STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

PREFABRICATED RETAINING WALL SYSTEMS
APPROVAL PROCESS

REVISED JANUARY 02, 2020

1. General
2. Prefabricated Retaining Wall Systems Review Process Overview
3. Renewal Requirements of the Approved Prefabricated Retaining Wall System
4. Prefabricated Retaining Wall System Performance
6. Prefabricated Retaining Wall System Submittal Requirements

1. General. This document outlines the process for (1) approval of Prefabricated Retaining Wall Systems (PRWS) and (2) inclusion of a Wall System on the Department’s Approved Product List (APL). The PRWS must meet all applicable policy and procedure requirements enforced by the Ohio Department of Transportation (ODOT).

This Document applies to both Permanent and Temporary fill wall systems including but not limited to the following:

- Precast Gravity and Semigravity Retaining Wall Systems
- Prefabricated Modular Retaining Wall Systems
- Mechanically Stabilized Earth (MSE) Retaining Wall Systems

Each of these wall systems and exclusive Wall Supplier products may employ unique design and construction requirements that are specific to a particular Wall Supplier. The Review Engineer’s Prefabricated Retaining Wall System Evaluation Report shall identify all unique features of the PRWS and highlight exceptions taken by the Wall Supplier to the AASHTO LRFD Bridge Design Specification. Note that no PRWS consisting of dry-cast modular units will be accepted for use as supporting a structure or roadway or as a wingwall due to durability concerns and consequently, will not be considered for the APL.

2. Prefabricated Retaining Wall Systems Review Process Overview. For a PRWS to be placed on the Department’s APL, the following minimum requirements must be met by the Wall Supplier. Additional requirements may be enforced on the Wall Supplier at the discretion of the Department at any stage during the approval process.
A. To be placed on the Department’s APL the PRWS shall be reviewed and evaluated by a Registered Professional Engineer, hereafter referred to as the Review Engineer. Prequalification requirements for the Review Engineer are provided in Section 8. The Review Engineer shall produce a Retaining Wall System Evaluation Report which shall be submitted to the Department along with the Wall System approval request. With respect to the PRWS review and evaluation, ODOT will not have any contractual relationship with the Review Engineer. The Wall Supplier is responsible for engaging the Review Engineer for the purpose of producing a Retaining Wall System Evaluation Report at no cost to the Department.

B. Approval of the Wall System will be based on a technical review by the Department of the entire submission package. The technical review, at a minimum, would entail thorough examination of the PRWS design theory, design details, durability, material requirements, QA/QC plan, and recommended construction methods. Constructability, manufacturer support, and system performance on previous projects will also be evaluated. Attachments I, J, and K include submittal requirements for approval of the Wall Systems.

C. The Office of Geotechnical Engineering (OGE) will make the final decision regarding the completeness and acceptability of the Retaining Wall System Evaluation Report. OGE will present its recommendation to the Department for inclusion of the PRWS to the APL.

D. The PRWS needs to be approved by ODOT prior to being used on ODOT projects. Note that approval of a specific PRWS by ODOT does not constitute approval of other PRWS being marketed by the same Wall Supplier. Also note that placement of a wall system on the APL does not constitute a commitment or agreement by the Department to use the system on any highway construction project.

E. Direct all correspondence to ODOT at the address shown below.

Christopher Merklin, Administrator
Office of Geotechnical Engineering
Attn: Dorothy Adams
Ohio Department of Transportation
Mail Stop 5090
1980 West Broad Street. 3rd Floor
Columbus, OH 43223
Phone 614-275-1361
Chris.Merklin@dot.ohio.gov
Dorothy.Adams@dot.ohio.gov

3. Renewal Requirements of the Approved Prefabricated Retaining Wall System

A. The approved status of any wall system on the APL will expire:

i. Five years from the date of placement on the list,
ii. Upon any changes in the Approved Wall System materials or design or construction specification initiated by Wall Supplier, or

iii. If there are revisions in the technology such that updates to the approved wall system or approval process are deemed necessary to fulfill the Department requirements.

B. Provided there are no changes as described above that would require a new evaluation, as determined by the Department, the renewal of the wall system on the APL may be expedited by a written request from the Wall Supplier certifying that there have not been any Wall System changes as defined in Section 3.A.ii.

4. Prefabricated Retaining Wall System Performance

A. The Department reserves the right to remove any PRWS from the APL at any time and at its sole discretion. The reasons for the removal may include, but are not limited to:

i. Unsatisfactory wall performance, as determined by the Department, on any public or private project;

ii. Non-response by the Wall Supplier, the Review Engineer, or the Wall Supplier subcontractor to a Department request;

iii. Substandard or lack of proper quality control or,

iv. Improper response to correct construction defects.

5. Design and Construction Specifications. The PRWS shall meet the design and construction requirements of the following specifications and manuals, as applicable:

- AASHTO LRFD Bridge Design Specification, latest Edition with Interims
- ODOT Bridge Design Manual, latest edition
- ODOT Construction and Materials Specifications, latest edition
- ODOT Supplemental Specification 840
- ODOT Supplemental Specification 867
- ODOT Supplemental Specification 870

6. Prefabricated Retaining Wall System Submittal Requirements. The formal submission by the Wall Supplier to the Department for the approval of the PRWS shall follow the steps in Section 7 (which details the approval process, required information, timeframe for
submittals, and the Department review time). The submission shall be in electronic format only (searchable pdf) and shall include the following:

A. A Letter of Intent (LOI) from the Wall Supplier requesting approval of the specific PRWS. If applying for a new system, include items B thru I of this section with the LOI. If applying for evaluation of a previously approved system with proposed modifications, the letter shall specifically identify all aspects of the PRWS that are proposed to be modified after the publication of the latest version of the Retaining Wall System Evaluation Report in addition to including items B thru I of this section (Attachments A thru H).

B. Completed Attachment A entitled “Declaration of Proprietorship and Point of Contact”.
C. Completed Attachment B entitled “Declaration of Design Responsibility”.
D. Completed Attachment C entitled “Implied and Proffered Warranties”.
E. Completed Attachment D entitled “Declaration of Understanding of ODOT’s Design and Construction Specifications”.
F. Completed Attachment E entitled “Declaration of Patents and Proprietary Technology”.
G. Completed Attachment F entitled “Declaration of Precast Concrete Manufacturers”.
H. Completed Attachment G entitled “Affirmation of Notification Responsibility”.
I. Completed Attachment H entitled “Authorization for Duplication and Reproduction”.
K. A sample set of shop drawings for a recently completed project.
L. A sample set of long hand design calculations for the type of retaining wall system being submitted:
   i. Precast Gravity and Semigravity Retaining Wall Systems
      a. Prefabricated retaining wall supporting a bridge abutment (Wall Height of 25 feet, height to roadway surface of 32 feet, See Figure A).
Note: reasonable loads and abutment dimensions shall be assumed in the example calculations.
Cast-in-Place Footing may be shallow foundation or pile supported.

**Figure A. Design Case for Bridge Abutment – Precast Gravity and Semigravity Wall**

b. Prefabricated wall retaining a level backfill with and without a live load surcharge (Design Height of 25 feet, See Figure B).
c. Prefabricated wall retaining a backfill with an infinite 2:1 slope (Design Height of 25 feet, See Figure C).

d. Prefabricated wall retaining a backfill with a 2:1 slope that breaks to a level backfill at a distance equal to the design height of the wall (Design Height of 25 feet, See Figure D).
ii. Prefabricated Modular Retaining Wall Systems

a. Prefabricated wall retaining a level backfill with and without a live load surcharge (Design Height of $H_{max}$, See Figure E).

b. Prefabricated wall retaining a backfill with an infinite 2:1 slope (Design Height of $H_{max}$, See Figure F).
c. Prefabricated wall retaining a backfill with a 2:1 slope that breaks to a level backfill at a distance equal to the design height of the wall (Design Height of $H_{\text{max}}$, See Figure G).
iii. MSE Retaining Wall Systems

a. Prefabricated retaining wall supporting a bridge abutment (Wall Height of 25 feet, height to roadway surface of 32 feet, See Figure H).

```plaintext
Note: reasonable loads and abutment dimensions shall be assumed in the example calculations.

Piles not shown for clarity.

Figure H. Design Case for Bridge Abutment – MSE Retaining Wall
```

b. Prefabricated wall retaining a level backfill with and without a live load surcharge (Design Height of 25 feet, See Figure I).

```plaintext
Figure I. Design Case for Level Backfill – MSE Retaining Wall
```
c. Prefabricated wall retaining a backfill with an infinite 2:1 slope (Design Height of 25 feet, See Figure J).

Figure J. Design Case for Infinite Slope – MSE Retaining Wall

d. Prefabricated wall retaining a backfill with a 2:1 slope that breaks to a level backfill at a distance equal to the design height of the wall (Design Height of 25 feet, See Figure K).

Figure K. Design Case for Breaking Slope – MSE Retaining Wall
M. Experimental field and laboratory test data supporting the design methodology and the design parameters of the PRWS.

N. A complete list of PRWS specific design requirements that must be incorporated into ODOT Design and Construction Specifications.

O. Design drawings and structural design calculations for all elements of the PRWS.

P. Recommended Construction Specifications. If the PRWS falls under any existing ODOT Construction Specification (including Supplemental Specifications), provide a marked-up document highlighting proposed revisions to the applicable ODOT Construction Specification.

Q. A complete list of design exceptions taken by the Wall Supplier that do not meet the requirements of the Design and Construction Specifications listed in Section 5.

R. A complete list of limitations on the use of the PRWS, such as: limiting differential settlement, limiting wall height, alignment turn angles or minimum radius, minimum face batter, abutment applications, etc.

S. Details of typical frames and frame connections utilized to avoid obstructions.

T. Detailed repair methods for partial or full replacement of precast concrete elements of the PRWS.

7. **Detailed Steps of Approval Process for Prefabricated Retaining Wall Systems.** The approval process consists of the following steps:

**Step A: Wall Supplier Submits Letter of Intent Application**

Conditions for acceptance of application:

- The application for approval must be for a single PRWS. A single PRWS may include only one wall type. A single PRWS may include only one facing type, one type of reinforcement, and one facing connection type.

- The applicant must own the PRWS or act as the sole representative of the PRWS owner for the purpose of obtaining ODOT approval.

- The LOI should provide a basic description of the system, design approach, and sequence of construction.

- The LOI should include Attachments A through H as described in Section 6.

- The LOI should also include the resume of the Review Engineer, in accordance with Section 8 of this document.
Step B: ODOT Reviews Letter of Intent

Written acknowledgement is sent to the applicant upon receipt of the LOI application. ODOT reviews the Letter of Intent within 4 weeks of receiving the LOI and does one of the following:

- ODOT sends written notice to the Wall Supplier that the LOI is accepted and provides any supplemental information and/or direction required for the Wall Supplier to prepare detailed system information for the PRWS described in the LOI application.
- ODOT sends written notice to the Wall Supplier stating that the LOI application has not been accepted, along with an explanation of why the application has been declined. The notice may request additional information or clarification about the PRWS.

Step C: Wall Supplier Submits Detailed Information

After ODOT accepts the LOI application, the Wall Supplier will submit the detailed information described in Section 6 (Items J through T) and Attachment I, J, or K, based on the wall type.

To help ODOT understand the system components and performance of the technology and thereby facilitate the technical review, applicants are urged to spend the time necessary to provide clear, complete, and detailed submissions which address all requested topics and information. Missing or incomplete information will delay ODOT’s technical review.

Information on all items that could possibly apply to the system or its elements and components, including those where evaluation procedures have not been fully established is of interest to ODOT. Any omissions should be noted and explained.

The information within the submission should be organized in the order listed in Section 6 and referenced to the given numbering system. Avoid duplication of information. A simple statement referencing another section of the submission is adequate.

Prior to beginning the technical review (Step D), ODOT will verify completeness of the submittal. The technical review will not begin until the submittal is complete.

Step D: ODOT Performs System Technical Review and Issues Findings

ODOT performs a technical review of the Wall Supplier submittal. Approval will be based on compliance with the ODOT requirements. ODOT may request additional system information during the technical review if needed. ODOT technical review will take place within 16 weeks of receiving the submittal.

Based on the findings of the ODOT technical review, the wall system will be approved or it will be rejected. Rejected Wall Systems will be provided an explanation of items warranting the finding. If approved, the PRWS will be posted on the Department’s APL and an approval letter will be sent to the Wall Supplier. The approval letter will include the conditions of approval and address the following:

- Specific procedures, materials and practices identified by the Wall Supplier in their submittal that do not meet ODOT requirements. Reasons for the exception(s) and suggested modifications and solutions, as also provided by the Wall Supplier.
General comments about the system.

Categories for use (critical and noncritical applications).

Approval effective date.

Approved maximum wall height.

Approved Wall Supplier plan, profile and system component and detail drawings.


The Wall Supplier shall submit with the LOI the Review Engineer’s resume and supporting evidence that the Review Engineer has, at a minimum, the following experience:

A. Ten (10) years’ experience in the design and construction of analogous PRWS.

B. Served as the Lead Engineer for the preparation of similar retaining wall designs for at least five (5) separate publicly funded retaining wall projects.

C. Authored or co-authored at least two technical papers that have been published in professional Civil/Geotechnical Engineering Journals or the following: American Association of State Highway and Transportation Officials (AASHTO) Publications, American Society of Civil Engineers (ASCE) Publications, Federal Highway Administration (FHWA) Publications, or National Highway Institute (NHI) Publications relating to the design and construction of PRWS.

The technical paper publication requirement stated above can be waived if the Review Engineer has served on any Technical Committee responsible for the development of the design standard or specification including the Design and Construction Specifications listed Section 5 above.

Other than performing the evaluation of the PRWS, the Review Engineer shall not have any ownership interests with the Wall Supplier, and shall not have served as an employee of the Wall Supplier at any time during the last five years. Any conflict of interest between the Review Engineer and the Wall Supplier may result in the rejection of the Retaining Wall System Evaluation Report.

The Retaining Wall System Evaluation Report shall address all items included in the applicable Attachment I, J, or K and all items in Section 6 above, less the information provided by the Wall Supplier as part of the LOI.
ATTACHMENTS

ATTACHMENT A: Declaration of Proprietorship and Point of Contact Form
ATTACHMENT B: Declaration of Design Responsibility Form
ATTACHMENT C: Implied and Proffered Warranties Form
ATTACHMENT D: Declaration of Understanding of ODOT’s Design and Construction Specifications Form
ATTACHMENT E: Declaration of Patents and Proprietary Technology Form
ATTACHMENT F: Declaration of Precast Concrete Manufacturers Form
ATTACHMENT G: Affirmation of Notification Responsibility Form
ATTACHMENT H: Authorization for Duplication and Reproduction Form
ATTACHMENT I: Submittal Requirements for Approval of Precast Gravity and Semigravity Retaining Wall Systems
ATTACHMENT J: Submittal Requirements for Approval of Prefabricated Modular Retaining Wall Systems
ATTACHMENT K: Submittal Requirements for Approval of Mechanically Stabilized Earth (MSE) Wall Systems