ITEM SPECIAL - NOISE BARRIERS

GENERAL

1. THIS WORK CONSISTS OF PREPARING ANY NECESSARY SHOP DRAWINGS, AND MANUFACTURING, INSTALLING, TESTING, STARTING, AND INSTALLING NOISE BARRIERS, INCLUDING REARING INSTALLATION, ENERGY ATTENUATION AND BACKFILLING, AND RESTORING THE WORK AREA IN ACCORDANCE WITH THESE DRAWINGS AND SPECIFICATIONS. THE WORK IS MEASURED AND CHARGED IN LINEAL FEET AND SQUARE FEET, AND IS REPORTED IN SQUARE FEET.

2. DESIGN SPECIFICATIONS:

GOST BRIDGE DESIGN MANUAL, 2007
AASHTO-LRFD BRIDGE DESIGN SPECIFICATIONS, 4th EDITION, 2007
PCI DESIGN HANDBOOK, 2003
ACI STANDARD 350-05, APPENDIX D

3. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:

PREFORM: PROVIDE MATERIALS, AND ENSURE WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSION OF THE ORI GINAL CONSTRUCTION AND MATERIAL SPECIFICATIONS AND THESE STANDARD DRAWINGS.

4. DESIGN LOADS:

WIND LOAD:
APPLIED WIND LOAD ON POSTS 25 PSF (1.16 kN/m²) 0.25, AND 20 PSF (0.91 kN/m²) 0.20.
APPLIED WIND LOADS ARE 25 PSF, THE WIND LOAD IS BASED ON AN 80 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 20 PSF, THE WIND LOAD IS BASED ON AN 60 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 15 PSF, THE WIND LOAD IS BASED ON AN 40 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 5.0 PSF, THE WIND LOAD IS BASED ON AN 30 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 2.5 PSF, THE WIND LOAD IS BASED ON AN 20 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 1.0 PSF, THE WIND LOAD IS BASED ON AN 10 MPH MAX WIND VELOCITY.
APPLIED WIND LOADS ARE 0.22 PSF, THE WIND LOAD IS BASED ON AN 5 MPH MAX WIND VELOCITY.

ICE LOAD:
APPLIED ICE LOAD IS 3 INCHES AT 57.3 PSF, 43.4 PSF.

6. DESIGN LOAD CASES:

"NORMAL" LOAD CASE: 1.20(LOAD) + 0.50(WIND LOAD)
"EXTREME EVENT" 1.0 LOAD CASE: 1.50 LOAD + 1.00 WIND LOAD
"SEVERE" 1.0 LOAD CASE: 1.50 LOAD + 1.00 WIND LOAD
"SEVERE" 1.25 LOAD CASE: 1.25 LOAD + 0.75 WIND LOAD
"EXTREME" 1.25 LOAD CASE: 1.25 LOAD + 1.00 WIND LOAD

7. SOIL SPECIFICATIONS:

REINFORCING STEEL:
REINFORCING STEEL SHALL BE G50-C05-A05 AS PER CMS 5.08.10.05.05.
REINFORCING STEEL SHALL CONFORM TO CMS 703.9.0.01, 19.00 WELDED WIRE FABRIC SHALL BE CMS 703.9.10.2.

COMPRESSION:
COMPRESSIVE STRENGTH: 7,000 PSI (50 MPa) AND POSTS.
CONCRETE CLASS 3000 PSI (20 MPa) AND POSTS.
COMPOSITE CONCRETE STREET BARRIER: 3,000 PSI (20 MPa) AND POSTS.
CONCRETE CLASS 3000 PSI (20 MPa) AND POSTS.
EXCEPT FOR DRILLED SHAFT CONCRETE WHICH SHALL CONFORM TO CMS 520, 6000 PSI (40 MPa) AND POSTS. EXCEPT FOR WARE WATER RESISTANT ADEQUATE AND DRY BY WET TOLD ASHINI OR 1-MY 100 4000 CEMENT GRADED BULK FOOLED (BCG).

STRUCTURAL STEEL: ASTM A705, GRADE 50.5 AS PER CMS 77.01.

FASTENERS:
ANCHOR BOLTS SHALL BE ASTM 1400, GRADE 600. TIES ARE ASTM 1150, GRADE 150.
NUTS SHALL BE ASTM A194, GRADE 8 SM, AND WASHERS SHALL BE ASTM A194.

COMPOSITE CONCRETE STREET BARRIER: 1.5 INCH THICK, STRUCTURAL STEEL, BASE PLATES, ANCHOR BOLTS, THREADED NUTS, AND WASHERS AS PER CMS 77.01.05, ENSURE THAT THE ENTIRE LENGTH OF ANCHOR BOLTS AND THREADS ARE GALVANIZED.

FOAM IPC:
THE BACKER FOAM SHALL BE AN EXPANDED, CLOSED CELL POLYURETHANE FOAM, THE BACKER FOAM MATERIALS ARE AS SHOWN ON SHEET 6/15. OTHER BACKER FOAM MATERIALS (RIPPLE, ROPS AND OPEN CELL FOAM) ARE NOT ACCEPTABLE. FURNISH FOAM BACKER FROM ONE OF THE SUPPlys SHOWN ON THE DRAWING (PROJECT INSTALLATION) MAINTAINED BY THE OFFICE OF MATERIALS MANAGEMENT, OR ACCEPTED BY THE CM IN ACCORDANCE WITH THEIR WRITTEN PROCEDURES.

B. CONCRETE NOISE BARRIERS:

PRODUCTS:
EVERY PRODUCER OF PRECAST CONCRETE NOISE BARRIER COMPONENTS SUPPLIED TO THE PROJECT SHALL SUBMIT A PRECAST CONCRETE NOISE BARRIER COMPONENTS TEST REPORT TO THE DESIGNER FOR REVIEW IN ACCORDANCE WITH CMS 703.50.05.05.05. THE DESIGNER WILL NOT ACCEPT PRECAST COMPONENTS FROM NON-CERTIFIED PLANTS. THE CONCRETE SUPPLIER AND MANUFACTURER SHALL COMPLY WITH THE REQUIREMENTS SPECIFIED ABOVE UNDER SECTION 6, MATERIAL SPECIFICATIONS.

NOISE BARRIERS REQUIRE A REINFORCED INTERNAL CAP ON THE TOP OF THE 100" POSTS AND OTHER REINFORCED STEEL INTERNAL CAPS ON THE TOPS OF THE POSTS. FOR GENERAL DEMENSION REQUIREMENTS REFER TO DETAIL "A" ON SHEET 1,403.20 FOR PANELS, CAPS AND SECTIONS. CAPS AND SECTIONS MAY NOT BE CAST WITH SOUND ABSORPTIVE MATERIAL.

THE NOISE BARRIER PANELS SHALL BE CAST WITH AN APOLAR STONE PATTERN FORM LINES ON BOTH SIDES OF THE PANEL. SOME OF THE APOLAR FORM LINES OR AERIAL SURFACE TREATMENTS MAY BE USED UPON THE APPROVAL OF THE DISTRICT AESTHETIC COORDINATOR.

SEAL THE CONCRETE NOISE BARRIER PANELS AND POSTS WITH AN APPROVED COATING FROM A SUPPLIER LISTED IN THE NOISE BARRIER SEALER SPECIFICATION ON SHEET 50.03.

CMS (PARTIAL) APPROVED COLLECTING AND CONCRETE PANEL APPLICATION AT THE FACTURATION PLANT. FURNISH THE SEALING/COUNTING MATERIAL FROM A SINGLE SUPPLIER FOR AN ENTIRE PROJECT. THE SEALING/COUNTING MATERIAL SHALL BE AS NOTED IN THE PROJECT DRAWINGS.

FOR AESTHETIC PURPOSES, HORIZONTAL JOINT LINES BETWEEN PANELS SHALL MATCH FOR A MINIMUM DISTANCE OF 6 FEET, EXCEPT AT ANGLE BREAKS GREATER THAN 30°.

REMOVE LEACHING OR EROSION THAT OCCURS PRIOR TO FINAL ACCEPTANCE OF THE ENTIRE PROJECT AREA. THE MATERIALS CHAIN OF CONFORMITY PROCESS SHOWN ON SHEET 1,403.20. THIS SHALL ALSO APPLY IN AREAS WHERE A PARTIAL ACCEPTANCE OF THE COMPLETED WALLS MAY HAVE BEEN GRANTED.

11. BEARING PLADS:


12. DRILLED SHADS:

THE NOISE BARRIER POSTS SHALL BE SUPPORTED BY 60-DIAMETER DRILLED SHADS FOUNDATIONS UNLESS ANOTHER DRAINAGE SYSTEM IS APPROVED BY THE OFFICE OF STRUCTURAL ENGINEERING IN ORDER TO ACCOMMODATE POOR SOIL CONDITIONS AND OTHER REASONS. THE DRILLED SHARDS shall be extended or if another foundation type should be preferable.

A POOR SOIL CONDITION SHOULD BE CONSIDERED TO EXIST WHEN OVER ONE THIRD OF THE EXCAVATED DEPTH SHOWS AN UNSTABLE REAK W00 TYPE. THE EFFECT IS AS ENGINEERED BY THE ENGINEER.

THE REINFORCEMENT FOR THE DRILLED SHARDS FOUNDATION SHALL BE DEVELOPED BY USING A MINIMUM 50" LIP SPACE WITHIN THE CASE TO ATTACH THE ADDITIONAL FOUNDATION BASE. PROVIDE ADDITIONAL 4" TIES AT 1" - 0" MAXIMUM SPACING.

17. AVARIANCE OF UNPREDICTED OBSTRUCTIONS:

IF THE AVOIDANCE OF UNPREDICTED OBSTRUCTIONS OR OTHER RESTRICTIONS REQUIRE THE USE OF LONGER POST SPACINGS THAN WHAT SHOWN ON THE PROJECT PLANS, FURNISH AND INSTALL THE ADDITIONAL POSTS AS DIRECTED BY THE ENGINEER. THE ADDITIONAL FOUNDATIONS, POSTS, AND PANELS SHALL CONFORM TO THE SPECIFIED REQUIREMENTS AND ELEVATIONS OF THE ADDITIONAL POSTS AND PANELS, AND PANEL JOINT LOCATIONS SHALL CONFORM TO THE ORIGINAL DRAWINGS. THE DEPARTMENT WILL NOT ACCEPT FIELD CUTTING OF POSTS OR PANELS TO MATCH THE NEW POST LOCATION.
CONSTRUCTION METHODS

1. LAYOUT AND STAKE EACH NOISE BARRIER IN THE FIELD AND VERIFY THE PROPOSED WALL DIMENSIONS AND GEOMETRIES OF THE POSTS AND THE PANELS PRIOR TO DEVELOPING AND FABRICATING THE NOISE BARRIERS.

2. CLEAR BRUSH AND LAY OUT THE NOISE BARRIER BRANDMARKS FROM THE CENTER OF THE ROADWAY. REMOVE ALL TREES THAT ARE ABSOLUTELY NECESSARY TO PERFORM THE WORK. OBTAIN APPROVAL FROM THE PROJECT ENGINEER PRIOR TO PERFORMING WORK.

3. DO NOT INSTALL NOISE BARRIERS UNTIL THE PUBLIC WILLINGLY ACCEPT THEM AND ARE ABLE TO CONSIDER THE IMPACT OF THE NOISE BARRIERS. THE ENGINEER WILL MAKE RECOMMENDATIONS FOR THE INSTALLATION OF THE NOISE BARRIERS.

4. INSTALL NOISE BARRIERS IN ACCORDANCE WITH THE PLAN, SECURE JOINTS, AND SURFACE CONNECTIONS IN SUCH A MANNER AS TO BE STRUCTURALLY AND MECHANICALLY STABLE WITH NO VISIBLY OPENINGS FOR SOUND TRANSMISSION. NOISE BARRIERS ATTACHED TO POSTS AND PANELS WILL BE STRAIGHT, LEVEL, AND TIGHTLY FITTED TO THE SUPPORT, NOISY PANELS OR BOLTS WILL BE REMOVED, AND THE DEPARTMENT WILL CONSIDER CONDITIONS THAT CAUSE SPALLING OR DAMAGE.

5. PROTECTION OF EXISTING SEwers AND CURBING: BEFORE EXCAVATION, INSPECT THE LOCATION OF ALL EXISTING SEwers AND CURBING SHOWN ON THE PLAN.

6. REFER TO CMS 220.07 FOR REQUIREMENTS TO OPERATE CORRECTLY WITH UTILITIES.

7. FOR NOISE BARRIERS THAT ARE BUILT ON TOP OF EARTH BERRMS, CONSTRUCT THE BERMS OF EMBANKMENT MATERIAL IN ACCORDANCE WITH CMS 215.03 OF THE CMS.


9. RESTORATION OF WORK AREAS: FOLLOW THE CMS 855, SPECIAL NOISE BARRIERS OR ANY APPLICABLE CMS.

10. NOISE LEVEL MEASUREMENT:

METHOD OF MEASUREMENT

The department shall measure the noise barrier by the number of square feet.

The department shall determine the area of individual noise barrier segments from project plan dimensions using a height from the bottom of the bottom panel, to the top of the wall panels, to the top of the noise barrier, and span lengths measured as shown in post details on sheets B & B/13.

The calculated noise barrier area in the project plans is based upon 1" x 3" incremental panel heights. The department shall not adjust pay quantities for noise barrier heights or lengths greater than project plan requirements.

BASIS OF PAYMENT

Payment for noise barriers is full compensation for furnishing and installing foundations, posts, panels, caps, steel base plates and connections, concrete construction, and all other work and labor involved in constructing the noise barriers. The department shall pay an additional amount for noise barrier materials and labor.

The department shall pay for cleaning and grubbing and trimming trees under item 320.07 - cleaning and grubbing.

The department shall pay for the additional length of drilled shafts constructed at the direction of the engineer in unexpected areas of poor soil as extra work in accordance with CMS 155.10.5.

The department shall pay for the additional foundations, posts, and panels furnished and installed at the direction of the engineer in areas where the engineer determines the necessary or other conditions as extra work in accordance with CMS 155.10.5.

The department shall pay for erecting, maintaining, and removing temporary fence, and installing and maintaining the temporary fence in accordance with CMS 155.10.5.

The department shall pay for laying out and staking the noise barrier under item 623 - construction layout stake.

WHERE THE DRILLED SHAFT LENGTH WAS INCREASED FROM THE PROJECT PLAN DUE TO INTERFERENCE WITH EXCEPTED BEDROCK, THE DEPARTMENT WILL NOT PAY FOR THIS WORK DIRECTLY BUT WILL CONSIDER IT INCENTIVE TO PAY TO THE CONTRACTOR.

The department shall pay for repairing or replacing damaged components by improving roads not including, transporting, storing, or erecting.

The department shall pay for acceptance quantities at the contract prices as follows:

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<th>ITEM</th>
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<th>DESCRIPTION</th>
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| SPECIAL | 50'S | NOISE BARRIER REFLECTIVE, 8'2" HEIGHT AND WITH DASHED LINE |}

7/18
NOISE BARRIER SEALER

DESCRIPTION

A SEALER FOR ALL CONCRETE SURFACE AREAS OF NOISE BARRIER PANELS AND CONCRETE POSTS, INCLUDING CONCRETE TO CONCRETE CONTACT SURFACES.

APPLY THE COLOR DEFINED BY THE FEDERAL COLOR STANDARD IDENTIFICATION NUMBER IN THE NOISE BARRIER PANELS. IF THERE IS NO NUMBER, THE ENGINEER WILL SPECIFY THE COLOR.

MATERIALS

1. THE SEALER SHALL MEET THE FOLLOWING PERFORMANCE REQUIREMENTS.
   1.1 FREEZE-THAW TEST: SUBMIT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLES AS FOLLOWS:
   1.2 ACCELERATED WEATHERING: SUBMIT THE APPLIED FINISH COATING TO ACCELERATED WEATHERING TESTS. THE SPECIMEN SHALL BE EXPOSED TO AT LEAST 200 HOURS OF DIRECT SUNLIGHT OR ARTIFICIAL LIGHT SOURCE, WITH A MINIMUM OF 80 DEGREES F. FOR 4 HOURS BEFORE COATING THE SPECIMENS WITH THE APPLIED FINISH COATING. THE SUNLIGHT OR ARTIFICIAL LIGHT SOURCE SHALL COMPLY WITH THE SPECIFICATIONS OF THE ASHRAE STANDARD 110.
   1.3 TRAFFICABILITY:
   1.4 IMPACT RESISTANCE:
   1.5 FLEXIBILITY:
   1.6 SCALING RESISTANCE:

MATERIALS APPROVAL

SUBMIT CERTIFIED TEST DATA TO THE ENGINEER THAT SHOWS THE SEALER MEETS THE MATERIAL REQUIREMENTS.

THE FOLLOWING PRODUCTS AND COVERAGE RATES ARE PRE-APPROVED:

1. THIESMANN COAT 5000
   2. BRIXIE Grade 100
   3. SCOTT BROS.
   4. WOODWARD
   5. SPRINGFIELD

APPLICATION

APPLY THE APPLIED FINISH COATING TO FREEZE-THAW CYCLES AS FOLLOWS:

1. APPLY THE APPLIED FINISH COATING TO THE EXTERIOR AND INTERIOR FACES OF THE NOISE BARRIER PANELS.

EQUIPMENT

USE THE APPLICATION EQUIPMENT RECOMMENDED BY THE SEALER MANUFACTURER, SUCH AS SPRAY EQUIPMENT, TOOLS, HOSES, PUMPS, ETC., SHALL BE CLEAN AND FREE OF FOREIGN MATTER, OIL, RESIDUE AND WATER PRIOR TO APPLYING THE SEALER.

APPLICATION TEMPERATURES

MINIMUM DAMPENED AIR TEMPERATURE - 40 DEGREES F
MINIMUM AMBIENT TEMPERATURE - 50 DEGREES F

DO NOT APPLY SEALER IF THE AIR TEMPERATURE IS EXPECTED TO BE BELOW OR ABOVE THE ABOVE TEMPERATURE RANGE FOR UP TO 12 HOURS AFTER APPLICATION. DO NOT APPLY THE SEALER IF RAIN IS ANTICIPATED WITHIN 4 HOURS AFTER APPLICATION.

PROTECTION OF ADJACENT SURFACES AND THE PUBLIC

WHEN APPLYING A SEALER, PROTECT ADJACENT SURFACES THAT CANNOT BE COVERED BY MIGEING OFF. FOR OTHER LIGHTS, PROTECT THE PUBLIC WHEN APPLYING SEALER IN AN AREA USED BY THE PUBLIC.

ENIRONMENTAL REQUIREMENTS

PROTECT SURFACE FROM OVERRUN BY COVERING WITH DROP CLOTHS. COMPLY WITH ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

PRECAUTIONS

FOLLOW PRECAUTIONS ON THE MANUFACTURER'S WAGS.

BASIS OF PAYMENT

THE DEALER WILL CONSIDER THE COST FOR MATERIALS, LABOR AND APPLICATION OF SEALER AS INCIDENTAL TO THE SQUARE FOOT COST OF THE NOISE WALL.

1. NO SEALER ON EXPOSED CONCRETE AREA.
2. NO SEALER ON UNCONCRETE AREA.
3. NO SEALER ON EXPOSED CONCRETE AREA.
4. NO SEALER ON EXPOSED CONCRETE AREA.
5. NO SEALER ON EXPOSED CONCRETE AREA.
6. NO SEALER ON EXPOSED CONCRETE AREA.
DETAIL A - REFLECTIVE PANEL WITH INTEGRAL CAP

NOTES:
1. FOR GENERAL NOTES REFER TO SHEETS 1-3/13.
2. INTEGRAL CAP DETAILS MAY VARY; REFER TO PROJECT PLANS FOR SPECIFIC DETAIL. BOTTOM OF CAP MUST HAVE RUSTICATION GROOVES OR OVERHANGS. PAINTED LINES ARE NOT ALLOWED.
3. THICKNESS OF ABSORPTIVE MATERIAL VARIES ACCORDING TO THE MATERIAL PROPERTIES USED BY THE MANUFACTURER.

LEGEND:
© AS REQUIRED BY DESIGN AND SHOWN ON PROJECT PLANS

DETAIL B - REFLECTIVE PANEL KEYWAY DETAIL

DETAIL B - ABSORPTIVE PANEL KEYWAY DETAIL
### 20° Precast Concrete Post Data

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### Notes
1. For general notes refer to Sheet 1/12.
2. By threaded rods are used for the steel base plate connections. In lieu of providing separate threaded rods, the #4 rebar may be extended and paired with thread ends to connect the steel base plate to the bottom of the post. Refer to steel base plate details on Sheet 2/12.
3. For additional post details refer to Sheet 1/12.
4. Working point is defined as the point of intersection of the wall alignment tangents. If the deflection angle equals zero, the working point is the point of intersection of the wall alignment and the post axis.

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### #3 Stirrup Schedule

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### Bending Diagrams

**Legend**
- # = Panel length deduction (P/D) dimension as shown on *C* column on sheet 2/12.
- 3/4" - Threaded rod embrace, see Sheet 1/12.
- # = Center of drilled shaft.
TYPICAL FILL SECTION

TYPICAL CUT SECTION

TYPICAL SLOPED SECTION

TYPICAL ELEVATION OF SLOPED SECTION - DRAINAGE

SLOPED SECTION DRAINAGE NOTES:
1. Construct a trench with a minimum longitudinal slope of 1% under the noise barrier panels as shown in the typical elevation.
2. Provide underdrain slope of 2% minimum or as specified in project plans, installed in accordance with item 605.
3. Outlet conduit to be spaced at 500' max. install in accordance with item 605.