

Twin Tunnels Environmental Assessment
Visual Resources Technical Memorandum

May 2012



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Acronyms

ASA	Areas of Special Attention
BLM	Bureau of Land Management
CDOT	Colorado Department of Transportation
CR	County Route
EA	Environmental Assessment
FHWA	Federal Highway Administration
PEIS	<i>I-70 Mountain Corridor Programmatic Environmental Impact Statement</i>
ROD	Record of Decision
USFS	U.S. Forest Service
VMS	variable message signs

Section 1. Purpose of the Memorandum

The Federal Highway Administration (FHWA), in cooperation with the Colorado Department of Transportation (CDOT), is preparing an Environmental Assessment (EA) for proposed changes to the eastbound lanes of Interstate 70 (I-70) and the eastbound bore of the Twin Tunnels between Mile Post (MP) 241 and MP 244 in Clear Creek County, Colorado. The Twin Tunnels area is one of the most congested locations along the I-70 Mountain Corridor. Improvements are necessary to increase safety, operations and travel time reliability in the eastbound direction of I-70 in the project area. Additionally, the improvements will be consistent with the *I-70*

Mountain Corridor Programmatic Environmental Impact Statement (PEIS) Record of Decision (ROD), the I-70 Mountain Corridor Context Sensitive Solutions process, and other commitments of the PEIS.

What is a *Context Sensitive Solution*?

A collaborative approach whereby a transportation facility is designed with extensive input from the public to fit its physical setting.

This technical memorandum discusses the regulatory setting and describes the affected environment and the impacts of the Proposed Action on visual resources within the identified study area. This memorandum also documents mitigation measures, including applicable measures identified in the *I-70 Mountain Corridor PEIS* that would reduce any impacts during construction and operation. The I-70 PEIS identified comprehensive improvements for the corridor. The Proposed Action would immediately address safety, mobility, and operations in the eastbound direction at the Twin Tunnels but would not address all of the needs in the Twin Tunnels area. The Proposed Action would not preclude other improvements needed and approved by the I-70 PEIS ROD.

Section 2. How Does the Analysis Relate to the Tier 1 PEIS?

The *I-70 Mountain Corridor Final PEIS* committed to conducting specific additional analysis and coordination regarding visual impacts during Tier 2 projects. The following commitments from the PEIS are applicable to this Tier 2 project:

- CDOT will conduct a more detailed and localized analysis of visual resources in individual jurisdictions and segments along the corridor to further define important visual elements and assess potential effects of Tier 2 processes.
- CDOT will consider creating visual simulations during Tier 2 processes to accurately illustrate the visual change at specific locations.
- CDOT will continue to coordinate with all jurisdictions regarding direct and indirect impacts to visual resources.
- Mitigation options (such as design modifications) that could minimize disruption to or interference with the corridor's historic towns and mountain scenery will be explored using the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines.

Section 3. What Process Was Followed to Analyze Visual Resources?

3.1 Methodology

The visual analysis follows guidance from FHWA's *Visual Impact Assessment for Highway Projects* (FHWA 1989). In addition, the I-70 Mountain Corridor Final PEIS (CDOT 2011a) was used as a resource for the analysis approach and identification of specific views and features that are designated for consideration and protection. The parameters of visual character, visual quality, and viewer response were

used to assess the viewshed's views. Visual quality is analyzed by evaluating vividness, intactness, and unity. Viewer response is analyzed in terms of viewer exposure and viewer sensitivity. Visual character is defined by the relationships between the natural and built landscape features. These relationships are considered in terms of dominance, scale, diversity, and continuity. Visual character is strongly influenced by specific landscape features such as large structures, landforms, or water bodies.

Potentially sensitive viewer groups include those who travel through the corridor and those who engage in recreational activities. It is important to identify viewer groups and their responses to the project by evaluating viewer sensitivity and viewer exposure.

The responses of viewers to a specific object or view produce the visual experience of that view. Sensitivity varies among viewer types. Sensitivity to views affects the response. Viewer sensitivity (or level of concern) is a combination of the following factors for a specific view:

- How many people have that view and what types of viewers are they?
- How long can they see the view? Most recreationists have long-duration views, while bicyclists and motorists typically have short-duration views.
- What is their likely level of concern about the appearance, aesthetics, and quality of the view?

Level of concern is a subjective response. Factors such as the visual character of the surrounding landscape, the activity in which a viewer is engaged, and the viewer's values, expectations, and interests affect a viewer's level of concern. Viewer sensitivity or level of concern does not imply support for or opposition to a proposed project; it is a neutral term that is an important parameter in assessing visual quality. Viewer sensitivity also is informed by the viewer's awareness of visual resource characteristics. Familiarity with a view can often increase viewer awareness, such as when viewing a visual resource from a residence or commute route. Local values and goals operate indirectly on viewer awareness and experience by shaping viewer expectations. These values are often expressed in local policies and practices.

The visual impacts of a project are determined by assessing the visual resource change resulting from the project and predicting viewer response to that change. Visual resource change is the sum of the change in visual character and change in visual quality. The first step in determining visual resource change is to assess the compatibility of the proposed project with the visual character of the existing landscape. The second step is to compare the visual quality of the existing resources with projected visual quality after the project is constructed. The viewer response to changes in the visual environment is the sum of viewer exposure, sensitivity, and reaction to the change resulting from the project. The resulting level of visual impact is determined by combining the severity of the change in the visual environment with the degree to which people are likely to react negatively to that change.

Four key views were selected to represent the range of views in the study area. The view selection process included field reconnaissance of the corridor and assessment of potential visual character units from which the existing highway and project are visible. The degree of visual impact was determined by assessing the visual changes that would be introduced by the project. Visual simulations were prepared to

What is a Viewshed?

A viewshed is the visible surface area from an observer's point of view. Viewsheds are defined by what viewers can see from the project and what portions of the project viewers can see from the surrounding area.

How is Visual Quality Determined?

The project team determined the visual quality of existing views using three criteria.

- *Vividness* is the memorability of landscape components as they combine in striking and distinctive visual patterns.
 - *Intactness* is the visual integrity of the natural and human landscape and its freedom from encroaching elements.
 - *Unity* is the visual coherence and compositional harmony of the landscape considered as a whole (FHWA, 1988).
-

represent the range of visual impacts and illustrate how the project may appear after construction. Development of mitigation strategies involved a review of the visual standards of the U.S. Forest Service (USFS) Landscape Aesthetics, A Handbook for Scenery Management (USFS 1995), the Bureau of Land Management (BLM) Visual Resource Management Guide (BLM_1980), and local jurisdictions, as well as the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines. The mitigation strategies focus on reducing visual contrast associated with the project.

3.2 Study area

The area studied in this visual resource assessment is called the project viewshed and is defined as areas that travelers on I-70 can see from the roadway and views toward the project from the surrounding areas such as the CR 314 and Clear Creek corridors. Typically, if viewers can see an area or a feature from the project, a viewer located in that area or near the feature can also see the project.

3.3 Regulations

The construction or modification of public highways can have a considerable effect on the quality and character of the landscape, and is a major source of public concern. In addition, general guidelines require that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that aesthetics and visual quality receive due weight in project decision making.

Section 4. Description of the Proposed Action

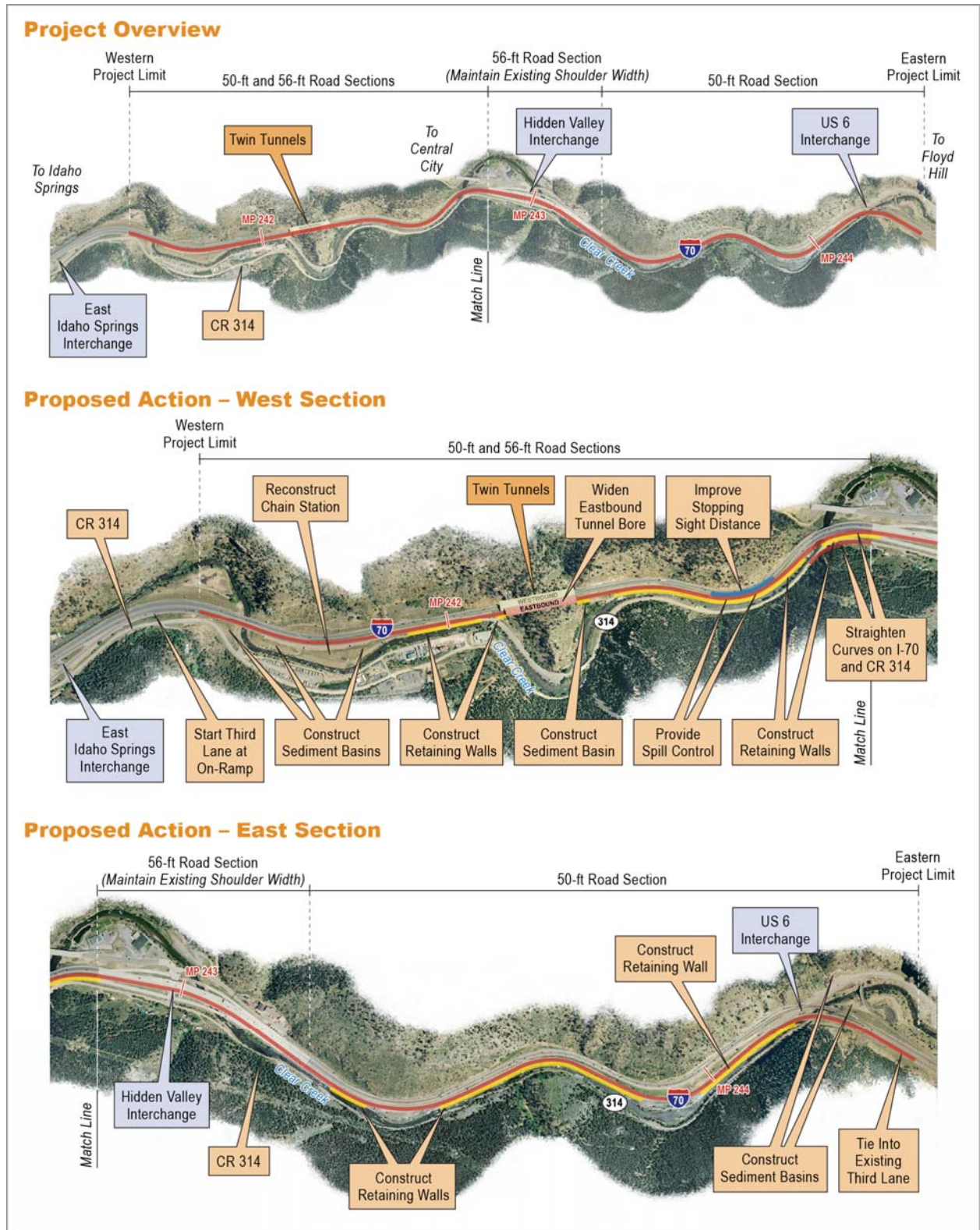
The Proposed Action would add a third eastbound travel lane and consistent 10-foot outside shoulder to the I-70 highway between the East Idaho Springs interchange and the base of Floyd Hill. The eastbound bore of the Twin Tunnels would be expanded to accommodate the wider roadway section, and the existing tunnel's portal face would be removed and replaced. Additionally, the Proposed Action would straighten the curve west of the Hidden Valley interchange where the highest number and most serious crashes occur. This curve reconstruction also involves replacing a bridge on I-70 over Clear Creek.

Other proposed improvements include reconstructing the chain station west of the Twin Tunnels, constructing and operating new sediment basins throughout the project area to treat stormwater runoff, installing wildlife fencing, and constructing retaining walls. Figure 4-1 illustrates the project limits and the proposed changes.

CDOT is considering a range of widths between 4 and 10 feet for the inside shoulder between the west project limits and the Hidden Valley interchange. A 4-foot inside shoulder would be provided east of Hidden Valley. A range of tunnel widths, corresponding to the variations in the inside median, is being evaluated.

CDOT is also considering whether the additional capacity will operate exclusively as a general purpose lane or as a tolled lane during peak periods (also called a managed lane).

Figure 4-1. Project Limits and Proposed Change



Section 5. What Are the Visual Resources in the Study Area?

Visual resources or scenic impacts are generally defined in terms of a project's physical characteristics and potential visibility, and the extent to which that project's presence changes the perceived visual character and quality of the environment surrounding it. Sightseeing is one of the activities that a high percentage of recreationalists in Colorado engage in, indicating the importance of the visual character to visitors and residents of the I-70 Mountain Corridor. Visual resources need protection for both economic and aesthetic purposes.

What are *Visual or Scenic Resources*?

The natural and built features of the landscape contributing to the public's experience and appreciation of an environment.

5.1 What is the visual character of the study area?

Geology, topography, water bodies, vegetation, and the built environment define the visual characteristics of the study area. The landscape setting is characterized by rugged terrain, V-shaped valleys, and historically mined lands. Surrounding hillsides include a variable density montane zone with rock and eroded slopes. Slopes facing south and west contain grasses with open montane scrub and intermittent barren slopes; slopes facing north and east are dominated by grasses and dense lodgepole pine. Clear Creek within the study area is characterized by steep, riprap banks that generally lack contiguous vegetation.

The I-70 and County Route (CR) 314 roadways lie within a narrow valley floor with exposed rock wall cuts forming an enclosed landscape. The study area is substantially natural in character except for the roadways and businesses located west of the Twin Tunnels. Evergreens and large rock outcroppings provide contrast. The enframing created by steep slopes on both sides increases the memorability of landscape components as they combine in striking and distinctive visual patterns. The dominant color for much of the year is tan but changes to green during summer.

The scenic attractiveness of the study area, as defined in the I-70 Mountain Corridor PEIS (CDOT 2011a), is categorized as Class B, which indicates that the lands have some distinctive features but are overall typical of the landscape. The Scott Lancaster Memorial Trail is located on/adjacent to CR 314 within the study area. Other sensitive views include recreation sites along Clear Creek. Major overhead utilities that are visible along I-70 include electric transmission lines.

The study area lies within the Mountain Mineral Belt design segment of I-70, according to the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines. The proposed improvements would be visible to motorists and recreationalists along Clear Creek and the Scott Lancaster Memorial Trail (CDOT 2011a). Rich in mining history, the Mountain Mineral Belt includes historic towns such as Idaho Springs as well as many scenic views, lush forests, rocky hillsides, and waterways. However, the mountainous terrain breaks up any continuous or extended views in the corridor.

Areas of Special Attention (ASA) are stretches along the I-70 Mountain Corridor that were identified by stakeholders during the PEIS Aesthetic Working Group process as having multiple or unique aesthetic issues. Three ASAs are adjacent to the study area: Idaho Springs, the Twin Tunnels, and Floyd Hill. The characteristics of these ASAs are described below:

Idaho Springs: Located in a narrow valley, I-70 through Idaho Springs was one of the first highway sections constructed in Colorado. Development in Idaho Springs is generally bounded on the east by the Twin Tunnels and on the west by the west I-70 interchange. In addition to the businesses and residences associated with Idaho Springs, manmade landscape features include evidence of historic mining, a major

electrical power line, and the I-70 highway. Several important contextual features and places add to the unique character of Idaho Springs, including the Charlie Tayler Waterwheel, the Argo Mill, and the Newhouse Tunnel. The area's proximity to Clear Creek and State Highway 103, which is a National Scenic and Historic Byway, also add to the visual context.

Twin Tunnels: The portals of the Twin Tunnels are distinctive visual features that serve as the gateway to Idaho Springs and the Mountain Mineral Belt for westbound motorists on I-70. Located between Idaho Springs and Floyd Hill, the design and location of the Twin Tunnels create a major “pinch point” for travelers. Motorists generally reduce their speeds in this area because of limited shoulder space and the dark and imposing façade of the tunnels. The Twin Tunnels are close to Clear Creek, serve as a landmark to those entering and leaving Idaho Springs, and are the first tunnels that westbound motorists from the Front Range travel through on I-70. The tunnel portals have various functions. They act as a transition between the open road and the tunnels and are the location of signs. The portals also protect the tunnel entrances from rock falls.

Floyd Hill: I-70 through Floyd Hill is characterized by a steep grade and tight corners. It is generally bounded by Genesee on the east and the interchange of U.S. Highway 6 on the west. Floyd Hill is the first steep incline that motorists encounter when traveling east to west along I-70 from the Front Range. It lies close to Clear Creek on the west and contains dense forest and offers dramatic views of Clear Creek Canyon.

5.2 What project features will have the greatest visual effects?

The project features that have the greatest potential to affect the study area's visual character and quality are the following:

- Widening the roadway for a third eastbound travel lane and shoulder
- Widening the eastbound tunnel and portals
- Constructing retaining walls
- Demolishing and reconstructing the bridge on I-70 over Clear Creek
- Construction activities involving equipment, workers, staging areas, cut-and-fill activities, removing vegetation primarily in the median, and nighttime lighting

5.3 What are the anticipated future conditions of visual resources in the study area?

Community controls on growth and land use planning will play a large part in changes to the visual landscape, as will effects of the implementation of BLM and USFS visual resource management plans. Local land use decisions could have positive or negative impacts on visual resources. The visual resource management plans of the BLM and the USFS manage visual impacts on their respective federal lands in the study area.

5.4 Is the future of visual resources considered to be at-risk?

Agencies and stakeholders are concerned that highway widening could increase congestion, cause indirect impacts, and make the unique mountain experience more urban, thus badly degrading the visual and aesthetic experience of the Colorado mountains. Additionally, municipalities raised concerns that while noise walls mitigate for noise impacts, they could alter existing scenic vistas of mountains and historic towns. They requested that the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines, meant to protect both natural and community resources, consider visual resources. The potential of increasing light pollution in the corridor and changing the nature of the corridor from a small highway to an “expanse of pavement” are also of concern.

5.5 What agencies were involved in this analysis and what are their issues?

During the Tier 1 PEIS process, CDOT coordinated the approach for the visual resource assessment with federal land managers, consistent with BLM and USFS visual analysis methodologies. CDOT also coordinated with staff and citizens from communities in the corridor to understand each community's values and identity. Following the BLM Visual Resource Management Program and the USFS Scenery Management System of landscape classifications, CDOT evaluated each landscape unit to determine the overall landscape scenic attractiveness and visibility of the corridor from sensitive viewpoints. The visual designations established by the BLM and the USFS for their lands, as determined by those agencies, were used for this visual assessment.

The I-70 Mountain Corridor Context Sensitive Solutions Team established the overall corridor aesthetic principles and regional functional context. Additionally, CDOT convened aesthetic working groups to assist the corridor and consultant teams in preparing the aesthetic guidance. The working groups collaboratively developed descriptions for four geographic design segments, as well as ASAs within each segment, that collectively include the entire I-70 Mountain Corridor. The project is located in the Mountain Mineral Belt section and includes the Idaho Springs, Twin Tunnels, and Floyd Hill ASAs, as described in Section 5.1.

During the Twin Tunnels project scoping process concern was expressed with the existing portal design and the impact of transitioning from open road conditions to a tunnel lighting environment. To address this concern, various designs for the portal structure will be considered with respect to aesthetics and functionality and the ultimate portal aesthetics will be decided on in the final design process in conjunction with stakeholders.

Section 6. What Are the Environmental Consequences?

6.1 How does the No Action Alternative affect visual resources?

Under the No Action Alternative, CR 314 would result in visual effects due to retaining walls. In addition, traffic congestion and its visibility in the I-70 corridor would worsen over time. No other components of the No Action Alternative would result in measurable visual effects.

6.2 What are the direct effects of the Proposed Action with a managed lane?

The communities and key viewers (motorists and recreationalists) comprising the study area have views of the surrounding hillsides that include open montane scrub with intermittent barren slopes; areas of dense lodgepole pine; and a large riparian floodplain along Clear Creek that is lined with narrow-leaf cottonwoods. Viewers in the study area are likely accustomed to the traffic and sight of the highway. Although the improvements associated with the Proposed Action are minor relative to the large scale of these views, they would result in permanent changes to the visual environment.

The project limits and changes that are part of the Proposed Action are shown in Figure 4-1. Overall, direct visual effects after mitigation would range from minor to moderate. Generally an effect was categorized as minor if it does not block or impede scenic views or diminish the visual character. This would include additional signage, new guardrails, retaining walls that are 5 feet or less in height, and bridge widening such as at the I-70 crossing over Clear Creek. An effect was categorized as moderate if it would noticeably contrast with the visual setting and change a scenic view of value to adjacent recreational activities. This would include retaining walls from 5 feet to 20 feet in height. An effect would be categorized as high if it blocks or impedes a scenic view of value or substantially increases contrasts

with the visual setting. This would include retaining walls higher than 20 feet. Although the project-related effects would be permanent, CDOT will avoid and minimize negative effects on visual quality by incorporating I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines into the project design. CDOT does not believe the Proposed Action would result in any high visual effects.

6.2.1 What are the visual effects of the roadway widening?

Both the 56-foot roadway cross section and 50-foot roadway cross section would widen the roadway entirely to the south, maintaining the existing inside (or left) shoulder in its current location. The new third lane would be constructed to the south of the existing travel lanes. Vegetation along the north side of old US 40 (Old Game Check area) consisting of narrow-leaf cottonwoods would be removed only to the extent needed for placement of a temporary fence during construction. Views looking from I-70 would not change substantially, and the additional pavement created by the widened roadway would not noticeably increase visual contrast in views of the highway.

6.2.2 What are the visual effects of the new tunnel portals?

The tunnel portals serve as a landmark to motorists entering and leaving Idaho Springs. Typically, the motorist's eye is drawn toward the tunnel portal and not toward Clear Creek and other features of the surrounding visual environment. Construction of a 61-foot-wide tunnel would accommodate the wider roadway section and the 2.5-foot-wide walks on each side of the tunnel for emergency egress. A 53-foot tunnel width would accommodate the smaller roadway section and emergency egress. Both tunnel sections would widen the tunnel entirely to the south, maintaining the existing inside (or left) wall in its current location.

Tunnel widening would require removal of the existing tunnel portal faces. During the project scoping process concern was expressed with the existing portal design and the impact of transitioning from open road conditions to a tunnel lighting environment. Various designs for the portal structure have been considered with respect to aesthetics and functionality with the most appropriate alternative being a modern barrel-type portal constructed from reinforced concrete. The new portals would be wider but would have less visual mass. The aesthetics of the portal faces have not been determined at this time. They will be designed to adhere to the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines and in conjunction with stakeholders during final design.

6.2.3 What are the visual effects of the retaining walls?

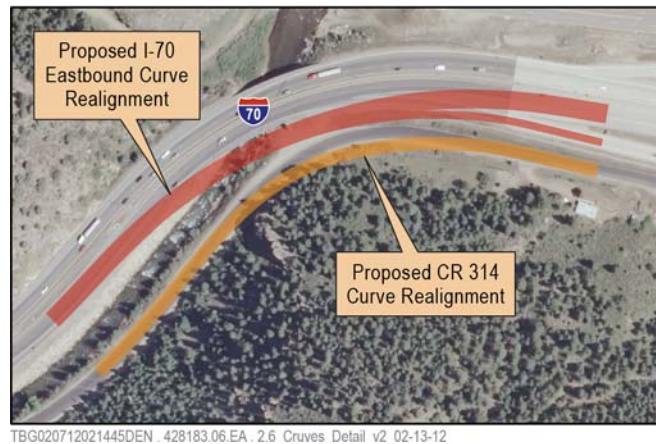
Retaining walls would be constructed in most locations adjacent to Clear Creek to accommodate the additional pavement width and to avoid the 100-year floodplain. Figure 4-1 shows the location of the proposed retaining walls. The new retaining walls would be highly visible because of their size, extent, and location within the project area. Most walls would range up to 10 feet tall, but in some isolated locations walls would be up to 20 feet in height. The tallest walls would be located immediately west of the new bridge at Hidden Valley and along a short stretch of I-70 between Hidden Valley and the US 6 interchange. The new retaining walls would be most visible to motorists on CR 314 and recreationalists along Clear Creek and the Scott Lancaster Memorial Trail.

The curve on CR 314 would be straightened to provide adequate separation from I-70. This would shift I-70 approximately 45 feet farther south toward CR 314, as shown in Figure 6-1.

The resulting curve straightening would require a retaining wall at the hillside on the south side of CR 314. The wall would span from 2 to 15 feet in height without tiering, and about 20 feet in height if tiered. The visual character along this section of the corridor would change with removal of vegetation and the introduction of a built form. However, views of the creek and surrounding hillsides would not be diminished. Aesthetics and tiering would be determined during final design.

The increased width of the 56-foot-wide roadway section would require a 300-foot-long cantilevered highway section in one location east of the Twin Tunnels. The cantilever would protrude approximately 10 feet from the face of the retaining wall. Although this feature would not be noticeable to motorists, it would slightly diminish the quality of views of the surrounding mountain setting for recreationalists along Clear Creek and the Scott Lancaster Memorial Trail. All retaining walls would be designed to blend in with the color and texture of the existing geology of the area and would not diminish the visual characteristics of the study area.

Figure 6-1. Curve Straightening at Hidden Valley



6.2.4 What are the visual effects of the I-70 bridge widening over Clear Creek?

Straightening the curve immediately west of the Hidden Valley interchange would require demolition and reconstruction of the bridge on I-70 over Clear Creek in that location. The new bridge would be very similar in appearance to the existing bridge and would not noticeably increase visual contrast or block views.

6.2.5 What are the visual effects of signage, guardrails, and lighting?

Signage, guardrails, and lighting currently are visible along the I-70 corridor. No new permanent variable message signs (VMS), signage, or lighting would be constructed under the general purpose lanes option. Infrastructure associated with the managed lane option would require signage to alert drivers to its presence, status, price, and location. All advance signage, comprising VMS and static signs for this option, would be placed along I-70 in Idaho Springs where views of signage is typically part of the landscape setting. Visual effects from these features would be minor.

CDOT would provide guardrails at retaining walls for safety. In addition, installing glare screen within the project area would help reduce both direct and indirect headlight glare. CDOT will evaluate new or different guardrails and glare screen during final design to help mitigate the headlight glare within the study area.

6.3 How will changes resulting from the Proposed Action affect viewers?

Major viewer groups include motorists on I-70 and CR 314, and recreationalists that use Clear Creek and the Scott Lancaster Memorial Trail. Viewer exposure is determined by the degree to which viewers are exposed to a view by their physical location and position, the number of people viewing, and the duration of their view. Distance zones for viewer location include foreground, middle ground, and background. The duration of view considers the frequency of exposure for either a stationary or moving view.

Motorists on I-70 and CR 314 generally have views from a concentrated point with reduced acuity and a narrowed cone of vision. These viewers have a relatively lower sensitivity to their surroundings because of their movement, speed, and relatively short viewing duration. Most motorists on I-70 would notice the increased pavement width and low retaining wall in one median area. Changes resulting from taller retaining walls south of the roadway and the bridge widening at the Clear Creek crossing would be less

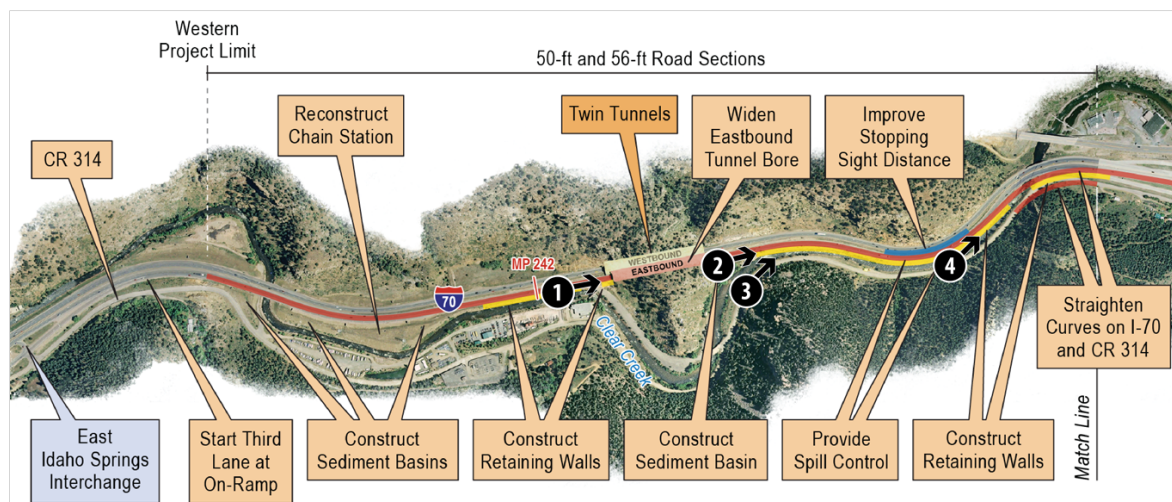
apparent. Motorists on CR 314 would have a visual experience similar to that of recreationalists, as described below. However, they would be less sensitive to contrast and change because of their relatively higher speed of travel.

Recreational sites along Clear Creek include the Unnamed Fishing Access, Unnamed Boat Access, and Below Box Boat Access (see the Recreation Technical Memorandum). Recreationalists such as rafters and fisherman use these sites to access Clear Creek. Views from the creek include I-70, the Twin Tunnels portals, the CR 314 roadway, surrounding hillsides, and local businesses in the western section of the project corridor. The heavily used Scott Lancaster Memorial Trail is located on/adjacent to CR 314.

Recreationalists on the Scott Lancaster Memorial Trail and fishing and boating recreationalists on Clear Creek would experience greater visual effects than motorists since the duration of their view would be longer. They also may have a greater expectation of experiencing a scenic and more natural setting. However, recreationalists in the area are likely accustomed to traffic and the sight of the existing highway. In addition, existing views to the highway are sometimes intermittent and obstructed by rock outcroppings and vegetation. Recreationalists and motorists may observe some minor changes associated with increased light and glare from the additional eastbound travel lane.

Viewpoint locations are shown in Figure 6-2, and the visual setting information and contrast assessment for four views are described below and illustrated in Figure 6-3 through Figure 6-6. The assessment shows existing conditions, simulated views of the project, and a comparison of existing and proposed visual quality scores. Existing conditions in each view establish a baseline for assessing changes in views. The views were selected to represent where the greatest number of viewers would see the project and where representative features of the project would be prominent.

Figure 6-2. Viewpoint Locations



6.3.1 What are the visual effects from Viewpoint 1?

Viewpoint 1 shows a typical view from I-70 looking east toward the west tunnel portal of the eastbound bore (Figure 6-2). This view represents eastbound motorists on I-70. The tunnel portals provide a focal point that draws the viewer's attention toward the opening. However, the view is dominated by the rock outcropping in the middle ground. Although the portals contrast with the natural setting making the view memorable and vivid, the intactness of the view is moderate due to encroaching elements such as pavement and guardrails, and the utility tower in the background. The degree to which the various landscape elements join together to create compositional harmony is moderate. The widened roadway and larger portal would increase the scale, size, and height of built forms. However, the view for motorists

would continue to be dominated by natural features such as the rocky hillside, and the project elements would not noticeably increase contrasts or reduce visual quality.

The range of roadway cross sections being considered and selection of either a concrete barrier or guardrail would not result in a meaningful variation in visual character or quality effects. The design of the concrete barrier or guardrail will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines (Figure 6-3).

The aesthetics of the portal face have not been determined at this time. The portal face will be designed to adhere to the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines and in conjunction with stakeholders during final design. The visual setting information and contrast assessment for this view are shown in Figure 6-3.

6.3.2 What are the visual effects from Viewpoint 2?

Viewpoint 2 shows a typical view from the north side of Clear Creek looking east toward CR 314, Clear Creek, and I-70 (Figure 6-2). This view represents recreationalists on Clear Creek and the Scott Lancaster Memorial Trail. The creek bed in the middle ground and the contrasting rock outcropping and forested hillside in the background draw the viewer's attention along the V-shaped valleys, making the view memorable and vivid. The intactness of the view is moderate due to encroaching elements such as the I-70 and CR 314 pavement and the utility tower and lines in the middle ground. The degree to which the various landscape elements join together to create compositional harmony is moderate. The widened roadway and retaining wall increase the scale and size of built forms. Recreationalists along the creek and trail would likely be focused on their recreational activities. However, with the addition of the widened roadway and a retaining wall along the north side of the creek, the scenic and natural characteristics of the setting would be reduced. Overall, the view quality would be diminished by the increase in contrast of the built forms with the natural landforms and vegetation. The visual setting information and contrast assessment for this view is shown in Figure 6-4.

6.3.3 What are the visual effects from Viewpoint 3?

Viewpoint 3 shows a typical view from the Clear Creek streambed looking northeast (Figure 6-2). This view represents recreationalists on Clear Creek. The creek, rock outcropping, and forested hillside create a highly vivid and memorable visual impression. The degree to which the various landscape elements join together to create compositional harmony is also high. The intactness of the view is slightly lower due to the visibility of I-70 as it traverses the base of the rock outcropping. In addition, a utility tower is visible in the background. The widened roadway and retaining wall increase the scale and size of built forms, and the scenic and natural characteristics of the setting would be reduced. Overall, the view quality would be diminished by the increase in contrast of the built forms with the natural landforms and vegetation. The range of roadway cross sections being considered and selection of either a concrete barrier or guardrail would not result in a meaningful variation in visual character or quality effects (Figure 6-2, Figure 6-5a, and Figure 6-5b). The design of the concrete barrier or guardrail will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines. The visual setting information and contrast assessment for this view is shown in Figure 6-5a.

6.3.4 What are the visual effects from Viewpoint 4?

Viewpoint 4 shows a typical view from I-70 looking east toward the Hidden Valley interchange (Figure 6-2). This view represents eastbound motorists on I-70. The location between eastbound and westbound I-70 has a grassy median and the view is dominated by pavement and other encroaching elements such as the guardrail, signage, and lighting. Safety improvements would remove the grass vegetation and cut into the median slope to construct a low retaining wall. This would increase visibility

for motorists on I-70 and result in low visual effects. The visual setting information and contrast assessment for this view is shown in Figure 6-6.

6.4 How does the Proposed Action change without tolling?

Changes to the visual setting's character or quality would not differ noticeably with either the managed lane or without tolling options. However, less signage would be needed without tolling, slightly reducing visual clutter.

6.5 What indirect effects are anticipated?

No notable indirect adverse effects would occur later in time or be farther removed in distance from the project than those already described in Section 6 of this memorandum. Over time, the visual quality of the study area would improve as landscaping and other vegetation matures and softens the appearance of retaining walls.

6.6 What effects would occur during construction?

Construction effects would include detours, an increase in roadway congestion in and around the area, the presence of large equipment, dust from construction, and general disruption to the surrounding area. Temporary effects to visual quality would result from construction-related activities, including the visibility of construction equipment and workers, material stockpiles, dust and debris, signs, high-visibility fencing, and staging areas. Visual quality effects also would occur from the degree of disorder created by demolition activities, including preparation of CR 314 for use as a detour and rehabilitation of the doghouse rail bridge.

Construction-related activities would affect the visual experience of motorists on I-70 and CR 314 to a lesser degree than recreationists. These short-term impacts would have a temporary visual effect on nearby communities such as Idaho Springs. A benefit of construction would be that driving speeds on I-70 would likely be reduced, thereby giving viewers more time to experience the view.

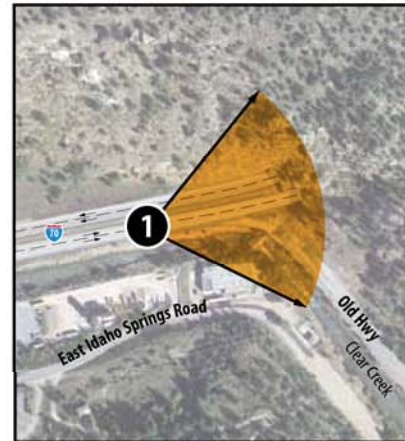
Figure 6-3a. Viewpoint 1



Proposed Conditions (Simulation A, with concrete barrier on top of retaining wall)



Existing Conditions



Key View Photograph Location



Visual Setting Information				
Project Elements Seen	1, 2			
Primary Viewer Group	A			
Project Elements				
1. Road Widening				
2. Tunnel Portal				
3. Retaining Wall				
Viewer Groups				
A. Motorists-I-70				
B. Motorists-CR 314				
C. Recreationalists-Clear Creek				
D. Recreationalists-Trail				
Visibility	H	M	L	
Quantity of Viewers	X			
Duration of View			X	
Viewer Sensibility		X		
Contrast Assessment of Project Elements				
	Existing Quality		Contrasts (Mitigated)	
	High	Moderate / High	High	Moderate / High
		Moderate	Moderate	Moderate
		Low-or-N/A	Low-or-N/A	Low-or-N/A
Visual Quality				
Vividness		X		X
Inactness			X	X
Unity		X		X
View Quality				
Viewing Scene		X		X
Viewing Sites		X		X
Viewing Corridor		X		X
Visual Character				
Built Character*		X		X
Built Form**		X		X
Visual Resources				
Mature Landscape		X		X
Landform		X		X
LEGEND				
H: High, M: Medium, L: Low, N/A: Not Affected or Not Applicable				
*Built Character: Material & Style, **Built Form: Scale, Size & Height				
Twin Tunnels Project				
Viewpoint 1				
View from I-70 looking east toward the west tunnel portal of the eastbound bore; represents eastbound motorist on I-70.				Figure 6.3

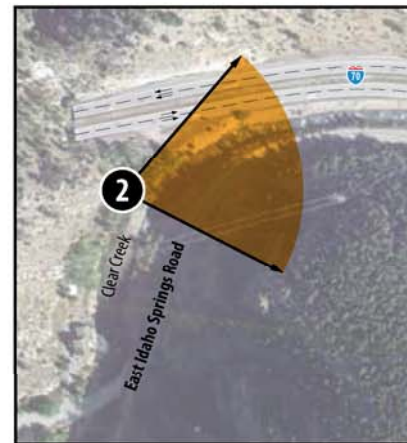
Figure 6-4. Viewpoint 2



Proposed Conditions (Simulation)



Existing Conditions



Key View Photograph Location



Visual Setting Information				
Project Elements Seen	1, 3			
Primary Viewer Group	C, D			
Project Elements	1. Road Widening 2. Tunnel Portal 3. Retaining Wall			
Viewer Groups	A. Motorists-I-70 B. Motorists-CR 314 C. Recreationalists-Clear Creek D. Recreationalists-Trail			
Visibility	H	M	L	
Quantity of Viewers		X		
Duration of View	X			
Viewer Sensibility	X			
Contrast Assessment of Project Elements				
	Existing Quality		Contrasts (Mitigated)	
	High	Moderate / High	High	Moderate / High
		Moderate	Moderate	
		Low -or- N/A	Low -or- N/A	
Visual Quality				
Vividness		X		X
Inactness		X		X
Unity		X		X
View Quality				
Viewing Scene		X		X
Viewing Sites		X		X
Viewing Corridor		X		X
Visual Character				
Built Character*			X	X
Built Form**			X	X
Visual Resources				
Mature Landscape		X		X
Landform		X		X
LEGEND				
H: High, M: Medium, L: Low, N/A: Not Affected or Not Applicable				
*Built Character: Material & Style, **Built Form: Scale, Size & Height				
Twin Tunnels Project				
Viewpoint 2				
View from the north side of Clear Creek looking east toward CR 314, Clear Creek, and I-70; represents recreationalists on Clear Creek and the Scott Lancaster Memorial Trail.				Figure 6.4

Figure 6-5a. Viewpoint 3



Proposed Conditions (Simulation A, with concrete barrier)



Existing Conditions



Key View Photograph Location



Visual Setting Information				
Project Elements Seen	3			Project Elements
Primary Viewer Group	C			1. Road Widening
				2. Tunnel Portal
				3. Retaining Wall
Visibility	H	M	L	Viewer Groups
Quantity of Viewers		X		A. Motorists-I-70
Duration of View	X			B. Motorists-CR 314
Viewer Sensibility	X			C. Recreationalists-Clear Creek
				D. Recreationalists-Trail
Contrast Assessment of Project Elements				
	Existing Quality		Contrasts (Mitigated)	
	High	Moderate / High	High	Moderate / High
		Moderate	Moderate	Moderate
		Low-or-N/A	Low-or-N/A	Low-or-N/A
Visual Quality				
Vividness	X			X
Inactness		X		X
Unity	X			X
View Quality				
Viewing Scene	X			X
Viewing Sites		X		X
Viewing Corridor		X		X
Visual Character				
Built Character*			X	X
Built Form**			X	X
Visual Resources				
Mature Landscape		X		X
Landform		X		X
LEGEND				
H: High, M: Medium, L: Low, N/A: Not Affected or Not Applicable				
*Built Character: Material & Style, **Built Form: Scale, Size & Height				
Twin Tunnels Project				
Viewpoint 3				
View from the Clear Creek streambed looking northeast; represents recreationalists on Clear Creek.				Figure 6.5a

Figure 6-5b. Viewpoint 3



Proposed Conditions (Simulation B, with guard rail)

Twin Tunnels Project

Viewpoint 3

View from the Clear Creek streambed looking northeast; represents recreationalists on Clear Creek.

Figure
6.5b

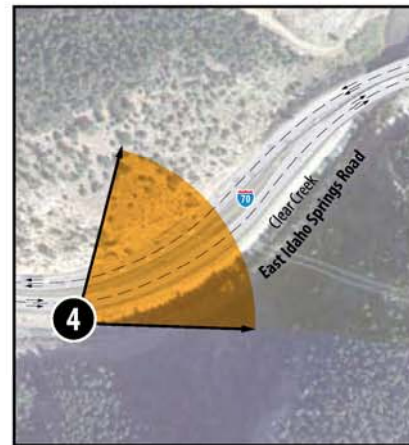
Figure 6-6. Viewpoint 4



Proposed Conditions (Simulation)



Existing Conditions



Key View Photograph Location

Visual Setting Information						
Project Elements Seen	1, 3	Project Elements 1. Road Widening 2. Tunnel Portal 3. Retaining Wall				
Primary Viewer Group	A	Viewer Groups A. Motorists-I-70 B. Motorists-CR 314 C. Recreationalists-Clear Creek D. Recreationalists-Trail				
Visibility	H M L					
Quantity of Viewers	X					
Duration of View		X				
Viewer Sensibility		X				
Contrast Assessment of Project Elements						
	Existing Quality		Contrasts (Mitigated)			
	High	Moderate / High	Low-or-N/A	High	Moderate / High	Low-or-N/A
Visual Quality						
Vividness			X		X	
Inactness			X		X	
Unity		X		X		
View Quality						
Viewing Scene		X			X	
Viewing Sites			X			X
Viewing Corridor		X			X	
Visual Character						
Built Character*		X			X	
Built Form**		X			X	
Visual Resources						
Mature Landscape		X			X	
Landform		X			X	
LEGEND H: High, M: Medium, L: Low, N/A: Not Affected or Not Applicable *Built Character: Material & Style, **Built Form: Scale, Size & Height						
Twin Tunnels Project						
Viewpoint 4						
View from I-70 looking east toward the Hidden Valley interchange; represents eastbound motorist on I-70.					Figure 6.6	

Section 7. What Mitigation Is Needed?

7.1 Tier 1 Mitigation Strategies

The Tier 1 PEIS indicates that mitigation strategies for visual resources will be defined in Tier 2 National Environmental Policy Act processes in coordination with corridor communities. The mitigation strategies will focus on reducing visual contrast associated with implementation of the Action Alternatives. The lead agencies will refer to the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines and create a site-specific Tier 2 Aesthetic Plan and Lighting Plan mitigation strategies.

7.2 Twin Tunnels Mitigation

7.2.1 Operations Mitigation

The cut walls proposed for this project will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines and will be designed to blend in with the color and texture of the existing geology of the area.

Through the Context Sensitive Solutions process stakeholders have identified design principles and engineering design criteria for the Mountain Mineral Belt as well as specific concepts to address its unique characteristics. CDOT developed these design solutions with stakeholder input to ensure that community concerns relating to aesthetics and visual quality received attention early in the project development process.

CDOT will avoid and minimize negative effects on visual quality by incorporating I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines into the project design. CDOT has committed to the use of these criteria for the design of the project, as listed below.

03 | STRUCTURES THAT SUPPORT TRANSPORTATION FACILITIES

Retaining Walls Supporting the Highway

- Construct each retaining wall using a single material with a visually simple texture that renders a shadow pattern on the surface
- Provide space for landscape screening treatment in front of all retaining walls that are visible from the roadway or adjacent community
- Incorporate wall materials that have a consistent texture and pattern
- Employ simple vertical textures and patterns on walls to create shadows and interest
- Use landscape platforms and form the ends of walls to meet with the grades of hills and slopes to ensure that retaining walls are integrated with adjoining slopes
- Design walls with single material style and method rather than a mix of materials—even if wall material varies
- Design walls to include an appropriate cap with overhang to create shadows and interest

Tunnels

- Provide lighting and light-colored reflective surfaces in the tunnel to eliminate the black hole effect
- Flair tunnel portals and extend them out from the rock cut face; use of headwalls perpendicular to travel lanes is strongly discouraged

05 | GUARDRAILS, BARRIERS, AND EDGE DELINEATION

- Use Type 3 Guardrail W-beam with wooden posts for guardrails; eliminate the use of galvanized “W” rails
- Color concrete barriers using the selected colors from the design segment color palette in order to blend the roadway into the surrounding environment (see Section 06 I Color Selection and Consistency for color palette)
- Incorporate □ landform and planting directly with concrete barrier walls
- Discourage the use of cable rail in this segment because of long-term maintenance costs and aesthetics
- Use continuous concrete barriers rather than segmented movable barriers
- Provide edge delineation through applied markings and reflectors rather than painting bright contrasting colors on concrete barriers

06 | COLOR SELECTION AND CONSISTENCY

- This segment’s color palette should be applied to transportation structures and associated facilities within this segment—e.g., retaining walls, lighting, signage, and bridges
- The colors selected for this segment complement the unique features found here and provide consistency across the entire design segment
- The base color for this design segment is a beige tone consistent with the dominant color of the bridge and overpass structures in Glenwood Canyon
- The accent color for this design segment is a light blue green tone currently found in this segment and should not be more than 15 percent of the painted structure
- The base color should be applied to the dominant sections of the structure; accent colors should be used to highlight smaller details that are attached to the overall roadway structure
- Vertical metal features—such as light poles, sign poles, and highway edge facilities—should be colored with USFS brown color
- Vertical metal features less than 8 inches in diameter or 10 feet in height may be excluded from the vertical metal features color palette

07 | EARTHWORK, EMBANKMENT, AND RESTORATION OF EXISTING DISTURBANCE

- Limit slopes to 2.5:1 (H:V) maximum and physical disturbance to less than 40 vertical feet from the edge of pavement or rail platform to the farthest edge of cut or fill, as described in the Design Criteria
- Round the top and bottom of the slope to provide a stable area for revegetation and transition the embankment back into the natural grade; when viewed in elevation, this rounded transition should occur over the last 1/6th of the slope top and toe
- Allow for the removal of more vegetation than necessary for earthwork to create a natural and irregular edge, allow a naturalized rounding of the slope, frame scenic views, and create islands of significant existing trees and shrubs
- Use a warped or variable slope technique in areas where the terrain is rolling and road work requires frequent shifts between cuts and fills; soften transitions by laying back the slopes more at the ends of the cuts and fills than in the middle
- Vary the slope of the embankment through the length of a large cut or fill area; a consistent slope should not be used for a longitudinal length greater than 300 feet
- Replicate the diversity of natural slope conditions in new earthwork design and construction

09 | LANDSCAPE PLANTING, REVEGETATION, AND TOPSOIL MANAGEMENT

- Evaluate sites for elevation, solar orientation, soil conditions, and Mountain Mineral Belt ecosystem type (subalpine, montane, foothills, or riparian)
- Review plant selections for drought tolerance, salt and alkali tolerance, seedling vigor, fire-retardant characteristics, growth habit, suitable soil groups, and seeding rates; natural patterns and distribution of plants is the predominate landscape principle; ensure that the selected plant palette complements the site-specific existing vegetation (see section 09 | Landscape Planting); vary plant height, size, and width in restored plant communities
- Minimize the linear effect of vegetation clearing
- Create a continuous habitat pattern by extending planting across the full extent of medians and roadway edges
- Mimic surrounding conditions of plant density and spacing, species composition, and plant community structure
- Blend existing rock and natural materials from the site with the landscape; save and reuse native rock, stumps, and other natural materials in conditions such as boulder fields, talus slopes, or ground cover that emulates the existing landscape; reuse of existing materials should be part of site design

Rocks comprise a large portion of the landscape's ground surface. Cut slope lines would be carefully modified, and replicating the existing ground surface will enable constructed slopes to blend more effectively. Grading strategies will be implemented to minimize the height of retaining walls along the corridor.

The cut walls proposed for this project will conform to the goals outlined in the Aesthetic Guidance Index of the I-70 Mountain Corridor Context Sensitive Solutions Aesthetic Design Guidelines and will be designed to blend in with the color and texture of the existing geology in the area.

7.2.2 Construction Mitigation

To reduce visual effects related to construction activities, the following mitigation measures are recommended:

- Visually obtrusive erosion-control devices, such as silt fences, plastic ground cover, and straw bales, should be removed as soon as the area is stabilized; stockpile areas should either be in containers or neatly organized and cleaned
- Stockpile areas should be located in less visibly sensitive areas and, whenever possible, not visible from the Scott Lancaster Memorial Trail
- Lighting, including "down-lighting," should be directed toward the interior of the construction staging and work areas, and be shielded so that it does not spill over into adjacent areas

References

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- FHWA, 1989. *Visual Impact Assessment for Highway Projects (FHWA-HI-88-054)*. Federal Roadway Administration, 1981, reprinted 1989.
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