Index D6025 GRS-IBS

Design Criteria

FHWA-HRT-11-026 "Geosynthetic Reinforced Soil Integrated Bridge System Interim Implementation Guide"; ***Structures Design Guidelines*** (***SDG***)

Design Assumptions and Limitations

Design GRS-IBS in accordance with ***SDG 3.13.4***. Include these additions and modifications while using the Design Methods presented in Appendix C of the ***FHWA-HRT-11-026 "Geosynthetic Reinforced Soil Integrated Bridge System Interim Implementation Guide"***.

The use of these Developmental Design Standards will typically be restricted by the SDO and not approved for use on limited access facilities, four-lane roadways with high ADT, water crossings subject to stream flow in excess of 7 ft/sec, or locations with sufficient wave action to displace scour countermeasures.

When using these Developmental Design Standards, the designer must request Developmental Specification Dev549 from the District Specifications Office.

This Developmental Design Standard is for use only with standard CMUs having nominal dimensions of 8" x 8" x 16"; therefore, if other block types and/or dimensions are desired (e.g. those used for Modular Block Walls), provide project specific designs in the plans.

Details presented in this Developmental Design Standard are intended for use with flat slab type superstructures. Standardized details will be developed for beam type superstructures in the future.

Plan Content Requirements

Insert the entire ***Developmental Design Standards*** Index, received from the Central Office monitor, into the appropriate component plan set in accordance with ***PPM***, Volume 2, Section 3.8.

In the Structures Plans:

A full height block is typical in front of the bearing seat; however, a half-height block and/or special height polystyrene board may be required to accommodate elevations. If this is required, show project specific details in the plans.

When specifying color, do not specify "brick red" for the textured blocks if scour countermeasures are shown. "Brick red" is reserved for the solid blocks hidden by the scour countermeasure in order to assist Maintenance in determining effectiveness of the countermeasure.

Where beam type superstructures are used, show project specific details in the plans for grade beam and backwall. In these cases, expansion joints will be required between the backwall and bridge deck.

When a backwall is used, Begin/End Bridge Stations will be at FFBW. Otherwise, Begin/End Bridge Stations will be located at ends of the superstructure.

Show details for filling CMU with concrete and rebar for special locations such as corners of wingwall and face of abutment.

Complete the following data tables and notes and include them in the plans. Use additional sheets as necessary. Supplemental details and notes to Standard Drawings and Tables are permitted as required to address special conditions. Include these items in the plans. However, the data tables themselves should not be modified when using Standard Drawings. See Introduction I.3 for more information regarding use of Data Tables.

Detail scour countermeasures in Data Table as follows:

When detailing scour countermeasures, indicate Finish Grade Elev. as "N/A".

Indicate the contraction scour elevation as the Scour Elev. in the data table. Indicate the countermeasure type and finish slope in the notes. Ensure the finish slope and EL. RR provide for at least 2.5 feet of cover over RSF when Bank and Shore Riprap is used. When scour design procedures do not apply, indicate "N/A".

GRS-IBS DESIGN DIMENSIONS									Table Date 03-30-12
LOCATION			WALL GEOMETRY						
WALL NO.	FFGW (Station)	BEGIN/END BRIDGE (Station)	SKEW ANGLE	L_A (FT)	α_A (Deg)	L_B (FT)	α_C (Deg)	L_C (FT)	S (FT)
1									
2									

Note to Designer:
The Geotechnical Engineer shall provide the values within the red boxes designated below in a signed and sealed report to the Structural Engineer.

GRS-IBS DESIGN DIMENSIONS																						Table Date 03-30-12
RSF					GRS				BEARING BED				BEAM SEAT						GRS TRANSITION			
WALL NO.	x_{RSF} (FT)	B_{RSF} (FT)	D_{RSF} (FT)	INTERMEDIATE REINFORCEMENT VERTICAL SPACING	H (FT)	B (FT)	L (FT)	LAYER THICKNESS (IN)	B_r (FT)	D_r (FT)	NO. OF INTERMEDIATE REINF. LAYERS	LAYER THICKNESS (IN)	a_b (IN)	b (FT)	d_e (IN)	D_b (FT)	NO. OF LAYERS	LAYER THICKNESS (IN)	D_t (FT)	NO. OF LAYERS	LAYER THICKNESS (IN)
1																					
2																					

TABLE OF ELEVATIONS														Table Date 03-30-12
WALL NO.	EL. A	EL. B	EL. C	EL. D	EL. E	EL. F	EL. G	EL. H	EL. J	EL. K	EL. L	EL. RR	Scour Elev.	Finish Grade Elev.
1														
2														

NOTE: Work this sheet with Developmental Design Standard Index D6025.

GRS-IBS QUANTITIES[1]			
WALL NO.	GRS BACKFILL (CU YD)	RSF FILL (CU YD)	GRADED AGGREGATE (CU YD)
1			
2			

(1) The estimated materials quantities correspond to the dimensions on the accompanying plan sheets. Deviation from the dimensions on the plan sheets will void the quantities.

CMU COLORS:
Hollow, textured CMU = _____ (color # / none)
Solid, smooth-faced CMU = Brick Red

CMU TEXTURE:
For hollow, textured CMU, provide Split Face texture.

SCOUR COUNTERMEASURE:
Scour Protection Type: _____
Finish Slope: _____

DESIGN LOADS:
Combined load: Superstructure (qLL + qB) ___ TSF maximum (factored design load).
___ TSF maximum (service load).
Roadway live load surcharge: ___ psf uniform vertical.

SOIL PROPERTIES:
GAB unit weight = 140 pcf.
GRS backfill: Unit weight = 115 pcf, friction angle = 38°, cohesion = 0 psf
Retained backfill: Unit weight= ___ pcf, friction angle= ___°, cohesion = ___ psf
Foundation soil: Unit weight = ___ pcf (submerged), friction angle = ___°, cohesion = ___ psf

GEOSYNTHETIC REINFORCEMENT:

All Reinforcement:
Use only reinforcement approved for use in Steepened Slopes (Approved Application Usage 1 or 3)
RSF:
Use woven geotextile with a maximum AOS of 0.035 in. and the following minimum strength:
T_{ult} = _____ lb/ft (both machine and cross directions).
All Other Reinforcement:
Use geogrid or woven geotextile having the following minimum strengths:
T_{ult} = _____ lb/ft (both machine and cross directions).
$T_{2\%}$ = _____ lb/ft (both machine and cross directions).

Payment

Item number	Item description	Unit Measure
549-1	GRS Retaining Wall	SF
549-2	GRS Bridge Abutment	SF
549-3	Gravel Fill	CY