Techniques for Aesthetic Design of Freeway Noise Barriers

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Objectives

☐ To provide guidelines for improved aesthetic design of freeway noise barriers in urban areas
☐ To relate physical and cultural patterns of urban areas to noise barrier design
☐ To discuss how to combine landscaping and barrier design into an integrated unit
Background

- Legislative mandated study of Wisconsin State Legislature
- Milwaukee area emphasis
- State DOT, city government, regional planning agency, university steering committee
- Landscape architect/urban planning/civil engineering team

Outline

- Design principles
- Wall design variables
- Landscaping
- Integration of wall, landform and plants
- Design prototypes
- Costs
- Conclusions
Design Principles

- Distance and motion
- Balance: symmetrical/asymmetrical
- Sequence
- Visual orientation
Fundamental Elements of Design

- **LINE**
  ![Line Diagram]

- **FORM**
  ![Form Diagram]

- **SCALE**
  ![Scale Diagram]

Symmetrical Balance

![Symmetrical Balance Diagram]
Asymmetrical Balance

Sequence
## Land Use/Design Considerations

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Suburban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Vertical</td>
<td>Horizontal</td>
<td>Horizontal</td>
</tr>
<tr>
<td>Lines</td>
<td>Angular</td>
<td>Mixed</td>
<td>Curvilinear</td>
</tr>
<tr>
<td>Balance</td>
<td>Symmetrical</td>
<td>Mixed</td>
<td>Asymmetrical</td>
</tr>
<tr>
<td>Rhythm</td>
<td>Regular</td>
<td>Mixed</td>
<td>Irregular</td>
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</table>
Wall Design Variables

- Top profile
- Configuration
- Surface Treatment

Top Profile of Wall
Surface Contrast

- Shadow
  - Surface relief creates shadow patterns
- Texture
  - Smooth, fine, coarse
- Color variation
  - Prominent, paint, materials
- Pattern orientation
  - Horizontal, vertical, diagonal

Landscaping

- Soften
- Reduce scale
- Horizontal/vertical emphasis
- Framing element
Castellated Wall Configuration

Reduce Scale
Horizontal and Vertical Emphasis

Framing Element
Integration of Wall, Landform, and Plants

- Wall endings
- Living barrier
- Wall as planter
- Attachments of plants to walls
Living Barrier

Planting Troughs Nested in the Wall
Inventory for Design

- Physical patterns
- Cultural patterns
- Land use as viewed from road
Sites

- Rural character
- Suburban character
- Urban focal point
- Urban neighborhood
- Urban gateway
- Historical ghost
Site #1: Rural Character -- "Before"
Site #1: Rural Character -- "After"

Site #2: Suburban Character -- "Before"
Site #3: Urban Focal Point -- "After"

Site #4: Urban Neighborhood -- "Before"
Site #4: Urban Neighborhood -- "After"

Site #5: Urban Gateway -- "Before"
Site #5: Urban Gateway -- "After"

Site #6: Historical Ghost -- "Before"
Site #6: Historical Ghost -- "After"

Relative Costs

<table>
<thead>
<tr>
<th>Landscaping</th>
<th>Metal</th>
<th>Wood</th>
<th>Concrete</th>
</tr>
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<tbody>
<tr>
<td>Limited</td>
<td>1.05</td>
<td>1.55</td>
<td>1.71</td>
</tr>
<tr>
<td>Average</td>
<td>1.08</td>
<td>1.58</td>
<td>1.74</td>
</tr>
<tr>
<td>Extensive</td>
<td>1.22</td>
<td>1.72</td>
<td>1.88</td>
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</table>
Cost Considerations

- Cost differences between material types are greater than between landscaping types.
- Elaborate landscaping coupled with a lower cost barrier may be cheaper than simple landscaping with more extensive materials.
- Cost tradeoffs should be made clear to local citizens and elected officials so they can select the best overall option.

Conclusions:

Attractive and efficient freeway noise control can be achieved if these principles are followed:

- Diversity: Provide variety in placement, materials, texture, and landscaping. Reflect diverse urban landscapes with diverse barrier design.
- Integrate barriers and landscaping; choose all elements to fit together. Provide a balance between wall decoration and landscaping that is complementary.
Reflect neighborhood characteristics: Develop barrier designs in consultation with local residents to relate to the physical, cultural, and historical characteristics of surrounding areas.

Options: Provide a broad range of options in materials, profile, configuration, location, and type of barrier and landscaping. Consider wall material/landscaping cost tradeoffs.

Creativity: Maximize the opportunity for creative design, inventory neighborhood characteristics, select design themes, prepare alternatives, and involve the community.

Sound Good/Look Good