1.0 GENERAL
A. THIS WORK SHALL CONSIST OF PROCURING AND DESIGNING THE COMPOSITE ARCH BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN CONFORMITY WITH THE LINE, GRIDS, AND DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS. THE COMPOSITE ARCH BRIDGE SYSTEM IS SUPPLIED BY:

B. ADVANCED INFRASTRUCTURE TECHNOLOGIES (AIT), LLC
20 Godfrey Drive, Orono, Maine 04473
PHONE: 207.866.6526 FAX: 207.866.6501
WWW.AITBRIDGES.COM

2.0 COMPOSITE ARCH SYSTEM
A. THIS WORK SHALL BE LIMITED TO SPANS NOT TO EXCEED 65'-0" WITH A SKEW LIMIT OF 50 DEGREES FOR NON-NHS SYSTEMS

3.0 PENNDOT DRAWING NUMBER

4.0 HEADWALLS
A. THIS WORK SHALL CONSIST OF DESIGNING THE FRP DECK PANELS, FASTENERS, AND ADHESIVE FOR THE COMPOSITE ARCH BRIDGE SYSTEM IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND THESE SPECIFICATIONS.

5.0 DECK PANELS
A. THE CUSTOM PANELS ARE DESIGNED AND SUPPLIED BY AIT IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND THE AASHTO STANDARD FOR LRFD OF PULTRUDED FRP STRUCTURES TO CARRY THE REQUIRED LOADING.

6.0 DESIGN LOADS ARE IN ACCORDANCE WITH PENNDOT DM-4 AND ASHAGAIN U.30 BRIDGE DESIGN SPECIFICATIONS, PHIL-93 LIVE LOADING. ARCH DESIGN IS IN ACCORDANCE WITH THE ASHAGAIN U.30 GUIDE SPECIFICATIONS FOR DESIGN OF CONCRETE-FILLED FRP TUBES FOR FLEXURAL AND axial MEMBERS, SUPPLEMENTED BY LABORATORY TESTING AS NECESSARY.

7.0 B. SECURE DISTRICT BRIDGE AND GEOTECHNICAL (SOILS) ENGINEERS’ APPROVAL BEFORE INCORPORATING COMPOSITE ARCH BRIDGES IN ANY PROJECT.

8.0 C. PROVIDE AT NO EXPENSE TO THE DEPARTMENT FOUR SETS (THREE SETS TO DISTRICT AND ONE SET TO CENTRAL OFFICE BRIDGE DIVISION) OF THE FINAL DESIGN PLANS, THE IFM, AND THE CONTRACT DOCUMENTS.

9.0 D. ON THE FIRST SHEETS OF THE COMPUTATIONS, SHOW A PROFESSIONAL ENGINEER’S SEAL (LICENSED IN PENNSYLVANIA), SIGNATURE AND THE DATE OF COMPLETION IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

10.0 J. PROVIDE A SUITABLE DRAINAGE PIPE THAT MEETS THE DEPARTMENT STANDARD SHAPE, SIZE AND REINFORCEMENT.

11.0 ALL REINFORCEMENT BARS IN THE CURB AND PARAPET ARE TO BE EPOXY COATED.

12.0 PROVIDE A SUITABLE DRAINAGE PIPE AT REGULAR INTERVALS (NOT TO EXCEED 10'-0") ALONG THE ARCH TO RELEASE HYDROSTATIC PRESSURE.

13.0 PROVIDE PRECAST OR CAST-IN-PLACE MOMENT SLAB BARRIERS PER BC-799M.

14.0 THE BRIDGE SYSTEM AS DETAILED IN THE CONTRACT DRAWINGS. EACH COMPONENT IS CUSTOM DESIGNED, DETAILED, AND FABRICATED FOR THE SPECIFIC BRIDGE PROJECT.

15.0 A. THE CUSTOM PANELS ARE DESIGNED AND SUPPLIED BY AIT IN ACCORDANCE WITH DM-4 AND AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

16.0 B. ADVANCED INFRASTRUCTURE TECHNOLOGIES (AIT), LLC
20 GODFREY DRIVE, ORONO, MAINE 04473

17.0 0.01 S²/R
WHERE;

R = RISE OF STRUCTURE (FT)

Δ

18.0 PENNDOT DRAWING 2013-236

19.0 THIS DRAWING IS THE PROPERTY OF “ADVANCED INFRASTRUCTURE TECHNOLOGIES, LLC” (“AIT”). NO USE IS TO BE MADE OF IT WHICH IS OR MAY BE IN ANY WAY INJURIOUS TO AND/OR CONTRARY TO THE INTERESTS OF “AIT”. “AIT” MAKES NO REPRESENTATION OR WARRANTIES AS TO ANY USE OF THIS DRAWING OTHER THAN THAT OF WHICH “AIT” ORIGINALLY INTENDED. THIS COMPOSITE ARCH BRIDGE SYSTEM IS COVERED UNDER U.S. PATENT NUMBERS 7,811,459, 8,522,486, AND 8,591,765.

PREPARED BY: AIT BRIDGES 20 GODFREY DRIVE ORONO, ME 04473

INDEX OF SHEETS

NO.

1. GENERAL
2. CONSTRUCTION NOTES
3. ARCH PLAN AND ELEVATIONS
4. ARCH DETAILS
5. DECKING DETAILS
6. FASADAGE PLATE LAYOUT
7. HEADWALL AND DRAINAGE DETAIL

DRAWN BY:

TAK
3-25-2014

3-25-2014

3-25-2014

6-19-2014

CHECKED BY:

KLS

07/14 PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
RECOMMENDED

CHIEF BRIDGE ENGINEER

THOMAS M. MAECKER

MARK
DESCRIPTION
BY
CHKS
RECD
DATE
PREVISIONS

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 GENERAL/DESIGN NOTES

SHET NUMBER:

1 OF 7
1. ALL SELECT GRANULAR BACKFILL MATERIAL USED IN THE STRUCTURE VOLUME SHALL BE FREE FROM ORGANIC OR MATERIAL NOTES:

1. FORM FOUNDATIONS AND PLACE REBAR

SUGGESTED CONSTRUCTION SEQUENCE:

1. FORM FOUNDATIONS AND PLACE REBAR
2. INSERT END REINFORCEMENT GAGES INTO ARCH ENDS AND INSTALL ARCHES IN FOOTINGS
3. ATTACH DECKING TO ARCHES
4. POUR FOUNDATIONS
5. DRILL 3" HOLE AT APEX OF ARCH AND FILL ARCHES WITH SELF-CONSOLIDATING CONCRETE, CONSTRUCT IN ACCORDANCE WITH PUB 408 7.14 (h) AND SECTION 1007 FOR GUIDANCE OF FIELD USE. ACHIEVE 200 PSI STRENGTH IN FIELD CYLINDER TEST BEFORE BACKFILLING
6. ERECT HEADWALLS
7. BACKFILL STRUCTURE AND PLACE SOIL REINFORCEMENT LAYERS PER RC-12M. BACKFILL ARCH IN MAXIMUM 1'-0" LOOSE LIFTS, ALTERNATING LIFTS ON EACH SIDE OF THE ARCH TO MAINTAIN BALANCED LOADING. THE MAXIMUM DEVIATION FROM EQUAL BACKFILLING WILL BE 2'-0". ACHIEVE THE BACKFILL COMPACTION WITHIN THE 4'-0" ON EACH SIDE OF ARCH UNIT AND OVER THE TOP OF THE ARCH UNIT UNTIL IT IS COVERED TO A MINIMUM DEPTH OF 6" BY USING AT LEAST THREE PASSES WITH LIGHT MECHANICAL TAMPER, ROLLERS OR VIBRATORY SYSTEM. ACCOMPLISH BACKFILL COMPACTION WITHOUT DISTURBANCE OR DISTORTION OF THE ARCH COMPONENTS
8. INSTALL FASCIA PLATES
9. INSTALL FACEPLATE OF HEADWALL PANELS AT TOP EDGE OF ARCHES WITH AN APPROVED SEALANT PER SECTION 705.4(a) OF PUB 408

ARCH FILLING NOTES:

1. SELF-CONSOLIDATING CONCRETE MAY BE PLACED BY PUMP OR WITH A CONCRETE BUCKET AND FUNNEL
2. EACH ARCH WILL TAKE AN ESTIMATED "X" 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 2" HOLE THROUGH THE ARCH AT THE APEX, DRILL A 2" HOLE IN THE ADJACENT CORRUGATION FOR AIR VENTING.
5. ARCHES CAN BE INSPECTED FOR VOIDS AFTER FILLING BY TAPPING THE ARCH AND LISTENING FOR A HOLLOW SOUND. REPAIR IN ACCORDANCE WITH THE SPECIFICATIONS.

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MANUFACTURING AND CONSTRUCTION TOLERANCES AND INSPECTION DETAILS:

1. EACH ARCH WILL BE MEASURED TO CONFORM TO THE DIMENSIONAL TOLERANCES SPECIFIED. DIMENSIONS OUTSIDE THE FOLLOWING LIMITS WILL BE SUBJECT TO REJECTION OR REPAIR.
1.1. THE SHAPE OF THE ARCH SHALL NOT VARY FROM THE SHOP DRAWINGS BY MORE THAN 1.5" AT ANY LOCATION
1.2. THE SPAN AND RISE OF THE ARCH SHALL CONFORM TO THE DESIGN AND SHOP DRAWINGS TO WITHIN ±0.5% OF THE GIVEN DIMENSION
1.3. DIAMETER OF ALL SECTIONS OF THE ARCH SHALL CONFORM TO THE DESIGN AND SHOP DRAWINGS TO WITHIN ±2% AS MEASURED WITH A R TAPE
2. 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.
2.1. VOIDS RESULTING FROM DECOMPRESSION OF THE TOOLING
2.2. VOIDS RESULTING FROM INFUSED AIR (E.G. CAUSED BY UNCLAMPED HOSE, DRY RESIN BUCKET, ETC.)
2.3. VOIDS CAUSED BY BAG LEAKS WHICH LEAVE TRACES OF AIR IN THE INFUSED PART
2.4. UNREPAIRED DRY SPOTS LARGER THAN 2" DIAMETER
3. COMPOSITE DECK SECTION SHALL CONFORM TO CREATIVE PULTRUSIONS DESIGN GUIDE CHAPTER 8 QUALITY ASSURANCE AND STANDARD TOLERANCES

SHEAR BOLT INSTALLATION NOTES:

NOTE: FOR SKEWED BRIDGES ONLY
1. PLACE ARCHES AND DECKING
2. DRILL PLACEMENT HOLES FOR EACH SHEAR BOLT SPACED 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-CONSOLIDATING CONCRETE, INSTALL SHEAR BOLTS

SPlice INSTALLATION NOTES:

NOTE: FOR SPliced ARCHES ONLY
1. CLEAR A LEVEL AREA TO SPICE THE ARCHES PRIOR TO ERECTION
2. TAKING TWO ARCH HALVES, SPICE REINFORCEMENT, AND ONE SPlice COLLAR, FIT THE SPICE REINFORCEMENT AND TWO HALVES INSIDE THE SPICE COLLAR AND VERIFY EXTERNAL ARCH GEOMETRY
3. DRILL AND PLACE BLIND RIVET FASTENERS PER DESIGN
4. ERECT ARCH INTO FINAL POSITION AND CONTINUE TO ITEM 2 OF SUGGESTED CONSTRUCTION SEQUENCE

COMposite ARCH BRIDGE SYSTEM

PROJECT: Sample JN: YR-XXX (EG. 13020) TITLE: COMPOSITE ARCH BRIDGE SYSTEM CONSTRUCTION NOTES LOCATION: Sample DRAWING STATUS: Sample

DRAWING: TAK 3-25-2014
DESIGNED: ZBU 3-25-2014
CHECKED: KLS 6-19-2014
Correct scale on size B paper (11x17 Ledger)
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

END REINFORCEMENT CAGE LOCATION
NOTE: DESIGNED TO DETAIL
REINFORCEMENT CAGE TO PROVIDE
MINIMUM CLEAR COVER

END REINFORCEMENT CAGE PLAN VIEW
NOTE: DESIGNED AS PER PROJECT

END REINFORCEMENT CAGE SECTION

VARIES

MINIMUM OF 1.5"

TIE PER DESIGN

TIES ACCORDING TO
SECTION 709.1(f) OR 709.1(g)
OF PUB 408 PER DESIGN

LONGITUDINAL
REINFORCEMENT
ACCORDING TO
SECTION 709.1(f) OR
709.1(g) OF PUB 408 PER
DESIGN

CLEAR SPACE NOT MORE THAN 7"

PROJECT: Sample  JN: YR-XXX (EG. 13020)
TITLE: COMPOSITE ARCH BRIDGE SYSTEM
ARCH DETAILS

LOCATION: Sample

DRAWING STATUS: Sample

DRIVEN BY: TAK  3-25-2014
DESIGNED BY: ZBU  3-25-2014
CHECKED BY: KLS  6-19-2014

Correct scale on size B paper (11x17 Ledger)

20 Godfrey Drive
Orono, Maine 04473
Tel 207.866.6526
Fax 207.866.6501
www.aitbridges.com
FASCIA PLATE NOTES:
- PROJECT TO INCLUDE "X" TOTAL 1/4" THICK E-GLASS PANELS ACCORDING TO ASTM D578-98 WITH DEREKANE 610C-200 VINYL ESTER RESIN

FIELD TRIM TO MATCH FOOTING

FASTEN TO HEADWALL PANEL WITH 1" STAINLESS STEEL SELF-DRILLING SCREWS (3 PER PLATE) ASTM F593 LOCATED PER DESIGN

ARCH LENGTH ALONG SPINE REQUIRES "X" PANELS PER SIDE

FASCIA PLATE INSTALLATION ELEVATION

ASTM A307 3/8" HUCK BA-BOM R10-14 BLIND RIVET WITH ASTM F436 1-1/2" Ø WASHER

4.25" CIRCUMFERENCE TUBING SLIT COLLAR AS REQUIRED PER DESIGN

1/4" OR 1/2" Ø FRP TUBE SLIT COLLAR AS REQUIRED PER DESIGN

2 1/8" EDGE DISTANCE

LIMITS OF MATING ARCH HALVES

PER DESIGN

ARCH CONSTRUCTION SPLICE ELEVATION

SPRING REINFORCEMENT ACCORDING TO SECTION 709.1(f) OR 709.1(g) OF PUB 408

LONGITUDINAL REINFORCEMENT ACCORDING TO SECTION 709.1(f) OR 709.1(g) OF PUB 408

ELEVATION OF FINISHED ABUTMENT LOCATOR HOE ELEVATION

FASCIA PLATE JOINT CENTERED AT CROWN

FASCIA PLATE JOINT TYP

BLIND RIVETS ACCORDING TO ASTM F436 PER DESIGN

NOTE: LOCATION DETAILED PER DESIGN

IF NECESSARY FOR SHIPPING

IF NECESSARY FOR SHIPPING

PROJECT: Sample JN: YR-XXX (EG. 13020)
LOCATION: Sample
DRAWING STATUS: Sample
TIE: COMPOSITE ARCH BRIDGE SYSTEM
FASCIA PLATE LAYOUT

DRAWN BY: TAK 3-25-2014
DESIGNED BY: ZBU 3-25-2014
CHECKED BY: KLS 6-19-2014

Correct scale on size B paper (11x17 Ledger)