DESIGN METHODOLOGY (CONTINUED)

1. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

2. GEOSTRUCTURAL PROVISIONS: INTERIM IMPLEMENTATION GUIDES

3. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

4. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

5. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

6. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

7. LOAD & RESISTANCE FACTOR DESIGN METHODOLOGY
   a) ENSURING RESISTANCE FACTOR SOIL ON SOIL < 1.0 GLOBAL STABILITY FACTOR OF SAFETY = 1.5
   b) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE INTERNAL STABILITY FACTOR OF SAFETY = 1.5
   c) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0
   d) ENSURING RESISTANCE FACTOR SOIL ON CONCRETE + STRUCTURAL REINFORCEMENT TENSION FACTOR OF SAFETY = 3.0

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GEOSYNTHETIC REINFORCED SOIL INTEGRATED BRIDGE SYSTEM NOTES

RECOMMENDED:
APR. 29, 2016
BD-697M
WINGWALLS FOLDED OUT FOR ELEVATION VIEW.

RSF CMU BLOCK FACE

SOLID CMU TOP ROW

GALVANIZED REBAR #4 EPOXY OR WALL FILL CONCRETE BLOCK

WALL FILL CONCRETE FILLED HOLLOW CMU, REBAR

DEFLECTION GUIDERAIL

ABUTMENT WIDTH (L) SUPERSTRUCTURE WIDTH (B)

GUIDERAIL TYPES DEPENDENT ON BRIDGE

GUIDERAIL TRANSITION DEPENDENT ON BRIDGE RAIL TYPE

MASONRY BLOCKS)

PRECAST COLOR TREATED CMU AREA

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION INTEGRATED BRIDGE SYSTEM

PREFERRED SHEET 3 OF 4

PLAN AND ELEVATION (ISOMETRIC VIEW)

TYPICAL BEAM SEAT

ELEVATION VIEW

GRS-IBS ABUTMENT

NOTES

1. INSERT #4 REBARS INTO THE TOP 3 ROWS OF CMU'S AND ALL ROWS OF CORNER CMU'S ABOVE THE RIPRAP LINE AND FILL WITH CONCRETE.

2. SUPERSTRUCTURE CROWN OR SUPERELEVATION CAN BE PROVIDED BY GRADING TO MATCH THE REINFORCED FILL PROVIDING REINFORCEMENT FOR FULL TRAVEL SPEEDS LESS THAN 6 FPS including TOP OR GROIN REINFORCEMENT FOR GEOSYNTHETIC, AND INDIVIDUALLY PERFORATION OR CUTTING BLOCKS TO MATCH GRADE USING A CONCRETE CUT-OFF OR CIRCULAR SAW

3. ADJUST LENGTH AND ANGLE OF WINGWALLS FOR SITE SPECIFIC CONSIDERATIONS. MINIMUM LENGTH CONSIDERATION SHOULD INCLUDE PERFROMING PERMISABLE CUTTING OF THE WINGWALLS ON SHOULDER AVOIDING THE EFFECTS OF ESTIMATED CHANNEL MIGRATION.

4. IF RSF IS NOT USED BENEATH THE WINGWALLS, THEN ADDITIONAL REINFORCEMENT SHOULD BE PERMIERED TO DETERMINE THE STABILITY OF THE WINGWALLS.

5. CMU BLOCKS ARE STAGGERED, INCLUDING CORNERS, SO THERE ARE NO VERTICAL JOINTS GREATER THAN 1 CMU BLOCK HEIGHT.

6. CMU BLOCKS ARE STAGGERED, INCLUDING CORNERS, SO THERE ARE NO VERTICAL JOINTS GREATER THAN 1 CMU BLOCK HEIGHT.

7. GUIDERAIL, TYPE AND LOCATION TO BE DESIGNED BY OTHERS IN ACCORDANCE WITH REQUIRED SAFETY STANDARDS.

8. WHEN NECESSARY, GRADE A DRAINAGE OFFSET FROM THE TOP OF THE WINGWALL AND LINED WITH GEOTEXTILE AND TOP OF GRADED FILL WITH GEOTEXTILE, AND INDIVIDUALLY COVERING OF CORNER CMU'S ABOVE THE RIPRAP LINE AND FILL WITH CONCRETE.

9. SET WINGWALL HEIGHT A MINIMUM OF 6" BELOW THE ROADWAY SURFACE TO ALLOW FOR DRAINAGE AWAY FROM THE ROADWAY.

COMONWEALH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD GEOSYNTHETIC REINFORCED SOIL INTEGRATED BRIDGE SYSTEM PLAN AND ELEVATION BD-697M

APR.29, 2016

APR.29, 2016
**SECTION A-A**

**BEAM SEAT & INTEGRATED APPROACH DETAIL**

- **NOTES**
  1. FINISH CONCRETE FILL AT TOP OF CMU'S UNDER BRIDGE SUPERSTRUCTURE.
  2. ON TOP ROW OF CMU'S CREATE A MORTAR CAPping APPROXIMATELY 1/3 THICK. SEE DETAIL ON SHEET 4.
  3. THE SOLID CMU IN BEAM SEAT MUST ENGAGE THE UPPER-MOST CONCRETE FILLED CMU FEACING BY 1/3 OF THE BLOCK HEIGHT.
  4. WATERPROOFING METHODS ARE DEPENDENT ON THE SUPERSTRUCTURE TYPE BUT CAN INCLUDE PROTECTIVE OR EXTERNAL WATERPROOFING.
  5. PRIMARY WRAP REINFORCEMENT VERTICAL SPACING FOR THE INTEGRATED APPROACH IS A MAXIMUM OF 12 INCHES.
  6. ON TOP ROW OF CMU'S CREATE A MORTAR CAPping APPROXIMATELY 1/3 THICK. SEE DETAIL ON SHEET 4.
  7. DEPTH DESIGNED TO SATISFY INTERNAL STABILITY WITH MINIMUM OF 5 LAYERS OF BEARING BED REINFORCEMENT.
  8. PRIMARY WRAP REINFORCEMENT VERTICAL SPACING FOR THE INTEGRATED APPROACH IS A MAXIMUM OF 12 INCHES.

- **LEGEND**
  - REINFORCED BACKFILL MATERIAL
  - ROAD BASE AGGREGATE
  - PAVEMENT
  - RIPRAP
  - HOLLOW CONCRETE MASONRY UNIT (CMU)
  - PIGMENTED SOLID CONCRETE MASONRY UNIT (CMU)
  - CONCRETE FILLED CONCRETE MASONRY UNIT (CMU)

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**STANDARD**
**GEO SYNTHETIC REINFORCED SOIL**
**INTEGRATED BRIDGE SYSTEM**

**DETAILS**

- **APR.29, 2016**

**RECOMMENDED APR.29, 2016**
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**BD-697M**