General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
2023 AASHTO Guide Specifications for LRFD Seismic Bridge Design (3rd Ed.)

Choose one
- Seismic Design Category = A (Seismic Zone - 1)
- Seismic Design Category = B (Seismic Zone - 2) (Seismic Analysis No Seismic Analysis)
- Seismic Design Category = C (Seismic Zone - 3) (Seismic Analysis No Seismic Analysis)
- Seismic Design Category = D (Seismic Zone - 4) (Seismic Analysis)

Design earthquake response spectral acceleration coefficient at 1.0 second period, S_{D1} <0.15 = _ _
(13) Acceleration Coefficient (effective peak ground acceleration coefficient), A_S = _

Design Loading:

For strength limit state and extreme event limit state, the wall designer to confirm that the minimum Capacity to Demand Ratio (CDR) for bearing, sliding, overturning, eccentricity, and internal stability is greater than or equal to 1.0. MSE wall designer shall include this note on shop drawings.

For Extreme Event I limit state, the wall designer shall design wall for γ_{EQ} = 0.5

Φ_b = ° and Unit weight, γ_b = pcf for retained backfill material to be retained by the mechanically stabilized earth wall system.

(3)
- Φ_f = ° for unimproved foundation ground where wall is to bear.
- Φ_f = ° for improved foundation ground where wall is to bear.

For unimproved foundation ground, factored bearing resistance is ___ ksf for strength limit state and factored bearing resistance is ___ ksf for extreme event limit state.

For improved foundation ground, factored bearing resistance is ___ ksf for strength limit state and factored bearing resistance is ___ ksf for extreme event limit state.

The maximum applied factored bearing stress for the strength and extreme event limit state(s) at the foundation level shall be shown on the shop drawings and shall be less than the factored bearing resistance.

(3) Factored bearing resistance and limits of improved foundation ground shall be used as shown on the plans. No adjustments are allowed.

Contractor shall include design Φ_f (actual $\Phi_f \geq 34°$) and the total unit weight, γ_f, for the select granular backfill (reinforced backfill and wedge area backfill) for structural systems on shop drawings. Contractor shall identify source of select granular backfill material, submit proctor in accordance with AASHTO T 99 (ASTM D698) and gradation with the shop drawings. When backfill material is too coarse to develop a proctor curve the contractor shall determine the maximum dry density (relative density) in accordance with ASTM D4253 and ASTM D4254 and assume percent passing the 200 sieve for optimum water content.

Total unit weight, γ_f = (95% compaction) x (maximum dry density) x (1 + optimum water content)

Design Φ_f = 34°for the select granular backfill (reinforced backfill) for structural systems.

(7) Seismic analysis provisions shall not be ignored for MSE wall design.

(8) No-Seismic-Analysis provisions may be considered for MSE wall design in accordance with LRFD 11.5.4.2.

(4) Use default values for the pullout friction factor, F^*, in accordance with LRFD figure 11.10.6.3.2-2 and default value for scale effect correction factor, α, in accordance with LRFD table 11.10.6.3.2-1. For approved steel strips not shown in LRFD figure 11.10.6.3.2-2, use $F^* \leq 2.0$ at zero depth and $F^* \leq \text{Tan } \Phi_f$ at 20 feet depth and Φ_f design = 34°. F^* and α values shall be shown on the shop drawings.

Design Unit Stresses:

All concrete for leveling pad and coping shall be Class B or B-1 with f'c = 4000 psi.

The minimum compressive strength of concrete for precast modular panel precast modular (drycast and wetcast) block shall be 4,000 psi in accordance with Sec 1052.

Excavation:

Excavation quantities and pay items are given on the roadway plans. Excavation quantities are based on a soil reinforcement length of (2) ft. The soil reinforcement length may vary based upon the wall design selected by the contractor. Plan excavation quantities will be paid regardless of any actual quantities removed based on the soil reinforcement length and design selected.

(9) The MSE wall system shall be built vertical.

The MSE wall system shall be built in accordance with Sec 720.

The MSE wall system shall be a drycast modular block or wetcast modular block precast modular panel wall system.

(11) The cost of joint filler and joint seal, complete in place, will be considered completely covered by the contract unit price for Concrete Traffic Barrier (Type B D). See Roadway Plans.

Precast modular panel, drycast modular block, wetcast modular block and coping (or capstone) reinforcement shall be epoxy coated.

A filter cloth meeting the requirements for a Separation Geotextile material shall be placed between the select granular backfill for structural systems and the backfill being retained by the mechanically stabilized earth wall system.

(4) Coping shall be required on this structure. When CIP coping sections extend beyond the limits of a single panel, bond breaker (roofing felt or other approved alternate) between wall panel and coping is required. Coping joints shall use 3/4-inch chamfers and shall be sealed with 3/4-inch joint filler. Coping reinforcement shall terminate 1 1/2-inch minimum from face of coping joint.

(10) The top and bottom elevations are given for a vertical wall. The height of the wall shall be adjusted as necessary to fit the ground slope and the concrete leveling pad shall be adjusted as necessary to account for the wall batter. If a fence is built on an extended gutter, then the height of the wall shall be adjusted further.

The baseline of the wall shown is for a vertical wall. This baseline shall correspond to Elevation _____.

The contractor shall be solely responsible to coordinate construction of the wall with bridge and roadway construction and ensure that the bridge and roadway construction, resulting or existing obstructions, shall not impact the construction or performance of the wall. Soil reinforcement shall be designed and placed to avoid damage by pile driving, guardrail post installation, utility and sign foundations. (See Roadway and Bridge plans.)

(4) Minimum 18" wide geotextile strips shall be centered at vertical and horizontal joints of panel. Geotextile material shall be adhered to back face of panel using an adhesive compound supplied by the manufacturer. All edges of each fabric strip shall provide a positive seal. A minimum 12" overlap shall be provided between spliced filter fabric.

Aluminized soil reinforcement shall have edges coated with coating material per manufacturer.

Soil reinforcement shall be spaced to avoid roadway drop inlet behind wall.

(1) Upper two layers of soil reinforcement shall be extended 3 feet beyond the lower layers when wall height is greater than or equal to 10 feet.

(5) All steel soil reinforcements shall be separated from other metallic elements by at least 3 inches.

(6) The splay angle should be less than 15° and tensile capacity of splayed reinforcement shall be reduced by the cosine of the splay angle. Soil reinforcement shall clear the obstruction by at least 3 inches.

No reinforcement shall be left unconnected to the wall face or arbitrarily cut/bent in the field to avoid the obstruction.

Where interference between the vertical obstruction and the soil reinforcement is unavoidable, the design of the wall near the obstruction may be modified using one of the alternatives in FHWA-NHI-10-024, Section 5.4.2. Show detail layout on the drawings. For wall designs with horizontal obstructions in reinforced soil mass, see FHWA-NHI-10-024, Section 5.4.3.

(12) Contractor shall be responsible for the internal stability, external stability, compound stability, and overall global stability of the temporary MSE wall structure. The soil parameters assumed for the temporary MSE wall design shall be those shown on the plan details for the MSE Wall and shown in the foundation report. The contractor shall submit the proposed method of temporary MSE wall construction to the engineer prior to beginning work. See special provisions.

DATE PREPARED 10/30/2026
ROUTE | STATE MO
DISTRICT BR | SHEET NO. 000
COUNTY
JOB NO.
CONTRACT ID.
PROJECT NO.
BRIDGE NO.

DESCRIPTION | DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

Detailed
Checked

Note: This drawing is not to scale. Follow dimensions.

Sheet No. of

MSEW_02_LRFD2_Notes Guidance

Standard Drawing Guidance (do not shown on plans):

Revise notes and details per project as necessary.

(1) Use for MSE walls in seismic design categories B, C & D (seismic zones 2, 3 & 4).

(2) Minimum soil reinforcement length shall be based on the following cases in accordance with EPG 751.6.2.17:

Maximum (0.7H, or 8 ft, or FIGR) for a non-seismic design.

Maximum (0.8H, or 8 ft, or FIGR, seismic loading requirement) for a seismic design.

Maximum (0.8H, or 8 ft, or FIGR) for a sloping backfill surcharge case.

Soil reinforcement length shall be greater than or equal to as required for a stable feature wall for strong/stable rock case.

Where,

H = Height of the wall as measured from the top of the leveling pad to the top of the wall.

FIGR = Foundation Investigation Geotechnical Report

(3) The nominal bearing resistance, resistance factor for the strength event limit state(s), and an angle of internal friction, Φ_f, for unimproved and improved ground where wall is to bear as determined by the Geotechnical Section and reported on the Foundation Investigation Geotechnical Report (FIGR) shall be shown on the plans. Show areas and locations of ground improvement along the wall where required, for example, using stationing or using changes in wall height. Provide cross-section of ground improvement based on FIGR. Provide any other geotechnical requirements in FIGR on plans.

Use the underlined portion from note EPG 751.50 J1.2 when limits of improved foundation ground is required by Geotechnical Section.

Strength Limit States:
Factored bearing resistance = Nominal bearing resistance from the Geotechnichal report x Resistance Factor

For walls that DO NOT contain or support a structure, use resistance factor per LRFD BDS Table 11.5.7-1.

For walls that contain or support a structure, use resistance factor per LRFD BDS Table 10.5.5.2.2-1 or as otherwise recommended in the Geotechnical report.

Extreme Event Limit State:
Factored bearing resistance = Nominal bearing resistance from the Geotechnical report x Resistance factor. Resistance factor = 0.9 in accordance with LRFD BDS 11.5.8

(4) Use for all precast modular panel walls.

(5) Use for MSE walls when there may be contact between dissimilar metals.

(6) Use for MSE walls when there may be vertical and/or horizontal obstructions in reinforced soil mass.

(7) (BRIDGE DESIGNER) Use for MSE walls that support another structure foundation (i.e. support abutment fill, building or Bridge MSE wall) in SDC B, or C (seismic zone 2 or 3). Use for all MSE walls in SDC D.

(8) (ROADWAY DESIGNER) Use for MSE walls that do not support another structure foundation (i.e, Not supporting abutment fill or building (District MSE wall) in SDC B or C (seismic zone 2 or 3)) and only if Geotechnical report allows, otherwise use note J1.4 (EPG 751.50). Use note J1.4 for all MSE walls in SDC D.

(9) Use for all precast modular panel walls. Use for drycast or wetcast modular block walls if applicable.

(10) Use for drycast or wetcast modular block walls unless either wall is to be built vertical.

(11) Use for MSE walls when traffic barrier is provided in front of the MSE wall.

(12) For staged bridge construction with MSE walls at the abutments, show this note on plan details when temporary MSE wall is required.

(13) Use value for A_S per Geotech Report/Design Layout, or N/A if not reported in GeoTech Report/Design Layout. If $A_S > 0.75$ then show $A_S = 0.75$.

NOTES TO ROADWAY AND BRIDGE DESIGNERS:

Excavation classes, quantities and pay items are the responsibility of District Design Division for including on the roadway 2B quantity sheets which is noted on the MSEW plans and required in accordance with Sec 720. All other quantities are the responsibility of the division responsible for the MSE wall plans.

If rock is not known to exist from a geotechnical report or study, place the following note on the plans:

"If rock is encountered in the proposed reinforced backfill area or wedge area of the MSE wall before or during excavation, the contractor shall immediately cease excavating and notify the engineer."

Otherwise, if rock is known to exist and it is to be excavated, then do not place above note on plans and determine the excavation class and estimate a rock quantity. For all Bridge Division MSE walls, Bridge Division and District Design Division shall coordinate in estimating excavation quantities when rock is known to exist from the geotechnical report and if rock is to be used as part of the wall backfill or excavated for MSE wall construction.