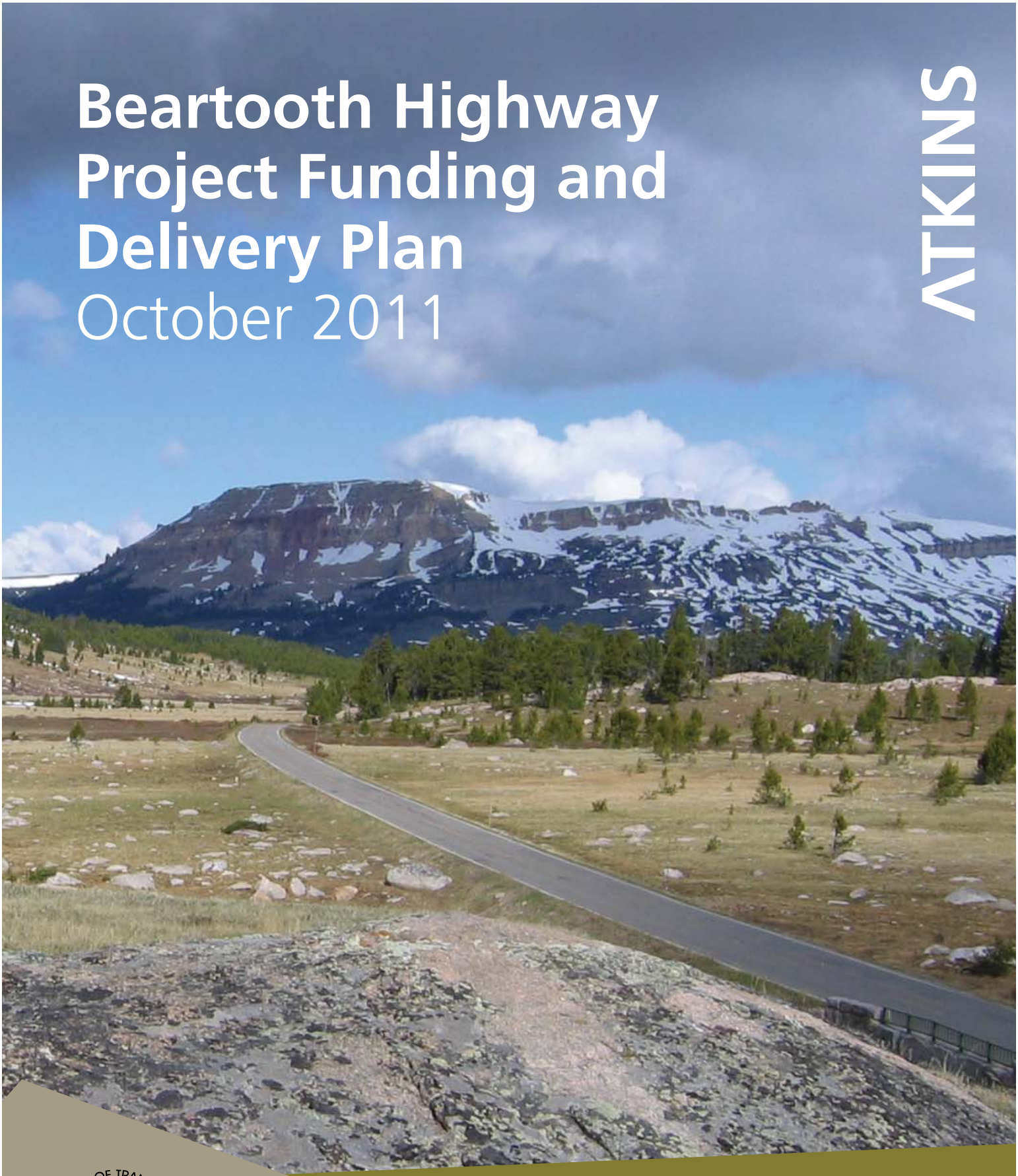
Beartooth Highway Project Funding and Delivery Plan

October 2011

ATKINS



DEPARTMENT OF TRANSPORTATION
UNITED STATES OF AMERICA

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Beartooth Highway Project Funding and Delivery Plan

Executive Summary

This Project Delivery Plan (PDP) documents the current completion status of Segment 4 of the Beartooth Highway and describes two funding and delivery plans to fully improve the route. This analysis reflects the recently completed projects, changes in the bidding environment, and remaining work for the road.

Project Description

The Beartooth Highway has been recognized as a nationally significant highway, but is also an "orphan" road, meaning no Federal or State agencies currently claim ownership of the road and there are no designated funding mechanisms to fund the needed improvements. Project partners and the steering committee have been instrumental in supporting and providing funding for improvements to date.

Project History and Accomplishments

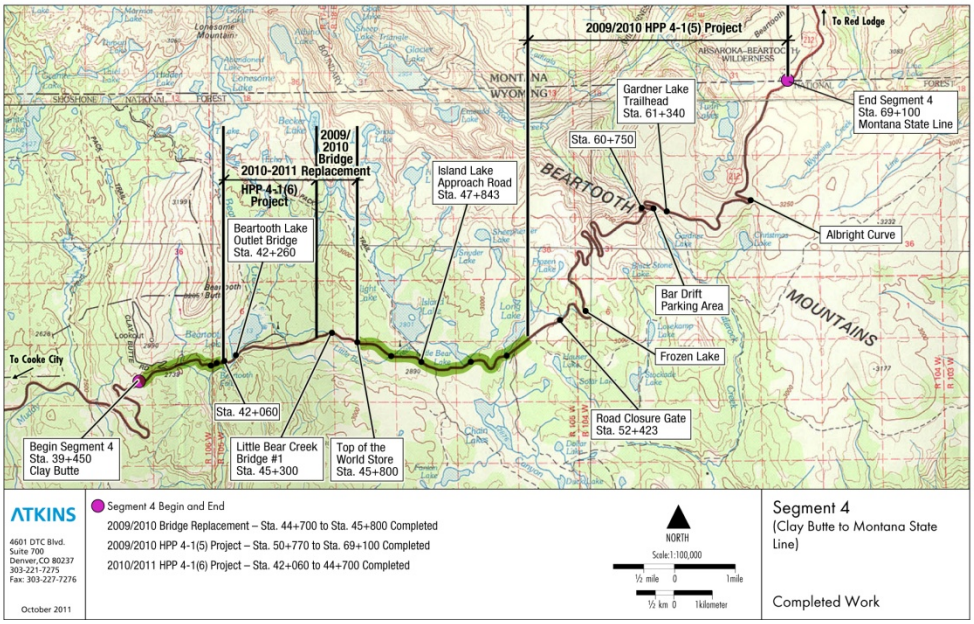
As a result of the collaborative efforts of the steering committee, 22.56 kilometers (14.02 miles) out of 30.14 kilometers (18.73 miles) of Segment 4 have been improved. With funding support from all of the project partners, Segment 4 has received to date $40.23 million in funding and will have expended approximately $39.84 million by the end of 2011. These expenditures have resulted in the following improvements to the Beartooth Highway:

- 18.795 kilometers (11.68 miles) of roadway rehabilitation
- 3.763 kilometers (2.34 miles) of roadway reconstruction
- Roadway maintenance activities (i.e., snowplowing)
- Pavement preservation of entire length of Segment 4
- Environmental documentation and preliminary engineering for all of Segment 4
- Construction of Fox Creek Work Camp
- Replacement of Little Bear Creek Bridge #1 and Beartooth Lake Outlet Bridge
- Wetland mitigation, Beartooth Trail and Interpretive Site construction
- Construction support activities for multiple construction project

Remaining Needs and Proposed Delivery packages

The completion of these projects leaves only 7.58 kilometers (4.71 miles) of roadway in need of improvement, for the entire route to be an upgraded facility. The remaining gap projects are shown in Figure ES-1.

Figure ES–1 Segment 4 Remaining Projects



The remaining work is designed and construction packages are prepared and ready for advertisement as shown (listed in no particular order of precedence), in Table ES–1. Funding needs for the remaining improvements are estimated at $46.1 million to construct.

Table ES–1

Project				Total Costs (2011)
Station to Station	Length (km)	Description	Highlights	
Project 1 – Station 45+800 to Station 47+843	2.043	Top of the World Store to Island Lake Campground Approach Road; Complete wetland mitigation, continues realignment at Top of the World Store	Completes wetland mitigation, continues realignment at Top of the World Store, replaces Little Bear Creek Bridge #2	$8,900,000
Project 2 – Station 47+843 to Station 50+770	2.927	Island Lake Campground Approach Road to HPP 4-1(5)	Little Bear Lake Fen Bridge, Long Lake Outlet Bridge	$12,200,000
Project 2A – Station 49+980 to Station 50+770	0.79	Long Lake Outlet Bridge to HPP 4-1(5)	Long Lake Outlet Bridge	$5,000,000
Project 3 – Station 39+450 to Station 41+100	1.650	Clay Butte to Beartooth Ravine	Slide Area, Wildlife Crossings	$5,200,000
Project 4 – Station 41+100 to Station 42+060	0.960	Beartooth Ravine	Beartooth Ravine Bridge and Retaining Wall, Parking Area	$19,800,000
			***Total**	**$46,100,000**

*Total costs doesn't include the cost for project 2A because project 2A is included in project 2 costs.

Alternate Delivery Packages

Due to the non-existence of a consistent funding program combined with consideration for the current state of economy, alternate delivery packages were considered. In 2009/2010, the HPP 4-1(5) project completed rehabilitation of the eastern section of Segment 4, instead of the originally planned full reconstruction. This modification to the original project was necessary due to constraints of limited funding and the rapid deterioration of the roadway conditions. Considering this approach, a similar re-evaluation was performed on the remaining work, including developing alternatives in the Beartooth Ravine, developing a transitional section from the completed reconstruction project to the HPP 4-1(5) rehabilitation project, and developing alternatives for high cost structures. FHWA also conducted a value engineering study for the remaining work. With a flexible approach and a thorough evaluation of the remaining needs of the Beartooth Highway, the following modifications are recommended:

- Project 2 – By reducing the paved width to 8.4 meters (28 feet) in this transition section and using the existing bench width at Little Bear Lake Fen, construction of a small retaining wall to avoid impacts instead of a bridge is proposed and saves $2.1 million.
- Project 4 – By modifying the horizontal alignment in the Beartooth Ravine, the proposed bridge can be eliminated and reduce the cost of the retaining wall design. This was accomplished by reducing the design speed by 10 km/hr in this area (the current design has a reduction of 5 km/hr) and changing the guardrail used on the wall. This proposal saves $4.9 million.

Project Funding Plan

The funding plans were developed to assess the delivery impacts at different funding levels and to examine the impact of inflation on delivery. These plans considered two annual allocations: $6 million and $10 million.

Scenario 1 evaluates delivering project packages as designed in the FEIS/ROD and Scenario 2 delivers project packages using the alternative design modifications. Table ES–2 highlighted the cost impacts based on the different funding levels.

Table ES–2

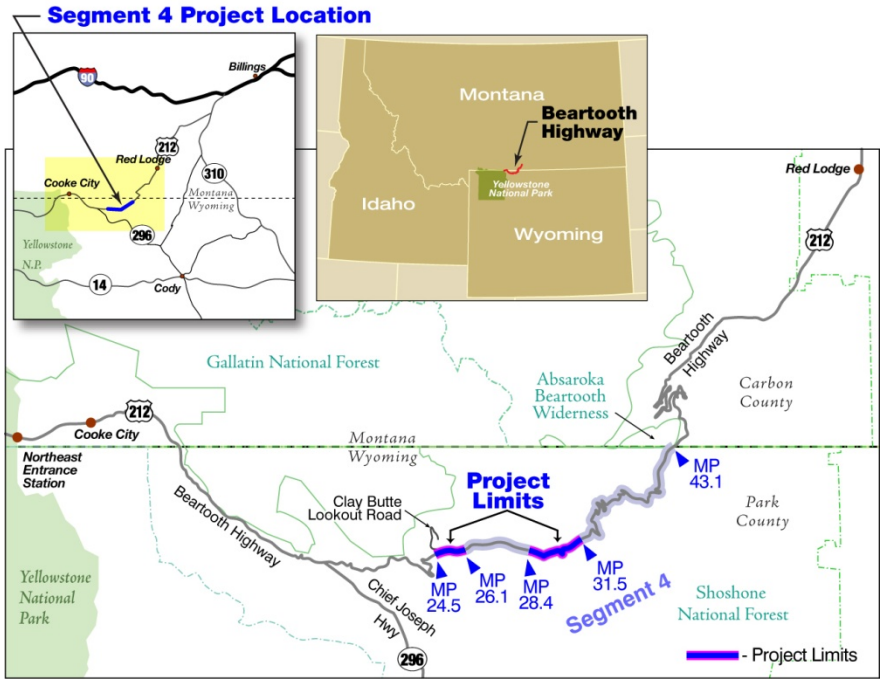
	Scenario 1 - As Designed		Scenario 2 - Alternate Design		Cost savings between Scenario 1 and 2
Total Cost	$46,100,000	(2011 Dollars)	$39,100,000	(2011 Dollars)	$7,000,000
Annual Allocation of $6 million Total Cost	$59,085,300	Funded by 2021	$47,219,956	Funded by 2019	$11,865,344
Annual Allocation of $10 million Total Cost	$51,604,940	Funded by 2016	$43,489,071	Funded by 2016	$8,115,869
	$7,480,361	Savings due to funding amounts	$3,730,885	Savings due to funding amounts	

By securing a $10 million annual allocation instead of $6 million, construction can be funded in 4-5 years with a cost savings of $7.48 million for projects designed in the FEIS/ROD and $3.73 million for the alternate design modifications. By constructing the alternate delivery packages instead of the projects as designed using the $10 million annual allocation, there can be an additional savings of $8.12 million.

A. Project Description

The Beartooth Highway is a 108-kilometer-long (67-mile) route that begins at the northeast entrance to Yellowstone National Park (YNP) and ends in Red Lodge, Montana. The roadway was originally built in the 1930s to provide access to YNP. The Beartooth Highway has been divided into seven segments for reconstruction and study purposes, all of which have been reconstructed except for Segment 4. This Project Funding and Delivery Plan is for the 30.14 kilometer (18.73 mile) portion of the Beartooth Highway referred to as Segment 4. See Figure 1, Project Area and Segment 4 Location Map.

Figure 1 – Project Area and Segment 4 Location Map



The Beartooth Highway has been recognized as a nationally significant highway and has been designated a U.S. Forest Service (USFS) Scenic Byway, a Wyoming State Scenic Byway, and sections of the road, including the project area, are designated an All-American Road under the FHWA's Scenic Byway Program. The Beartooth Highway is also an "orphan" road, meaning no Federal or State agencies currently claim ownership of the road, and there are no designated funding mechanisms to fund the needed improvements. Maintenance responsibilities for the first 69.3 kilometers (43.1 miles), including all of Segment 4, are currently completed by YNP. These jurisdictional and funding challenges complicate the process for developing and funding improvements of the Beartooth Highway.

B. Project History and Accomplishments

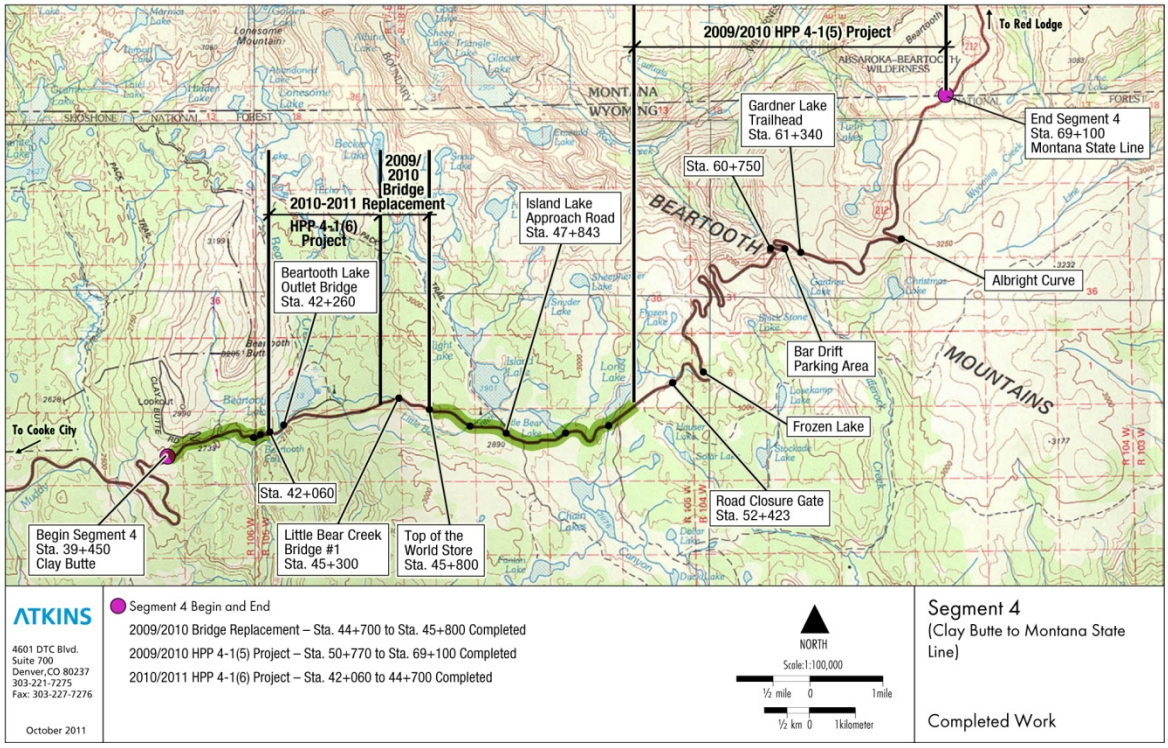
Despite the challenges with funding improvements to the route, there have been significant accomplishments on Segment 4 of the Beartooth Highway. The Final Environmental Impact Statement (FEIS) was completed in September 2003 and the Record of Decision (ROD) was signed in February 2004. The engineering for the Segment 4 was completed in 2004 based on the full reconstruction design as detailed in the ROD.

As a result of the collaborative efforts of the steering committee, 22.56 kilometers (14.02 miles) out of 30.14 kilometers (18.73 miles) of Segment 4 have been improved. These improvements included pavement preservation and rehabilitation and replacement of the failing Little Bear Creek Bridge # 1 completed as part of the HPP 4-1(5) in 2009/2010. A reconstruction project was not pursued on this eastern portion of Segment 4 because advanced roadway deterioration necessitated rehabilitation with available funds. This flexibility in the approach allowed the funding to be used for rehabilitation meeting the purpose and need identified in the FEIS/ROD.

Funding was requested for the reconstruction of the remaining Segment 4 through the TIGER (Transportation Investment Generating Economic Recovery) Discretionary Grant funds. An award of $6 million, less than the $65 million requested, was received for a reconstruction package. These funds were used for the current construction project, HPP 4-1(6), which includes the replacement of the Beartooth Lake Outlet Bridge and reconstruction of the road east of the bridge to the edge of the HPP 4-1(5) project.

The completion of these two projects leaves only 7.58 kilometers (4.71 miles) of roadway in need of improvement, for the entire route to be an upgraded facility. The remaining gap projects are shown in Figure 2.

Figure 2 – Segment 4 Project Completion



With funding support from all of the project partners, Segment 4 has received to date $40.23 million in funding and will have expended approximately $39.84 million by the end of 2011. These expenditures have resulted in the following improvements to the Beartooth Highway:

- 18.795 kilometers (11.68 miles) of roadway rehabilitation
- 3.763 kilometers (2.34 miles) of roadway reconstruction
- roadway maintenance activities (i.e., snowplowing)

- pavement preservation of entire length of Segment 4
- environmental documentation and preliminary engineering for all of Segment 4
- construction of Fox Creek Work Camp
- replacement of Little Bear Creek Bridge #1 and Beartooth Lake Outlet Bridge
- wetland mitigation, Beartooth Trail and Interpretive Site construction
- construction support activities for multiple construction projects

Table 1 summarizes all project funding and expenditures for Segment 4.

Table 1 – Segment 4 Funding and Expenditure Summary

Funding Source or Expenditure Type	Administration	Funding Received	Expenditures	Description
Funding Source				
Crown Butte (DOI appropriations)	USFS transferred to CFLHD	$10,000,000		NEPA, pavement preservation, and engineering
Crown Butte (DOI appropriations)	USFS (transfer of funds to NPS)	$2,000,000		NPS snowplowing
Discretionary HPP funds	FHWA	$17,500,000		Engineering, environmental, rehabilitation
FY 2008 Wyoming and Montana STP redistribution	WYDOT/MDT	$1,730,000		Construction only funds
Wyoming Forest Highway (FLHP) Funds (2008)	WYDOT	$2,000,000		Construction only funds
TIGER Discretionary Grant Recipient	WYDOT	$6,000,000		Construction only funds
Wyoming Forest Highway (FLHP) Funds (2010)	WYDOT	$700,000		Construction engineering
FLHP Aquatic Organism Passage (2011)		$300,000		Construction engineering, Construction
Expenditure Type				
Maintenance activities	USFS (transfer of funds to NPS annually)		$200,000/ annually (total $2,000,000)	Crown Butte for NPS snowplowing
Pavement preservation (Segment 4)	FHWA		$2,000,000	Crown Butte for seal coat
Environmental documentation (A/E)	FHWA		$3,240,000	HPP/Crown Butte funds
Preliminary engineering (A/E)	FHWA		$5,471,000	HPP/Crown Butte funds
Preliminary engineering (CFLHD internal)	FHWA		$2,789,000	HPP funds
Fox Creek Work Camp construction	FHWA		$1,000,000	HPP funds
Clearing contract construction	FHWA		$320,000	HPP funds
HPP 4-1(5) Project	FHWA		$14,420,000	Rehabilitation, Construction Engineering. HPP/STPP/Forest Highway Funds
HPP 4-1(6) Project (Under Construction)	FHWA		$8,600,000	Rehabilitation, Construction Engineering. HPP/STPP/Forest Highway Funds
Funding Summary		**Total $40,230,000**	**Total $39,840,000**	**Balance (Funds Remaining) $390,000**

A/E – Architecture/Engineering
DOI – U.S. Department of the Interior
CFLHD – Central Federal Lands Highway Division
FY – Fiscal Year
NEPA – National Environmental Policy Act
STP – Surface Transportation Program

C. Remaining Needs

To date, approximately 22.56 kilometers (14.02 miles) out of 30.14 kilometers (18.73 miles) of roadway improvements have been completed on Segment 4 with 7.58 kilometers (4.71 miles) of unimproved and unfunded remaining work.

C.1 Project Delivery As Designed in the FEIS/ROD

To complete the remaining unimproved sections of the Beartooth Highway, improvements to the following areas are necessary:

- the Beartooth Ravine parking area
- Beartooth Ravine bridge and retaining wall
- the pullout at Beartooth Falls
- wildlife crossing mitigation areas
- replacement of Little Bear Creek Bridge #2
- wetland mitigation
- Little Bear Lake Fen Bridge
- Long Lake Outlet Bridge
- Geological interpretive site.

All remaining improvements have been designed with construction packages prepared and ready for advertisement. Funding needs for the remaining improvements are estimated at $46.1 million to construct.

Recommended project packaging for the remaining improvements in the following fundable phases, listed in no particular order of precedence:

a. Project 1 – Station 45+800 to Station 47+843, 2.044 kilometers (1.27 miles). Begins at the Top of the World Store connecting to the 2009/2010 reconstruction project HPP 4-1(5) and ends at Island Lake Campground Road. Completes the majority of the wetland mitigation and the replacement of Little Bear Creek Bridge #2. Project 1 Total Cost = $8.9 million.

b. Project 2 – Station 47+843 to Station 50+770, 2.927 kilometers (1.82 miles). Begins at Island Lake Campground Road and ends just east of Long Lake connects to the completed 2009/2010 rehabilitation project HPP 4-1(5). Reconstructs Long Lake Outlet Bridge and constructs Little Bear Lake Fen Bridge. Project 2 Total Cost = $12.2 million.

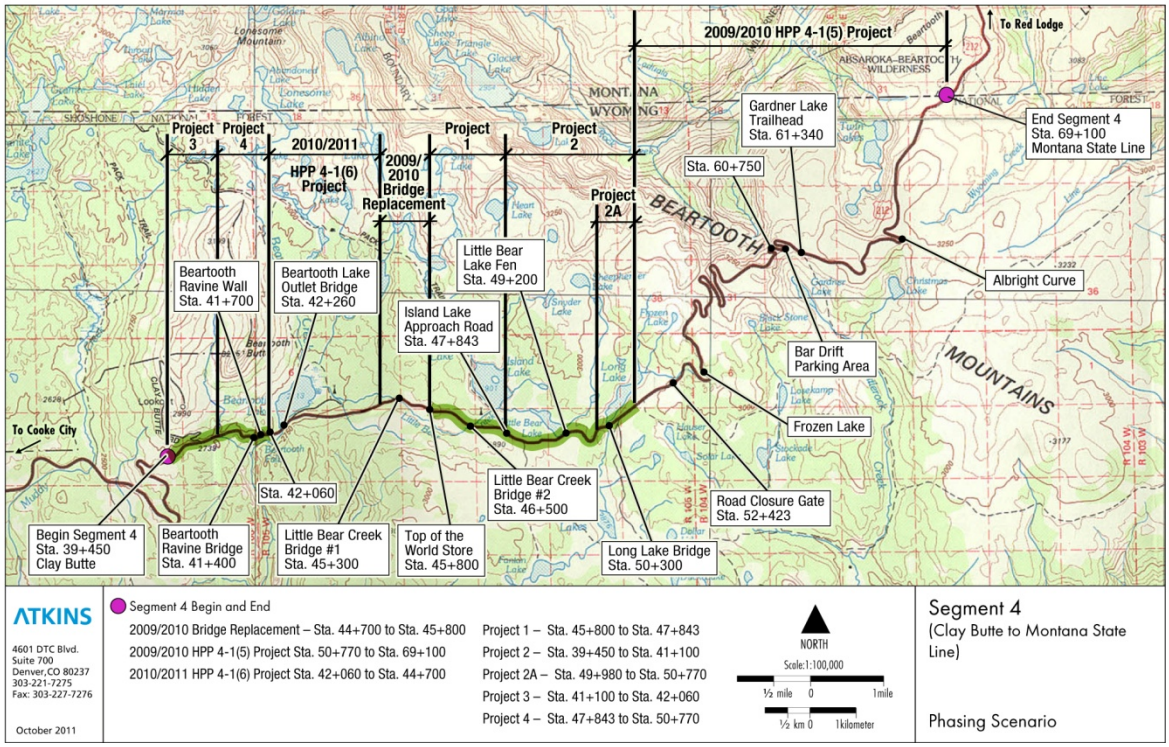
c. Project 2A – Station 49+980 to Station 50+770, 0.79 kilometers (0.50 miles). Reconstructs Long Lake Outlet Bridge and ends just east of Long Lake connecting to the completed 2009/2010 rehabilitation project HPP 4-1(5). Project 2a Total Cost = $5 million.Project 3 – Station 39+450 to Station 41+100, 1.65 kilometers (1.03 miles). Begins at the beginning of Segment 4 and heads east to the Beartooth Ravine. Project 3 Total Cost = $5.2 million.

d. Project 4 – Station 41+100 to Station 42+060, 0.96 kilometers (0.60 miles). Begins at the Beartooth Ravine to the western edge of the HPP 4-1(6) project currently under construction at Beartooth Lake. Constructs Beartooth Ravine Bridge and Retainign Wall. Project 4 Total Cost = $19.8 million.

Based on the current competitive bidding environment, it is anticipated that these projects could be advertised and awarded within the estimated 2011 construction costs.

The recommended project packages for Segment 4 are shown in Figure 3.

Figure 3 – Potential Projects on Segment 4



C.2 Alternate Project Delivery Analysis

Due to the non-existence of a consistent funding program combined with consideration for the current state of economy, opportunities were sought out to identify design considerations that would present optional funding scenarios for the remaining Beartooth Highway work.

The HPP 4-1(5) project on the eastern end of Segment 4 was originally planned for reconstruction, but was repackaged as a pavement preservation and rehabilitation project. This modification to the project plan was necessary due to the constraints of limited funding and the rapid deterioration of the roadway conditions. The modified approach continued to support the purpose and need identified in the ROD as it supports management of the National Forest adjacent to the road, it maintains an efficient transportation link between Red Lodge, MT and YNP, and it was improved in a manner that permits sustainable maintenance practices. Considering this approach, a similar reassessment was performed on the remaining sections of work.

Due to wetland mitigation activities associated with the reconstruction of Project 1 (Top of the World Store to Island Lake Campground), consideration for an alternate design was precluded from this reassessment.

Project 3 (beginning of Segment 4 to east of Beartooth Ravine) completes the wildlife crossing mitigation, the slide repair, and doesn't include any structures; therefore, alternate designs are not recommended.

As a result of the reassessment and a recent value engineering study completed by FHWA, the following proposals are considered:

Project 2 – Station 47+843 to Station 50+770, 2.927 kilometers (1.82 miles).

Project 2 connects the full design standard of Project 1 to the previously completed rehabilitation standard of the HPP 4-1(5) project. Originally designed to be completed as a 9.0 meter (30 foot) width, this section could act as a "fill-gap" project transitioning the two standards. The transitional section will offer a gradual change in roadway standard from the reconstructed, 9.0 meter (30 foot) wide template of Project 1 reducing to a 8.4 meter (28 feet) reconstruction project for Project 2 and then match into the 7.2 meter (24 feet) wide pavement preservation and rehabilitation project already constructed under the HPP 4-1(5) project. With this approach, the structurally deficient Long Lake Outlet Bridge will be replaced as originally planned, but an additional cost savings can be realized with the removal of the Little Bear Lake Fen Bridge from the project. This concept offers a logical and gradual transition with a reduced impact to the sensitive tundra environment surrounding the Little Bear Lake Fen. The USFS manages the roadway in two distinct types of use including recreational and alpine zones; the majority of project 2 is outside the recreation area and in the alpine zone, so the reduced shoulder width meets the land management goals. Additionally, the proposed alternative project meets the purpose and need as outlined in the ROD by supporting management of the National Forest adjacent to the road, maintains an efficient transportation link between Red Lodge, MT and YNP, and will provide for sustainable maintenance activities.

Project 4 – Station 41+100 to Station 42+060, 0.96 kilometers (0.60 miles).

Project 4 is located in the Beartooth Ravine. The existing alignment has sharp curves and steep terrain. The proposed design as presented in the FEIS/ROD is full reconstruction with improvements to curvature requiring a bridge and retaining wall; however, the improved curvature still requires a design speed exception of 5 km/hr. Multiple options were evaluated in this analysis and the value engineering study, but were determined to not meet the purpose and need or were considered unfeasible. These options include rehabilitation of the existing alignment, reducing the proposed width, shifting the alignment into the cut slope to eliminate the retaining wall, and adjusting the alignment to eliminate the bridge and extend the retaining wall. The recommended alternative design for Project 4 proposes a full reconstruction that follows the existing alignment but improves the curvature with a design speed exception of 10 km/hr. This new alignment eliminates the bridge and modifies the design of the retaining wall.

In summary, design modifications proposed to Project 2 and 4 are feasible and include:

- Project 2 – By reducing the paved width to 8.4 meters (28 feet), and using the existing bench width at Little Bear Lake Fen, construction of a small retaining wall to avoid impacts instead of a bridge is proposed. Modified Project 2 Total Cost = $10.1 million (versus $12.2 million as presently designed).

- Project 4 – The horizontal alignment was modified in the Beartooth Ravine to improve curves from existing conditions but eliminate the proposed bridge and modify the retaining wall design. This was accomplished by reducing the design speed by a total of 10 km/hr in this area (the current design has reduction of 5 km/hr design speed in this area) and changing the guardrail used on the wall. Modified Project 4 Total Cost = $14.9 million (versus $19.8 million presently designed).

D. Funding Plan

As stated previously, the potential funding for the remaining construction is uncertain. The following funding plans were developed to identify potential opportunities, assess the delivery impacts at different funding levels and to examine the impact of inflation on the delivery. These plans considered two funding amounts, a $6 million annual allocation and a $10 million annual allocation. The funding amounts were selected based on prior funding history with $6 million representing the smallest funded project and $10 million representing an amount similar to the award of the HPP 4-1(5) project.

Assumptions used in development of the funding plan include:

- Project 1 can have an option for a smaller construction package
- Project 2 can be phased into two smaller packages
- Project 3 and 4 should remain as one construction package
- Project 1, 2 and 4 assumed a 2 year construction season
- Project 3 assumes a 1 year construction season
- The baseline year is 2011 for construction costs, projected annual Inflation for construction costs from 2011 to 2012 is 0%, from 2012 to 2013 is 3% and from 2013 to 2014 and subsequent years is 5.0%
- Engineering, environmental and construction engineering costs from 2011 to 2013 do not include inflation. From 2013 to 2014 and subsequent years, a 3% inflation per year is applied

Scenario 1 – As Designed

Scenario 1 evaluates delivering project packages as designed in the FEIS/ROD. The total cost to deliver these projects in 2011 dollars is $46.1 million dollars.

Assuming a $6 million annual allocation beginning in 2012, all remaining projects will be funded in 9 years for a total delivery price of $59.06 million.

Assuming a $10 million annual allocation beginning in 2012, all remaining projects will be funded by 2016 (this requires a one-time funding amount of $12 million in 2016) with construction completed in 2018 for a total price of $51.60 million. The funding plan for Scenario 1 is shown in Figure 4.

Scenario 2 – Alternate Design

Scenario 2 evaluates delivering project packages utilizing the alternative design modifications based on priority. The total cost to deliver these projects in 2011 dollars is $39.1 million dollars.

Assuming a $6 million annual allocation beginning in 2012, all remaining project will be funded by 2019 for a total price of $47.22 million.

Assuming a $10 million annual allocation beginning in 2012, all remaining projects will be funded by 2016 for a total price of $43.49 million.

The funding plan for Scenario 2 is shown in Figure 5.

Presently, funding for the remaining work is uncertain ($46.1 million as designed/$39.1 million alternate delivery). As in the past, there is a need for the project stakeholders and the steering

committee to continue to work together in the identification of funding sources and project delivery scenarios for the remaining improvements.

Figure 4 – Funding Plan – Scenario 1 – As Designed

Funding Plan - Scenario 1 (As Designed)																	
Project			Construction Costs (2011)	Engineering/ Environmental/ Construction Engineering Costs	Total Cost (2011)	Total Costs with Inflation											
Station to Station	Length (km)	Description				2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
					Funding →	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	
					Balance →	$6,000,000	$12,000,000	$8,792,830	$14,792,830	$6,952,908	$6,779,132	$12,779,132	$18,779,132	$24,779,132	$30,779,132	
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000		$9,207,170									
2 – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$10,800,000	$1,400,000	$12,200,000				$13,839,922							
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000					$6,173,776						
4 – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$18,300,000	$1,500,000	$19,800,000										$29,864,432	
					Total	$46,100,000										
					Total Cost with Inflation	$59,085,300										
					Funding →	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$12,000,000						
					Balance →	$10,000,000	$11,061,000	$21,061,000	$17,850,982	$23,954,045						
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000	$8,939,000										
2 – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$10,800,000	$1,400,000	$12,200,000			$13,210,018								
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000				$5,896,937							
4 – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$18,300,000	$1,500,000	$19,800,000					$23,558,985						
					Total	$46,100,000										
					Total Cost with Inflation	$51,604,940										

Construction costs for projects from 2011 to 2012 use 0% inflation/year, from 2012 to 2013 use 3.0% inflation/year and from 2013 to 2014 and subsequent years use 5% inflation/year.
Engineering, environmental, and construction engineering costs do not include inflation from 2011 to 2013. Use 3% inflation/year from 2013 to 2014 and subsequent years.
Projects are listed in no particular order of precedence.

Figure 5 – Funding Plan – Scenario 2 – Alternate Delivery

Funding Plan - Scenario 2 (Alternate Design)																
Project			Construction Costs (2011)	Engineering/ Environmental/ Construction Engineering Costs	Total Cost (2011)	Total Costs with Inflation										
Station to Station	Length (km)	Description				2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
					Funding →	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000			
					Balance →	$6,000,000	$12,000,000	$8,792,830	$14,792,830	$9,338,622	$9,164,846	$15,164,846	$21,164,846			
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000		$9,207,170									
2 Modified – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$8,600,000	$1,500,000	$10,100,000				$11,454,208							
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000					$6,173,776						
4 Modified – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$13,300,000	$1,600,000	$14,900,000								$20,384,802			
				Total	$39,100,000											
				Total Cost with Inflation	$47,219,956											
					Funding →	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000						
					Balance →	$10,000,000	$11,061,000	$21,061,000	$20,121,010	$24,224,072						
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000	$8,939,000										
2 Modified – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$8,600,000	$1,500,000	$10,100,000			$10,939,991								
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000				$5,896,937							
4 Modified – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$13,300,000	$1,600,000	$14,900,000					$17,713,143						
				Total	$39,100,000											
				Total Cost with Inflation	$43,489,071											

Construction costs for projects from 2011 to 2012 use 0% inflation/year, from 2012 to 2013 use 3.0% inflation/year and from 2013 to 2014 and subsequent years use 5% inflation/year.
Engineering, environmental, and construction engineering costs do not include inflation from 2011 to 2013. Use 3% inflation/year from 2013 to 2014 and subsequent years.
Projects are listed in no particular order of precedence.

E. Delivery Plan

The delivery plan calculates the funding required for the remaining work as designed and the alternate delivery to complete the projects over an 8-10 year period with associated inflation. An additional table showing the impacts of inflation on construction costs annually for each project. These tables are included in the Appendix.

APPENDIX

Delivery Plan – Scenario 1 (As Designed)

Delivery Plan - Scenario 1 (As Designed)											
Project			Construction Costs (2011)	Engineering/ Environmental/ Construction Engineering Costs	Total Cost (2011)	Funding By Year					
Station to Station	Length (km)	Description				2012	2014	2016	2018	2020	2022
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000	$9,000,000					
2 – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$10,800,000	$1,400,000	$12,200,000		$13,300,000				
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000			$6,200,000			
4 – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$18,300,000	$1,500,000	$19,800,000				$12,000,000	$12,000,000	$3,700,000
				Total	$46,100,000						
				Total Cost with Inflation	$56,200,000						

Construction costs for projects from 2011 to 2012 use 0% inflation/year, from 2012 to 2013 use 3.0% inflation/year and from 2013 to 2014 and subsequent years use 5% Inflation/year.
Engineering, environmental, and construction engineering costs do not include inflation from 2011 to 2013. Use 3% inflation/year from 2013 to 2014 and subsequent years.
Projects are listed in no particular order of precedence.

Delivery Plan - Scenario 2 (Alternate Design)

Delivery Plan - Scenario 2 (Alternate Design)										
Project			Construction Costs (2011)	Engineering/ Environmental/ Construction Engineering Costs	Total Cost (2011)	Funding By Year				
Station to Station	Length (km)	Description				2012	2014	2016	2018	2020
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000	$9,000,000				
2 Modified – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$8,600,000	$1,500,000	$10,100,000		$11,000,000			
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000			$6,200,000		
4 Modified – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$13,300,000	$1,600,000	$14,900,000				$12,000,000	$8,300,000
				Total	$39,100,000					
				Total Cost with Inflation	$46,500,000					

Construction costs for projects from 2011 to 2012 use 0% inflation/year, from 2012 to 2013 use 3.0% inflation/year and from 2013 to 2014 and subsequent years use 5% Inflation/year.
Engineering, environmental, and construction engineering costs do not include inflation from 2011 to 2013. Use 3% inflation/year from 2013 to 2014 and subsequent years.
Projects are listed in no particular order of precedence.

Delivery Plan – Projects with Inflation Impacts (As Designed and Alternate Design)

PROJECT PACKAGE COSTS																
Project			Construction Costs (2011)	Engineering/ Environmental/ Construction Engineering Costs	Total Cost (2011)	Total Costs										
Station to Station	Length (km)	Description				2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1 – Station 45+800 to Station 47+843	2.044	Island Lake Campground Approach Road	$7,600,000	$1,300,000	$8,900,000	$8,939,000	$9,207,170	$9,639,945	$10,093,531	$10,568,945	$11,067,251	$11,589,568	$12,137,070	$12,710,987	$13,312,613	$13,943,301
2 – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$10,800,000	$1,400,000	$12,200,000	$12,242,000	$12,609,260	$13,210,018	$13,839,922	$14,500,404	$15,192,965	$15,919,180	$16,680,702	$17,479,268	$18,316,697	$19,194,902
3 – Station 39+450 to Station 41+100	1.65	Clay Butte to Beartooth Ravine	$4,400,000	$800,000	$5,200,000	$5,224,000	$5,380,720	$5,632,782	$5,896,937	$6,173,776	$6,463,916	$6,768,007	$7,086,730	$7,420,798	$7,770,961	$8,138,007
4 – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$18,300,000	$1,500,000	$19,800,000	$19,845,000	$20,440,350	$21,430,541	$22,469,286	$23,558,985	$24,702,156	$25,901,442	$27,159,618	$28,479,596	$29,864,432	$31,317,336
2 Modified – Station 47+843 to Station 50+770	2.927	Approach Road to HPP 4-1(5)	$8,600,000	$1,500,000	$10,100,000	$10,145,000	$10,449,350	$10,939,991	$11,454,208	$11,993,153	$12,558,033	$13,150,113	$13,770,722	$14,421,255	$15,103,175	$15,818,016
4 Modified – Station 41+100 to Station 42+060	0.96	Beartooth Ravine	$13,300,000	$1,600,000	$14,900,000	$14,948,000	$15,396,440	$16,132,313	$16,903,962	$17,713,143	$18,561,704	$19,451,579	$20,384,802	$21,363,506	$22,389,928	$23,466,419

Construction costs for projects from 2011 to 2012 use 0% inflation/year, from 2012 to 2013 use 3.0% inflation/year and from 2013 to 2014 and subsequent years use 5% inflation/year.

Engineering, environmental, and construction engineering costs do not include inflation from 2011 to 2013. Use 3% inflation/year from 2013 to 2014 and subsequent years.

Projects are listed in no particular order of precedence.