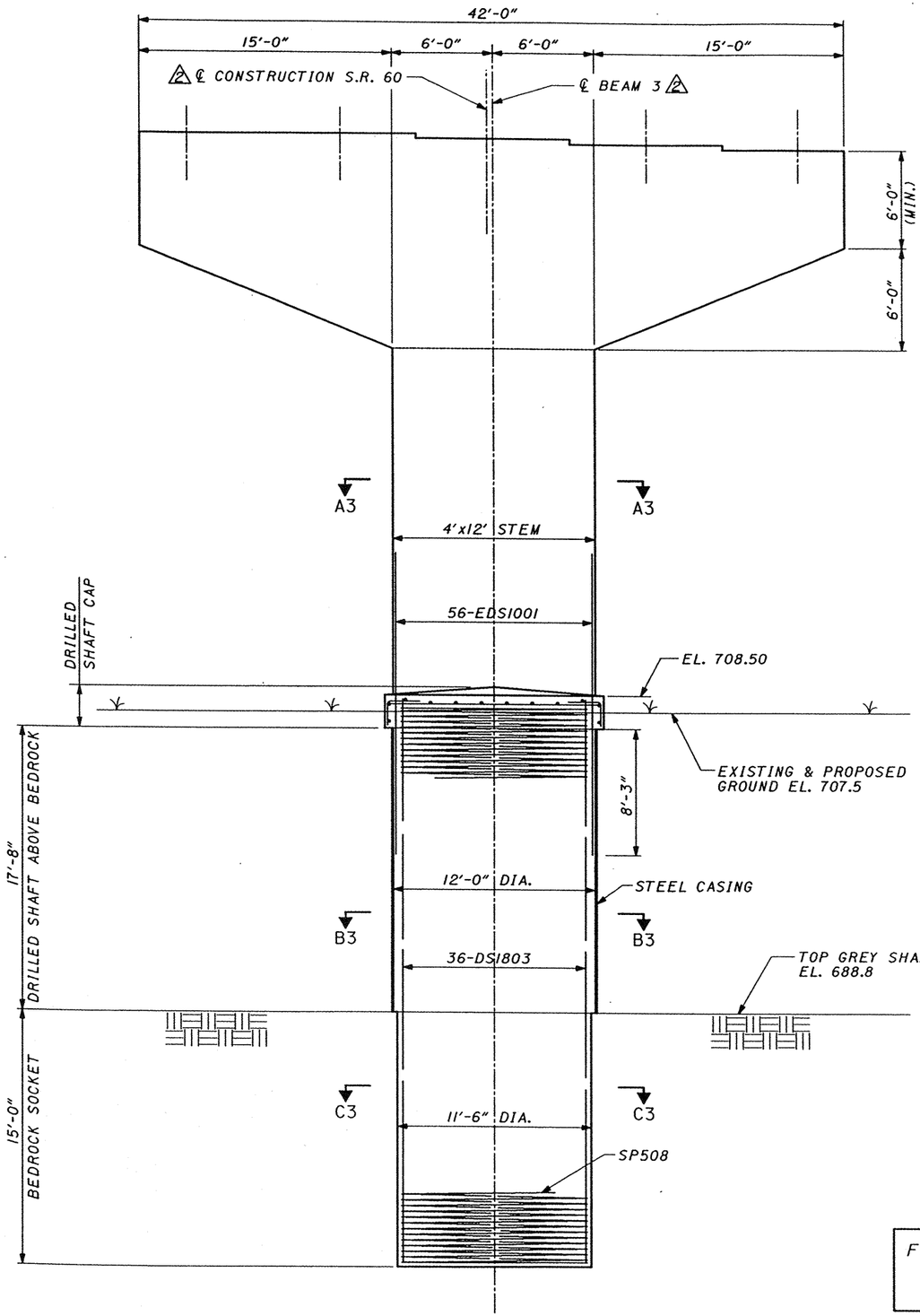
DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	KH	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

PERMANENT ROCK ANCHOR DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

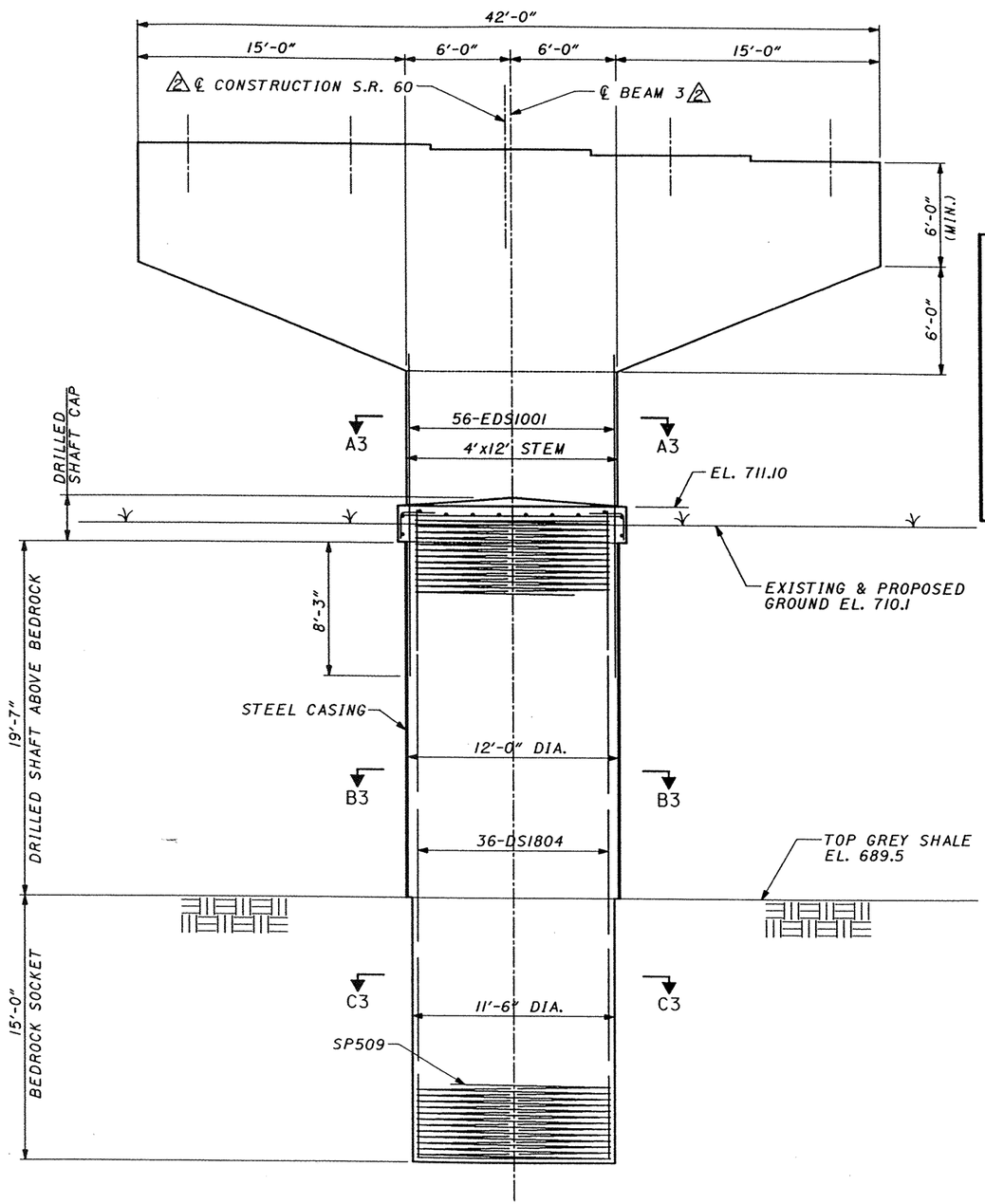
ERI-60-3.100

18/23

46/56



PIER 3 ELEVATION



PIER 4 ELEVATION

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

NOTES

SECTIONS A3-A3, B3-B3 & C3-C3: SEE SHEET 20/23.

ADDITIONAL NOTES: SEE SHEET 7/23.

REVISED 3/7/02	DESIGNED DAP/JDB	DRAWN JLS	REVIEWED DT	DATE 12/10/01
	CHECKED KAK	REVISED	STRUCTURE FILE NUMBER 2202476	

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

PIERS 3 & 4 ELEVATION

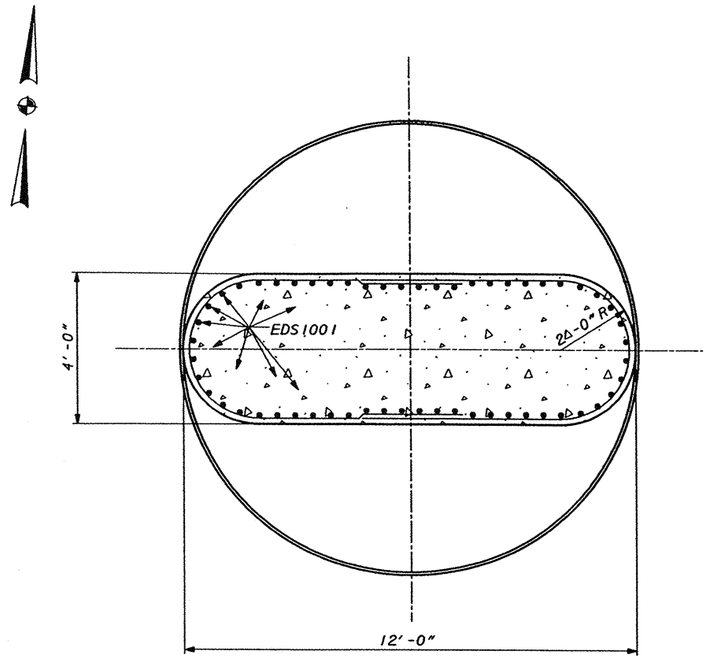
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

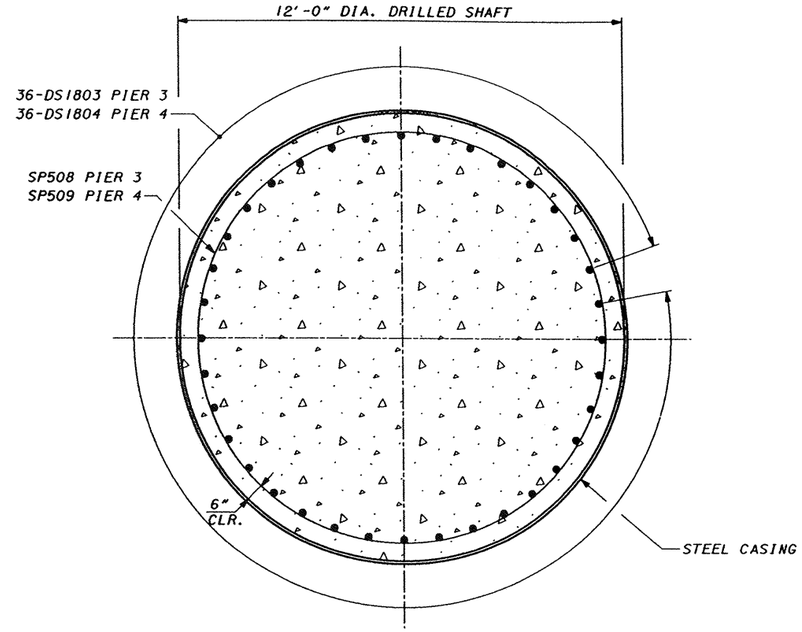
19/23

47/56

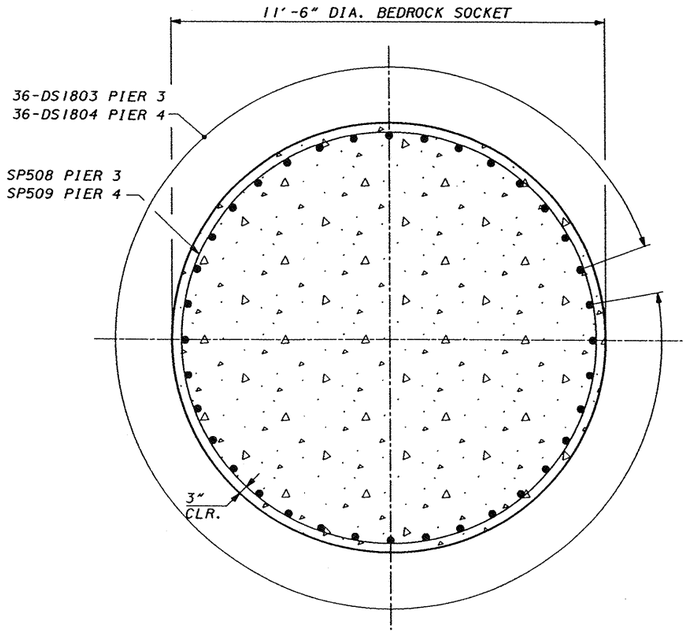
2235BB.DGN 3/7/02 JLS



SECTION A3-A3



SECTION B3-B3



SECTION C3-C3

NOTES

ADDITIONAL NOTES: SEE SHEET 7/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DT	12/10/01
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

PIER 3 AND 4 SECTIONS AND DETAILS

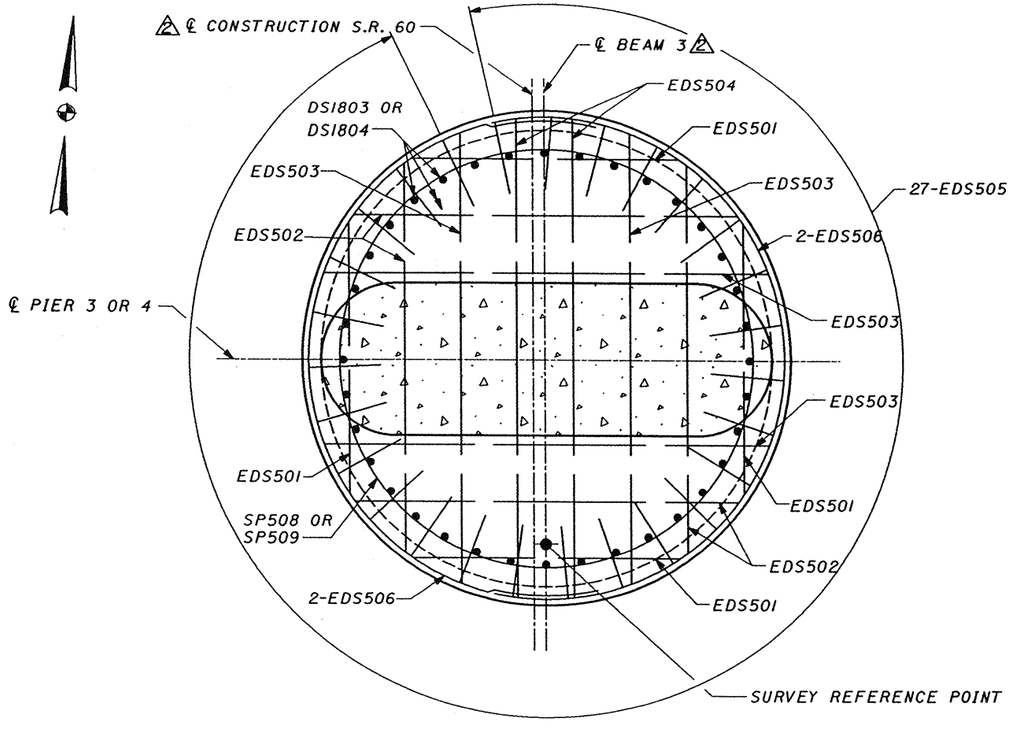
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

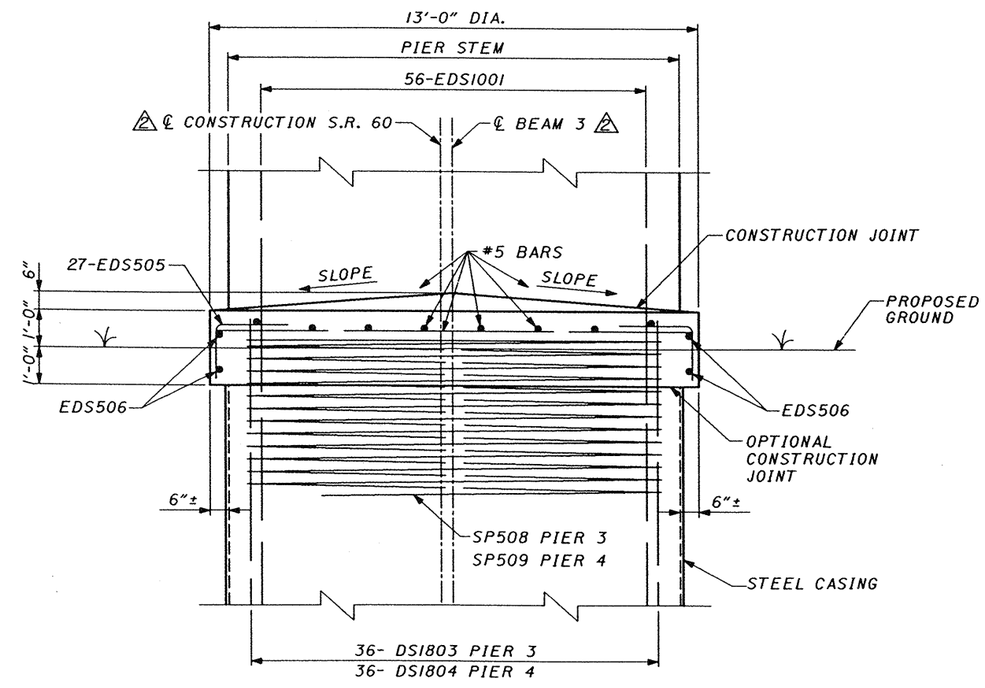
20/23

48/56

23SBC.DGN 12/10/01 JLS



PLAN



ELEVATION

NOTES

SURVEY REFERENCE POINT: SEE GENERAL NOTE SHEET 2/23.

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

223SBD.DGN 3/7/02 JLS

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

REVISED 3/7/02	DESIGNED DAP/JDB	DRAWN JLS	REVIEWED DT	DATE 12/10/01	STRUCTURE FILE NUMBER 2202476
	CHECKED KAK	REVISED			

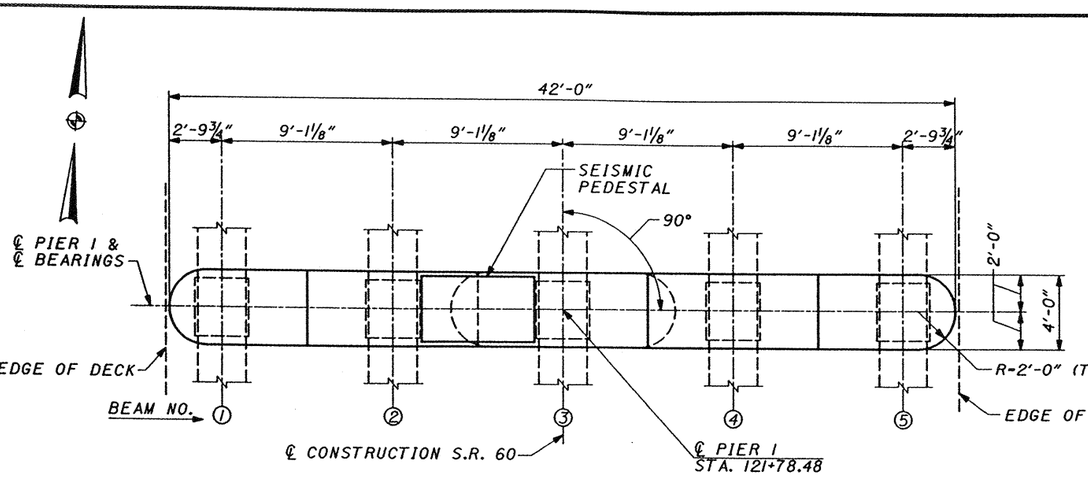
PIER 3 AND 4 DRILLED SHAFT CAP DETAILS

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

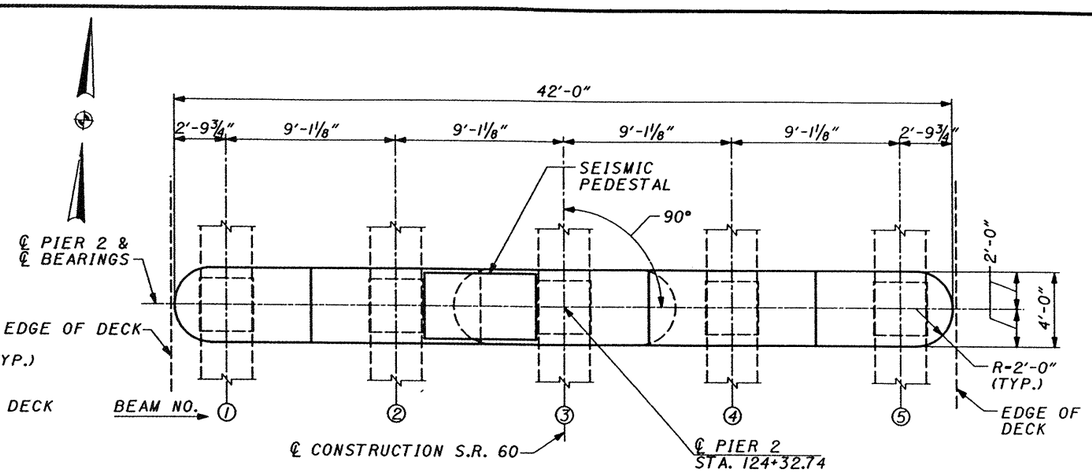
ERI-60-3.100

21/23

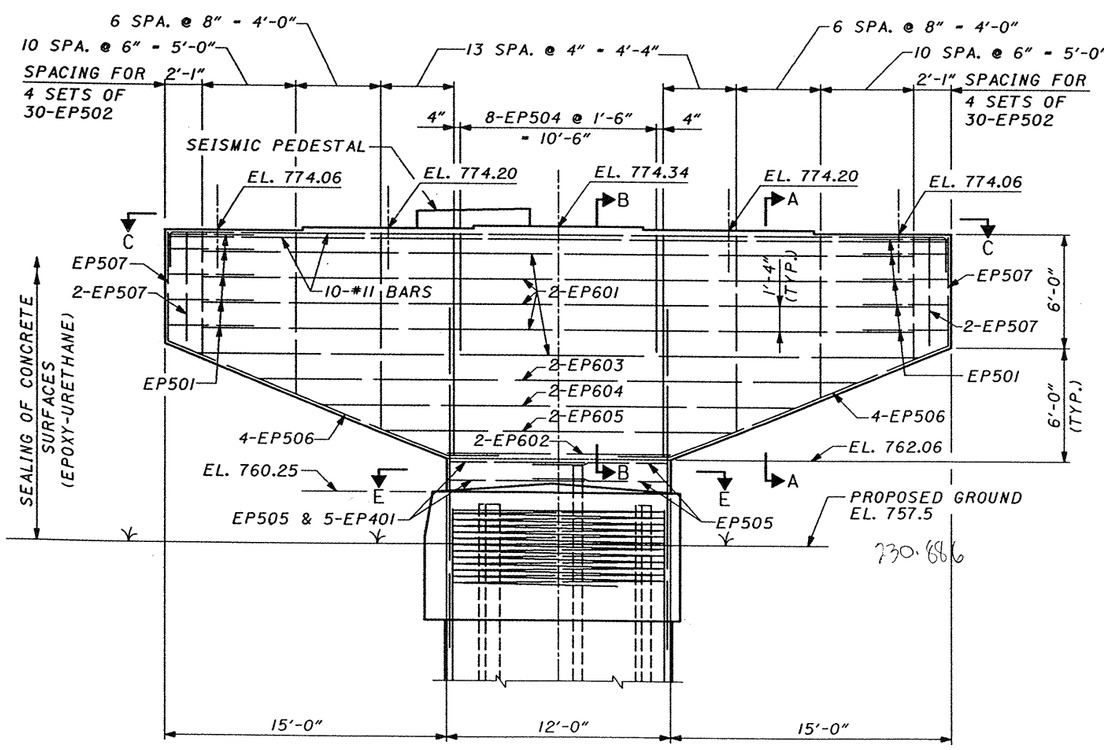
49/56



PLAN

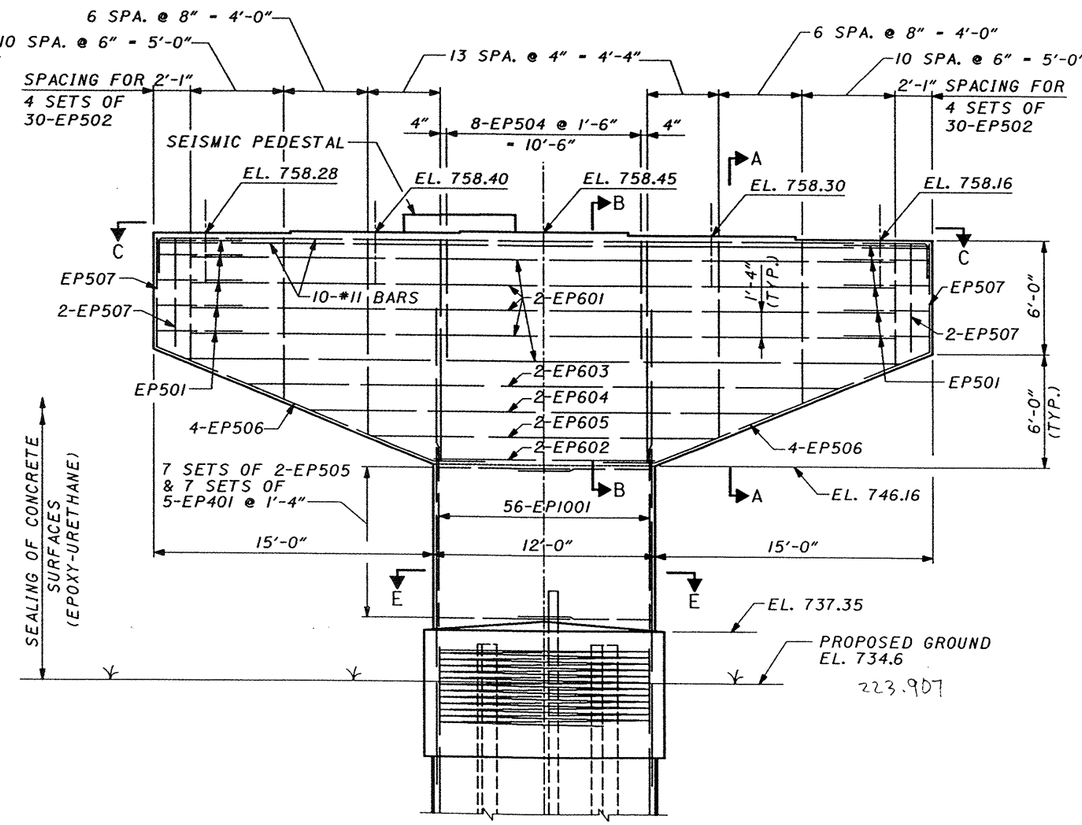


PLAN



ELEVATION

PIER 1



ELEVATION

PIER 2

NOTES

SEISMIC PEDESTAL: SEE SHEET 21D/23.

SECTIONS A-A, B-B & E-E: SEE SHEET 21C/23.

VIEW C-C SEE SHEET 21C/23.

2 ADDED SHEET 3/7/02

DESIGNED JDB | DRAWN JLS | REVIEWED DAP | DATE 3/7/02 | CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

PIERS 1 AND 2 - CAP DETAILS

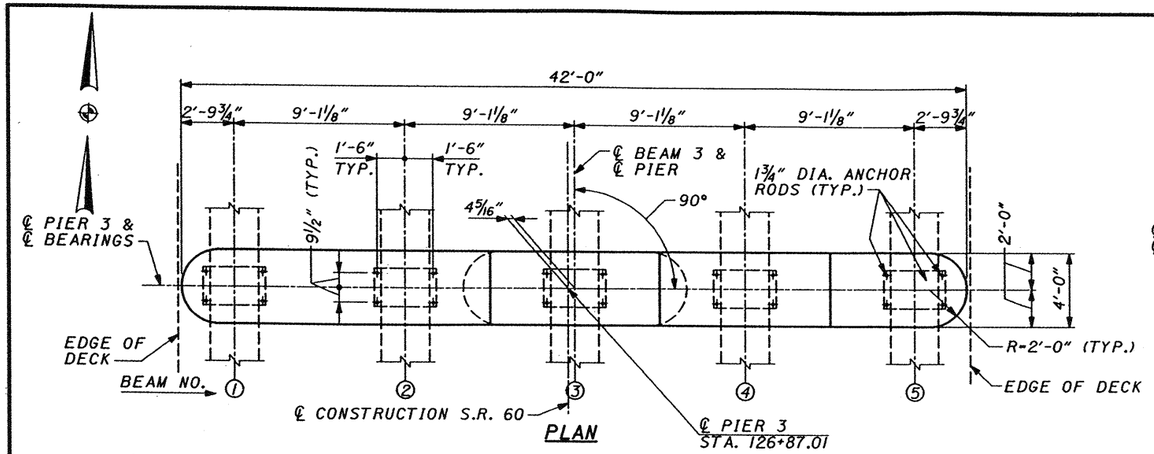
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

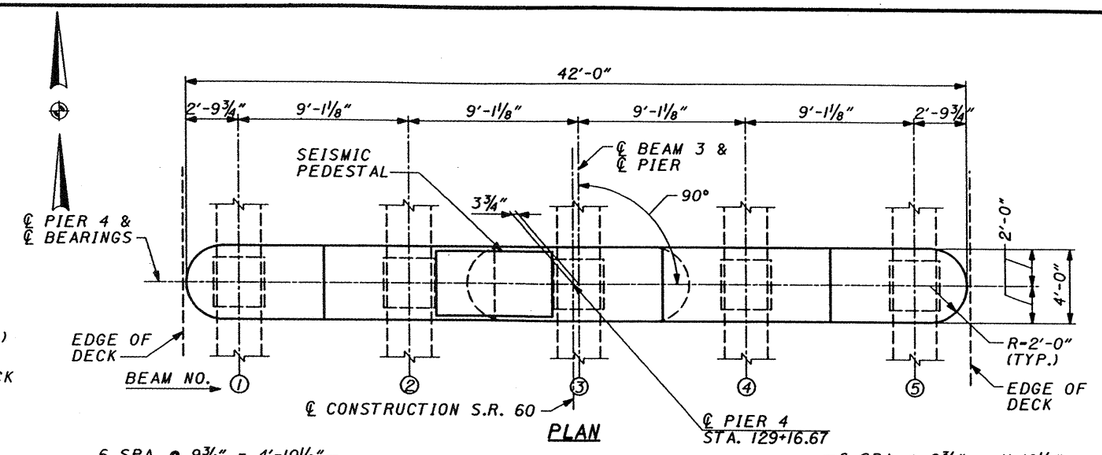
21A/23

50/56

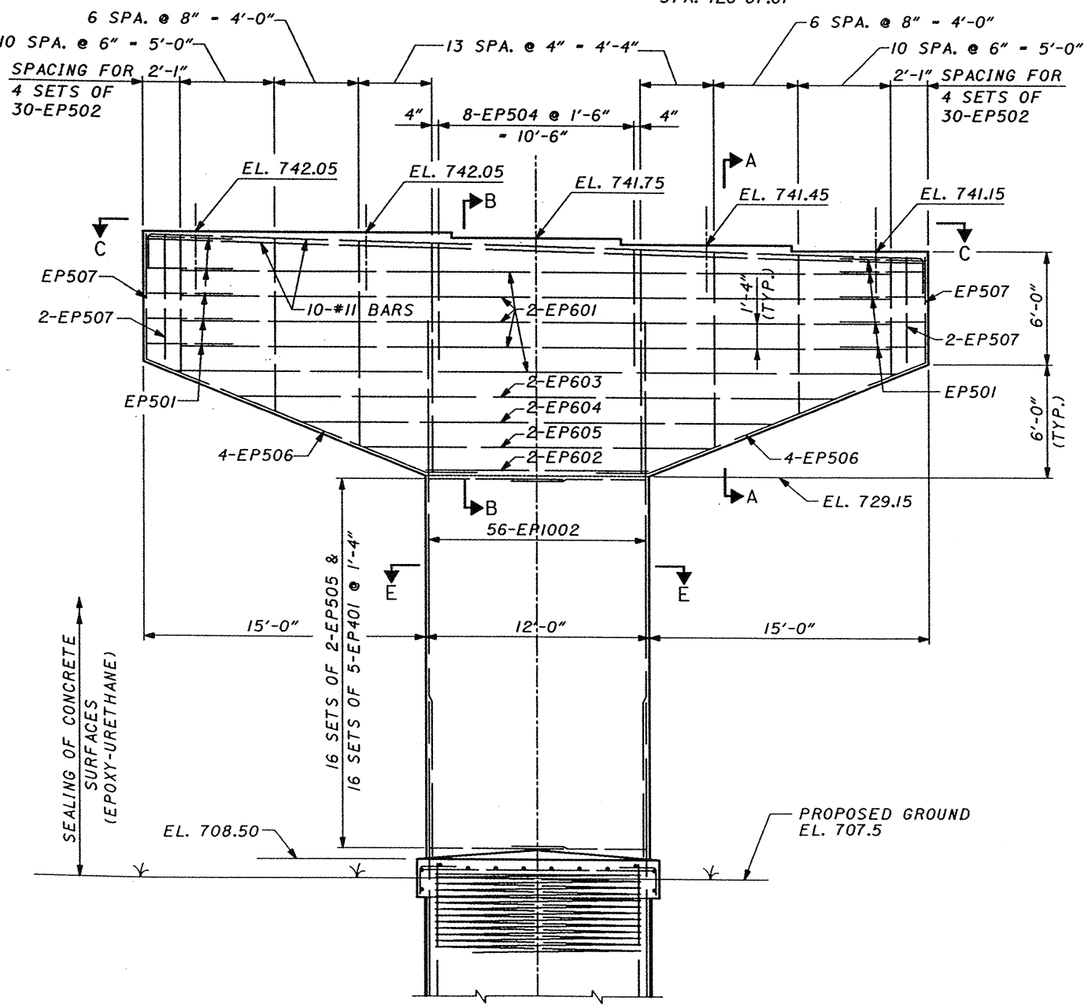
2235BN.DGN 3/7/02 JLS



PLAN

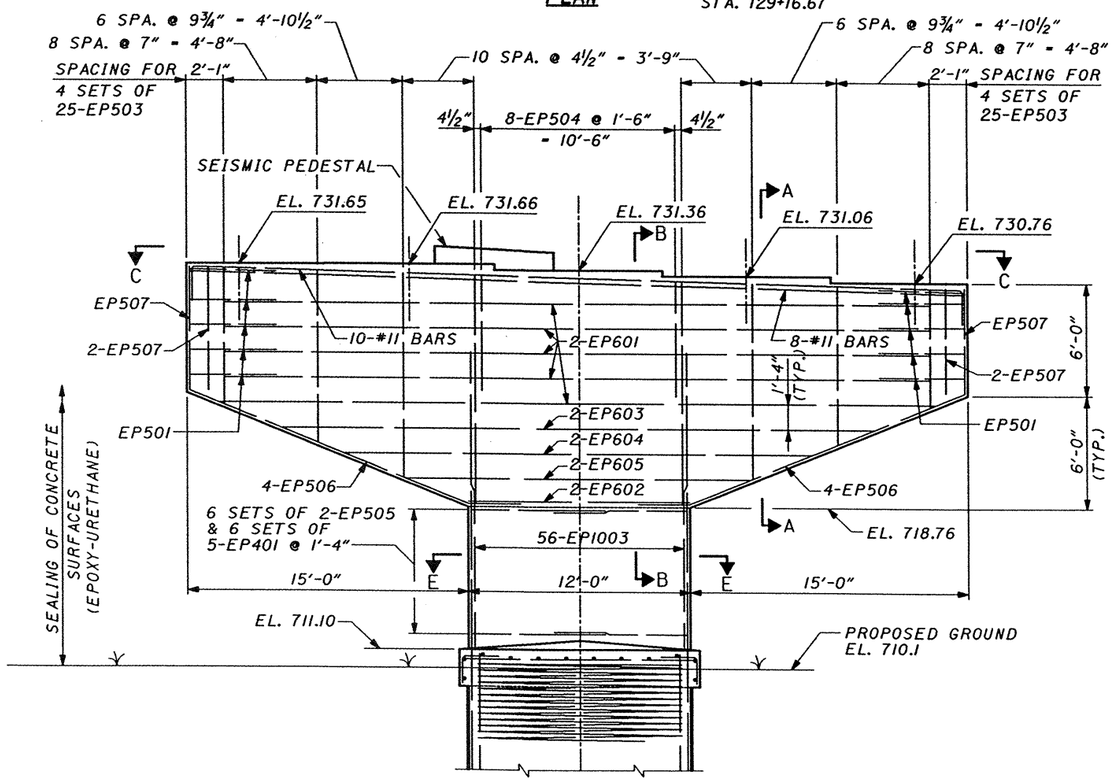


PLAN



ELEVATION

PIER 3



ELEVATION

PIER 4

NOTES

BRIDGE SEAT REINFORCING: REINFORCING STEEL FOR PIER 3 IN THE VICINITY OF THE BRIDGE SEAT SHALL BE ACCURATELY PLACED TO AVOID INTERFERENCE WITH THE DRILLING OF ANCHOR DOWEL HOLES OR THE PRE-SETTING OF BEARING ANCHORS.

SECTIONS A-A, B-B & E-E: SEE SHEET 210/23.

VIEW C-C: SEE SHEET 210/23.

SEISMIC PEDESTAL: SEE SHEET 210/23.

223SBN.DGN 3/7/02 JLS

ADDED SHEET 3/7/02

DESIGNED	DRAWN	REVIEWED	DATE
JDB	JLS	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

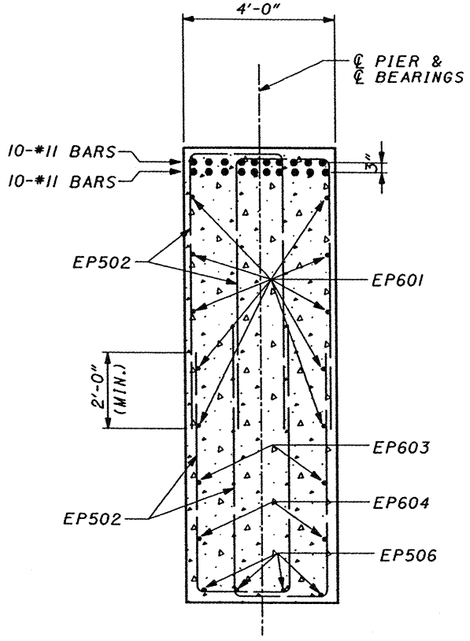
RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

PIERS 3 AND 4 - CAP DETAILS

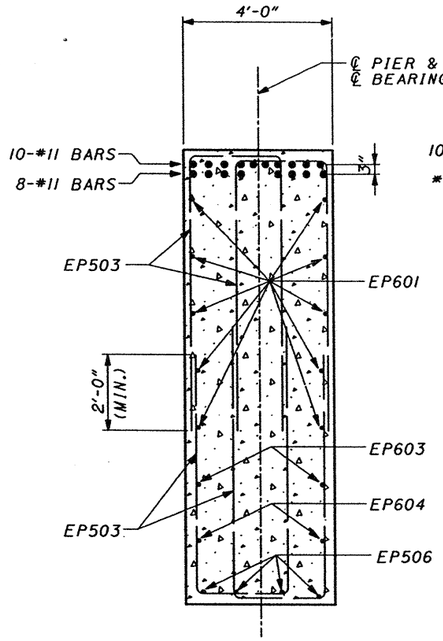
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

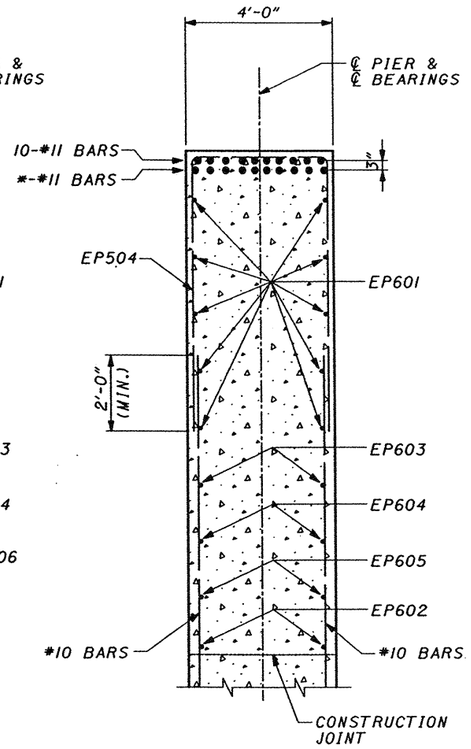
* 10-#11 BARS (PIERS 1, 2 & 3)
8-#11 BARS (PIER 4)



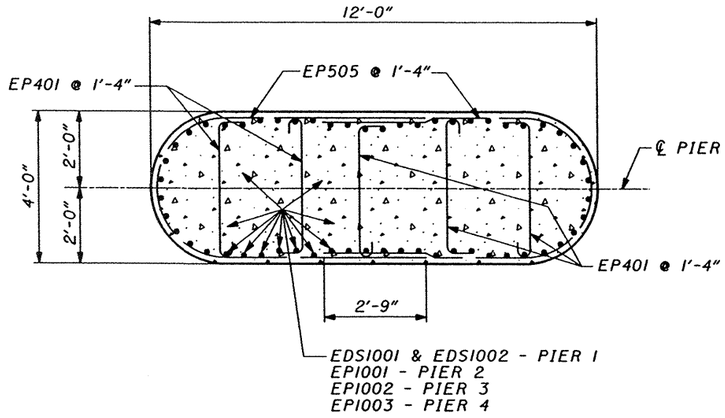
SECTION A-A
(PIERS 1, 2 & 3)



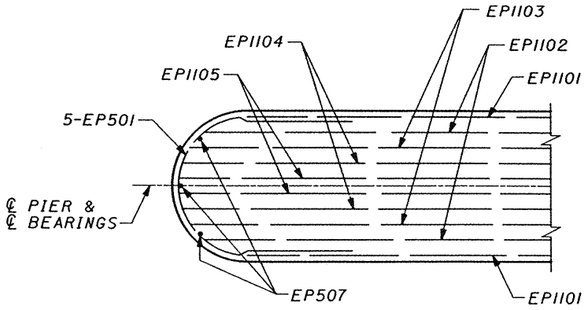
SECTION A-A
(PIER 4)



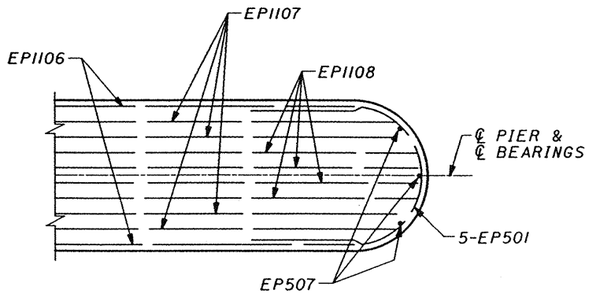
SECTION B-B



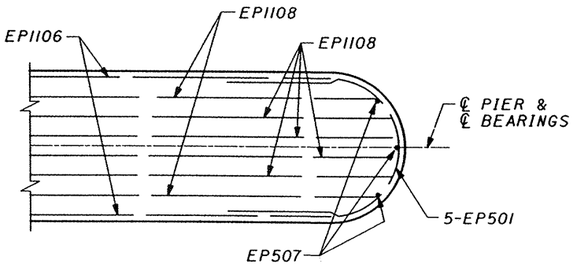
SECTION E-E



TOP ROW



BOTTOM ROW - PIERS 1, 2 & 3



BOTTOM ROW - PIER 4

VIEW C-C

NOTES

SECTIONS A-A, B-B & E-E: FOR LOCATIONS SEE SHEETS 21A/23 AND 21B/23.

VIEW C-C: FOR LOCATIONS SEE SHEETS 21A/23 AND 21B/23.

ADDED SHEET 3/7/02

DESIGNED	DRAWN	REVIEWED	DATE
JDB	JLS	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

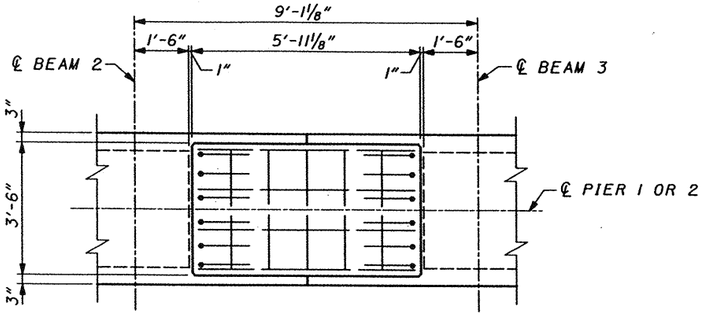
PIER CAP DETAILS
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

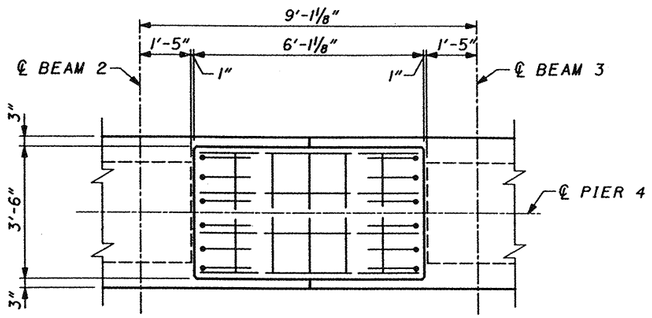
21C/23

52/56

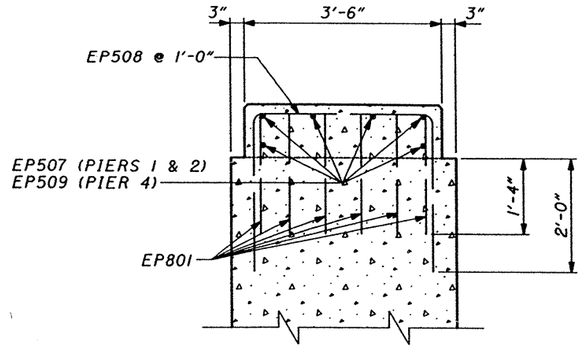
'23580.DGN 3/7/02 JLS



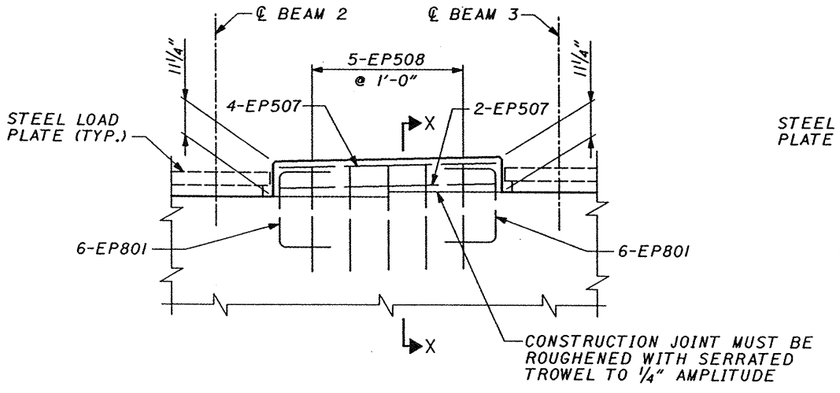
PLAN



PLAN

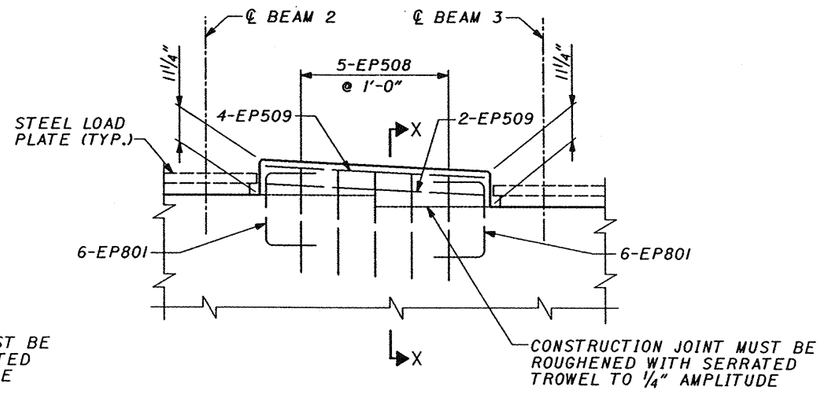


SECTION X-X



ELEVATION

SEISMIC BLOCK
PIERS 1 & 2



ELEVATION

SEISMIC BLOCK
PIERS 4

223SBP.DGN 3/7/02 JLS

2 ADDED SHEET 3/7/02

DESIGNED	DRAWN	REVIEWED	DATE
JDB	JLS	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

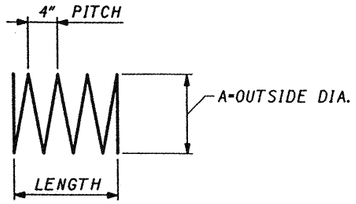
PIERS - SEISMIC PEDESTAL DETAILS

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

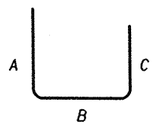
ERI-60-3.100

21D/23

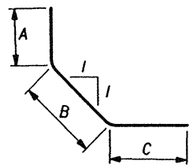
53/56



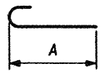
TYPE 1



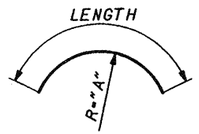
TYPE 2



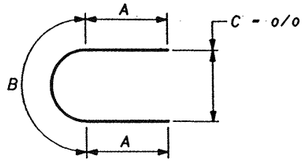
TYPE 3



TYPE 4



TYPE 5



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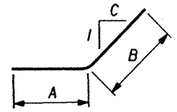
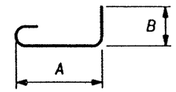


TYPE 7



TYPE 8

PIERS

CALCULATED JLS DATE 11/01
CHECKED JDB DATE 12/01

MARK	PIER NO. 1	2	3	4	TOTAL	LENGTH	TYPE	A	B	C	INC.
EDS501	2	2	4	4	12	7'-1"	STR.				
EDS502	3	3	4	4	14	10'-3"	STR.				
EDS503	2	2	4	4	12	11'-10"	STR.				
EDS504	2	1	2	2	7	12'-7"	STR.				
EDS505			27	27	54	3'-3"	2	1'-8"	1'-8½"	0	
EDS506	6	6	4	4	20	22'-8"	5	6'-4"			
EDS507	2	1			3	8'-3"	STR.				
EDS508	1				1	5'-7"	STR.				
EDS509	2	2			4	17'-0"	5	6'-3"			
EDS510	1				1	10'-11"	STR.				
EDS511	1				1	4'-8"	STR.				
EDS512		2			2	11'-6"	STR.				
EDS513		1			1	4'-3"	STR.				
EDS514		1			1	8'-6"	STR.				
EDS515		1			1	6'-0"	STR.				
EDS516	22	22			44	8'-0"	2	6'-5"	1'-8½"	0	
EDS517	7	7			14	8'-3"	2	4'-0"	4'-4½"	0	
EDS518	12	12			24	20'-0"	5	5'-6"			
EDS901	18	15			33	11'-4"	3	3'-11"	3'-7½"	3'-11"	
EDS902	18	15			33	10'-8"	3	3'-9"	3'-3½"	3'-9"	
EDS903	18	15			33	10'-0"	3	3'-7"	2'-11½"	3'-7"	
EDS904	2				2	8'-5"	2	1'-7"	5'-10"	1'-7"	
EDS905	2	1			3	7'-11"	2	1'-7"	5'-4"	1'-7"	
EDS906	2				2	7'-5"	2	1'-7"	4'-10"	1'-7"	
EDS907	1				1	8'-9"	2	1'-7"	6'-2"	1'-7"	
EDS908	1	1			2	8'-3"	2	1'-7"	5'-8"	1'-7"	
EDS909	1	1			2	7'-9"	2	1'-7"	5'-2"	1'-7"	
EDS910	1				1	9'-4"	2	1'-7"	6'-9"	1'-7"	
EDS911	1				1	8'-10"	2	1'-7"	6'-3"	1'-7"	
EDS912	1				1	8'-4"	1	1'-7"	5'-9"	1'-7"	
EDS913	1	1			2	9'-8"	2	1'-7"	7'-1"	1'-7"	
EDS914	1	1			2	9'-1"	2	1'-7"	6'-6"	1'-7"	
EDS915	1	2			3	8'-8"	2	1'-7"	6'-1"	1'-7"	
EDS916	1	1			2	9'-11"	2	1'-7"	7'-4"	1'-7"	
EDS917	1	1			2	9'-5"	2	1'-7"	6'-10"	1'-7"	
EDS918	1				1	8'-11"	2	1'-7"	6'-4"	1'-7"	
EDS919	1	1			2	10'-6"	2	1'-7"	7'-11"	1'-7"	
EDS920	1				1	10'-0"	2	1'-7"	7'-5"	1'-7"	
EDS921	1				1	9'-6"	2	1'-7"	6'-11"	1'-7"	
EDS922	1				1	10'-10"	2	1'-7"	8'-3"	1'-7"	
EDS923	1				1	10'-4"	2	1'-7"	7'-9"	1'-7"	
EDS924	1				1	9'-10"	2	1'-7"	7'-3"	1'-7"	
EDS925	1				1	11'-1"	2	1'-7"	8'-6"	1'-7"	
EDS926	1				1	10'-7"	2	1'-7"	8'-0"	1'-7"	
EDS927	1				1	10'-1"	2	1'-7"	7'-6"	1'-7"	
EDS928		2			2	7'-1"	2	1'-7"	4'-6"	1'-7"	
EDS929		2			2	6'-7"	2	1'-7"	4'-0"	1'-7"	
EDS930		2			2	6'-0"	2	1'-7"	3'-5"	1'-7"	
EDS931		2			2	7'-6"	2	1'-7"	4'-11"	1'-7"	
EDS932		1			1	6'-11"	2	1'-7"	4'-4"	1'-7"	
EDS933		1			1	6'-5"	2	1'-7"	3'-10"	1'-7"	
EDS934		1			1	7'-2"	2	1'-7"	4'-7"	1'-7"	
EDS935		1			1	8'-1"	2	1'-7"	5'-6"	1'-7"	
EDS936		1			1	9'-0"	2	1'-7"	6'-5"	1'-7"	
EDS937		1			1	8'-6"	2	1'-7"	5'-11"	1'-7"	
EDS938		1			1	9'-9"	2	1'-7"	7'-2"	1'-7"	
EDS939		1			1	9'-3"	2	1'-7"	6'-8"	1'-7"	
EDS940		1			1	10'-2"	2	1'-7"	7'-7"	1'-7"	

PIERS (CONT'D.)

CALCULATED JLS DATE 11/01
CHECKED JDB DATE 12/01

MARK	PIER NO. 1	2	3	4	TOTAL	LENGTH	TYPE	A	B	C	INC.
EDS1001	40	44	56	56	196	18'-0"	STR.				
EDS1002	16	12			28	12'-7"	4	11'-2"			
DS1801	52				52	52'-0"	STR.				
DS1802	52	36			88	47'-0"	STR.				
DS1803			36		36	34'-2"	STR.				
DS1804				36	36	36'-1"	STR.				
DS1805		36			36	45'-6"	STR.				
SP501	1				1	52'-0"	1	10'-8"			
SP502	1				1	50'-0"	1	9'-5"			
SP503	1				1	35'-0"	1	6'-6"			
SP504	1				1	47'-0"	1	11'-6"			
SP505		1			1	47'-0"	1	10'-8"			
SP506		1			1	40'-0"	1	9'-5"			
SP507		1			1	45'-6"	1	11'-6"			
SP508			1		1	34'-2"	1	11'-0"			
SP509				1	1	36'-1"	1	11'-0"			
SP510		1			1	30'-0"	1	6'-6"			

FOR PIER FOUNDATION CONSTRUCTION
12-11-01

NOTES:

EPOXY COATED REINFORCING STEEL IS INDICATED BY THE LETTER PREFIX "E".

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTERS IDENTIFY BAR LOCATION, THE NEXT DIGIT INDICATES THE BAR SIZE DESIGNATION, THE REMAINING DIGITS STATE THE SEQUENCE NUMBER.

EXAMPLE: A5 11
A - LOCATION OF THE BAR IN STRUCTURE (ABUTMENT)
5 - BAR SIZE DESIGNATION
11 - SEQUENCE NUMBER

BAR DIMENSIONS SHOWN ARE OUT TO OUT UNLESS OTHERWISE INDICATED. R INDICATES INSIDE RADIUS, UNLESS OTHERWISE NOTED.

223SMC.DGN 12/12/01 JLS.TWH

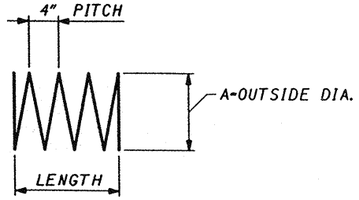
RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN JLS | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

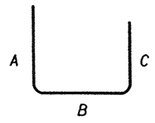
REINFORCING STEEL LIST - 1

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

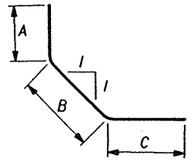
ERI-60-3.100



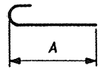
TYPE 1



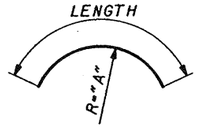
TYPE 2



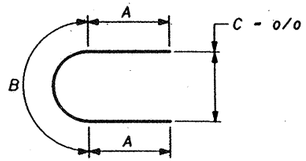
TYPE 3



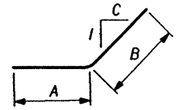
TYPE 4



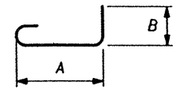
TYPE 5



TYPE 6



TYPE 7



TYPE 8

PIERS (CONT'D.)

CALCULATED JLS DATE 2/02
CHECKED JDB DATE 2/02

MARK	PIER NO. 1	2	3	4	TOTAL	LENGTH	TYPE	A	B	C	INC.
EP401	10	35	80	30	155	4'-9"	8	3'-8"	0'-8"		
EP501	10	10	10	10	40	11'-1"	6	2'-9"	5'-7"	3'-6¾"	
EP502	8 SER.OF 30	8 SER.OF 30	8 SER.OF 30		24 SER.OF 30	12'-7" TO 17'-5"	2	5'-2" TO 7'-7"	2'-6"	5'-2" TO 7'-7"	1"
EP503				8 SER.OF 25	8 SER.OF 25	12'-5" TO 17'-11"	2	5'-1" TO 7'-10"	2'-6"	5'-1" TO 7'-10"	1⅜"
EP504	8	8	8	8	32	15'-9"	2	6'-2"	3'-8"	6'-2"	
EP505	4	14	32	12	62	16'-7"	6	5'-5"	5'-9"	3'-8"	
EP506	8	8	8	8	32	19'-0"	7	16'-0"	3'-0"	2½	
EP507	12	12	6	6	36	5'-7"	STR.				
EP508	5	5		5	15	8'-5"	2	2'-9"	3'-2"	2'-9"	
EP509				6	6	5'-9"	STR.				
EP601	10	10	10	10	40	38'-0"	STR.				
EP602	2	2	2	2	8	11'-11"	STR.				
EP603	2	2	2	2	8	31'-11"	STR.				
EP604	2	2	2	2	8	25'-3"	STR.				
EP605	2	2	2	2	8	18'-7"	STR.				
EP801	12	12		12	36	4'-4"	2	1'-4"	2'-1"	1'-4"	
EP1001		56			56	17'-0"	STR.				
EP1002			56		56	28'-11"	STR.				
EP1003				56	56	15'-11"	STR.				
EP1101	2	2	2	2	8	41'-4"	2	2'-0"	38'-0"	2'-0"	
EP1102	2	2	2	2	8	43'-4"	2	2'-0"	40'-0"	2'-0"	
EP1103	2	2	2	2	8	44'-1"	2	2'-0"	40'-9"	2'-0"	
EP1104	2	2	2	2	8	44'-6"	2	2'-0"	41'-2"	2'-0"	
EP1105	2	2	2	2	8	44'-9"	2	2'-0"	41'-5"	2'-0"	
EP1106	2	2	2	2	8	38'-0"	STR.				
EP1107	4	4	4	2	14	40'-0"	STR.				
EP1108	4	4	4	4	16	41'-2"	STR.				

NOTES:

ADDITIONAL NOTES: SEE SHEET 22/23.

ADDED SHEET 3/7/02

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED	DRAWN	REVIEWED	DATE
DAP/JDB	JLS	DAP	3/7/02
CHECKED	REVISED	STRUCTURE FILE NUMBER	
KAK		2202476	

REINFORCING STEEL LIST - 2
BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

22A/23

55/56

123SMC.DGN 3/7/02 JLS

INSPECTION RECORD FOR DRILLED SHAFTS

PROJECT NO. _____	GENERAL CONTRACTOR _____ DRILLING CONTRACTOR _____ PROJECT ENGINEER _____	TYPE & MODEL OF DRILLING MACHINERY _____ MAX. CONTINUOUS TORQUE _____ FT.-LB. CROWD (MAX. CONTINUOUS DOWNWARD FORCE) _____ LBS	TYPE OF CONCRETE PUMP _____ HOSE DIAMETER _____ INCHES CAPACITY _____ CU.FT./MIN.	COST PER LINEAL METER _____ ABOVE THE BEDROCK SOCKET _____ IN BEDROCK SOCKET _____ TYPE OF ROCK _____

SUBTRUCTURE UNIT		DATE AND TIME OF DRILLING		APPROX. ELEV. OF TOP OF OVER BURDEN	LENGTH OF DRILLED SHAFTS ABOVE THE BEDROCK SOCKET				OBTRUCTIONS ENCOUNTERED			LENGTH OF DRILLED SHAFTS IN BEDROCK SOCKET			STEEL CASING			REINFORCING STEEL				CONCRETE					TOLERANCES			PLAN SHAFT DIAMETER (INCH)	CON-STRUCTED SHAFT DIAMETER (INCH)
PIER OR ABUT.	SHAFT NO.	STARTED DATE / TIME	FINSHED DATE / TIME		THROUGH AIR (FEET)	THROUGH WATER (FEET)	THROUGH OVER BURDEN (FEET)	PAY LENGTH (FEET)	NUMBER	SIZE (INCH)	ELAPSED TIME FOR REMOVAL (HR.)	APPROX. ELEV. OF TOP OF BEDROCK	ELEV. OF BOTT. OF BEDROCK SOCKET	LENGTH OF BEDROCK SOCKET (FEET)	LENGTH (METER)	CASING GAUGE	WAS CASING LEFT IN PLACE ?	VERTICAL BAR SIZE NO.	VERTICAL NO. OF REBARS	SPIRAL BAR SIZE NO.	SPIRAL PITCH (INCH)	SLUMP TEST RESULT (INCH)	CYLINDER STRENGTH f'c (P.S.I.)	AIR TEMP. (°F)	TIME NEEDED TO PLACE CONCRETE (HR.)	QUANTITY (CU.YD.)	DEVIATION FROM PLUMB N-S (INCH)	DEVIATION FROM PLUMB E-W (INCH)	DEVIATION OF COLUMN TOP CENTER FROM PLAN LOCATION HORIZONTALLY (INCH)		
		/	/																													
		/	/																													
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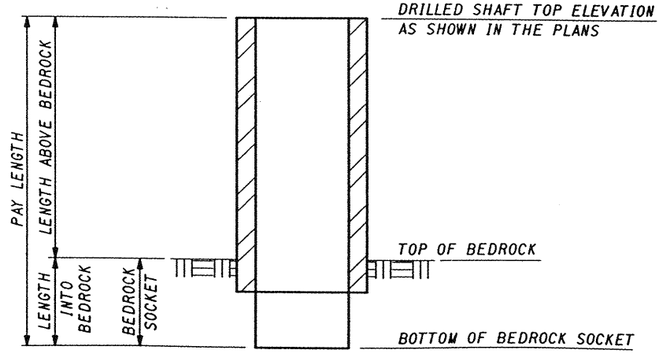
PROJECT ENGINEER COMMENTS

1. LOCATION AND EXTENT OF CAVITIES

2. PROCEDURES FOR CONTROLING WATER

3. WERE UNEXPECTED SUBSURFACE CONDITIONS ENCOUNTERED

4. ANY SUGGESTIONS FOR IMPROVING THE PLANS



DRILLED SHAFT STRUCTURE

SUBMIT A COPY TO BUREAU OF BRIDGES ATTN: FOUNDATION ENGINEER

THIS SHEET IS TO BE USED ONLY FOR RECORDING "AS BUILT" INFORMATION

RICHLAND ENGINEERING LIMITED
29 NORTH PARK STREET
MANSFIELD, OHIO 44902

DESIGNED DAP/JDB | DRAWN KH | REVIEWED DT | DATE 12/10/01
CHECKED KAK | REVISED | STRUCTURE FILE NUMBER 2202476

DRILLED SHAFT INSPECTION RECORD

BRIDGE NO. ERI-60-03649
OVER VERMILION RIVER

ERI-60-3.100

23/23

56/56

223SMD.DGN 12/10/01 KH