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OVER THE RIVER

Chapter 4. Technical and Logistical Aspects of OTR and Alternate Actions

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Chapter 4. Technical and Logistical Aspects of OTR and Alternative Actions

4.1 Introduction

This chapter outlines the technical and logistical aspects of the OTR temporary work of art, also referred to here as “the Proposed Action.” The descriptions of OTR included in Chapters 1 and 3 describe the foundations of the Proposed Action. In addition, this chapter describes actions alternative to the OTR Proposed Action.

4.2 OTR Proposed Action

As described in Chapter 3, the OTR temporary work of art will consist of approximately 5.9 miles of luminous fabric panels temporarily suspended horizontally above the Arkansas River in eight select areas within a 42-mile stretch of the river between Salida and Canon City, in the western portion of Fremont County and southeast portion of Chaffee County, Colorado (see Map 3-1). Set against the natural beauty of the Arkansas River, surrounding landscape and sky, the shimmering fabric panels will magnify the effects of changing light that occurs throughout the day. The fabric panels will be supported 8 to 25 feet above the river by a system of cables and anchors that will be removed and the river corridor restored at the end of the 14-day viewing period.

In addition, the OTR temporary work of art requires a staging area to be located at Texas Creek. A permanent warehouse/office will be built on this site and donated to BLM when OTR is ended. The area adjacent to the warehouse/office will be used as a storage yard to stockpile material. The nearby railroad siding will be used to move equipment and material along the rail track from Texas Creek to County Line and from Texas Creek to Parkdale. OTR Corporation has already received permission from Union Pacific to use the railroad for OTR installation and removal activities.

The locations identified for temporary use by OTR will be needed for various periods of time. OTR is expected to take several seasons to install, is proposed to be displayed during the first two weeks of August, and would take a few months to remove and restore the lands to their original conditions. OTR installation activities will begin when all necessary permits and authorizations are received.

The following section describes all of the OTR Operations Plans, as of April 2007, which contain descriptions of the technical components of OTR. These plans are composed of the Installation, Removal, and Restoration Plan (see Appendix J1) and the Event Management Plan (see Appendix J2). They explain the specific procedures for installing OTR, operating during the viewing period, removing OTR and restoring the lands. These plans include the traffic management and emergency response plans during all project phases.

The common thread among these plans is coordination and communications. Early establishment of the stakeholders’ teams (see Appendix J2.2) will ensure efficient plan implementation. While each plan is summarized briefly below, Appendix J includes all details as of April 2007. All plans will continue to evolve based on input and guidance from the OTR team, skilled specialists, the BLM, Colorado Department of Transportation (CDOT), and other agencies.

4.2.1 Installation, Removal, and Restoration Plan

The plans for OTR installation, removal, and restoration are divided into two sections: engineering and operations. The engineering plan explains the technical details concerning the engineering for OTR

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4.2.1.1 The Installation, Removal, and Restoration Engineering Plan

The Installation, Removal, and Restoration Engineering Plan is described in detail, with supporting maps and schedules, in Appendix J1.1. The plan will continue to evolve and, as described here, includes the best available information as of April 2007 provided by Golder Associates, Hayward Baker Inc., Rowan, Williams, Davies & Irwin Inc. (RWDI), and Vince Davenport, OTR Chief Engineer and Director of Construction, regarding the following:

- Anchor, cable, and fabric panel geometric layouts
- Approximate anchor loads
- Approximate cable sizes
- Anchor types and capacities
- Wind test evaluation data, both scale model and life-size prototype test
- Anchor and anchor transition frame (ATF) installation schedule
- Anchor and ATF removal schedule
- Equipment and machinery specifications, including photographs, of various drilling, anchor, and material options
- Cable installation and removal procedures
- Fabric panel installation and removal procedures
- Restoration plan

Installation of the OTR temporary work of art will be accomplished in five progressive phases: (1) survey anchor points, (2) design and install anchors, (3) install ATFs, (4) design and install cables, and (5) install fabric panels. The anchor points will be surveyed and the anchors installed over a time period that includes two spring seasons, two fall seasons, and, weather permitting, two winter seasons. Installation work in the summer seasons will involve construction activity only on the railroad side of the river. The final scheduling of anchor and ATF installation will depend on the need to avoid sensitive areas during certain times of the year. The cables will be installed during the two-month period immediately before the fabric panel installation. The distribution, hooking, pulling, and securing of the panels will take place immediately before the viewing of the OTR temporary work of art.

Anchor Point Survey

A survey crew of three people will be used to locate and mark all anchor points. No highway closures will be necessary during anchor surveying because this work will not take place within the US 50 right-of-way. Warning signs, however, will be provided to caution drivers of their proximity to a survey crew. CDOT will be consulted regarding additional measures.

Anchor Design and Installation

The anchors will serve as secure points of attachment for the cables. Because of the variation in surface material and geology along the river, several different anchor types and systems will be used, and these will require a variety of specialized equipment and machinery. See Anchor and ATF Installation and Removal Plan and supporting documents provided by Hayward Baker Inc. in Appendix J1.1. Geological settings and specific ground conditions in each of the eight areas have been identified by Golder Associates. These data are critical in determining anchor design and are included in Appendices J1.1.1 and J1.1.2, the Preliminary Design Engineering Reports from 2000 and 2006.

ATF Installation

Immediately after anchor installation is complete, the same crews will begin the ATF assembly and installation. The Anchor and ATF Installation and Removal Plan and supporting documents in Appendix J1.1, provided by Hayward Baker Inc., give a detailed description of this operation.

Cable Design and Installation

The load and resistance factor design (LRFD) approach, consistent with US design codes, will be used for sizing cables and connections. The cable system is considered a temporary structure because of the short duration of the OTR temporary work of art. Controlling loads to the cable system are categorized into (1) dead loads of cables, fabric, and connections, and (2) wind load. Parsons Structural Engineers made cable load and design recommendations, and the results of their calculations are included in the Golder Associates reports in Appendices J1.1.1 and J1.1.2.

To determine the cable tensions due to wind loads, RWDI conducted a series of wind tunnel tests. In 1998, they completed a scale model test in their laboratory in Guelph, Ontario, Canada. RWDI also conducted live wind load tests during the OTR life-size prototype tests near Grand Junction in 1999. All test results are recorded in the RWDI report included in Appendix J1.1.3, Wind Engineering Services Report. There is also an extensive evaluation of the RWDI data included in the Golder Associates reports in Appendices J1.1.1 and J1.1.2.

Cable installation will begin approximately two months before installation of fabric panels. It is estimated that two crews will be working at the same time, one working from the east and one working from the west, on both the highway side and the railroad side of the river. The cable installation contractor will define exact procedures; this contract has not been awarded yet.

Where river and bank conditions allow, the cables may be taken across the river by raft. Within some areas, however, it may be necessary to send the cables across the river using a .22-caliber, low-decibel line gun. This equipment will be used to send a leader line to which other cables are attached and will only be used at the beginning of each section. Once the first cable is across the river, that cable will be used to pull across the next.

Cable sizes vary in diameter from 3/8 inch to 3/4 inch, depending on the load they support. A discussion of cables that may be used and results of cable load tests can be found in the Golder Associates reports in Appendices J1.1.1 and J1.1.2. Equipment used to install cables may include a boom truck with roller drum and hand-carried ratchet winches with miscellaneous hand tools.

Fabric Panel Installation

The OTR temporary work of art fabric panels will be made of loosely woven polypropylene fabric that weighs approximately 0.063 pounds per square foot. The panels will be translucent, allowing sunlight to pass through the fabric, and providing one of the intended fundamental artistic effects. The panels will vary in width from approximately 50 to 120 feet and in length from approximately 35 to 40 feet, depending on their planned location on the river. Grommets will be installed into the fabric seams when the panels are sewn.

Panel types and configurations were field-tested twice in 1997, once in 1998, and once in 1999 in western Colorado. A description of these life-size prototype tests can be found in Section 5.7.6.2, Impact and Mitigation Issues (in Section 5.7.6, Engineering Safety for Extreme Weather Events), and photographs are displayed in Section 3.2, Illustrations of OTR.

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The fabric panels will be suspended above the river using a system of cables that attach with carabiners at grommets. The area between the fabric and the banks from the water's edge will remain open. This distance between the suspended fabric panels and the banks will vary from approximately 6 to 25 feet. This opening allows the public and wildlife access to the river along the length of the OTR temporary work of art while also allowing sunlight to illuminate the river on both sides.

The fabric panels will be installed in three phases. First, the fabric panels will be delivered to predesignated locations on the highway side on flatbed trucks coming from the central staging area at Texas Creek. Bundled fabric panels will be delivered to panel locations on the railroad side by flatbed rail cars. Fabric panels will be delivered at a pace that matches that of the crews hooking the fabric panels to the cables. Then, crews will hook the fabric panels onto cables with specially designed carabiners, and tie the fabric panels in bundles.

In the third phase, the OTR temporary work of art opens, or "blossoms." At this time, crews using winches attached to the ATFs will begin pulling the fabric panels into place using small pulling cables that will then be used to secure the panels into position.

Removal

Removal of the physical features of the OTR temporary work of art (fabric panels, cables, and anchors) will commence immediately after the 14-day viewing period and will be completed within a few months, weather permitting. Fabric panels will be removed in approximately the first two weeks and cables within four to five weeks. As soon as fabric panels and cables are removed, anchor removal will begin immediately.

Fabric panel removal will begin from both the east end and the west end, with crews working toward the middle, from both the highway side and the railroad side. Fabric panels will be tied into bundles, loaded onto flatbed trucks and rail cars, and delivered to the central staging area at Texas Creek. From there, the panels will be delivered to an industrial recycling company.

Removal of cables will begin as soon as each fabric panel is removed, again with two or more crews working from east and west, to match efforts of the crews removing the fabric panels. Cables and other hardware will be loaded onto flatbed trucks and rail cars and delivered to the central staging area at Texas Creek. These materials will then be shipped to a steel recycling company.

Anchor and ATF removal will complete the process. A detailed description of the removal design plan is in the Hayward Baker Inc. report included in Appendix J1.1.

Restoration

A complete step-by-step restoration of anchor sites is included in the Hayward Baker Inc. report in Appendix J1.1, with further restoration text included at the end of Appendix J1.1. In addition, cleanup crews will check the area for trash and litter daily during installation and viewing, and at the end of the removal period, to ensure that all material generated by the OTR temporary work of art and viewers has been removed from the site. See Appendix J1.2, Installation, Removal, and Restoration Operations Plan, and Appendix J2.2, Event Management Plan.

Best efforts will be made throughout installation, viewing, and removal to preserve the native vegetation and minimize human impact on the river corridor. OTR Corporation will also consult further with the BLM as to specific revegetation efforts.

4.2.1.2 The Installation, Removal, and Restoration Operations Plan

Installation and removal of OTR (including restoration activities) will require plans for traffic and emergency response management and sanitation protocols. These plans are included in Appendix J1.2. Installation and removal traffic operations will include delay evaluations, temporary signing and pavement marking, lane closures, flagging and associated traffic control, staging areas and construction parking, and employee transportation. These plans also include sanitation protocols for the installation, removal, and restoration periods. The plans will continue to be designed to minimize impacts during the installation and removal periods.

4.2.2 Event Management Plan

The Event Management planning documents for OTR begin with five Traffic Planning documents: (1) a profile of the OTR Traffic Team (Appendix J2.1.1); (2) a Visitation Analysis (Appendix J2.1.2); (3) an explanation of the Transportation Alternatives (Appendix J2.1.3); (4) a Traffic Operations Analysis (Appendix J2.1.4); and (5) an Alternative Route Report (Appendix J2.1.5). These documents all provide the basis for planning the traffic management included in the Event Management Plan (Appendix J2.2). This plan includes all plans for communications, traffic and emergency management, management of personnel, including monitors, and sanitation protocols for the viewing period.

4.2.2.1 Visitation Analysis

The Visitation Analysis in Appendix J2.1.2 includes detailed studies to determine an OTR visitation estimate and convert that to traffic demands within the project area. This provides the basis for distribution of anticipated parking, use of alternative transportation modes, pedestrian traffic, local traffic, and interface with existing recreation activities.

4.2.2.2 Transportation Alternatives

Four transportation alternatives are described generally in Section 4.3.4 of this Report, and are explained in detail in Appendix J2.1.3. The alternative selected will affect the transportation performance and the relevant mitigation techniques included in the Event Management Plan (Appendix J2.2).

4.2.2.3 Traffic Operations Analysis

A Traffic Operations Analysis was conducted in June 2006 with the best available information available at that time. The results of this analysis are presented in Appendix J2.1.4.

4.2.2.4 Alternate Route Report

The Alternative Route Report of Appendix J2.1.5 enumerates potential detours for different traffic patterns.

4.2.2.5 Event Management Plan

The background information explained in the preceding sections provides the basis for the Event Management Plan (see Appendix J2.2). This plan focuses on the coordination and communications required during the OTR viewing period. It identifies the structure and composition of the various stakeholder teams and their connections to all of the planning for operations during the viewing period. Critical elements of the Event Management Plan are traffic and emergency response management, public information management, management of personnel, including monitors, and sanitation protocols for the OTR viewing period.

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4.3 Alternative Actions

NEPA requires that an EIS include the analysis of a range of alternatives to a Proposed Action, including a No Action Alternative. Other alternatives were developed to ensure that options to meet the stated purpose and need, while protecting, enhancing, or restoring the environment, were not precluded.

This section describes the alternatives analyzed in detail and those alternatives considered but not selected for detailed analysis. The chapter concludes with a summary comparison of the Proposed Action and alternative actions.

4.3.1 Seven Alternatives Selected for Detailed Study

The alternatives selected for detailed study were developed with input from BLM, other agencies and the public, to respond to human and environmental concerns. On the basis of public comment (as discussed in Chapter 1, Section 1.3, Public Involvement) and BLM and other agency input, the Proposed Action was redesigned to address concerns for wildlife (bighorn sheep), recreation, and public safety. Alternatives B, C, and D, as discussed below, were developed to respond to the socioeconomic and transportation concerns (see Sections 1.3.1 and 1.3.2). The alternatives selected for detailed study are the following:

1. Alternative A: No Action
2. Alternative B: Alternate Timing of Viewing Period
- 3–6. Alternatives C: Transportation Alternatives
 3. Alternative C1: Traffic Management
 4. Alternative C2: Transit Emphasis
 5. Alternative C3: Exclusive Transit
 6. Alternative C4: One-Way US 50
7. Alternative D: Alternate Timing of Construction

4.3.2 Alternative A: No Action

Under the No Action alternative, no temporary work of art for public viewing would be installed. None of the installation activities for OTR would occur, and thus none of the potential impacts of installation activities would occur. In addition, none of the potential positive or negative impacts from visitation would occur. The negative impacts that would be avoided include temporary disruption to residents' routine way of life and potential environmental impacts. Some of the potential benefits of OTR that would *not* be experienced include improvements in communications, opportunities among local public safety agencies to improve current management practices, and economic benefits of up to \$50 million to the local area. In addition, a selection of the No Action alternative may discourage future proposals for artistic use on public lands.

4.3.3 Alternative B: Alternate Timing of Viewing Period

The Proposed Action includes a viewing period of the first two weeks in August of the year the work of art may be realized. Other viewing periods are possible, however, and the artists are open to the possibility of having alternate viewing periods if it is revealed that other viewing periods have less adverse impacts on human and environmental communities.

The artists are receptive to a 14-day viewing period anytime during the summer. Their artistic vision includes the long summer daylight hours and rafters being able to view the fabric from underneath. Therefore, any 14-day period from June 21 through September 21 is acceptable to the purpose and need for OTR.

The commercial rafting community has expressed the desire for the viewing period to occur as late as possible in the year, because June, July, and August are the heaviest rafting periods and if the viewing

period were in September, the rafting community would experience greater benefits than if it were held in July. However, the education system previously stated they prefer that the viewing period be before the schools are open. Therefore, it seems that the best viewing period would be the first two weeks in August, but if further agency and community discussions identify that an alternate viewing period is desirable, then this is feasible from the artists' perspective.

4.3.4 Alternatives C1 through C4: Transportation Alternatives

Different approaches to transportation management during the OTR viewing period comprise four alternatives. Each alternative was created by selecting complementary measures to represent the range of treatment available. The final, optimal transportation management plan, however, will be selected after close coordination with the BLM, CDOT, other entities, and the public, and may end up including attractive features from all four alternatives described here.

4.3.4.1 Alternative C1: Traffic Management

Alternative C1 focuses on maximizing capacity of US 50 through traffic management and operational techniques without making major physical changes to the highway or relying on alternate modes. Visitors would be led by pilot vehicles to barrier-separated locations along existing passing lanes to view panels in the Spike Buck, Maytag, and Texas Creek areas. Temporary traffic signals or traffic enforcement officers would control movements at major intersections such as SH 69 at Texas Creek and Fremont County Road 1A at Cotopaxi.

4.3.4.2 Alternative C2: Transit Emphasis

Alternative C2 encourages visitors to use alternate modes by offering special accommodations to transit users. Current passing sections would be converted to barrier-separated pedestrian trails where bus passengers could disembark for a closer view of OTR. Viewing and rafting shuttle buses would leave from several new park-and-ride lots created for the viewing period. Tour buses from various statewide locations may possibly be subsidized to reduce demand at close-in park-and-ride lots. One weekday would be reserved for an organized bicycle tour of OTR, and westbound US 50 would be closed to motorized traffic. Viewers could have the option of taking an extended rail trip from Cañon City to Texas Creek or Salida if Union Pacific authorizes passenger use on this rail line.

4.3.4.3 Alternative C3: Exclusive Transit

Only credentialed local residents, commercial businesses, delivery vehicles, and tour buses would be allowed on US 50 between Parkdale and Salida under Alternative C3. Through traffic would have to use heavily advertised detours and viewers would park at intercept lots to board shuttle buses. As with Alternative C2, buses would make stops so that passengers could disembark and walk along barrier-separated areas at existing passing locations. These areas would afford closer views of the Spike Buck, Maytag, and Texas Creek areas. Rafting shuttles also could depart from the new intercept lots, and one weekday would be reserved for an organized bike tour of OTR.

4.3.4.4 Alternative C4: One-Way US 50

Under Alternative C4, US 50 would be converted to one-way westbound traffic between Parkdale and Texas Creek (Junction SH 69). Fremont County Road 1A, SH 69, SH 96, and SH 67 would be advertised as the formal eastbound detour, although knowledgeable residents could use Fremont County Roads 28 and 3A as a shorter, informal eastbound detour. Existing passing sections would be converted to a barrier-separated auxiliary lane for safer access to limited parking at riverside turnouts. SH 69 would also be converted to two one-way southbound lanes from US 50 to Fremont County Road 28 to better absorb traffic turning from both directions of US 50 at Texas Creek. With this configuration, no additional traffic control would be needed at the junction of US 50 and SH 69.

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4.3.5 Alternative D: Alternate Timing of Installation Activities

The current installation plan involves installation activities during the daytime. It is possible for the plans to be altered to have some installation activities during the nighttime as well. Nighttime installation would relieve some of the impacts on daytime transportation (for example, commercial traffic, commuter traffic), but might entail some nighttime noise, which may be undesirable to local residents and wildlife, and would also lengthen the installation period by approximately 10 percent.

4.3.6 Other Alternatives Considered but Not Selected for Detailed Study

Several other alternatives were identified through public scoping and agency discussion but were subsequently eliminated from detailed analysis because they did not meet the purpose and need, did not have a desirable environmental effect relative to the Proposed Action, or were not technically, operationally, and economically feasible. These alternatives, and the reasons they were not analyzed in detail, are discussed here.

Increase the length of the OTR temporary work of art. In direct response to agency and public comments regarding the OTR temporary work of art, the artistic design for OTR has already undergone two significant alterations. Longer versions of the design of OTR have existed. The original design was 10.4 miles and in response to agency and public comments, was reduced to 7.7 miles and then further reduced. The current design of OTR includes 5.9 miles of fabric panels, a reduction of more than 43 percent from the original design.

10.4 Miles of Fabric Panels. The OTR temporary work of art was originally designed to include 10.4 miles of fabric panels suspended over the Arkansas River at nine different areas within a 46-mile stretch of river. This design included longer areas and an additional area at Five Points/Sheep Basin. Based on information and guidance provided by BLM and the Colorado Department of Wildlife (CDOW), the area at Five Points/Sheep Basin was identified as a major sheep watering hole and fabric panels were eliminated to avoid potential impacts to big horn sheep.

7.7 Miles of Fabric Panels. To mitigate impacts to big horn sheep, the OTR temporary work of art was redesigned to include only 7.7 miles of fabric panels. The artists agreed to reduce this design further to address recreation and public safety concerns at locations where rescues frequently occur. Elimination of these fabric panels enhances water rescue efforts. In addition, because of public safety concerns, several sections of fabric panels were eliminated near County Line, where it was determined that overhead power lines presented a potentially hazardous situation. As a result, the formulation of the current Proposed Action design of 5.9 miles of fabric panels is a reduction of 43 percent from the artists' original proposal. It has taken many years to revise the design of the OTR temporary work of art to address agency and public concerns, while still serving OTR's artistic purpose and need.

Reduce the length of the OTR temporary work of art. There has been some discussion that the length of the OTR temporary work of art should be reduced further. However, any further reductions in fabric panel length would no longer meet the purpose and need for the OTR temporary work of art. The design of OTR has already been reduced by more than 43 percent of the original design to address agency and public concern. As now proposed, OTR has been carefully crafted by the artists to meet their specific artistic vision (see Section 1.3). None of these areas defined in the Proposed Action may be further reduced without damaging the integrity, intent, and harmony of the work of art as a whole.

Increase the length of viewing period. Some comments have questioned why OTR is planned for only a two-week display. A longer viewing period alternative was not considered for detailed analysis because it does not meet the artists' vision. Part of the artistic intent is the tenderness for that which does not last, and the freedom that exists without possession or permanence. The temporary nature of the work of art is

a significant aspect of it. The artists stress that OTR will be a unique, once-in-a-lifetime experience and will never happen again. Their previous work of art *Wrapped Reichstag* had a similar viewing period of two weeks, and when the German government asked the artists for an extension, the artists refused.

Install OTR on another river. Some public comments expressed desire for OTR to be installed on another river, or on another stretch of the Arkansas River. This alternative was not considered for detailed analysis because it would not meet the purpose and need. The artists chose this exact location out of 89 other locations because this met specific setting qualities described in Chapter 1, Section 1.2.

4.4 Alternatives Summary

The Proposed Action and seven alternative actions are summarized in Table 4-1. The next chapter, Chapter 5, includes preliminary discussions of potential impacts of the Proposed Action and No Action alternative, both positive and negative. Further studies are recommended to complete those discussions and determine potential impacts of the other selected alternatives.

Table 4-1. Summary of OTR Proposed Action and Alternatives

Action	Installation/Removal Variations	Viewing Period Variations	Transportation Variations
OTR Proposed Action	Daytime activities	August 1 through August 14	Transportation elements as required by BLM and CDOT
Alternative A: No Action	Not applicable	Not applicable	Not applicable
Alternative B: Alternate Timing of Viewing Period	Same as Proposed Action	Any other 2-week period during the summertime	Same as Proposed Action
Alternative C1: Traffic Management	Same as Proposed Action	Same as Proposed Action	Traffic is managed through operational techniques
Alternative C2: Transit Emphasis	Same as Proposed Action	Same as Proposed Action	Visitors given incentives to use transit
Alternative C3: Exclusive Transit	Same as Proposed Action	Same as Proposed Action	Only credentialed local residents, delivery vehicles and tour buses are allowed on US 50 between Parkdale and Salida
Alternative C4: One-Way US 50	Same as Proposed Action	Same as Proposed Action	US 50 is converted to one-way westbound traffic between Parkdale and Texas Creek
Alternative D: Alternate Timing of Installation Activities	Nighttime activities incorporated into installation and removal plans	Same as Proposed Action	Same as Proposed Action

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