National and International Experience with Green Noise Barriers

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Outline

- Review of available green noise barriers
- Green noise barrier questionnaire
- Past experience with green noise barriers
- Concluding remarks
- Questions
Review of Available Green Noise Barriers
Green Noise Barriers

- The Living (Willow) Wall
- PileByg
- Criblock
- Timbergrid
- Evergreen
- Recywall
- Supported Earth Embankments
- Deltalok
The Living (Willow) Wall

- Irrigation
- Willow Stems
- Geotextile
- Soil
- Steel Ties

Dimensions:
- 0.8 m
- 1.2 m
- Up to 3.5 m
The Living (Willow) Wall
The Living (Willow) Wall
PileByg

Dry PileByg

- Dry willow rods
- Rock wool core
- Wooden frame
- Wooden posts

Living PileByg

- Dry willow rods
- Rock wool core
- Wooden frame
- Wooden posts
- Living willow rods
Dry PileByg
Dry PileByg
Living PileByg
Living PileByg
Criblock

DRAINAGE TO BE SPECIFIED BY SOILS ENGINEER. MANUFACTURER ADVISES AS A MINIMUM A 4 INCH PERFORATED PVC SUBDRAIN ENCASED IN 3 CU. FT./FT. OF 3/4" CRUSHED ROCK WRAPPED IN A FILTER FABRIC.
Criblock
Criblock

SCALE: 1" = 6'

3'-0" HEADER
FRONT STRETCHER
FALSE HEADER
4'-6" HEADER

EMBEDMENT (IF REQUIRED)
CONCRETE PAD
STEP OPTION
VERTICAL OPTION
Timbergrid

Pedestrian guard rail or safety fence, if required

Topsoiling/landscaping by others

PCC/HABASS laid to inside front face of wall, if required

Well graded granular infill in accordance with PHI Group specification

Soil stabilisation & erosion control matting, if required

Cut & bench

80mm dia. u.P.V.C. perforated drain as Wavin Coil or similar with 500mm min. bed and surround of pea gravel. Connection to outlet by others.

Mass concrete grade C25/26 cast on approved formation.
Timbergrid
Timbergrid
Evergreen
Evergreen
Recywall
Supported Earth Embankments
Supported Earth Embankments
Deltalok
Deltalok
Deltalok
Deltalok

Rendering by Ohio DOT
Green Noise Barrier Questionnaire
Green Noise Barrier Questionnaire

- Sent out to more than 300 experts in traffic noise
- Five main sections:
  - General information
  - Preconstruction
  - During construction
  - Post construction
  - Additional information
- Written responses/ follow-up phone questions
Past Experience with Green Noise Barriers
The Ontario Experience

- Many green noise barriers have been constructed in the Province of Ontario, Canada using the Living (Willow) Wall design.
- Most of these barriers were constructed very recently.
- Furthermore, none of these barriers were constructed along a major highway.
- Therefore, their performance may not reflect how they would perform along a major highway.
The New Hampshire Experience

- Three green noise barriers constructed in the early 1990s:
  - The first barrier was constructed in 1992 in Manchester, NH along I-93
  - The other two barriers were constructed shortly thereafter in the Nashua, NH
- All three barriers were constructed using the Evergreen concrete planter design
The New Hampshire Experience

- The Manchester barrier:
  - Length: 1700 ft
  - Height: 8 to 24 ft
  - Orientation: North-South
  - Cost: $950,000
  - Noise level: 75 dBA (before) and 65 dBA (after)
  - Still in service
The New Hampshire Experience
The New Hampshire Experience
The Colorado Experience

- A green noise barrier was constructed along I-70 in Silver Plume, CO in 1994
- The barrier was constructed under the Colorado Type II noise barrier program
- It was constructed using recycled plastic
- From the description provided, it seems that it utilized a similar technology to that of the Recywall
The Colorado Experience

- The Silver Plume barrier:
  - Mountainous location
  - Length: 1200 ft
  - Height: 9 to 14 ft
  - Orientation: East-West
  - Target noise reduction: 5 dBA (old CDOT optimization standard)
  - Still in service
The Colorado Experience
The Wisconsin Experience

- A green noise barrier was constructed along I-94 in Milwaukee, WI in 1994
- The barrier was constructed using the Recywall design that uses recycled plastic
- This project was part of a formal research study led by WisDOT in collaboration with HNTB
The Milwaukee barrier:

- Length: 520 ft
- Height: up to 21 ft
- Orientation: North-South
- Target noise reduction: 8 dBA
- Cost: $395,000 ($285,902 for structure and $109,981 for vegetation)
- Not in service
The Wisconsin Experience
The Wisconsin Experience
Concluding Remarks
Concluding Remarks

- Several concerns have been raised regarding the performance of green noise barriers

- Main concerns include:
  - The ability to capture and retain moisture
  - The ability to incorporate suitable vegetation
  - The ability to resist erosion
  - The height limitations of the barrier

- Vegetated retaining walls have mainly been successful in geographic regions with moderate climates and abundant moisture
Questions?