

GENERAL NOTES

1. GENERAL

1.1 The design presented herein is based on the AutoCAD and MicroStation versions of the project plans prepared by SSFM International, Inc., provided on November 14, 2012, revised wall and bridge elevations provided by SSFM on February 20, 2013 and the provided bid documents for FHWA Project No. HI A-AD 6(7).

1.2 Location of the proposed Geosynthetic Reinforced Soil - Integrated Bridge System (GRS-IBS) shall be based on the abutment and wall layout in the project documents.

1.3 The Contractor shall verify the location of proposed and existing underground features prior to any grading or excavation.

1.4 Locations and elevations of CMU blocks, reinforcement, and reinforced soil foundation (RSF) shall be periodically verified by the Contractor during and at completion of construction.

2. MATERIALS

2.1 Concrete Masonry Units (CMU), RSF, extensible reinforcement, and backfill shall be installed in accordance with the Project Specifications and the manufacturer's construction guidelines.

2.2 Wall facing shall be hollow core, split face CMU block with dimensions of 7-5/8 inch in height, 15-5/8 inch in face width, and 7-5/8 inch in depth. Color shall be approved by the Owner.

2.3 All CMU blocks shall have a minimum 28-day compressive strength of 4,000 psi. The concrete shall have a maximum moisture absorption rate of 5.0 percent.

2.4 All blocks shall be sound and free of cracks or any other defects that would not allow proper construction or affect the strength of the wall. All face units shall be free of imperfections when viewed by the Contract Officer from a distance of 10 feet.

2.5 See Sheets S10 through S13 for type and lengths of soil reinforcement. Soil reinforcement shall be Mirafi HP570 woven polypropylene geotextile with a minimum ultimate tensile strength (Tult) of 4,800 lbs/ft and a minimum tensile strength at 2% strain of 960 lbs/ft in both the machine direction and the cross direction.

2.6 All blocks and geotextile shall be stored, handled, and installed according to manufacturer's specifications.

2.7 Reinforced Backfill, Reinforced Soil Foundation (RSF) fill, retained backfill, and integrated approach fill shall consist of crushed aggregate meeting the requirements of FHWA Grading C (Base) with a minimum friction angle of 42 degrees. The RSF and integrated approach shall be constructed to the dimensions provided on the detail drawings. The gradation, plasticity, and friction angle of Grading C (Base) shall be verified prior to construction.

2.8 All wall backfill materials shall be approved by the Owner or Contract Officer prior to construction.

2.9 CMU block fill shall consist of FHWA FP-03 552.03 Class C Concrete with a minimum 28-day compressive strength of 4,000 psi.

2.10 Steel reinforcement shall be Grade 60 epoxy coated No. 4 dowels and conform to ASTM A615.

2.11 Erosion control on wing wall slopes shall consist of EXCEL CC-4 or approved equal and shall be placed to the extents of the limits of reinforcement as shown on the drawings in accordance with the manufacturer's recommendations.

3. EXCAVATION AND SUBGRADE PREPARATION

3.1 Subgrade soils below the abutment and wing walls shall be excavated to a minimum depth of 5 feet below the bottom of wall and replaced with properly moisture treated and compacted FHWA Grading C (Base). Grading C (Base) shall be compacted in accordance with FHWA Standard Specifications (FP-03) Section 204.11.

3.2 The excavation shall be carried to the extents necessary to place geotextile at the required lengths.

3.3 Temporary excavation slopes shall be graded in accordance with OSHA's guidelines.

3.4 Subgrade shall be excavated as required for placement of the RSF and wall backfill as shown on the design drawings or as directed by the Contract Officer.

4. CONSTRUCTION

4.1 Construction shall be in accordance with Chapter 7 of Geosynthetic Reinforced Soil - Integrated Bridge System, Interim Implementation Guide, Publication No. FHWA-HRT-11-026, June, 2012.

4.2 Reinforced backfill and retained backfill shall be placed in uniform lifts not to exceed 8 inches in compacted thickness, graded to nearly level, and compacted in accordance FHWA Standard Specifications (FP-03) Section 204.11.

4.3 RSF and integrated approach fill shall be placed in uniform lifts not to exceed 6 inches in compacted thickness, graded to nearly level, and compacted in accordance with FHWA Standard Specifications (FP-03) Section 204.11.

4.4 Only light weight hand-operated compaction equipment shall be used within 1 foot behind the facing units and in the bearing reinforcement zone where vertical geotextile spacing is less than 4 inches. Downward pressure should be exerted on CMU block during compaction operations to prevent lateral displacement of the block.

4.5 The first course of blocks shall be placed on the geotextile wrapped RSF. Blocks shall periodically be checked for proper elevations. If necessary, a maximum 1/2-inch layer of fine aggregate may be used to aid in leveling of the first course of block. Check level and plumbness of block every other course and correct deviations greater than 1/4 inch.

4.6 CMU block shall be placed in a running bond pattern.

4.7 Geotextile reinforcement shall be placed according to the design drawings and manufacturer's recommendations.

4.8 Geotextile reinforcement shall be laid horizontally on properly compacted level backfill. The geotextile must be pulled taut and anchored prior to backfill material placement on the geotextile. Backfill shall be placed from the front of wall to the back.

4.9 Geotextile reinforcement will be continuous for their embedment length. Spliced connections will not be allowed parallel to the wall face. Spliced connections perpendicular to the wall face shall overlap a minimum of 24 inches.

4.10 A 2-inch layer of reinforced backfill material shall be placed between two layers of geotextile in the overlapping areas.

4.11 Construction equipment shall not be allowed to operate directly upon geotextile. A minimum of 6 inches of backfill must be placed prior to operation of rubber-tired vehicles over the geotextile at speeds less than 5 miles per hour with no sudden braking or sharp turning. Tracked equipment shall not operate in the geotextile reinforced zone.

4.12 Following the placement of the superstructure, place geotextile for the integrated approach. Geotextile layers shall be wrapped with a minimum overlap of 4 feet. Maximum vertical spacing of geotextile layers shall be 12 inches. Final wrap shall be approximately 2 inches below the top of the superstructure to allow at least 2 inches of aggregate base cover to protect it from hot mix asphalt.

4.13 Any damage to the geotextile such as rips, tears, or punctures, that affects the strength of the wall shall be replaced as directed by the Contract Officer.

4.14 No changes to the geotextile layout, length, type, or elevation shall be made without approval from the Design Engineer.

4.16 Top three courses of block shall be pinned and concrete filled as shown on the Plans. After the the block voids are filled, a thin layer of the same mix of concrete shall be placed on the top course of blocks to form a coping cap. The coping shall then be hand troweled round and sloped to drain.

5. DRAINAGE

5.1 The wall system and the surrounding areas must be kept relatively dry at all times during and after the construction.

5.2 In no case should surface runoff be allowed to enter the wall construction areas or water be ponded around the wall during construction.

5.3 At the end of construction day, the Contractor shall slope the last lift of reinforced backfill away from the wall facing to rapidly direct runoff away from the wall face.

5.4 Excavation slopes shall also be protected against erosion to reduce the potential for sloughing and slope failure.

6. QUALITY ASSURANCE

6.1 Quality assurance shall be performed in accordance with the contract documents.

7. DESIGN CRITERIA

7.1 AASHTO LRFD Bridge Design Specifications, 5th Edition.

7.2 FHWA Geosynthetic Reinforced Soil - Integrated Bridge System, Interim Guide, Publication No. FHWA-HRT-11-026, June 2012.

7.3 Design parameters used for GRS wall design:

Material Type	Friction Angle (degrees)	Cohesion (psf)	Unit Weight (pcf)
FHWA Grading C Base	42	0	135
Embankment Fill	28	0	90
Volcanic Ash	26	0	60
Basalt/Clinker	30	100*	125

* Used in Global Stability Analysis only

7.4 Long Term Design Strength of Geotextile

RFglobal	2.25
LTDS = TF / RFglobal	

7.5 Internal Stability

Criteria	Load Factor
Vertical Earth Pressure	1.35
Live Load Surcharge	1.75 *
Dead Load Surcharge	1.50 *
Components	1.25 *

* Same for external stability

Reinforcement	Resistance Factor
Strength	0.90

7.6 External Stability

Criteria	Load Factor
Horizontal Earth Pressure	1.50
Sliding and Eccentricity	1.00
Bearing Pressure	1.35
Seismic	1.00

Stability Mode	Resistance Factor
Sliding	1.00
Bearing Resistance	0.65

7.7 Global Stability Factor of Safety = 1.5

REGION	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
	HI	HI A-AD 6(7)	S9	S16

8. ABBREVIATIONS

BG	Finish Grade at bottom of wall
BW	Bottom of Wall at top of RSF
DIA	Diameter
EQU	Equivalent
H	Design Wall Height
MAX	Maximum
MIN	Minimum
MOD	Modified
NTS	Not to Scale
O.C.	On Centers Spacing
STA	Station Number
TW	Top of Wall at top of uppermost block
TG	Finish Grade at top of wall

9. INDEX OF DRAWINGS

Sheet S9	Wall General Notes
Sheet S10	Wall A Plan and Profile 01
Sheet S11	Wall A Plan and Profile 02
Sheet S12	Wall B Plan and Profile 01
Sheet S13	Wall B Plan and Profile 02
Sheet S14	Typical Abutment Section
Sheet S15	Typical Wing Wall Section
Sheet S16	Typical Wall Details

10. WALL FACE AREA

Wall A	2,272 SF
Wall B	2,251 SF
Total	4,523 SF

BUILT DRUGS/SPECIFICATIONS

This certifies that the dimensions and details shown on this sheet reflect the dimensions and details and specifications as constructed in the field.

GOODFELLOW BROS., INC.
Contractor's Name:

Signature: *[Signature]* Date: 1/2/14



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Signature: *[Signature]*

SIGNATURE: *[Signature]* EXPIRATION DATE OF THE LICENSE: 04/30/14

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

GRS-IBS
WALL GENERAL NOTES

APPROVED FOR CONSTRUCTION

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								J.ARTHURS	H.SIDERS	H.H.CHIANG	NOT TO SCALE	9 of 16	MARCH 2013	-

GROUND
ENGINEERING CONSULTANTS