

The Interstate 70 Glenwood Canyon Project



Unit 14 Project Examples



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Unit 14 Project Examples



The Interstate 70 Glenwood Canyon Project

13 mile corridor

Planning 1970s

Construction 1981 – 1995

\$550,000,000.00 – design/construction

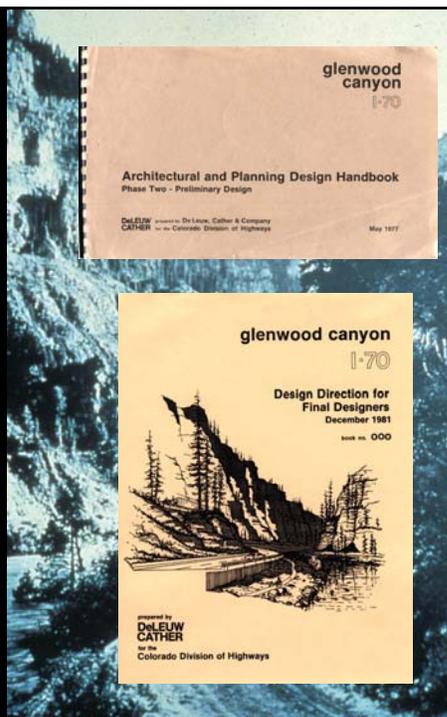


The Interstate 70 Glenwood Canyon Project

Architectural Guidelines
Directions to Final Designers
Congressional Act

BMPs

- Thematic highway architectural
 - common elements, design and detail
- Limit disturbance/ preservation
- Revegetation / surface textures
- Bedrock sculpting/ staining
- Controlled access – 60 to 5



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Interstate 70 Glenwood Canyon



Highway 6 & 24

Interstate 70 Glenwood Canyon



Form - Line - Color - Texture - Scale

Interstate 70 Glenwood Canyon



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Don't compromise the Canyon's scenic value

Keep to existing disturbance

Heal existing impacts

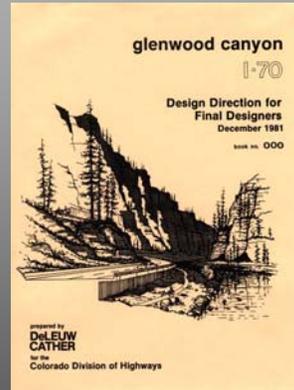
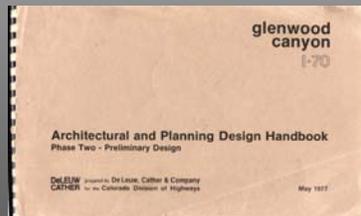
Avoid further filling in river

Maintain recreation access



Interstate 70 Glenwood Canyon

**Architectural Guidelines
Directions to Final Designers
Congressional Act**



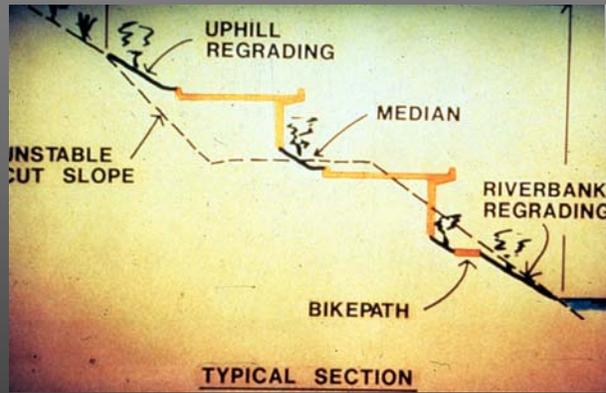
Interstate 70 Glenwood Canyon

Visualization tools



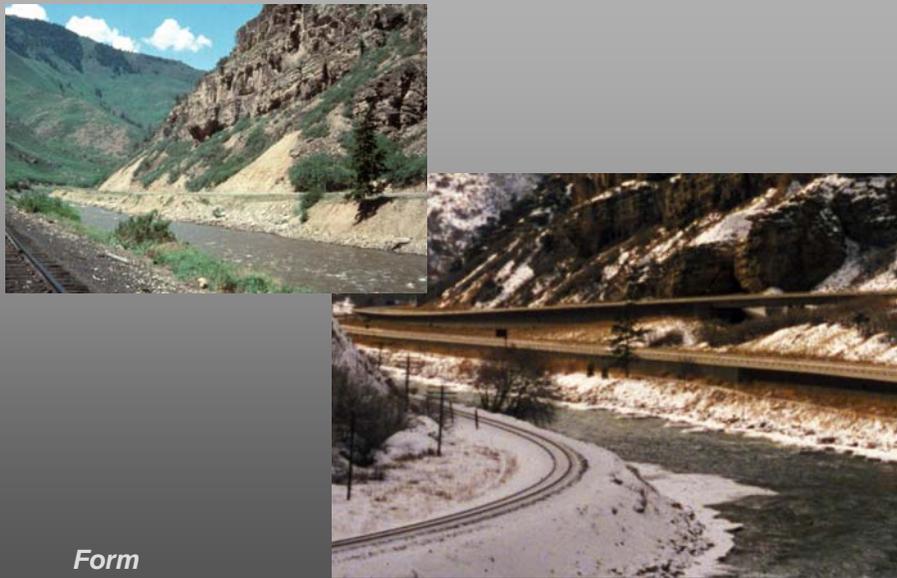
Interstate 70 Glenwood Canyon

Independent terraced alignments



Form

Interstate 70 Glenwood Canyon



Form

Interstate 70 Glenwood Canyon



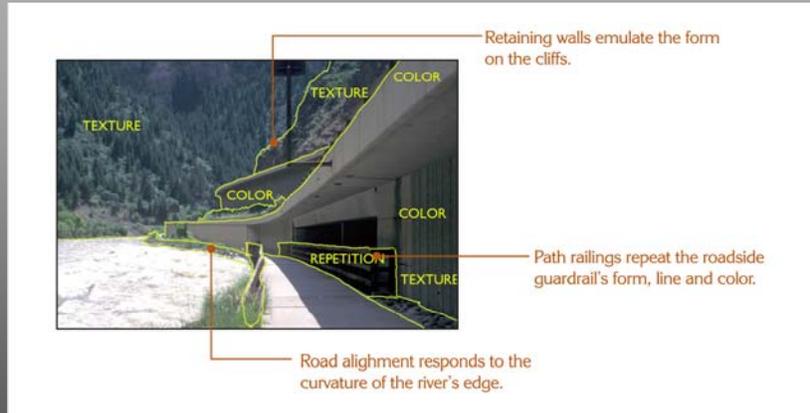
Form

Interstate 70 Glenwood Canyon



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon



Architectural Form – Line – Color – Texture – Scale

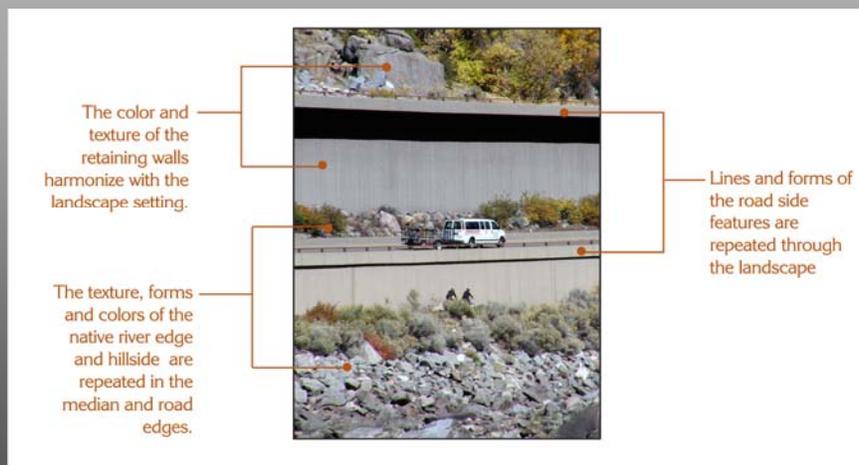
Interstate 70 Glenwood Canyon

Terraced Walls



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Terraced Walls



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Terraced Walls



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

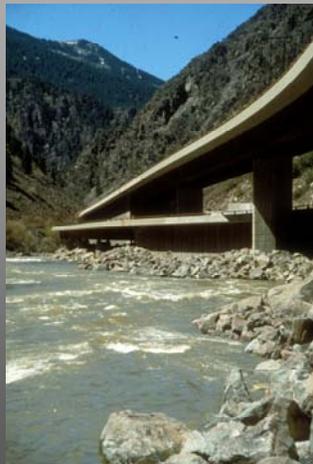
Viaducts



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Viaducts



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

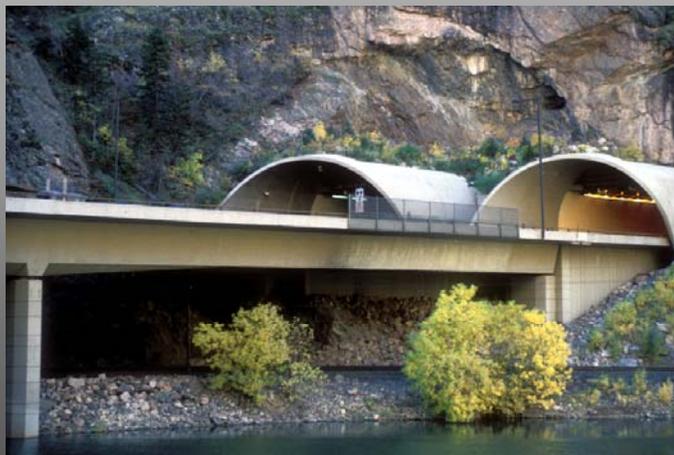
Viaducts



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Tunnels



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

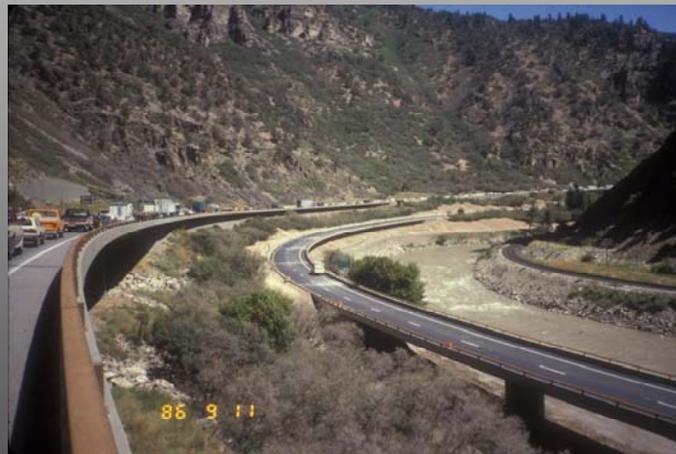
Tunnels



Architectural Form – Line – Color – Texture – Scale

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Terraced Walls, Viaducts and Tunnels



Architectural Form – Line – Color – Texture – Scale

Interstate 70 Glenwood Canyon

Best Management Practices



Minimize disturbance – fencing, access control, marking vegetation

Interstate 70 Glenwood Canyon

Best Management Practices



Minimizing the disturbance – fencing, pre-cast twin-T wall technology

Interstate 70 Glenwood Canyon

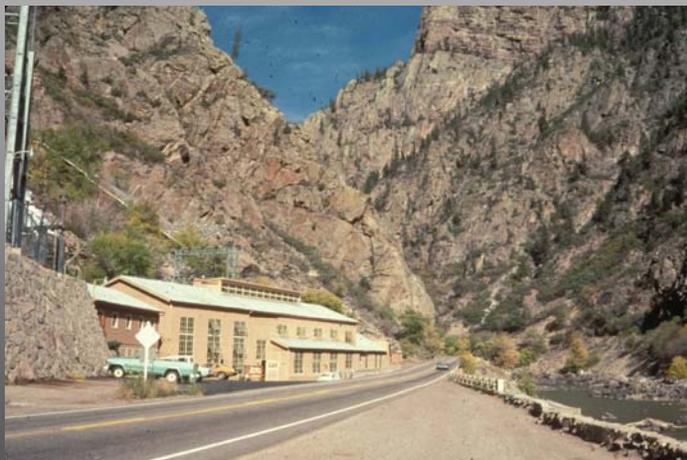
Best Management Practices



Minimizing the disturbance – segmental bridge technology

Interstate 70 Glenwood Canyon

Best Management Practices



Minimizing the disturbance – uphill tie-back wall technology

Interstate 70 Glenwood Canyon

Best Management Practices



Minimizing the disturbance – uphill tie-back wall technology

Interstate 70 Glenwood Canyon

Best Management Practices



Minimizing the disturbance – uphill tie-back wall technology

Interstate 70 Glenwood Canyon

Best Management Practices



Minimizing the disturbance – uphill tie-back wall technology

Interstate 70 Glenwood Canyon

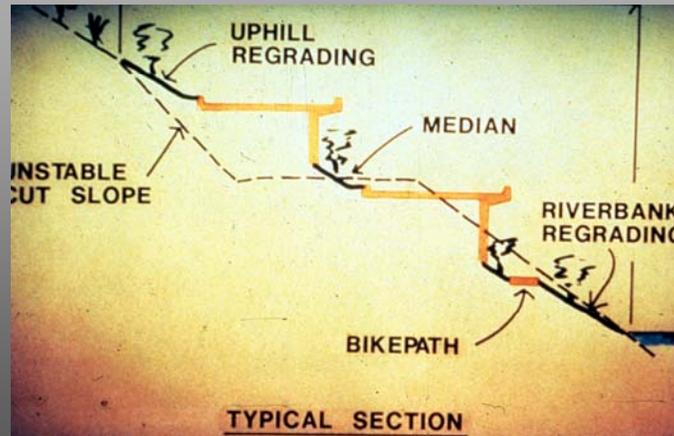
Best Management Practices



Minimizing the disturbance – uphill tie-back wall technology

Interstate 70 Glenwood Canyon

Best Management Practices



Hillside grading

Interstate 70 Glenwood Canyon

Best Management Practices

- Vegetation inventory
- Test plots
- Contract Growing/ planting & maintenance
- Irrigation
- Seeding/ seed testing



Revegetation

Interstate 70 Glenwood Canyon

Best Management Practices

The green scar phenomenon



Revegetation

Interstate 70 Glenwood Canyon

Best Management Practices

Surface textures



Revegetation

Interstate 70 Glenwood Canyon

Best Management Practices



Grading

Interstate 70 Glenwood Canyon

Best Management Practices



Grading

Interstate 70 Glenwood Canyon

Best Management Practices



Grading

Interstate 70 Glenwood Canyon

Best Management Practices



Grading

Interstate 70 Glenwood Canyon

Best Management Practices



Grading

Interstate 70 Glenwood Canyon

Best Management Practices

- Extended disturbance
- Pre-split blasting/ Drill traces
- Bedding planes
- Shaping



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

Best Management Practices



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

Best Management Practices



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

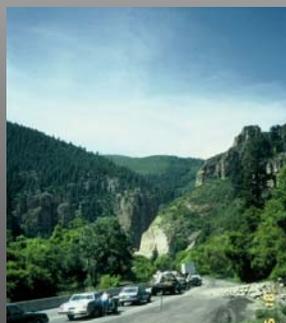
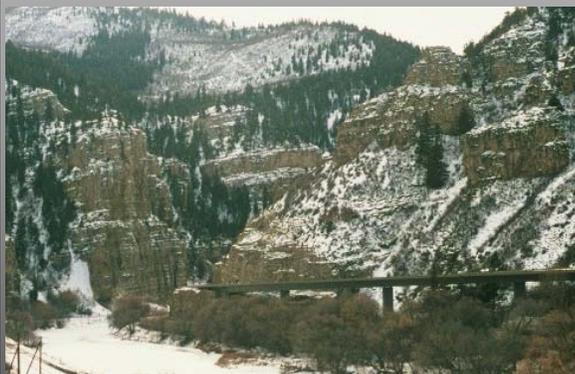
Best Management Practices



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

Best Management Practices



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

Best Management Practices



Bedrock Sculpting, staining and planting

Interstate 70 Glenwood Canyon

Best Management Practices



Bedrock Sculpting and staining

Interstate 70 Glenwood Canyon

Best Management Practices



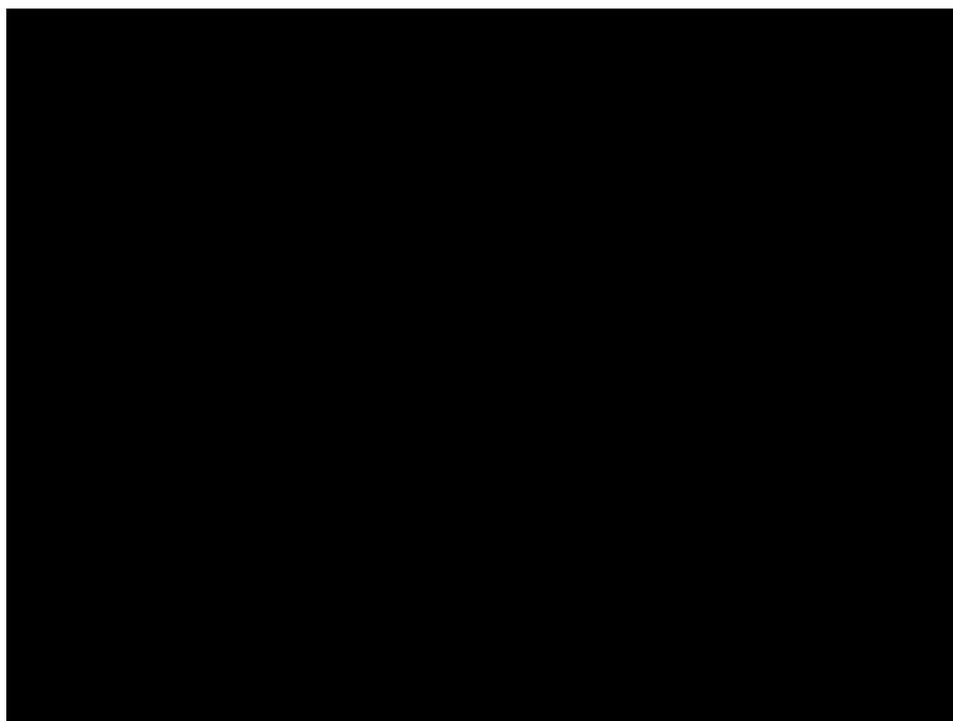
Rest Area – site planning

Interstate 70 Glenwood Canyon

Awards:

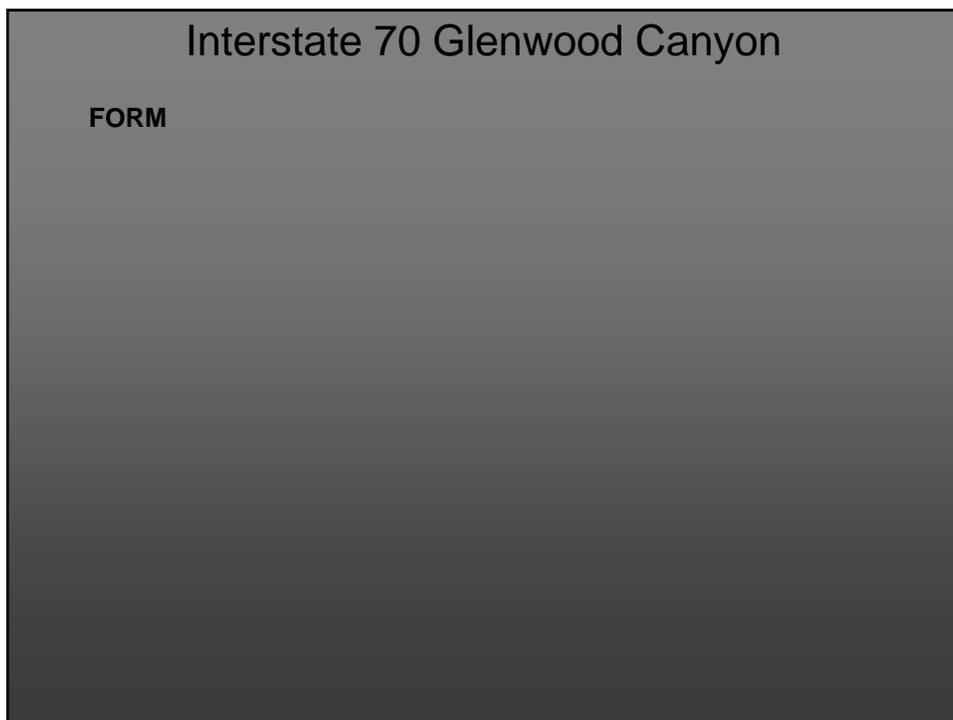
- *Quadrennial, Presidential Award for Design Excellence*
- *Outstanding Civil Engineering Outstanding Achievement Award*





Interstate 70 Glenwood Canyon

FORM



Interstate 70 Glenwood Canyon

FORM



Interstate 70 Glenwood Canyon



FORM - LINE - COLOR - TEXTURE - SCALE

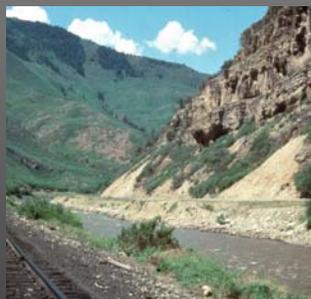
Interstate 70 Glenwood Canyon

FORM



Glenwood Canyon Goals and Objectives

Objectives established through a collaborative process between CDOT, FHWA, Citizens and Stakeholders



form

Glenwood Canyon

System of Structures

- Walls
- Viaducts
- Tunnels



form

Glenwood Canyon



line & texture

Glenwood Canyon



Color

Glenwood Canyon



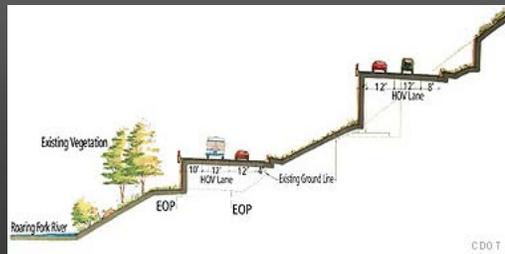
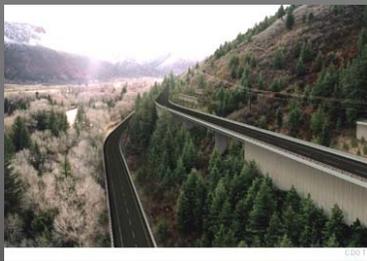
Thematic Highway Architecture

Glenwood Canyon



Flexibility

A Trend Established in Corridor Design – Highway 82



Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordination

- Achieving Visual Subordination
- Careful attention to detail



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordination - Form, Line, Color, Texture, Scale

- Achieving Visual Subordination
 - Preservation of the natural terrain and associated natural attributes



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordination - Form, Line, Color, Texture, Scale
Simplistic elegance in architectural quality – Texture/Form/Line

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements
- Repetition of form, line, color and texture



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordination - Form, Line, Color, Texture, Scale
Simplistic elegance in architectural quality – Form, Line, Color, Texture, Scale & Barriers

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements
- Repetition of form, line, color and texture



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale
Simplistic elegance in architectural quality - Guardrails & Barriers

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements

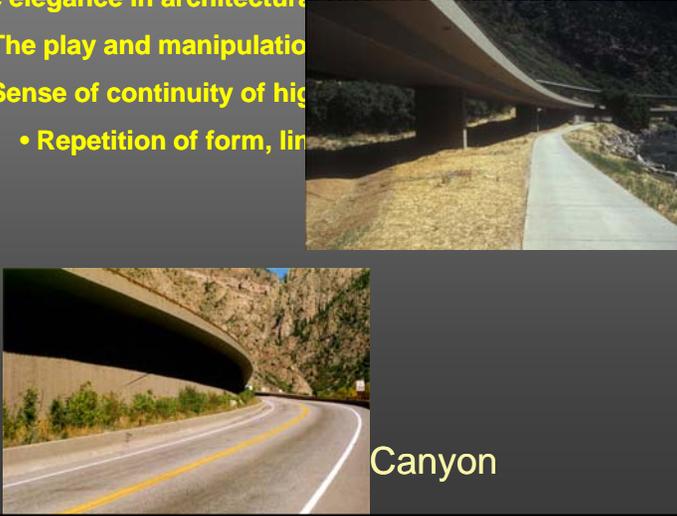


Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale
Simplistic elegance in architectural quality - Guardrails & Barriers

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements
- Repetition of form, line, color, texture, scale



Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale

Simplistic elegance in architectural quality - *Guardrails & Barriers*

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements
- Repetition of form, line, color and texture



Glenwood Canyon

Interstate 70 Glenwood Canyon

FORM - LINE - COLOR - TEXTURE - SCALE



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale

Simplistic elegance in architectural quality - *Guardrails & Barriers*

- The play and manipulation of light (color/ texture)
- Sense of continuity of highway structure and common elements
 - Repetition of form, line, color and texture



Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

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Sim



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Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale
Simplistic elegance in architectural quality

- The play and manipulation of light (color/ texture)
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Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

Visual Subordinance - Form, Line, Color, Texture, Scale
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Glenwood Canyon

Interstate 84
Columbia River Gorge National Scenic Area

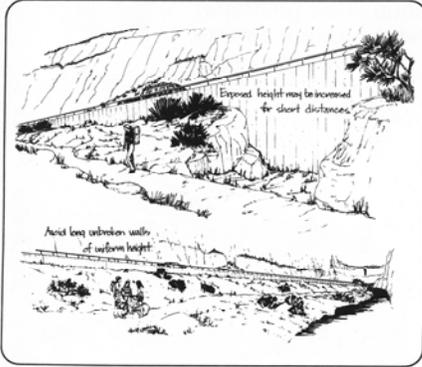
Visual Subordination - Form Line Color

• Chal



Glenwood Canyon





Exposed height may be increased
to clear distances

Fixed face retention walls
of uniform height

Options are available to make the retaining wall system more acceptable. High retaining walls may be berched or stepped to break up the visually dominant plane. They may also be used in combination with cantilevers to set the wall where it will intersect the existing fill slope at a higher elevation.

This guideline deals only with the exposed height. Where the retaining wall supports the edge of the roadway, it includes the height of the barrier. For structural purposes the retaining wall may extend below the finished grade line after landscape design treatment has been applied.

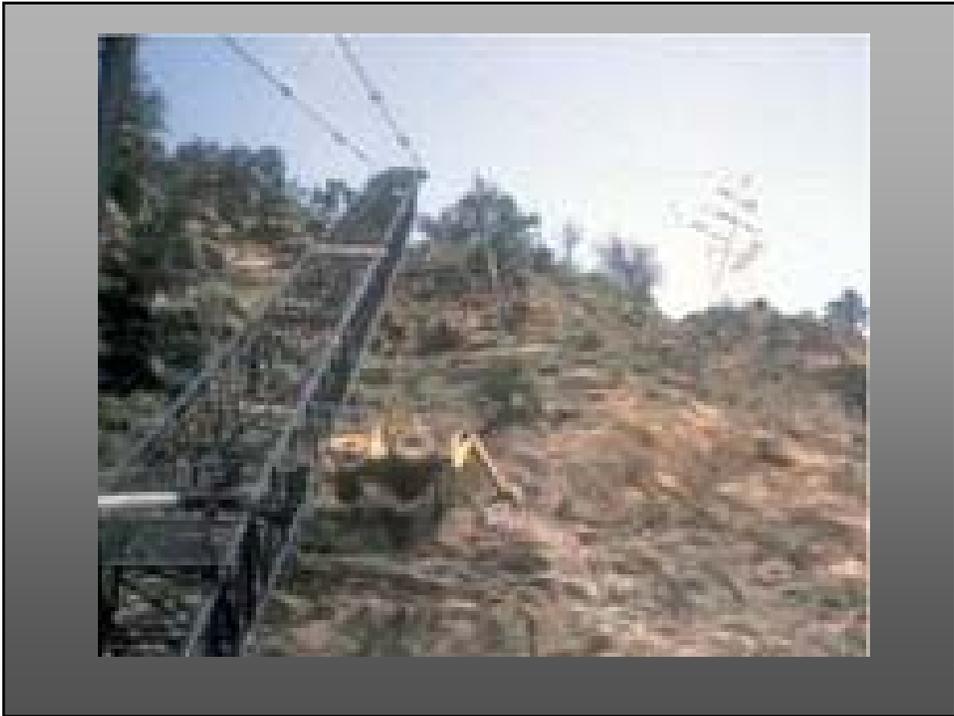
DeLEUW
CATHER

GLENWOOD CANYON
PHASE TWO · DESIGN HANDBOOK

Roadway Structures

4.3
2





from Caltrans Canyon Design

Retaining Wall Form (ref. Figure 3)

- 1. Wall Profile** - Top of walls can be straight, sloped or stepped as appropriate to accommodate Canyon conditions. Curved top of wall not acceptable.
- 2. Horizontal Wall Alignment** - Wall alignment to generally follow the alignment of the roadway.
 - Walls may be segmented to accommodate Canyon conditions and/or to relieve long, straight wall sections parallel to the roadway (with stepped walls, segments to be related to top of wall profile).
 - Length of wall segments should vary to eliminate visual monotony.
 - Depth and angle of segment setbacks may vary and will be determined on a site-by-site basis.
- 3. Wall Height** - Where the necessary wall height is equal to or greater than the necessary length of the wall, terracing should be considered. Other visual length modifications (i.e., extended length, additional length, etc.) may also be considered to achieve a 1:2 (height:length) ratio.

For long sections of wall where the height exceeds 10 feet above the shoulder barrier, terraced or tiered or additional horizontal setback of walls should be considered.
- 4. Wall Ends** - Joints between the ends of retaining walls and the Canyon hillside rock are to be handled by angling the last wall segment away from the roadway into the rock with top of wall and finished grade at same elevation.

Interstate 70
Glenwood Canyon

Common Element
Design Directive

REVISED 4/15
BY 56-15

