



PROPRIETARY RETAINING AND SOUND BARRIER WALL SYSTEMS REVIEW PROCESS

November 2023

The Oklahoma Department of Transportation (ODOT) reviews each Proprietary Retaining or Sound Barrier Wall System (hereinafter referred to as “System”) to be used on the Oklahoma highway system. The Proprietary Wall System Approved Products List (APL) is a selection of Systems qualifying under the ODOT Standard Specifications and the requirements listed herein.

Products that are not on the APL may be used on ODOT projects on a case-by-case basis, as accepted by the Engineer. *ODOT is not liable for any incidental or consequential damages incurred by using any products listed on the APL. Further, ODOT does not endorse products or manufacturers.* System owners and/or manufacturers are prohibited from using the ODOT APL to market their products.

This document describes the review process and requirements for System approval on the APL. These requirements apply to all walls within ODOT right-of-way and along frontage roads. They do not apply along the side of the frontage road opposite to the highway, or to walls along City streets.

For classification purposes, a retaining wall laterally supports a mass of soil that has more than a three (3) feet differential between the wall face groundline elevation and the backwall groundline elevation. A sound barrier wall primarily protects from noise, and must have less than a three (3) feet differential between the wall face groundline elevation and the backwall groundline elevation.

This document is for approval of Systems only. Fabricators of System components are evaluated and approved separately through ODOT Materials Division.

Submitting a Retaining Wall System for Review

System owner submits a written request for approval to ODOT Bridge Division, along with a package addressing the items below. A current *Innovations, Developments, Enhancement and Advancements (IDEA)* evaluation report that is consistent with the System being submitted may be used as part of these requirements.

1. System Overview:
 - a. Identify the wall System category:
 - i. Concrete modular block unit paired with extensible reinforcement
 - ii. Concrete modular block unit paired with inextensible reinforcement
 - iii. Precast concrete panel paired with extensible reinforcement

- iv. Precast concrete panel paired with inextensible reinforcement
 - v. Steel facing paired with extensible reinforcement
 - vi. Steel facing paired with inextensible reinforcement
 - vii. Concrete modular gravity
 - viii. Prefabricated counterfort
 - ix. Sound barrier wall
 - b. Brief description of System
 - c. History of system development including patents
 - d. Practical applications with descriptions and photos
 - e. Laboratory and field data supporting the design and construction procedures.
 - f. System advantages
 - g. System limitations and disadvantages including but not limited to:
 - i. Limiting differential settlement
 - ii. Limiting wall height
 - iii. Alignment turn angles or minimum radius
 - iv. Minimum face batter
 - v. Bridge abutment applications
 - h. Materials
 - i. Engineering specifications for each component
 - ii. Durability aspects (freeze/thaw, corrosion, construction damage, environmental)
- 2. Current/past users' contact information (names, addresses, phone)
- 3. Precast manufacturers' contact information (precast manufacturers are not approved as part of this APL, and must be approved separately under the ODOT Materials Division APL.)
- 4. Design:
 - a. General design procedures including sample calculations for the following cases:
 - i. Level surcharge
 - ii. Sloping surchargeInclude complete sample AASHTO LRFD analyses/calculations and design specifications using MSEW+ or other approved software. Design procedures should address estimated design life. Designs should conform to requirements in Section 510 of the most recent edition of the ODOT Standard Specifications for Highway Construction.
 - b. Details of wall elements, as applicable:
 - i. Facing
 - ii. Reinforcement and reinforcement connections
 - iii. Filters
 - iv. Standard erection and casting and connection drawings including structural analysis, details for bearing pads, leveling pads, footings, copings, etc.
 - v. Details for mounting concrete traffic barrier (TL-4 and TL-5) on the wall adjoining both concrete and flexible pavements
 - vi. Typical obstruction details for both vertical and horizontal obstructions

- vii. Full-scale test data for connection of earth reinforcement to facing
- 5. Construction:
 - a. Detailed construction manual
 - b. Manufacturer's Quality Control / Quality Assurance Plan for the System and its components.
 - c. Material and construction control specifications which includes acceptance and rejection criteria (copies of these specifications are to be provided to the contractor and the Resident Engineer prior to construction)
 - d. Typical unit construction costs
- 6. Technical evaluation report for the System from an independent engineer with expertise in retaining wall systems. Evaluation report must address System theory, laboratory and field data, proposed design procedures, construction procedures and System components.
- 7. Architectural:
Describe architectural options associated with the System (i.e., form liners, etc.). ODOT often specifies a fractured granite appearance or artwork. Sound wall systems are required to provide finished surfaces on both faces.
- 8. Affirmation of responsibility to notify of changes, if approved (see "Attachment A")

Submitting a Sound Barrier Wall System for Review

Submit to ODOT Bridge Division a written request for approval and a package addressing all applicable items listed above, along with the following:

- 1. Acoustic Performance:
 - a. Transmission loss as determined by ASTM E90-04 using the typical truck noise spectrum must be at least 20 dB(A). To aid in minimizing noise transmission through the barrier, gaps or openings in the wall System should be minimized or nonexistent, except as required for drainage purposes. When required for drainage purposes, openings at the wall base shall be limited to 8 inches in height. The associated degradation of acoustical performance due to such openings shall not exceed 1 dB(A).
- 2. Design:
 - a. Joints and fittings should be vibration-free.
 - b. Sample calculations conforming to current edition of the AASHTO Guide Specification for Structural Design of Sound Barriers.

General Review and Approval Process

- 1. The above items are reviewed by the ODOT Retaining Wall and Sound Barrier Wall Committee consisting of personnel from ODOT Bridge, Construction, Materials, Roadway, and Environmental Divisions.
- 2. Following a satisfactory review, a System representative is invited to present to the Committee.

3. Upon resolution of any comments, the committee will make their recommendations to the Bridge Engineer. The Bridge Engineer will provide a written notification of approval, and the System is placed on the APL.

The first wall constructed will be monitored by ODOT during construction and for a period of up to 12 months following construction.

Experimental Status

Wall systems not meeting one of the following three (3) requirements* will initially be designated “experimental” status:

1. The wall system must have been used on 20 or more state DOT projects with 5 of the projects being more than 5 years old.
2. More than 1,000,000 square feet (as measured on the exposed wall face) of the wall system must have been built on state DOT projects.
3. The wall system must have been used on state DOT projects in at least 5 different USA states.

* Conclusive evidence of compliance with a given requirement must be provided, including current references from wall owners with current phone numbers. Each project must be listed with face square footage, and the date the project was constructed.

Experimental status designation will be in place until successful construction and satisfactory monitoring on at least one wall on an ODOT project are complete.

Size Constraints on Experimental Systems

The extent of the experimental wall system shall be indicated on the submitted drawings and contract documents. ODOT may not approve the use of experimental wall systems at certain locations. Walls designated experimental status will be subject to the following size constraints:

Minimum Wall Dimensions¹:

- Minimum length: 300 feet
- Minimum height of tallest portion of the wall: 10 feet

Maximum Wall Dimensions:

- Maximum height: 25 feet
- Maximum total area: 20,000 square feet.

Renewal Requirements

Approved status of a System on the APL will expire:

- Five (5) years from the date of approval (or previous renewal).
- Upon any changes in the System materials, design, or construction specification.

¹ Height requirements refer to exposed wall height. Minimum height requirements do not apply to sound walls.

It is the responsibility of the System representative to notify ODOT Bridge Division if either of the above conditions requires a renewal of approved status. If there is a change, ODOT Bridge Division shall be notified immediately of such to determine whether a formal review is required. If, after five years there are no changes to the System which would require review, renewal may be processed by written request, along with a newly executed copy of Attachment A.

Mailing address:

ODOT Bridge Division
Attn: Mr. Jason Giebler, P.E.
200 NE 21st Street
Oklahoma City, OK 73105

Disclosure

ODOT reserves the right to remove a System from the APL at any time and at the sole discretion of ODOT. The reasons for removal may include, but are not limited to: non-response to contract and bid requests; substandard performance; lack of proper quality control observations during construction; and lack of response to owner requests to correct construction defects.

Attachment A: Affirmation of Responsibility to Notify of Changes

We, the System owner affirm our understanding that once our System is approved, we will notify ODOT Bridge Division within three (3) months of any future changes made to the System which will affect the design, construction, inspection, or performance requirements of the System (*if applying for renewal of approved status: this affirms that since the time of approval or most recent renewal of the System on the APL, no such changes have been made*). The Department will then determine if the change will require a formal review. Failure to notify the Department of any changes may result in removal of the System from the APL.

Name of Proprietary Wall System

Owner of Proprietary Wall System (Company)

Printed Name of Representative

Signature of Representative

Title

Date