

Specifications for Sound Absorbing Noise Barrier

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1.0 General

1. Sound absorbing noise barrier system shall be of post and panel design with a(n) _____ pattern on the community side and a(n) _____ pattern and surface texture on the sound-absorbing (highway) side.
2. The sound absorbing noise barrier system shall meet or exceed requirements for sound absorption, freeze/thaw, fire resistance and sound transmission loss, as specified below for pre-approval.
3. The system shall include a reinforced concrete component and the panels shall be cast such that the sound absorbing material is integral with the reinforced concrete component. No adhesives or mechanical fasteners may be used to attach the Sound Absorbing material to the structural concrete.
4. The sound absorbing material shall be durable under all weather conditions and shall resist rotting, mold and mildew build-up, rusting, warping, and bird, rodent or insect nesting or infestation.
5. Adequate drainage shall be provided at the base of the panel.
6. The contractor shall obtain concrete and sound absorbing products from a single manufacturer.

2.0 Sound Absorption Test Requirements

1. The Noise Reduction Coefficient (NRC) of the proposed sound-absorbing barrier panels shall equal or exceed 0.80 when tested per current ASTM C 423 requirements, mounting type A (sample placed directly against the floor of the reverberant chamber) at an NVLAP accredited testing laboratory. For pre-approval purposes, these results may be from representative tests prior to this contract, however the test samples must be made by the precast facility that will produce the actual panels to be used in this project using the exact same processes and materials and have the same unit weight as those to be used on the project and the same as the freeze/thaw test material.
2. One set of test samples shall be made for testing at the start of production, witnessed by inspectors. Samples shall be stained using the materials and application rates to be used in this project. If samples fail either the Sound Absorption test or Freeze/Thaw test, the contractor, at his own expense, shall have the option of testing new samples made with adjusted mixes or procedures, selecting another facility, or another noise barrier supplier that then passes the tests. Failure to meet requirements shall not constitute cause for an excusable project delay or time extension.

3.0 Freeze/Thaw Test Requirements

1. Freeze/Thaw test shall be performed prior to the production run in accordance with the test procedure in ASTM C 666 (latest version) using Method A (freeze and thaw in water) for 300 cycles at a NVLAP certified testing laboratory. Sample weight shall be measured in a saturated condition before and after testing. Weight loss shall not exceed 7% and no physical distress (no cracking or breaking) shall be allowed. For pre-approval purposes, these results may be from representative tests prior to this contract, however they must be made by the precast facility that will produce the actual panels to be used in this project using the exact same processes and materials and have the same unit weight as those to be used on the project and the same as the sound absorption test material.
2. One set of samples shall be made and testing at the start of production, witnessed by inspectors. If samples fail either the Sound Absorption test or Freeze/Thaw test, the contractor, at his own expense, shall have the

option of testing new samples made with adjusted mixes or procedures, select another facility, or another noise barrier supplier that then passes the tests. Failure to meet requirements shall not constitute cause for an excusable project delay or time extension.

4.0 Sound Transmission Loss Requirements

1. Contractor shall submit test results by current ASTM E90 requirements for the thickness of the concrete and /or concrete plus sound-absorbing panels. These results may be from representative tests prior to this contract. The transmission loss in each 1/3 octave band from 125 to 4000 Hz shall be at least 20 dB. This requirement is waived if structural concrete thickness is 4” or greater and the sample wall does not exhibit a clear line of sight through gaps in the tongue and groove joints or the post-panel connection.

5.0 Sound Absorbing Material Fire Rating Requirements

1. The sound absorbing material shall exhibit a Flame Spread Index of 25 or less when tested according to current ASTM E84 requirements. These results may be from representative tests prior to this contract.

6.0 Sound Absorbing Material Quality Control

1. Compressive strength and unit weight tests shall be made on test cylinders made to represent manufacturing lots not less than one lot per day of production. Compression test cylinders shall be made by placement of sound absorptive material into cylinder molds compacted to a depth the same as in panel production. The cylinder shall then be filled with structural concrete as used in panel production. Cylinders will be cured in like manner as standard concrete cylinders and tested at 7 days of age. The manufacturer shall establish and meet performance criteria for this testing including sound absorptive concrete unit weight and compressive strength.

7.0 Noise Barrier System Surface Finish

1. The noise barrier shall have a(n) _____ pattern on side of noise barrier facing the community, with minimum 3/4” depth of reveal at joints, and a(n) _____ pattern and texture on sound-absorbing surface of the barrier, which will face the roadway, with minimum 1” depth of reveal at joints.
2. The _____ pattern shall be allowed to repeat itself in full panel units.

8.0 Sound Absorbing Material and Concrete Material Surface Treatment

1. Color Uniformity: All panels will be stained after installation so that all the panels appear uniform in color. The color shall be _____ (Federal Color no. _____).
2. Coloring material shall be accomplished by using weather resistant water based acrylic stain approved by the manufacturer of the sound-absorbing material.
3. Surface preparation, application rate and application procedure shall be as specified by the stain manufacturer. Surfaces must be clean and free of any contaminants that could prevent good adhesion. Stain shall not be applied when the air temperature is below 45 degrees F or above 90 degrees F, nor when

the surface is damp, nor when weather conditions such as rain, fog or dew would not permit full drying of material.

4. The stain application shall be performed at the project site to material that is surface dry. The contractor applying stains at the production site shall be responsible for any damage to the finish that occurs during shipping and installation and shall re-stain as needed after installation to correct any problems, in accordance with requirements of the stain manufacturer and the sound-absorbing material manufacturer, and to the satisfaction of the inspector.
5. Graffiti removal procedures shall be described on wall installation notes and demonstrated on the sample wall. Removal of graffiti by pressure washing and masking with stain shall be an acceptable method subject to demonstration.

9.0 Test Section for Product Acceptance

1. The contractor shall erect a demonstration section of barrier at the precast fabrication yard consisting of at least two columns and one pair of panels. The bay of panels shall be two panels stacked in standard height above ground. The demonstration barrier section shall have the same patterns, texture and color as the final product to be used in this contract, and shall serve as a standard for acceptance for all further work. A graffiti removal procedure shall be demonstrated on the sample wall. Panels used in the demonstration section may be incorporated into the project as the last product to be installed.

10.0 Panel Transportation and Installation

1. Manufacturer and trucking company shall insure that all panels are protected during all aspects of truck loading/unloading and transportation to the project installation location. Straps or other devices used to hold the panels in place on the truck shall not make contact with the sound absorptive material at any time.
2. Panels having deficiencies such as cracking, crazing, scaling, spalling, efflorescence or segregation, or panels having mottling of stain or finish shall be repaired prior to installation. Contractor shall inspect delivered product for any defects.
3. Written procedures designed to protect panel and sound absorptive material from damage during all phases of installation shall be incorporated into wall installation drawing notes. Installer shall consult with manufacturer and/or licensee to determine the proper procedures.
4. Installation shop drawings shall be drawn such that horizontal joints between panels line up with lines or joints in the adjacent panel bays.
5. Field patching of damaged sound absorbing surfaces shall be permitted upon demonstration to the satisfaction of the engineer that 1) such patching can be performed in the precast facility by a method approved by the manufacturer of the sound absorbing material, and 2) that patches can be durable. In any case, such field patching must be accomplished with the same sound absorbing material as is on the precast panel.
6. After installation, contractor shall remove dirt from panels with water by pressure washing. If not yet stained, contractor shall perform the staining as described herein after proper surface preparation and surface drying.
7. When panel installation is completed on any single barrier wall, post and panel appearance and alignment shall be inspected for acceptance. The surface of walls shall be viewed from a distance of not less than 100 feet for architectural acceptability.