ITEM SPECIAL - NOISE GENERAL

1. DESCRIPTION

This work consists of preparing any necessary shop drawings, and
manufacturing, testing, transporting, installing and testing noise
barriers and sound absorbing materials, designing, installing
backing panels, and for the contractor's benefit, designing, installing
and backfilling of new construction. The work will be done in
accordance with the drawings and specifications on the
project plans.

2. DESIGN SPECIFICATIONS

The design specifications for noise barriers are based on the
the AASHTO Guide Specifications for Structural Design of
Sound Barriers, 1994, including the 1992 and 2002
interim revisions.

3. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP

The work will be performed in accordance with the current
version of the good construction and material specifications and
these standard specifications.

4. DESIGN LOADS

Wind Load

A wind load on posts is 25 PSF (6.8 kPa), and on beams is 10 PSF
(2.5 kPa).

Snow Load

A snow load is 3 inches at 57.3 PSF (2.6 kPa).

5. DESIGN CASES

Extreme Event 1.0 Load

'2.0 MILE x 200 ft.'

Service 1.0 Load

1.0 MILE x 200 ft.

6. MATERIAL SPECIFICATIONS

REINFORCING STEEL: SHALL BE 50/60/70 GRADE, PER CMS 7050, AND ACCORDING TO ASTM A615, CANadian STandard.

ACCOMODATIONS

Concrete:

Concrete shall be cast in place, using a water-repellent admixture and
be at least 5 ksi (34.5 MPa) on 25 mm (1 in.) ground. The admixture shall be of Type III-A,
ASTM A 1126.

Structural: ASTM 460, Type 2A, 50 ksi (345 MPa). See CMS 701.01

FASTENERS:

Anchor bolts shall be ASTM F1554, Grade 2, with hex head and
threaded ends. The bolts shall have a minimum ultimate tensile
strength of 105 ksi (700 MPa). The nuts shall be ASTM C668, Grade 2, with
hex head and a minimum ultimate tensile strength of 75 ksi (517 MPa).

CALCULATION:

CALCULATE ALL STRUCUTRAL STEEL, BASE PLATES, ANCHOR
BOLTS, THREADED RODS, NUTS, AND WASHERS AS PER CMS 701.02.
ENSURE THAT THE THREATENED NUTS SAFELY ENGAGE THE
ANCHOR BOLTS AND THREADED RODS ARE CALACULATED.

FOAM BACKER ROD

The backer rod shall be an expanded, closed-cell polystyrene foam,
with a density not to exceed 2.5 lbs/ft³ and a diameter of 0.5
inches. Other materials such as foams, open cell foams, and
latex are not acceptable. Furnish backer rod meeting ASTM D455, Type 2 or 3.

ALL ELECTRONIC DOCUMENTS SHALL BE IN PORTABLE DOCUMENT FORMAT (PDF) FORM. SHOP DRAWINGS SHALL BE SUBMITTED IN 9 X 12 SHEET SIZE. ACCEPTANCE LETTERS SHALL BE SUBMITTED IN 8 X 11 SHEET SIZE.

2. CONCRETE NOISE BARRIER PANELS AND POSTS

Every piece of all noise barrier panels and concrete noise barrier components supplied to the
project shall conform in accordance with CMS 730. The concrete panels shall be 8 ft 6 in.
wide and 10 ft 6 in. long. The concrete panels shall be made of concrete with a minimum
compressive strength of 4,000 psi (27.6 MPa). The concrete shall be placed in 24 inch
sections and be properly cured. The concrete panels shall be installed with the use of
post anchors, bonding the panels to the ground reinforcement. The concrete panels shall
be in accordance with CMS 730. The concrete panels shall be placed on top of the concrete
posts. The concrete posts shall be cast in place with the use of post anchors, bonding the
posts to the ground reinforcement. The concrete posts shall be installed with the use of
anchor bolts, and the concrete posts shall be in accordance with CMS 730.

USE NO REINFORCED CONCRETE PANELS AND POSTS EXCEPT FOR STEEL STRUCTURES.


SEAL THE CONCRETE NOISE BARRIER PANELS AND POSTS WITH AN APPROVED SEALING COMPOUND TO ENSURE THE LEAKAGE SEALING REQUIREMENTS ARE MEET. ENSURE THAT THE SEALING COMPOUND IS APPLIED TO THE JOINTS BETWEEN THE PANELS AND THE POSTS. THE SEALING COMPOUND SHALL BE IN ACCORDANCE WITH CMS 730.

FOR AESTHETIC PURPOSES, HORIZONTAL JOINTS BETWEEN PANELS SHALL MATCH ANY EXISTING JOINTS. NO PANEL JOINTS SHALL BE LESS THAN 3 INCHES IN WIDTH.

REMOVING LEAFS OR FALLEN LEAVES THAT OCCUR PRIOR TO FINAL ACCEPTANCE IS THE RESPONSIBILITY OF THE OWNER. THE OWNER MAY APPLY A FINES TO THE CONTRACTOR FOR ANY TIME THE WEEDS AND MOWING IN THE COMPLETED MOWING COST MAY BE CHARGED.

BEARING PLACEMENT

ALL BOTTOM NOISE BARRIER PANELS REQUIRE A NEOPRENE PERFORATED BEARING PAD BETWEEN THE BOTTOM OF THE PANEL AND THE POST. THE BEARING PADS SHALL BE MAINTAINED WITH THE USE OF AN APPROVED SEALING COMPOUND TO ENSURE THE LEAKAGE SEALING REQUIREMENTS ARE MET. THE LEAKAGE SEALING COMPOUND SHALL BE IN ACCORDANCE WITH CMS 730.

ATTACH CONCRETE NOISE BARRIER PANELS TO CONCRETE POSTS ACROSS THE ENTIRE PANEL WIDTH TO ENSURE THAT THE WEEDS AND MOWING IN THE COMPLETED MOWING COST MAY BE CHARGED.
CONSTRUCTION METHODS

1. LAYOUT AND ERECTION OF HOE BARRIERS IN THE FIELD AND VERIFY THE PROPOSED
   MOUND GEOMETRY AND DIMENSIONS OF THE POSTS AND THE PANELS PRIOR TO
   INSTALLATION TO AVOID NOSE DAMAGE OR WAVING AND IMPROVE LOCATION OF THE
   BARRIER COMPONENTS.

2. CLEAR BRUSH AND NETTING WALLS AND/OR REMOVE TREES IN CONFLICT WITH THE
   PROJECT LIMITATIONS. ENSURE THAT ALL TREES ARE THOROUGHLY CRUSHED OR
   REQUIRED TO PERFORM THE WORK. OBTAIN APPROVAL FROM THE PROJECT
   ENGINEER PRIOR TO INSTALLING ANY TREES ON THE SITE. ALL TREES REQUIRED TO
   FOR MINIMUM 10 FT. IN LOCATION.

3. DO NOT SHIP CONCRETE PANELS, POSTS, OR CART UNITS TO THE CONSTRUCTION SITE.
   WHEN TRANSPORTING PANELS OR CART UNITS, THE MANUFACTURER MAY REQUIRE
   THE OWNER TO MAKE THE TRANSPORTATION DUTIES TO AVOID DAMAGE TO THE
   PANELS.

4. INSTALL NOISE BARRIERS IN ACCORDANCE WITH THE PROJECT PLANS. CEMENT
   JOINTS AND CONNECTIONS IN SUCH A MANNER AS TO BE STRUCTURALLY OR
   SEISMICALLY FLEXIBLE AND TO WITHSTAND THE VIBRATION CAUSING DAMAGE.
   INSTALL ALL BARRIERS IN ACCORDANCE WITH THE PROJECT DRAWINGS.

5. PROTECTION OF EXISTING SERVING AND CABLES:
   a. BEFORE EXCAVATING FOR THE DRAINAGE PLANS, AFIELD VERIFY THE LOCATION OF ALL
      EXISTING SEWER AND CABLES SHOWN ON THE PROJECT PLANS.
   b. SHOVEL ALL CABLES OR UV DAMAGED BY THE CONTRACTOR'S NEGLIGENCE OR
      ANY OTHER DAMAGE CAUSING DAMAGES TO THE BARRIERS BY THE CONTRACTOR TO
      FINAL ACCEPTANCE AS EFFECTIVE WORK.

6. DISPOSE OF ALL EXCESS EXCAVATION IN A MANNER SATISFACTORY TO THE
   ENGINEER.

7. FOR BARRIERS THAT ARE BUILT ON TOP OF EARTH SURFACES, CONSTRUCT THE
   BARRIERS ON A GRASSY AREA WITHIN 10 FT. OF THE PROJECT LINE. ENSURE ALL BARRIERS
   AREc CONSTRUCTED ON A STRAIGHT LINE. ENSURE ALL BARRIERS ARE CONSTRUCTED ON A
   STRAIGHT LINE.

8. INSTALL TEMPORARY FENCE WHEN THE TIME BETWEEN THE REMOVAL OF THE
   EXISTING FENCE AND THE INSTALLATION OF THE PROPOSED BARRIER IS ONCE AGAIN
   MORE THAN 10 FT. OF THE PROJECT LINE. ENSURE ALL BARRIERS ARE CONSTRUCTED ON A
   STRAIGHT LINE.

9. RESTORATION OF WORK AREAS:
   a. UNDERSIGHT BARRIERS INSTALLATION, RESTORE ALL AREAS DISTURBED BY THE
      BARRIERS CONSTRUCTION TO THEIR ORIGIN CONDITION. RESTORATION SHALL
      BE EMBELLISHMENT AND IN ACCORDANCE WITH THE CONTRACT AND
      SPECIFICATIONS.
   b. IN THE AREA BETWEEN THE BOUNDARY WALL AND THE EXISTING FENCE, WHERE
      THE BARRIERS IS TO BE REMOVED AND THE RESIDING PROPERTY IS GRASSED
      RESTORE BARRIERS PANELS TO THE ORIGINAL BOUNDARY WALL IN ACCORDANCE WITH THE
      RESIDENTIAL PROVISIONS OF 65-9.5.5.
MATERIALS:

1. Select and use products only from the Office of Materials Management.

ONE COTTON OF ANY OF THE APPROVED SEALERS SHALL MEET THE FOLLOWING PERFORMANCE REQUIREMENTS:

1. FREEZE-THAW TEST: Subject the applied finish coating to freeze-thaw cycle tests as follows:
   - Cast three concrete specimens, not less than 4 x 4 x 8 by 8 x 8 x 8 inches, using the same mix proportions and water to cement ratio as those of the full-scale concrete. Cure the concrete specimens for fourteen days with a curing period at room temperature, 60 degrees to 80 degrees Fahrenheit, before storing in a controlled environment with a relative humidity of 90% or greater. Store the specimens in a controlled environment at 70 degrees Fahrenheit for 120 hours and then place them in a refrigerator at 40 degrees Fahrenheit for 48 hours.
   - The specimen shall be stored in a controlled environment at 70 degrees Fahrenheit for 120 hours and then placed in a refrigerator at 40 degrees Fahrenheit for 48 hours. After the freeze-thaw cycle, the specimen shall not exhibit any cracks, spalling, or other signs of damage.

2. ACCELERATED WEATHERING TEST: Subject the applied finish coating to a 5,000-cycle exposure to the Weather-Ometer, ASTM C-146, Type I, Test Method B. The test shall be conducted at 100 degrees Fahrenheit and 100% relative humidity. The test shall be conducted for a period of 2,000 hours. At the end of the test, the specimen shall show no discoloration, peeling, or flaking. The specimen shall also pass a visual inspection for any damage.

3. SURFACE RESISTANCE TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a salt solution in a climate chamber. After 1000 hours, the coated specimen shall pass the visual inspection for any damage.

4. IMPACT RESISTANCE TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a 3-foot high, 2-inch diameter steel ball. After 24 hours, the coated specimen shall show no signs of damage.

5. ABSORPTION TEST: Cast a 1-foot metal specimen with the applied finish coating at a rate of 60 x 4 x 4 inches. Allow the specimen to dry for 48 hours at room temperature. Measure the total weight of the specimen. After 24 hours, the specimen shall show no signs of moisture absorption.

6. SOLUTION RESISTANCE TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a 10% solution of sodium chloride. After 24 hours, the specimen shall show no signs of damage.

7. SCALING RESISTANCE TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a 10% solution of sodium chloride. After 24 hours, the specimen shall show no signs of scaling.

8. MOISTURE VAPOR TRANSMISSION TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a 10% solution of sodium chloride. After 24 hours, the specimen shall show no signs of moisture absorption.

9. EMISSIONS TEST: Apply a sample coating to a concrete surface at the rate of 1 gallon per 100 square feet. Allow the coating to cure for 24 hours at room temperature. Expose the coated specimen to a 10% solution of sodium chloride. After 24 hours, the specimen shall show no signs of scaling.

10. Blasting Clean: Any rust-stained areas on the concrete base. If exposed, remove rust, scale, or other surface materials. Ensure that the surface is clean and free of dust and other contaminants. Apply the sealer in accordance with the manufacturer's recommendations. If the surface is not clean, apply the sealer and then apply the sealer in accordance with the manufacturer's recommendations.

11. Following the manufacturer's recommended temperature restrictions specified above, the sealer application has started to verify the entire application continuity, re-inspect and reblast the new area of the coating surface to ensure proper adhesion.

12. Storage: Store the coatings in a dry and cool area, away from direct sunlight and exposure to freezing temperatures. Keep the coatings at a temperature between 40 degrees and 80 degrees Fahrenheit. Do not expose the coatings to freezing temperatures. Expose the coatings to freezing temperatures for more than 24 hours. Do not apply the coatings at temperatures below 40 degrees Fahrenheit.

13. Protection of Adjacent Surfaces and the Public: When applying a sealer, protect adjacent surfaces that might come into contact with sealer. Use a protective cover on any equipment or materials that might come into contact with the sealer.

14. Environmental Requirements: Protect plants and vegetation from overspray by covering with drop cloths. Comply with all federal, state, and local environmental regulations.

15. Basis of Payment: The Department will consider the cost for materials, labor, and application of sealers or sealants to the concrete as part of the overall project costs.
**SLOPED SECTION DRAINAGE NOTES:**

1. Construct a trench with a minimum longitudinal slope of 1.0% under the noise barrier panels as shown in the typical elevation.
2. Provide an underdrain slope of 4% minimum or as specified in project plans, install in accordance with item EOS.
3. Outlet conduit to be spaced at 500' max; install in accordance with item EOS.