

SPECIAL SPECIFICATION**4573****Reflective-Noise-Reduction Walls**

1. **Description.** Furnish materials and construct reflective-noise-reduction walls as shown on the plans and required by this Item.
2. **Materials.** Conform to the pertinent requirements of the following standard specification Items:

- Item 420, "Concrete Structures"
- Item 421, "Hydraulic Cement Concrete"
- Item 425, "Precast Prestressed Concrete Structural Members"
- Item 426, "Prestressing"
- Item 427, "Surface Finishes for Concrete"
- Item 440, "Reinforcing Steel"
- Item 441, "Steel Structures"
- Item 442, "Metal For Structures"
- Item 445, "Galvanizing"
- Item 446, "Cleaning and Painting Steel"
- Item 449, "Anchor Bolts"

Provide materials that are durable, weather resistant, and non-corrosive.

Galvanize anchor bolts, nuts, washers, and other structural steel elements for corrosion protection. Galvanize or paint all with the protection system shown on the plans.

Provide joint fillers, grout, and other incidental materials as shown on the plans or approved by the Engineer.

3. **General.**
 - (1) **Options.** Contractor has the option to furnish any proprietary reflective-noise-reduction wall system, which meets the requirements of this specification and complies with the design criteria shown on the plans. Provide a modular wall system that securely attaches to the face of the existing retaining walls or top of the traffic rail using maintainable anchorage or a framework of rails. Provide for the use of these systems in accordance with Article 7.3, "Patented Devices, Material and Processes".
 - (2) **Documentation.** Submit documentation from an independent, accredited laboratory demonstrating a Noise Reduction Coefficient (NRC) for the wall material no less than 0.90 as measured in accordance with one of the following ASTM test methods or other approved standard for determining NRC:

ASTM C423 (Reverberation Room Method)

ASTM C384 (Impedance Tube Method)

- (3) **Working Drawings.** Prior to fabrication, prepare and submit working drawings and design calculations for the proposed reflective-noise-reduction wall system to the Engineer for approval. Submit drawings on 11 in. x 17 in. size sheets. Submit 7 sets of casting drawings for precast segments, if applicable, and shop drawings for each detail of the plans requiring the use of structural steel, 7 sets of construction drawings and 2 sets of design calculations. Upon completion of construction, submit 1 set of reproducible as-built drawings to the Engineer.

If applicable, include all information necessary for precasting wall elements in the casting drawings. Casting drawings shall reflect the shape and dimension of precast components, the size, quantity and details of reinforcement, the quantity, type, size and details of connection and lifting hardware, the size and location of drain openings, and any additional details necessary.

Include a numbered wall component layout, and reflect field verified horizontal and vertical alignment of the wall in the shop drawings. Also include all information needed to erect the wall including the proposed drilled shaft elevations and length, limits of riprap, the type, details, and construction procedure for connecting the wall to the existing retaining wall or traffic rail, details necessary to account for change of grade, all existing and proposed utilities, and any additional details necessary to complete the work.

Provide design calculations that include a summary of all design parameters used, including material types, strength values, allowable stresses, assumed loads and load combinations. Submit calculations covering the range of heights and loading conditions on the project.

Provide drawings and design calculations that bear the seal of a registered professional Engineer who is registered in the State of Texas.

4. **Construction Methods.** Conform to the design and details shown on the plans and to the pertinent requirements of the following Items:

Item 424, "Precast Concrete Structures (Fabrication)"

Item 429, "Concrete Structure Repair"

Item 447, "Structural Bolting"

Item 448, "Structural Field Welding"

Set all posts plumb and firm to the line and grade shown on the plans.

Construct walls to a vertical and horizontal alignment tolerance of 3/4 in. when measured along a plumb or level 10-foot straight edge. Construct walls to an overall vertical tolerance (plumbness from top to bottom) of 1/2 in. per 10 feet of wall height. For the purpose of this standard, the existing retaining walls shall be considered plumb.

Provide positive drainage throughout system to prevent standing and trapped water.

5. **Measurement.** This Item will be measured by the square foot of front surface area of the reflective-noise-reduction wall, complete in place.

This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal and unless modified by Article 9.2. "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

The Noise Level Reduction (NLR) resulting from the reflective-noise-reduction wall, complete in place, will be measured by Nelson Acoustical Services as shown in the plans.

6. **Payment.** The work performed and material furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reflective-Noise-Reduction Walls". This price is full compensation for furnishing and installing all reflective-noise-reduction wall materials including anchorage into the drilled shaft; for all reflective-noise-reduction wall preparation, hauling and erection; and for all labor, tools, equipment and incidentals.

The Department will pay an incentive as shown in the plans for the Noise Level Reduction (NLR), measured as provided under "Measurement".