ACTT WORKSHOP

Wyoming

September 21-22, 2005 | DuBois, Wyoming

OKLAHOMA DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

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Executive Summary

Accelerated Construction Technology Transfer (ACTT) is a strategic process that uses innovative techniques and technologies to reduce construction time on major highway projects while enhancing safety and improving quality. The process is implemented by conducting 2-day workshops for State departments of transportation (DOTs). The American Association of State Highway Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA) jointly fund ACTT workshops.

In September 2004, the Wyoming Department of Transportation (WYDOT) hosted a workshop that brought together transportation professionals from around the Nation. The primary objective of the workshop was to draw on the expertise of participants to help WYDOT achieve its goal of minimizing construction time for its US-287/26, between Moran Junction and Dubois. The $100 million project is to reconstruct this 37-mile stretch of the highway to upgrade to a super-two facility with passing lanes. The primary project challenge is to complete the project under traffic while minimizing socioeconomic, environmental, and wildlife impacts. The construction season in this part of the country is short and coincides with tourism, which the small communities along the corridor rely on as a major source of retail sales. Prior to the workshop, WYDOT was evaluating several scheduling options including an accelerated 5-year construction option, a 7-year option, and a 9-year option. The corridor project was being designed as five projects that could be constructed individually or combined. The first project, approximately 10 mi (16 km) in length, was scheduled to begin in 2005 with completion in the 2006 construction season. To accelerate construction of the corridor, WYDOT is now considering combining contracts as recommended by workshop participants.

At the opening session on September 21, Pat Collins, WYDOT's Engineering and Planning Engineer, welcomed the participants and expressed support for the workshop. Jim Sorenson, FHWA's Senior Construction Engineer, posed the question "Why ACTT? Why Now?" before introducing WYDOT personnel to give an overview of the project. Following the opening remarks and a project tour, the participants spent a day and a half brainstorming, looking for methods and measures that would help achieve project goals.

The skill sets selected by WYDOT prior to the start of the workshop were Structures; Geotechnical; Innovative Contracting/Financing; Pavements; Traffic/ITS/Safety; Public Relations; Environmental; and Construction/Materials/Accelerated Testing. Each skill set team focused on how the ACTT process applied to the specific concerns of their area of expertise, while collectively the teams searched for methods/measures to help WYDOT achieve its goals of minimizing construction time as well as socioeconomic, environmental, and wildlife impacts.

Workshop participants remained focused throughout the workshop and made numerous recommendations, many of which were deemed viable and will be pursued, according to WYDOT. Sleeter Dover, WYDOT's Director, attended the last day of the workshop. He thanked the participants, expressed support for the workshop, and spoke of the significance of such an undertaking on high-profile projects like this one. With the workshop now completed, it remains for WYDOT to sift through the various workshop ideas and recommendations and decide which should be implemented in the future planning, design, and construction phases of the US-287/26 reconstruction.

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CHAPTER 1

Accelerated Construction Technology Transfer

Highway construction continues to produce significant disruptions in communities across the nation as DOTs work to update an aging infrastructure system. While highway construction is unavoidable, excessive construction time is unnecessary and should be avoided because it is costly and exposes workers and the traveling public to substandard conditions. The ACTT initiative aims to minimize travel delays and community disruptions by reducing cost and construction time and improving quality, traffic control, and safety.

1.1 Background

ACTT is a process that encourages the use of innovative technologies and methods to accelerate the construction of major highway projects to reduce user delay and community disruption. A complete accelerated construction approach involves evaluating the planning, design, and construction activities within a highway corridor using multiple strategies and technologies. Successful ACTT deployment requires a thorough examination of all facets of a highway corridor with the objective of improving safety and optimizing cost effectiveness while minimizing adverse impacts for the benefit of the traveling public.

Recommendations by Transportation Research Board (TRB) Special Report 249, "Building Momentum for Change: Creating a Strategic Forum for Innovation in Highway Infrastructure," called for creating a strategic forum to promote accelerated construction in the highway infrastructure. TRB Task Force AFH35T (formerly A5T60) was formed with the following objectives:

- Facilitating the removal of barriers to innovation.
- Advocating continuous quality improvement and positive change.
- Enhancing safety and mobility.
- Encouraging the development of strategies that generate beneficial change.
- Creating a framework for informed consideration of innovation.

Fully supporting the task force's mission and objectives, the FHWA and the Technology Implementation Group (TIG) of AASHTO joined the task force in an outreach effort. The result was the formation of a national resource pool known as the "National Skill Sets Council" and completion of two ACTT pilot workshops (one in Indiana and one in Pennsylvania). Following the pilot workshops, TRB Task Force AFH35T transferred the concept to FHWA and AASHTO to continue the effort by conducting future workshops.

CHAPTER 2

Project Overview

2.1 Background

US-287/26 is a primary east-west route in northwest Wyoming that provides the most direct access to Grand Teton National Park and connects with north-south roadways that lead to Yellowstone National Park and the Jackson Hole area. The project area bisects Teton and Fremont counties and traverses the public lands of the Bridger-Teton National Forest, Shoshone National Forest, and Grand Teton National Park (see figure 1).

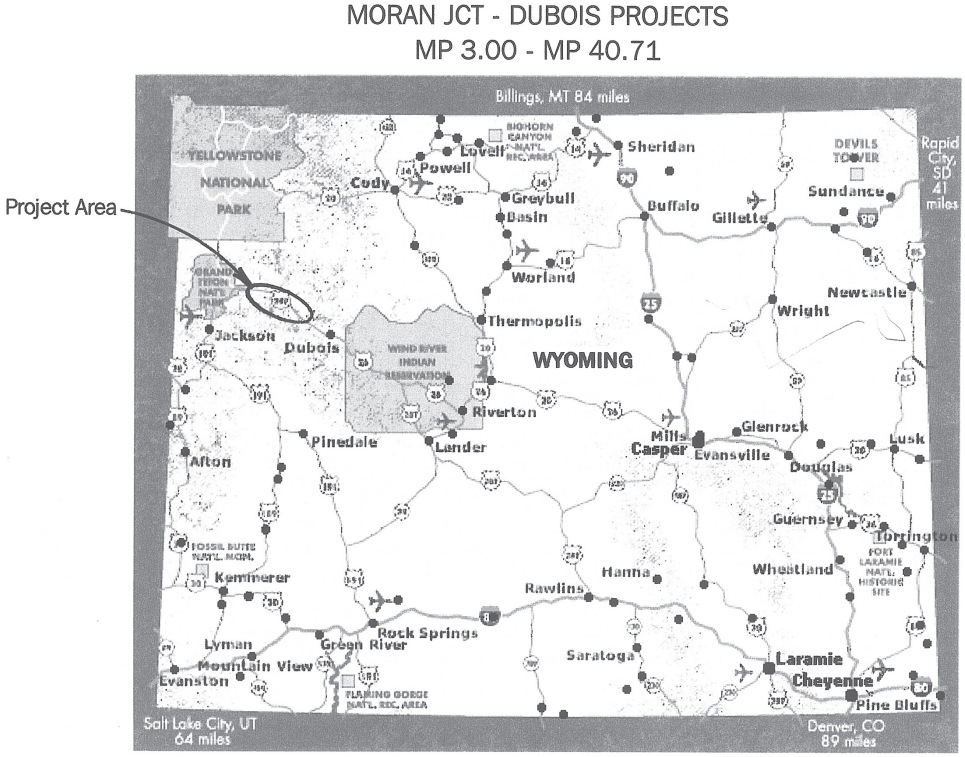

Figure 1

The Moran Junction–Dubois project corridor lies between MP (mile point) 3.00 and MP 40.71 on US-287/26. At the western end, the Buffalo Fork River segment of the project begins approximately 3 mi (5 km) east of Moran Junction. This point is 23 mi (37 km) northeast of Grand Teton National Park, 34 mi (55 km) northeast of Jackson, and 30 mi (48 km) southeast of Yellowstone National Park. At the eastern end, the Brooks Lake section ends at the Shoshone National Forest boundary, approximately 12 mi (19 km) northwest of Dubois. This point is 70 mi (113 km) northwest of the Wind River Indian Reservation, 86 mi (138 km) northwest of Riverton, and 88 mi (142 km) northwest of Lander (See figure 2).

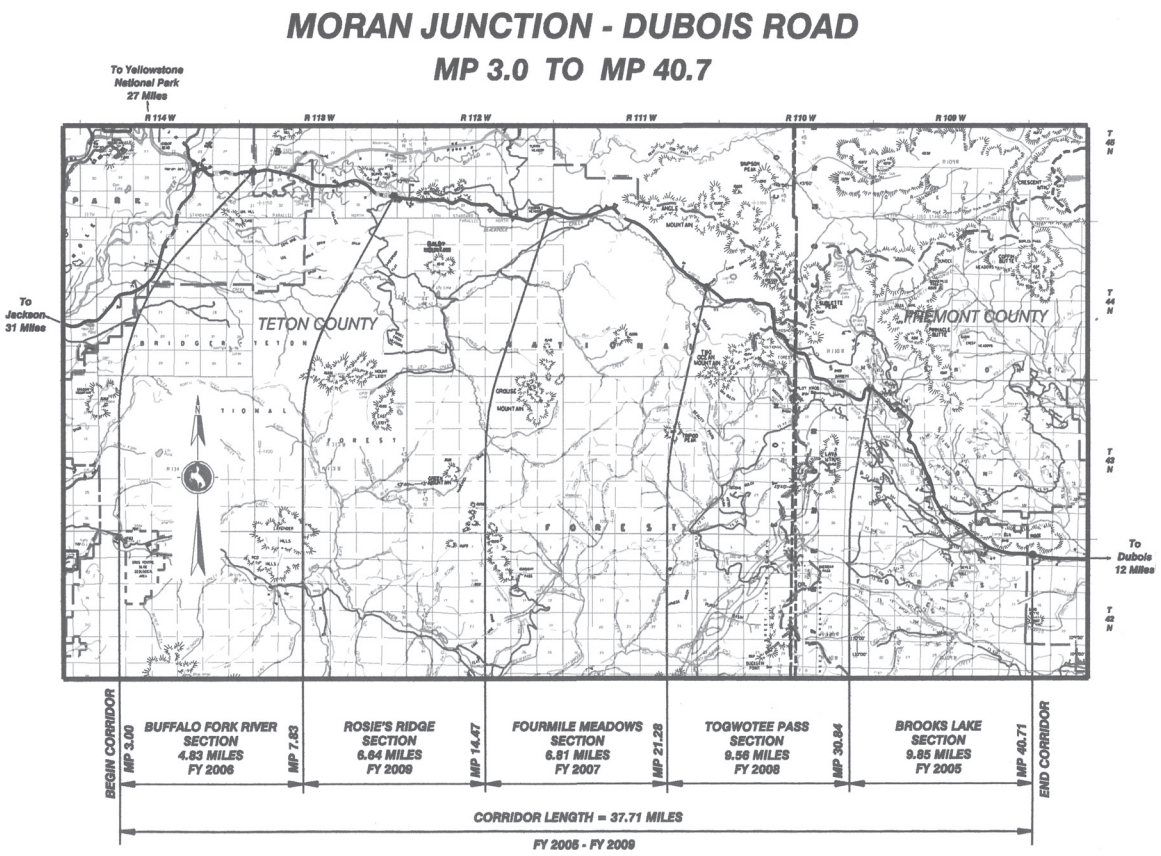

Figure 2

The project corridor is part of the Centennial Scenic Byway, and is renowned for its natural, scenic, cultural, and ecological setting. US-287/26 also facilitates numerous outdoor recreational opportunities, including camping, hiking, snowmobiling, picnicking, hunting, and cross-country skiing. Local residents in Teton and Fremont counties use the road for year-round travel, and the road is also used as a truck route for goods to and from the Jackson area.

The U.S. Bureau of Public Roads constructed US-287/26 between 1955 and 1967. Portions of the roadway have been extensively repaired and reconstructed since that time. The existing roadway consists of two 12-ft (3.6-m) travelways with 0- to 2-ft (0- to 0.6-m) shoulders on the western 27 mi (43.5 km) and 7-ft (2.1 m) shoulders on the eastern 10 mi (16 km). This roadway corridor is situated at an altitude between 7,500 ft (2,286 m) to 9,700 ft (2,957 m) above sea level, with surrounding peaks of up to 10,900 ft (3,322 m) in elevation.

US-287/26 has substandard design features that do not meet current AASHTO recommendations, including numerous physical and operational problems that reduce the safety and capacity of the roadway and contribute to higher than average accident rates. These problems include poor sight distances, narrow or no shoulders, steep sideslopes, few turnouts, steep grades, sharp curves, deteriorating bridges, and geological hazard areas.

Traffic volumes are anticipated to increase over the next 20 years and are expected to contribute to congestion along the roadway, limit access to side roads and turnouts, and lower the quality of the driving experience. The purposes of the recommended improvements to US-287/26 are to improve safety, accommodate future traffic, correct design deficiencies, and improve visitor experience, while minimizing impacts to the natural and human environment and maintaining

consistency with adopted Federal, State, and local plans.

2.2 Environmental Impact Statement

The Federal Environmental Impact Statement (EIS) was completed in October 2003. An interdisciplinary (ID) team comprised of various Federal, State, and local agencies was established at the beginning of the EIS process to assist with the development and evaluation of project alternatives. At that time, the 38-m (61 km) roadway corridor consisted of eight separate projects, which have since been reduced to five projects. The ID team considered seven action alternatives plus the no-action alternative, ultimately advancing four action alternatives along with the no-action alternative. A preferred alternative was eventually recommended for this project, meeting the objectives to increase safety, provide for future capacity, correct roadway deficiencies, and enhance visitor experience while also minimizing impacts to the natural and human environment.

The wildlife and fisheries impact analysis in the EIS identified the potential for impacts including loss of habitat, disturbance or displacement of wildlife, and the potential for increased roadkill. WYDOT and FHWA have since developed a 2-year wildlife movement study to identify major wildlife movement corridors within the project limits and to identify design and construction criteria that can be used to improve wildlife mobility within the roadway corridor. The study's development involved the cooperation of the U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS,) and Wyoming Game and Fish Department (WGFD). This study was initiated in November 2003 and includes data collected by the USFS in 2002–2003. Wildlife movement studies will continue, as necessary, to ensure that current information is used to design each project.

2.3 Groups and Committees

The Socioeconomic Committee, composed of WYDOT and local community members, was created in September 2003 to discuss impacts to the Wind River area and to find ways to keep tourism in the area during the construction of the five projects. The major concern from local residents and businessmen was the time involved to construct five projects and the subsequent effect on the local businesses and tourism industry. From this committee was spawned the Marketing Group and the Constructibility Study Group. In March 2005, the Marketing Group completed a marketing plan to promote the accessibility of regional resources/activities during highway construction.

The Constructibility Study Group was formed in January 2004 to integrate construction knowledge and experience, along with citizen and USFS input, into the planning and preliminary concept development for the reconstruction of the corridor. It identified strategies to minimize impacts to the traveling public and adjacent communities while ensuring safety and the feasibility of construction. This was accomplished through the development of evaluation criteria and review of alternative time lines for completion of the projects; construction methods and design approaches used to minimize traffic disruption; and other methods to enhance the plans, specifications, and other contract documents for constructibility.

The Wildlife Steering Committee consists of members of the WGFD, the Greater Yellowstone Coalition, WYDOT, FHWA, and the USFS.

2.4 Design Considerations

2.4.1 Functional Classification

The AASHTO Green Book ("A Policy on Geometric Design of Highways and Streets," 2001) uses the concept of functional classification of highways to group types of highways according to the type of service they will provide. A complete, functionally-designed system provides a series of distinct travel movements. The movements can be described as the main movement, which consists of uninterrupted, high-speed flow with relatively long travel distances; a collection

and distribution movement, which takes place on a lower-speed facility with the possibility of stops and shorter travel distances; and the last movement, which is a termination or land-access movement.

The Green Book defines three functional categories of streets and highways as arterial (main movement), collector (collection and distribution movement), and local (termination or access movement). Functionally, the systems change from total mobility associated with a high type arterial to total land access that is associated with a local facility. There are certain driver expectations associated with each type of functional classification.

US-287 between Dubois and Moran Junction is a National Highway System (NHS) highway, which is automatically classified as a Rural Principal Arterial-Other. Functionally, a principal arterial should accommodate high volumes of traffic and long distances at high speeds. Land access is secondary to mobility.

US-287 is also listed as a Wyoming Scenic Byway. By definition, scenic byways and backways are specially designated roadways that provide an opportunity for recreational or slower-paced travel through lands of significant or scenic or cultural interest.

The anticipated travel expectations of a motorist using this corridor as an arterial to quickly move from Dubois to Jackson is completely different from a motorist who is traveling slowly while enjoying the scenic value of the corridor. The different uses are at odds.

It has long been known that speed differential between vehicles can cause accident rates to increase. With the different motorist expectations, as well as a traffic mix that includes passenger cars, recreational vehicles, and trucks, it is possible to achieve speed differentials that can lead to higher than normal crash rates.

2.4.2 Design Consistency

A road should be designed in a manner that is consistent with the expectations of the user. Building a new highway with wider shoulders creates an expectancy in drivers that is consistent with high speed and long trips, and design features such as low-speed curves may not operate as well as desired.

While there are sections of this corridor that will provide design consistency, there are also other areas where the design speed, the operating speed, and the speed limit will be far enough apart to have the potential for problems.

2.4.3 Speed Limit

The current speed limit between Dubois and Moran Junction is 65 mi/h (104 km/h). Speed studies on tangent sections within the mountainous sections indicate that the 85 percentile speeds approach 70 mi/h (112 km/h). While the speed limit on the new project may be set lower than the existing speed limit, there is a high degree of probability that speeds will not be much lower, if any, than the speeds represented by current speed studies.

2.4.4 Multi-Use

Since this route is designated as an east-west bicycle route, it is desirable to have 8-ft (2.4-m) shoulders to accommodate the bicyclists.

2.4.5 Design Criteria

This roadway corridor contains several types of design deficiencies that contribute to unsafe conditions along the roadway. These include substandard shoulder widths; substandard curve geometrics; inadequate snow storage areas; substandard barriers and guardrails; motorist exposure to landslides; no provisions for bicyclists, snowmobilers, and pedestrians; reduced clear zones; and substandard passing and stopping sight distances.

Arterial highways are expected to provide a high degree of mobility. Therefore, they should be designed to provide high operating speeds with a high level of service. The AASHTO Green Book suggests that arterial highways be designed using a design speed of as high as 75 mi/h (120 km/h) on level terrain to a low of 40 mi/h (64 km/h) on mountainous roads. The appropriate level of service (LOS) for a principal arterial is B, with a lower value of C in mountainous terrain.

In general, it is desirable that the running speed of a large proportion of the drivers be at or below the design speed. Experience indicates that deviations from this desired goal are most problematic on sharp horizontal curves. While it is acceptable to design roadway features to a lower speed, it is desirable to maintain as high a design speed as practicable. This is extremely important on the US-26/287 corridor because of the mix in driver expectation as well as the vehicle mix. Maximizing sight distance (design speed) will provide the greatest margin of safety as vehicle speeds deviate. Using present standards, a design speed of 55 mi/h (88 km/h) was used to determine design deficiencies based on the following 2001 AASHTO design criteria:

- Horizontal curvature: a minimum radius of 1,065 ft (319 m) or 5.4-degree curve.
- Maximum superelevation (tilt of the roadway): 6 percent.
- Vertical curvature: stopping sight distance of 495 ft (148 m), passing sight distance of 1985 ft (595 m).
- Maximum grades: mountainous terrain 6 percent, rolling terrain 5 percent.
- Horizontal clearance from edge of travelway (clear zone): variable from 20–30 ft (6–9 m) for fills and 15–21 ft (4–6 m) for cuts.
- Lane widths: 12 ft (3.6 m).
- Shoulder widths: 8 ft (2.4 m).

2.4.6 Horizontal Alignment and Superelevation

The horizontal alignment of a roadway must provide a desired level of comfort for drivers traversing horizontal curves. The minimum curve radius is a limiting design value that provides the desired degree of comfort with respect to centrifugal force (the force attempting to push the vehicle to the outside of the curve) while drivers are traversing the horizontal curve at a given design speed. The minimum radius is determined by the maximum allowable rate of superelevation or tilt of the roadway, and the maximum allowable side friction factor relating to the friction between the tires and the pavement. WYDOT has established a maximum rate of superelevation of 0.06 (6 percent) for mountainous terrain, due to the relatively large winter snowfall resulting in snowpacked or icy highways.

The existing roadway has numerous substandard horizontal curves, based on minimum radii alone. Once existing superelevations are determined further into the design process, more curves might be found to contain deficient superelevation rates for the given degree of curve.

2.4.7 Vertical Alignment

The vertical alignment must provide adequate stopping sight distance. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path. In computing stopping sight distances, the height of the driver's eye (3.5 ft/1 m) and the height of the object to be seen by the driver (2.0 ft/0.6 m) are used. For sag vertical curves, the available sight distance is also dependent on the actual amount of roadway illuminated by the vehicle's headlights. The vertical alignment should also provide as much passing sight distance as practical.

The existing roadway has 14 vertical curves that do not meet the 55 mi/h (88 km/h) design criteria. The lengths and/or grades will need to be modified, or the curves totally reconstructed to bring the substandard curves up to current design standards.

2.4.8 Grades

The length and steepness of grades directly affect the operational characteristics of an arterial. AASHTO recommends that long grades on a mountainous rural arterial with a 55 mi/h (88 km/h) design speed be limited to 6 percent. If the length of a steep grade is such that the speed of a loaded truck will be reduced beyond a reasonable reduction in speed (15 mi/h, 24 km/h), design adjustments such as changes in location to reduce grades or addition of extra lanes should be considered.

2.4.9 Clear Zone

The term "clear zone" is used to designate the unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles. The clear zone includes shoulders. Factors that affect the clear zone dimensions are design speed, embankment slope, traffic volumes, and degree of curvature of horizontal curves. The clear zone should be free of fixed object hazards and critical slopes. The 1996 AASHTO Roadside Design Guide recommends a variable clear zone of 20–30 ft (6–9 m) for fills and 15–21 ft (4–6 m) for cuts for slopes varying from 1:6 or flatter to 1:3. The steeper the clear zone slope, the longer the clear zone width. A slope steeper than 1:3 is considered a "critical" slope, on which an errant vehicle is likely to overturn, and is not an acceptable clear zone slope. A 1:3 to 1:4 slope is considered a "non-recoverable" slope, defined as one which is traversable, but from which most motorists will be unable to stop or to return to the roadway easily. A "recoverable" slope is an embankment slope 1:4 or flatter, and motorists who encroach on these can generally stop their vehicles or slow them enough to return to the roadway safely.

Most of the existing road consists of steep surfacing tapers due to the original construction plus numerous overlays. Most slopes beyond the surfacing tapers are steeper than 1:4. There is little opportunity for a vehicle to safely pull off the road for emergency reasons. The clear zone widths previously mentioned are by no means absolute. Any action that can be taken during design to increase the width of the recovery area will enhance the safety of the roadway.

2.4.10 Lane Width

The lane width of a roadway greatly influences the safety and comfort of driving, as well as LOS. The wider lane provides desirable clearances between large commercial vehicles traveling in opposite directions. The narrower lane forces drivers to operate their vehicles closer to each other laterally than they would normally desire. Lane widths for rural arterials may vary from 10–12 ft (3–3.6 m), but AASHTO recommends a 12-ft (3.6-m) lane width for a higher speed (>45 mi/h, 72 km/h), free-flowing, principal arterial. The existing lane widths are all 12-ft (3.6-m) wide; the proposed lane widths will also be 12-ft (3.6-m) wide.

2.4.11 Shoulder Width

A shoulder is the portion of the roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use, bicycle use, and lateral support of subbase, base, and surface courses. The advantage of well-designed, properly maintained shoulders is providing space away from the traveled way for motorists to stop for emergencies, to change a flat tire, to consult a road map, to view wildlife or scenery, or to provide room for evasive maneuvers to avoid potential crashes or reduce their severity. Wider shoulders provide many benefits:

- Sight distance is improved in cut sections, thereby potentially improving safety.
- Lateral clearance is provided for signs and guardrails.
- Storm water can be discharged farther from the traveled way, and seepage adjacent to the traveled way can be minimized to reduce pavement breakup.
- Structural support is given to the pavement.
- Space is provided for pedestrian and bicycle use, for occasional encroachment of vehicles, and for detouring traffic during construction.

AASHTO recommends a minimum 8-ft (2.4-m) shoulder for rural arterials with projected traffic counts over 2,000 vehicles per day.

2.5 Environmental Concerns

2.5.1 Recreation

Wyoming Trails and the USFS estimate that 126 snowmobile-hauling vehicles are currently parking on the road. This is illegal and unsafe.

2.5.2 Socioeconomic

If a slide were to block the road east of the Flagstaff/Blackrock road intersection (MP 17.6), drivers would have to travel over South Pass to Pinedale to Jackson. This route would be roughly four times longer than that created by the Wolf Mountain Slide in the Snake River Canyon in 1997. If a slide were to occur west of the Flagstaff/Blackrock road intersection, that road could be used as a detour once crossings were reinforced to handle commercial vehicles. Likely the Blackrock Road does not have horizontal and vertical curves to accommodate two-way truck traffic.

2.6 Geotechnical Hazards and Impacts

The following sections explain in detail the geological conditions for the above road section.

2.6.1 Milepost 3.0 to 7.83 (Buffalo Fork River Section)

No major geologic hazards are present within this section.

The roadway traverses a flat section of highway along the Buffalo Fork River Valley. The geology of this section is predominantly composed of clay, silt, sand, gravel, and cobble alluvial deposits derived from the Buffalo Fork drainage. West of the Buffalo Fork River the roadway traverses glacial and colluvium material ranging from clay to boulders.

Stabilization of embankment foundations will be required along with some minor subgrade mitigation.

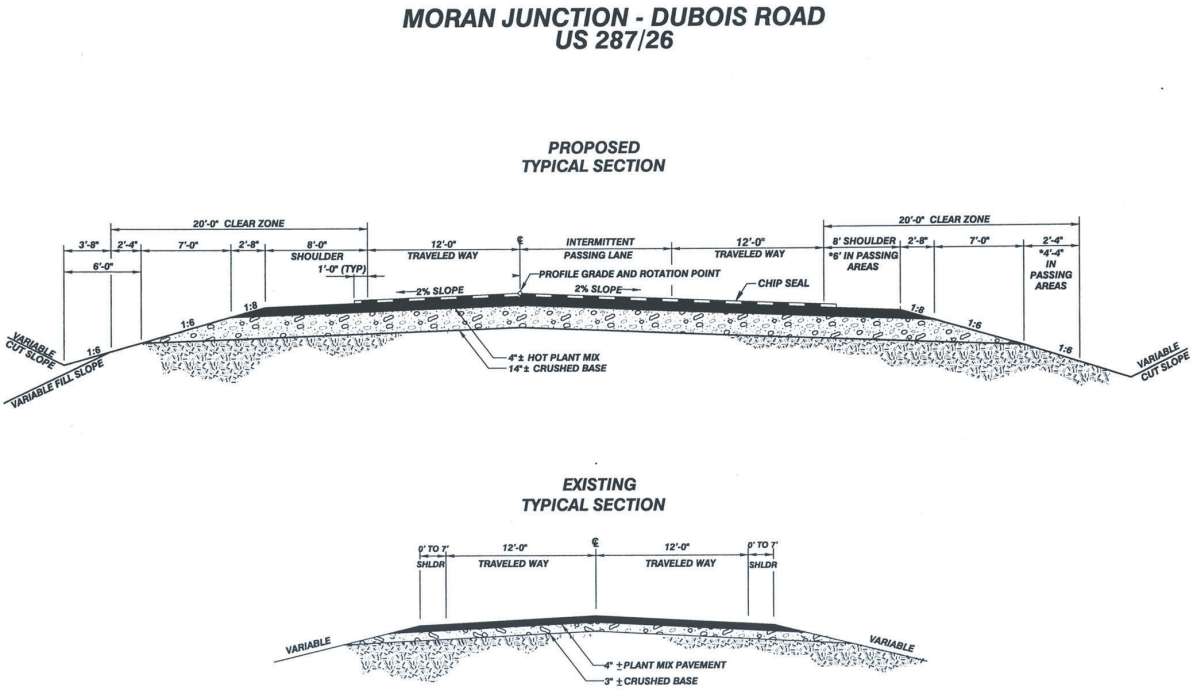

Figure 2: Proposed Shoulder Widths

2.6.2 Milepost 7.83 to 14.47 (Rosie's Ridge Section)
The Rosie's Ridge section has the most geological hazards of any of the five sections on Togwotee Pass.

There is an elevation change of approximately 800 ft (240 m) with the roadway situated to the north of Blackrock Creek. The road traverses the Upper Cretaceous age Harebell Formation, which consists of interbedded shale, sandstone, and poorly cemented conglomerate. Between MP 9.5 and 12.0, the bedrock is covered with colluvium and glacial moraine material ranging in size from clay to boulders. The numerous springs within the permeable glacial soils act as a lubricant to activate slides randomly throughout this section.

There are approximately 13 slides within this section, of which about one-half are currently active. Road damage is common throughout this section. Slides include large circular and block failures and saturated debris and mud flows with the consistency of oatmeal. One very large slide located at MP 10.0 on Rosie's Ridge is approximately 2,000 ft (600 m) long x 700 ft (210 m) wide. Two large vertical 12-ft (3.6-m) diameter culvert drains were installed at this location in 1939, combined with horizontal drains that outlet onto slide debris below the roadway. Four construction projects were let between 1971 and 1998 to repair slides between MP 9.0 and 11.5. Repairs included realignment, lightweight fill (sawdust, wood chips), underdrains, geogrid reinforced fills, and a mudflow retention area.

Three cutslopes were assessed for rockfall risk potential by WYDOT; they ranged from low to very high.

Geotechnical problems are plentiful, particularly between MP 9.0 and 11.5. Many unstable slide areas and rock slopes are in need of urgent repair. Landslides and high groundwater conditions have created ongoing problems for maintenance forces and the WYDOT Geology Program.

2.6.3 Milepost 14.47-21.28 (Fourmile Meadows Section)
The Fourmile Meadows section has minor to moderate geotechnical problems.

The highway traverses a relatively flat, wide, tree-covered region in the west and then moves into a flat meadow section with typical hummocky topography associated with slides on the east end of the section. Geologic materials consist of clay, sand, and boulders derived from glacial moraine deposits. Bedrock in the eastern half of the section is the Tertiary Age Aycross Formation. It consists of interbedded claystone, siltstone, and tuffaceous sandstone. Covering the bedrock are colluvial and glacial deposits ranging from clay to boulder-size material.

There is a steel bin wall west of MP 21.0 that is at the toe of an active slide, which was placed to deter loose debris and slump material from entering the roadway. In addition, a slide at MP 20.2 that was repaired in 1985 with a sawdust lightweight fill is still active. Only one rock slope is within these limits, and it has a rating of low to moderate rockfall risk potential.

Geotechnical problems present include soft embankment foundations, frost heaves, soft subgrade, repair of several smaller landslides, and a rockslope.

2.6.4 Milepost 21.28-30.84 (Togwotee Pass Section)
The Togwotee Pass section has a minor to moderate level of geotechnical problems.

Bedrock in the western half of the section is the Eocene Wiggins Formation, which consists of volcanic breccia with a tuffaceous sandstone matrix. The bedrock weathers into rounded blocks and columns, creating rockfall hazards. Overlying the bedrock are glacial moraine and landslide deposits.

Bedrock in the eastern half of the section is the Tertiary age Aycross Formation that consists of weak layers of claystone and siltstone and strongly cemented and thick layers of tuffaceous sandstone. Overlying the bedrock is a thin covering of colluvial and glacial material.

Three landslides have been identified by WYDOT on this section; two of these are currently active. Repair work was done on these slides in 1971, 1985, and 1998, and consisted of underdrains and a sheet pile cut-off wall. Nine rock slopes have been rated on this section; they are rated from low to moderate risk potential for rockfall.

Predominant geotechnical problems on this section include necessary repair of at least three landslides and mitigation of approximately 5,500 ft (1,650 m) of rock backslopes. Since this is the highest section in elevation, frost heave problems within the roadway will have to be addressed. Retaining walls will be necessary to minimize encroachment into the Wind River.

2.6.5 Milepost 30.84-40.71 (Brooks Lake Section)
The Brooks Lake portion of roadway has many geological hazards similar to the problems on the Blackrock Creek Section.

This road corridor traverses the Wind River Valley along undulating terrain. Bedrock consists of interbedded shale, siltstone, and non-tuffaceous and tuffaceous sandstones of the Wind River and Aycross Formation that are generally weak and erodible. Landslide deposits cover most of the bedrock throughout this area. Also overlying bedrock randomly are clay, gravel, and cobble-size alluvial and glacial materials.

Approximately 12 landslides have been identified on this section, of which about half are very active and are currently affecting the roadway. Some of the slides are very large, extending up adjacent hillsides for 500 to 1,000 ft (150 to 300 m) and paralleling the roadway for stretches of up to 0.75 mi (1.2 km) each. The roadway has been repaired in many areas due to landslide-related problems. Numerous springs and in some cases, ponding of water, is present above and below the roadway. Repair work has been done on approximately eight of these slides between 1982 and 1998. Repairs include removal, woodchip fill, toe berms, drains, a combination "H" and sheet pile wall, and a geotextile wall. Only one slope has been evaluated for rockfall potential and it was rated in the low risk category.

The primary hazards on this section are unstable slopes. The current roadway design as recommended by the WYDOT Geology Program calls for shifting the alignment away from unstable backslopes for approximately 2.5 mi (4 km). This section will require repairs of four or five landslides, with one very large slide at MP 40.0 possibly costing several million dollars to stabilize. In addition to the landslide-related problems, it will be necessary to construct retaining walls and stabilize embankment foundations. Frost heave and soft subgrade problems will also have to be addressed.

2.6.6 Summary

Overall, the above geological hazards will require a variety of repair methods. For landslide mitigation these include, but are not limited to, toe berms, underdrains, retaining walls, lightweight fills, realignment, removal of slide debris, and tie-back anchors. Unstable rock slopes may require presplitting, flattening, meshing, rock bolting, shotcrete, and adequate ditch catchment sections. There are also a variety of subgrade problems within the roadway where geotextiles, subexcavation, and backfill with free draining material, underdrains, or other measures will be necessary to stabilize the sensitive soil and bedrock materials.

Due to the numerous amount of geologically-related problems, this highway corridor will benefit greatly from reconstruction. Many of the existing landslides have been worked

on under various contracts since at least 1971; however, it appears that some of them continue to be a problem, often because some repairs were only temporary. Most of the rockslopes have been designed with inadequate catchment areas and poor blasting techniques and are a constant maintenance problem. The roadway has been patched and overlayed throughout the years by maintenance due to frost heave, soft subgrade, and other pavement- or subgrade-related problems.

With the use of modern highway design and construction techniques, many of these problems can be mitigated. Upgrading the road to current design standards will ultimately provide a safer road for the traveling public and reduce future WYDOT maintenance costs.

2.7 Maintenance

Maintenance costs have been evaluated for the two maintenance sections that are encompassed by the Moran Junction–Dubois reconstruction projects on US-26/287. Although the exact locations of problem areas are not available through the maintenance cost reports (i.e., Geneva), they have been discussed with the maintenance sections, the district maintenance engineer (DME), and the foreman for the Dubois crew.

The TE03A maintenance section runs from MP 2.20 to MP 26.75, and for all intents and purposes its costs can be totally included in the analysis. The FR03A maintenance section runs from MP 26.75 to MP 98.79, of which the area in question is from MP 26.75 to MP 40.71. The foreman and DME have both indicated that a majority of the surfacing maintenance (estimated at 70 percent), other than chip sealing, was done in the 14 mi (22 km) in question. Surfacing maintenance includes hand patching, motor grader patching, motor grader leveling, laydown operations, crack sealing, chip sealing, and base repair. The remaining maintenance costs were prorated on a direct-mileage comparison.

The crew foreman has indicated that even though surfacing maintenance costs are high, they are still not doing all that needs to be done. They have scaled back maintenance work over the past 2 or 3 years due to the upcoming projects in the State Transportation Improvement Plan. The slide areas are major causes for concern because of the possibility of the weight of additional plant mix increasing the potential for slides to occur.

Cost comparisons (on a per-mile basis averaged over the last 5 years), as shown below, indicate a substantial increase in the Moran Junction–Dubois maintenance sections when compared to similar roadways (mountainous terrain, traffic volumes, etc.) throughout the State.

Even with reduced maintenance efforts on the two sections in question, their average per-mile costs are significantly higher than all but one of the comparable sections. As the roadways deteriorate, these costs will only increase if the reconstruction projects are not continued.

2.7.1 Passing Lanes

To evaluate the need for passing lanes, Highway Capacity Manual software was used along with year 2025 predicted volumes. Percentage no-passing and traffic volumes are the critical factors in evaluating the LOS for the corridor. Twenty to 50 percent no-passing is normal on level terrain, and greater than 50 percent typical of mountainous terrain. The higher the percentage of no-passing zones, the lower the LOS. Levels of service are lettered from A to F with LOS A being the best and LOS F being the worst. The following are explanations for the levels of service.

- LOS A means average speeds are greater than 55 mi/h (88 km/h), passing demands are below capacity, drivers are delayed no more than 30 percent of the time, and almost no platoons of three or more vehicles are observed. The maximum service flow rate of 420 vehicles per hour (vph)—total flow in both directions—is not exceeded.
- LOS B is characterized by average speeds around 55 mi/h (88 km/h), passing demands are about equal to passing capacity, drivers experience delays 45 percent of the time, and platooning is becoming evident. The maximum service flow rate is a total in both directions of 750 vph.
- LOS C is typified by average speeds of 52 mi/h (83 km/h), increases in platoon formation and size, passing demand in excess of passing capacity, and delays 60 percent of the time. The maximum flow rate under ideal conditions is a two-way total of 1,200 vph.
- LOS D is approaching unstable traffic flow. Passing demand is high while passing capacity is approaching zero. Average platoon sizes are 5 to 10 vehicles and motorists are delayed 75 percent of the time. Turning movements and/or roadside distractions cause major shockwaves in the traffic stream. Average speeds can approach 50 mi/h (80 km/h) under ideal conditions, and the maximum two-way traffic flow is 1,800 vph.
- LOS E is unstable traffic flow. Any disturbance causes traffic flow to fail or fall to LOS F. The highest volume attainable under ideal conditions is a two-way total of 2,800 vph and is the capacity of the highway. Delays are over 75 percent, passing is impossible, and speeds vary from below 50 mi/h (80 km/h) down to 25 mi/h (40 km/h).
- LOS F is forced flow and is comparable to a slow-moving parking lot. Traffic flow has failed and the maximum flow rate is less than the roadway capacity.

The Moran Junction–Dubois road is classified as a principal arterial and is part of the NHS. It is the only direct connection from Dubois to Jackson or Yellowstone. The main purpose of the road is mobility—the safe, timely, and efficient movement of people and goods. The road also passes through a very scenic part of the State and thus carries tourists that are driving slower than the motorists using the road simply to get from point A to point B. The mix of motorists and variance in their speeds makes it imperative that a road design be implemented that will account for the different needs of motorists—through traffic as well as tourist and recreational traffic. The road must be designed for at least LOS C up to the design year, must accommodate slow traffic enjoying the scenery and wildlife, and must accommodate the normal traffic using the road mainly as a route connecting point A to point B.

Using year 2025 traffic volumes and the percent of no-passing zones for the evaluation of the Moran Junction–Dubois corridor yielded LOS B for the Buffalo Fork River Section from MP 3.01 to MP 7.50 and LOS D for the rest of the sections from MP 7.50 to MP 40.7. The Buffalo Fork River Section is relatively flat terrain and has good passing opportunities. The other sections are in steep mountainous terrain with few passing opportunities. The LOS D condition for the mountainous sections is unacceptable.

One of the most cost effective and least environmentally intrusive methods to achieve an efficient and safe two-lane road is to add passing lanes—one in each direction every 4 to 6 mi (6 to 10 km). Passing lanes allow faster moving motorists to safely pass slower moving tourists without getting impatient and trying ill-advised and unsafe passing maneuvers. To be effective, the lanes should be about 1 to 1.5 mi (1.6 to 2.4 km) in length.

Passing lanes added to two-lane highways have been found to reduce total crashes by 25 percent and fatal and injury crashes by 30 percent. For the Moran Junction–Dubois corridor, traffic recommends four passing areas for the LOS D sections. A passing area has a passing lane in each direction and the areas start at MP 11.6 and end at MP 40.6. The locations and lengths are as follows:

Proposed Passing Areas

	Eastbound	Westbound
Passing Area 1	MP 11.6–MP 12.7	MP 13.5–MP 14.8
Passing Area 2	MP 18.0–MP 19.3	MP 21.6–MP 22.6
Passing Area 3	MP 27.3–MP 28.4	MP 30.5–MP 31.8
Passing Area 4	MP 34.3–MP 35.3	MP 39.4–MP 40.6

With the proposed passing areas and projected 2025 volumes, the roadway will operate at LOS C. Without the passing areas, the roadway will operate at LOS D.

2.7.2 Turn Lanes

Two lengthy left-turn lanes are recommended, a continuous two-way, left-turn lane for the KOA Campground and another continuous two-way, left-turn lane for The Cowboy Village resort. These are the only two areas that showed significant turn volumes. Other turn lanes may be recommended for safety or geometric reasons.

2.8 Structures

2.8.1 Structure No. BPH—Buffalo Fork River—MP 3.59

- Structure type: Four-span continuous concrete girder.
- Year built: 1954.
- Bridge roadway width = 26.2 ft (7.8 m).
- Structure length = 230 ft (69 m).
- Inventory rating: 24 tons. (A rating < 36 tons is considered substandard.)
- Structure condition:
  - Deck has numerous cracks in asphalt surface and along bottom of deck.
  - Concrete girders have vertical cracks.
  - Abutments: Timber cribbing pushed out; signs of water leakage from deck.
  - Condition state: Fair—structure will need major rehabilitation work to remain in service for an extended period of time.
- Sufficiency rating = 45.5.
- Recommended work: Bridge replacement due to age, condition, substandard load rating, and narrow width.

2.8.2 Structure No. BPI—Blackrock Creek—MP 8.44

- Structure type: Single-span concrete rigid frame.
- Year built: 1954.
- Bridge roadway width = 26.4 ft (7.9 m).
- Structure length = 83 ft (25 m).
- Inventory rating: 34 tons. (A rating < 36 tons is considered substandard.)
- Structure condition:
  - Deck has numerous cracks in the asphalt surface.
  - Wingwalls are tipped.
  - Overall condition state: Adequate—structure may need major rehabilitation work to remain in service for an extended period of time.
- Sufficiency rating = 62.2.
- Recommended work: Bridge replacement due to age, narrow width, and substandard load rating.

2.8.3 Structure No. BXV—Brooks Lake Creek—MP 32.49

- Structure type: Double-barrel, 10 x 8 ft (3 x 2.4 m) reinforced concrete box culvert.
- Year built: 1961.
- Inventory rating: 36 tons. (A rating < 36 tons is considered substandard.)
- Structure condition:
  - No deficiencies noted during annual inspection.
  - Overall condition state: Excellent—structure can be expected to remain in service.
- Sufficiency Rating = 81.7.
- Recommend work: Extend culvert ends past clear zone.

2.9 Commitments and Constraints in the FEIS/Record of Decision

Note: Bold items are required by the Record of Decision. Other items are commitments to minimize harm.

The new roadway design is based on standards for rural, mountainous highways, reduced as necessary to minimize impacts to the natural environment.

Major alignment shifts—Limit major alignment shifts to those locations necessary to improve safety and avoid or minimize impacts to environmental resources.

Travel Lanes—Two continuous 12-ft (3.6-m) travel lanes are to be included in the design.

Shoulders—8-ft (2.4-m) continuous shoulders, 6 ft (1.8 m) in passing lanes, are to be included in the design.

Clear Zones—Use clear zones up to 20 ft (6 m) wide. Use modifications, as necessary, to minimize impacts to environmental resources or further improve roadway safety.

Passing Lanes—Locate passing lanes outside major wildlife movement areas. Refine the number, location, and length of passing lanes accordingly.

Wetlands—Avoid all fen wetlands.

Environmental Resources—Balance the following:

- Reduce ground disturbance with features such as guardrail and retaining walls to avoid or minimize impacts to environmental resources.
- Look for opportunities to improve wildlife movement, minimize retaining walls (number, length, and heights) and guardrail, and provide opportunities for wildlife to escape.
- Use flatter cut and fill slopes where needed to improve driver sight distance, and where possible to increase the success of revegetation.
- Identify locations where improvements to existing non-revegetated slopes and landslides beyond the cut and fill slope may be environmentally beneficial.
- Using wildlife study data, look for opportunities to improve wildlife crossings through things such as habitat and topography.

CHAPTER 3

Workshop Meeting Details

3.1 Construction/Materials Skill Set

Goals:

- Construct corridor in 7-year schedule or less.
- Use design/construction techniques that can reduce contract time.
- Meet, or improve on, constructibility team parameters.
- Identify strategies for high-elevation construction.
- Minimize impacts to traffic by using traffic management techniques that maintain two-lane, two-way traffic and reduce work zone delays/stops.
- Ensure adequate personnel and resources to administer the contract and prevent delay to the contractor's operation.
- Maintain an acceptable traveling surface for the public at all times.

- Maximize opportunities for the contractor to be productive (consider night-time closures).
- Encourage and consider value engineering change proposals.
- Evaluate use of constructibility review of 70 percent plans (engineering and preliminary right-of-way [ROW] plans) of Fourmile Meadows, Togwotee, and Rosie's Ridge projects.
- Utilize a post construction review process (possibly at the end of each construction season) to discuss improvements to the processes being used.

Recommendations

Contract Administration:

- Dedicated and available WYDOT program representatives to respond to issues—geologist on site.
- Contractor construction surveying (includes slope staking and elevation control).
- Allowing decisions to be made at a lower level.
- Communications—streamline process (submittals, issue escalations, contract amendments).
- Partnering with formalized chartering.
- Critical path method (CPM) required per Spec Book 2003.

Innovative Contracting:

- Incentive/Disincentive (early completion of construction season).

Accelerated Construction:

- Snow Plan—allows the contractor to manage/maximize the seasons. Snow fence placement to mitigate snow storage conflicts between winter operations by maintenance forces and spring construction.
- Material Testing:
  - Contractor test results for acceptance (earthwork, base, surfacing).
  - Change density testing from sand cones to nuclear gauge through streamlining calibration process.

- Use of proof rolling and reduced frequency of testing.

- Strategically placed staging/stockpile areas to have materials on site. (Advanced crushing for temporary surfacing.)
- Advance clearing of trees to facilitate southern exposure for construction in the spring.
- Accelerate the schedule to 6 years by shifting Fourmile Meadow to 2006 and Rosie's Ridge to 2008 to include evaluation of consolidation of individual projects into fewer contracts.
- Let advanced contracts for various hot spots (rock cuts, slide remediation areas).
- Alternate alignment to the north for Rosie's Ridge—minimizes impacts to the traveling public. Could reduce the construction duration by 2 years.

Work Zones:

- Maintain two-way, two-lane traffic and minimum speed exceptions—15/30 minute stop/hold, night-time closures (blasting, etc).
- Maintain widths at tight locations with incentive/disincentive (with window for completion).
- Minimize grade difference with new vertical alignment.
- Wider dirt template, material storage, future contract temp surfacing, crusher run base.

Technology:

- Communications—investigate new technologies for real time communications, Web cams.
- Alternative test methods (geogauge, concrete maturity meters, etc.).
- Alternative materials and construction methods (use of precast/prefabricated materials, pipe arch versus reinforced concrete box, extend construction season with heaters, use of geogrid, etc.).
- GPS-controlled equipment (laser guided graders using GPS levels).
- Improved lighting technology.

3.2 Environment Skill Set

Goals:

- Meet FEIS/ROD mitigation measures.
- Identify strategies to work effectively with interdisciplinary advisory committees.
- Identify cost effective design/construction options to separate wildlife and vehicle movements.

Recommendations

Meet FEIS/ROD environmental commitments, mitigation, and project specific stipulations:

- Resident engineer (RE) responsible for all commitments. Communicate with advisory committee.
- Coordinate public relations and public relations consultant (cooperation).
- Environmental coordinator (EC) is responsible for wildlife data incorporated into design. Ensure additional National Environmental Policy Act (NEPA) process is performed.

Identify strategies to work effectively with interdisciplinary groups:

- EC will ensure information exchange and decisions made between groups. Roles and functions of each member.
- EC will ensure that the Advisory Committee (AC) obtains all information necessary to make recommendation.
- EC will request stakeholder status check from all AC members:

    - Reassess at each meeting.
    - Consider AC carrots.
- EC/RE visit with AC members.
- Encourage more Corps of Engineers (COE) involvement of outreach to others agencies.

Identify cost effective design/construction options to separate wildlife and vehicle movements:

- Inherent process.

Communication:

- 800 number for project information, comments/responsive to comments, update up and running as soon as possible (publish number).
    - Project information for public involvement tool.
- Mail out newsletter to property owners and provide to certain businesses in communities.
- Heavily involve marketing consultants immediately.
- Project Web site:
    - EIS.
    - Commitments.
    - Newsletter.
    - AC minutes.
    - Monitor for effectiveness.
    - Web camera.
    - Community appreciation.
    - AC assess community incentives throughout an outreach effort (e.g., newsletter).

3.3 Geotechnical/Structures Skill Set

Goals:

- Identify designs/construction practices to minimize construction time and disruption to traffic.
- Use best practice during the investigation to accurately identify and characterize all subsurface conditions.
- Evaluate the subsurface conditions to provide complete geotechnical recommendations for an efficient design.
- Accelerate design and construction by utilizing innovative mitigation and contracting methods.
- Minimize latent/unknown subsurface conditions.
- Explore new methods and materials that would speed up construction (e.g., use of fabrics, backfill types) or allow a longer construction season.

- Identify retaining wall designs to minimize construction time and disruption to two-lane, two-way traffic control.
- Identify structural designs and construction practices to minimize construction time and disruption to traffic.
- Identify contractual options to expedite construction activities and provide contractor innovation in excava-

tion and construction techniques for retaining walls and bridges.

Recommendations

Major Issues:

- Advanced contracts for "hot spots":
  - Rock cut at Sta. 2730+00.
  - Major slides at MP 9-11:
    - Debris flow areas.
  - Slide mitigation—various locations throughout corridor.
- Retaining walls.
- Structures/bridges:
    - Buffalo Fork Bridge surcharge.
- Contract packaging.
- Frost heaves.
- Alternative materials/methods for extending the construction season.

Advanced Contracts:

- Geotech/Structures can be the "critical path" for the overall project:
  - Several "hot spots" identified:
    - Rock cut at Sta. 2730+00.
    - Rosie's Ridge slide areas.
    - Other slide areas throughout the corridor.
    - Buffalo Fork Bridge/approach surcharge.

Treatment of "Hot Spots":

- Let as advanced contracts:
  - Contract packaging:
    - Independent of main roadway projects.
  - Accelerate geotech studies.
  - Look into value engineering studies at the critical sites.
  - Allow specialty contractors to streamline operations.

Rock cut at Sta. 2730+00:

- Value engineering at this site:
  - Option 1: Blast and cut:
    - Will require 1-2 hour closures for debris clearing.
    - Night work suggested.
    - Provides materials for future contracts.
    - Double handling of material is an issue.
  - Option 2: Tunnel through hill:
    - Better horizontal alignment.
    - Reduced environmental impacts.
    - High cost.
    - Ventilation if over 800 ft (480 m).
    - Work can be done through winter.

- Option 3: Bridge around site:
  - High cost.
  - Wildlife connectivity.
- Option 4: Wall with cantilever slab:
  - Potential for least cost.
  - Wildlife crossing barrier.
- Option 5: Combine Options 3 and 4:
  - Short bridge(s) with walls.
  - Wildlife connectivity.

Major Slides at Rosie's Ridge (MP 9-11) and Other Areas:

- Investigate each site.
- Toe berms.
- Alternative alignments.
- Debris flow fields.
- Tie back walls.
- Soil nail walls.
- Subsurface drainage.
- Lightweight fills.

Retaining Walls:

- Structure types:
  - Precast elements for all types:
    - Walls/footings/modular elements.
  - Mechanically stabilized earth.
  - Precast cantilever (cast-in-place possible).
  - Gravity (cast-in-place or precast modular).
  - Tie back.
  - Soil nail.
  - Combinations of above.
  - Aesthetic treatments.

Snowmobile Underpass Bridges:

- Precast culverts.
- Con-span/bebo arches/hyspan (precast bottomless).
- Corrugated steel pipe arches.
- Use prefabricated elements.
- Storage/staging areas.
- Oversize to accommodate wildlife passage.

Bridges:

- Jointless/integral.
- High performance materials.
- Surcharge approaches over winter (Buffalo Fork Bridge).
- Use prefabricated elements:
  - Storage/staging areas.

        - Concern about local experience with prefabricated elements.
    - Aesthetics.

Contract Packaging:

- Group specialty contracts by type and not by location:
    - Slide mitigation (Rosie's and other sites).
    - Rock cut or other alternatives.
    - Bridges.
- Rearrange roadway contracts:
    - Three in place of five.
    - Only three contracts have major impact on traffic.
- Construction management:
    - Electronic data transfer:
        - Streamline shop drawing process.
    - Automated management systems (Pennsylvania, Texas, others).
- Bid contracts in fall:
    - Maximize startup work in off-season:
        - Material procurement.
        - Shop drawing submittals.
        - Materials certifications.

Frost Heaves:

- Elevated profile with rock cap.
- Overexcavate and replace material with drainage.
- Polystyrene board insulation layer.
- Vertical edge drains.
- Horizontal geocomposite drains.

Alternate Materials/Methods for Extending the Construction Season:

- Use larger crushed aggregate materials:
    - Can be placed in colder weather.
- Identify material sources early:
    - Pits.
    - Borrow.
- Geo-foam.
- Use prefabricated elements.
- Alternate testing procedures:
    - Cold weather concrete.
- Do submittals in the off-season.

3.4 Innovative Financing/Contracting

Goals:

- Maintain pay-as-you-go financing philosophy.
- Identify cost containment strategies.
- Identify components of a financial plan (funding sources, cash flow, etc.).

- Identify innovative financing techniques that can minimize the impact of this project on the State Transportation Improvement Program for both District 5 and the State as a whole.
- Identify innovative contracting procedures that can reduce or minimize the impact to the traveling public and business community.
- Evaluate use of aggressive incentive/disincentive contract provisions.
- Utilize new and existing contracting methods to minimize the duration for the contract.
- Explore new specifications to maintain and enhance the mobility of the traveling public through the job.
- Consider the use of A + B bidding and lane rental.
- Utilize specifications that allow some flexibility for the contractor to sequence his operations and maximize his efficiency.

Recommendations

Contractor Designs for Speciality Work:

- Geotechnical.
- Tunnel/bridge(s).

Early Contracts:

- Stockpiling/staging.
- Prefab items (individual contract, mechanically stabilized earth MSE walls).

Bundling Contracts:

- Option A:
  - Brooks Lake section (one contract)—$18 million.
  - Remaining four sections in one contract.
- Option B:
  - Brooks Lake section.
  - Buffalo Fork River, Togwotee Pass, and Fourmile Meadows sections.
  - Rosie's Ridge section.
- Option C:
  - Brooks Lake section with elements of other projects.
  - Same as options A or B.
- Outsourcing design for bundled contract scenario.
- A+B bidding for larger contract with department time determination schedule.
- Minimizing one-way lane closures.
- Special prequalification.
- Subcontracting limits—increase from 50 percent.
- Incentives/disincentives:
  - For time (with A+B or special closure).
  - Traffic mobility.
- Mandatory partnering:
  - Alternative dispute resolution.
  - Preconstruction workshops.
- Corridor management team:

    - Scheduling management (CPM).
    - Traffic.
- 5-year schedule—traditional pay-as-you-go:
    - Develop cash flow schedule.
    - Match financing plan with overall schedule.

Accelerated Construction Schedule—less than 5 years:

- Options:
    - Use State Infrastructure Bank to issue variable rate debt (less than 5-year schedule).
    - Draw on $60 million from general fund.
    - Use flexible match to cash flow State match.
    - Other sources?
        - Donations.
        - Game and Fish.
        - National Park Service shadow tolls/shared fee.

Long-Term Legislative Strategy:

- Taxes.
- Tolls.
- Mineral trust funds.

3.5 Pavements

Goals:

- Identify surfacing options to limit future construction impacts to traffic, specifically design life and initial geometric design, to allow for future overlays.
- Explore mobility issues/resolutions for concrete projects, although not an issue on the Moran Junction-Dubois project.
- Explore new methods for testing and evaluating material properties such as utilizing a geogauge, which measures stiffness, as an accompaniment to base density measurements.

Recommendations

- Surfacing options discussed with the goal of increasing pavement life, maybe to 40 or 50 years (excluding pavement overlays):
    - Increase asphalt thickness from 4 to 6 in (101.6 to 152.4 mm) to reduce thermal cracking.
    - Continue use of current standard for asphalt binder.
- Investigate non-traditional paving methods, including night-time paving, "A+B" bidding, and season and air temperature limitations (but maintain density and moisture standards).
- Conduct density testing at longitudinal joints.
- Consider use of joint sealers at time of construction.
- Investigate additional staging areas to minimize impacts on old and new pavements and to increase ef-

ficiency of construction activities.

- Let two separate crushing and stockpiling contracts; one in conjunction with first reconstruction contract and the other ahead of the remaining contracts.
- Consider use of one chip seal over entire corridor instead of on a project-by-project basis (if chip sealing is deemed necessary).
- Consider use of plant-mix base to provide construction platform (would help improve mobility through construction zone) if subgrade drainage can be addressed. Alternative is use of two base layers; top layer is plant-mix base, lower layer is Cement Base.
- Evaluate new specifications for Cement Base quality control/quality assurance.
- Consult with FHWA and Expert Task Groups about new testing procedures; use "side-by-side" methodology for correlating results.

3.6 Public Relations Skill Set

Goals:

- Provide accurate, timely, and complete information on the daily construction operations affecting traffic movement.
- Provide information concerning the long-term benefits of corridor reconstruction.
- Provide information concerning the environmental protection objectives in use.
- Minimize the negative feelings toward road construction (construction is only a distraction, not a reason to cancel or reroute travel through Dubois, Lander, Riverton, or Wind River Indian Reservation).

- Fewer traffic delays, if possible, and shorter.
- Minimize the impacts of road construction through innovative traffic movements through construction areas, minimized delays, interpretive radio, and portable bathroom facilities along route, etc.
- Promote that funding for the $100 million worth of projects will be available.
- Market the marketing plan (dollars, how many years, need for this, etc.).
- Publicize possible mitigation plans.
- Help area benefit while helping State grow in its tourism efforts as well.
- Provide up-to-date construction information to travelers and businesses in the form of maps, possible traffic movement times (so they can hit the traffic control about the time it moves), and times when the road will be open without delays.

Recommendations

- Put a public relations representative on the AC—immediate action item:
  - **Continuity of communications.**
  - **Capitalize on opportunities.**

    - Identify potential problems in advance.
- Clearly identify potential and existing user groups (customers, homeowners, residents, business groups, etc.):
    - Bloggers.
    - Business owners.
    - Civic leaders.
    - Commuters.
    - Construction workers.
    - Frontline workers.
    - Influencers (travel agents, American Automobile Association, media, etc.).
    - Internal workers.
    - Landowners.
    - Public land managers.
    - Residents.
    - Resource groups.
    - Schools.
    - Service workers.
    - Tourists.
    - Tribes.
- Develop a comprehensive and detailed communications plan:
    - Retain selected marketing and advertising consultant to prepare plan.
    - The detailed communications plan would include several of the following strategies:
        - Provide comprehensive information to all travelers.
        - Ensure all construction and road condition information is real-time, accurate, informative, proactive, useful, and widely available.
        - Provide origin/destination specific travel information alternatives (relative to where people are going).
        - Deliver information with unique personality and aspect of "fun" consistent with the region's unique appeal.
        - Always strive to change consumer/motorist perceptions of the typical road construction experience.
- Develop a comprehensive and detailed marketing plan:
    - Retain selected marketing and advertising consultant to prepare plan.
    - The detailed marketing plan would include several of the following strategies:
        - Inform, promote, and educate target audiences about Togwotee Trail and scenic byways natural/historic/cultural attributes.
        - Remind people that the area is a unique destination.
        - Leverage existing resources from the Wind River Visitors Council and other appropriate marketing efforts.
        - Develop a retail/commercial educational program to enhance economic benefits of the project.
        - Send messages that construction will not inhibit activities—"Keep Wyoming moving and open for adventure."
- Select and retain a local, qualified, professional, public information officer for the corridor.
- Develop long-term measures of effectiveness:
    - Sales tax.

- Lodging tax.
- Occupancy rate.
- Survey of attitudes and perceptions.
- Wyoming Business Council and tourism measures.
- Traffic counts.
- Complaints.
- Crisis management.
- Media audits.

3.7 Traffic/Safety/ITS Skill Set

Goals:

- Identify intelligent transportation systems (ITS) options at grade to warn motorists of active, impending wildlife roadway crossings.
- Identify ITS applications for work zone traffic control, particularly to advise the traveling public of possible delays.
- Establish doable, measurable benchmarks that deal with delay (e.g., 75 percent of the time, two-way traffic shall be maintained; any time two-way traffic is disrupted, the stopped delay shall not exceed 10 minutes for any vehicle; minimum attainable speeds for vehicular travel through the construction area shall be 30 mi/h [48 km/h]).

- Describe work zone techniques that will provide safety for the traveling public as well as the workers, yet maintain mobility.
- Look at innovative traffic control contracting methodologies such as performance-based specifications and contractor-developed, agency-approved, traffic control plans.
- Identify methods of traffic control coordination between concurrent projects.
- Identify innovative methods to deal with difficult telecommunication situations as they relate to ITS devices (wireless, satellite, etc.).
- Identify innovative methods to deal with difficult power situations (solar, wind, etc.).

Recommendations

Wildlife movements and crossings:

- Incorporate data on migration crossings into design.
- Use existing box culverts and structures, as well as new snowmobile crossings.
- Implement roadside clearing strategy.
- Postpone technological solutions.

ITS:

- Geotech systems:

        - Ground water.
        - Slope stability.
- Motorist information system (variable message signs):
    - Pre-travel, key decision points, and at construction site.
    - Part of system to remain after project complete.
- Give information needed in real time:
    - Travel (trip) time.
    - Delay time.
- Highway advisory radio system.
- Web site.
- Telephone—511 (1-888-WYO-ROAD).
- Traffic management operations center.
- Coordinate with public relations—information sharing.

Communications and Power:

- Install power and fiber optic services for whole corridor.
    - Trench and bury cables.
    - Short-term benefits:
        - Real-time data communication.
        - Power to the ITS systems.
        - Video feeds for public information and Web site.
    - Long-term benefits:
        - Power for future projects or use.
        - Continued ITS support (corridor cameras, weather).
        - Increase cellular service (repeaters) for 911 emergency calls.

Safety and Traffic Control:

- Motorists assistance patrol contract—tow truck:
    - Basic motor maintenance functions.
    - Little or no medical support.
- Traffic control coordinator (TCS)—certified.
    - Single TCS contract for whole corridor:
        - Overall corridor functions defined.
        - Traffic control devices.
        - Messages kept up to date.
        - Signs covered and uncovered.
        - Night work inspections.
        - Pay on a 24-hour day.
- Traffic control devices:
    - Wet reflective tape.
    - Barrier reflective panel for curves and barriers.

Specifications/Contracting:

- A+B bidding could be used for any or all units.
- Identification clauses for "hot spots" lists:
    - Long-term lane closures.

CHAPTER 4

Conclusions

WYDOT personnel reviewed the recommendations made by the seven skill set teams to assess their feasibility and potential benefits for this project, and during an October 7 ACTT recap meeting and a November 22 scheduling meeting, reached the following conclusions.

Project schedule:

- Brooks Lake section planned to be let in April 2005.
- Buffalo Fork section, plus contracts for timber clearing, crushing, and stockpiling planned to be let in October 2005.
- Fourmile Meadows section planned to be let in October 2006.
- Togwotee Pass section planned to be let in January 2007.
- The planning and design for the Fourmile Meadows and Togwotee Pass sections will continue separately, but with a goal of bundling them into one project for letting early in 2007. Getting geological analysis completed in time to move up the beginning of work on the Togwotee section will be a challenge, due to weather barriers to required testing. Continuing to work on the projects separately will allow WYDOT to go forward with the Fourmile Meadows section as planned, whether or not design of the Togwotee Pass section is completed in time for the 2007 construction season.
- Rosie's Ridge planned to be let in October 2007.

Value engineering studies will be done on:

- The rock cut, tunnel, and bridge options at Sta. 2730+00 on the Togwotee Pass section.
- Staying on existing alignment versus realigning the highway to the north on the Rosie's Ridge section.

4.1 Construction/Materials

- WYDOT will discuss the feasibility of having key design and geology personnel on site during construction.
- Partnering will be mandatory to resolve issues quickly. Methods to speed up availability of shop drawings and other processes will be discussed at preconstruction meetings with contractors.
- Incentives for completing construction early will be included in the contracts, as well as disincentives for failing to meet completion dates.
- Developing snow plans to allow contractors to manage and maximize the construction season will be considered in specific areas.
- District 5 will look into the advantages of strategically placed staging and stockpile areas to have materials on site, advanced crushing for temporary surfacing, and advanced clearing of trees to increase southern exposure and facilitate construction in the spring.
- Letting advanced contracts for rock cuts, slide remediation, and other specialty work will be evaluated as project designs are developed.
- Efforts will be made through planning, design, and contract incentives and disincentives to maintain two-way, two-lane traffic with minimum speed exceptions and to limit stop-hold times to 15 minutes as much as practicable.
- Highway advisory radios will be available to provide real-time communications.
- Snowmobile underpasses and box culverts will be mostly precast. Use of precast and prefabricated materials for bridges will be assessed as part of the normal design process.
- A specification for the brightness and coverage of lighting for night work will be included in the contracts.

4.2 Environment

- Weekly public meetings will be required to update the public on the project. The day and time of the meetings will be determined during the pre-construction conference.

- The Marketing Group will consider an 800 number to provide project information.
- Newsletters will be mailed to property owners within the project area, and to businesses in the neighboring communities.
- District 5 will coordinate with the contractors to provide community appreciation events such as mid-point or completion barbecues.

4.3 Geotechnical/Structures

- WYDOT will look into hiring a consultant for a separate design contract for work on the major slides at MP 9-11.
- The rock cut at Sta. 2730+00, Rosie's Ridge slide areas, other slide areas throughout the corridor, and the Buffalo Fork Bridge approach will be considered for separate contracts.
- Precast elements will be used for all types of structures when applicable.
- Increasing the size of snowmobile underpasses to accommodate wildlife passage is being considered in the design process.

4.4 Innovative Financing/Contracting

- Design of all the sections will be done by WYDOT. If necessary, the design of other projects around the State will be outsourced in order to free any personnel needed to work on this project.
- WYDOT will look into increasing to 70 percent the amount of a project a subcontractor can complete.
- WYDOT will conduct meetings for contractors before the bid letting and before construction.

4.5 Pavements

- Establishing additional staging areas to minimize impacts on pavements and letting two separate crushing and stockpiling contracts, one in conjunction with the first reconstruction contract and the other ahead of the remaining contracts, will be addressed as a "hot spots" issue as the design progresses.
- District 5 will consider the feasibility of including the chip seal for one section in the contract for the next section to be reconstructed.
- The Materials Program will look into the feasibility of using plant-mix base to provide a construction platform.

4.6 Public Relations

- The marketing consultant signed to a contract in October will develop a comprehensive and detailed communications plan.
- The marketing consultant also will develop a comprehensive and detailed marketing plan.
- The Marketing Group will handle the identification of potential and existing user groups.
- District 5 will hire a qualified, professional public information officer to reside and work in the Dubois area during construction.
- WYDOT's Research Advisory Committee will look into extending a University of Wyoming study in progress on the economic impacts of highway construction to include the 287/26 project, in order to provide data to help measure the effectiveness of the marketing plan.

4.7 Traffic/Safety/ITS

- WYDOT will postpone pursuing technical solutions to wildlife movement and crossing issues until the reliability of the technology is proven.
- A motorist information system with pre-travel, key decision points, and construction site elements will be

considered and implemented as necessary.

- A project Web site will be created.
- WYDOT will consult with power and telecommunications companies to see if they are interested in partnering with the department in using the project as an opportunity to extend power and communications lines into areas not currently served.
- A motorist assist service with towing and basic motor maintenance functions will be included in the contract specifications.
- Each contractor will handle traffic control for its project and be required to provide a certified traffic control coordinator.
- WYDOT will look into modifying its contract specifications to use "stop-hold" language rather than "delay" language.
- Night work will be considered with extended maximum times for stop-holds or lane closures.

Appendix A

Workshop Attendees

Moderators

Rick Smith—WSDOT, (360) 705-7150, SmithRick@wsdot.wa.gov
Dan Sanayi—FHWA, (202) 493-0551, dan.sanayi@fhwa.dot.gov
Jim Sorenson—FHWA, (202) 493-0551, james.sorenson@fhwa.dot.gov

Construction/Materials Skill Set

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Galen Hesterberg—FHWA, (307) 772-2012
Andy Long—WYDOT, (307)777-4425, andy.long@dot.state.wy.us
Mary Lou Masko—FHWA, Construction & Project Management Team, FHWA Atlanta Resource Center, 61 Forsyth St. SW, Suite 17T26, Atlanta, GA 30303
Jeff McDonald—E.H. Oftedahl, E.H. Oftedahl & Sons, Inc., P.O. Box 50520, Casper, WY 82605-0520
George Raymond—OKDOT, (405) 521-2561, graymond@fd9ns01.okladot.state.ok.us
Bob Rothwell—WYDOT, (307) 777-4071
Sandy Pecenka—WYDOT, (307) 777-4140
Facilitator—Rob Elliot—FHWA, 61 Forsyth St., Suite 17T26, Atlanta, GA 30303
Recorder—Bill Schmidt—WYDOT, 3411 S. 3rd St., Suite 1, Laramie, WY 82070

Environment Skill Set

Bob Baker—Mayor of Dubois, 712 Mekem, Dubois, WY 82513
Bob Bonds—WYDOT, (307) 777-4364
Rick Clark—U.S. Forest Service, Cheyenne
Wayne Hall—SCDOT, (803) 777-1872, halljw@scdot.org
Stephen Haydon—U.S. Forest Service, P.O. Box 1888, Jackson, WY 83001
Mark Hinschberger—U.S. Forest Service, P.O. Box 186, Dubois, WY 82513
Tim Stark—WYDOT, (307) 777-4379
Facilitator—Jackie Cheatham—WYDOT, P.O. Box 461, Basin, WY 82410
Recorder—Claudia Frederick—WYDOT, P.O. Box 461, Basin, WY 82410

Geotechnical/Structures Skill Set

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Mike Culmo—CME Engineering, (860) 928-7848, Culmo@cmeengineering.com
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Paul Huck—WYDOT, (307) 777-4046
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Jim Myers—WYDOT, P.O. Box 929, Lander, WY 82520
Claude Napier—FHWA, (804) 775-3363, claude.napier@fhwa.dot.gov
Jerry Potter—FHWA, (202) 366-4596, jerry.potter@fhwa.dot.gov
Facilitator—Cliff Spoonemore—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Recorder—Nora Lyon—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009

Innovative Financing/Contracting Skill Set

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Rick Jaffe—NJDOT, Value Management, 1035 Parkway Avenue, P.O. Box 600, Trenton, NJ 08625
Joe Mikesell—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Ken Spear—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Facilitator— Sidney Scott—Trauner Consulting Services, Inc., (215) 814-6400,
sid.scott@traunerconsulting.com
Recorder—Karen Obermeier—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009

Pavements Skill Set

Mark Ayen—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Vicki Bonds—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Dale Decker—Decker LLC, 109 Royal Ridge Rd., Bailey, CO 80421
Gerry Huber—Heritage Group, 7901 W. Morris St., Indianapolis, IN 46231
Earl Montgomery—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Mike Schulte—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Facilitator—Kevin Powell—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009
Recorder—Bruce Burrows—WYDOT, 5300 Bishop Blvd., Cheyenne, WY 82009

Public Relations Skill Set

Mayor Bob Baker—712 Mekem, Dubois, WY 82513
Cody Beers—WYDOT, Box 1784, Riverton, WY 82501
Don Brandes—Design Studio West, Denver
Chris Clemens—Cameron Christopher Thomas Advertising, Denver
John Kilpatrick—National Park Service, Glacier National Park

Dave Kingham—WYDOT, Cheyenne
Sharon Linhart—Linhart McClain Finlon, Denver
Paula McCormick—McCormick Marketing, Lander
Judy Melander—Minnesota Department of Transportation
Lisa Murphy—WYDOT, Cheyenne
Facilitator—Lee Potter—FHWA, Cheyenne
Recorder—Joyce Wagner—WYDOT, Cheyenne

Traffic/Safety/ITS Skill Set

Brian Chamberlain, UDOT, (801) 887-3723, bchamberlain@htah.gov
Curtis Clark—WYDOT, Basin
Vince Garcia—WYDOT, Cheyenne
Richard Gatten—FHWA, Vancouver, WA
Mike Gostovich—WYDOT, Cheyenne
Scott M. McCanna—ORDOT, (503) 986-3788, scott.m.mccanna@odot.state.or.us
Linda Mullen—WSDOT, (206) 464-1209, MullenL@wsdot.wa.gov
Christina Spindler—WYDOT, Cheyenne
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Recorder—Cathi Lutz—WYDOT, Cheyenne

Observers

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Appendix B

Skill Set Descriptions

Structures/Geotechnical

Accelerating the construction of structures will require deviation from standard practices for design and construction and include early coordination between designers and contractors. A systems approach from the "ground up" will be necessary instead of emphasis on individual components. Prefabrication, preassembly, incremental launching, lift-in, roll-in, etc., are systems or concepts that have a proven contribution to accelerating construction and should be understood and receive priority consideration. Designers have several options in structure types and materials to meet design requirements, but identifying the most accommodating system while minimizing adverse project impacts should be the objective. Subsurface conditions and issues should be explored to assess their impacts on the project. Based on the geography of the project, subsurface investigation may be complicated by traffic volume, environmental hazards, utilities, railroad property, and right-of-way.

Innovative Contracting/Financing

Innovative contracting and financing align the financing options with the goals of the project by matching anticipated cash flow with project management, while recognizing competing priorities for existing resources. Financing tools could include cost sharing strategies, tolling mechanisms, contractor financing, leveraging techniques, credit assistance, and cost management and containment concepts. Explore the state-of-the-art in contracting practices and obtain a better knowledge of how these techniques could be selected, organized, and assembled to match the specific situations needed on this project. Techniques to be considered include performance-related specifications, warranties, design/build, maintain, operate, cost + time, partnering escalation agreements, lane rental, incentive/disincentives, value engineering, and any other innovative contracting techniques that would apply to the project.

Pavements

It is feasible to acquire pavement designs approaching a 50-to 60-year design life by telling the contractor what is wanted, rather than how to build the pavement. By identifying and communicating the pavement performance goals and objectives for the pavement, the designer and contractor have the maximum freedom to determine the appropriate methodology. Explore the future maintenance issues on the project also, including winter services, traffic operations, preventative maintenance, and any other concerns that may affect the operations of the project features.

Traffic/ITS/Safety/Public Relations

Enhanced safety and improved traffic management by corridor contracting should be considered. Developing and evaluating contract models may illustrate the best use of incentives to enhance safety and improve traffic flow during and after construction. Evaluating both the construction and maintenance work may help access traffic and safety issues more fully than the conventional project-by-project approach. Better information should be provided to the traveling public and politicians on the relationships among crashes, delays, mobility, total traffic volume, truck traffic volumes, and the need for lane closures during construction. Implement integrated ITS systems to communicate construction information to motorists via radio, the Internet, and wireless alerts, along with incident management systems/services. Use of public relations techniques for informing the traveling public should be implemented, including public Web sites, media campaigns, and periodic press releases.

Environmental

Scope-of-work and construction activities need to reflect environmental concerns to ensure the most accommodating and cost effective product, while minimizing any socioeconomic impacts. Context-sensitive design explores opportunities to blend the existing environment with the proposed roadway. Recognizing community, environmental, and aesthetic requirements is essential in urban settings.

Construction/Materials/ Accelerated Testing

Accelerated construction may press the contractor to deliver a quality product in confined time frames and areas, while maintaining traffic. Completion milestones and maintenance and protection of traffic are key elements visible to the traveling public. Allowing contractors to have input on design elements that would affect time or quality during construction can improve the effectiveness and efficiency of the overall project completion. The use of automation to enhance construction equipment performance; construction engineering and surveying; data collection and documentation; and contract administration should be explored and implemented. Pursue options to expedite and facilitate turnaround times in material testing for material acceptance and contractor payment. The use of innovative materials should be explored and encouraged on projects to maximize the creative characteristics of the designer and contractor. By identifying project performance goals and objectives, the designer and contractor have the maximum freedom to determine the appropriate methodology for constructing the project.

Appendix C

Skill Set Reporting Forms

Construction/Materials Skill Set

Harold Albright—Albright Construction, Dubois
Keith Compton—WYDOT, Basin
Galen Hesterberg—FHWA, Cheyenne
Andy Long—WYDOT, Cheyenne
Mary Lou Masko—FHWA, Atlanta
Jeff McDonald—E.H. Oftedahl, Miles City, Mont.
George Raymond—Oklahoma Department of Transportation
Bob Rothwell—WYDOT, Cheyenne
Sandy Pecenka—WYDOT, Cheyenne
Facilitator—Rob Elliot—FHWA, Atlanta
Recorder—Bill Schmidt—WYDOT, Laramie

Notes - Construction/Materials Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
One prime contractor for the corridor	One contractor can provide ideas on design, traffic control, and other facets. Work with one concept and contact person. Help with snow plan. Like hiring a superintendent or company that would then hire the subs. Best value process or selection based on the prime's qualifications. ID/IQ. Indefinite delivery/indefinite quantity. Snow plan. Muck excavation off to the shoulder.	N/A on the concept of one prime as a project superintendent. Snow plan and shoulder excavation were passed forward for further consideration.
Staging roadway materials	Have the quantity on hand of materials in enough staging areas. Are there enough acres to provide staging areas?	Advanced crushing of material, at least for the Togwotee section. Reasoning is to reduce haul damage to the new roadway surface.
Nighttime closures	Need to know the hourly AADT to see if there is commuter traffic. What times of the week or weekends? Limit the days or weeks if committed to closures.	Hourly AADT was presented, and confirmed nighttime closure is an available option for the contractor to optimize operations.
Communication is key	Try to get to real-time communications links. This will help keep all parties involved. Dedication of phone lines may not be possible to start with. Telecommunications will have to work and commit to this effort. Contact business owners on a regular basis by PR.	Set up communication links during the partnering session. Set up landline phone connections at various locations on the pass to improve communications between contractor and WYDOT to reduce turnaround time on critical issues that arise.

Notes - Construction/Materials Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Get test results quicker	Put more people versus use of different methods to manage quality control. Use geogate equipment to replace the cone test. Use nuclear gauge that has been correlated to agree with a given number of cone tests. Plant mix is the extent of contractor testing of materials. Can the contractor QC/QA the earthwork?	Recommend the use of other equipment and methods to test earthwork to reduce turn around time between sampling and test results. The desired results are to maintain production and consistency.
Contractor to do QC/QA on the entire project	This would reduce the turnaround time on test results.	This is a viable option to pursue. The contractor shall provide a QC/QA plan before proceeding.
Open up Sundays and holidays	This may have to happen at higher elevations for work.	To maximize the construction season. Leave holiday spec as is but allow the contractor to work on Sundays.
Reduce the frequency of material testing	Test results for the contractor is a time problem. Personnel to provide test results is a frequency problem. There is a need to shift from sand cone testing to an accepted alternate testing method. Project manager of prime is responsible for all tests.	New testing methods would not reduce the frequency but would reduce the turnaround time or delays between sampling and test results. Innovative testing includes proof rolling, geogauge, nuclear gauge, etc.
Change some of the specifications control structure	Empower the RE to make decisions that are usually above their normal realm.	Review internal policies and procedures. This should reduce the turnaround time to implement change to the contract or resolve disputes.
Geologist on site	If a problem develops, a geologist may have to be available on site to make adjustments	This was expanded to all programs within WYDOT. If they cannot be on site, a dedicated representative should be assigned to the project. Barrier would be an increase of staff on the project site.
Contractor staking	Contractor is in control of timing and work that needs to be redone. This allows the contractor the ability to determine the priority of activities. Give the contractor responsibility for all construction survey activities. This includes slope stakes, blue tops, structures, misc. WYDOT can do spot checks. Pay items survey to be done by WYDOT to verify quantities. See if survey data can be transferred between contractor and WYDOT.	Inspection staff will need to be able to survey, test, etc., and will require training in the different areas.
Traffic control two-way traffic	Corridor is open to two-way traffic, except for slide areas.	Two-way, two-lane with a minimum speed limit is to be pursued without need for corridor TCS.

Notes - Construction/Materials Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
	Consultant/contractor corridor traffic control supervisor (TCS) to make recommendations for traffic control to the contractor. Horizontal shifts are more prevalent on the projects. The vertical grade is not changing very much. At the most it is about 4 ft. Width may be a more critical concern to maintain traffic flow during construction and the temp surface that the public runs on.	
Traffic controller to control all traffic	Controller that handles the traffic flow of both the contractor and the public. They would have to set up a communications system. The controller would be in the decision process of the workload. This lends itself to a single contact for the entire corridor. Review ODOT traffic control specs on traffic control. To help maintain traffic is to overbuild the template. Overbuild with crusher run base to be used as temp surface then pulled out and moved to the next project. Do second stage final paving after the haul for the next project is complete.	Incentive to be paid to the contractor for maintaining two-lane, two-way traffic. Value engineering contractor proposal (VECPs) will have to be active to evaluate the cost-to-benefit ratio. Wider dirt template with 15-minute delays.
Work zone lengths	Plans usually specify the length of disturbance. Multiple crews to do shift work or work at two different ends. This will require WYDOT to staff up to match the workload.	Current WYDOT spec covers the limitations. If a larger 20-30 mi project is let, the spec will have to be reviewed.

Notes - Construction/Materials Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Work zone delays	Will have liquidated damages that exceed 15 min. The contractor adds this into his bid. Look at incentive and disincentive. Make sure the contract plans better, not contractor planning. Set design criteria for construction min. such as 30 mi/h steady flow, etc. Bid contract time and open the off-peak times for construction. Look at what is called A+B bidding. No excuse clause and incentives with the A+B. Does the terrain fit this type of bidding? Look at lane rental, handle odd traffic patterns. Controls one-lane closures, handles the 15-min. queue. Give an incentive to not move into a third construction season. Add chip seal from the previous contract on to the next contract. This could cut down on time delays. Use fog seals to get us through the winter months.	See two-lane, two-way section above.
Reused surfacing material	Problems are under the existing surfacing. Some of the existing milled material is not as usable as would be believed. Build on top of the existing roadway surface. Keeps from going down into the subgrade. Hard to adjust vertical and horizontal alignments. Can be done if the adjustments are minor. Use concepts from the Buffalo Fork project on sweetening or reclaiming the base material.	See other skill sets' recommendations. Should be evaluated on a project-by-project basis. The existing surfacing should be used as topping material.
Advance clearing and grubbing	See presentation for other ideas.	Incorporate into snow plan as a viable option. May be part of a fall letting or an advanced contract.

Notes - Construction/Materials Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Letting schedule review	Move Fourmile Meadows up 1 year to be completed 2006-07. Move Rosie's Ridge section up 1 year. Could have three projects underway at the same time. Landslide mitigation has real merit for advance construction projects. The design is not necessarily far enough along for the structures to be packaged as an advanced project. Alternate alignment on the Rosie's Ridge section to the north. This would be the existing original alignment. Look at possible separate one-way sections.	Recommended advancing the two projects. Funding is a barrier. Environmental issues are very minimal. Can we maintain traffic flow and staff up for contract administration? Evaluation of Rosie's Ridge realignment should be reviewed because of the lack of traffic flow conflicts. Barrier is schedule impacts for delivery of contract plans.
Alternative materials and methods	Use heaters to extend the paving season. This involves warming the base and the pavement.	Hard to incorporate stiffness of material into a density spec.
GPS equipment control for construction	See presentation for other ideas.	Contractor has to determine if using GPS is cost effective. WYDOT is going to have to gear up to provide the necessary data to support the contractors' equipment.
Improved lighting technology	See presentation for other ideas.	Research effort and spec the equipment. Turn nighttime into day (per Andy Long).
Crushing contract and stockpiles	See presentation for other ideas.	
Milestones or intermediate goals		Critical path method (CPM) should have a master plan for the corridor, developed from input provided by the individual contractors from each project let. This should help coordinate activities between contractors. This would be a valuable tool used as partners. The CPM master plan would be available to all contractors before bidding, during construction, and at any time necessary.
Preheat for plant mix or waive temp. going with density and moisture		
Separate time critical elements		
Incentive/disincentive on each critical activity	See presentation for other ideas.	
Environmental issues	Try to find ways to streamline environmental issues that are affecting acres on Forest Service land. The EIS has been signed and can be supplemented if needed.	

Innovative Financing/Contracting

Paul Bercich—WYDOT, Cheyenne
Pat Collins—WYDOT, Cheyenne
Shelby Carlson—WYDOT, Basin
Prabhat Diksit—FHWA, Lakewood, Colo.
Mark Eisenhart—WYDOT, Cheyenne
Jim Hatter—FHWA, Atlanta
Robert Hundley—Texas Department of Transportation
Joe Mikesell—WYDOT, Cheyenne
Ken Spear—WYDOT, Cheyenne

Notes - Environment Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Goals:	1. Meet FEIS mitigation. 2. Identify strategies/advisory, and subcommittee (how to make committee work). 3. Cost-effective design/construction options to wildlife/vehicle movements. 4. Communication throughout all levels: newsletters.	
Meet FEIS/ROD Environmental commitments, mitigation, and project specific stipulations	a) Ensure additional NEPA is performed. b) RE is accountable for all commitments. c) Ensure commitments are communicated throughout all programs levels. d) Wildlife report is incorporated into design.	a) RE responsible for all commitments. Communicate w/advisory committee and coordinate public relations and public relations consultant. b) EC is responsible for wildlife data incorporated into design. c) Ensure additional NEPA is performed.
Identify strategies to work effectively with inter-disciplinary groups	a) Are all stakeholders represented on advisory committee (AC)? b) Have flexible, dynamic group that moves with various issues and changes of composition. c) Forest Service should have been participating in early stages. COE engineers need to be involved. d) Is AC able to change with new goal of accelerated construction?	a) EC ensures information exchange and decisions made between groups. Roles and functions of each member. b) EC will ensure that the AC obtains all information necessary to make recommendation. c) EC will request stakeholder status check from all AC members. • Reassess at each meeting. • Consider AC carrots. d) EC/RE visit with AC members. e) Encourage more COE engineers involvement of outreach to other agencies.
Identify cost-effective design and construction options to separate wildlife and vehicle movements	a) What defines separation of wildlife/vehicles? b) Bridging/box culverts. c) How do you determine cost effectiveness? d) Balance with effectiveness. e) Aesthetically pleasing. g) Prioritize resources social/natural.	a) Inherent process.

Notes - Environment Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Communication	a) Responsive to public. b) Proactive/early and continuous involvement. c) Implementation plan for communication. d) Who is responsible for "c." e) How do we get public more involved? f) Explanation of how our goals help ACTT. g) Are there carrots to be offered? h) Publicize commitments/summary on Web site (talk to marketing group). i) Mail communication to constituents.	a) 1-800 number for project with information, comments/responses to comments, update. ASAP up and running and publish number. Project information for public involvement tool. b) Mail newsletter to property owners and provide to certain businesses in communities. c) Heavily involve marketing consultants immediately. d) Project Web site. EIS. Commitments. Newsletter. AC minutes. Web camera. e) Community appreciation. f) AC assess community incentives through an outreach effort (i.e., newsletter).

Geotechnical/Structures Skill Set

Tom Baker—Washington State Department of Transportation
Jim Coffin—WYDOT, Cheyenne
Mike Culmo—CME Engineering, Woodstock, Conn.
Jim Dahill—WYDOT, Cheyenne
Mark Falk—WYDOT, Cheyenne
Paul Huck—WYDOT, Cheyenne
George Machan—Landslide Technology, Portland
Jim Myers—WYDOT, Lander
Claude Napier—FHWA
Jerry Potter—FHWA, Washington, D.C.
Facilitator—Cliff Spoonemore—WYDOT, Cheyenne
Recorder—Nora Lyon—WYDOT, Cheyenne

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Advance/routine specialty contracts	Treat hot spots as separate contracts. —Rock cut Sta. 2730+00: —Rosie's Ridge slide areas. —Other slide areas throughout the corridor. —Buffalo Fork Bridge approach surcharge. Even if you are doing stuff out of sequence, you can coordinate these types of things to save time and money. Try to group slide mitigation means for all sections at one time: —Ground anchors. —Tie-backs (soldier pile). —Horizontal drains. —Slope grouting. —Toe berms. —Soil nail wall. Let as advanced contracts. Additional funding. Slide development report. Consider outside review by consultant. Accelerate design of alignment and profile. Original roadway plan needs to be revamped. Merge geotech investigation with design.	Construction. Finance. Barrier—ability to obtain additional funding or re-prioritize available funding. Slide development report required to identify similar mitigation means for similar slides.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Rock cut at Sta. 2730+00	Value engineering at this site. Option 1: blast and cut: —Will require 1-2 hour closures for debris clearing. —Night work suggested. —Provides materials for future contracts. —Double handling of material is an issue. Option 2: tunnel through hill: —Better horizontal alignment. —Reduced environmental impacts. —High cost. —Ventilation if over 800 ft. —Work can be done through winter. Option 3: bridge around site: —High cost. —Wildlife connectivity. Option 4: wall with cantilever slab: —Potential for least cost. —Wildlife crossing barrier. Option 5: combine options 3 and 4: —Short bridge(s) with walls. —Wildlife connectivity. May want to do rock excavation out of sequence to acquire materials for future areas.	Construction Finance Barrier—night closure: Window required for blasting and clean up (2 hrs). Early funding or funding rearrangement (same as item #1).

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Major slide MP 9-11	Accelerate geotech and design contracts. Conduct VE of this site. Let RFP for larger landslide mitigation. Evaluate mitigation methods for site: —Toe berms. —Alternative alignments. —Tie back walls. —Soil nail walls. —Sub-surface drainage. —Lightweight fills. —Debris flow fields. —Catch and clean out. —Various depths in these slide areas. —Channel under the road. Consolidate all the exploration and information collected on this area in one place. Advanced contracts for slide repairs. Geotech design barrier. Requires minimum of 1 year study, prefer 2 years. Separate RFPs.	Construction. Finance. Barrier—funding (same as item #1). Environment/social barriers. Amend/supplement ROD w/major alignment shift. Requires a minimum of 1 year of study, and prefer 2 years.
Slide mitigation	List some of the things we would be doing for slide mitigation: Toe berms using rock materials, drainage systems, H-pile cut-off wall, rock material, tiebacks, retaining walls, re-alignment, alignment shed, lightweight embankment, removal of slide material, tieback anchors, bridge over the slide area, cantilevered structures in sharp curves and rock cuts, elevated road and bridge sections in areas of high animal migration, reinforce fabric embankment, and fabric envelope drain. Mix and match to each section based on the needs at that place.	Construction. Finance. Funding (same as item #1).

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Slide mitigation, continued	Try to handle material once, or as few times as possible. May have to spell out the cut and fill areas and sequences for the contractor. Brooks Lake lends itself for toe berm. Many of the other sites will not be available for that because of other constraints, such as easements, right-of-way (ROW), etc. May need to explore options of getting more easement or ROW lands in order to do some of these things. Established a wide corridor to anticipate future needs. Separate out specialty construction features into RFPs. · Let RFPs for larger landslide mitigation (noted under item 3). · Let RFPs for specialized walls and specialized areas. May be able to do some of these specialty construction areas to minimize impact to the traveling public. Three of the sections are above 8,000 feet, so the construction window is actually only 3 months. Look at alternate routes/alignments. Use old surfacing as temporary surfacing.	

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Retaining walls	Precast cantilevered retaining walls (cast-in-place is not recommended for rapid construction). Precast walls. Precast footings. MSE walls: —Virginia has put in an 80-ft high mechanically stabilized earth (MSE) wall. Quality control is the key. Drilled shaft walls. Gravity walls (cast-in-place or precast modular): —Above 30 ft we are going to post tension structures. Advantage is excavation behind wall is not as extensive, quicker to put in, less cost. Gravity walls—precast double walls. Tied back walls. Evergreen walls (crib). Soil nail walls. Combination walls. Snow removal and wildlife migration are issues with any wall. Maintenance prefers rail closer to the road for snow plowing: —Set walls back 5-6 ft behind a guardrail. Aesthetic treatment for walls: —Form liners, etc. —Develop theme for corridor. VE this area. Location of combined areas.	Construction. Finance. Contract package barrier. Alignment decisions (horizontal, vertical). Allow alternate walls with VE.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Structures/bridges	Precast as much as possible for everything, including footings. High performance materials on structures is a must for performance and longevity of service life (75 years). Minimize joints (jointless/integral): —CT: precast and post tension is speeding; building a bridge in two days. Aesthetics: —Formliners, etc. —Develop theme for corridor. Surcharge approach over winter (Buffalo Fork Bridge). Staging area at rock cut: —Precast issue. —Legal loads. Structural steel considerations.	Prefabrication not normal method. Little experience. Two to three sites. Contractor experience w/spec type (rockcut).
Snowmobile underpass bridges	Precast culverts. Bebo/conspan/hyspan/etc. arches (recast bottomless). Corrugated arches—hold up great above the waterline where the streambed load doesn't wear away the galvanization. They are cheap and go together quick. Use prefabricated elements: —Storage/staging areas. Oversize to accommodate wildlife passage.	Precast coordination with installment and trucking (hauling) requirements, etc. Lane closure/temporary bridge.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Debris flow slide areas (sta. 1950—2020)	Evaluate mitigation methods. Consider early mitigation to reduce maintenance requirements during construction of different sections. —If there is a type of wall in several sections of the road, but on different sections, have the contractor that is doing these types of walls do all of those walls and specialty items throughout the project. Once a contractor gets going, he can get all of them done quickly and that saves time and money. Can you get the materials onsite in a timely manner?	Construction. Finance mitigation. Coordination with maintenance: —Coordination issue with removal at sites.
Buffalo Fork Bridge sequence	New bridge to be built off the alignment. Issues with pond. Approaches—need to address compressible soil issue. Approach options: —Deep soil mixing. —Surcharge. —Wick drains. —Lightweight embankment. —Stone columns. Options: —Lengthen the bridge. Evaluate constructability—look at letting in the fall and having it built before the snow comes.	Design/construction coordination to allow surcharge over winter. Getting surcharge in place in a timely manner. Move approach slabs up into earlier contract.
Frost heaves	Raise grades (elevated with rock cap). Pave on top of rock cap (4-in minus)—non-frost susceptible (Geology will do a test site for rock cap). Over excavate and replace material with drainage. Horizontal and vertical road drains. Polystyrene (styrofoam) board insulation layer. Horizontal geocomposite drains.	Lane closure and mobility issues.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Alternate materials and methods to extend construction season	Are there ways to extend the ends of the construction season? Easier in the spring to clear out snow to start on work. Larger crushed aggregate material sources: —Pits. —Borrow cuts. Alternate test methods—is there anything new in testing? TRB is looking at several types of penetrometers to move away from nuclear devices. Is there any heavier equipment to achieve compaction? Geo foam. Use precast/prefabricated elements. Automatic data-loggers for concrete. Use it for concrete maturity rather than concrete temperature.	Construction. Finance. ITS. Innovative contracting. Liaison with Forest Service to facilitate some of these early contracts done. Coordination with other programs. "Change" implementation.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Contract packaging	Group specialty contracts by type and not by location. Slide mitigation (Rosie's and other sites). Rock cut or other alternatives. Bridges. Rearrange roadway contracts: —Three in place of five. —Only three contracts have major impact on traffic. Construction management: —Electronic data transfer. —Streamline shop drawing process. —Automated management systems (PA, TX, others). Bid contracts in fall: —Maximize start-up work in off season. —Material procurement. —Shop drawing submittals. —Materials certifications. Electronic submittals to get things done earlier, shorten the turn-around time on approvals, shop drawings, etc. —Establish an electronic data submittal site on Web site. —Set things up "pencilless" to expedite many of these "paperwork" submittals, shop drawings, scheduling, fabrications, etc. —If there is a statutorial requirement for a paper document with a real signature on it, that can be handled as the project goes along. For a State that is not doing this now, how long does it take to get this thing up and running? 6 to 8 months. FHWA would cooperate to send a team to a State that has already set this up and has it running. Off-season submittals and approvals—get all the paperwork part of the project done in the 7 to 8 months (winter) when the contractor cannot be on the project. Automated management systems.	Impact on current PD. Funding issue. Work force issue.

Notes - Geotechnical/Structures Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Durability	Design for durability, constructibility, inspection, and minimum maintenance.	Innovative contracting. Construction. Design. Having enough experienced people for pre-planning, design, construction, etc. Select materials and develop details to enhance construction and minimize future maintenance.
Out of sequence work	May spend the first 3 years doing mitigation of slides and retaining walls, and the last 2 to 4 years doing the actual road construction. Folks in finance and design need to be onboard with giving us the ability to get some of this specialty construction done out of sequence.	Innovative contracting. Construction. Finance. Impact on project design. Need financing and design people on board.

Innovative Financing/Contracting

Paul Bercich—WYDOT, Cheyenne
Pat Collins—WYDOT, Cheyenne
Shelby Carlson—WYDOT, Basin
Prabhat Diksit—FHWA, Lakewood, Colo.
Mark Eisenhart—WYDOT, Cheyenne
Jim Hatter—FHWA, Atlanta
Robert Hundley—Texas Department of Transportation
Joe Mikesell—WYDOT, Cheyenne
Ken Spear—WYDOT, Cheyenne
Rick Jaffe—New Jersey Department of Transportation
Facilitator—Sid Scott—Trauner Consulting Services, Philadelphia
Recorder—Karen Obermeier—WYDOT, Cheyenne

Notes - Innovative Financing/Contracting		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Financing		
Pay as you go	Traditional funding approach does not leverage future funds or use alternative financing strategies. If 5-year schedule cannot be shortened for reasons other than cash flow, then use a pay-as-you-go approach using grant funds.	Develop 5-year cash flow schedule. Match financing plan with overall 5-year schedule—pay as you go.
Alternative financing	Project can be constructed in less than a 5-year schedule, then innovative financing techniques should be investigated to identify additional revenue to fund an accelerated schedule. The advantages would be to lessen the impact on the traveling public, reduce escalation and cost uncertainties related to bidding work in future time periods.	
State infrastructure bank ($25 million)	Use State infrastructure bank to issue variable rate debt (less than 5 years).	Wyoming has a SIB in place. The SIB can be used to pay for State highway projects or as a revenue source to pay for bonds. Should investigate use of SIB to supplement funding.
Bonds	Issue revenue bonds.	Has statutory authority to issue bonds—this option is a last resort, have not issued highway bonds since 1930.

Notes - Innovative Financing/Contracting		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
$60 million loan from general fund	Has the statutory authority under Title 9 to borrow from the State general fund to alleviate cash flow problems on a short-term basis.	Can be used as a safety net in the event of cash flow problems.
Flexible match	Use flexible match technique to cash flow State match.	Get approval under FHWA innovative financing program to use a flexible match to delay use of State funds.
Other agency funding sources—Forest Service/Game and Fish/USFWS	Discuss with the Forest Service and Game and Fish benefits of the project to their operations and possible additional funding. Monetary or in-kind donations could be used as State match.	Donations. Game and Fish permits. Registration for permits for hunters/four wheelers/snowmobilers—taxes back to recreation commission.
Local taxes—tourism/lodging Shadow tolls National Park Service (NPS)	Lodging occupancy tax—allocate a portion to project. NPS shadow toll/shared fee—the Togwotee improvement project enhances transportation to and from the National parks. Collect a toll or allocate a portion of entry fee for visitors accessing the parks, making an exception for local residents.	Need legislative approval. Issues with NPS roads that dead end into Yellowstone. Public relations issue with Legislature. Need DOT leadership to educate legislators and promote advantages of additional transportation investment.
Mineral trust fund (as part of long-term legislative strategy)	Allocate a portion of the mineral trust fund to transportation improvements to support long-term economic development.	Public relations issue with Legislature. Long-term Nov. 17, 2004, strategy. Need DOT leadership to educate legislators and promote advantages of additional transportation investment.
Statewide taxes: Gas tax Interstate toll (as part of long-term legislative strategy)	Dedicate additional taxes/tolls for transportation improvements to support long-term economic development.	Public relations issue with Legislature. Long-term strategy. Need DOT leadership to educate legislators and promote advantages of additional transportation investment.
Delivery Methods/ Strategies		
Design-bid-build (DBB)	No statutory authority for design-build (DB). Can amend STIP for emergencies.	Because of proposed number of section contracts and coordination issues, DBB time frame can be accelerated outsourcing design, bundling construction contracts, and implementing corridor management.
Design-build or contractor designs for specialty work	Geotechnical, tunnel, or bridges.	Because DB is not allowed by statute, specialty items would typically be limited to preengineered features or temporary structures.

Notes - Innovative Financing/Contracting		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Early contracts	Stockpiling/staging. Prefab items, MSE walls.	Early contracts (recommended by multiple skill sets) would allow quicker access to main section contracts and accelerate roadway reconstruction work.
Bundling contracts	Combining contracts under a DBB delivery will accelerate overall construction, and reduce coordination issues.	Option A: • Brooks Lake section (one contract). • Remaining sections (combine four into one contract). Option B: • Brooks Lake Section. • Buffalo Fork, Togwotee Pass, and Fourmile Meadows sections. • Rosie's Ridge section. Option C: • Brooks Lake section with elements of other projects. • Same as options A or B.
Outsourcing design for bundled contracts	If contracts are bundled (work performed more concurrently than sequentially), the design work will need to be accelerated, requiring outside consultant assistance.	Does not typically outsource design work. May require more oversight and training.
Procurement		
Special prequalification	Ask for special qualifications for specialty work, time performance, adherence to environmental requirements, quality, etc.	Implement as a project-specific questionnaire supplementing std. prequalification.
A+B bidding	Set a daily road user cost and bid time (B) for project completion (calender days x daily rate). Could be applied to multiple contracts with separate B bids. Department needs to develop an overall time determination schedule.	Easier to implement for a bundled contract for overall corridor completion. If used for two or more contracts in sequence, include language such that early/late completion dates for the preceding contractor should not affect schedule for follow-on contractor(s).
Subcontracting limits	Adjust subcontracting limits to promote local contractor involvement.	FHWA limits.

Notes - Innovative Financing/Contracting		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Contract Management		
Incentive/disincentives (I/D) for time	Apply I/Ds in conjunction with A+B bidding, special closures, or critical milestones. The I/D amount is based on road user delay costs caused by construction and expressed as a daily rate.	I/Ds could be applied to interim milestones or project completion dates. Incentives are typically capped at 5-10 percent, disincentives are typically not capped. Also disincentives should not duplicate liquidated damages. When using I/Ds, ensure that project has minimal risk, complications, or issues that may result in delays to the completion date beyond the control of the contractor.
I/Ds for traffic mobility	Provide incentives for moving traffic through the work zone faster than specified target time, especially when one-way lane closures are used. I/D amount based on the cost of delay (for taking a lane out of service) in the work zone per unit of time, similar to a lane rental fee for taking lanes out of service.	Keep a tally of I/Ds and pay out/assess on a monthly basis or at end of contract.
Managing one-way lane closures	Use corridor management CM or hire a specialty contractor to coordinate lane closures.	
Mandatory partnering	Use partnering as an alternative dispute resolution mechanism.	Make partnering mandatory and use follow-up partnering sessions and escalation procedures to manage issues.
Preconstruction workshops	Use mandatory prebid and preconstruction workshops to enhance coordination and scheduling.	Preconstruction workshops can be scheduled between award and mobilization for major segments or contract or for multiple contracts as a coordination tool.
Corridor management team: $ Schedule management $ Traffic management	Manage overall schedule, one-way lane closures, mobility, and night work.	Use internal staff. As an alternative, hire a traffic control consultant/contractor to coordinate night work, closures, mobility, etc.

Pavements

Mark Ayen—WYDOT, Cheyenne
Vicki Bonds—WYDOT, Cheyenne
Dale Decker—Decker LLC, Washington, DC
Gerry Huber—Heritage Group, Indianapolis
Earl Montgomery—WYDOT, Cheyenne
Mike Schulte—WYDOT, Cheyenne
Facilitator—Kevin Powell—WYDOT, Cheyenne
Recorder—Bruce Burrows—WYDOT, Cheyenne

Notes - Pavements		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Increase asphalt thickness	Increase from 4 in to 6 in would add pavement life by reducing thermal cracking, helping meet goal of "perpetual pavement."	Smoothness specification might require three lifts instead of two, increasing cost and time needed for construction. Variations in soil types and drainage characteristics in select areas along project prevent this type of increase. Terminology (perpetual) might be confusing for public because an overlay will still be necessary.
Adjust specification for asphalt mix from supplier	Will the current "64-28" binder specification be sufficient to address concerns?	A constraint: supplier issues limit on what can be obtained. In any case, current asphalt specification is deemed to be appropriate.
Non-traditional paving methods	Possibilities include alternative paving schedules (including nighttime paving), A+B bidding and temperature standard waiver.	Need to maintain density and moisture standards.
Longitudinal joints	Density testing at joints. Consider use of joint sealers at time of construction.	Possible increase in contractor bid related to density testing requirements.
Stone matrix asphalt (SMA)		SMA on I-80 suffered from pumping problem. Even without problems, could it be justified due to additional cost?
Staging area locations	Locations to minimize impacts over old/new pavements, increase efficiency of construction activities.	Constraint posed by jurisdictional issues; i.e., Forest Service stewardship of public land required.
Obtaining and processing material sources	Let crushing and stockpiling contract, separate and in advance of actual reconstruction. Sites identified so far: Dunoir pit, Blackrock Creek. Turpin Meadows, Fourmile Meadows, Deception Creek, and other sites should be investigated.	Turpin Meadow pit: small; not enough quantity for uses beyond PM aggregate. Too late to let separate contract ahead of Brooks Lake job, but could add this on to the Brooks Lake contract for use on Togwotee Pass section. Want to avoid having to do additional NEPA. Use Blackrock and Turpin Meadow sources for west slope jobs.
Chip sealing	Determine most efficient timing for chip sealing.	Consider use of one chip seal over entire corridor instead of on a project-by-project basis, if chip sealing is deemed necessary.

Notes - Pavements		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Use of geogrid	Use geogrid to reduce thickness of base course.	Some controversy currently within over use of geogrid. Results from previous test section are inconclusive.
Plant mix base	Use of plant mix base provides construction platform; i.e., provide mobility through construction zones. Another option: stabilized base on top of drainable base.	Additional cost, uncertainty about drainage ability. Reduction in aggregate quantity. Second option—lot of cost for slight reduction in overall thickness?
New testing methods	What, if any, changes or improvements in testing technologies are available, or appropriate?	New methodologies need additional testing and validation. Time frame probably too short to institute changes by next spring; prospects better for subsequent projects. But, QC/QA on CB would push into evaluating new methods.

Public Relations Skill Set

Monte Baker—Dubois
Cody Beers—WYDOT, Riverton
Don Brandes—Design Studio West, Denver
Chris Clemens—Cameron Christopher Thomas Advertising, Denver
John Kilpatrick—National Park Service, Glacier National Park
Dave Kingham—WYDOT, Cheyenne
Sharon Linhart—Linhart McClain Finlon, Denver
Paula McCormick—McCormick Marketing, Lander
Judy Melander—Minnesota Department of Transportation
Lisa Murphy—WYDOT, Cheyenne
Facilitator—Lee Potter—FHWA, Cheyenne
Recorder—Joyce Wagner—WYDOT, Cheyenne

Notes—Public Relations Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation details (barriers, skill set coordination,**
PR representative on advisory committee	Public needs should be identified during development of construction requirements, construction sequencing.	Advisory committee needs to vote on addition of PR representative and add the position to the MOU.
Identify user groups	User groups need to be identified to identify marketing/communication plans in order to target	Responsibility of the consultant and need to do research.
Develop marketing plan	Responsibility of the hired consultants.	Sign the contract.
Develop communications plan	Responsibility of the hired consultants and the PI.	Sign the contract; hire the PI.
Hire public information officer	Have PI located in Dubois to do daily communications.	Determine if consultant hires PI.
Develop measures	We need measurable milestones to determine marketing campaign success.	Sign the marketing contract; determine available baseline data and create the plan to gather the future data and make

Traffic/Safety/ITS Skill Set

Mike Gostovich—WYDOT, Cheyenne
Brian Chamberlain—Utah Department of Transportation
Scott McCanna—Oregon Department of Transportation
Curtis Clark—WYDOT, Basin
Vince Garcia—WYDOT, Cheyenne
Christina Spindler—WYDOT, Cheyenne
Richard Gatten—FHWA, Vancouver, Wash.
Facilitator—Greg Jones—FHWA, Atlanta
Recorder—Cathi Lutz—WYDOT, Cheyenne

Notes - Traffic/Safety/ITS Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Is there a current system working in Wyoming?	Wildlife crossing system.	Pilot project canyon used combination of tech. Building system west of Pinedale—yes pilot project and putting in a system—not sure if it works or not or how effective it will be—Nugget Canyon with static sign. The Pinedale is blank out signs—combo garage door trip lines, cameras, etc, cleoforms (ground sensing movement)—may have animals above trip lines in the ground—number if FAOSE calls other things besides deer can trip system. Crossing places easy to define. All date stamped and recorded. Areas of high concentration of deer kills data good. District 3 has extensive data and not just a couple of weeks worth. Getting one system to track all. Not really high numbers. Vehicle/minimum crashes—could plot this info because recorded in safety not increasing design speed. Crash data not drastically high but very political. Many people around country and area as what happens with game.
Power and communications		Not available—looking into solar.
Fencing an option versus technology	Doubtful.	Interrupts migration—Forest Service doesn't like fencing, can look at fencing for underpasses—less kills with underpasses—15 mi of this without kills so far with an 8-ft mesh fence.
Deer reflectors work?	Triangle device and shines into ditch and reflects and holds deer back.	Not sure if it works or not—had more deer kills with reflectors but manufacturer said we didn't install them right.
Steve Albertson, Montana	Using some tech—should check into their system—western research.	

Notes - Traffic/Safety/ITS Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Snowfall visibility and snowfall	Camera not affected because beam could be broken but ground sensing and trip wire main sensors. How concentrated—too expensive to be over too many miles—that's why only approx 2-mile sections.	Cameras automated or manual. Would be manual. In past sat on a ridge and watched and cameras would replace this watching feature. Two-mile section costs about $1 million. Fencing handles bigger area.
Fencing static	Haven't had to use if fencing farther back and funneling still to underpasses.	
Clearing trees from right-of-ways	Great idea—no studies to document—but works according to wildlife.	It reduces problem and somewhat medicates—Forest Service not happy about us cutting trees—would have to have continuous maintenance to keep trees cleared—only allowed 20 ft.
Federal land has used	Reflectors, wildlife crossings which don't help during construction, after construction use a funneling concept—limited in National parks but tried under road crossings and on road where decent side.	
Fake owls or ? Keeping animals out of area	Fake hunters?	Put fake owls on radio towers for birds, but works only a little while—not real effective—got to watch changing migratory pattern.

Notes - Traffic/Safety/ITS Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Identify ITS applications—delays	Communications issues. Portland area. Alternate route. Everyone wants to be gateway to Yellowstone. Have minimal delays. Is it reasonable—the goals. Many months of construction with stop-go in same route versus full closure. California on Redwood Hwy had multiple work zones a mile apart with 20-minute delays between reach. Summer time: 3,500 cars—pilot car open for 10 miles couldn't get through and delays too great—increased travel time by an hour. Construction constraint reduces time through a project. Have to maintain one lane in one direction—keep open. Capacity on mountain won't be an issue if not extended long distances. Work zone analysis a little easier—first unit going in April—volumes won't go up that much in April. Allow 20-30 minutes delay where this project is 10-minute delays—make sure in contract with contractor and define peak hours to allow longer time for closure. The max delay through the whole project should be clarified up front. Stop-hold come to a dead stop where delay is a change in mi/h. The difference needs to be explained to the public up front—user costs won't be used in this project because it will kill the project. Traffic control pay person a bid item—main traffic control devices and make sure traffic moving and public and workers safe. TCS charge of devices and traffic control. Helps to allow longer closures during non-peak hours.	Have signs on construction delays—come back to an area like Dubois so that drivers can be in a town shopping, etc., instead of stopped on the roadway. DMS. Public affairs perspective on Web sites—video from construction zones—cams. Ext highway cam network—64 cameras in metro area multiple directions—and variable message signs in advance of metro areas in real time. During commute peaks give time frame to get there. Very dynamic based on traffic flow and loops in the pavement. Even use portable VMS for work zones. Need to be warned at appropriate times. Since no alternate routes, post so that can take an alternate route. Jackson doesn't want that but time savings may be more of an issue than towns. Need to be fair to everyone. It is after all just communication for everyone. Informational purposes and needs to be shared—gives driver chance to choose alternate route. Do have Web trip site and can see interactive changes occurring on road. Internet an excellent tool. Radio and TV great resources but do a dynamite the airport with info going on Hwy 26 in Dubois, Lander, and Riverton. Sometimes these routes add significant hours to route—2 to 3 hours at times. Parking structure sometimes not great, time perspective can't encourage them to take another route and politically kill towns—affects community. Need to keep this in perspective—have some data—have an auto counter in town and last place to be constructed—gave us an idea of traffic volume—have hourly counters data over 3 months. West of town data is about 150 cars maximum and drops to 100 over mountains. Taken in July and August of 2004. If going to maintain two lanes of traffic trying for 10 minutes versus alternate routes—town perception on construction project concerns town folk—don't want it going over a long amount of town so could do two jobs at one time.

Notes - Traffic/Safety/ITS Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Identify ITS applications—delays	Stop-hold criteria comes into play only when down to one lane—happens in conflict points (crossovers). Rural 15 minutes, other 20 minutes according to spec book. Free flow and through construction cannot be longer than 20 minutes. Construction people and one-lane traffic happens in slide repairs, bridge replacements and culvert operations. Bridges. Incentives and bonuses work. One lane problems. Get away from traditional design. If go to a different type of design. Is there added benefit having traffic counting info—would that be of value for public—current counters don't record speed. Putting temp cameras on jobs great, some temp some not. Put overall time to trip versus possible delays and leaving public questioning. Time and difference and knowing how long it is going to take better option. Moran Junction and before project limits its needs to be here ... both directions.	Town, county, etc., stop-delay seems awful but 30 mi/h OK. Fed highway did 86 and 2000, get in, get out. Get work done as quickly, safely, and economically in as little time as possible. Stop-go at one set mi/h okay versus 5 at one point, 10 at another, 30 at another, very frustrating. People rather take alternate route and have construction area totally closed. Having multiple work zones okay so long as separated. Unacceptable. Under certain sections can't delay because of. Can open up 2 miles at a time. If start adding truck traffic, etc., with 1,500-3,000 ADT where the one lane in each direction is okay except grades and semis. Lengthy two-lane operations sting—won't see the lengthy work error in here. Work zone area short and queue build up—should be small. Capacity-wise for backup should be good even though the public concerned about this. Dubois stop-delay bothered them. As long as they are moving they are okay. 30 mi/h set for this project. Even with delay in this case public likes it better. Can't exceed over 20 minutes delay. Difference in projects. Better to maintain traffic mobility especially with Dubois being so small. 3-hour delay scares people away. Nighttime temp around here may not allow paving. Only problem; two lanes okay. Special provision can change this but, if you get behind a slow vehicle or animal delays, this time factor may be blown out of the water. Don't know for sure if there will be other things causing delays; passing lanes and large cuts could be complicated but with the right amount of protection.

Notes - Traffic/Safety/ITS Skill Set		
Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
Identify ITS applications—delays	Proposal to purchase permanent DMS is in the works now at MP 2.5, and 52.5. Highly recommend having portable north and south and Diversion Dam 287 and 26, at 287 and 26 committed and not great. Now 45 minutes away, OK for Oregon but for Wyoming another story.	One is being realigned—easy; other one for acceleration contractor is I/D clause—to replace on very important routes—temp signal, detour—look real import told to contractor, needs to be done in a month. Bridge work done up front and can be replaced in weekend. Plan I/D clause for certain section like bridge and narrow right-hand curve and won't be able to be two lanes, will have to be flagged area so offer bonuses for the I/D areas and give reason especially the incentives. Sometimes the max delay and the I/D area will be a problem. Identify them and put in one contract and bite the bullet and get them out of the way in 1 year so the remainder of the construction won't affect the two-lane traffic. Problem is how the grades fit and can we tie in with other part of roadway if going 20 ft. If great differences in grades, very difficult. Let contractors have some flexibility to help. No need for cameras, average delays, etc. not great. Cameras are a huge selling point for the public, so can go on Web site to see weather and how the job is going and progress. Helps value on project, especially this one, sometimes there is nothing on roadway because of volume on project. The speed could come in to benefit the problem lack of volume. Travel time is a real good feature. The city could have an interactive exchange area in Dubois and get info on project and find out the time to get from point A to B. Give parameters without mi/h. Using the ITS educates the public, can also partner and give info on Dubois, things to do in Dubois, and construction info. Do on north/south before junction at least one-half mile. Real time info becoming the wave of the future—great way to go—even though have to build it first, it would be money well spent. Real time info becoming the wave of the future—great way to go—even though have to build it first, it would be money well spent. Will they be effective?

Notes - Traffic/Safety/ITS Skill Set		
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License plate recognition	Do you have expert with infrastructure to provide activity to project devices...need to get power to it and possibly can use satellite, have satellite systems in place in remote areas, but none in area five yet. On land site potentially up to 30 miles, is the phone service above able to handle this, Jackson has a phone line. Do we look at picking up time over corridor or project? Could do a combination; good to find out average travel time and then look at delay in work zone to give those averages, based on what is seen in the work zone. Use radios to keep up on time constraints, etc. General overview on project with projected delays a good concept for this project. Generally have a 5-minute window. Antenna outside of Laramie gives awesome info on time, etc., maybe can get some portable larger antennas to help with info gathering and give time delays, etc.	If going to detect speed throughout project, capture license plate recognition, and beginning and end of project can determine mi/h versus counters. A camera system that focuses on cars and passes info from point A to point B to determine time. Need to check ending of lines. Sometimes someone stops to site see, so data can get messed up. Need to be able to kick out outliers. Sometimes cheaper to have high school kid out there manually doing this than spending lots of money on tech. equipment in work area Congestion problems won't be significant because of traffic flow. Pick peak times to get type best average. Can talk longer instead grabbing the 10-second view for the license plates.
Safety	Have tow truck on project for the just-in-cases. Don't do much. I-5 thru Oregon—3,000 feet long on one lane bridge had tow truck at each end; suspension bridge in Portland have one on call so only pay as used. Could have a couple of trucks patrolling for the whole corridor. Difficult in this scenario to have any detection. If no pullout, areas can be difficult—in pulloff areas get them off the road. Shouldn't be an issue to deal with stuck vehicles.	Second choice works better but for us. The distance the truck has to come could be too significant. Should have them just roam. In past have told contractors to get them off the road. This project a little more questionable.

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Safety	Can pullout areas be put in for some of the troubled areas and what is a reasonable distance between the pullout areas?	Usually head-to-head traffic on high-volume roads bigger jobs 5-6 mi apart. If take into consideration the train, should pullouts be closer together? Too many locations may not be that helpful. There should be parking and scenic areas all the time.
Vehicle assist on site	Helps keep traffic going everywhere. Would this help to have one available?	Can have it as part of contract or have a motorist assistance, which would be more flexible to do versus liability issues with changing stuff from contract. At this time does not have a road assist vehicle available.
Larger rebuild cut sections	Are implementing temporary concrete barriers.	Determined by how close to fill or edge. Once at a foot drop off and running adjacent to it, then puts up a barrier. Contractor sometimes uses fill back and barriers to use as a retaining wall versus safety issues
ITS—geology	Instrumenting slopes—would real-time ITS be beneficial?	Develop communication to access info later or better in real time...more worried about traffic volumes in this group, but combining a communication system that accesses both groups could be beneficial.
Ways with multiple projects on pass to make sure traffic control coordinated to make sure traffic control coordinated	1. Have corridor traffic control supervisor (inspector) hired by contractor—Oregon has a spec on this that will forward. Coordinating the traffic control can make a big difference in the corridor and could let drivers run all the way through without stopping. Traffic control supervisor better than using inspector because sometimes run out of inspectors, so let contractor handle TCS and make sure they are supervised, can pay by hour or day and would be logical to have them out when needed versus every day. Have to advise project manager when needed and he gives yeah or nay. Not paid until work the day. Putting on contractor relieves major burden on DOT. Can be a contractor employee or a subcontractor. 2. If have multiple contractor and in first contract before others done, how does the TCS switch between projects and how is the TCS paid over the different projects? 3. Become an entity of the DOT and get better consistency and sharing versus conflicts. Let it as a separate contract as related to the TCS duties, traffic control inspector would help in the multiple contracts and he would handle the overall control between all projects. Avoids conflicts of interests.	

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Performance specs for traffic control	If have goals and objectives, lends itself to performance specs. Here's what we want and you figure out how you are going to do it. New in Oregon DOT—designed in-house. Out of house.	Coordinates with design and construction philosophy. Design done by ODOT—biddable document and specials. There is an out where traffic control has to supply traffic control info, can be accepted or rejected by contractor, ODOT can approve change or just use ODOT's. Want to hand off to consultant and we don't maintain than information, on larger projects submit spec very general with general guidelines and deliverables and approve accordingly. Give the framework and let them fill in. Contractor doesn't do that, consultant does that.
Acceleration	1. Overall project completion. Finish the job in so two. Many days and give a bonus, can we close the road at night totally. Night volumes midnight to 6 a.m., may have 20 cars an hour max both ways (120 cars still being shuffled). 2. Portable lighting would need decent generators and flagging removed. 3. Have done the night work in the forest. 4. Make tough projects as one project and then do others separate from that. 5. Alternate routes through forest, etc. Forest can't handle the traffic. 6. Identify common structure areas that cause problems.	
Afternoon		
Wildlife crossings	Use data on movement.	Incorporate in design, use preused technologies, and target a few locations, optimal size to be determined.
Snowmobile crossings	Use migrations areas for snowmobile crossings.	Animals usually somewhere else in winter.
Self sufficient	Needs to be in regards to communication.	Needs to be more automated. If cost prohibitive to keep communication going via technology/camera—focus more on an activation system (garage door-trip wire), etc.
Location of crossings	All over the place. None really concentrated.	Clearing strategy would be helpful.
Section crashes	Mostly wildlife crashes versus other crashes especially in certain areas—try in two different high-crash areas.	Use two areas as a trial and, if it works, apply in other areas.

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If tunnel too long	Wildlife won't use it. Have about 10,000 animals cross in a year.	They need to see light at the other end of the tunnel. Can drill through median and have skylights put in (what ODOT did but maintenance a mess).
Crashes	Most of them are at night.	Could light the tunnels (not).
A+B way to go if minimizing traffic, but are there other considerations	Components to lowest bidder assigned with time constraints. How much you want paid and how many days will it take? Add tricky parts in as other I/Ds.	Days converted into a dollar amount...based on this determines contractor. Apply damages if not done in the amount of days said could be done; weather days can be written in for inclement weather, etc.
A+B+C	For pre-qualifications and meeting requirements. Mobilization problems come in if project supposed to be done by fall and inclement weather postpones this ODOT will negotiate where doesn't penalize.	
Combine units or focus on hot spots	Grades over 5 percent in every section, horizontal curves of 45 mi/h trouble. Units highest is 2 and 3, unit 1 gone out of this since going off in April 2005. Can bid on 1 and 2 knowing that the design can be done on 2 within a certain time frame knowing that unit 1 is already designed and ready to go. Mobilization significant in dollars, to develop, award, etc costly, efficiency gained by contractor staying on site and quality control of product is more consistent. To take care of geotech problems may cause road closures and one-lane traffic.	Do unit 1, put 2 and 3 together taking care of grades. Make sure to award jobs together rather than all separate; not geared up to do design that quickly. Innovative finance comes into play, two units would drain the budget combining units okay but what about doing the hot spots first then the other units.
Need to minimize delays	Let contractor buy into them having a traffic control manager regardless of the cost to handle the flow through the corridor. If constrain ourselves that recs fully implement, then limiting ourselves.	Software, optimized timing already available; if communication a problem build a couple of towers. One or two good suggestions could make the difference.
ITS	Put in power and communication to make it work. Community perception causes concern. ODOT—conservative but generally okay on traffic control; a hard sell to the community because of the "do or die" fear with the community.	Could be one of the main tools. In Phoenix set up video cameras to control traffic on regular highway so could help on construction sight by making sure product of their people moving adequately. Tourists possibly would choose alternate routes because of construction delays and closures. Need lots of PR to keep public calm and get them the information they want.

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ITS	Towers aren't a good option because of Forest Service, but maybe there is a shared facility. Consider pulling power and fiber optics through project to keep communication open; not easy but doable. Time to get the power, and fiber in place could be started from both ends; telephone poles not an option but burying them is the option and it is less problem; putting power and telecommunications together is the optimum rather than placing power and communication lines separately. Is a camera really beneficial or the talking back and forth better—public loves the visual and in PR prospective worth their weight in gold. Works great in Cheyenne because there are alternate routes. 4 p.m. running 50-100 cars per hour both ways from 9 a.m.-6 p.m. Many hours between midnight and 6 a.m. maybe 1 to 2 cars an hour.	Currently Forest Service uses radio frequency to communicate. Obviously getting Ma Bell to coordinate with us for future use with minor maintenance from time to time would be a benefit. Could put up a temporary facility until everything hooked up. Makes closing of road at night a bigger benefit with the less trafficked road.
Pineal	Have an ITS project in place and waiting for results—burying conduit not a great thing to do right now, but if environmental wants to address this then say that this should be considered.	65 mi/h with low design speed and now will be reducing speed and have more of a dispersion and there will not be different speeds through the tunnel. Speed 65 mi/h, and design speed is 55 mi/h (especially curves) clear zone will drop back down to 55 mi/h also. Posted speed should be 5 to 10 mi/h over design speed. There will still be some 45 mi/h curves too.
High water—flood planes should be considered	Shouldn't be a problem.	
Geotech construction for hot spots and for traffic congestion	Bite the bullet and do the hard parts first.	
Construction	Have a corridor wide traffic control manager and have nighttime closures.	

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Idea (short name)	**Idea (detailed description)**	**Implementation Details (barriers, skill set coordination, etc.)**
PR coordination	Have info area in Dubois to give out traffic info (kiosk) and combine that with a town public info center. Cameras at this location would be good. VMS boards are available but limited to what can be posted on them. There could be other things posted like where to eat, but radio a better media for it. Have to PR within our own PR to convince that we can do it. Need to find out what they need for us to be successful. Want speeds, times, who is the end user, what?	Advance info in Riverton and Lander a strong possibility as well as coming out of Jackson, but the towns don't want anyone to discourage people from coming to their town. PR should figure out how to handle this. Violent public pose a problem so warn them in advance. Let them know there is construction and there are delays but the delays are bearable and it is worth your while to continue our way. Real-time info helps public make a better educated choice and most frequently, if well-informed, public will continue on construction path rather than taking an alternate route. National trend is how long does it take to get through the corridor—travel time versus corridor time. What is a good time to say? Travel time would be a more positive tract. Delay sounds kind of negative, and if don't stick to amount of delay said, causes problems. Distance would be a good item to know too. Post possible delays for possible hours on Web site for advance communications. Most commuters got the information. Schedule to minimize traffic delays. Get them on the Web site, HAR, etc. Give plenty of time to notify others via contractor of delays like the blasting area in the corridor. If an alternate route doesn't work then come up with advance communication to advise commuters.
FM HARs/AM HARs	Lots of people using FM versus AM, look at going FM.	AM travels farther and lower frequencies.
I/Ds work	Better if can find gray area where sting isn't as bad.	Use an incentive and disincentive; ODOT usually caps both and also sets a daily amount too for both, even on-time amounts; pays more in incentives versus disincentives
Lane rental	Cost is determined by parameters set. We don't get really high dollars because volumes not that high.	If not racking up a lot of user costs, can't worry about lane rental costs.
After talking to other groups		
Construction	How much can we restrict to one-lane (distance)?	Are there going to be clauses where there will be no more than this amount of one lanes for this amount?

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Geotech	Do you want COMS—us to monitor slope, stability, etc. Go with 2-mile limit at 30 mph, takes about four minutes to travel that, so to set maximum time to travel through. Identifying hot spots—yes—let's bite the bullet up front—hot spots for them—land-side mitigation, bride construction and off-land construction (could be I/D clauses or incentives, etc.)—could shave one year off of project; animal protection issues.	Two miles no problem with 15-minute delay—urban areas should limit it by the mile. Contract—wanted to shift one of the units around—switch Togowtee Pass (October 0 8) and Rosie's Ridge (October 07) flip flop—looking to shave off a year.
Geotech	Wants hot spots dealt with first—do early contracts.	
Environmental	Understood lack of its technology but want to utilize structures already in place.	
Contract	Lane rentals maybe, but looking at bank hours. Rock work. Early completion. Don't want to do the whole thing at once. Distance of limit for single land operation. Traffic control coordination/TCS still a possibility. Safety should have wet reflective tape on pavement. Roving vehicle good idea for gas, diesel, flats, etc.	If have to close hours, would give them 500 hours at night and 50 hours during the day; disincentive for overusing but no incentive for not. Require advanced notice for lane closures. Incentive and disincentives should apply. Time factor not a distance factor.
Public Relations	Want accurate and real-time information on delay and travel times. Would like to use VMS and HAR radios to get information out. Hot spots—community standpoint is don't do this because will lose job and take money away from them, etc; just as soon have more steady and consistent work over the life of the corridor project.	Web cams not a biggie.

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