DESIGN SPECIFICATION FOR COMPOSITE ARCH BRIDGE SYSTEM

1. GENERAL
A. THIS WORK SHALL CONSIST OF PRODUCING AND DESIGNING THE COMPOSITE ARCH BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN CONFORMANCE WITH THE LAWS, GRANTS, AND DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS.
B. THE COMPOSITE ARCH BRIDGE SYSTEM IS SUPPLIED BY:
   B. ADVANCED INFRASTRUCTURE TECHNOLOGIES, LLC.
   55 BAKER BLVD, SUITE 205, BRIENZ, ME 04412
   PHONE: 207.573.8956
   www.altbri.ges.com

2. DESIGN SPECIFICATIONS
A. THE COMPOSITE ARCH BRIDGE SYSTEM WILL BE LIMITED TO SPANS NOT EXCEEDING 65 FT WITH A CLEARWAY OF 50 FEET OR LESS.
B. THE ARCH SYSTEM OF THE COMPOSITE ARCH BRIDGE SYSTEM IS REINFORCED CONCRETE WITH CONCRETE SPANS AND A CASSETTE CONCRETE ARCH.
C. THE TYPES OF CONCRETE SPECIFICATIONS ARE AS FOLLOWS:
   1. DESIGN LOADS ARE IN ACCORDANCE WITH PENNDOT DESIGN MANUAL PART 4 - STRUCTURES (CM-4), ASHRO/LRID BRIDGE DESIGN SPECIFICATIONS, AND AVAILABLE DESIGN SPECIFICATIONS FOR THE DESIGN OF CONCRETE-FILLED TUBES FOR DESIGN PURPOSES.
   2. PENNDOT DEPARTMENT OF TRANSPORTATION ENGINEERING STANDARDS ANDrewals and SIMILAR SPECIFICATIONS ARE ADOPTED FOR THE DESIGN AND CONSTRUCTION OF THE COMPOSITE ARCH BRIDGE SYSTEM.
   3. DRAWING MATERIALS ARE SPECIFIED IN ACCORDANCE WITH THE DEPARTMENT STANDARD SHEET SIZE, SCALE, AND DESIGN.
   4. DRAWING MATERIALS ARE SPECIFIED IN ACCORDANCE WITH THE DEPARTMENT STANDARD SHEET SIZE, SCALE, AND DESIGN.

3. DRAWING MATERIALS
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7. DRAWING MATERIALS
A. DRAWING MATERIALS ARE SPECIFIED IN ACCORDANCE WITH THE DEPARTMENT STANDARD SHEET SIZE, SCALE, AND DESIGN.
1. ALL SELECTED GRANULAR BACKFILL MATERIAL USED IN THE STRUCTURE VOLUME SHALL BE FREE FROM ORGANIC OR OTHERWISE DELETERIOUS MATERIAL AND SHALL CONFORM TO THE FOLLOWING GRADATION LIMITS AS DETERMINED BY ASHTR 120-1:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
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<tbody>
<tr>
<td>3&quot;</td>
<td>100%</td>
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<tr>
<td>½&quot;</td>
<td>100%</td>
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<tr>
<td>No. 40</td>
<td>80%</td>
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<tr>
<td>No. 200</td>
<td>10%</td>
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FURNISH MATERIALS MEETING THE QUALITY REQUIREMENTS OF TYPE C COARSE AGGREGATE OR BETTER AS SPECIFIED IN SECTION 702.3(A), TABLE B, EXCEPT FURNISH MATERIALS FREE OF CLAY Lumps, FRANKLE PULP, CARBON, AND COKE, DO NOT USE METALLURGICAL SLAG OR CINDER.

FURNISH MATERIALS WITH A MAXIMUM PLASTICITY INDEX (PI) OF 3 OR LESS AS DETERMINED IN ACCORDANCE WITH ASHTR 79(a) AND (b), FURNISH MATERIAL EXHIBITING AN ANGLE OF INTERNAL FRICTION OF NOT LESS THAN 34 DEGREES AS DETERMINED IN ACCORDANCE WITH ASHTR 7285, ON THE PORTION FINER THAN THE 2.0 MM (3/32") WILL BE COMPACTED TO 85% OF PI, 70% OF METHOD B AT optimum moisture content, EXCEPT FOR COARSE AGGREGATE MEETING THE REQUIREMENTS OF SECTION 702.12 DIRECT SHEAR TESTING MAY BE PERFORMED ON SAMPLES CONTAINING MATERIAL LARGER THAN THE 2.0 MM (3/32") IF THE SHEAR DEVICE CONFORMS TO ASHTR 7285, SECTIONS 6.0 AND 9.2 ADDITIONALLY, ALL SELECTED GRANULAR BACKFILL MATERIAL SHALL EXHIBIT THE FOLLOWING PROPERTIES:

- PI RANGE BETWEEN 6.0 AND 10.0
- RESISTIBILITY GREATER THAN 5000 OUNCE-FT
- NO CHLORIDE OR SULFATE TESTING AS REQUIRED RESISTIBILITY BETWEEN 2000 AND 5000 OUNCE-FT, PERFORM SPECIFIED CHLORIDE AND SULFATE TESTS
- CHLORIDES LESS THAN 100 PPM, AND
- SULFATES LESS THAN 500 PPM

ARCH FILLING NOTES:

1. SELF-COOKING CONCRETE MAY BE PLACED BY PUMP OR WITH A CONCRETE AUGER AND FUNNEL.
2. EACH ARCH WILL TAKE AN ESTIMATED 3" CUBIC YARDS OF CONCRETE.
3. NO CONCRETE SHOULD BE PLACED IN THE ARCH IF IT DOES NOT MEET THE SLUMP FLOW REQUIREMENTS OF 24" - 30" SPREAD.
4. DRILL THE 3" HOLE THROUGH THE ARCH AT THE APEX, DRILL A 2" HOLE IN THE ADJACENT CONCRETE FOR A WELDING SADDLE.
5. ARCHERS CAN BE INSPECTED FOR VOIDS AFTER FILLING BY TAPPING THE ARCH AND LISTENING FOR A HOLLOW SOUND, REPAIR IN ACCORDANCE WITH THE SPECIFICATIONS.

MANUFACTURING AND CONSTRUCTION TOLERANCES AND INSPECTION DETAILS:

1. EACH ARCH WILL BE MEASURED TO CONFORM TO THE DIMENSIONAL TOLERANCE SPECIFIED. DIMENSIONS OUTSIDE THE FOLLOWING LIMITS WILL BE SUBJECT TO REJECTION OR REPAIR:
2. THE SHAPE OF THE ARCH SHALL NOT VARY FROM THE SHOP DRAWINGS BY MORE THAN 1/2" AT ANY LOCATION.
3. THE SPAN AND RISE OF THE ARCH SHALL CONFORM TO THE DESIGN AND SHOP DRAWINGS WITHIN 10% OF THE DIMENSION.
4. DIAMETER OF ALL SECTIONS OF THE ARCH SHALL CONFORM TO THE DESIGN AND SHOP DRAWINGS WITHIN 1/8" AS MEASURED WITH A TAP WRENCH.
5. PRIOR TO ACCEPTANCE EACH ARCH WILL BE VISUALLY INSPECTED FOR DEFECTS, THE PRESENCE OF ONE OR MORE OF THE FOLLOWING DEFECTS WILL BE CAUSE FOR REJECTION:
6. VOIDS RESULTING FROM DECOMPRESSION OF THE TOOLING.
7. VOIDS RESULTING FROM INSUFFICIENT AIR (i.e., CAUSED BY UNLINED HOLE, DRY REINFORCING, ETC.)
8. VOIDS CAUSED BY BAD LAY WHICH LEAVES TRACES OF AIR IN THE INSUFFICIENT PUMPED MATERIAL.
9. UNREPAIRED DRY SPOTS LARGER THAN 1/2 DIAMETER.
10. COMPOSITE DECK SECTION SHALL CONFORM TO CREATIVE TULIPRUSCONE DESIGN GUIDE CHAPTER 8, QUALITY ASSURANCE AND STANDARD TOLERANCES.

HEADWALL ARCH CONNECTION NOTES:

1. PLACE NONSHRINK CEMENT GROUT ALONG OUTER EDGE OF PREFAB AS DESIGNED PER DRAWING WITH A MINIMUM OF 4" BEYOND THE INSIDE FACE OF THE HEADWALL PANEL AND SLIDED OFF AT A 1:1
2. ERECT HEADWALL PANELS AND PLACE GROUT.
3. ERECT PRECAST CONCRETE FASCIA PLATE, ANCHOR TO ARCH AS DESIGNED.

SPICE INSTALLATION NOTES:

1. CLEAR 1/8" LEVERAGE AREA TO SPICE THE ARCHES PRIOR TO ERECTION.
2. TAKING TWO ARCHES AT A TIME, SPICE REINFORCEMENT, AND ONE SPICE COLLAR, FIT THE SPICE REINFORCEMENT AND TWO "HALVES INSIDE THE SPICE COLLAR AND VERIFY EXTERNAL ARCH GEOMETRY.
3. DRILL AND PLACE BLIND WELD FIXTURES PER DESIGN.
4. ERECT ARCH INTO FINAL POSITION AND CONTINUE TO ITEM 2 OF SUGGESTED CONSTRUCTION SEQUENCE.

SHEAR BOLT INSTALLATION NOTES:

1. PLACE ARCHES AND DECKING.
2. DRILL PLACEMENT HOLES FOR EACH SHEAR BOLT SPACE PER DESIGN (NOTE: PLACEMENT HOLES SHOULD BE THE SAME DIAMETER AS THE SHEAR BOLT TO ENSURE A TIGHT FIT)
3. PRIOR TO FILLING THE ARCH WITH SELF-COOKING CONCRETE, INSTALL SHEAR BOLTS.
FINISHING NOTES:
1. ARCH MATERIALS SHALL CONFORM TO SECTION 3:
   MATERIAL SPECIFICATIONS OF AASHTO LRFD GUIDE
   SPECIFICATIONS FOR DESIGN OF CONCRETE-FILLED
   FRP TUBES FOR FLEXURAL AND AXIAL MEMBERS

2. INSTALLED SPAN MIN 20'-0" TO MAX 65'-0"
   ELEVATION OF FINISHED ABUTMENT
   LOCATOR HOLE ELEVATION
   LOCATOR REBAR HOLES PER DESIGN

APPROX. 4' OF TRIM TO BE
REMOVED BEFORE SHIPING TYP

LOW RISE ARCH DETAILS
SEE END CAGE DETAILS

ARCH LENGTH ALONG SPINE
VARIIES

VARIIES

INSTALLED SPAN MIN 20'-0" TO MAX 65'-0"
ELEVATION OF FINISHED ABUTMENT
LOCATOR HOLE ELEVATION
LOCATOR REBAR HOLES PER DESIGN

APPROX. 4' OF TRIM TO BE
REMOVED BEFORE SHIPING TYP

HIGH RISE ARCH DETAILS

ARCH LENGTH ALONG SPINE
VARIIES

VARIIES

INSTALLED SPAN MIN 20'-0" TO MAX 65'-0"
ELEVATION OF FINISHED ABUTMENT
LOCATOR HOLE ELEVATION
LOCATOR REBAR HOLES PER DESIGN

APPROX. 4' OF TRIM TO BE
REMOVED BEFORE SHIPING TYP

VARIABLE RADIUS ARCH DETAILS

ARCH LENGTH ALONG SPINE
VARIIES

VARIIES

INSTALLED SPAN MIN 20'-0" TO MAX 65'-0"
ELEVATION OF FINISHED ABUTMENT
LOCATOR HOLE ELEVATION
LOCATOR REBAR HOLES PER DESIGN

APPROX. 4' OF TRIM TO BE
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CFCC END CAGE DETAILS
NOTE: PLACEMENT DEPENDS ON ARCH END MOMENT CFCC ALWAYS PLACED ON TENSION FACE
EMBEDDMENT LENGTH AND QUANTITY IS DESIGNED PER PROJECT

PROJECT: Sample JN: YR-XXX (EG. 13020)
LOCATION: Sample
DRAWING STATUS: Sample
Correct scale on size B paper (11x17 Ledger)

TITLE: COMPOSITE ARCH BRIDGE SYSTEM
ARCH DETAILS

INITIALS DATE
DRAWN BY: TAK 2-20-2020
DESIGNED BY: ZBU 2-20-2020
CHECKED BY: KLS 2-28-2020

3/20/2020 PENNDOT DRAWING 2013-236 REV. 1

55 BAKER BLVD, SUITE 205 BREWER, ME 04412 Tel 207.573.9055 www.aitbridges.com
**FASCIA PLATE NOTES:**

1. PROJECT TO INCLUDE TWO (2) TOTAL 8' THICK PRECAST CONCRETE FASCIA PANELS
2. FINISH SURFACE TO BE NATURAL CONCRETE
3. REINFORCING: ASTM A615 GRADE 60 EPOXY COATED
4. CONCRETE SHALL BE GRADE AA, 4000 PSI, CLASS H.E.S.
5. EXPANSION ANCHORS SHALL BE MANUFACTURED ACCORDING TO ASTM B633, TYPE III STC AND SHALL COMPLY WITH A-A-1923A-416, TYPE 4, CLASS 1
6. LIFTING ANCHORS WILL BE DAYTON SUPERIOR PS2 SWIFT LIFT ANCHORS SIZE AND LENGTH AS NOTED

**SPINE OF ARCH**

**CENTERLINE OF FASCIA**

**DESIGNED PER PROJECT**

**1.0˝ OR 1.3˝ Ø FRP TUBE SLIT COLLAR AS REQUIRED PER DESIGN**

**4.25˝ CIRCUMFERENTIALLY**

**ARCH CONSTRUCTION SPlice ELEVATION**

**IF NECESSARY FOR SHIPPING**

**NOTE: LOCATION DETAILED PER DESIGN**

**ARCH CONSTRUCTION SPlice SECTION**

**IF NECESSARY FOR SHIPPING**

**NOTE: DESIGNER TO DETAIL REINFORCEMENT CAGE TO PROVIDE MINIMUM CLEAR COVER**

**ARCH CONSTRUCTION SPlice SECTION**

**IF NECESSARY FOR SHIPPING**

**NOTE: DESIGNER TO DETAIL REINFORCEMENT CAGE TO PROVIDE MINIMUM CLEAR COVER**

**FASCIA PLATE ELEVATION**