NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION
PROPRIETARY RETAINING WALL SYSTEM
PRE-APPROVAL PROCESS

1.0 PURPOSE

This document presents a systematic process that enables the New Hampshire Department of Transportation to review proprietary retaining wall systems that are submitted to the Department for pre-approval. The document is based on FHWA publications and guidelines and AASHTO LRFD Bridge Design Specifications. It also provides information for the consistent selection, review, and acceptance of proprietary retaining wall systems.

Pre-approval of a proprietary retaining wall system and its addition to the Pre-Approved Proprietary Retaining Wall List does not constitute a blanket approval of the wall system on all projects. For projects that require a retaining wall, the Bureaus of Bridge Design, Highway Design and Materials and Research will evaluate the project wall criteria and prepare a special provision that lists the wall systems from the Pre-Approved List that are qualified specifically for use on the project.

This pre-approval process is used to update and maintain a list of pre-approved proprietary retaining walls and special provisions for retaining wall systems.

2.0 PRE-APPROVAL

Not all wall systems are suitable for Department projects. Department pre-approval of different wall systems prior to preparation of contract documents eliminates the use of systems that do not perform to the Department's standards, and systems that have not been adequately evaluated. A pre-approved list also provides contractors a more concise description of the qualified wall system(s), and hence enables them to prepare their bidbased on more complete information. The criteria for acceptance for inclusion on the Department's Pre-Approved Proprietary Retaining Wall System List are as follows:

1) The supplier/fabricator's manufacturing facility shall be certified by the National Precast Concrete Association (NPCA) or Precast/Prestressed Concrete Institute (PCI).
2) The wall system shall be based on sound engineering theoretical and practical concepts, shown in a proposal subject to review by the Department.
3) Past experience in building and performance of the proposed system are required and must be provided.
4) Documentation and design calculations demonstrating the wall system's compliance with the following shall be included in the proposal:
   a) Current AASHTO LRFD Bridge Design Specifications.

b) FHWA-NHI-10-024, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I, November 2009.
c) FHWA-NHI-10-025, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume II, November 2009.
d) FHWA-NHI-09-087, Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, November 2009.
e) Current NHDOT Bridge Design Manual.

5) Report on the evaluation by FHWA's HITEC (Highway Innovative Technology Evaluation Center), shall be provided if available.

3.0 PROCEDURE

A proprietor or contractor interested in having a retaining wall system approved for inclusion on the Pre-Approved Proprietary Retaining Wall List shall submit a written request and documentation as noted below (2 copies), and mail the request to the following:

NHDOT
Administrator, Bureau of Bridge Design
PO Box 483, 7 Hazen Drive
Concord, NH 03302-0483

The following information shall be included in the request for approval:

1) The name, address, and contact information of the manufacturer.
2) The name or designation of the proprietary system that is to be reviewed.
3) How and when the wall was developed, system theory, and laboratory and field experiments, all of which support the theory or wall design.
4) Practical applications with descriptions, photos, and a list of users including names and contact information.
5) List of state Departments of Transportation that have pre-approved the proposed wall system including names and contact information.
6) Specific heights, loads and loading conditions, surcharge depths, and backslope for which the supplier is seeking approval.
7) Details of wall elements, analysis of structural elements, special designs for traffic barriers or guardrail posts, drainage details, minimum embedment for frost protection, abutments, corners, and skew details.
8) Design calculations demonstrating the stability of the wall against sliding, overturning, eccentricity, bearing resistance, reinforcement pullout, reinforcement rupture, and reinforcement/facing connection failure, for all those wall heights and loading conditions (vehicle impact on guardrail, traffic surcharge) for which the designer-

supplier requests preapproval by the Department, in accordance with the codes and documents listed in paragraph 2.0, above.

9) Design calculations that consist of computer program generated output shall be supplemented with at least one set of hand calculations and graphics that demonstrate the design methodology. Design calculations shall provide thorough documentation of the sources of equations used and material properties. The wall calculations shall be prepared and sealed by a Professional Engineer licensed in the State of New Hampshire.

10) Estimated design life, corrosion design, procedures for field and laboratory evaluation of corrosion, corrosivity, durability, and long-term performance, including special requirements.

11) Maximum tolerable differential settlements within the wall and between the wall facing elements.

12) Sample material and construction quality control specifications showing material type, quality, certifications, field testing, acceptance and rejection criteria, and installation procedures.

13) Facing panel or block dimensions, tolerances, geometry and weight, details of assembly and construction; shear strength and long term durability of alignment pins, shear lips; compressive strength, freeze thaw resistance, and moisture absorption characteristics (permibility) of concrete facing blocks or panels.

14) Laboratory test data for connection strength between soil reinforcement and facing elements, and frictional resistance between soil reinforcement and backfill.

15) For MSE wall reinforcement, information about macrostructure, metals, coatings or polymers used; ultimate tensile strength; 10,000 hour creep test data at multiple load levels and temperatures; backfill requirements including shear strength, gradation, and corrosivity;and chemical, biological, and microstructural degradation data, that can be used to estimate long-term strength losses during the design life.

16) A well-documented field construction manual describing in detail, with illustrations as needed, the step-by-step construction sequence.

17) Typical unit costs per square foot of vertical face area, supported by data from actual projects given in 2) above.

18) Details of no-dig zones, warning markers, or other protective measures recommended.

19) Limitations of the system.

The pre-approval submission will be reviewed by a Review Team comprised of the NHDOT Bureaus of Bridge Design, Materials and Research, Construction, and the FHWA NH Division Bridge Engineer. The submission will be reviewed and evaluated with regard to the design, construction practicality, and anticipated performance of the system. A formal presentation to describe the system and its applications may be requested by the Department.

4.0 QUALIFICATION

The Administrator of Bridge Design (Chair of the Review Team) will send a written notification to the manufacturer regarding the review of the system. The notification will state if the system is approved for the Pre-Approved Proprietary Retaining Wall List, present any concerns or limitations, request additional information, or describe the reasons for not qualifying the system.

Upon inclusion of a pre-approved wall retaining wall system in a contract, the final design of the wall system shall be submitted for review and approval for the specific project per Section 105.02 of the NHDOT Standard Specification.

5.0 DISQUALIFICATION

The Department reserves the right to remove a wall system/supplier from the Pre-Approved Proprietary Retaining Wall List if the wall system is not performing adequately, design and/or construction procedures are not being followed, or for other reasons that the Department deems justifiable cause for removal from the list. The Department will inform the wall system supplier of the reasons for removal and will provide a means by which the wall supplier can request to be reinstated to the Pre-Approved Proprietary Retaining Wall List.

6.0 MAINTENANCE OF QUALIFIED STATUS

The supplier or manufacturer shall submit a letter to the Department, every two (2) years between the period of January and March 1st, certifying that the plant production process control and the materials, testing, and design procedures have not changed since the last Department review. If the supplier/manufacturer does not submit the information to the Department, it will be removed from the NHDOT Pre-Approved Proprietary Retaining Wall List.

If the supplier or manufacturer introduces a new material, cross-section, or design procedure into its product line, the new feature(s) must be submitted for review by the Department. If the new feature(s) is significantly different from the original product, the new product may be subjected to a complete review and pre-approval by the Department.