



INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

Design Memorandum No. 17-03
Technical Advisory

March 1, 2017

TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/ David Holtz
David Holtz
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SUBJECT: Mechanically Stabilized Earth (MSE) Walls

REVISES: *Indiana Design Manual* Sections 402-6.02(02), 409-2.04(02), 409-3.03,
Figure 409-2G, and Figure 410-5(0)C (new)

EFFECTIVE: As Noted

The Department is implementing an MSE wall review process to determine the suitability of MSE walls for the project site. Revisions to the referenced sections of the *Indiana Design Manual* (IDM) provide additional guidance to enhance the quality of information provided to contractors as well as facilitate constructability.

Determination of MSE Wall Suitability

Effective immediately, all projects that contain an MSE wall will be evaluated for suitability for the project site. This includes both longitudinal MSE walls (non-bridge related) and MSE walls utilized adjacent to a bridge end bent. The selection criteria in IDM 410-5.01(05) in addition to the guidance included in this memo will be considered as part of the evaluation.

The table below describes the need for review based on the stage of project development as well as the timing and documents required.

Stage of Plan Development (as of the date of the memo)	Review by Geotechnical Services?	When to Submit	Information to Submit
Prior to Stage 1	Yes	Concurrent with Geotechnical Investigation Request	Stage 1 plans, including preliminary wall layout.
After Stage 1 and Before Stage 3	Yes	Immediately	Current plan set or Title Sheet, Plan and Profile, Detail Sheets*
After Stage 3	Yes, where guidance below has not been accounted for in the plans.	Coordinate with Geotechnical Services immediately	As determined during coordination with Geotechnical Services
* Detail sheets include wall layout/geometry, wall section view, known obstructions, known foundation improvement requirements.			

Please contact Athar Khan, Office of Geotechnical Services, atkhan@indot.in.gov to begin coordination.

For projects that have not complete a Stage 1 submittal, the Office of Geotechnical Services must provide concurrence that an MSE is suitable for the project site. A second submittal at Stage 3 may be necessary once project details are finalized.

For projects that have not completed the Stage 3 submittal, revisions to plans based on this memo are expected. For projects that are beyond the Stage 3 submittal, the need for revisions will be determined on a project-by-project basis.

IDM Revisions

The following sections of the IDM have been revised to provide additional guidance and set forth new requirements for MSE walls. These revisions aim to enhance the quality of information provided to contractors as well as facilitate constructability. The revisions are summarized below and are an attachment to this memo. The on-line version of the IDM will be update at a later date.

IDM 402-6.02(02) Structure Sizing – Alignment Pile sleeves should be assumed where an end bent is placed behind an MSE wall. The minimum distance from the edge of the pile sleeve to the back of the MSE wall panel is 3 ft.

IDM 409-2.04(02) Integral End Bent – Design Requirements, 409-3.03 Semi-Integral End Bent, and Figure 409-2G Figure 409-2G illustrates the minimum distance from the edge of the pile sleeve to the back of the MSE wall panel and preferred MSE wall configurations at an end bent.

IDM 410-5.01(06), Design Criteria

- Acute angles should be avoided because of construction difficulties, e.g. compaction in corners and placement of reinforcement. Where two intersecting walls form an enclosed angle, the angle is to be greater than or equal to 70 degrees.
- Sharp curves should be avoided in the wall layout. The curvature of the wall will impact the size of panel than can be provided. Typically a 10-ft wide panel can accommodate a radius of 100 ft., and a 5-ft wide panel can typically accommodate a radius of 50 ft.
- Utilities should not be placed through the reinforced zone. Where utility placement in the reinforced zone is unavoidable, future access must be provided to the utility without disrupting the reinforcement. The breakage or rupture of the utility must not have a detrimental effect on the stability of the MSE wall.

IDM 410-5.01(07), Figure 410-5(0)C (New), Information to be Shown on Plans

- Drainage systems are required for all MSE walls. Figure 410-5(0)C illustrates a typical MSE wall cross sections and provides the drainage details to be included on plans.
- A plan view showing all obstructions and their offset from the back of the MSE wall is required on the MSE Wall Details sheet. Obstructions include but are not limited to, piles, pile sleeves, catch basins, signal or sign foundation, guardrail posts, and culverts. Where an obstruction projects through the MSE wall panel, the obstruction should also be shown in an isolated section and elevation view.
- Modifications to the wall design to avoid obstructions must be shown in the MSE Wall working drawings. Design options for obstructions within the reinforced zone are described in the *AASHTO LRFD Bridge Design Specifications*, section 11.10.10.4.