Index 6020 Permanent MSE Retaining Wall Systems

Design Criteria

AASHTO LRFD Bridge Design Specifications, 6th Edition; ***Structures Design Guidelines (SDG)***; AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), ***Insitu Soil Improvement Techniques***, January 1990.

Design Assumptions and Limitations

1. It is the responsibility of the Engineer of Record to determine that the maximum factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
2. The wall Company is responsible for the internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer of Record.
3. If there are manholes and/or drop inlets present, design and analysis for both internal and external stability shall be considered. See ***SDG*** Chapter 3 for more details.
4. When a slope is necessary at the base of the front face of the retaining wall, and a flat area meeting the requirements of ***PPM*** Vol. 1, Section 2.4 (10'-0" Min.) cannot be provided, then the flat area can be reduced up to a minimum of 4'-0".

Plan Content Requirements

In the Structures or Roadway Plans:

Prepare Wall Control Drawings and related drawings as specified in ***SDM*** Chapter 19 and ***PPM*** Vol. 1, Chapter 30, and include them in the plans.

Complete the following Data Tables using the following instructions and include the Data Tables on the retaining wall supplemental detail sheets. See Introduction I.3 for more information regarding use of Data Tables.

1. Complete the Notes and add/modify/delete as necessary.
2. List each wall in Note 3 separately, showing applicable wall systems.
3. Complete the "Geotechnical Information" table based on project soil conditions. See ***SDG*** Chapter 3 for required design based internal friction angle and unit weight of Reinforced Soil and Random Backfill.
4. Complete the "Retaining Wall Variables" and "Soil Reinforcement Lengths for External Stability" tables based on project requirements. If the Design High Water Elevation (DHW) is above the adjacent ground surface, include the elevation in the "Retaining Wall Variables" table. Otherwise include "N/A" in the appropriate column in the table. DHW refers to the Mean High Water, Normal High Water or other controlling high water elevation adjacent to the wall. The Wall Heights in the "Soil Reinforcement Lengths for External Stability" table refer to the height above the leveling pad, measured to the top of the wall coping. See ***SDG*** Chapter 3 Figures for details.

5. Transverse Differential Settlement is only applicable for widening of existing embankments.
6. Include the pay item for Polyethylene Sheeting on Concrete Piles per Specification 459 (to minimize downdrag) for all piles and drilled shafts that are located within the wall limits.

PERMANENT MSE RETAINING WALL SYSTEM DATA TABLES

GEOTECHNICAL INFORMATION						Table Date 1-01-11
		Reinforced Soil & Random Backfill	Loose Fine Sand	Firm Fine Sand	Loose Clayey Fine Sand	Firm Clayey Fine Sand
Depth Below Existing Ground Line (ft.)	Wall No. 1	—				
	Wall No. 2	—				
Effective Unit Weight (pcf)						
Cohesion (psf)		0				
Internal Friction Angle						

NOTE:
If the unit weight and/or internal friction angle of the fill proposed by the Contractor differs from that shown above, the Project Engineer will contact both the District Geotechnical Engineer and the Wall Designer for a possible redesign.

RETAINING WALL VARIABLES					Table Date 7-01-13
Wall No.	Wall Settlement				Design High Water Elevation (ft.)
	Long Term Settlement (in.)	Short Term Settlement (in.)	Differential Settlement		
			Longitudinal (%) (ft./100ft.)	Transverse (in.)	
1				N/A	
2				N/A	

NOTE:
Design walls for the settlements noted in the table.
Long term settlement is measured from the end of wall fill placement.
Transverse differential settlement is measured from the face of wall to the end of the soil reinforcement.

SOIL REINFORCEMENT LENGTHS FOR EXTERNAL STABILITY												Table Date 1-01-11
Wall No. 1	Wall Height (ft.)											
	Reinforcement Length (ft.)											
	Factored Bearing Resistance (psf)											
Wall No. 2	Wall Height (ft.)											
	Reinforcement Length (ft.)											
	Factored Bearing Resistance (psf)											

NOTES:
1. The reinforcement strap lengths shown above are the minimum lengths required for external stability. The reinforcement lengths used in the construction of the retaining walls will be the longer of that required for external or internal stability (determined by proprietary wall companies).
2. The Factored Bearing Resistances shown above are the critical (lowest) values from all the load cases analyzed using LRFD methodology.

NOTES [Notes Date 01-01-16]:

1. Concrete facing panel surfaces treatment will be _____ .
2. If required, the soil reinforcement and fasteners for the abutment back wall will be designed and furnished by the proprietary wall company. The soil reinforcement will be designed to resist a factored horizontal load of _____ kips/ft. of back wall width. The cost of soil reinforcement and fasteners (if required) will be included in the cost of the Retaining Wall System.
3. Applicable FDOT Wall Types for each wall location are listed below. See the Approved Products List for approved Wall Systems and Design Standards Index No. 6020 for allowable Wall Type substitutions.
   Wall No. 1 – FDOT Wall Type _____
   Wall No. 2 – FDOT Wall Type _____
4. Concrete for Coping and/or Junction Slab shall be Class _____ (f'c = _____ psi) with/without silica fume, metakaolin or ultrafine fly ash.
5. See Design Standards Index. No. 6020 for General Notes and Details.

Payment

Item number	Item description	Unit Measure
548-12	Retaining Wall System, Permanent, Excluding Barrier	SF
548-14	Retaining Wall System, Permanent - Widening, Attached To Existing Wall	SF
459-71	Polyethylene Sheeting on Concrete Piling	SY

Commentary: See Instructions for Design Standards Index 6100 Series for Traffic Railing/Junction Slab Pay Items as required.